

## Sessions for Tuesday, May 23

**Tuesday, 08:00 AM - 09:30 AM**

### Invited Session

133	Tuesday, 08:00 AM - 09:30 AM, Celebration 1	Track: Agriculture and Food Supply Chains
	Invited Session: <b>Panel: Challenges and Research Opportunities in Agriculture and Food Supply Chains</b>	
	Chair(s): Arzum Akkas      Mert Hakan Hekimoglu	

115-1884 Panel: Challenges and Research Opportunities in Agriculture and Food Supply Chains

Yanchong Zheng, Professor, Massachusetts Institute of Technology, United States

Burak Kazaz, Professor, Whitman School of Management, United States

Deishin Lee, Associate Professor, Ivey Business School, Western University, Canada

Academic experts in the domain of agriculture and food supply chains discuss challenges and research opportunities.

### Invited Session

134	Tuesday, 08:00 AM - 09:30 AM, Celebration 2	Track: Behavioral Operations Management
	Invited Session: <b>Challenges in Behavioral Operations Management</b>	
	Chair(s): Yao Jin	

115-0117 Impacts of Panic Buying on Supply Chain and the Interventions Towards Panic Buying

Ziqi Yun, Student, University of Warwick, United Kingdom

Mucahit Ozden, Post Doc/Researcher, University of Warwick, United Kingdom

Ahmed El-Said, Assistant Professor, Education, United Kingdom

Mujthaba Ahtamad, Assistant Professor, Education, United Kingdom

Forty-one relevant articles were analysed. Using the thematic analysis method, five significant impacts were extracted from the selected articles: the surge in demands, the shortage of panic buying items, the price increases, the delay or disruption in distribution and the changing in consumers' purchasing behaviour.

115-1301 Nudge Drivers to Stay; A behavioral perspective

Adebola Akintomide, Student, University of North Texas, United States

Michel Fathi, Assistant Professor, University of North Texas, United States

There are work challenges, insufficient compensation, and management style as reasons for driver attrition. Data was collected from a bus company(X) in the United States for preliminary analysis. The company's challenges are why drivers leaving in the first six months of hiring and looking for effective ways to retain drivers.

115-1750 Enhancing Organizational Identification for Emotional Labor: Implications for Managing Call Centers

Hyojeong Kim, CEO, Other, South Korea

Nagesh Murthy, Professor, University of Oregon, United States

Kwangtae Park, Professor, KUBS(Korea University Business School), South Korea

Anurag Agarwal, Professor, Florida Gulf Coast University, United States

In this paper, we study the antecedents of organizational identification of employees in emotional labor settings, such call centers. We use primary and secondary data to test hypothesis about the perceived organizational support for protection from rude customers and servant leadership style of supervisors. We also discuss managerial implications.

### Contributed Session

135	Tuesday, 08:00 AM - 09:30 AM, Celebration 3	Track: Healthcare Operations Management
	Contributed Session: <b>Policy Issues in Healthcare</b>	
	Chair(s): Sanjay Ahire	

115-0088 System dynamics modeling for exploring the structural problems of FDA's medical device recalls

Chung-Cheng Chen, Assistant Professor, National Central University, Taiwan

Dong-Shang Chang, Professor, National Central University, Taiwan

Chia-Chen Yeh, Student, National Central University, Taiwan

Medical device recalls affecting the quality of medical care and the patient's health. The R&D investment of device manufacturers and the technical support of suppliers cannot effectively reduce device recalls. This study uses the methodology of systems dynamics to explore the structural issues of device recall from a macro perspective.

115-0475 COVID-19 and Health Information Exchange - State Designated Entity Type

C. Christopher Lee, Professor, Central Connecticut State University, United States

Young Sik Cho, Associate Professor, Jackson State University, United States

Yong-Taek Min, Assistant Professor, Florida Gulf Coast University, United States

## Tuesday, 08:00 AM - 09:30 AM

There are four different types of State Designated Entity (SDE) for Health Information Exchange (HIE). This paper investigated if the HIE-SDE type made significant differences in the State response to the COVID-19. ANOVA model analyzed COVID-19 response data on CDC website.

115-0589 Adaptive Approval: Improving Timely Access to Treatments for Unmet Clinical Needs

Wendy Olsder, Assistant Professor, Erasmus University Rotterdam, Netherlands

Tugce Martagan, Associate Professor, Technische Universiteit Eindhoven, Netherlands

Jan Fransoo, Professor, Tilburg University, Netherlands

Carla Hollak, Professor, Amsterdam Medical Center, Netherlands

Adaptive approval is a novel regulatory program that enables earlier patient access to new drugs for rare diseases; however, industry participation has been surprisingly low. Our results inform healthcare policymakers on ways to redesign adaptive approval programs such that both firm participation and patients' access to new drugs will increase.

115-1393 Cancer Clinical Trial Selection and Recruitment Process Improvement at Hollings Cancer Center.

Sanjay Ahire, Professor, University of South Carolina, United States

This paper presents a methodology for selecting high potential cancer clinical trials and patient recruitment using a combination of secondary data, and subject matter experts' judgment, and external benchmarking. We discuss the organizational and professional biases and mental models that can pose a challenge in prioritizing life-saving trials.

## Contributed Session

136	Tuesday, 08:00 AM - 09:30 AM, Celebration 4	Track: Healthcare Operations Management
	Contributed Session: Adoption and Use of AI in Healthcare	
	Chair(s): Yufei Huang	

115-0413 Triage III patients classification using machine learning techniques: Hospital del Bordo case

Jhon Segura-Dorado, Student, Corporación Universitaria Comfacaucua - Unicomfacaucua, Colombia

Helmer Paz Orozco, Professor, Corporación Universitaria Comfacaucua, Colombia

Juan Machuca, Professor, Universidad de Lima, Peru

Mario Chong, Professor, Universidad del Pacifico, Brazil

Triage is a patient classification system in emergency departments that allows quick and organized medical procedures. This research methodology focuses on classification methods (K-NN, Naive Bayes, individual trees, and random forest algorithms) to enable patient flow management with demand and clinical constraints. The case study in Colombia's medical system.

115-0887 Human And AI Collaboration - Incorporating AI as an enablement Into Adverse Event Identification

PROMIT ROY, Associate Director Business Operations and Innovation, Trinity College Dublin and Novartis Ireland Limited, Ireland

Yufei Huang, Associate Professor, Trinity College Dublin, Ireland

Junchi Ye, Student, Trinity College Dublin, Ireland

Introducing AI based technology in a Pharmaceutical firm working together with the data science and IT (Information Technology) team to create an AI and ML-based user-centric Chat Bot that captures real-time AE from chats used by the patients to interact. We observe a significant improvement in AE detection and monitoring.

115-1006 Optimal resource allocation for high-need high-cost patients by accurate cost prediction using deep learning models

Mohammad Morid, Assistant Professor, Santa Clara University, United States

Accurate and fair patient cost predictions are essential to support effective decision among regarding resource allocation that ca result in healthcare payor cost savings. To improve the performance of cost prediction models this study proposes a novel deep learning method to effectively leverage the temporal patterns underlying patient medical data.

115-1658 Technostress and Artificial Intelligence Adoptions in Healthcare

Hulya Yazici, Professor, Florida Gulf Coast University, United States

Chrissann Ruehle, Senior Lecturer, Florida Gulf Coast University, United States

Yong-Taek Min, Assistant Professor, Florida Gulf Coast University, United States

We examine the effects of AI characteristics, technostress creators, and inhibitors on healthcare staff outcomes. We propose a mixed methods approach to analyze quantitative survey data and qualitative data from semi-structured interviews to better understand the employee experience when AI is introduced into the healthcare workforce.

## Invited Session

137	Tuesday, 08:00 AM - 09:30 AM, Celebration 5	Track: Healthcare Analytics
	Invited Session: Value-based Care Models and Performance Impacts	
	Chair(s): Xin Ding	

115-0133 Does Pursuing Hospital Accreditation Tend to Improve Hospital Technical Efficiency?

Aaron Bonnett, Student, Texas A&M University College Station, United States

Gregory Heim, Professor, Texas A&M University College Station, United States

Rogelio Oliva, Professor, Texas A&M University College Station, United States

## Tuesday, 08:00 AM - 09:30 AM

We use stochastic frontier analysis (SFA) to address whether hospital accreditation is associated with hospital efficiency. Our main findings indicate hospital accreditation is associated with an increase in hospital efficiency. We provide one of the first panel-based SFA analyses of the associated impact that hospital accreditation has on hospital efficiency.

### 115-0469 Hospital and Surgeon Experience and Patient Health Outcomes after Coronary Artery Bypass Graft Surgery

Jingyun (Jenny) Li, Assistant Professor, California State University Stanislaus, United States  
Indranil Bardhan, Professor, University of Texas Austin, United States  
Suresh Sethi, Professor, University of Texas Dallas, United States  
Steves Ring, Professor, UT South Western, United States

We study three drivers of CABG readmission risk - case volume of hospitals and surgeons, variation in surgeon volume, and surgeon familiarity with hospitals. Drawing on patient datasets of CABG surgeries spanning three years, we study the relationships between hospital and surgeon case volume, readmission risk, and post-operative LOS.

### 115-0951 Benchmarking and Performance Progression under VBP Program Structure

Xin Ding, Assistant Professor, Rutgers Business School, United States

This paper examines how hospitals progress toward performance frontiers over time with a panel dataset comprising acute care hospitals in California between 2011 and 2019. We find that benchmarking drives performance improvements and performance progression rates are subject to the degree of operating focus and market competition.

### 115-1307 Conditional Approval & Value-Based Pricing for New Health Technologies

Ozge Yapar, Assistant Professor, Indiana University Bloomington, United States  
Stephen Chick, Professor, INSEAD, France  
Noah Gans, Professor, University of Pennsylvania, United States

Conditional-approval schemes postpone a new treatment's reimbursement decisions until after the collection of post-marketing data that can mitigate uncertainty regarding the treatment's cost-effectiveness. Our game-theoretic model examines when to use conditional approval and how to negotiate the post-marketing trial design, market access and pricing during and after the trial.

## Invited Session

138	Tuesday, 08:00 AM - 09:30 AM, Celebration 6	Track: POM-Finance Interface
	Invited Session: <b>Blockchain Technology Applications</b>	
	Chair(s): Jiri Chod	

### 115-0166 Digital Voucher Financing and Transfer in a Three-echelon Supply Chain

Yaobin Wu, Student, Fudan University, China  
Xiangfeng Chen, Professor, Fudan University, China  
Xun Xu, Associate Professor, California State University Dominguez Hills, United States  
Gangshu Cai, Professor, Santa Clara University, United States

Blockchain technology has been widely adopted in supply chain finance with the emergence and rapid development of financial technology. In this study, we focus on two of the financing programs facilitated by blockchain – digital voucher financing and transfer – and compare them with traditional bank financing.

### 115-0938 Trusting the Trust Machine: How does Blockchain Enhance Credibility in Supply Chain Finance

Hua Song, Professor, Renmin University of China, China  
Wenyi Liu, Student, Renmin University of China, China  
Siqi HAN, Student, Renmin University of China, China

Blockchain technology was recognized as a “trust machine” to the trust crisis in the supply chain finance. We adopt the multiple case method to explore the dynamic process that how blockchain-enabled capabilities reconfiguration and process reconfiguration reconstruct trust relationship in the supply chain finance network.

### 115-1055 Financing Platforms with Cryptocurrency: Token Retention, Sales Commission, and ICO Caps

Rowena Gan, Assistant Professor, Southern Methodist University, United States  
Gerry Tsoukalas, Associate Professor, Boston University, United States  
Serguei Netessine, Professor, The Wharton School, United States

Decentralized service platforms usually raise capital via initial coin offerings (ICOs). By examining the interplay of ICO design choices of such platforms including token retention, platform commission and ICO cap, we provide recommendations to firms with different visions on how to fund platforms under network effects.

### 115-2028 Resale with Non-Fungible Tokens

Yao Cui, Assistant Professor, Cornell University, United States  
Jingchen Liu, Assistant Professor, Nanjing University, China

In this paper, we study NFTs as a novel means to facilitate resale. We characterize market conditions for NFTs to create value over traditional resale markets and prescribe how to design NFT features (such as the royalty fee) to maximize its value.

**Contributed Session****139**

Tuesday, 08:00 AM - 09:30 AM, Celebration 7

Track: Sustainable Operations Management

Contributed Session: **Strategic and Policy Issues in Sustainable Operations**

Chair(s): Weihua Zhang

115-0576 The impact of government policy on the competition between OEMs and independent remanufacturers (IRs)

Gendao Li, Professor, Changchun University of Science and Technology, China

Marc Reimann, Professor, University of Graz, Austria

Weihua Zhang, Assistant Professor, University of Northumbria, United Kingdom

This study investigates supply chains that consist of OEMs either implementing or not implementing remanufacturing and IRs only remanufacturing used products. Governments levy taxes on both new and remanufactured products as well as subsidising remanufactured products. Mathematical programming models are employed to analyse the various impacts of different government policies.

115-1516 Rapid experimentation as boundary object to design circular business models

Hannu Makkonen, Professor, University of Vaasa, Finland

Erwan Mouazan, Post Doc/Researcher, University of Vaasa, Finland

This paper provides insight into how ecosystem actors designing complex circular business models may benefit from shedding light on the boundary work practices taking place, more specifically when developing rapid experimentation leading to bridge the design-implementation gap of circular business models.

115-1725 Green entrepreneurial orientation, institutional resources and organizational performance. A resource orchestration approach.

Okyere Anim Barima, Student, Kwame Nkrumah University of Science and Technology, Ghana

Nathaniel Boso, Professor, Kwame Nkrumah University of Science and Technology, Ghana

David Asamoah, Associate Professor, Kwame Nkrumah University of Science and Technology, Ghana

Abdul-Samed Muntaka, Senior Lecturer, Kwame Nkrumah University of Science and Technology, Ghana

Emmanuel Quansah, Lecturer, Kwame Nkrumah University of Science and Technology, Ghana

Research has proven that aside intrinsic motivation, other factors that could help shape up green entrepreneurial orientation (GEO) include institutional context and resources. This study addresses how organizations could orchestrate GEO and institutional resources to result in enhanced performance under different conditions of power asymmetry and financial slack.

115-1888 Improving supply chain sustainability by due diligence acts? Insights from a German case

Marcus Brandenburg, Professor, Flensburg University of Applied Sciences, Germany

Germany's act for due diligence in supply chains (SCs) represents a strong governmental intervention into global operations and SC management which is worth being studied. Expert interviews with managers reveal risk factors and opportunities as well as performance impacts and implementation issues. A conceptual framework and research avenues are outlined.

**Invited Session****140**

Tuesday, 08:00 AM - 09:30 AM, Celebration 8

Track: Sustainable Operations Management

Invited Session: **Sustainable Operations in Developing Economies**

Chair(s): Gonzalo Romero Andre Calmon

115-0638 Innovative Business Models in Ocean-Bound Plastic Recycling

Opher Baron, Professor, University of Toronto, Canada

Gonzalo Romero, Assistant Professor, University of Toronto, Canada

Sean Zhou, Professor, Chinese Univ of Hong Kong, Hong Kong, China

Zhuoluo Zhang, Post Doc/Researcher, Chinese Univ of Hong Kong, Hong Kong, China

We study novel business models of organizations aiming to tackle ocean plastic pollution with triple bottom line objective -- profit, environmental and social impacts. They sell (a) plastic offsets and (b) segregated plastic. We analyze supply chain models of (a), (b) or both. We use data to unveil additional insights.

115-0639 Operational Challenges for EMS Platforms in Developing Economies

Pieter van den Berg, Associate Professor, Erasmus University Rotterdam, Netherlands

Andre Calmon, Assistant Professor, Scheller College of Business, United States

Andreas Gernert, Assistant Professor, Kuehne Logistics University, Germany

Stef Lemmens, Assistant Professor, Erasmus University Rotterdam, Netherlands

Gonzalo Romero, Assistant Professor, University of Toronto, Canada

Many developing economies lack the health-emergency infrastructure of developed countries. Our industry partner Flare (Nairobi, Kenya) coordinates existing ambulance providers through a platform. Flare aggregates the available ambulance capacity and demand for emergency services. Since ambulance platforms make use of independent providers, the ambulance fleet can only be partially controlled.

115-0868 Weaving a Prosperous Future: A Data-driven Approach to Improve Artisans' Productivity

Ben Liu, Student, New York University, United States

Divya Singhvi, Assistant Professor, New York University, United States

Somya Singhvi, Assistant Professor, University of Southern California, United States

## Tuesday, 08:00 AM - 09:30 AM

Xinyu Zhang, Student, New York University, United States

This work is in close collaboration with a social enterprise that works with thousands of women artisans from low-income households in India. Using a multi-method approach that combines field-based research, empirical analysis and optimization tools, we show that regular supervision can significantly improve artisans' productivity.

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### 115-0910 Storing Carbon in Closed-Loop Supply Chain

Donghyun (Daniel) Choi, Student, Georgia Institute of Technology, United States

Andre Calmon, Assistant Professor, Scheller College of Business, United States

Beril Toktay, Professor, Georgia Institute of Technology, United States

Motivated by a manufacturing company that uses bio-based materials, we model a firm that optimizes a product's material composition and the amount of carbon offsets it must purchase to achieve carbon neutrality. By analyzing how different carbon accounting mechanisms shape the firm's decisions, we unravel managerial insight for carbon-neutral operations.

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## Contributed Session

141	Tuesday, 08:00 AM - 09:30 AM, Celebration 9	Track: Supply Chain Management
	Contributed Session: Supply Chain Collaboration	
	Chair(s): Osman Alp	

### 115-0224 Coexistence or encroachment in industrial symbiosis

Xiaoying Tang, Student, Southeast University, China

Osman Alp, Associate Professor, University of Calgary, Canada

Yong He, Professor, Southeast University, China

This paper considers an industrial symbiosis (IS) system composed of a supplier and a manufacturer, and examines the optimal production strategies of both the supplier and the manufacturer under the coexistence mode and encroachment mode and investigates the mode choice of IS for the supplier.

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### 115-1415 Supply Chain Collaboration: Two is a party, three is a crowd?

Bo Van Der Rhee, Professor, Nyenrode University, Netherlands

Jack Van Der Veen, Professor, Nyenrode University, Netherlands

Ata Zare, Assistant Professor, Nyenrode Business University, Netherlands

Andriy Sirchenko, Assistant Professor, Nyenrode Business University, Netherlands

Venu Venugopal, Professor, Nyenrode University, Netherlands

Supply chain collaboration is believed to be beneficial to all entities, yet in practice end-to-end collaboration is rarely witnessed. We explain this by demonstrating that in multi-echelon supply chains collaborating with the neighboring entity leads to win-win, yet it is better to wait for other entities to move first.

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### 115-1416 The practice of Supply Chain Collaboration: Soft is Hard?

Bo Van Der Rhee, Professor, Nyenrode University, Netherlands

Jack Van Der Veen, Professor, Nyenrode University, Netherlands

Ata Zare, Assistant Professor, Nyenrode Business University, Netherlands

Bin Yu, Assistant Professor, Nyenrode University, Netherlands

Venu Venugopal, Professor, Nyenrode University, Netherlands

Although theoretically Supply chain collaboration is beneficial to all entities, in practice it does not happen to the extent expected. To explain this gap, we make an inventory of requirements and impediments to establish collaboration using the ability-motivation-opportunity framework. It is concluded that 'soft' (behavioral) factors form the key hurdles.

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### 115-1804 Supplier Encroachment with Decision Biases

Xiaolong Guo, Associate Professor, University of Science and Technology of China, China

Zenghui Su, Student, University of Science and Technology of China, China

Quan Zheng, Associate Professor, University of Science and Technology of China, China

To investigate a supply chain containing the retailer and direct selling channel, we considered biases of retailer and supplier. Here, we developed a game-theoretic model. By analyzing the model, we found that the supplier's bias always hurt herself while the retailer could benefit from his own underestimation bias.

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## Invited Session

142	Tuesday, 08:00 AM - 09:30 AM, Celebration 10	Track: Supply Chain Management
	Invited Session: Analytics in Operations and Supply Chain	
	Chair(s): Ruihao Zhu	

### 115-0018 Data Sharing and Analytics in the Supply Chain: A Theoretical Analysis

Yue Li, Assistant Professor, Shandong University, China

I consider a theoretical model where data on demand is readily available, and a newsvendor can analyze the data (at a cost) to learn a noisy signal before ordering from a producer. I derive the trade-offs of data sharing and data analytics. Two sources of equilibrium learning inefficiencies are identified.

## Tuesday, 08:00 AM - 09:30 AM

### 115-0395 Multi-Item Online Order Fulfillment in a Two-Layer Network

Yanyang Zhao, Student, University of Chicago, United States  
Xinshang Wang, Research Scientist, Alibaba Group, United States  
Linwei Xin, Associate Professor, University of Chicago, United States

We study a real-time online order-fulfillment problem. An order can be split and fulfilled from multiple warehouses at an additional cost. We focus on an RDC-FDC network that major e-retailers have implemented in practice. We analyze the performance of a simple myopic policy and provide theoretical bounds on its performance.

### 115-0671 Concentration or Democratization Effects of an Online Marketplace

Rakesh Allu, Student, Cornell University, United States  
Vishal Gaur, Professor, Cornell University, United States

Online B2B marketplaces brings together sellers and buyers from geographically dispersed markets. Using a large-scale dataset containing millions of buyer-seller transactions in an online B2B marketplace, we empirically investigate whether such integration of markets leads to concentration or democratization of market power and then design the platform's optimal marketing strategy.

## Invited Session

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Tuesday, 08:00 AM - 09:30 AM, Celebration 11

Track: Social Media and Web 2.0

Invited Session: **Power of Social Media**

Chair(s): Yumei He

### 115-0080 Factual vs. Non-Factual Awareness During Emergency Response on Social Media

Abhishek Ray, Assistant Professor, George Mason University, United States  
Chahat Raj, Student, George Mason University, United States  
Hemant Purohit, Assistant Professor, George Mason University, United States

We use the opinion dynamics framework to build a game-theoretic model on a representative social network consisting of multiple nodes, one of which is the emergency operations manager. Using both dissemination and refutation as strategies, we establish conditions under which either strategy is optimal.

### 115-1232 Effects of Real-Time Sales Data on Sales Performance: A Randomized Field Experiment in Livestream Selling

Yumei He, Assistant Professor, Tulane University, United States  
Lingli Wang, Assistant Professor, Beijing university of post and telecommunications, China  
Ni Huang, Associate Professor, University of Miami Business School, United States  
Yan Sun, Data analytics manager, Alibaba Group, China

A randomized field experiment in partnership with Alibaba finds that the sales of presale products in the treatment group approximately increased by 27.5% compared with those presale products sold by streamers in the control group, due to streamers' improvisation on streaming tactics.

### 115-1883 Frustrated but Politely: the Effects of Emotions and Politeness on the Success of Educational Fundraising.

Yasamin Hadavi, Student, Baylor University, United States  
Xunyi Wang, Assistant Professor, Baylor University, United States

We aim to identify factors of fundraising success using data from a leading educational crowdfunding platform. We found that impoliteness expressed in the request description is negatively related to fundraising success and positive emotions have a negative impact on fundraising success, whereas negative emotions have a positive impact on it.

### 115-1931 Discovering a Visits-based Local Market Structure using Mobility and Social Media Data

Yan Leng, Assistant Professor, The University of Texas at Austin, United States  
Ashish Agarwal, Associate Professor, The University of Texas at Austin, United States

Firms interact with their competitors and complementors within a multi-firm environment. We formulate a new problem to discover local market structure---complementary and substitutions based on visits---for a particular store or service outlet. We develop a scalable framework, which relies only on social media and mobility and social media data.

## Invited Session

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Tuesday, 08:00 AM - 09:30 AM, Celebration 12

Track: Humanitarian Operations and Crisis Management

Invited Session: **Tutorial on Humanitarian Operations**

Chair(s): Harwin De Vries

### 115-2138 Panel: Teaching Humanitarian Operations

Harwin De Vries, Assistant Professor, Rotterdam School of Management, Netherlands  
Maria Besiou, Professor, Kuehne Logistics University, Germany  
Jarrod Goentzel, Senior Lecturer, MIT, United States  
Diego Vega, Assistant Professor, HUMLOG Institute, Finland  
JOAKIM KEMBRO, Associate Professor, Lund University, Sweden

In this session, an experienced and diverse list of panelists from academia will discuss teaching strategies for a course on humanitarian operations/humanitarian logistics. The panel will concentrate on topics, materials, risks, and best teaching practices.

## Tuesday, 08:00 AM - 09:30 AM

### Contributed Session

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Tuesday, 08:00 AM - 09:30 AM, Celebration 13

Track: Teaching/Pedagogy in POM

Contributed Session: Online Education and Digital Technology

Chair(s): Ana Rosado Feger

115-0602 Dark side of digital environments - Barriers preventing information sharing between students in online teaching

Pia Kastl, Lecturer, University of Bamberg, Germany

Lars Friedrich, Student, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany

Kai-Ingo Voigt, Professor, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany

Based on the media richness and social presence theories, we examined the willingness to share information in different learning environments. We conducted a survey in online and face-to-face courses (n=283). The results showed that exchange of information was significantly higher in face-to-face due to the perception of higher learning quality.

115-1491 Digital Technology's impact on uneven access to tertiary education

Peter Darko, Student, Kwame Nkrumah University of Science and Technology, Ghana

Marvin Owusu Ansah, Chief Operations Officer, Peadato Research Services, Ghana

Bismark Agyei, Chief Operations Officer, Peadato Education Services, Ghana

Bridget Appiah, Research Associate, Peadato Research Services, Ghana

Sampson Adom, Research Associate, Peadato Research Services, Ghana

The use of digital technologies has improved structural changes in educational systems; however, it is unclear whether digital technologies lead to equitable access to all. This study seeks to access how digital technologies impact uneven access to education.

115-1653 Creating Culture in Online Education

Ana Rosado Feger, Associate Professor, Ohio University, United States

Amy Taylor-Bianco, Professor, Ohio University, United States

Online education has expanded to every level of the academic enterprise. While students seek out online education for the enhanced flexibility and access, we note limitations in developing belonging and affinity to create more effective remote teams. We propose a model for developing institutional culture in an online setting.

### Invited Session

146

Tuesday, 08:00 AM - 09:30 AM, Celebration 14

Track: Service Operations

Invited Session: Student Best Paper Competition 1

Chair(s): Benjamin Lawrence

115-0033 Multi-Armed Bandits with Endogenous Learning Curves: An Application to Split Liver Transplantation

Yanhan (Savannah) Tang Tang, Student, Carnegie Mellon University, United States

Andrew Li, Assistant Professor, Carnegie Mellon University, United States

Alan Scheller-Wolf, Professor, Carnegie Mellon University, United States

Sridhar Tayur, Professor, Carnegie Mellon University, United States

Inspired by experience-based learning, we consider a multi-armed bandit problem, where endogenous, parametric learning curves (LC) are embedded in the arms' reward functions. We propose the FL-UCB algorithms that can incorporate LC's parametric forms, prove its logarithmic regret, demonstrate its advantages, and apply it to the split liver transplantation problem.

115-1820 A Data-driven Approach to Improve Artisans' Productivity

Ben Liu, Student, New York University, United States

Divya Singhvi, Assistant Professor, New York University, United States

Somya Singhvi, Assistant Professor, University of Southern California, United States

Xinyu Zhang, Student, New York University, United States

Collaborating with a rug-manufacturing social enterprise of women artisans in rural India, we consider the problem of optimizing supervisor visit and develop a novel predict-then-optimize framework to improve productivity. We show the existence of a polynomial-time algorithm with competitive ratio of  $1-1/\sqrt{e}$  and test the proposed methodology on actual data.

115-2141 Fast or Slow? Competing on Publication Frequency

Lin Chen, Student, INSEAD, France

Guillaume Roels, Professor, INSEAD, France

For information goods, longer publication cycles are more economical, but result in less timely information. Using a game-theoretic model, we characterize how information providers set their publication cycles and prices under competition. We show that firms should anticipate nonmonotone or abrupt changes in publication strategy in the process of digitalization.

115-2142 Can Predictive Technology Help Improve Acute Care Services? Investigating the Impact of Virtual Triage Adoption

Jiatao Ding, Student, INSEAD, Singapore

Michael Freeman, Assistant Professor, INSEAD, Singapore

Sameer Hasija, Professor, INSEAD, Singapore

## Tuesday, 08:00 AM - 09:30 AM

Healthcare and technology companies have been developing and deploying virtual triage tools to help patients make better and more efficient self-triage decisions. This paper develops a queueing game model to investigate the impact of virtual triage in acute care services and optimal virtual triage accuracy to maximize its efficacy.

### Invited Session

**148** Tuesday, 08:00 AM - 09:30 AM, Coral Spring 1 Track: Emerging Topics in Operations Management  
Invited Session: Navigating Trade-Offs: Fostering Worker Productivity and Performance in Service Settings  
Chair(s): Paige Tsai

115-0364 Algorithm Reliance Under Pressure: The Effect of Customer Load on Service Workers

Clare Snyder, Student, University of Michigan Ann Arbor, United States  
Samantha Keppler, Assistant Professor, University of Michigan Ann Arbor, United States  
Stephen Leider, Professor, University of Michigan Ann Arbor, United States

Algorithms may provide helpful advice in service settings, but its users (workers) cannot initially know if it will benefit them personally. Using laboratory experiments, we find that customer load drives workers' algorithm reliance and that this is partly because high customer loads promote workers' learning about algorithm quality.

115-1147 Creative Task Constraints and Knowledge Worker Productivity

Samer Charbaji, Student, University of Michigan Ann Arbor, United States  
Stephen Leider, Professor, University of Michigan Ann Arbor, United States  
Roman Kapuscinski, Professor, University of Michigan Ann Arbor, United States

Knowledge workers often work on creative tasks with an originality goal and a usefulness constraint. We conduct a lab experiment to examine how increasing usefulness constraints affect participants' creative output. Our results show a non-linear relationship between originality and usefulness and that "artificially" lowering constraints can sometimes improve employee performance.

115-1240 Leveraging the Experience: Exploration and Exploitation in Gig Worker Learning Process

Jayashankar Swaminathan, Professor, University of North Carolina Chapel Hill, United States  
Yuqian Xu, Assistant Professor, UNC Chapel Hill, United States  
Hongyan Dai, Associate Professor, Central University of Finance And Economics, China

On-demand delivery through gig platforms is ushering in a new era of business operations. Utilizing data from one leading on-demand delivery platform in Asia, this paper seeks to investigate how experience affects worker performance in this new business setting.

### Contributed Session

**149** Tuesday, 08:00 AM - 09:30 AM, Coral Spring 2 Track: Emerging Topics in Operations Management  
Contributed Session: Transparency and Diversity, Equity, and Inclusion in the Workforce  
Chair(s): Tomás Harrington

115-0249 Differentiating on Diversity: How Disclosing Workforce Diversity Improves Brand Attitudes

Maya Balakrishnan, Student, Harvard Business School, United States  
Jimin Nam, Student, Harvard Business School, United States  
Ryan Buell, Professor, Harvard Business School, United States

We examine how consumers perceive the strategic decision companies make regarding whether to disclose workforce diversity information. We find no evidence that a company's disclosure of its workforce diversity data negatively affects attitudes or perceived company commitment to diversity, even when it reveals racial disparities across job categories.

115-0591 Water Embodiment-Gender-Skills: A New Nexus in Food Systems?

Ettore Settanni, Post Doc/Researcher, University of Cambridge, United Kingdom  
Tomás Harrington, Associate Professor, University of East Anglia, United Kingdom

This study explores how publicly available input-output data might support human agency and the design of empowerment projects. We present intuitive analytics around the water intensity of crop production in India- linked to gender and skills- to navigate complex patterns of production and consumption in global value networks.

115-1221 A framework for ageing workforce management at international level

Niloofar Katirae, Post Doc/Researcher, Padova University, Italy  
Nicola Berti, Post Doc/Researcher, Padova University, Italy  
Ilenia Zennaro, Assistant Professor, Padova University, Italy  
Ajay Das, Professor, Baruch College, United States  
Debra Dobbs, Associate Professor, University of South Florida, United States

A rapidly aging workforce is a reality that confronts many businesses and governments with a variety of challenges. Governments and companies seek solutions. Our study gathers data globally to develop a framework that identifies critical benchmarks on ageing workforce management practices and policies at three levels: company, country, and international.

115-1799 Operational Transparency: Showing We are Different

Simai He, Professor, Shanghai Univ. of Finance and Economics, China



## Tuesday, 08:00 AM - 09:30 AM

Chris Ryan, Associate Professor, University of British Columbia, Canada

Danli Yao, Assistant Professor, University of Shanghai For Science & Technology, China

Meng Zheng, Student, University of British Columbia, Canada

Operational transparency, an emerging operational strategy, provides customers with information about firms' internal operations. We develop a model that captures operational transparency's mean-shifting and variance-reduction effects in a competition environment. We find that more heterogeneous markets will implement operational transparency. Also, symmetric firms may choose different strategies due to competition.

### Contributed Session

150	Tuesday, 08:00 AM - 09:30 AM, Blue Spring 1	Track: Supply Chain Risk Management
	Contributed Session: Block Chain Technology/Supply Chain Risks	
	Chair(s): Rizwan Manzoor	

115-0400 Blockchain-backed Resilient Strategies in a Supply Chain under disruption

Rizwan Manzoor, Student, IIM Jammu, India

B.S. Sahay, Professor, Indian Institute of Management Jammu, India

Kapil Gumte, Assistant Professor, Indian Institute of Management Jammu, India

Sujeet Singh, Assistant Professor, Indian Statistical Institute Hyderabad, India

Current study investigates a disruption-affected risk-averse manufacturer [C-VaR (Conditional Value-at-Risk)] and fairness-concerned distributor's behaviour [unfairness-aversion utility function] for three-echelon supply-chain (SC) to establish resilience through blockchain-backed strategies of visibility and recovery. A scenario-based integrated multi-objective model (cost and shortage utility) is developed, and an analytical case study is performed.

115-0625 A new theory to explain the process of disruption management: coping

Nezih Altay, Professor, Depaul University, United States

Raktim Pal, Professor, James Madison University, United States

This is a conceptual paper and uses a theory building approach. It develops a conceptual framework adapted from coping theory in psychology to explain supply chain disruption management. It can help revise supply chain disruption management with an alternative lens that has not been applied before in this domain.

115-1802 Risk and trust as behavioral decision-making factors in supply chain risk management

Ying Liao, Associate Professor, East Carolina University, United States

Christopher Kwaramba, Assistant Professor, East Carolina University, United States

Seth Ketron, Assistant Professor, University of North Texas, United States

This paper investigates the influences of risk and trust as behavioral decision factors in supply chain risk management. Specifically, we explore the interactive effects among buyer and supplier risk cultures, perceived supply disruption risk, and trust in the supplier on a buyer's decision on safety stock quantity.

115-1868 Managing Supply Chain Risks using Blockchain Technology: Institutional Drivers, Strategic Choices and Impact

Run Niu, Associate Professor, Webster University, United States

Ying Fan, Associate Professor, University of Colorado Colorado Springs, United States

Maria Madlberger, Professor, Webster University, Austria

The study explores the development of Blockchain technology (BCT) for supply chain risk management (SCRM) based on business case studies. Institutional theory, operations strategy literature, and field data are utilized to develop a conceptual framework that links institutional drivers, strategic choices, and the strategic impact of BCT on SCRM.

### Invited Session

151	Tuesday, 08:00 AM - 09:30 AM, Blue Spring 2	Track: Empirical Research in Operations Management
	Invited Session: Empirical Research on Regulatory and Management Policies in Operations Management	
	Chair(s): Zachary Wright	

115-0193 Changing Standards And Drug Shortages In The Pharmaceutical Industry

Ivan Lugovoi, Assistant Professor, Kühne Logistics University, Germany

Enno Siemsen, Professor, University of Wisconsin, United States

Matching supply and demand is a fundamental task of supply chain management. Failure to supply a product is painful for consumers, but particularly so in the pharmaceutical industry, where the product is often necessary for the treatment of life-threatening diseases. Drug shortages, therefore, pose significant public health threats.

115-0312 Categorization of Environment Sustainable Practices and Associations with Firm Performance

Anqi Wu, Assistant Professor, Florida International University, United States

Ramanath Subramanyam, Associate Professor, University of Illinois Urbana-Champaign, United States

Gopesh Anand, Associate Professor, University of Illinois Urbana-Champaign, United States

In the climate change context, this study categorizes sustainable practices adopted by firms and associates adoption of each of the resulting practice bundles with firms' financial performance. Results from our empirical analyses suggest heterogeneity in the association between practice adoption and financial returns across firms with different emission impacts.

## Tuesday, 08:00 AM - 09:30 AM

115-0955 Effectiveness of Inspection Types for Quality Outcomes

Zachary Wright, Student, Ohio State University, United States

John Gray, Professor, Ohio State University, United States

Regulatory inspections play an important role in maintaining acceptable quality standards for manufacturers. Contextual heterogeneity leaves it unclear as to which types of inspections will prove to be most effective in different situations. This study aims to explore the relative effectiveness of differing inspection types across contexts.

115-1707 The Effects of Collectivism and Organizational Tenure on the Emergence of Pre-Release Digital Piracy

Brett Massimino, Associate Professor, Virginia Commonwealth University, United States

Sean Handley, Professor, University of South Carolina, United States

We empirically investigate two forms of (national) cultural collectivism - in-group and institutional - and their interactions with the organizational tenure of digital product development team on the pre-release piracy of the product. Data are drawn from video game products released between 2000 and 2019.

### Invited Session

152	Tuesday, 08:00 AM - 09:30 AM, Rainbow Spring 1	Track: Empirical Research in Operations Management
	Invited Session: Empirical Research Using Quasi-Experimental Designs	
	Chair(s): In Joon Noh	

115-1091 Better Call a Mechanic: An Empirical Examination of Real-Time Feedback and Automotive Repair Service Outcomes

Mariia Petryk, Assistant Professor, George Mason University, United States

We analyze the real-time feedback application in a major car dealership in the U.S. Using the DID methodology, we identify several effects: the submissions increase due to the app accessibility; the submission length and readability decrease due to the real-time mode. We link our findings to the IS success model.

115-1514 Does Legalizing Marijuana Affect Operational Performance?

Suvrat Dhanorkar, Associate Professor, Penn State University State College, United States

Suresh Muthulingam, Professor, Penn State University University Park, United States

In Joon Noh, Assistant Professor, Penn State University, United States

Leveraging a quasi-experimental setting, this study explores whether legalizing marijuana has an impact on operational performance at manufacturing facilities.

115-1983 Recharging Retail: Estimating Consumer Demand Spillovers from Electric Vehicle Charging Stations

Yash Babar, Assistant Professor, University of Wisconsin-Madison, United States

Gordon Burtch, Associate Professor, Boston University, United States

We study how the placement of electric vehicle (EV) charging stations impacts foot traffic at neighboring brick-and-mortar businesses. Our analysis focuses on the Tesla Supercharger network within the United States. We employ a differences-in-differences design, exploiting the staggered construction of Supercharger stations to quantify the effect.

115-2046 Political Power, Party Allegiance, and the Operations of Public Projects

Guillaume Lapierre-Berger, Student, McGill University, Canada

Juan Camilo Serpa, Associate Professor, McGill University, Canada

We argue that contractors' allocation of project resources is driven by political opportunism. Using a difference-in-differences analysis on U.S. public contracts data, we show that when a scandal dooms an incumbent's popularity, contractors re-allocate resources to other districts where the incumbent remains popular, exacerbating project delays in the original district.

### Invited Session

153	Tuesday, 08:00 AM - 09:30 AM, Rainbow Spring 2	Track: Operational Excellence
	Invited Session: Achieving Operational Excellence Through Strategic Organizational Alignment	
	Chair(s): Yuqi Peng	

115-0659 Inventory Restocking Information and Customer Purchase Intention

Minseok Park, Assistant Professor, Salisbury University, United States

Kelly Eunjung Yoon, Assistant Professor, University of Mary Washington, United States

Jae-Young Oh, Assistant Professor, Central Washington University, United States

If stockout occurs, retailers often provide the restocking lead-time information for their stockout product. When a retailer established good coordination with their suppliers, one may expect a smaller variability in restocking lead-time. In this study, we investigate how restocking lead-time variability impacts online customers' willingness-to-wait for the stockout product purchase.

115-1348 Improving E-retailer Order Fulfillment Processes: Packing Boxes Better To Reduce Shipping Costs

Qilong Zhu, Student, Texas A&M University, United States

Gregory Heim, Professor, Texas A&M University College Station, United States

Chelliah Sriskandarajah, Professor, Texas A&M University College Station, United States

Yunxia Zhu, Associate Professor, University of Nebraska Lincoln, United States

## Tuesday, 08:00 AM - 09:30 AM

Logistics costs for order fulfillment and shipping materially affect the profitability of online retailers. We identified several order fulfillment tasks (i.e., customer order box packing, box assortment selection) that might be improved, potentially leading to reduced shipping costs and improved sustainability outcomes.

### 115-1704 The Effects of Mergers and Acquisitions on Operational Performance

Zhihao Zhang, Assistant Professor, University of Missouri At Kansas City, United States

Yuqi Peng, Assistant Professor, Salisbury University, United States

Yan Dong, Professor, University of South Carolina, United States

Yongyi Shou, Professor, Zhejiang University, China

We study the impact of mergers and acquisitions on firm's operational performance. We also seek to understand how firms recover their operational efficiency after merger and acquisitions.

### 115-2084 Exploring the role of time-to-owner notification and dealership network size on automotive recall outcomes

Anto Verghese, Assistant Professor, University of North Texas, United States

Xiaosong (David) Peng, Professor, Lehigh University, United States

Arunachalam Narayanan, Associate Professor, University of North Texas, United States

Sriram Venkataraman, Associate Professor, University of South Carolina, United States

Rachna Shah, Professor, University of Minnesota, United States

We examine whether the time-to-owner notification impacts recall completion ratio. Additionally, we test whether the relationship is moderated by dealership network size. We use 679 unique automotive recalls and a two-stage least squares estimation approach to test our hypotheses and conduct a series of robustness checks to corroborate our findings.

## Invited Session

154	Tuesday, 08:00 AM - 09:30 AM, Barrel Spring 1	Track: POM-Marketing Interface
	Invited Session: Auctions, Targeting, and Competition	
	Chair(s): Wenjia Ba	

### 115-0135 Information Disclosure in Generalized Second Price Auction : An Empirical Analysis with Heterogeneous Advertisers

Michelle Song, Assistant Professor, Boston College, United States

Mingxi Zhu, Student, Stanford University, United States

We analyze data from a platform that initiated a bid recommendation system and find that some advertisers may simply adopt the platform's suggestion instead of constructing their own bids. By designing the mechanism and aggregating the information of many bidders, the advertiser platform can assist less sophisticated advertisers.

### 115-0539 Search Neutrality and Competition between First-party and Third-party Sellers

Tianxin Zou, Assistant Professor, Warrington College of Business, United States

Bo Zhou, Associate Professor, University of Maryland, United States

Search neutrality regulations and legislations prohibit retail platforms from self-preferentially boosting first-party products' search rankings over third-party sellers'. We argue that although search neutrality increases consumers' search relevancy, it can reduce consumer and social surplus by alleviating price competition and inducing the platform's preemption of third-party seller entry.

### 115-1153 Budget Pacing in Repeated Auctions: Regret and Efficiency without Convergence

Bar Light, Postdoc Researcher, Microsoft Research, United States

We study the aggregate welfare and individual regret guarantees of dynamic pacing algorithms that are commonly used as bidding agents in Internet advertising platforms in the context of repeated auctions with budgets.

### 115-1339 Dynamic Coupon Targeting Using Batch Deep Reinforcement Learning: An Application to Livestream Shopping

Xiao Liu, Associate Professor, New York University, United States

We present an empirical framework for creating dynamic coupon targeting strategies for high-dimensional and high-frequency settings, and we test its performance using a large-scale field experiment. The model is estimated using batch deep reinforcement learning (BDRL).

## Invited Session

155	Tuesday, 08:00 AM - 09:30 AM, Barrel Spring 2	Track: Procurement and Supplier Management
	Invited Session: Emerging Topics in Sustainable and Socially Responsible Supply Chain Management	
	Chair(s): Tao Lu	

### 115-0055 Shipment Monitoring, Allocation and the Impact on Food Waste

Tao Lu, Assistant Professor, University of Connecticut, United States

A firm sells a fresh produce to two markets. A sensor technology enables the firm to monitor and allocate the product based on the conditions of each unit and the transportation distances. Shipment monitoring, despite being advocated for the potential to reduce food waste, may increase the total waste.

### 115-0086 Impact of Social Learning on Consumer Subsidies and Supplier Capacity for Green Technology Adoption

Hang Ren, Assistant Professor, George Mason University, United States

## Tuesday, 08:00 AM - 09:30 AM

Tingliang Huang, Associate Professor, Boston College, United States

Georgia Perakis, Professor, Massachusetts Institute of Technology, United States

Customers are usually a priori uncertain about their benefits from purchasing green-technology products (e.g., electric vehicles and solar panels) and consult reviews from adopters before making a purchase. We examine the impact of such social learning on the government's optimal dynamic consumer subsidies, considering the supplier's strategic capacity decision.

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### 115-0540 Guided Delegation in Multi-tier Responsible Sourcing

Sammi Tang, Associate Professor, University of Miami, United States

Jing-Sheng Song, Professor, Duke University Durham, United States

In a three-tier supply chain setting where responsibility risk stems from Tier-2 suppliers and supplier selection is delegated to Tier-1 firm, we examine the benefit and potential risk of a guided delegation approach compared to full delegation.

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### 115-0623 Dealing with Groups: Incentives and Requirements for Protecting Natural Resources and Improving Welfare

Joann de Zegher, Assistant Professor, MIT, United States

Dan Iancu, Associate Professor, Stanford University and INSEAD, United States

Erica Plambeck, Professor, Stanford University, United States

Xavier Warnes, Post Doc/Researcher, Stanford University, United States

Many global agricultural commodities are produced by poor smallholders, often involving illegal deforestation. We propose group incentives conditional on forest protection requirements as a mechanism to prevent this deforestation while increasing farmer welfare. We demonstrate the effectiveness of these incentives theoretically and using data collected from the Indonesian palm-oil context.

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## Invited Session

156	Tuesday, 08:00 AM - 09:30 AM, Rock Spring	Track: POM-Economics Interface
	Invited Session: Innovative incentive models	
	Chair(s): Salar Ghamat	

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### 115-0609 The Benefits-Value-Advisor (BVA) Program for Shoppable Medical Procedures

Jingyao Huang, Assistant Professor, University of Missouri At Kansas City, United States

Diwakar Gupta, Professor, University of Texas Austin, United States

Large price variation is prevalent for routine medical procedures such as MRI and CT Scan, which has led insurers to introduce the BVA program to steer beneficiaries to low-cost providers. We explore the providers' price responses, and the question that under which conditions the program saves costs for insurers.

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### 115-1633 Incentive Mechanisms Design in On-Demand Digital Platforms

Yousuf Aziz, Student, State University of New York, United States

Zhiling GUO, Associate Professor, Singapore Management University, Singapore

Ram Ramesh, Professor, State University of New York, United States

Flexible service sourcing, uncertain demand, and variable earnings are key features of the sharing economy. To address workers' concern about significant earning variations, we propose forward contract mechanisms to manage labor supply in on-demand platforms that both maximize the platform's profitability and guarantee workers' minimum expected earnings.

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### 115-2089 Encouraging Greater Use of Home Dialysis for Medicare Beneficiaries with ESRD Using Competitive Incentive Plan

Maryam Afzalabadi, Post Doc/Researcher, Lazaridis School of Business and Economics, Canada

Mojtaba Araghi, Associate Professor, Wilfrid Laurier University, Canada

Salar Ghamat, Associate Professor, Lazaridis School of Business & Economics, Canada

We study the use of competitive incentive models to align incentives of a payer and service providers. Our paper is motivated by the End-Stage Renal Disease Treatment Choices (ETC) Model of the CMS. We show conditioning incentive payments to performance of other providers can improve the outcome for all parties.

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### 115-2116 Information-trigger contracts

Rongzhu Ke, Professor, Zhejiang University, China

Chris Ryan, Associate Professor, University of British Columbia, Canada

We study moral-hazard problems where principal and agent are risk neutral with bounded agent compensation. We show optimality of information-trigger (IT) contracts, where the agent receives a bonus when the likelihood ratio of output signals between two actions exceeds a trigger value and otherwise receives the minimum.

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## Invited Session

157	Tuesday, 08:00 AM - 09:30 AM, Regency Ballroom Q	Track: Revenue Management and Pricing
	Invited Session: Online Advertising, and Digital Marketplaces and Platforms	
	Chair(s): Sami Najafi-Asadolahi	

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### 115-0147 Leveraging Consensus Effect to Optimize Ranking in Online Discussion Boards

Gad Allon, Professor, The Wharton School, United States

Joseph Carlstein, Student, The Wharton School, United States

## Tuesday, 08:00 AM - 09:30 AM

Yonatan Gur, Associate Professor, Stanford University, United States

Online discussion boards suggest users a recommended “feed” of comments made by other users to stimulate engagement. In this study, we validate a novel engagement driver capturing the level of discussion consensus. From this, we propose a dynamic model and class of algorithms that maximize engagement along the discussion path.

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### 115-0162 Signaling Competition in Two-Sided Markets

Omar Besbes, Associate Professor, Columbia University, United States

Yuri Fonseca, Student, Columbia University, United States

Ilan Lobel, Assistant Professor, New York University, United States

Fanyin Zheng, Assistant Professor, Columbia University, United States

We study pricing and information design in two-sided marketplaces. We partner with a marketplace in LatAm to elucidate how much agents anticipate downstream competition. We propose a structural model that accounts for strategic behavior and show how revealing information about competition is a powerful lever for the platform.

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### 115-0177 Dynamic Two-part Pricing and Bidding for Display Advertising Campaigns

Naren Agrawal, Professor, Santa Clara University, United States

Sami Najafi-Asadolahi, Associate Professor, Santa Clara University, United States

Stephen Smith, Professor, Santa Clara University, United States

We consider an advertising agency that manages ad campaigns by bidding for targeted viewers on an ad exchange. We formulate the problem as a Markov Decision Process and determine the optimal upfront fee and the CPM price to charge each campaign and the optimal dynamic bidding policy to serve campaigns.

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### 115-0180 Dynamic Pricing and Capacity Optimization in Railways

Chandrasekhar Manchiraju, Student, UT Dallas, United States

Milind Dawande, Professor, University of Texas Dallas, United States

Ganesh Janakiraman, Professor, University of Texas Dallas, United States

Arvind Raghunathan, Senior Principal Research Scientist, Mitsubishi Electric Research Laboratories, United States

Motivated by our work with a major railway company in Japan, we analyze a joint pricing and capacity optimization problem, which is a more-general version of the canonical multiproduct dynamic-pricing problem. Our work provides railway administrators with simple and effective policies for pricing, capacity, and congestion management.

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## Invited Session

158	Tuesday, 08:00 AM - 09:30 AM, Regency Ballroom O	Track: Retail Operations
	Invited Session: Food Waste and Retail Operations	
	Chair(s): Ioannis Stamatopoulos      Fiori Anglou	

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### 115-0416 The Carbon Footprint of Cold Chain Food Flows in the United States

Junren Wang, Student, University of Illinois at Urbana Champaign, United States

Deniz Berfin Karakoc, Student, University of Illinois at Urbana Champaign, United States

Megan Konar, Associate Professor, University of Illinois at Urbana Champaign, United States

The refrigerated food supply chain is an energy-intensive, nutritious, and high-value part of the food system. Here, we estimate the 2017 cold chain food flows between counties in the United States. We also compute the 2017, and 2045 projections of carbon-dioxide emission for truck delivery of meat and prepared foodstuff.

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### 115-0421 An empirical study of food waste in US food banks

Fan Zou, Student, University of South Carolina, United States

Luv Sharma, Associate Professor, University of South Carolina, United States

Pelin Pekgun, Associate Professor, University of South Carolina, United States

Sanjay Ahire, Professor, University of South Carolina, United States

We investigate operational factors which can help reduce food waste in food bank operations.

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### 115-1075 Time-based Pricing at Grocery Stores? Transitioning Strategies under Retail Competition and Congestion Externality

Christopher Tang, Professor, University of California Los Angeles, United States

Steve Yoo, Associate Professor, University College London, United Kingdom

Dongyuan Zhan, Assistant Professor, University College London, United Kingdom

To examine “whether and when” stores should adopt intra-day time-based pricing under competition, we build a 2-stage dynamic duopoly game incorporating congestion externality. Two equilibria sustain: both firms adopt time-based pricing in stage 1, or one adopts in stage 1 and the other postpones adoption until stage 2.

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### 115-1755 On the Profitable Buffet Design to Cut Food Waste

Yuwen Hu, Student, University of Michigan - Ann Arbor, United States

Ekaterina Astashkina, Assistant Professor, Ross School of Business, United States

Izak Duenyas, Professor, University of Michigan - Ann Arbor, United States

## Tuesday, 08:00 AM - 09:30 AM

All-you-can-eat buffets are notorious for generating immense amounts of plate waste.. We build a model of a buffet operator who faces consumers with uncertain demand. We compare different buffet designs along the profit maximization and waste reduction metrics and suggest which design to use and when.

### Invited Session

159	Tuesday, 08:00 AM - 09:30 AM, Regency Ballroom P	Track: Disruptive Technologies and Operations Management
	Invited Session: Novel Topics in Distribution Channel Management	
	Chair(s): Sandun Perera	

115-0517 Improving Parcel Delivery Operations by Using Autonomous Truck-Based Drones and Intermediate Points

Bo Lan, Student, West Virginia University, United States

Yoshinori Suzuki, Professor, Iowa State University, United States

This study extended the existing research of traveling salesman problems of a truck and a drone which is operated only on customers' sites. Discrete intermediate points on arcs provide more flexibility to drivers. Some well-developed metaheuristics showed promising saving of delivery time than the existing model.

115-0526 How Upstream Bundling Interacts with Distribution Contracts

Yuanzhao Tang, Student, University of Science and Technology of China, China

Qingning Cao, Associate Professor, University of Science and Technology of China, China

Xiang Ji, Post Doc/Researcher, University of Science and Technology of China, China

Sandun Perera, Associate Professor, University of Nevada, Reno, United States

Xianjun Geng, Professor, Tulane University, United States

We examines the interaction between a firm's bundling strategy and a platform's distribution contract. We identify the conditions under which the firm prefers bundling in the wholesale and agency contracts, and further find that the firm's bundling incentivizes the platform to adopt agency contract even when commission rate is low.

115-0566 Truck vs Drone for Network Deliveries

Sandun Perera, Associate Professor, University of Nevada, Reno, United States

Duc Vu, Assistant Professor, University of Michigan-Flint, United States

Emerging technologies such as drone delivery offer unprecedented delivery speed and adaptable delivery lead times. Whereas, traditional delivery methods (e.g., trucks) have the advantage of reducing operational costs. We analyze the trade-offs of these two delivery modes and study which mode (s) should be offered by a retailer.

115-1869 Retail Competition using Drones

Sandun Perera, Associate Professor, University of Nevada, Reno, United States

When drones are employed to deliver packages, the competition between drone-equipped retailers could revolutionize the current delivery networks. We study the implications of competition between retailers with drone delivery capabilities and show that retailers will create local monopolies around their warehouses to maximize their profits under price and delivery-speed competition.

### Invited Session

160	Tuesday, 08:00 AM - 09:30 AM, Silver Spring 1	Track: Data Science and Analytics
	Invited Session: Operational Perspectives on Blockchain Applications	
	Chair(s): Guangzhi Shang	

115-0228 Blockchain-enabled business model design for operations innovations: a multi-year study of blockchain adoption

Yuanzhu Zhan, Associate Professor, University of Birmingham, United Kingdom

Kim Hua Tan, Professor, University of Nottingham, United Kingdom

Yu Xiong, Professor, University of Surrey, United Kingdom

XINJIE (Daniel) XING, Associate Professor, University of Liverpool, UK, United Kingdom

Fei Ye, Professor, South China University of Technology, China

Existing research on blockchain-enabled digital transformation has collectively focused on the critical role of firms in developing a specific, sometimes novel, and often enduring activity system during early years. Accordingly, the proposed study investigates the mechanisms involved in this process for effective blockchain-enabled business model design and operations innovations.

115-0276 Transparentizing Supply Chain: Is Blockchain a Supplement or Substitute for Consumer Trust toward Retailers?

Yanji Duan, Assistant Professor, University of North Florida, United States

Qingyun Zhu, Assistant Professor, University of Alabama in Huntsville, United States

Joseph Sarkis, Professor, Worcester Polytechnic Institute, United States

Blockchain facilitates supply chain (SC) transparency. Via two behavioral experiments, we find curvilinear relationships between consumers' blockchain knowledge and perceptions. We also show that blockchain-enabled SC transparency impacts consumer trust and purchase intention asymmetrically. Results show that blockchain is a supplement for consumer trust that can prompt future purchases.

115-0286 Blockchain and AI enabled-supply network risk modelling mechanism design, implementation challenges and subsequent utilities

Dequn Teng, Student, University of Cambridge, United Kingdom

## Tuesday, 08:00 AM - 09:30 AM

Veronica Martinez, Associate Professor, University of Cambridge, United Kingdom

This research will focus on the design choice, implementation challenges, and subsequent utilities of Blockchain-AI technologies for supply network risk modelling purposes, based on a structured review, multi-case study (for suppliers and blockchain solution providers), and blockchain-AI system design. A blockchain-AI-enabled cooperative mechanism is designed and validated through simulations.

115-1437 Leading academics thoughts about blockchain and Web 3.0 - A survey-based study

XINJIE (Daniel) XING, Associate Professor, University of Liverpool, UK, United Kingdom

Guangzhi Shang, Associate Professor, Florida State University, United States

Yu Xiong, Professor, University of Surrey, United Kingdom

Seeing the rise of Web 3.0 revolution, this study has designed a series of questions and compiled a list of targeted respondents through a systematic literature review process. The expected research outcomes aim at bridging gaps between academics and politicians and making real impacts on blockchain and web 3.0 topics.

### Invited Session

161	Tuesday, 08:00 AM - 09:30 AM, Silver Spring 2	Track: Inventory and Logistics Management
	Invited Session: <b>Collaboration and Scheduling in Logistics</b>	
	Chair(s): Shoshana Anily	

115-0168 Collaboration among manufacturers in parallel machine scheduling under job-splitting environment is profitable

Tzvi Alon, algorithm engineer, Western Digital, Israel

Shoshana Anily, Professor, Tel Aviv University, Israel

The Parallel Machine Scheduling under job-splitting cooperative game is defined by manufacturers that hold uniform parallel machines, and are committed to produce some jobs, bearing the sum of their completion time cost on their machines. We prove that collaboration is profitable and present an infinitely large subset of the core.

115-0789 Managing Hybrid Manufacturing/Remanufacturing Inventory Systems with Random Production Capacities

Xiting Gong, Associate Professor, The Chinese University of Hong Kong, China

Suting Liu, Student, The Chinese University of Hong Kong, China

We study hybrid manufacturing/remanufacturing inventory systems with random demand, return and production capacities. We partially characterize optimal policy for general model and completely characterize it for models with one deterministic capacity and further characterize it for model with unlimited manufacturing capacity. We also conduct numerical studies to derive further insight.

115-1325 Co-exposure management in service systems

Binyamin Oz, Senior Lecturer, The Hebrew University of Jerusalem, Israel

Yael Perlman, Senior Lecturer, Bar-Ilan University, Israel

We consider multi-class service systems where customers (or jobs) are affected by being exposed to other customers while waiting for service. We study the steady-state performance with respect to some co-exposure measures under different scheduling policies.

115-1398 Information Provision from a Platform to Competing Sellers: The Role of Strategic Ambiguity

Noam Shamir, Assistant Professor, Tel Aviv University, Israel

We study the ability of a platform to convey forecast information to its sellers via cheap-talk. Although information improves the payoff for both the platform and sellers, perfect information sharing cannot be achieved due to incentives misalignment. We illustrate that partial information sharing equilibrium can be sustained.

### Contributed Session

162	Tuesday, 08:00 AM - 09:30 AM, Winter Park 49	Track: Product Innovation and Technology Management
	Contributed Session: <b>Collaboration and Business Ecosystems</b>	
	Chair(s): Debasish Mallick	

115-0345 -Impact of Development Tools on Internal Coordination, External Collaboration, and New Product Development Performance

Debasish Mallick, Professor, University of St. Thomas, United States

Sameer Kumar, Professor, University of St. Thomas, United States

Changyue Luo, Assistant Professor, Metropolitan State University Minnesota, United States

Many product development tools have emerged to facilitate new product development (NPD). Yet, their impact on NPD outcome is often in question. Using a survey of 453 firms we empirically explore the impact of internal coordination and external collaboration on the relationship between development tools and NPD Performance.

115-0810 Leveraging exploratory business ecosystems to produce breakthrough innovation: the role of absorptive and desorptive capacity

Marta Riquelme-Medina, Lecturer, University of Granada, Spain

Marcel Bogers, Professor, Eindhoven University of Technology, Netherlands

Vanessa Barrales-Molina, Associate Professor, University of Granada, Spain

Francisco Javier Llorens-Montes, Professor, University of Granada, Spain

## Tuesday, 08:00 AM - 09:30 AM

This article investigates whether firms can leverage exploratory orientations in business ecosystems to enhance breakthrough innovation, and considers the joint moderation of absorptive/descriptive capacity. Using data from 262 firms, results show that firms benefit from exploratory ecosystems to produce breakthrough innovations, which can be maximised through knowledge absorption/desorption from/to the ecosystem.

115-1939 A Case Study of MBA "Product/Service" Restructuring Using Six-Sigma Methodology Tools

Jayant Saraph, Professor, Metropolitan State University Minnesota, United States

The MBA degree, a flagship product of business schools, is delivered in a very competitive environment of generally declining MBA enrollments recently. This paper deals with a case study of innovatively "restructuring of MBA program (product/service)" holistically at a regional university using a six-sigma methodology.

### Invited Session

163	Tuesday, 08:00 AM - 09:30 AM, Winter Park 50	Track: Socially Responsible Operations
	Invited Session: Emerging Issues in Socially Responsible Operations: NGOs and Developing Countries	
	Chair(s): Gokce Esenduran	

115-0066 Subsidizing Social Welfare Programs: Contracted Slots or Vouchers?

Wei Wei, Student, University of Massachusetts Amherst, United States

Priyank Arora, Assistant Professor, University of South Carolina, United States

Senay Solak, Associate Professor, University of Massachusetts Amherst, United States

We study the interplay of decisions by multiple players within two popular service-focused subsidy welfare programs--subsidy vouchers and contracted slots. Through game-theoretic models, we analyze how program-related factors influence the quantity and quality of services provided by local providers. We also compare the societal outcomes generated by these two programs.

115-0408 Yield Benefits of Alert-Based Interactive Voice Response System: A Case Study of Buland Shahar District

Campbell Clarkson, Student, University of South Carolina, United States

Necati Tereyagolu, Associate Professor, University of South Carolina, United States

Sriram Venkataraman, Associate Professor, University of South Carolina, United States

This paper investigates the yield effects of introducing an alert-based interactive voice response system to farmers, using the launch of one platform in Buland Shahar district in India as a case study. We also check if such effects could be explained by changes in fertilizer usage during the same period.

115-1259 Matching Volunteers to Clients in Non-Profit Organizations

Shikha Safaya, Student, Georgia Institute of Technology, United States

Basak Kalkanci, Associate Professor, Georgia Institute of Technology, United States

Ravi Subramanian, Professor, Georgia Tech, United States

Non-profit organizations are often challenged with the issue of volunteer retention. We explore the tradeoff between incorporating volunteer preferences in task assignments and pooling volunteers to alleviate the mismatch between supply and demand. We analytically derive the conditions under which a particular policy may be preferred.

115-1628 Allocation of Nonprofit Funds among Program, Fundraising, and Administration

Telesilla Kotsi, Assistant Professor, Fisher College of Business, United States

Arian Aflaki, Assistant Professor, Joseph M. Katz Graduate School of Business, United States

Goker Aydin, Professor, Johns Hopkins University, United States

Alfonso Pedraza, Professor, Indiana University, United States

How should nonprofits allocate funding among program, administrative, and fundraising expenses? We show that the allocation among the three expenses changes based on a nonprofit's initial capacity and beliefs about future needs. The model's calibration with a leading foodbank's data illustrates the practical relevance and implications of our study.



Invited Session

**166**

Tuesday, 09:45 AM - 11:15 AM, Celebration 1

Track: Agriculture and Food Supply Chains

Invited Session: **Agriculture Supply Chain Analytics**

Chair(s): Shailesh Divey

**115-0146 Direct Trade Sourcing Strategies for Specialty Coffee**

Burak Kazaz, Professor, Whitman School of Management, United States

Scott Webster, Professor, Arizona State University Tempe, United States

Shahryar Gheibi, Assistant Professor, Siena College, United States

Leading specialty coffee roasters rely on direct trade to source premium coffee beans. We study how characteristics of the operating and market environment affect the optimal sourcing strategy and incentives for a closer relationship with a grower.

**115-0878 Vintech: Robo-advising Using Wine Analytics**

Mert Hakan Hekimoglu, Assistant Professor, Rensselaer Polytechnic Institute, United States

Burak Kazaz, Professor, Whitman School of Management, United States

This paper utilizes analytics to help wine distributors build their wine portfolios. We first develop a pricing algorithm to represent the realistic value of a wine. We then compare the price evolution of underpriced wines to overpriced wines. Last, we construct portfolios for different investment goals and risk preferences.

**115-1479 Capacity Management and Coordination in Contract Farming Supply Chains with Uncertainty and Risk Preferences**

Chenqiang Yue, Student, University of Liverpool, UK, United Kingdom

Dong Li, Reader, University of Liverpool, UK, United Kingdom

Dongping Song, Professor, University of Liverpool, UK, United Kingdom

We consider two opposing risk preferences (i.e., risk aversion and risk seeking, respectively) for a farmer and build a Stackelberg game model with a leading agribusiness firm to analytically investigate and compare farmland investment and ordering quantity decisions under yield and demand uncertainty. Contractual coordination are studied with numerical analysis.

**115-2085 Modelling Food Bank Donation Decisions in Retail Stores**

Soodeh Jahdi, Student, Wageningen University, Netherlands

Rene Haijema, Associate Professor, Wageningen University, Netherlands

Renzo Akkerman, Associate Professor, Wageningen University, Netherlands

Sander de Leeuw, Professor, Wageningen University, Netherlands

Retailers aim to efficiently manage inventories of perishable products. Potentially remaining surplus inventory is often donated to organizations like food banks. We study the early identification of products that could be donated, which would help food banks to efficiently use these products and reduce waste in food supply chains.

**115-2097 Transmission Interaction Persistence (TIP): A Supply Chain and Epidemiological Model for Zoonotic Diseases Outbreaks**

Lu Chen, Post Doc/Researcher, Massachusetts Institute of Technology, United States

Qihua Gao, Post Doc/Researcher, Massachusetts Institute of Technology, United States

Retsef Levi, Professor, MIT, United States

Nicholas Renegar, Student, Massachusetts Institute of Technology, United States

El Ghali Zerhouni, Student, Massachusetts Institute of Technology, United States

Zoonotic diseases have caused global pandemics starting from live animal markets in China. This paper develops a supply-chain epidemiology model that explains the mechanism of viruses outbreaks in markets. It provides several managerial implications on the role of the supply chain structure and the environment to limit infection risks.

Invited Session

**167**

Tuesday, 09:45 AM - 11:15 AM, Celebration 2

Track: Behavioral Operations Management

Invited Session: **Panel: Past, Present and Future of Behavioral Operations**

Chair(s): Brent Moritz

**115-2135 Panel: Past, Present and Future of Behavioral Operations**

Brent Moritz, Associate Professor, Penn State University University Park, United States

Karen Donohue, Professor, University of Minnesota, United States

Jan Fransoo, Professor, Tilburg University, Netherlands

Rogelio Oliva, Professor, Texas A&M University College Station, United States

Panel discussion on the past, present and future of behavioral operations. Distinguished members will make opening remarks, respond to some questions and Q&A from the audience. Karen Donohue (Minnesota), Jan Fransoo (Tilburg), Rogelio Oliva (Texas A&M), moderated by Brent Moritz (Penn State).

**Contributed Session****168**

Tuesday, 09:45 AM - 11:15 AM, Celebration 3

Track: Healthcare Operations Management

Contributed Session: **Scheduling for Operating Rooms**

Chair(s): Manmohan Sodhi

**115-0470 Equitable Anesthesiologist Scheduling under Demand Uncertainty Using Multi-Objective Programming**

Kai Sun, Post Doc/Researcher, University of Texas at San Antonio, United States

Minghe Sun, Professor, University of Texas San Antonio, United States

Ronald Dravenstott, Director of Perioperative Informatics , The University of Texas Health Science Center at San Antonio, United States

Frank Rosinia, Professor, The University of Texas Health Science Center at San Antonio, United States

Arkajyoti Roy, Assistant Professor, University of Texas at San Antonio, United States

We present a data-driven two-step anesthesiologist scheduling framework for an academic anesthesiology department using mixed-integer programming models. Step 1 model designs optimal shifts under demand uncertainty. Step 2 model assigns shifts considering optimal and equitable workload distribution. Case studies, hiring planning and monthly scheduling, are addressed via the framework.

**115-1686 Stochastic Optimization Approaches for an Operating Room and Anesthesiologist Scheduling Problem**

Man Yiu Tsang, Student, Lehigh University, United States

Karmel Shehadeh, Assistant Professor, Lehigh University, United States

Frank Curtis, Professor, Lehigh University, United States

Beth Hochman, Associate Professor of Surgery , Columbia University Medical Center, United States

Tricia Brentjens, Associate Professor, Columbia University Medical Center, United States

We propose combined allocation, assignment, sequencing, and scheduling problems under uncertainty involving multiple operation rooms, anesthesiologists, and surgeries, as well as stochastic optimization methodologies for solving such problems under uncertainty. Using real-world surgery data, we conduct extensive experiments comparing the proposed methodologies and derive several managerial insights relevant to practice.

**115-1736 A Pareto Improvement Bumping-Rescheduling Policy for Operating Room Scheduling**

Hung Do, Associate Professor, University of Vermont, United States

David Novak, Associate Professor, University of Vermont, United States

We model and analyze a bumping policy called First-In-First-Out (FIFO) Bump Policy in the context of Operating Room Scheduling. For hospitals using shared operating rooms for scheduled and emergent cases, a bumping policy is needed to facilitate emergent cases when they arrive, but it often operates with competing objectives.

**115-1910 Surgery Scheduling under Uncertainty**

Nicklas Klein, Student, University of Bern, Switzerland

Nicola Travaglini, Student, University of Bern, Switzerland

Robin Hauenstein, Student, University of Bern, Switzerland

Norbert Trautmann, Professor, University of Bern, Switzerland

The scheduling of elective surgeries and randomly arriving emergency surgeries of uncertain durations in flexible operating rooms strongly influences patient-care and hospital-efficiency-related costs. We present a matheuristic based on a mixed-integer linear programming formulation and the results of an experimental performance analysis.

**115-1998 Reducing elective surgery waiting times for NHS England**

Manmohan Sodhi, Professor, Bayes Business School, United Kingdom

Patients in NHS England are waiting excessively long for elective procedures due to theatre underutilization. Data show significant differences between surgeons in the ratio of actual procedure time to the requested time. I propose a way for a hospital to create surgeon-specific scheduling (list creation) to decrease waiting times.

**Contributed Session****169**

Tuesday, 09:45 AM - 11:15 AM, Celebration 4

Track: Healthcare Operations Management

Contributed Session: **Models for Medication Management**

Chair(s): Kenan Arifoglu

**115-0686 From Black to Grey: Improving Access to Antimalarial Drugs in the Presence of Counterfeits**

Jiatao Ding, Student, INSEAD, Singapore

Saša Zorc, Assistant Professor, Darden School of Business, United States

Michael Freeman, Assistant Professor, INSEAD, Singapore

We study how donors should optimally allocate limited budgets, i.e., subsidize the purchases and/or sales of the private-sector distribution channel of antimalarial drugs, in markets where counterfeits are present, and what further interventions should or should not be taken to address the problems of counterfeit drugs.

**115-1134 Managing Over-The-Counter Homogeneous Medicines**

LAN LUO, Assistant Professor, University of Hartford, United States

Lizao Zhang, Assistant Professor, (CIF:ESG50985993), United States

Charles Munson, Professor, Washington State University Pullman, United States

## Tuesday, 09:45 AM - 11:15 AM

Retail customers often have a choice for over-the-counter medicines between brand-name products and cheaper generic alternatives. Why do customers choose one or the other, and how willing are they to switch? We develop a profit model for a retail store to investigate pricing and inventory strategies for these substitutable products.

### 115-1190 Influencing Primary Care Antibiotic Prescription Behavior Using Financial Incentives

Salar Ghamat, Associate Professor, Lazaridis School of Business & Economics, Canada

Mojtaba Araghi, Associate Professor, Wilfrid Laurier University, Canada

Lauren Cipriano, Associate Professor, Ivey Business School, Canada

Michael Silverman, Professor, University of Western Ontario, Canada

Antibiotic resistance is an ongoing public health crisis that is escalated by overuse and misuse of antibiotics. We develop a stylized physician compensation model to reduce inappropriate antibiotic prescription and study the interaction between a payer and a provider who makes antibiotic prescription decisions for heterogeneous patients.

### 115-1680 The Generic Competition Paradox in the Prescription Drug Market

Qinquan Cui, Student, University College London, United Kingdom

Kenan Arifoglu, Associate Professor, University College London, United Kingdom

Dongyuan Zhan, Assistant Professor, University College London, United Kingdom

We build a game-theoretic model with signaling to explain the generic competition paradox (GCP), the price increase of a brand-name drug when a new generic drug enters the market and intensifies the competition. We examine the impacts of GCP on social welfare, and extend to allow multiple entrants.

## Invited Session

171	Tuesday, 09:45 AM - 11:15 AM, Celebration 6	Track: POM-Finance Interface
	Invited Session: <b>Advances in OM-Finance Interface</b>	
	Chair(s): Vibhuti Dhingra	

### 115-0663 The Effect of Expedited Payments on Project Delays: Evidence from QuickPay Reform

Vibhuti Dhingra, Assistant Professor, York University, Canada

Volodymyr Babich, Professor, Georgetown University, United States

Harish Krishnan, Professor, University of British Columbia, Canada

Jie Ning, Associate Professor, Case Western Reserve University, United States

Contractors are not paid instantaneously upon completing the project tasks and furnishing the invoice. We study the impact of payment timings on project delays. We develop theories that explain how payment duration affects project completion, and generate testable hypotheses. We empirically test these hypotheses using data on U.S. public projects.

### 115-2020 Operational performance and financial performance: An impact assessment

HariPrasad Bellamkonda, Associate Professor, IIM Indore, India

Indian domestic air transport industry experienced tremendous growth in operational parameters over past decade. The ROIC tree model was applied to analyze their impact on financial performance and productivity. We examined how much an inferior entity would be improved if it imitates some productivity factors of well performing entity.

### 115-2056 Impact of Operational characteristics on Supply chain financing

HariPrasad Bellamkonda, Associate Professor, IIM Indore, India

We examine how the operational characteristics such as inventory salvage value and demand uncertainty influences the inventory stocking behavior and the capital structure decisions under asset-based borrowing constraints in supply chains. It is observed that inventory advance rates are more sensitive to firms' operational characteristics than interest rates.

## Invited Session

172	Tuesday, 09:45 AM - 11:15 AM, Celebration 7	Track: Sustainable Operations Management
	Invited Session: <b>Environmental Technology Innovation and Adoption</b>	
	Chair(s): Michael Lim      Karthik Murali	

### 115-0155 Optimal Management of Renewable Energy Certificates (REC): A Reinforcement Learning Approach

Daeho Kim, Student, 000, South Korea

Dong Gu Choi, Associate Professor, 000, South Korea

Michael Lim, Professor, Seoul National University, South Korea

There exists a market-based instrument, Renewable Energy Certificate (REC), for promoting the renewable energy integration. Recently, a brokerage service has emerged to help renewable energy generators to participate into the REC market. This talk introduce the optimal REC management for the brokerage service provider based on a deep reinforcement learning.

### 115-0172 Impact of Taxes on the Adoption of Green Technologies

Gal Raz, Associate Professor, Ivey Business School, Western University, Canada

Paolo Letizia, Associate Professor, University of Tennessee, United States

Wangcheng Yan, Assistant Professor, Tongji University, China

## Tuesday, 09:45 AM - 11:15 AM

In this paper we examine government emissions taxes on consumers and firms and show how these taxes impact the behavior of manufacturers in adopting a clean technology in a competitive market with two competing firms. Our results show the conditions under which each taxing mechanism works better.

### 115-0348 The Role of Driver Behavior in Moving the Electric Grid to Zero Emissions

Leann Thayaparan, Student, Massachusetts Institute of Technology, United States

Georgia Perakis, Professor, Massachusetts Institute of Technology, United States

As renewable energy production increases, energy storage becomes a significant challenge. Electric vehicles could act as distributed storage. However, complex driver behavior must be accounted for first. We combine machine learning with optimization to model driver behavior to size the capacity of energy storage electric vehicles can offer the grid.

### 115-1525 Allocation of recycling credits to final products in plastics production

Müge Cakan, Student, University of Mannheim, Germany

Moritz Fleischmann, Professor, University of Mannheim, Germany

Danja R. Sonntag, Associate Professor, Lund University, Sweden

Chemical recycling gives rise to a new planning problem for plastics manufacturers: How to allocate recycled material to final products. Current industry practice is subject to controversial debate, including concerns of greenwashing. We contribute to this debate by analyzing the impact of different allocation rules on environmental and economic performance.

## Invited Session

173	Tuesday, 09:45 AM - 11:15 AM, Celebration 8	Track: Sustainable Operations Management
	Invited Session: <b>Game Theory in Sustainable and Socially Responsible Operations</b>	
	Chair(s): David Drake Hasti Rahemi	

### 115-0245 Servicizing and Remanufacturing in the Circular Economy: Economic and Environmental Implications

Xichen Sun, Student, Texas A&M University College Station, United States

Tharanga Rajapakshe, Associate Professor, University of Florida, United States

Rogelio Oliva, Professor, Texas A&M University College Station, United States

To investigate the complementarities between servicizing and remanufacturing, two widely used strategies in the circular economy, we consider a profit-maximizing manufacturer who explores the possibility of jointly adopting servicizing and remanufacturing. We identify conditions under which the firm can improve its economic and environmental performance at the same time.

### 115-0256 Trade-Off Between Social and Environmental Sustainable Investment in Competition

Mike Gordon, Assistant Professor, Virginia Polytechnic Institute And State University, United States

Titing Cui, Student, University of Pittsburgh, United States

Esther Gal-Or, Professor, University of Pittsburgh, United States

Michael Hamilton, Assistant Professor, University of Pittsburgh, United States

Jennifer Shang, Professor, University of Pittsburgh, United States

We study competition between firms using sustainable investment. Sustainable investment is separated into environmental and socially focused projects. We consider a context where a socially focused firm competes with a firm with projects in both sustainable domains.

### 115-1169 Coopetition in First Response Operations to Global Disasters

Hasti Rahemi, Student, University of Colorado Boulder, United States

David Drake, Assistant Professor, University of Colorado Boulder, United States

Cooperation among humanitarian organizations is widely encouraged. Yet, hurdles of cooperation, such as competition in the field of disaster response, are understudied. We investigate the effects of competition and the prospect of cooperation among HOs considering this competition from the perspective of a United Nations Humanitarian Response Depot (UNHRD).

## Contributed Session

174	Tuesday, 09:45 AM - 11:15 AM, Celebration 9	Track: Supply Chain Management
	Contributed Session: <b>SCM Practice and Performance</b>	
	Chair(s): Andrea Patrucco	

### 115-0324 How Resilience Can Inform The Principle-Agent Relationship

Kevin Burnard, Associate Professor, Western Connecticut State University, United States

This research explores how organizations can design and implement robust supply chain relationships under challenging conditions. Following a review of relevant literature, attention is placed on the influence of resilience on the structure and interactions defined through the Principle-Agent Relationship. Informing the mechanisms that establish and maintain supply chain linkages.

### 115-1702 Operations Function in the Driver's Seat: Performance Effects of Operations Department Power

Sara Rezaee Vessal, Assistant Professor, ESSEC Business School, France

Mehdi Nezami, Assistant Professor, Bradley University, United States

## Tuesday, 09:45 AM - 11:15 AM

The operations function continues to gain prominence as a strategic contributor to the firm. This study investigates the effect of operations department power (ODP) on shareholder wealth. We find that ODP exerts a positive effect on abnormal stock returns, and it has a negative effect on idiosyncratic risk.

115-1849 Supply chain integration for innovation projects: the role of project complexity and project management methods

Andrea Patrucco, Assistant Professor, Department of Marketing and Logistics, United States

Kostas Selviaridis, Associate Professor, Lancaster University, United Kingdom

Federica Ciccullo, Assistant Professor, Dipartimento di Ingegneria Gestionale, Italy

We ground our study on project complexity theory and through 15 innovation projects managed by eleven multinational firms, we explore supply chain integration decisions at the level of the innovation project. We identify distinct innovation project management strategies, understood as intertwined choices concerning project management methods and supply chain integration.

115-1933 Supply chain management practices and performance. The mediating effect of Logistics management information systems

Okyere Anim Barima, Student, Kwame Nkrumah University of Science and Technology, Ghana

John Marfo, Lecturer, Kwame Nkrumah University of Science and Technology, Ghana

Matilda Owusu-Bio, Lecturer, Kwame Nkrumah University of Science and Technology, Ghana

This study was conducted to examine the impact of LMIS usage in shaping the relationship between supply chain management practices and supply chain performance. Based on the gaps identified in literature, a framework of three main hypotheses was developed. A sample of 200 managers of health institutions were sampled.

### Invited Session

175	Tuesday, 09:45 AM - 11:15 AM, Celebration 10	Track: Supply Chain Management
	Invited Session: <b>Advances in Flexible Resource Allocation</b>	
	Chair(s): Shixin Wang	

115-0127 A New Approach for Vehicle Routing with Stochastic Demand: Combining Route Assignment with Process Flexibility

Kirby Ledvina, Student, Massachusetts Institute of Technology, United States

Hanzhang Qin, Student, Massachusetts Institute of Technology, United States

David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States

Yehua Wei, Associate Professor, Fuqua School of Business, United States

We propose a new approach for the vehicle routing problem with stochastic customer demands revealed before vehicles are dispatched. We combine ideas from vehicle routing and manufacturing process flexibility to propose overlapped routing strategies with customer sharing, and characterize the asymptotic performance of these strategies under probabilistic analysis.

115-0221 Real-Time Omnichannel Fulfillment Optimization

Zuguang Gao, Student, University of Chicago, United States

Zi Ling, Student, University of Chicago, United States

Varun Gupta, Associate Professor, University of Chicago, United States

Linwei Xin, Associate Professor, University of Chicago, United States

We consider an online omnichannel fulfillment problem. Suppose a retailer has brick-and-mortar stores and faces both online and offline demands. An online customer can be fulfilled by any store, whereas an offline customer must be satisfied by the local designated store. We develop efficient online algorithms with performance guarantees.

115-0930 Optimal Robust Sourcing with Volume Flexibility: Anticipatory Ordering Using the Shifting Operator

Joren Gijsbrechts, Assistant Professor, Catholic University of Portugal, Portugal

Christina Imdahl, Assistant Professor, Eindhoven University of Technology, Netherlands

Robert Boute, Associate Professor, KU Leuven, Belgium

Jan Van Mieghem, Professor, Northwestern University, United States

We study an inventory model with volume flexibility. We employ robust optimization and leverage the central limit theorem to express the robustly optimal base-stock levels in closed-form. The robustly optimal sourcing policy is characterized by a shifting operator defining how orders are shifted to make best use of base capacity.

115-1084 Sufficient Profitability without Significant Flexibility: The Impact of Margin Differentials on the Value of Flexibility

Shixin Wang, Assistant Professor, Chinese Univ of Hong Kong, Hong Kong, China

Jiawei Zhang, Professor, New York University, United States

Yichen Zhang, Assistant Professor, Krannert School of Management, United States

It is well believed that the value of flexibility increases as the profit margin differentials increases. Contrary to this intuition, we show that the value of flexibility decreases as the profit margin differential increases if we compare the fully flexible structure with a carefully designed sparse structure.

### Invited Session

176	Tuesday, 09:45 AM - 11:15 AM, Celebration 11	Track: Social Media and Web 2.0
	Invited Session: <b>Social Media and Video Game</b>	
	Chair(s): Xuying Zhao Duc Vu	

## Tuesday, 09:45 AM - 11:15 AM

115-1175 Selling vs Subscription for Information Goods Under Valuation Uncertainty

Duc Vu, Assistant Professor, University of Michigan-Flint, United States

Xuying Zhao, Associate Professor, University of Notre Dame, United States

Media market plays an important role in global economy. When a new product is released, the publisher considers whether to sell this product separately or to put in subscription service. Considering customers' valuation uncertainties of the new product, we derive the optimal strategy and provide managerial insights for the publisher.

115-1587 Content feeds on social media

Xuying Zhao, Associate Professor, University of Notre Dame, United States

Jane Gu, Associate Professor, University of Connecticut, United States

We consider a C2C media platform that provides content feeds to viewers. Some feeds are real content pieces, while some are ads. We study two decisions for the platform: the proportion of real content in content feeds and the degree of a variety in real content in content feeds.

115-1589 Niche Width, Internal Bonding and External Bridging: A Multilevel Perspective of Virtual Group Growth

Jingyi Sun, Assistant Professor, Stevens Institute of Technology, United States

Although internal bonding and external bridging social capital both affect virtual group sustainability, it is unknown why groups are inclined for internal or external networks. This study proposes a multilevel perspective that considers group niche width as the antecedent of internal and external networks, which affect group growth.

### Invited Session

177

Tuesday, 09:45 AM - 11:15 AM, Celebration 12

Track: Humanitarian Operations and Crisis Management

Invited Session: Priorities, Actions, & Modeling I

Chair(s): Miguel Jaller

115-0575 A risk measurement to assess the strength and weaknesses of road networks

Daniel Rivera-Royero, Student, University of California Davis, United States

Miguel Jaller, Associate Professor, University of California Davis, United States

In this paper the authors develop a risk road network performance that considers the national risk index and topological road network performances (RNP) from the literature. Additionally, the authors provide a comparative analysis and insights about the capabilities of the road network on a set of cities in California.

115-0989 Social Cost - Vehicle Routing Problem in Post-Disaster Humanitarian Logistics

Azadeh Sadeghi, Assistant Professor, University of Michigan-Flint, United States

Felipe Aros-Vera, Associate Professor, Ohio University, United States

After a disaster, delivering supplies, especially water, in different formats, such as bottled and bulk, is critical. We introduced the Social Cost Vehicle Routing Problem: a mathematical optimization model to determine the right mix of formats of supplies in terms of routing and delivery.

115-1873 Environmental sustainability through waste management in humanitarian contexts

Virva Tuomala, Post Doc/Researcher, Hanken, Finland

Gyöngyi Kovács, Professor, HUMLOG Institute, Finland

Anna Aminoff, Assistant Professor, Hanken, Finland

Environmental sustainability is an emerging concept in humanitarian contexts. Through an extensive review of grey and academic literature and an empirical study, this paper provides a framework of theoretical and practical solutions for greening the humanitarian supply chain. Particularly procurement, local action, and collaboration are highlighted as recommended action.

### Contributed Session

178

Tuesday, 09:45 AM - 11:15 AM, Celebration 13

Track: Teaching/Pedagogy in POM

Contributed Session: Alternative Approaches in Teaching Operations Management

Chair(s): Cenk Caliskan

115-1809 A Simple Algebraic Method for the Economic Production Quantity Model

Cenk Caliskan, Professor, Utah Valley University, United States

We demonstrate an approach to teach the EPQ model with backordering using only algebra and analytic geometry, which is applicable to any minimization or maximization problem with a continuously differentiable objective function. The proposed approach is a great pedagogical tool in teaching inventory management to students with less mathematical backgrounds.

115-2037 Teaching effectively (online)

Glen Schmidt, Professor, University of Utah, United States

Bo Van Der Rhee, Professor, Nyenrode University, Netherlands

Do students learn as much if the course is online vs. videoconferencing vs. in-person? Do students choosing pass-fail learn as much as if taken for a grade? What kinds of videos and problem sets and exercises are most effective? We relate some experiences related to these questions.

115-2072 Do Compressed MBA Courses Impact Student Engagement and Satisfaction?

## Tuesday, 09:45 AM - 11:15 AM

William Swart, Professor, East Carolina University, United States  
Diana Haytko, Professor, East Carolina University, United States  
Christine Kowalczyk, Associate Professor, East Carolina University, United States  
Thomas Robbins, Associate Professor, East Carolina University, United States  
Ying Liao, Associate Professor, East Carolina University, United States

Some MBA programs feature 8-week classes that compress a full semester of information into the abbreviated time interval. We present the impact that this compression has had on student engagement and satisfaction in Marketing and Operations Management classes.

### Invited Session

179	Tuesday, 09:45 AM - 11:15 AM, Celebration 14	Track: Service Operations
	Invited Session: <b>Student Best Paper Competition 2</b>	
	Chair(s): Benjamin Lawrence	

115-0823 When Harry Won't Meet Sally: Gender Disparity in Online Learning Platforms

Zhihan (Helen) Wang, Student, Ross School of Business, University of Michigan, United States  
Jun Li, Associate Professor, University of Michigan - Ann Arbor, United States  
Andrew Wu, Assistant Professor, University of Michigan - Ann Arbor, United States

Utilizing a large-scale, interaction-level dataset on Coursera, we uncover a noted gender disparity in learners' interaction with the teaching staff. Also, we show that receiving staff response in forum leads to significant improvement in course passing rate. Our results provide direct managerial implications to platform managers and course providers.

115-1027 A Multi-Treatment Forest Approach for Analyzing the Heterogeneous Effects

Minmin Zhang, Student, University of Texas at Dallas, United States  
Guihua Wang, Assistant Professor, University of Texas Dallas, United States  
Wallace Hopp, Professor, University of Michigan - Ann Arbor, United States  
Michael Mathis, Assistant Professor, University of Michigan Medical School, United States

We develop a new approach called "MT forest" to estimate the heterogeneous effects of multiple treatments. We demonstrate the effectiveness of this approach using synthetic data and apply this new approach to a clinical setting to examine the effect of team familiarity on surgery duration.

115-1367 A Field Experiment on AI-Assisted Physicians

Ting Hou, Student, University of Science and Technology of China, China  
Meng Li, Associate Professor, University of Houston, United States  
Yinliang (Ricky) Tan, Associate Professor, University of Houston, United States  
Huazhong Zhao, Associate Professor, City University of Hong Kong, China

In this study, we conduct a field experiment and examine the impact of AI strategies on service providers' adoption behavior. Our results indicate that AI smartness leads to higher adoption rates, while the effect of disclosure of information is contingent on the level of the assistant smartness.

115-2145 Towards Achieving Mental Health Equity in Underserved Communities: Evaluating the Potential of Mobile Apps

Yi Tang, Student, University of Minnesota, United States  
Kingshuk Sinha, Professor, University of Minnesota, United States  
Adam Moen, Founder and Principal, ., United States  
Necati Ertekin, Assistant Professor, University of Minnesota, United States

We empirically investigate user usage behavior of a mental health mobile app and its impact on users' self-reported mental conditions. The results indicate that mobile apps can create capacity in a mental healthcare supply chain so as to reduce the disparities associated with gender, sexual orientation, and race-ethnicity.

### Invited Session

180	Tuesday, 09:45 AM - 11:15 AM, Celebration 15	Track: Information Systems and Operations Management
	Invited Session: <b>Retail and Ecommerce</b>	
	Chair(s): Luna (Xingyue) Zhang	

115-0306 BM Retailer's Exclusive Brand Introduction Decision and Consumer Showrooming: A Dual Channel Perspective

Prasenjit Mandal, Associate Professor, NEOMA Business School, France  
Abhishek Roy, Assistant Professor, Temple University, United States

In a two-tier supply chain with a supplier and a brick-and-mortar (BM) retailer, we investigate how consumer showrooming interacts with the retailer's exclusive store brand strategy. Counterintuitively, the BM retailer benefits from consumer showrooming when it carries a store brand. The store brand strategy may lead to a 'win-win' outcome.

115-0458 Search Routes in Mobile Commerce

Luna (Xingyue) Zhang, Assistant Professor, University of Washington, United States  
Raluca Ursu, Assistant Professor, New York University, United States  
Elisabeth Honka, Assistant Professor, University of California, Los Angeles, United States  
Yuliang Yao, Professor, Lehigh University, United States

## Tuesday, 09:45 AM - 11:15 AM

We collect panel data from a mobile shopping app containing detailed information on consumer browsing for sandals over six months. We develop a sequential search model to quantify preferences, discovery costs, and search costs. Our results show that product discovery costs are five times lower than product search costs.

115-0856 The impact of "Shop & Scan" technology on buyer behavior

Ruifeng (Brett) Wang, Student, University of Maryland - College Park, United States

Martin Dresner, Professor, University of Maryland, United States

Yuliang Yao, Professor, Lehigh University, United States

Xiaodan Pan, Assistant Professor, Concordia University, Canada

Kevin Park, Assistant Professor, University of Dayton, South Korea

Using quasi-experimental data, we analyze how Shop & Scan technology impacted consumer foot traffic at locations of a major retail chain. Results show that this technology increased visit frequency, decreased dwell time in stores, differentially impacted minority consumers, and was associated with lower foot traffic at competitors.

115-2134 An expectation confirmation model (ECM): study of customers' continuance usage intention of smartphone banking applications

Nambirajan Thangasamy, Retired, Pondicherry University, India

Smartphone banking apps are applications provided to access banking services. Authors aim to look at antecedents that influence the customers to accept and improve their continuance usage intention of smartphone banking. A questionnaire survey was used to study 514 users. Results will be useful to improve banking service operations.

### Invited Session

181 Tuesday, 09:45 AM - 11:15 AM, Coral Spring 1

Track: Emerging Topics in Operations Management

Invited Session: **Emerging Topics in Operations Management VII**

Chair(s): Yang Li

115-0516 Probabilistic Approximations for Network Revenue Management

Saied Samiedaloui, Assistant Professor, University of Alberta, Canada

Dan Zhang, Professor, University of Colorado Boulder, United States

Rui Zhang, Assistant Professor, University of Colorado Boulder, United States

We propose probabilistic approximations to capture the interactions among resources for network revenue management. The probabilistic approximations are stronger than SPL approximation in the sense that they lead to tighter upper bounds. Our numerical results also suggest that the probabilistic approximations lead to better control policies than the SPL approximation.

115-0899 Fairness in Pollution Regulation: The Polluter-Pays Principle Under Cap-and-Trade

Krishnan Anand, Associate Professor, University of Utah, United States

Francois Giraud-Carrier, Associate Professor, Weber State University, United States

Fairness in pollution regulation is an important and much-debated question, especially given multiple stakeholders with conflicting objectives. We develop a novel pollution-control mechanism that we use as a benchmark of fairness. We then assess the fairness of Cap-and-Trade and Taxes against this benchmark.

115-0973 Digital Goods Reselling: Implications on Cannibalization and Price Discrimination

Hongqiao Chen, Assistant Professor, Nanjing University, China

Ying-Ju Chen, Professor, Hong Kong University of Science and Technology, Hong Kong, China

Yang Li, Assistant Professor, Richard Ivey Business School, Canada

Xiaoquan Zhang, Professor, Tsinghua University, China

Sean Zhou, Professor, Chinese Univ of Hong Kong, Hong Kong, China

Resale of digital goods is often prohibited due to the concern of primary market cannibalization. Yet, we posit that resales can be an effective tool of managing heterogeneous demand if the digital goods can be sold with optimized usage allowance.

115-1324 Platform Governance in the Presence of Provider Competition: Do Regulations Boost Service Quality?

Xuan Zhao, Professor, Wilfrid Laurier University, Canada

Li Jiang, Professor, Hong Kong Polytechnic Univ, Hong Kong, China

Xiaokai Wu, Post Doc/Researcher, Wilfrid Laurier University, Canada

We consider a setting where two platforms enforce service standards and set prices, based on which heterogeneous providers and consumers decide whether and which platform to join. We find that social-welfare maximizing regulations might actually downgrade the service standard.

### Contributed Session

182 Tuesday, 09:45 AM - 11:15 AM, Coral Spring 2

Track: Emerging Topics in Operations Management

Contributed Session: **Electric Vehicles**

Chair(s): Mucahit Ozden

115-0118 Electric Vehicle Adoption Intention: An Empirical Study in China

Dingni Wang, Student, University of Warwick, United Kingdom

Mucahit Ozden, Post Doc/Researcher, University of Warwick, United Kingdom



## Tuesday, 09:45 AM - 11:15 AM

An extended model using the Unified Theory of Acceptance and Use of Technology (UTAUT), integrating perceived risk, price value and policy incentives, was developed to predict customers' adoption intention of EVs. Quantitative data was collected from 348 valid surveys and analysed using the structural equation model (SEM).

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### 115-1841 Real-time Optimal Charging Schedule and Routing Algorithm for Logistic Service Providers

Shalini Velappan, Assistant Professor, IIM Tiruchirappalli, India

Sabitha Devarajulu, Student, IIM Tiruchirappalli, India

In this research, we propose mixed-integer optimization model for real time optimal charging schedule and routing for electric vehicles to meet the ongoing demand of logistic service providers such as Fedex, DHL, Amazon and So on. In addition, we perform sensitivity analysis to evaluate several business scenarios and constraints.

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### 115-1876 Fast-charging versus battery-swapping: a way-out or a dead-end?

Yudi Zhang, Student, University of Bristol, Great Britain

Xiaojun Wang, Professor, University of Bristol, United Kingdom

Bangdong Zhi, Lecturer, University of Bristol, United Kingdom

Existing electric vehicle manufacturers have invested significantly in developing efficient recharging services. Motivated by the ongoing debate on whether the fast-charging and battery-swapping services are way-outs or dead-ends, our research aims to explore whether and how the service provider should invest in these emerging charging services.

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### 115-1877 Too late or too early: Optimal market entry strategy for battery-swapping service

Yudi Zhang, Student, University of Bristol, Great Britain

Xiaojun Wang, Professor, University of Bristol, United Kingdom

Bangdong Zhi, Lecturer, University of Bristol, United Kingdom

Electric vehicle commercial charging services are currently dominated by the fast-charging service. This study investigates the optimal market entry strategy for the battery-swapping service, a new market entrant that seeks to challenge the incumbent fast-charging service and redefine the growing electric vehicle charging service market.

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## Invited Session

183	Tuesday, 09:45 AM - 11:15 AM, Blue Spring 1	Track: Supply Chain Risk Management
	Invited Session: Environmental Risk Management	
	Chair(s): Shirin Shahsavand	

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### 115-0722 An Empirical Investigation of Facility-Level Operations and Disparities in Occupational Hazards in Minority Communities.

Abhinav Shubham, Student, Georgia Institute of Technology, United States

Ravi Subramanian, Professor, Georgia Tech, United States

Racial and ethnic factors, coupled with gaps in equal employment opportunities and differing facility-level operational characteristics, may contribute to disparities in exposure to occupational safety hazards. We empirically investigate the occupational safety hazards associated with facility-level operational choices in host communities with differing demographics.

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### 115-1083 An Operational Perspective on Microfinancing in Developing Countries

Opher Baron, Professor, University of Toronto, Canada

Elaheh Rashidinejad, Student, Rotman School of Management, Canada

Gonzalo Romero, Assistant Professor, University of Toronto, Canada

We compare two microfinancing setups in developing countries where an entrepreneur borrows loan to start a business. The entrepreneur faces a Newsvendor problem with finance and effort. We characterize conditions under which community bank, by applying social pressure on the entrepreneur to repay all debt, improves individual and social welfare.

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### 115-1600 Decarbonization Logistics: Does the Truth Hurt?

Qingyun Zhu, Assistant Professor, University of Alabama Huntsville, United States

Yanji Duan, Assistant Professor, University of North Florida, United States

Joseph Sarkis, Professor, Worcester Polytechnic Institute, United States

Retailers decarbonize logistics to mitigate environmental and reputational risks. Blockchain and decarbonization, each can be expensive and complex to manage. We examine how blockchain-supported carbon offset information provision and shipping options with different cost implications impact consumer perceptions toward retailers and logistics providers.

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### 115-1659 Breaking the Invisible Cage: Investigating the Gender Wage Gap in Gender-Blind Online Platforms

Li Ding, Student, Georgia Institute of Technology, United States

Basak Kalkanci, Associate Professor, Georgia Institute of Technology, United States

Our study seeks to investigate differences in self-evaluation biases between genders as potential contributors to the gender wage gap in online platforms, and explore potential strategies to mitigate the gap. We leverage a gender-blind online labor platform and conduct a two-phased field experiment.

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### 115-1752 Mitigating environmental risk of apparel supply chains by clothing the loop

Shirin Shahsavand, Student, Washington State University, United States

Yixuan Xiao, Assistant Professor, Washington State University, United States

Kevin Mayo, Assistant Professor, Washington State University, United States

## Tuesday, 09:45 AM - 11:15 AM

Charles Munson, Professor, Washington State University Pullman, United States

The apparel industry contributes significantly to annual carbon emissions and overflowing landfill, which may risk business with younger, environmentally conscious consumers. We develop a stylized model to investigate how apparel firms can mitigate their environmental impact by offering end-of-life/end-of-use apparel collection programs and providing incentives to encourage consumers to participate.

### Invited Session

184

Tuesday, 09:45 AM - 11:15 AM, Blue Spring 2

Track: Empirical Research in Operations Management

Invited Session: Empirical Research in Healthcare Operations

Chair(s): Chia-Chun Yang

#### 115-1037 Analyzing Professional Ethics of Physicians Using Online Patient Reviews: A Machine Learning Approach

Kanix Wang, Assistant Professor, University of Cincinnati, United States

Feng Mai, Assistant Professor, Stevens Institute of Technology, United States

Jay Shan, Assistant Professor, University of Miami, United States

David Zhang, Assistant Professor, Lehigh University, United States

Xiaosong (David) Peng, Professor, Lehigh University, United States

To study how patient complaints contribute to the regulation of ethical conduct in medical profession, we introduce a novel language-model-based measure of physicians' professional ethics, grounded in ethical theories. Empirical findings from 1.5 million patient reviews suggest that our measures can help predict both future disciplinary actions and pay-to-prescribe tendency.

#### 115-1242 Virtuous Spillover Effects of Quality Penalties on the Continuity of Health Care

Aishwarya Deore, Assistant Professor, Georgetown University, United States

Ranjani Krishnan, Professor, Michigan State University, United States

Anand Nair, Professor, Michigan State University, United States

We examine whether a quality regulation that penalized hospitals for excess readmissions has implications for continuity of care through direct and indirect spillovers. We conduct difference-in-differences analyses using patient-level data and the empirical strategy utilizes the nature of the hospital production function which is organized by medically related specialties.

#### 115-1315 Effect of Shift Structure on Service-Worker Fatigue: Evidence from Emergency Department Caregivers

Chia-Chun Yang, Student, University of Cincinnati, United States

Craig Froehle, Professor, University of Cincinnati, United States

Elizabeth Leenellett, Professor, University of Cincinnati, United States

Service worker fatigue is known to harm work quality, but what is unknown is how shift structures influence fatigue. Using primary data from emergency caregivers, we examine how shift duration and timing drive fatigue, and how the fatigue-reduction efficacy of workers' recovery time is affected by their between-shift activities.

### Invited Session

185

Tuesday, 09:45 AM - 11:15 AM, Rainbow Spring 1

Track: Empirical Research in Operations Management

Invited Session: Empirical Research in Supply Chain Management

Chair(s): Daesik Hur

#### 115-1234 Strategic fit in the configuration of global production networks

Gwen Louis Steier, Post Doc/Researcher, University of South Carolina Aiken, Germany

Fabian Klinkner, Student, Institute of Technology Management, University of St. Gallen, Switzerland

Sina Peukert, Post Doc/Researcher, wbk Institute for Production Science, Karlsruhe Institute of Technology, Germany

Gisela Lanza, Professor, Karlsruhe Institute of Technology, Germany

The configuration of global production networks according to the strategy and the corporate environment, termed as strategic fit, is a complex challenge in practice. In this contribution, causal relations between network structure, strategic goals and environmental factors are presented in a conceptual model and validated with an empirical mixed-methods approach.

#### 115-1328 Incentivizing Suppliers via Opportunity Cost: Evidence from Commercial Real Estate

Alper Nakkas, Assistant Professor, University of Texas Arlington, United States

Jayarajan Samuel, Assistant Professor, The University of Texas at Arlington, United States

Sriram Villupuram, Associate Professor, University of Texas Arlington, United States

Commercial real estate spaces are a critical link in a business's supply chain. Government regulations play an important role in keeping these links robust. Using a unique data set of commercial rental information in four metropolitan areas in North America we assess the impact of government incentives on rental contracts.

#### 115-1627 Supply chain resilience. How supply networks react to product-level shocks.

James Zhang, Post Doc/Researcher, Eindhoven University of Technology, Netherlands

Shaunak Dabadghao, Assistant Professor, Technische Universiteit Eindhoven, Netherlands

Maximiliano Udenio, Associate Professor, KU Leuven, Belgium

In this paper, we use a rich secondary dataset on product-level import/export relationships to analyse the evolution of the supply chain network as a reaction to shocks, a.o., the imposition of new tariffs and entry restrictions at the HTS code level.

## Tuesday, 09:45 AM - 11:15 AM

115-2068 Quantification of the Strategic Fit Between Process Choice Criteria and Manufacturing Systems

Vishwas Dohale, Student, National Institute of Industrial Engineering, Mumbai, India

This study formulated an integrated framework comprising Delphi, Voting AHP, and Bayesian network for selecting the best-suited production system by quantifying the strategic fit between process choice criteria (PCC) and manufacturing systems. Total 22 cases within traditional and additive manufacturing systems are evaluated to understand the benchmark level of PCC.

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### Invited Session

186	Tuesday, 09:45 AM - 11:15 AM, Rainbow Spring 2	Track: Operational Excellence
	Invited Session: Behavioral impacts of digital technologies on improvement processes and routines	
	Chair(s): Andrea Furlan	

115-0069 Providing real-time feedback to workers: A field experiment in a digitalized production setting

Daniel Kwasnitschka, Student, ETH Zürich, Switzerland

Henrik Franke, Post Doc/Researcher, Swiss Federal Institute of Technology Zurich, Switzerland

Torbjørn Netland, Assistant Professor, Eth Zurich, Switzerland

Using a large-scale and multi-site field experiment, we analyze 29.669 machine statuses and study the productivity effects of providing workers real-time performance feedback via a smartwatch technology. We allocate several combinations of different feedback to workers, providing novel theoretical insights on the combination of feedback framing and reference points.

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115-0587 How employees solve problems in digital contexts?

Ambra Galeazzo, Professor, Università Degli Studi Di Padova, Italy

Andrea Furlan, Professor, Padova University, Italy

Michela Carraro, Student, University of Padova, Italy

According to routine dynamics literature, employees combine reflective, mindful actions with routinized, mindless ones while performing their routines. Based on a field experiment, our paper investigates whether and why employees shift to reflective actions when problems occur. Furthermore, do digital technologies affect this shift in problem solving?

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115-1156 The learning perspectives of digital lean manufacturing

Daryl Powell, Professor, Norwegian University of Science And Technology, Norway

In this paper, we explore the digital enhancement of lean practices to accelerate learning capabilities within and across lean organizations. We draw on practical insights from a multiple case study and provide recommendations for manufacturing companies embarking on their digital lean Journey.

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115-1607 How Lean and Industry 4.0 affects production workers? Testing competing models

Alejandro Frank, Associate Professor, Federal University of Rio Grande do Sul, Brazil

Timothy Sturgeon, Post Doc/Researcher, Massachusetts Institute of Technology, United States

Guilherme Benitez, Student, Federal University of Rio Grande do Sul, Brazil

Giuliano Marodin, Associate Professor, University of South Carolina, United States

We test competing models for the relationship between Lean and Industry 4.0 with workers' performance and employment. We use a randomized sampling from the Brazilian National Confederation of Industries. We analyze 415 companies through regression models, showing how Lean, Industry 4.0, and people are related.

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### Invited Session

187	Tuesday, 09:45 AM - 11:15 AM, Barrel Spring 1	Track: POM-Marketing Interface
	Invited Session: Marketing and Operations of the Online Platform and Marketplaces	
	Chair(s): Bo Zhou Buqing Ma	

115-1502 Buy Now, Pay Later Competition Under Competitive Market

Buqing Ma, Assistant Professor, University of Science and Technology of China, China

Yi Zhu, Associate Professor, University of Minnesota, United States

we investigate how the Buy Now Pay Later plan affects the product competition, retailers' and lenders' profits, and consumer surplus. We find that compared to the monopolistic lender, the competition between two lenders can soften the product competition (i.e., higher retail prices).

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115-1768 Self-Preferencing in E-commerce Marketplaces: The Role of Sponsored Advertising and Private Labels

Fei Long, Assistant Professor, University of North Carolina Chapel Hill, United States

In recent years, e-commerce platforms have begun to leverage private label and sponsored advertising to generate additional revenue. We study when and why a platform may seek to give preference to its private label in sponsored advertising, and what the implications of this are for consumers and third-party sellers.

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115-2010 Role of Aggregator Platforms in Sustainability of Social Enterprises

Vinaysingh Chawan, Assistant Professor, Indian Institute of Management Indore, India

Bhavani Shankar Saripalli, Associate Professor, Indian Institute of Management Indore, India

## Tuesday, 09:45 AM - 11:15 AM

Ensuring sustainability and profitability of small scale social enterprises is possible via aggregator platforms. The platforms help social enterprises in overcoming the uncertainties in supply and demand. It further helps in promoting the artisan created product differentiation and facilitates marketing by aggregating products to serve demand.

### 115-2050 How Does Best Seller Recommendation Shape the Ecosystem of an Online Marketplace?

Farzad Fathi, Student, University of Maryland, United States

Yi Xu, Associate Professor, University of Maryland, United States

Bo Zhou, Associate Professor, University of Maryland, United States

This paper studies the impact of the best seller recommendation, a widely used popularity-based system, on consumers, sellers, and the online marketplace. The results highlight the importance of accounting for the strategic response of the sellers before an online marketplace implements the best seller recommendation system.

## Invited Session

188	Tuesday, 09:45 AM - 11:15 AM, Barrel Spring 2	Track: Procurement and Supplier Management
	Invited Session: <b>Advances in Inventory Theory</b>	
	Chair(s): Melvin Drent	

### 115-0541 Stochastic Inventory Control with Non-Stationary Demand

Lotte van Hezewijk, Student, Eindhoven University of Technology, Netherlands

Nico Dellaert, Associate Professor, Eindhoven University of Technology, Netherlands

Willem Van Jaarsveld, Associate Professor, Eindhoven University of Technology, Netherlands

We propose a demand model that can be used to generate realistic non-stationary demand scenarios. The suitability of this demand model is illustrated by evaluating the performance of improved inventory control policies based on this model in a stochastic inventory control problem with fixed ordering costs and lead time.

### 115-0974 Multi-Echelon Inventory Optimization using Deep Reinforcement Learning

Kevin Geevers, Analytics Consultant, ORTEC, Netherlands

Lotte van Hezewijk, Student, Eindhoven University of Technology, Netherlands

Martijn Mes, Professor, Twente University Enschede, Netherlands

This paper studies the applicability of a deep reinforcement learning approach to three different multi-echelon inventory systems, with the objective of minimizing the holding and backorder costs. We conduct an extensive literature review to map the current applications of reinforcement learning in multi-echelon inventory systems and implement a PPO algorithm.

### 115-1908 Projected Inventory Level Policies for Lost Sales Inventory Systems: Asymptotic Optimality in Two Regimes

Willem Van Jaarsveld, Associate Professor, Eindhoven University of Technology, Netherlands

Joachim Arts, Professor, University of Luxembourg, Luxembourg

We consider the canonical periodic review lost-sales inventory system with lead-times and i.i.d. demand under the average cost criterion. We introduce a new policy that places orders such that the expected inventory level at the time of arrival of an order is at a fixed level and study asymptotic optimality.

### 115-2030 Automating Due Diligence

Shawn Bhimani, Assistant Professor, Northeastern University, United States

We present initial findings from our analysis of thousands of buyer supplier relationships for social responsibility risk using automated tools such as machine learning and NLP. This provides insights based on an ongoing paradigm shift in due diligence and governance.

## Invited Session

189	Tuesday, 09:45 AM - 11:15 AM, Rock Spring	Track: POM-Economics Interface
	Invited Session: <b>OM-Economics Interface: innovative Applications</b>	
	Chair(s): Tim Kraft      Manish Tripathy	

### 115-0110 Trust-and-evaluate: A Dynamic Non-monetary Mechanism for Internal Capital Allocation

Shivam Gupta, Assistant Professor, University of Nebraska Lincoln, United States

Saurabh Bansal, Associate Professor, Penn State University University Park, United States

Milind Dawande, Professor, University of Texas Dallas, United States

Ganesh Janakiraman, Professor, University of Texas Dallas, United States

To stay competitive, firms regularly invest in internal capital projects and request proposals from managers for funding. Managers are better informed about the costs and benefits of their projects, and can use this information strategically to secure funding. We propose a truthful, near-optimal dynamic nonmonetary mechanism for this problem.

### 115-0459 The influence of machine learning techniques on airlines' on-time performance

Rang Gong, Student, Ohio State University, United States

Xiang Wan, Assistant Professor, Ohio State University, United States

## Tuesday, 09:45 AM - 11:15 AM

We explore how airlines use machine learning (ML) techniques to improve their operational performance through empirical analyses. Although AI-based ML approaches are expected to enhance on-time performance, it remains unclear when the benefit of ML techniques can be observed, how much it is, and what mechanisms to achieve improved performance.

### 115-1116 Competitive Implications of Spectrum Sub-Leasing on Price, Quality and Sourcing Decisions

Manish Tripathy, Post Doc/Researcher, Sauder School of Business, UBC, Canada

Tim Kraft, Associate Professor, 2801 Founders Dr, United States

H. Sebastian Heese, Professor, North Carolina State University, United States

We study a duopoly cellular network market, wherein two Mobile Network Operators (MNOs) compete on price and quality, but also, potentially sub-lease spectrum to a Mobile Virtual Network Operator (MVNO). We analyze the impact of an MVNO on market factors such as quality of service, service price, and market structure.

### 115-1478 Business Operations Redesign and Working-Condition Improvement in Agribusiness

Dongsheng Li, Student, Penn State University University Park, United States

Saurabh Bansal, Associate Professor, Penn State University University Park, United States

Karthik V. Natarajan, Associate Professor, University of Minnesota, United States

Phillip Coles, Associate Professor, Lehigh University, United States

We investigate how business operations can be redesigned to improve both a firm's performance and workers' working conditions in agribusiness. We provide a multi-dimensional decision support system based on the optimal strategies of our model. We further calibrate our model using industry data.

## Contributed Session

**190** Tuesday, 09:45 AM - 11:15 AM, Regency Ballroom Q Track: Revenue Management and Pricing

### Contributed Session: Spatial and Network Revenue Management

Chair(s): Sven Müller Asrar Ahmed

#### 115-0004 Spatial Revenue Management in Public Transport

Sven Müller, Professor, Rwth Aachen University, Germany

Lorena Reyes, Post Doc/Researcher, OvGU, Germany

We present approaches to designing a counting zones tariff system in public transportation. The approaches are able to account for different spatial patterns of the resulting zones. We present results of a case study using real world data from the San Francisco Bay Area.

#### 115-1128 Capacity Pooling for Network Revenue Management

Asrar Ahmed, Student, Indian School of Business, India

Milind Sohoni, Professor, Indian School of Business, India

Sumit Kunnumkal, Assistant Professor, Indian School of Business, India

Raja Gopalakrishnan, General Manager, INDIAN RAILWAYS, India

Motivated by the resource allocation rule used by a large passenger rail operator, we explore capacity pooling as a control mechanism. We present a dynamic programming formulation, highlight pooling benefits, develop approximate solution and provide structural insights. We numerically demonstrate the performance gains of our solution.

#### 115-1461 Degeneracy is OK: Logarithmic Regret for Network Revenue Management with Indiscrete Distributions

Jiashuo Jiang, Assistant Professor, Hong Kong University of Science and Technology, China

Will Ma, Assistant Professor, Columbia University, United States

Jiawei Zhang, Professor, New York University, United States

We study the classical Network Revenue Management (NRM) problem with accept/reject decisions and T IID arrivals. We consider a distributional form where each arrival must fall under a finite number of possible categories. We develop new algorithms achieving logarithmic regret without assuming non-degeneracy that is usually required by previous analysis.

## Invited Session

**191** Tuesday, 09:45 AM - 11:15 AM, Regency Ballroom O Track: Retail Operations

### Invited Session: Emerging Topics in Retail Operations

Chair(s): Hang Ren

#### 115-0423 Freemium Pricing of Conspicuous Digital Goods in Free-to-play Multiplayer Games

Hang Ren, Assistant Professor, George Mason University, United States

Esma Koca, Lecturer, Imperial College London, United Kingdom

Ioannis Bellos, Associate Professor, George Mason University, United States

Lifei Sheng, Assistant Professor, University of Houston Clear Lake, United States

Many free-to-play multiplayer games offer digital goods at a monetary price and a price in virtual currency which is earned with playtime. These goods do not provide gameplay advantages but furnish unique cosmetics. In a game-theoretic framework, we show that players' exclusivity-seeking behavior can support the publisher's freemium offering.

#### 115-0777 Selling to time-inconsistent consumers in the presence of consumer-to-consumer secondary market

Chen Pang, Student, Hong Kong Polytechnic Univ, Hong Kong, China

## Tuesday, 09:45 AM - 11:15 AM

Li Jiang, Professor, Hong Kong Polytechnic Univ, Hong Kong, China

Gang Li, Professor, Xi'an Jiaotong University, China

The time difference between immediate payment and delayed payoff gives rise to time-inconsistent purchases and overestimation of current utilities by consumers. This paper investigates the effect of time inconsistency on the pricing strategy of a monopolist who sells different versions of new products with the existence of second-hand transactions intra-consumers.

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### 115-0779 Local Trade-in vs. Cross-brand Trade-in Program in Vertically Differentiated Market

yi Tong, Student, Xi'an Jiaotong University, United States

Gang Li, Professor, Xi'an Jiaotong University, China

Guangzhi Shang, Associate Professor, Florida State University, United States

We build a two-period model to consider one competition between an incumbent and an entrant where the entrant offers the cross-brand trade-in program (CTP, exchange product A for a cheaper product B) to poach the incumbent's customers. However, we find that CTP can benefit the incumbent considering consumers' forward-looking behavior.

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### 115-1813 The Warehouse of the Future for CPGs

Miguel Rodriguez Garcia, Post Doc/Researcher, Massachusetts Institute of Technology, United States

Maria Jesus Saenz, Associate Professor, Massachusetts Institute of Technology, United States

Eva Ponce-Cueto, Associate Professor, Massachusetts Institute of Technology, United States

This paper identifies the key elements that will define the warehouse of the future for CPGs. This work considers how warehouse design and operations are affected by fast technological development and the move towards omnichannel retailing. The discussion focuses on the tradeoffs between efficiency, complexity and flexibility in the warehouse.

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## Invited Session

192	Tuesday, 09:45 AM - 11:15 AM, Regency Ballroom P	Track: Disruptive Technologies and Operations Management
	Invited Session: AI and Disruptive Technologies	
	Chair(s): Jason Wu	

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### 115-0674 Should the Seller Offer Multiple Shipping Speed Options in Online Market Bargaining?

Wen Zhang, Assistant Professor, Baylor University, United States

Guihua Wang, Assistant Professor, University of Texas Dallas, United States

We empirically study online marketplace bargaining and find that the buyer is more likely to concede when the seller offers multiple shipping speed options. We also analyze the heterogeneity effects using generalized random forests.

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### 115-1170 Trust and Trustworthiness: Experiments with Artificial Intelligence (AI) Agents

Jason Wu, Post Doc/Researcher, University of Houston, United States

Kay Yut Chen, Professor, University of Texas Arlington, United States

Yan Wu, Associate Professor, San Jose State University, United States

Lei Hua, Assistant Professor, University of Texas At Tyler, United States

The trust game, a simple two-person economic exchange, has been extensively used as experimental measures for trust and trustworthiness of individuals. Here, we develop deep neural network-based artificial intelligence (AI) agents to participate a series of experiments based upon the trust game.

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### 115-1677 How human-AI collaboration impacts demand planning

Elena Revilla, Professor, IE Universidad, Spain

Maria Jesus Saenz, Post Doc/Researcher, MIT, United States

Jafar Namdar, Post Doc/Researcher, Massachusetts Institute of Technology, United States

In the context of AI-demand planning under Human-AI collaboration, this paper conducts experiments with 1800 SKUs. We demonstrate that when uncertainty is low, demand forecasting accuracy mediates the relationship between the Human-AI demand forecasting method and inventory. When uncertainty is high, the effect of algorithm aversion impedes this mediation.

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## Invited Session

193	Tuesday, 09:45 AM - 11:15 AM, Silver Spring 1	Track: Data Science and Analytics
	Invited Session: Data Analytics for Electrical Vehicle Systems Design	
	Chair(s): Ibrahim Capar	

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### 115-0148 Pricing and Producing Green Products: The Case of Subsidy Termination and Competition

Lingling shi, Student, UT Dallas, United States

Metin Cakanyildirim, Professor, University of Texas Dallas, United States

Suresh Sethi, Professor, University of Texas Dallas, United States

Government subsidies help industries achieve green product adoption targets. However, subsidies will terminate. Accounting for this termination and the interplay among subsidy, learning-by-doing and competition, we develop a two-period Stackelberg-Nash game between the government and the manufacturer(s). We provide equilibrium prices, production quantities, optimal subsidy amounts and managerial insights.

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### 115-0149 Stochastic Network Design for Blockchain-based Electric Vehicle Charging Payment Systems

## Tuesday, 09:45 AM - 11:15 AM

Zhangchen Hu, Student, University of Massachusetts Amherst, United States  
Heng Chen, Assistant Professor, University of Nebraska Lincoln, United States  
Senay Solak, Professor, University of Massachusetts Amherst, United States

Environmental awareness has stimulated the increasing popularity of electric vehicles. However, there are two critical challenges to the widespread adoption of EVs: range anxiety and privacy concerns. To help deal with such challenges, we propose a stochastic optimization approach to establish a Blockchain-based network payment system for suppliers and users.

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### 115-0165 Simulation-based ADP Charging Policy For EV Fleets With Heterogeneous Vehicles

Ehsan Mahyari, Student, University of Alabama Tuscaloosa, United States  
Nickolas Freeman, Associate Professor, University of Alabama Tuscaloosa, United States

A simulation-based approximate dynamic programming approach is developed to design charging policies for charging depots serving fleets of heterogeneous electric vehicles with the goal of minimizing total charging costs and maximizing service reliability in light of the trade-offs that Charging-as-a-Service providers face.

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### 115-1812 Considering Capacity in Designing Electrical Vehicle Chargers

Ibrahim Capar, Assistant Professor, Bowling Green State University, United States  
Ozgur Araz, Professor, University of Nebraska Lincoln, United States  
Ismail Capar, Associate Professor, Texas A&M University College Station, United States

In this research, we present a network design framework to improve the infrastructure for EVs with quality of service constraints. The model formulation allows assessing capacity and quality of service trade-offs and support service network design decisions. We the performance based on both computational efficiency and solution quality.

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## Invited Session

194	Tuesday, 09:45 AM - 11:15 AM, Silver Spring 2	Track: Inventory and Logistics Management
	Invited Session: <b>Managing inventory in food systems</b>	
	Chair(s): Nina Mayer	

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### 115-0268 Reducing Third-party Storage Costs Using Shorter Production-runs in a Food Packaging Company: A Trade-off Analysis

Ram Roy, Senior Lecturer, Eastern Institute of Technology, Napier,, New Zealand

A food company observed that production costs increase when production run-times are shortened, while third-party storage costs decrease but the company is undecided about which way to go. A trade-off analysis was conducted to determine whether savings in storage costs significantly outweigh rise in production costs for different meals types.

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### 115-0490 Pricing, advertising, and inventory replenishment strategies in a three-echelon food supply chain for growing items.

Makoena Sebatjane, Lecturer, University of Pretoria, South Africa

Most food production systems commence with the rearing of live growing items, followed by the processing of these items into packaged, ready-for-sale food products, and finally, the food products are sold in retail outlets. This paper will investigate the impact of advertising and pricing strategies on food supply chains.

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### 115-0855 Collaboration Mechanisms for Food Waste Reduction in Supply Chains Considering Shelf-Life Variability and Behavioral Aspects

Nina Mayer, Student, Kuehne Logistics University, Germany  
Sandra Transchel, Professor, Kuehne Logistics University, Germany

Reducing food waste through improved inventory management in fresh food supply chains requires the consideration of product shelf-life variability and the interest alignment of the different supply chain partners. Using a serious game, we study how and to what extent collaboration mechanisms can reduce food waste, accounting for behavioral aspects.

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### 115-1480 The impact of standardization on the effectiveness of reusable packaging systems

Sandra Transchel, Professor, Kuehne Logistics University, Germany

Reusable primary packaging for food products is becoming increasingly important. However, a particular challenge for the widespread implementation of reusable systems is an efficient logistics. We study the impact of standardization on the efficiency and effectiveness of reusable packaging systems.

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## Invited Session

195	Tuesday, 09:45 AM - 11:15 AM, Winter Park 49	Track: Product Innovation and Technology Management
	Invited Session: <b>Collaboration, Incentives and Innovation</b>	
	Chair(s): Zhi Chen	

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### 115-0287 Advising Entrepreneurs: Optimal Recommendation of Alternatives

Zeya Wang, Student, Georgia Institute of Technology, United States  
Morvarid Rahmani, Associate Professor, Georgia Institute of Technology, United States  
Karthik Ramachandran, Professor, Georgia Institute of Technology, United States

Facing emergent business challenges, entrepreneurs often seek guidance from experienced advisors. When there are multiple alternatives that could potentially solve the entrepreneur's problem, advisors can lead the entrepreneur's exploration by choosing which alternative(s) to suggest and in what sequence.

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## Tuesday, 09:45 AM - 11:15 AM

115-0677 Mergers between On-Demand Service Platforms: The Impact on Consumer Surplus and Labor Welfare

Xiaogang Lin, Lecturer, Guangdong University of Technology, China

Tao Lu, Assistant Professor, University of Connecticut, United States

Xin Wang, Assistant Professor, Hong Kong University of Science & Tech, Hong Kong, China

We study the impact of mergers between on-demand service platforms on consumer surplus and labor welfare. We incorporate two into the study: the cross-side network effect and the pooling of agents and consumers. We find that these two features can make a merger beneficial to all parties under certain conditions.

115-0879 Fairness Concerns in Heterogeneous Teams: Optimal Team Composition and Contract

Lin Chen, Student, INSEAD, France

Antoine Desir, Assistant Professor, INSEAD, France

Guillaume Roels, Professor, INSEAD, France

When managing heterogeneous teams, a manager may choose to over-use the most efficient member, potentially giving rise to inequalities, or require more even involvement at the cost of lower output. Is there a fairness-efficiency tradeoff? Our analysis demonstrate that the best team contract could be envy- and guilt-free.

115-1451 Dynamic Development Contests

Sina Moghadas Khorasani, Assistant Professor, University of Dayton, United States

Ersin Korpeoglu, Associate Professor, University College London, United Kingdom

Vish Krishnan, Professor, University of California San Diego, United States

We derive optimal dynamic development contests with enriched rank-based incentives and carefully-tailored information design that can help organizations leverage their suppliers for their development projects while seeking to minimize project lead time by stimulating competition among them.

### Invited Session

196	Tuesday, 09:45 AM - 11:15 AM, Winter Park 50	Track: Socially Responsible Operations
	Invited Session: <b>Socially Responsible Supply Chains</b>	
	Chair(s): Natalie (Ximin) Huang      Sining Song	

115-0993 The Effect of Fuel Tax on Firms' Performance

Fahimeh Chomachaei, Assistant Professor, University of Massachusetts Boston, United States

Davood Golmohammadi, Associate Professor, University of Massachusetts Boston, United States

Robert Klassen, Professor, Ivey Business School, Western University, Canada

There is a growing concern regarding CO2 emissions. One way to decrease carbon levels from human activities is through a fuel tax. The effect of fuel taxes on firms' performance is unclear. We empirically investigate the impact of the fuel tax on the performance of the U.S. automotive industry.

115-1062 Inventory System with Demand-Dependent Returns: Stationary Analysis and Approximations

Zhijie Tao, Associate Professor, Shanghai University of Finance and Economics, China

Xuefeng Gao, Associate Professor, Chinese Univ of Hong Kong, Hong Kong, China

Sean Zhou, Professor, Chinese Univ of Hong Kong, Hong Kong, China

Chenxi SUN, Student, The Chinese University of Hong Kong, Hong Kong, China

We study a single-product, infinite-horizon periodic-review inventory system with random demand and product returns. The quantity of returned products each period depends on the historical demands. We propose a simple heuristic called forecast-adjusted base-stock policy with a constant base-stock level and develop simple approximations of the optimal base-stock level.

115-1215 Closing the loop for plastic in high-quality applications

Moritz Jäger-Roschko, Student, Kuehne Logistics University, Germany

Moritz Petersen, Assistant Professor, Kuehne Logistics University, Germany

Maria Besiou, Professor, Kuehne Logistics University, Germany

We analyze the recycling supply chain of plastic for high-quality applications. Based on 49 expert interviews, we observe a severe misalignment of recycled plastic's supplied and demanded quality. We show how OM can help to increase supply quality and stability, relax manufacturers' requirements and increase trust between both sides.

115-1676 Shared Supplier Capacity as a Barrier to Socially Responsible Sourcing

Jacob Chestnut, Assistant Professor, Cornell University, United States

Ravi Anupindi, Professor, University of Michigan Ann Arbor, United States

This experimental project considers the role of buyer behavior (e.g., time pressure, low margin, near delivery specification changes) in their supplier's performance along the dimension of social sustainability (forced OT, child labor, unauthorized outsourcing, etc.). We attempt to understand the relevant features (contractual/non-contractual) that suppliers use when creating preference rankings



**Invited Session****199**

Tuesday, 11:30 AM - 01:00 PM, Celebration 1

Track: Agriculture and Food Supply Chains

Invited Session: **Improving Food Safety and Reducing Waste**

Chair(s): John Lowrey      Chenghuai Li

**115-1105**    Inducing effort and adoption of agriculture innovation from risk-averse farmers

Lingxiu Dong, Professor, Olin Business School, Washington Univ., United States

Jie Ning, Associate Professor, Case Western Reserve University, United States

Ruiping Ke, Student, Olin Business School, United States

It is challenging to induce risk-averse farmers to adopt agriculture innovations that are inherently risky and require set-up effort. We propose a novel debt-like contract to address this challenge. We investigate how this contract incentivizes a farmer to exert effort and provide conditions under which it yields a win-win outcome.

**115-1518**    Uncovering the Impact of Food Safety Regulations on the Food Logistics Industry

Abhay Grover, Student, University of Maryland - College Park, United States

Food safety regulations affect food industry in several ways, yet its intersection with the food logistics industry is under-examined. We explore the case of Sanitary Transportation of Food Rule 2018 and develop an understanding of stakeholders' evolved roles including brokers, shippers, carriers, and receivers. We further identify challenges and solutions.

**115-1945**    Health Coverage and Farmworker Productivity

Zach Rutledge, Assistant Professor, Michigan State University, United States

John Lowrey, Assistant Professor, Northeastern University, United States

Timothy Richards, Professor, Arizona State University, United States

Agricultural work is notoriously demanding, and one of the most dangerous in terms of long-term health impacts working in the fields over long periods of time. We find that wages, productivity, and job duration are all positively related to the incidence of healthcare coverage among agricultural workers.

**115-2043**    Determining Maximum Shipping Age Requirements for Shelf Life and Food Waste Management

Arzum Akkas, Assistant Professor, Boston University, United States

Dorothee Honhon, Associate Professor, University of Texas Dallas, United States

Products approaching the end of their shelf lives are a major contributor to food waste. We offer a framework for manufacturers to determine maximum -shipping-age thresholds, which offer by up to 8.7% improvement in profits and 14.7% reduction in food waste compared to the one-size-fits-all approach practiced at our collaborator.

**Invited Session****200**

Tuesday, 11:30 AM - 01:00 PM, Celebration 2

Track: Behavioral Operations Management

Invited Session: **Current Trends in Behavioral Operations Management**

Chair(s): Hasti Rahemi

**115-0187**    The Impact of Secondary Markets on Selling Blind Boxes with Set Bonuses

Chaolin Yang, Associate Professor, Shanghai Univ. of Finance and Economics, China

Yinbo Feng, Assistant Professor, Shanghai University of Finance and Economics, China

Chenxi SUN, Student, The Chinese University of Hong Kong, Hong Kong, China

We compare the selling of blind boxes in two settings, with and without a secondary market. We prove that with the secondary market, the firm's problem is a principal-agent problem. We use a linear program and its dual problem to solve the secondary market equilibrium and the firm's profit.

**115-0192**    A Behavioral Study of Self-Other Adoption Discrepancies in Explainable AI (XAI)

Fernanda Bravo, Assistant Professor, UCLA Anderson School of Management, United States

Zezhen (Dawn) He, Student, University of Rochester, United States

Yaron Shaposhnik, Assistant Professor, Simon Business School, United States

Leon Valdes, Assistant Professor, University of Pittsburgh, United States

In this work, we conduct behavioral experiments to study whether the party that is affected by a user's decision (self vs. other) impacts the user's adoption of ML recommendations. In addition, we study whether the presence vs. absence of explanations—commonly touted to increase ML adoption moderates our results.

**115-0497**    An Experimental Analysis to Understand the Causes of Developing Biased Machine Learning Algorithms by Developers

Mohammadreza Shahsahebi, Student, Haskayne School of Business, Canada

Osman Alp, Associate Professor, University of Calgary, Canada

Alireza Sabouri, Assistant Professor, University of Calgary, Canada

Justin Weinhardt, Associate Professor, Haskayne School of Business, Canada

There are many anecdotal examples and empirical studies that show the tendency of machine learning algorithms to yield biased results towards one or more disadvantaged groups in the society. We discuss the results of a behavioural experiment designed to understand the root causes of developing biased algorithms by the developers.

## Tuesday, 11:30 AM - 01:00 PM

115-0751 The influence of mental features on distracted driving behaviors: A Perspective of Two Age Groups

Setareh Daneshgar, Student, Personal, United States

Suman Niranjani, Assistant Professor, University of North Texas, United States

Timothy Hawkins, Associate Professor, University of North Texas, United States

Priyali Rajagopal, Associate Professor, University of North Texas, United States

Janeth Gabaldon, Student, University of North Texas, United States

This paper explores the role of drivers' stress, anxiety, mental workload, and mind wandering on distracted driving behavior for two different generations who are younger than 24 and older than 50 years old. The results of this study suggest drivers' mental features have direct impacts on DDB for both groups.

115-1263 Leveraging the Internet of Things and an understanding of human behavior in condition-based preventive maintenance

Mateus do Rego Ferreira Lima, Student, The Ohio State University, United States

Elliot Bendoly, Professor, Ohio State University, United States

We investigate settings where the Internet of Things augments condition-based preventive maintenance. Inspired by field case data and on-site observations, we observe work behaviors that undermine the full potential of this technical benefit and consider mitigation options. We delve into these issues through the use of a multimethod empirical perspective.

### Invited Session

201

Tuesday, 11:30 AM - 01:00 PM, Celebration 3

Track: Healthcare Operations Management

Invited Session: **Analytics in Healthcare Operations**

Chair(s): Alireza Boloori

115-0174 Data-Driven Incentives for Repeated Principal-Agent Models with Hidden Rewards: Oracle Agent

Ilgin Dogan, Student, University of California, Berkeley, United States

Anil Aswani, Associate Professor, University of California Berkeley, United States

Max Shen, Professor, University of California Berkeley, United States

We design data-driven incentives for an unexplored setting of repeated principal-agent games where agent plays its optimal policy with rewards unobservable to principal. Our framework, which comprises a consistent estimator for a non-parametric agent model and a bandit policy attaining low regret to principal, is applicable to medical adherence incentives.

115-0293 Statistical Characterization of Patient Response to Offered Access Delays Using Healthcare Transactional Data

Esma Gel, Professor, University of Nebraska Lincoln, United States

Derya Kilinc, Student, Arizona State University Tempe, United States

Kalyan Pasupathy, Professor, University of Illinois Chicago, United States

Mustafa Sir, Senior Scientist, Amazon.com, United States

We present a novel framework to characterize the probability that an offered appointment with a given access delay will be booked and subsequently attended by a patient using transactional data from an academic medical center. Practical use of the obtained realization probabilities within a patient prioritization scheme is demonstrated.

115-1363 Multilocation, Dynamic Staff Planning for a Healthcare System: Methodology and Application

Sandeep Rath, Assistant Professor, University of North Carolina Chapel Hill, United States

Kumar Rajaram, Professor, UCLA Anderson School of Management, United States

Utilizing data-driven approaches for workforce scheduling will be one way to reduce stress on hospital systems and healthcare professionals. We model and solve data-driven optimization approach for scheduling anesthesiologists for a large multilocation hospital system. We improved schedule predictability for physicians and cost savings for the healthcare system.

115-1387 Diet recommendations using hybrid inverse optimization methods

Farzin Ahmadi, Student, Civil and Systems Engineering, United States

Tinglong Dai, Professor, Johns Hopkins University, United States

Kimia Ghobadi, Assistant Professor, Johns Hopkins University, United States

We present a hybrid inverse optimization and machine learning framework to derive improved and personalized diets based on patients' past food intake observation and dietary guidelines. The framework enables better adherence to the patients' food habits and knowledge-based nutritional constraints by the care providers.

### Invited Session

202

Tuesday, 11:30 AM - 01:00 PM, Celebration 4

Track: Healthcare Operations Management

Invited Session: **Improving Healthcare Operations**

Chair(s): Claudia Rosales

115-0164 Robust Data-Driven Design of a Smart Cardiac Arrest Response System

Weiliang Liu, Student, National University of Singapore, Singapore

Xin Wang, Student, National University of Singapore, Singapore

## Tuesday, 11:30 AM - 01:00 PM

This paper studies data-driven design of a smart emergency response system for out-of-hospital cardiac arrest that involves drones for automatic external defibrillator delivery and community responders alerted via a mobile application, in addition to ambulances. We illustrate our model and solution approach using real data from Singapore.

### 115-0942 Influenza vaccine contracts in developing nations - Coordination, flexibility and vaccine coverage

Raunak Joshi, Student, Indian Institute of Management Calcutta, India  
Sumanta Basu, Professor, Indian Institute of Management Calcutta, India  
Claudia Rosales, Assistant Professor, University of Arkansas - Fayetteville, United States  
Arnab Adhikari, Assistant Professor, Indian Institute of Management Ranchi, India

We study different contract mechanisms between a vaccine manufacturer and a vaccine procurement agency to coordinate the two-peak influenza vaccine supply chain, as observed in developing nations of (sub-)tropical regions. Here, we evaluate and compare the performances of private(for-profit) and public(not-for-profit) procurement agencies to attain desired vaccine coverage and profit.

### 115-1126 Assessing patient satisfaction with emergency department care delivery using a patient experience framework

Yann Ferrand, Assistant Professor, Augusta University, United States  
Lawrence Fredendall, Professor, Clemson University, United States  
Jennifer Siemens, Professor, Clemson University, United States  
Danny Weathers, Professor, Clemson University, United States  
Ronald Pirrallo, Vice-Chair for Academic Affairs Department of Emergency Medicine , University of South Carolina School of Medicine Greenville, United States

We adapt a generic quality framework with a Patient Experience Framework tailored to emergency department care delivery, to systematically review research about the patient experience. Managers should focus on how patients experience the services performed and how that experience and prior experiences affect expectations and subsequent evaluation of care received.

### 115-1767 Economics of Introducing a Mobile Clinic as an Added or Exclusive Modality for Dialysis Service

Mona Jabbari, Assistant Professor, Colorado School of Mines, United States  
Nagesh Murthy, Professor, University of Oregon, United States  
Eren Cil, Associate Professor, University of Oregon, United States

Medicare covers costs for dialysis treatments and any associated hospitalization for patients with End-Stage Renal Disease. We analyze the strategic interaction between Medicare and a dialysis service provider, and show that mobile clinic as an added or exclusive service modality can be a win-win-win for Medicare, service provider, and patients.

## Invited Session

203	Tuesday, 11:30 AM - 01:00 PM, Celebration 5	Track: Healthcare Analytics
	Invited Session: HCOM Best Paper Presentations	
	Chair(s): Tinglong Dai      Xin Ding	

### 115-0132 Provider Network Selection and Patient Targeting in Health Insurance Markets

Amin Hosseininasab, Assistant Professor, Warrington College of Business, United States  
Willem-Jan van Hoeve, Professor, Carnegie Mellon University, United States  
Sridhar Tayur, Professor, Carnegie Mellon University, United States

We develop a decision-support model to control healthcare expenditure in health insurance markets via better provider network selection and patient targeting. We develop a novel simultaneous multi-column-and-row generation algorithm that effectively solves real-life large-size instances to optimality. Our solution achieves \$564 million reduction in healthcare expenditure without lowering patient utility.

### 115-0656 Got (Optimal) Milk? Pooling Donations in Human Milk Banks with Machine Learning and Optimization

Timothy Chan, Professor, University of Toronto, Canada  
Rafid Mahmood, Assistant Professor, Ottawa University, Canada  
Deborah O'Connor, , ,  
Debbie Stone, , ,  
Sharon Unger, Professor, University of Toronto, Canada  
Rachel Wong, Student, University of Toronto, Canada  
Ian Yihang Zhu, Student, University of Toronto, Canada

Donor milk's macronutrient content is critical to infant development but varies substantially. To reduce this variance, milk banks pool multiple donations together to create a product. We propose a data-driven framework combining machine learning and optimization, to predict each donation's macronutrient content, then optimally combine them into pools.

### 115-1024 A Multi-Treatment Forest Approach for Analyzing the Heterogeneous Effects

Minmin Zhang, Student, University of Texas at Dallas, United States  
Guihua Wang, Assistant Professor, University of Texas Dallas, United States  
Wallace Hopp, Professor, University of Michigan - Ann Arbor, United States  
Michael Mathis, Assistant Professor, University of Michigan Medical School, United States

We develop a new approach to estimate the heterogeneous treatment effects. We demonstrate the effectiveness of this approach using synthetic data and apply this new approach to a clinical setting to examine the effect of team familiarity on surgery duration.

### 115-1371 The Cost of Task Switching: Evidence from Emergency Departments

## Tuesday, 11:30 AM - 01:00 PM

Yiwen Jin, Student, Sauder School of Business, UBC, Canada  
Yige Duan, Student, University of British Columbia, Canada  
Yichuan Ding, Associate Professor, McGill University, Canada  
Mahesh Nagarajan, Professor, Sauder School of Business, UBC, Canada  
Garth Hunte, Professor, University of British Columbia, Canada

We find that task switching in emergency departments hurts physician productivity, while it has no significant influence on treatment quality. Leveraging the heterogeneity among different task switches, we propose an implementable data-driven queue management method to partition patients into two queues. The simulation shows our method effectively improves efficiency.

### Invited Session

204

Tuesday, 11:30 AM - 01:00 PM, Celebration 6

Track: POM-Finance Interface

Invited Session: **Fintech in Operations Management**

Chair(s): WANG Ziang

115-0482 Open-Source Software and Enterprise Information Security Performance

Shenyang JIANG, Post Doc/Researcher, Tongji University, China  
Qian Wang, Assistant Professor, University of Macau, Macao, China  
Ruiqi LIU, Assistant Professor, The Hong Kong Polytechnic University, Hong Kong, China  
Yong Jin, Associate Professor, Hong Kong Polytechnic Univ, Hong Kong, China

This paper investigates the effect of open-source software (OSS) on enterprise information security performance. We find that a firm's OSS usage decreases its external data breach risk but increases its internal data breach risk.

115-0644 Who Gains from the blockchain-related announcements in China

Xiaoyang LI, Assistant Professor, The Hong Kong Polytechnic University, Hong Kong, China  
Qing HE, Professor, Renmin University of China, China

China encourages blockchain innovation as a national policy. Chinese firms with lower R&D and worse information disclosure speculate on government-led blockchain hype by making vague description of their blockchain-related achievement. They receive more government supports but abuse them through their tunneling-related activities. Market reacts negatively to their speculative announcements.

115-0937 Match made in heaven: Supply Chain Information Sharing with Blockchain

Zhanyue Wang, Assistant Professor, Nankai University, China  
Ziang Wang, Assistant Professor, PolyU, Hong Kong, China

We develop a multi-tier supply chain model to document how Blockchain based information sharing reduces inventory level and lead time. Using a novel job-posting data, we verify this significant decrease of IL and LT following Blockchain related recruitments, and the effect is significantly intensified by the firm upstreamness.

### Contributed Session

205

Tuesday, 11:30 AM - 01:00 PM, Celebration 7

Track: Sustainable Operations Management

Contributed Session: **Networks and Collaborations in Sustainable Operations**

Chair(s): Min Yu

115-0684 A Multiperiod Competitive Supply Chain Framework with Environmental Policies and Investments in Sustainable Operations

Min Yu, Associate Professor, University of Portland, United States  
Jose Cruz, Associate Professor, University of Connecticut, United States  
Michelle Li, Assistant Professor, Babson College, United States  
Amir Masoumi, Assistant Professor, Manhattan College, United States

We develop a supply chain network model in which firms compete noncooperatively in an oligopolistic manner over a finite planning horizon. Each firm makes a strategic decision regarding its target sustainability rating and tactical decisions of product flows, in the presence of consumer preferences for sustainability and environmental policies.

115-1209 Managing a Multi-tier Sustainable Supply Network: Focusing on a Resource Dependence Theory

Seongwon Park, Student, Michigan State University, United States  
Srinivas Talluri, Professor, Michigan State University, United States

While there is a need to consider network-level environmental impacts in supply networks and firms also preferentially incorporate sustainability practices by collaborating with suppliers, it is still rare for suppliers to be collectively engaged in the firms' initiative. Thus, our study investigates the interplay between cross-tier environmental efficiencies.

115-1417 Is the need for sustainability a driver for more supply chain collaboration?

Bo Van Der Rhee, Professor, Nyenrode University, Netherlands  
Jack Van Der Veen, Professor, Nyenrode University, Netherlands  
Venu Venugopal, Professor, Nyenrode University, Netherlands  
Taher Ahmadi, Assistant Professor, Nyenrode University, Netherlands

## Tuesday, 11:30 AM - 01:00 PM

Increasingly, companies are forced to make their supply chains (SCs) sustainable. While in practice SC collaboration is uncommon, this might change when sustainability becomes a dominant objective. We model SCs with multiple objectives and demonstrate that when the sustainability dimension becomes more important, the motivation for collaborations increases.

### Invited Session

206

Tuesday, 11:30 AM - 01:00 PM, Celebration 8

Track: Sustainable Operations Management

Invited Session: **New Topics in Sustainable Operations**

Chair(s): Amrita Kundu

115-1163 Advancing sustainable railway systems through Ecolabels

Willem Haanstra, Assistant Professor, University of Twente, Netherlands

Jan Braaksma, Associate Professor, University of Twente, Netherlands

Material passports and Ecolabels are becoming increasingly relevant instruments for improving the sustainability of railway transportation. We outline a Design Science Research project on the development of state-of-the-art Ecolabels for the European railway sector, focusing on the design, maintenance, and management of ecolabels in the European railway sector.

115-1373 Agricultural Index Insurance: An Optimization Approach

Jose Velarde Morales, Student, University of Chicago, United States

Linwei Xin, Associate Professor, University of Chicago, United States

Index insurance is a popular way of providing agricultural insurance in low-income countries. However, index insurance programs are very costly for governments. We develop an optimization-based approach for designing index insurance contracts. We validate our approach using real and synthetic data, and find that it is more cost effective.

115-1776 Business Model Innovation to Reduce Lead Poisoning in Bangladesh

Amrita Kundu, Assistant Professor, Georgetown University, United States

Erica Plambeck, Professor, Stanford University, United States

Qiong Wang, Associate Professor, University of Illinois Urbana-Champaign, United States

We have designed a business model to extend the life of lead acid batteries used in electric three wheelers in Bangladesh. Through a randomized control trial, we are testing the impact of the business model on battery life and performance, recycling rate and lead emissions.

115-1825 Do Mergers and Acquisitions Improve Efficiency: Evidence from Power Plants

Omer Karaduman, Assistant Professor, Stanford University, United States

Mert Demirer, Assistant Professor, MIT, United States

Using rich data on hourly physical productivity from US fossil fuel power plants, we study the effects of M&As on efficiency and provide evidence on the mechanisms. We find that acquired plants experience an average of 4 percent efficiency increase five to eight months after acquisition.

115-2144 The Role of Information about Circular Economy Strategies in Take-Back Programs for Clothing

Erin McKie, Assistant Professor, Ohio State University, United States

Anna Saez De Tejada Cuenca, Assistant Professor, IESE Business School, Spain

Vishal Agrawal, Associate Professor, Georgetown University, United States

Retailers are increasingly sponsoring take-back initiatives to facilitate the recycling of secondhand clothing. We test how consumers' propensity to return used garments is affected as the degree of information transparency and reward level is manipulated.

### Invited Session

207

Tuesday, 11:30 AM - 01:00 PM, Celebration 9

Track: Supply Chain Management

Invited Session: **SCM Best Paper Competition**

Chair(s): Shiliang Cui Joel Goh

115-2156 Last Time Buys during Product Rollovers: Manufacturer and Supplier Equilibria

Audrey Bazerghi, Student, Northwestern University Kellogg School of Management, United States

Jan Van Mieghem, Professor, Northwestern University, United States

We study manufacturer-supplier interactions during the rollover between a legacy part and its successor in a durable good supply chain. We propose a two-stage noncooperative game and prove there exist only six equilibria which achieve a "last time buy" delay for the old part under a necessary and sufficient condition.

115-2157 UMOTEM: Upper Bounding Method for Optimizing over Tree Ensemble Models and its Applications in Pricing

Georgia Perakis, Professor, Massachusetts Institute of Technology, United States

Leann Thayaparan, Student, Massachusetts Institute of Technology, United States

This work proposes UMOTEM, an algorithm for solving optimization problems where the objective is determined by a tree ensemble. We show UMOTEM scales well and bound analytically the optimality gap. Through work with Oracle Retail, we demonstrate UMOTEM can help improve supply chain management decisions when exact formulations don't scale.

115-2158 Supply chain risk and resolution: An empirical study of stock market reactions

Keno Theile, Student, Kühne Logistics University, Germany

## Tuesday, 11:30 AM - 01:00 PM

Christian Hofer, Associate Professor, University of Arkansas, United States

Vinod Singhal, Professor, Georgia Institute of Technology, United States

Kai Hoberg, Professor, Kuehne Logistics University, Germany

The estimation of supply chain risk and resolution of supply chain risk has been challenging due to missing firm-level data. We propose a measure based on textual analysis of quarterly earnings calls. While SC risk has a negative effect on stock returns, we find that resolution has a positive effect.

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### 115-2159 How Much did Store Closures Boost Online Sales during COVID-19?

Ragip Gurlek, Student, Emory University, United States

Diwas KC, Professor, Emory University, United States

Paolo Letizia, Associate Professor, University of Tennessee, United States

We examine the impact of store closures on omnichannel consumer behavior during the COVID-19 pandemic. We quantify the lift in online sales as well as the proportion of offline sales salvaged through the online channel. Additionally, we find that closures increased the likelihood of returns and ordering a bestselling product.

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## Invited Session

210	Tuesday, 11:30 AM - 01:00 PM, Celebration 12	Track: Humanitarian Operations and Crisis Management
	Invited Session: <b>Priorities, Actions, &amp; Modeling II</b>	
	Chair(s): Maria Besiou Erica Gralla	

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### 115-0190 Market Systems in a Humanitarian Crisis: Making Food more Affordable and Available

Tristan Downing, Student, Massachusetts Institute of Technology, United States

Jarrod Goentzel, Senior Lecturer, Massachusetts Institute of Technology, United States

Maria Besiou, Professor, Kuehne Logistics University, Germany

Humanitarian organizations increasingly provide cash assistance but struggle to analyze market dynamics. Our system dynamics model, created in collaboration with ICRC, combines population displacement with material and financial flows for market actors. Model application in Nigeria demonstrates the cost-effectiveness of market intervention and supports efforts to strengthen the humanitarian-development nexus.

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### 115-0236 Prepositioning Inventory of Multiple Items for Humanitarian Relief: Strategic Investment and Budget Allocation

Mahyar Eftekhari, Associate Professor, Arizona State University Tempe, United States

Scott Webster, Professor, Arizona State University Tempe, United States

We develop methods for prepositioning inventory for disaster relief. We illustrate how our methods can be used to inform strategic decisions related to the allocation of funds among competing priorities, including investment in prepositioned inventory.

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### 115-0454 The impact of humanitarian operations research: a critical review, challenges, and opportunities

Maria Besiou, Professor, Kuehne Logistics University, Germany

Erica Gralla, Associate Professor, George Washington University, United States

Since the first papers on humanitarian operations, there has been discussion about the impact of our research on practice and on scholarship. We review the literature and survey authors to see how we are doing so far, with an eye toward maintaining or redirecting the trajectory toward increasing impact.

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### 115-0778 Wildfire Response Operations: Operational Information Management for Disaster Response

Patricia Moravec, Assistant Professor, Indiana University Bloomington, United States

Lu (Lucy) Yan, Associate Professor, Indiana University Bloomington, United States

Alfonso Pedraza, Professor, Indiana University, United States

Sebastian Villa, Assistant Professor, University of New Mexico, United States

We examine whether and how operational information provided through social media by a reliable organization impacts people's emotions and actions during a wildfire response. Our analysis indicates that operational updates increase fear. Strikingly, enhancing the credibility of the relief organization decreases fear and, thereby, increases people's intention to heed warnings.

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## Invited Session

211	Tuesday, 11:30 AM - 01:00 PM, Celebration 13	Track: Teaching/Pedagogy in POM
	Invited Session: <b>Classroom Games for Interaction and Insight</b>	
	Chair(s): Charles Munson	

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### 115-0827 Implementing a Second Coordinated Round of the Beer Game with Excel

Jonathan Jackson, Associate Professor, Providence College, United States

The beer game is a well-known game used in operations management courses to illustrate the bullwhip effect. In this session, I demonstrate a second coordinated version of the beer game, implemented in Excel. It introduces new challenges and forces students to use team-based problem solving to manage their supply chain.

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### 115-1039 Diving Deep into Goldratt's Dice Game

LAN LUO, Assistant Professor, University of Hartford, United States

Charles Munson, Professor, Washington State University Pullman, United States

## Tuesday, 11:30 AM - 01:00 PM

Using an Excel-based simulation of the Dice Game from The Goal, students can explore capacity and inventory options to maximize profit. Instructors can change strategy costs to produce different winning strategies. Regression equations can predict throughput based on initial inventory, number of game rounds, and capacity mean and variance.

### 115-1109 Game Changer: A New Post-COVID Paradigm for Classroom Interaction using Google Sheets

Gihan Edirisinghe, Assistant Professor, Western Kentucky University, United States  
Maria Trindade, Post Doc/Researcher, Maria Alice Trindade, Italy  
LAN LUO, Assistant Professor, University of Hartford, United States

The COVID-19 pandemic rendered many traditional in-class activities that support operations management learning unfeasible. This research outlines an innovative strategy for conducting interactive classroom activities utilizing freely and widely accessible Google Sheets. The strategy was empirically tested in two countries and is suitable for both face-to-face and online teaching.

## Invited Session

212	Tuesday, 11:30 AM - 01:00 PM, Celebration 14	Track: Service Operations
	Invited Session: <b>Strategic Queueing</b>	
	Chair(s): Ricky Roet-Green      Yanting Li	

### 115-1081 On Information Disclosure in an Observable Shared Waiting Room

Yanting Li, Student, University of Rochester, United States  
Ricky Roet-Green, Associate Professor, University of South Carolina Aiken, United States

We study a service system with two types of customers arriving at a shared waiting room, and each type waits for the service provided by a specific server out of two servers. We measure the system performances to evaluate the value of the queue length information.

### 115-1102 Robust Queue Inference from Waiting Times

Eojin Han, Assistant Professor, Southern Methodist University, United States  
Chaithanya Bandi, Associate Professor, National University of Singapore, Singapore  
Alexej Proskynitopoulos, Student, Northwestern University, United States

We consider the problem of inferring service times from waiting time observations. Specifically, we propose an inference framework based on robust optimization, where service times are described via sets that are calibrated by the observed waiting times. Tractable optimization formulations to estimate moments and risk measures are provided.

### 115-1320 Strategic flexibility in service systems

Yoav Kerner, Senior Lecturer, Ben Gurion University of the Negev, Israel  
Binyamin Oz, Senior Lecturer, The Hebrew University of Jerusalem, Israel  
Seva Shneer, Associate Professor, Heriot Watt University, United Kingdom

We study a multi-server system. Customers may join any unobservable queue in front of each server or join all of them simultaneously. In the latter case, they will be served by the first available server and removed immediately from the other queues. Equilibrium and socially optimal strategies are studied.

### 115-1366 Behavior-Aware Queueing: When Strategic Customers Interact with Strategic Servers

Yueyang Zhong, Student, Booth School of Business, United States  
Raga Gopalakrishnan, Assistant Professor, Queen's University, Canada  
Amy Ward, Professor, Booth School of Business, United States

We study a queueing model with endogenous customers and servers behavior. We characterize when a Nash equilibrium exists, and, when exists, its multiplicity and monotonicity behavior. Moreover, we discover efficiency loss regarding social welfare and net profit due to the ignorance of strategic human behavior.

## Invited Session

213	Tuesday, 11:30 AM - 01:00 PM, Celebration 15	Track: Information Systems and Operations Management
	Invited Session: <b>Strategic Interactions in the Interface of Operations Management and Information Systems</b>	
	Chair(s): Abhishek Roy      Hao Jiang	

### 115-0519 Returns-based Partnerships: Can Competing Retailers Become Allies?

Ahmed Timoumi, Assistant Professor, Indian School of Business, India  
Abhinav Uppal, Assistant Professor, Indian School of Business, India

Amazon recently formed a partnership with its competitor Kohl's that allows Amazon's customers to return products at Kohl's stores. While this makes returns more flexible for Amazon's customers, it also sends additional footfall to its competitor's stores. In this paper, we investigate a theoretical rationale for this non-trivial partnership.

### 115-0581 Getting Your Money's Worth: Capacity Planning Through Admission Control vs. Consumption Control

Sreekumar Bhaskaran, Associate Professor, Southern Methodist University, United States  
Sanjiv Erat, Associate Professor, University of California San Diego, United States  
Rajiv Mukherjee, Assistant Professor, Southern Methodist University, United States

## Tuesday, 11:30 AM - 01:00 PM

In many industries, consumers who purchase services pay a fixed upfront fee for access, and then consume that service over a period of time. We examine the implications of this temporal separation of purchase and consumption on a user's consumption choices, and a firm's optimal capacity planning strategy.

### 115-1086 To Join or Not To Join: How Market Conditions Affect the Participation of Competing

Hao Jiang, Student, Temple University, United States  
Abhishek Roy, Assistant Professor, Temple University, United States  
Joydeep Srivastava, Professor, Temple University, United States  
Subodha Kumar, Professor, Temple University, United States

We investigate the impact of boom and bust conditions of the market on firms' strategic decisions about the participation in cooperative ventures that benefit all firms, such as industry alliances and generic advertising campaigns, when they face the prospect of cooperating with their competitor.

### 115-1748 The Impact of Consumer Showrooming on an Omnichannel Retailer under Supplier Encroachment

Samayita Guha, Assistant Professor, Florida International University, United States  
Abhishek Roy, Assistant Professor, Temple University, United States  
Subodha Kumar, Professor, Temple University, United States

Popularity of retail e-commerce has enabled many upstream manufacturers to encroach their downstream retailers' market through online direct channels. In this paper, we study how the interaction of consumer showrooming and supplier encroachment impact the omnichannel retailer and the manufacturer.

## Invited Session

214	Tuesday, 11:30 AM - 01:00 PM, Coral Spring 1	Track: Emerging Topics in Operations Management
	Invited Session: Digital Technologies in Operations Management	
	Chair(s): David Wuttke	

### 115-0285 Technical complaints, tweets, and automotive recalls

Christoph Schmidt, Post Doc/Researcher, Eth Zurich, Switzerland  
David Wuttke, Assistant Professor, Technische Universitat Munchen, Germany  
George Ball, Associate Professor, Indiana University Bloomington, United States  
Jorge Mejia, Associate Professor, Indiana University, United States

Our study adds to the literature on automotive recalls by examining how social media and NHTSA complaint sentiment affects the timing of a firm's recall decisions. Using a recurrent event Cox model, we find that negative Twitter sentiment increases, and negative complaints sentiment decreases the immediate probability of a recall.

### 115-0565 When transparency backfires: the impact of blockchain adoption on ESG performance

Andreas Gernert, Assistant Professor, Kuehne Logistics University, Germany  
Robert Graf, Professor, IU Internationale Hochschule, Germany  
David Wuttke, Assistant Professor, Technische Universitat Munchen, Germany

Using game theory, we analyze the effects that blockchain adoption has on investments in sustainability. Specifically, two competing firms decide on the level of sustainability and the price of their products, then customer choose which product to buy. We identify optimal strategies and examine the impact on welfare.

### 115-1111 Empirical evidence about payment term extensions in the supply chain finance context

David Wuttke, Assistant Professor, Technische Universitat Munchen, Germany

Digital platforms enable new forms of collaboration along supply chains, such as reverse factoring. When focal firms introduce reverse factoring platforms, they connect to many suppliers (1:n). This research demonstrates empirically that this can lead to new dynamics, yet unobserved in analytical work.

### 115-1179 Augmented Reality for Quality Inspections in Manufacturing. An Experiment on Task Performance and Human Factors

Arne Seeliger, Student, ETH Zurich, Switzerland  
Torbjørn Netland, Assistant Professor, ETH Zurich, Switzerland

We evaluated how Augmented Reality (AR) affects performance and human factors of industrial quality inspection. In an experiment, participants performed two types of real-world quality inspection tasks utilizing different forms of AR-based assistance. We find that, depending on task difficulty, AR increases performance and measures relating to human factors.

## Invited Session

215	Tuesday, 11:30 AM - 01:00 PM, Coral Spring 2	Track: Emerging Topics in Operations Management
	Invited Session: Social Responsibility in Operations and Supply Chains	
	Chair(s): Rakesh Mallipeddi M. Serkan Akturk	

### 115-1211 Assessing the Impact of Brand-Level ESG Violations on Sales

Yao Chen, Student, Clemson University, United States  
M. Serkan Akturk, Assistant Professor, Clemson University, United States  
Rakesh Mallipeddi, Assistant Professor, The Ohio State University, United States



## Tuesday, 11:30 AM - 01:00 PM

Employing retail transaction data and firm-level environmental, social, governance (ESG) information, our research investigates the impact of firms' ESG violations on their operational performance. We show that ESG violations lead to decreased sales for brands. Furthermore, store location and customer demographics moderate the relationship between ESG violations and brand sales.

### 115-1258 The Effects of ESG Violations on Firm Value

Rakesh Mallipeddi, Assistant Professor, The Ohio State University, United States  
Subodha Kumar, Professor, Temple University, United States  
Arvind Mahajan, Professor, Texas A&M University College Station, United States

In this study, we examine the effects of violations related to the environment, social, and governance (ESG) issues on a firm's financial performance. We documents the effects by employing an extensive sample of 1,593 ESG violations involving more than 1000 firms.

### 115-1453 The impact of supply chain relationship on CSR

Xingping Jia, Associate Professor, Hubei University, China  
Xingzhi Jia, Assistant Professor, Renmin University of China, China  
Xenophon Koufteros, Professor, Texas A&M University College Station, United States  
David Griffith, Professor, Texas A&M University, United States

Using dyadic data, this study examines the complex impact of supply chain relationship on CSR.

### 115-1499 Estimating the Competitive Impact of Sustainable Car Introductions in the Auto Industry

Ahmet Colak, Assistant Professor, Clemson University, United States  
M. Serkan Akturk, Assistant Professor, Clemson University, United States

Recently, the state of California has passed its legislation on "Zero-Emission Vehicle" program to ban the sales of new gasoline-powered vehicles after 2035. Yet, there is limited empirical insights for the competition and cross-channel effects between traditional, semi-sustainable, and zero-emission vehicles. Lack of such granular empirical insights motivate our study.

### 115-1573 Jumping the Queue: Managing Early and Same-Day Appointments

Rakesh Mallipeddi, Assistant Professor, The Ohio State University, United States  
Yunxia Zhu, Associate Professor, University of Nebraska Lincoln, United States  
Jon Stauffer, Assistant Professor, Mays Business School, Texas A&M University, United States

A common assumption in the operations management literature is that patients are homogeneous to wait time, and based on this assumption researchers attempt to optimize scheduling of patients from the perspective of health service providers. However, what if different patient types are heterogeneous and respond differently to wait times?

## Invited Session

216	Tuesday, 11:30 AM - 01:00 PM, Blue Spring 1	Track: Supply Chain Risk Management
	Invited Session: Disruption Risk Management	
	Chair(s): Wei Liu	

### 115-0113 Emergency Supply Chain Configuration with Correlated Uncertainties

Sheng Bi, Assistant Professor, Shanghai University of Finance and Economics, China  
Yini Gao, Assistant Professor, Singapore Management University, Singapore  
Guodong Lyu, Assistant Professor, Hong Kong University of Science and Technology, China

Emergency supply chain (ESC) is the supply chain that forms in response to emergencies, such as pandemics, natural disasters, or man-made attacks. A wise design of ESC is crucial to serving the emergency demand. We study the capacity configuration of ESC subject to uncertainties and explore the impact of correlations.

### 115-0173 Data-Driven Aircraft Assignment to Minimize Delay Propagation

Vinayak Deshpande, Professor, University of North Carolina Chapel Hill, United States  
Vidyadhar Kulkarni, Professor, University of North Carolina Chapel Hill, United States  
Wei Liu, Post Doc/Researcher, Purdue University, United States

We propose a new approach to reduce the delay propagation by optimizing the assignment between incoming and outgoing flights flown by an airline at a given airport. We show that the assignments derived from the data-driven approach can perform better than the optimal assignment derived in the deterministic setting.

### 115-0244 Operational Risk Management: Optimal Inspection Policy

Youngsoo Kim, Assistant Professor, University of Alabama Tuscaloosa, United States  
Yuqian Xu, Assistant Professor, UNC Chapel Hill, United States

We study how a financial firm can optimally design inspection policies to manage operational risk losses. We find that periodic policy dominates random policy if and only if the inspection cost is low. Also, we construct a novel hybrid policy that dominates both random and periodic policies.

### 115-0971 Inequity in Disaster Operations Management

Xabier Barriola, Post Doc/Researcher, INSEAD, France  
William Schmidt, Assistant Professor, Cornell University, United States

## Tuesday, 11:30 AM - 01:00 PM

We test for differences in the percentage change in prices paid for grocery products between low-income and high-income communities in the months following three large Atlantic hurricanes. We find that low-income communities in the disaster zones endure higher average percentage price increases within grocery categories compared to high-income communities.

### Invited Session

217	Tuesday, 11:30 AM - 01:00 PM, Blue Spring 2	Track: Empirical Research in Operations Management
	Invited Session: Customer-Centric Operations	
	Chair(s): Yasin Alan      Hallie Cho	

115-0455 The integrated impact of employee engagement, human capital, and workforce agility on green innovation

Abdulkareem Awwad, Associate Professor, Qatar University, Qatar

This study provides empirical evidence on the integrated impact of employee engagement, human capital, and workforce agility on sustainable green product innovation performance. The results that emerged from the descriptive and analytical statistical analysis provided a strong insight into these constructs' strategic role in developing new green products.

115-0467 Ownership and Rental Utilities in Rent-to-Own Businesses: A Modular Estimation Framework and Renter Decision Models

Milad Armaghan, Student, University of Texas at Dallas, United States

Metin Cakanyildirim, Professor, University of Texas Dallas, United States

Andrew Frazelle, Assistant Professor, University of Texas Dallas, United States

With a modular framework that separates estimation from a renter's decision problem, we study several renter decision models reflecting different degrees of sophistication (strategic, myopic) and different levels of alertness. For each model and with real-life data, we estimate a nonparametric utility distribution and the probability of abandoning the rental.

115-0932 Supply Networks and the Cash Conversion Cycle

Maximiliano Udenio, Associate Professor, KU Leuven, Belgium

Shaunak Dabadghao, Assistant Professor, Technische Universiteit Eindhoven, Netherlands

The working capital management of a firm affects not only its own performance, but that of its supply chain partners. We test a number of hypothesis Relating the financial management of firms with their and their partners performance. We use a large panel of supply chain relationships.

115-1379 A Study on the Role of Product Image in Online Shopping

Namkyung Lee, Post Doc/Researcher, Korea University, South Korea

Hyun Seok (Huck) Lee, Associate Professor, KUBS(Korea University Business School), South Korea

Product images provide useful information to online shoppers and are supposed to alleviate the uncertainty in purchase decision. Using the image tag (various features of a product that were detected by an AI and converted into a set of words), we examine the role of product image in online shopping.

115-1838 On the Granularity of Wait Time Information

Yiming ZHANG, Assistant Professor, The Chinese Univ of Hong Kong, Shenzhen, China

Qiuping Yu, Associate Professor, Georgia Institute of Technology, United States

Yong-Pin Zhou, Professor, University of Washington, United States

Collaborating with a ride-sharing platform, we study whether and how the granularity of wait time information (WTI) impacts customers abandonment behavior through a randomized field experiment on our partner platform. To uncover the mechanism, we propose a structural model to explore the impacts of granularity of WTI on customers' behavior

### Invited Session

218	Tuesday, 11:30 AM - 01:00 PM, Rainbow Spring 1	Track: Empirical Research in Operations Management
	Invited Session: Empirical Research in Operations - Interdisciplinary Perspectives	
	Chair(s): Sarv Devaraj	

115-0044 Determinants of Operations Management Faculty Salary

James Abbey, Associate Professor, Texas A&M University College Station, United States

Michael Ketzenberg, Professor, Texas A&M University College Station, United States

Richard Metters, Professor, Texas A&M University College Station, United States

We deliver a quantitative statement on the dollar value of faculty activities. In terms of faculty salaries, how much is an "A" publication worth? How much is non-"A" publication worth? We also seek to find the relative value of the full range of scholarly activities.

115-1692 Economic Impact of On-site Executive Education

Ana Rosado Feger, Associate Professor, Ohio University, United States

Ashley Metcalf, Associate Professor, Ohio University, United States

Executive education programs provide professional development to participants. In a small university town, they also provide significant benefit to the local economy. We develop a model for assessing and communicating impact which can assist in operational planning and town-gown collaboration for mutual benefit.

115-1974 An Empirical Study of Hospital Portfolio Strategy and Patient Choice

Sriram Thirumalai, Associate Professor, Texas Christian University (TCU), United States

## Tuesday, 11:30 AM - 01:00 PM

Sarang Sunder, Associate Professor, Indiana University Bloomington, United States

Specialize? Diversify? Do patients care? In this study, we investigate the demand implications from hospitals' portfolio strategy [quality signaling]. Using inpatient discharge data from Florida, we find strong evidence that patient choice is positively influenced by a hospital's depth (focus) and breadth (related focus) of expertise in a department.

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### Invited Session

219	Tuesday, 11:30 AM - 01:00 PM, Rainbow Spring 2	Track: Operational Excellence
	Invited Session: <b>Panel: A Research Agenda for Lean Management</b>	
	Chair(s): Daryl Powell      Andrea Furlan	

115-2106 Panel: A Research Agenda for Lean Management

Daryl Powell, Professor, Norwegian University of Science And Technology, Norway

Andrea Furlan, Professor, Padova University, Italy

Rachna Shah, Professor, University of Minnesota, United States

Eivind Reke, Senior Advisor, Sintef Trondheim, Norway

Tortorella Guilherme, , ,

This panel discussion takes stock of the key research topics on lean management. We organize a panel of leading lean academics within the following topics: Lean as a Strategy; Lean and learning, Lean and Sustainability, Lean Leadership and behaviors, and Lean and Digitalization. Each panelist will discuss the main theoretical

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### Contributed Session

220	Tuesday, 11:30 AM - 01:00 PM, Barrel Spring 1	Track: POM-Marketing Interface
	Contributed Session: <b>Pricing</b>	
	Chair(s): Kenan Arifoglu	

115-0253 Process Improvement under the Reference Price Effect

Zeming Wang, Student, University of Groningen, Netherlands

Jasper Veldman, Associate Professor, University of Groningen, Netherlands

Ruud Teunter, Professor, University of Groningen, Netherlands

We investigate a supplier's process improvement and pricing decisions in a setting where the reference price effect of customers drives a retailer's demand. We find that the reference price effect stimulates process improvement but may harm supply chain efficiency, shedding new light on how the reference price effect impacts efficiency.

115-0590 Luxury Brand Licensing: Competition and Reference Group Effects

Kenan Arifoglu, Associate Professor, University College London, United Kingdom

Christopher Tang, Professor, University of California Los Angeles, United States

Licensing enables luxury brands to reach out to their aspirational, low-end consumers ('followers') who value a brand more when more high-end consumers ('snobs') use it. However, over-licensing might dilute the brand for snobs who value brand exclusivity. We develop a game-theoretic model to study these two countervailing forces of licensing.

115-1441 Managing service shutdowns: Cash refunds or vouchers?

Rachel Chen, Professor, University of California Davis, United States

Eitan Gerstner, Professor, Technion Israel Institute of Technology, Israel

Daniel Halbherr, Associate Professor, Hec Paris, France

Paolo Roma, Associate Professor, Università Degli Studi Di Palermo, Italy

Service shutdowns caused by exogenous events are on the rise. Such shutdowns pose major challenges for service providers, customers, and regulators. This paper compares cash refund only, voucher only, and hybrid strategies from both profit, survival time, and welfare perspectives. Our findings provide important implications for all involved actors.

115-1923 Personalized Pricing: A Theoretical Analysis Under Intra-brand Competition

Shichang Li, Student, University of Science and Technology of China, China

Quan Zheng, Associate Professor, University of Science and Technology of China, China

Jingyan Li, Student, University of Science and Technology of China, China

Jie Wu, Professor, University of Science and Technology of China, China

This paper investigates the effect of personalized pricing (PP) under intra-brand competition. Different from the classical prisoner's dilemma outcome, under reselling format, PP can boost retailers' profit when both retailers exercise. Under agency selling format, one retailer exercises PP but the other retailers does not exercise in equilibrium.

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### Invited Session

221	Tuesday, 11:30 AM - 01:00 PM, Barrel Spring 2	Track: Procurement and Supplier Management
	Invited Session: <b>Recent Developments in Procurement</b>	
	Chair(s): Harish Guda	

## Tuesday, 11:30 AM - 01:00 PM

115-0527 Product Line Pricing under Utility-based Choice Model with Ambiguity Aversion

Qi CHENG, Student, City University of Hong Kong, Hong Kong, China

Jingwen Lin, Student, City University of Hong Kong, Hong Kong, China

Yimin Yu, Associate Professor, City University of Hong Kong, Hong Kong, China

We study the robust multiproduct pricing problem under a general utility-based discrete choice model. The customer preference is given as a multiplier preference with a relative entropy penalty. We provide an explicit solution for optimal prices, and our results recover the classical constant markup property.

115-1144 On the prevalence of unethical behaviour in buyer-supplier relationships

Fanny Chen, Student, Rotterdam School of Management, Netherlands

Finn Wynstra, Professor, Erasmus University, Netherlands

Procurement professionals, who are boundary spanners between the internal organisation and external suppliers, are prone to unethical behaviour. The present study examined the prevalence of unethical behaviour among procurement professionals utilising the Extended Crosswise Model. We will elaborate on the validity of the method and present the most prevalent practices.

115-1493 Fighting supply chain corruption: Promoting compliant operating practices and social justice

Geng Wang, Student, Aalborg University, Denmark

Yang Cheng, Associate Professor, Aalborg University, Denmark

Hugo Lam, Professor, University of Liverpool, United Kingdom

The purpose of this paper is to investigate the practical challenge of combating supply chain corruption (SCC) in a global context and promoting compliant and fair operating practices from a justice perspective. In particular, we argue that operations and supply chain management (OSCM) scholars could help fight SCC.

115-1557 Lack of Intentions or Actions? Analysis of the Sustainability-related Intention Action Gap

Ruth Schuelken, Student, University of Mannheim, Germany

Christoph Bode, Professor, University of Mannheim, Germany

Matthias Schlipf, Professor, ., Germany

Drawing on the consumer intention-action gap, this paper investigates whether a similar effect results in a gap between the corporate sustainability intentions and the sustainability intentions implemented in procurement. A survey and interviews provide first insights that such a gap exists and provide first explanations on its emergence.

### Invited Session

222	Tuesday, 11:30 AM - 01:00 PM, Rock Spring	Track: POM-Economics Interface
	Invited Session: Economics in Innovative Operational Business Models	
	Chair(s): Zheyu Jiang	

115-0701 The Dynamics of Distribution to Financially Constrained Nanostores

Zheyu Jiang, Student, University of Miami, United States

Harihara Natarajan, Professor, University of Miami, United States

Nan Yang, Professor, University of Miami, United States

Nanostores are small-sized, cash-operated retailers in developing markets. We study a decision problem facing a distributor who supplies financially-constrained nanostores and characterize its optimal policy. Further, we investigate the impacts of financial credits and retail pricing flexibility on distribution dynamics and stakeholders' profits in the supply chain.

115-0721 Managing Channel Profits with Network Effects

Dawei Jian, Student, University of California Riverside, United States

Many products exhibit network effects. How should manufacturers sell them through retail channels? We study this long-term channel contracting problems where the retailer privately observes and controls the evolving market conditions. The optimal contract unifies the classic centralized and decentralized policies, and characterizes dual role of network effects.

115-1067 Co-opetition business model for electric vehicle operations

Bo Feng, Professor, Business department, China

Jixin Zhao, Student, Department of Statistics, operations, and data science, United States

We investigate an emerging business model in electric vehicle operations. The model is established upon a co-opetitive paradigm, under which a pair of complementary resources are taken within a cooperation process. We investigate how to bring about the model's maximum efficacy using reciprocal cooperation contracts and ingenious pricing strategies.

115-1269 Dynamic pricing in the presence of loyalty-based customers

yunke li, Student, University of Miami Business School, United States

Harihara Natarajan, Professor, University of Miami, United States

Nan Yang, Professor, University of Miami, United States

Our work is motivated by the decision problem facing the revenue manager of a hotel that offers a loyalty reward program. We build a stylized model that to study how loyalty considerations impact dynamic prices, contrasting the trajectory of prices with those in contexts without customer reward programs.

**Invited Session****223**

Tuesday, 11:30 AM - 01:00 PM, Regency Ballroom Q

Track: Revenue Management and Pricing

Invited Session: **Frontiers in Modern Pricing**

Chair(s): Michael Hamilton

115-0248 List now or Later? An equilibrium analysis of advance-booking platforms

Neha Sharma, Student, Kellogg School of Management, United States

Sumanta Singha, Assistant Professor, Texas Tech University, United States

Milind Sohoni, Professor, Indian School of Business, India

Achal Bassamboo, Professor, Northwestern University, United States

Many sharing platforms allow guests to reserve assets ahead of service. On such platforms, "hosts" commit to providing assets ahead of availability by creating a "listing." Building on empirical support for hosts' decision of "when to list" from real data, we show the limitations of widely used revenue-sharing contracts.

115-0501 Convex Surrogate Loss Functions for Contextual Pricing with Transaction Data

Max Biggs, Assistant Professor, Darden School of Business, United States

We study an off-policy contextual pricing problem with transaction data. We introduce suitable loss functions for this setting which can be directly optimized to find effective pricing policies with expected revenue guarantees, without the need for estimation of an intermediate demand function.

115-0890 Approximation Schemes for Dynamic Pricing with Opaque Products

Yukai Huang, Student, Olin Business School, Washington Univ, United States

Jacob Feldman, Associate Professor, Washington University St Louis, United States

Xingxing Chen, Assistant Professor, University of Richmond, United States

We consider a choice-based dynamic resource allocation/pricing problem with opaque products, and provide various constant factor approximation schemes.

115-2077 Pricing Strategies for Online Dating Platforms

Titing Cui, Student, University of Pittsburg, United States

Michael Hamilton, Assistant Professor, University of Pittsburgh, United States

Dating apps have become the most common way for new couples to meet. Many of these dating apps use subscription-based pricing (SP). The most extreme version of SP is contract pricing (CP), where customers pay one-time price. We study the profit and welfare trade-offs associated with the

115-2079 Static Pricing for Queueing Systems

Jacob Bergquist, Student, Columbia University, United States

Adam Elmachtoub, Associate Professor, Columbia University, United States

We consider an M/M/C model with price-sensitive customers in which the objective is to maximize revenue while not letting congestion get too large. We provide performance guarantees for static pricing policies by constructing policies which achieve certain proportions of the optimal policy's performance in terms of revenue and cost.

**Invited Session****224**

Tuesday, 11:30 AM - 01:00 PM, Regency Ballroom O

Track: Retail Operations

Invited Session: **Product management and pricing**

Chair(s): Punya Chatterjee

115-0419 The Role of Supply Chain in Retailer Take-Back: An Empirical Study

Yuqi Peng, Assistant Professor, Salisbury University, United States

Yan Dong, Professor, University of South Carolina, United States

Sriram Venkataraman, Associate Professor, University of South Carolina, United States

Mark Ferguson, Professor, University of South Carolina, United States

While manufacturers are regulated to take back their end-of-life products, retailers are regulated. From a supply chain perspective, we empirically investigate why retailers have the incentive of offering take-back services. We find that a retailer's take-back decision can be affected by its manufacturing suppliers and its market competition.

115-0770 Optimal Pricing Policy for Green Products under Supply Disruption

Mehdi Amini, Professor, University of Memphis, United States

Punya Chatterjee, Assistant Professor, University of Memphis, United States

Yi Liu, Assistant Professor, University of South Dakota, United States

Rahul Pandey, Assistant Professor, University of Memphis, United States

We examine the optimal pricing decision for a retailer selling substitutable products with different levels of greenness under supply disruption. We investigate how the susceptibility of green products to supply disruption, the supply disruption duration and the sensitivity of consumers to product unavailability impact the retailer's optimal pricing decision.

115-0907 The Impact of Return Logistics on Customer Repurchase: A Service Co-Production Perspective

## Tuesday, 11:30 AM - 01:00 PM

Michael Galbreth, Professor, University of Tennessee Knoxville, United States

Guangzhi Shang, Associate Professor, Florida State University, United States

Li Wang, Post Doc/Researcher, Zhejiang Lab, China

Yu Jiang, Student, University of Tennessee, Knoxville, United States

This paper studies the link between customer loyalty and return logistics efficiency at the customer and shipper levels. We use proprietary datasets from an online apparel retailer to test hypotheses using a Cox model. Our paper contributes new managerial insights regarding the importance of speed throughout the return logistics process.

### 115-1487 Remanufacturing Technology Portfolio Planning for End-of-life Product

Ying Cao, Assistant Professor, Penn State Erie, United States

Kai Meng, Professor, Nanjing University of Aeronautics and Astronautics, China

Guang Li, Assistant Professor, Queen's University, Canada

Xianghui (Richard) Peng, Associate Professor, Penn State University Erie, United States

In a closed-loop supply chain, remanufacturers are often exposed to various technology alternatives. In this research, we study the remanufacturing technology portfolio planning of a remanufacturer in order to maximize the expected profit. We derive the properties of optimal technology portfolio structure and conduct numerical study to generate managerial insights.

## Invited Session

225	Tuesday, 11:30 AM - 01:00 PM, Regency Ballroom P	Track: Disruptive Technologies and Operations Management
	Invited Session: Economics of Disruptive Technologies	
	Chair(s): Hong Guo	

### 115-1127 Incentivizing Buyers to Share with Renters: An Economic Analysis of Manufacturers' Cooperation with Sharing Platforms

Wenyi Zhang, Student, Tianjin University, China

Nan Feng, Professor, Tianjin University, China

Haiyang Feng, Professor, Tianjin University, China

Some manufacturers attempted to cooperate with sharing platforms by subsidizing buyers who share products in response to the sharing economy. We demonstrate that such cooperation is easier to achieve with a higher sale price and sharing market-size; and they both have incentives to share costs and profits to promote cooperation.

### 115-2120 Is in-game purchase a guilty pleasure? Negative beliefs and treatment

Mei Li, Associate Professor, University of Oklahoma, United States

Hong Guo, Professor, Arizona State University, United States

Gyusuk Lee, Assistant Professor, IE BUSINESS SCHOOL, Spain

Rachna Shah, Professor, University of Minnesota, United States

In this study, we explore negative belief toward in-game purchases that prohibit gamers from in-game spending. We conduct three consecutive studies to explore the severity of these negative beliefs, identify their key types, and develop an approach to reduce its severity and improve positive attitudes toward in-game purchases.

### 115-2121 Measuring algorithmic interpretability: A human-learning-based framework and the corresponding cognitive complexity score

John Lalor, Assistant Professor, University of Notre Dame, United States

Hong Guo, Professor, Arizona State University, United States

In this work we build upon programming language theory and cognitive load theory to develop a framework for measuring algorithmic interpretability. The proposed measurement framework reflects the process of a human learning an algorithm and has several desirable properties.

## Invited Session

226	Tuesday, 11:30 AM - 01:00 PM, Silver Spring 1	Track: Data Science and Analytics
	Invited Session: Role of Data, Evidence and Analytics in Systems Modeling	
	Chair(s): Ozge Karanfil Paulo Goncalves	

### 115-1559 The Making of Practice Guidelines: Endogenous Dynamics of Evidence, Policy and Practice in Population Screening

Ozge Karanfil, Assistant Professor, Koç University, Turkey

Practice guidelines for routine screening are contentious and often change over time. Some tests are over- or underused, with clinical practice persistently deviating from evidence-based guidelines. We develop an integrated, broad boundary feedback theory explaining why some tests are over- while others are underused contrary to available scientific evidence.

### 115-1641 Platform Startup Strategy: New Product Development Investments, Pricing, and Metrics

Burcu Tan Erciyes, Associate Professor, University of New Mexico, United States

Edward Anderson, Professor, University of Texas Austin, United States

Geoffrey Parker, Professor, Dartmouth College, United States

We study a two-sided platform startup's optimal new product development investment and pricing decisions over a multiperiod life-cycle. We characterize optimal dynamic policies for different monetization models (commission vs 1- or 2-sided subscriptions) and ecosystem regimes including business-to-consumer vs. business-to-business, varying same-side and cross-side externalities, and product development agility.

## Tuesday, 11:30 AM - 01:00 PM

115-1678 How Decentralized Trials Fit Into and Alter the Current Clinical Development Landscape: A Systems View

Lidia Betcheva, Student, University of Cambridge, United Kingdom  
Feryal ERHUN, Professor, Cambridge University, United Kingdom  
Kenneth Getz, Professor, TUFTS UNIVERSITY, United States  
Jennifer Kim, Assistant Professor, TUFTS UNIVERSITY, United States  
Nektarios Oraiopoulos, Lecturer, Cambridge University, United Kingdom

This paper provides an overview of decentralized clinical trials (DCTs), emphasizing how they fit into and alter the current clinical development landscape. We propose a conceptual framework that employs systems thinking to evaluate the impact of trial decentralization on key stakeholders through a reiterative assessment of pain points.

115-1971 Collaborative Learning and Decision-Making on Pricing and Recommendation: A Simple Framework for Planning

Junyu Cao, Assistant Professor, University of Texas Austin, United States

We formulate a collaborative learning and decision-making problem involving contextual information. In current business practices, pricing and recommendation decisions often are made jointly by multiple teams in sequence. We propose a simple collaboration framework that integrates the learning about decision-making in an unknown environment. Numerical studies validate the superior performance.

### Invited Session

227	Tuesday, 11:30 AM - 01:00 PM, Silver Spring 2	Track: Inventory and Logistics Management
	Invited Session: Modeling in Logistics Management	
	Chair(s): Javier Rubio	

115-0716 Mean-Variance Optimal Base-Stock Policies

Yueqin Zhong, Student, Rutgers University, United States  
Andrew Benton, Data Scientist, Rutgers University, United States  
Melike Baykal-Gursoy, Professor, Rutgers University, United States

We consider infinite horizon inventory control under mean-variance performance criterion. Firstly, for the single period case, we show under certain conditions on the demand distribution that base-stock policies are optimal regardless of the coefficient of the variance term. We, then extend the result to infinite horizon problems.

115-0717 Supply Chain Planning: A Case for Hybrid Cross-Docks

Manoj Vanajakumari, Associate Professor, University of North Carolina Wilmington, United States  
Haoying Sun, Associate Professor, University of Kentucky, United States  
Chelliah Sriskandarajah, Professor, Texas A&M University College Station, United States

A Hybrid Cross Dock (HCD) facility provides an option for a company to store inventory for a period of time without incurring inventory holding costs. The objective of this research is to provide a near-optimal or an optimal solution that minimizes the total logistics and inventory related costs,

115-0834 Improving Trip Distribution Modeling with Sparse Regression

Javier Rubio, Assistant Professor, University of North Texas, United States  
Jesús Muñuzuri, Professor, Universidad De Sevilla, Spain

We explore how to increase the accuracy of trip distribution models by means of gravity models with data-driven deterrence functions. We test these techniques with interregional freight data from Spain and obtain an improvement in performance of up to 14% over the models generated with predefined deterrence functions.

115-1442 Deep Learning for Real-time Probabilistic Traffic Congestion Prediction

Pedro Cesar Lopes Gerum, Assistant Professor, Cleveland State University, United States  
Andrew Benton, Data Scientist, Rutgers University, United States  
Melike Baykal-Gursoy, Associate Professor, Rutgers University, United States

Transportation systems depend on timely and accurate traffic predictions to provide travelers with a reliable and satisfactory experience. We propose a new probabilistic deep learning architecture for traffic density forecasting that is significantly more general, reliable, and accurate than traditional approaches. They produce distributions that may improve congestion mitigation practices.

### Invited Session

228	Tuesday, 11:30 AM - 01:00 PM, Winter Park 49	Track: Product Innovation and Technology Management
	Invited Session: Navigating the Energy Transition through Smart Asset Management	
	Chair(s): Rob Basten     Ragnar Eggertsson	

115-1028 Managing Energy Resource Upgrading Decisions under Government Regulation and Emerging Technologies

Ragnar Eggertsson, Student, Eindhoven University of Technology, Netherlands  
Rob Basten, Associate Professor, Eindhoven University of Technology, Netherlands  
Alan Scheller-Wolf, Professor, Carnegie Mellon University, United States  
Nicola Secomandi, Professor, Rice University, United States

## Tuesday, 11:30 AM - 01:00 PM

We introduce a novel model to study how government regulations and emerging technologies influence power producers' capacity related choices, such as keeping, upgrading, or decommissioning their power plants. Through a numerical and theoretical analysis, we gain insight into how external factors influence optimal power plant management.

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### 115-1131 How Do Robots Affect Firms' Innovation Performance? Evidence from Spanish Manufacturers

Yiyao Zhou, Student, UCL School of Management, Great Britain  
Bilal Gokpinar, Professor, University College London, United Kingdom

This paper finds that robot use has a negative effect on manufacturing firms' process innovation. This effect is smaller for older firms and is only salient for complex manufacturing, rather than light manufacturing or heavy manufacturing. These results points to a potential mechanism is through reducing human involvement.

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### 115-1476 A longitudinal perspective on Asset Life Cycle decision-making

Jan Braaksma, Associate Professor, University of Twente, Netherlands  
Willem Haanstra, Assistant Professor, University of Twente, Netherlands  
Leo van Dongen, Professor, University of Twente, Netherlands

The energy transition calls for strategic planning and re-alignment of energy grids. A longitudinal research project spanning over ten years, shows how Asset Life Cycle decision-making has aided a Dutch grid operator in successfully evaluating scenarios for the energy transition through Asset Management Planning and Life Cycle Value-based investment decision-making.

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## Invited Session

229	Tuesday, 11:30 AM - 01:00 PM, Winter Park 50	Track: Socially Responsible Operations
	Invited Session: Socially Responsible Supply Chains	
	Chair(s): Tim Kraft	

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### 115-0643 Buyer-Imposed and Supplier-Initiated Social Responsibility Codes of Conduct

Han Zhang, Assistant Professor, Michigan State University, United States  
Mevan Jayasinghe, Associate Professor, Michigan State University, United States  
Sriram Narayanan, Professor, Michigan State University, United States

A buyer procuring from a socially irresponsible supplier will impose the buyer's code of conduct on the supplier. The supplier may voluntarily adopt a code of conduct to signal social responsibility. We show in equilibrium the buyer always waives the buyer's code when the supplier has adopted a voluntary code.

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### 115-0657 Buyer Engagement in a Supplier's Social Responsibility Risk Management: Prevention, Detection, and Remediation

Vincent (Junhao) Yu, Post Doc/Researcher, North Carolina State University, United States  
Tim Kraft, Associate Professor, 2801 Founders Dr, United States

We study how retailers can proactively manage their suppliers' responsibility risk. We focus on a retailer's risk management strategy and consider three tactics the retailer can deploy—prevention, detection, and remediation—and study how combining the three can help the retailer achieve optimal results.

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### 115-1255 Audit and Compliance in Supply Chains with Damage Cost Sharing under Supplier's Responsibility Standards

Prashant Chintapalli, Assistant Professor, Ivey Business School, Canada  
Yang Li, Assistant Professor, Richard Ivey Business School, Canada  
Hubert Pun, Associate Professor, University of Western Ontario, Canada

What is the impact of buyer audits on supplier compliance when buyer shares its damages with the supplier, e.g., through damage liquidation? Which of the audit mechanisms, independent, joint, or shared performs better under these circumstances? We examine these issues regarding buyer audits and supplier compliance in a B2B setup.

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### 115-1969 Operational Challenges faced by Social Enterprises in India

Bhavani Shankar Saripalli, Associate Professor, Indian Institute of Management Indore, India  
Vinaysingh Chawan, Assistant Professor, Indian Institute of Management Indore, India

This paper covers operational challenges faced by six large Social Enterprises working across three sectors in India. Operational challenges at production, procurement, processing, and distribution stages were identified and suitable solutions have been proposed. In-depth interviews with CEOs of six social enterprises were conducted to develop a conceptual model.

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**Invited Session****232**

Tuesday, 02:15 PM - 03:45 PM, Celebration 1

Track: Agriculture and Food Supply Chains

Invited Session: **Sustainability in Agriculture**

Chair(s): Erkut Sonmez

**115-0260 Dynamic Irrigation Management Under Temporal and Spatial Variability**

Erkut Sonmez, Associate Professor, University of Nebraska Lincoln, United States

Baris Ata, Professor, University of Chicago, United States

Derek Heeren, Associate Professor, University of Nebraska Lincoln, United States

Agricultural productivity must improve significantly soon following increasing food demand. One way to improve productivity is irrigation. However, freshwater scarcity, increasing costs, and climate change necessitate sustainable and efficient methods for irrigation. We study dynamic irrigation management under uncertainty considering temporal variability and spatial soil heterogeneity of the field.

**115-0263 Plastic Recycling in Agriculture Industry**

Yinping Mu, Professor, Yangtze Delta Region Institute (Huzhou) UESTC, China

Wenli Xiao, Assistant Professor, University of San Diego, United States

Feifei Shan, Student, University of Science and Technology of China, China

Qiong Chen, Assistant Professor, Southwestern University of Finance and Economics, China

In this study, we compare three prevailing forms of agricultural film recycling: Penalty Scheme, Reward Scheme and Service Scheme. Our results suggest the social planner should set a sufficiently high penalty if the manufacturer is responsible for collection and a moderate penalty if the farmer is responsible for collection.

**115-0316 Industrial Water Recycling: Optimal Capacity Amid Water Scarcity**

Sandra Buzon-Vargas, Student, Texas A&amp;M University College Station, United States

Neil Geismar, Professor, Texas A&amp;M University College Station, United States

This paper, motivated by the growing societal concern about freshwater availability, develops a stochastic optimization model to find a firm's optimal water recycling capacity decisions. We find the optimal water recycling capacity and assess how that optimal choice is affected by different regulatory instruments.

**115-0691 Enabling Sustainable Cultivation while Mitigating Malnutrition from India**

Sanchita Das, Student, University of Washington, United States

Masha Shunko, Associate Professor, University of Washington, United States

Motivated by recent protests against Farm Laws in India, we study role of government policy in farmers' cultivation choices. Using various policy instruments, we model an optimal contract that incentivizes farmers to diversify cultivation towards agro-ecologically sensitive alternatives. These alternatives are nutritionally wholesome and can also address malnutrition at scale.

**Invited Session****233**

Tuesday, 02:15 PM - 03:45 PM, Celebration 2

Track: Behavioral Operations Management

Invited Session: **Information and Behavioral Operations Management**

Chair(s): Changyue Luo

**115-0376 The Role of Governance Mechanisms in Improving Green Innovations**

Zuoming Liu, Associate Professor, University of North Georgia, United States

Huaqing Wang, Associate Professor, Palm Beach Atlantic University, United States

Building on information-processing perspective and contingency theory, this study empirically examines the impact of green innovation complexity on performance and how proper governance mechanisms can properly align with the complexity to improve innovation capability. This study provides theoretical contribution and managerial implications regarding green innovations in an intra-organizational setting.

**115-1132 Informativeness of Motor Response Dynamics in Optimal Stopping Problems**

Ilkka Leppanen, Assistant Professor, Aalto University, Finland

Tianqi Hu, Student, Loughborough University, United Kingdom

We experimentally study decision conflict in revenue management and sequential search problems. We represent decision thresholds by motor response dynamics, i.e. swiping right or left to accept or reject a decision proposal. This novel method is informative of behaviour and decision thresholds and is based on models of evidence accumulation.

**115-1233 The Impact of Economic Insecurity on Covid-19 Mitigation Efforts**

Kellas Cameron, Assistant Professor, University of South Florida, United States

Decentralized Covid-19 mitigation efforts led to differences in economic impacts between US states. This study looks at how the efficacy of different lockdown protocols, social distancing mandates, and mask requirements varied dependent on state culture, and demonstrates how a state's view of economic insecurity significantly affected economic.

**115-2051 Strategic importance of diversity in academia and industry**

Ram Tewari, Professor, University of Miami, United States

## Tuesday, 02:15 PM - 03:45 PM

With changing demography, diversity is natural and so it has to be accepted and respected . It is a challenge for stakeholders, academia and industry b that future workforce will be increasingly diverse. How to treat all persons fairly and encourage equitable participation without any discrimination.

### Invited Session

234	Tuesday, 02:15 PM - 03:45 PM, Celebration 3	Track: Healthcare Operations Management
	Invited Session: <b>Incorporating Patient Behaviors</b>	
	Chair(s): Pengyi Shi      Yue Hu	

115-0726    Structural Estimation of Kidney Transplant Candidates' Quality of Life Scores

Baris Ata, Professor, University of Chicago, United States

Yue Hu, Post Doc/Researcher, University of Chicago, United States

Cem Randa, Post Doc/Researcher, (CIF:ESG50985993), United States

We develop a framework for assessing the impact of changes to the deceased-donor kidney allocation policy taking into account transplant candidates' endogenous organ acceptance behavior. Specifically, we construct a dynamic structural model of transplant candidates' acceptance/rejection decisions for organ offers, and perform various counterfactual studies to assess policy changes.

115-0742    Heterogenous Impacts of Vaccine Rollouts on Demand for Public Transportation

Huaiyang Zhong, Assistant Professor, Virginia Tech, United States

Guihua Wang, Assistant Professor, University of Texas Dallas, United States

Tinglong Dai, Professor, Johns Hopkins University, United States

Public transit ridership tumbled amid the COVID-19 pandemic, contributing to enormous budget deficits. We collect data from multiple sources and leverage unique features of the COVID-19 vaccination process to identify an instrumental variable. We demonstrate the significant but heterogenous impacts of vaccine rollouts on the demand of public transportation.

115-1029    Mitigating Abandonment in Online Services: A Randomized Lab Experiment on Sunk Cost and Delay Announcement

Jimmy Qin, Student, Columbia University, United States

Carri Chan, Professor, Columbia University, United States

Jing Dong, Associate Professor, Columbia University, United States

Previous research has shown that telemedicine patients are more likely to abandon when facing in-clinic delays. Through an experiment on willingness to wait for a reward, we find that injecting sunk cost, providing delay announcement, or utilizing both levers are equally effective in significantly decreasing the abandonment rate.

115-1898    Artificial Intelligence on Call: The Physician's Decision on Whether to Use AI in Clinical Practice

Tinglong Dai, Professor, Johns Hopkins University, United States

Shubhanshu Singh, Associate Professor, Johns Hopkins University, United States

Physicians are increasingly using artificial intelligence (AI) systems to aid their medical decision-making. Using AI can also change the physician's legal liability in the event of patient harm. This paper examines a physician's decision regarding whether to use AI when prescribing a treatment plan for a patient.

### Contributed Session

235	Tuesday, 02:15 PM - 03:45 PM, Celebration 4	Track: Healthcare Operations Management
	Contributed Session: <b>Patient Experience and Health Outcomes</b>	
	Chair(s): Sriram Thirumalai	

115-0349    Less is More? Effects of Clinical Practice Variation on Patient-outcomes: The Mediating Role of Length-of-Stay

Qi Wang, Student, Xi'an Jiaotong University, China

Sarah Zheng, Assistant Professor, University of Victoria, Canada

Anita Carson, Professor, Boston University, United States

Eitan Naveh, Professor, Technion Israel Institute of Technology, Israel

This study explores when and how variations in clinical practice relate to patient-outcomes. Using data from over 39,000 inpatient samples we investigate practice variation's impacts on patient-outcomes and length-of-stay deviation, and the moderating role of practice variation. Our findings help improve practice operations and reduce waste in the healthcare system.

115-1206    Patient Insurance Status, Healthcare Procedures, and Patient Outcomes: An Empirical Study of Providers' Behavioural Biases

Subhankar Saha, Student, Indian Institute of Management Bangalore, India

Sriram Thirumalai, Associate Professor, Texas Christian University (TCU), United States

Sarang Sunder, Associate Professor, Texas Christian University (TCU), United States

Do healthcare providers' behavioural biases exacerbate the variability in the standardised diagnostics across patients, even within the same diagnostic category? This study examines the impact of patient insurance on the number of procedures after introducing the Hospital Value-Based Purchase (HVBP) Program using the State Inpatient Database of Florida.

115-1429    Patient satisfaction as a source of competitive advantage

Ayah Eyalawwad, Student, University of Jordan, Jordan

Sarah Awwad, Student, Qatar University, Qatar

## Tuesday, 02:15 PM - 03:45 PM

Abdulkareem Awwad, Associate Professor, Qatar University, Qatar

This study aims to investigate the causal relationship between patient satisfaction and the competitive advantage of healthcare organizations. The results of the data analysis provided empirical evidence that patient satisfaction will be reflected in the different building blocks of the competitive advantage including efficiency, quality, innovation, and customer responsiveness.

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### 115-1870 An Empirical Study of Patient Navigation Services: A Service Impact Chain Perspective

Ying Fan, Associate Professor, University of Colorado Colorado Springs, United States

Patient navigation enables patients to receive coordinated care in fragmented healthcare systems. We extend the Service Profit Chain framework to Service Impact chain to study success factors, patient navigator effectiveness, and their service impact beyond profitability. Survey research is utilized to collect data from a national patient navigator network.

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## Invited Session

236	Tuesday, 02:15 PM - 03:45 PM, Celebration 5	Track: Healthcare Analytics
	Invited Session: <b>Applied Analytics in Healthcare</b>	
	Chair(s): Christopher Sun	

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### 115-1904 Studying the Effect of Team Familiarity in Surgical Teams

Gulin Tuzcuoglu, Student, University of Chicago, United States

Dan Adelman, Professor, Booth School of Business, United States

Cagla Keceli, Student, University of Chicago, United States

Kiran Turaga, MD, MPH, Yale University, United States

Hunter Witmer, MD, University of Chicago, United States

We study the effect of team familiarity in surgical teams to maximize team performance. Our approach takes the team members' individual and collaborative experience into account, which we quantify using a novel metric. We report on results based on data from a high-volume academic medical center.

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### 115-2096 Optimizing intra-hospital patient transport services

Martin Copenhaver, Research Scientist and Lecturer, Massachusetts General Hospital and MIT, United States

Retsef Levi, Professor, MIT, United States

Christopher Sun, Assistant Professor, University of Ottawa, Canada

Cecilia Zenteno, Senior Manager, Data & Analytics, (CIF:ESG50985993), United States

Intra-hospital patient transportation services are an integral part of daily logistic activities in a hospital, facilitating patient flow. Suboptimal transport practices and transport delays can compromise hospital operations and quality of care. In this project, we propose analytical frameworks to address primary drivers of transport delays at Massachusetts General Hospital

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### 115-2098 Benefits of Adapting to Demand Disruptions in a Hospital Pharmacy Inventory System

Lauren Czerniak, Student, University of Michigan - Ann Arbor, United States

Mariel Lavieri, Associate Professor, University of Michigan - Ann Arbor, United States

Mark Daskin, Emeritus Professor, University of Michigan - Ann Arbor, United States

Eunshin Byon, Associate Professor, University of Michigan Ann Arbor, United States

Karl Renius, Associate Professor, University of Michigan, Ann Arbor, United States

The criticality and price of a drug, as well as supply and demand disruptions, make inventory decision-making challenging. We find that adaptive inventory policies generally have a greater influence on drugs with an unreliable supply chain. The drug's criticality-price profile dictates whether the influence is beneficial or consequential.

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### 115-2099 Consequences of Adapting to Demand Disruptions in a Hospital Pharmacy System -

Lauren Czerniak, Student, University of Michigan - Ann Arbor, United States

Burgunda Sweet, Professor, University of Michigan, College of Pharm, United States

Jenn Leja, Post Doc/Researcher, University of Michigan - Ann Arbor, United States

Matthew Tupps, Lecturer, University of Michigan - Ann Arbor, United States

We find that adaptive inventory policies generally have a greater influence on drugs with an unreliable supply chain. The drug's criticality-price profile dictates whether the influence is beneficial or consequential.

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### 115-2155 Got (Optimal) Milk? Pooling Donations in Human Milk Banks with Machine Learning & Optimization

Timothy Chan, Professor, University of Toronto, Canada

Rafid Mahmood, Assistant Professor, Ottawa University, Canada

Deborah O'Connor, Professor, University of Toronto, Canada

Debbie Stone, Professor, Sinai Health, Canada

Sharon Unger, Professor, University of Toronto, Canada

Rachel Wong, Student, University of Toronto, Canada

Ian Yihang Zhu, Student, University of Toronto, Canada

Donor milk's macronutrient content is critical to infant development but varies substantially. To reduce this variance, milk banks pool multiple donations together to create a product. We propose a data-driven framework combining machine learning and optimization to predict each donation's macronutrient content then optimally combine them into pool.

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Invited Session

237	Tuesday, 02:15 PM - 03:45 PM, Celebration 6	Track: Information Systems and Operations Management
	Invited Session: Panel: Recent Applications of Machine Learning in Business Research	
	Chair(s): Amit Mehra	

115-2117 Panel: Recent Applications of Machine Learning in Business Research

Amit Mehra, Professor, University of Texas Dallas, United States  
 Emaad Manzoor, Assistant Professor, Cornell University, United States  
 Guihua Wang, Assistant Professor, University of Texas Dallas, United States  
 Harpreet Singh, Assistant Professor, University of Texas at Dallas, United States  
 Edward McFowland III, , ,  
 David Bergman, Associate Professor, University of Connecticut, United States

The panel has a dual objective: (1) Discuss how ML can strengthen econometric approaches for better causal inference with observational data; (2) How and what ML approaches can be used by researchers to solve challenging business problems. Panelists: 1) Emaad Manzoor - Cornell University 2) Guihua Wang - UT Dallas 3) Harpreet Singh - UT Dallas 4) Edward McFowland III - Harvard Business School

Invited Session

238	Tuesday, 02:15 PM - 03:45 PM, Celebration 7	Track: Sustainable Operations Management
	Invited Session: College of Sustainable Operations Student Paper Competition	
	Chair(s): Shouqiang Wang	

115-0089 Allocation of Funds in Bilevel Subsidy Welfare Programs

Wei Wei, Student, University of Massachusetts Amherst, United States  
 Priyank Arora, Assistant Professor, University of South Carolina, United States  
 Senay Solak, Associate Professor, University of Massachusetts Amherst, United States

We study allocation of available and expected additional funds by a funding agency among various service agencies within bilevel, one-to-many, and service-focused subsidy welfare programs. We compare the resulting social impact when the funding agency has versus has no equity consideration while aiming to generate a greater overall social impact.

115-0124 Quality Costs of Fuel Efficiency Improvements in the Automobile Industry

Donggyu Jeon, Student, Indiana University Bloomington, United States  
 George Ball, Associate Professor, Indiana University Bloomington, United States  
 Gil Souza, Professor, University of Tennessee Knoxville, United States

In this study, we empirically examine the impact of firms' efforts to improve the environmental performance of a vehicle (measured as MPG) on product quality (measured as the number of quality complaints reported) in the automotive industry. We provide operational and strategic managerial implications of improving sustainability on product quality.

115-0297 Playing Fair? Environmental Impacts and Practices of Facilities in Minority Communities.

Abhinav Shubham, Student, Georgia Institute of Technology, United States  
 Ravi Subramanian, Professor, Georgia Tech, United States

Drawing on comprehensive US EPA and Census data, we examine the association between presence of substantial racial minority populations in host communities and facility-level environmental impacts and impact-reduction strategies. Our findings offer evidence for firms and policy makers to consider fairness and equity in managing and regulating environmental risks.

115-2146 A Data-driven Approach to Improve Artisans' Productivity

Ben Liu, Student, New York University, United States  
 Divya Singhvi, Assistant Professor, New York University, United States  
 Somya Singhvi, Assistant Professor, University of Southern California, United States  
 Xinyu Zhang, Student, New York University, United States

Collaborating with a rug-manufacturing social enterprise of women artisans in rural India, we consider the problem of optimizing supervisor visit and develop a novel predict-then-optimize framework to improve productivity. We show the existence of a polynomial-time algorithm with competitive ratio of  $1-1/\sqrt{e}$ , and test the proposed methodology on actual data.

115-2147 The Impact of Climate Change: An Empirical Analysis of Smart Thermostat Data

Michael Blair, Student, Yale University, United States  
 Saed Alizamir, Assistant Professor, Yale University, United States  
 Shouqiang Wang, Associate Professor, University of Texas Dallas, United States

Using a rich micro-level smart thermostat data we develop models for household's long- and short-term thermostat decisions. We leverage these models to estimate the impact of climate change on consumption by predicting future thermostat behavior. Our analysis estimates that cooling energy usage could rise up to 70% by 2050.

115-2148 Business Model Choice under Right to Repair: Economic and Environmental Consequences

Ece Gulserliler, Student, INSEAD, France  
 Atalay Atas, Professor, INSEAD, France

## Tuesday, 02:15 PM - 03:45 PM

Luk Van Wassenhove, Professor, INSEAD, France

Right-to-Repair (RTR) regulations require producers to design easy-to-repair products and supply necessary information and parts for consumers to independently undertake repairs. This paper analyzes the effect of RTR on producers' business model choices between ownership and non-ownership models (e.g., leasing), and the implications for producers, consumers, and the environment.

### Invited Session

239

Tuesday, 02:15 PM - 03:45 PM, Celebration 8

Track: Empirical Research in Operations Management

Invited Session: Examples of Empirical Research in Emerging Topics

Chair(s): Mahyar Eftekhari

#### 115-0061 Project Networks and Reallocation Externalities

Vibhuti Dhingra, Assistant Professor, York University, Canada

Juan Camilo Serpa, Associate Professor, McGill University, Canada

Harish Krishnan, Professor, University of British Columbia, Canada

A project involves several participants working concurrently on multiple projects, creating a network of otherwise unrelated projects. We show that a seemingly localized disruption, affecting only one project site, eventually causes delays across unrelated projects. Performance-based contracts, which reward contractors for timeliness, exacerbate these externalities by encouraging self-interested resource reallocation.

#### 115-0780 The Impact of Workload on Operational Performance: Empirical Evidence from Last-Mile Delivery

Yuchen Liang, Student, National University of Singapore, Singapore

Stanley Lim, Assistant Professor, Michigan State University, United States

Guodong Lyu, Assistant Professor, Hong Kong University of Science and Technology, China

Chung-Piaw Teo, Professor, National University of Singapore, Singapore

Leveraging a data set of last-mile deliveries from a parcel operator in Singapore, we examine the impact of employees' workload on delivery performance. We find that workload exhibits a U-shape relationship with delivery failure rate. We study moderating factors, subsample analysis, and the workload assignment model for different assignment mechanisms.

#### 115-0842 Empowering the Frontline Health Workers to Tackle Stock-outs

Amir Karimi, Assistant Professor, University of Texas at San Antonio, United States

Anant Mishra, Associate Professor, University of Minnesota, United States

Karthik V. Natarajan, Associate Professor, University of Minnesota, United States

Kingshuk Sinha, Professor, University of Minnesota, United States

In low- and middle-income countries, frontline health workers are frequently tasked with the non-clinical responsibility of inventory management for which they are not adequately trained. Focusing on this context, we analyze novel and proprietary field data from an inventory management training program of frontline health workers in Indonesia.

#### 115-0988 Reducing Greenhouse Gas emissions in Steel Manufacturing: An Intervention-based Study

Gopesh Anand, Professor, University of Illinois Urbana-Champaign, United States

Ujjal Mukherjee, Associate Professor, University of Illinois Urbana-Champaign, United States

Samit Paul, Assistant Professor, Indian Institute of Management Calcutta, India

Alok Raj, Assistant Professor, Xavier Labor Relations Institute, India

SAROJ SINGH, Project head, XLRI Xavier School of Management, India

In this research, we explore how the introduction of Internet of Things (IoT) impacts greenhouse gas emissions in steel manufacturing. Adopting a field experimental setting, we address whether IoT enables operational process improvement and triggers organizational learning.

#### 115-1523 Does governance ease the overhead squeeze experienced by nonprofits?

Iman Parsa, Post Doc/Researcher, INSEAD, France

Mahyar Eftekhari, Associate Professor, Arizona State University Tempe, United States

Charles Corbett, Professor, UCLA Anderson School of Management, United States

We investigate the role of governance quality in driving donations to nonprofits using longitudinal data of 38,226 nonprofits during 2010- 2017. In our estimations, we first evaluate and confirm the need to correct for omitted variable bias and then use valid instrumental variables in a fixed-effects 3SLS estimation.

### Invited Session

241

Tuesday, 02:15 PM - 03:45 PM, Celebration 10

Track: Revenue Management and Pricing

Invited Session: Algorithmic Causal Inference I

Chair(s): Jinglong Zhao

#### 115-0894 Using Algorithmic Scores to Measure the Impacts of Targeted Promotional Messages

Annie Shi, Student, Washington University in St. Louis, United States

Dennis Zhang, Associate Professor, Washington University in St. Louis, United States

Tat Chan, Professor, Washington University in St. Louis, United States

Haoyuan Hu, Technical Specialist, Alibaba Group, China

Binqiang Zhao, Technical Specialist, Alibaba Group, China

## Tuesday, 02:15 PM - 03:45 PM

We propose matching on ML-generated scores used in targeting decisions to measure the effectiveness of targeting promotions. To test our proposed approach, we conducted a large field experiment on targeting promotions with a large retailing platform and showed our proposed matching approach could effectively recover the true causal effects.

### 115-0895 Estimating Causal Effects Of Long-Term Treatments

Shan Huang, Assistant Professor, Hong Kong University, Hong Kong, China

Chen Wang, Student, Hong Kong University, Hong Kong, China

Yuan Yuan, Assistant Professor, Purdue University, United States

Jinglong Zhao, Assistant Professor, Boston University, United States

In this work, we present a framework to estimate the causal effects of long-term treatments. We establish a longitudinal analogue of the famous surrogate index framework. We showcase how to estimate the effects of long-term treatments by conducting a large-scale search bar experiment.

### 115-0957 Reducing Marketplace Interference Bias Via Shadow Prices

Ido Bright, Research Scientist, Lyft, Inc, United States

Arthur Delarue, Assistant Professor, Georgia Institute of Technology, United States

Ilan Lobel, Assistant Professor, New York University, United States

We propose a technique for online matching marketplaces to run randomized experiments and obtain meaningful estimates despite marketplace interference. Instead of comparing total value accrued by the treatment and control groups, we instead compare each group's average shadow price in the matching linear program. We show our technique reduces bias.

### 115-1421 Design of Panel Experiments under Inteference

Tu Ni, Student, National University of Singapore, Singapore

Iavor Bojinov, Assistant Professor, Harvard Business School, United States

Jinglong Zhao, Assistant Professor, Boston University, United States

We present a randomized design of panel experiments under spatial and temporal interference, which is efficient in variance minimization for the causal estimator. Our proposed design has two features: a notion of cluster-based randomization and a balancing of treatment and control assignments.

## Contributed Session

242

Tuesday, 02:15 PM - 03:45 PM, Celebration 11

Track: Manufacturing Operations

Contributed Session: Frontier of Manufacturing Operations

Chair(s): Roohollah Younes Sinaki

### 115-1816 Re-engineering of 5S Implementation to success

Mohsen Mosayebi, Assistant Professor, Georgia College & State University, United States

Mehrnaz Khalaj Hedayati, Assistant Professor, Georgia College & State University, United States

Implementing lean tools such as 5S relies on learning and continuous improvement. However, many failures occur at this point especially with low-wage operators and high-rate human resource turnover post pandemic. Results from re-engineering 5S, successful project-based implementation in an automotive manufacturing, and derived conceptual model will be presented.

### 115-1903 Project scheduling under various resource constraints

Nicklas Klein, Student, University of Bern, Switzerland

Mario Gnägi, Post Doc/Researcher, University of Bern, Switzerland

Norbert Trautmann, Professor, University of Bern, Switzerland

The execution of a project often requires two types of resources: renewable resources representing, e.g., staff members or equipment; and production and consumption resources representing, e.g., the project budget. We present a mixed-integer linear programming formulation for scheduling such a project which significantly outperforms state-of-the-art models from the literature.

### 115-1958 Cellular Manufacturing Design- Toward the application of Industry 4.0

Roohollah Younes Sinaki, Student, Ohio University, United States

Azadeh Sadeghi, Assistant Professor, University of Michigan-Flint, United States

This literature review discusses the placement of cellular manufacturing systems in the industry 4.0 paradigm. Among the existing automated manufacturing systems, reconfigurable cellular manufacturing systems continue to extensively adopt industry 4.0 by developing smart factory and smart product while establishing a strong communication system among suppliers, factories and customers.

## Contributed Session

243

Tuesday, 02:15 PM - 03:45 PM, Celebration 12

Track: Humanitarian Operations and Crisis Management

Contributed Session: National Security

Chair(s): Jomon Paul

### 115-0111 Domestic Extremism Prevention in the United States: A Policy Framework

Jomon Paul, Professor, Kennesaw State University, United States

Aniruddha Bagchi, Professor, Kennesaw State University, United States

## Tuesday, 02:15 PM - 03:45 PM

Absence of a domestic extremism prevention architecture represents a major strategic-policy vulnerability in efforts to counter terrorism within the United States. We focus on policies that mitigate this problem. We evaluate how radicalization occurs due to social media, political polarization, attitudes towards immigration, state of economy, religious freedom, among others.

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115-1436 Leveraging E-Government data to ensure equitable access to public services during a slow-onset disaster

Duygu Pamukcu, Post Doc/Researcher, Virginia Tech, United States

Christopher Zobel, Professor, Virginia Tech, United States

Municipal service systems should address community needs by maintaining services even during disaster events. To support this, we use time series modeling to analyze a large-scale publicly available data set from New York City and examine the impacts on municipal service provision during the first year of the COVID-19 pandemic.

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115-1535 Humanitarian and national security components in a refugee crisis

Luiza Cunha, Post Doc/Researcher, Universidade de São Paulo, Brazil

Afonso Silva, Student, São Paulo University, Brazil

Irineu Brito Jr, Professor, Universidade Estadual Paulista Julio De Mesquita Filho - Unesp, Brazil

Hugo Yoshizaki, Retired, Universidade de São Paulo, Brazil

The Operation Welcome has both a humanitarian and security component in receiving, sheltering and socio-economically inserting Venezuelan immigrants in Brazil. Through a casual loop diagram, this research provides dynamic hypotheses and discussion on these components. Results contribute with insights for practical improvements in the operation.

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115-1561 Selection of Brazilian Air Force Aircraft in Response to a Humanitarian Crisis on Brazilian Borders.

Newton Souza, Student, São Paulo University, Brazil

Hugo Yoshizaki, Retired, Universidade de São Paulo, Brazil

Luiza Cunha, Post Doc/Researcher, Universidade de São Paulo, Brazil

Irineu de Brito Junior, Associate Professor, Sao Paulo State University - UNESP, Brazil

An optimization model is developed to evaluate the Brazilian Air Force effort in transporting cargo for the strategic initial mobilization of the humanitarian response in border regions. We run the model for different crisis scenarios to evaluate the impact of response times and demand variation, critical for humanitarian logistics.

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### Contributed Session

244	Tuesday, 02:15 PM - 03:45 PM, Celebration 13	Track: Teaching/Pedagogy in POM
	Contributed Session: Games in Operations and Supply Chain	
	Chair(s): Yao Zhao	

115-0805 FASHION MANAGER: A BOARD GAME TO LEARN OPERATIONS MANAGEMENT

Ana Castillo, Assistant Professor, University of Granada, Spain

Leopoldo Gutierrez, Professor, University of Granada, Spain

Matilde Ruiz-Arroyo, Associate Professor, University of Granada, Spain

Carlos Albacete-Saez, Associate Professor, University of Granada, Spain

Jessica Braojos, Assistant Professor, University of Granada, Spain

"Fashion Manager" is a board game conceived as a gamification tool for Operations Management courses. This strategy game will lead students to learn a complete range of contents, organized around a managerial process covering the whole value chain and affected by external factors from the general and competitive environment.

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115-1274 In-class Discovery Exercise: Variation, Excess Capacity, and Waiting

Brad Meyer, Associate Professor, Drake University, United States

Using an online simulation of a single channel queue, students learn about the role of variation and buffer capacity in causing and managing waiting. Students compare wait time at 50%, 75% and 90% capacity and compare systems with and without variation in service and inter-arrival times.

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115-1724 FloraPark - A Competitive and Collaborative Supply Chain Simulation

Yao Zhao, Professor, Rutgers University, United States

Olena Rudna, Lecturer, New Jersey Inst of Technology, United States

Arim Park, Assistant Professor, North Carolina A&T State University, United States

Ju Myung Song, Assistant Professor, University of Massachusetts Lowell, United States

Supply chain collaboration is ambiguous due to the conflict of interests among the trading partners. At the same time, competition from other supply chains in the market forces them to find the effective way for a win-win outcome. The FloraPark simulation imitates the international fresh-flower supply chain and teaches.

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115-1893 The Hunger Chain: A competitive simulation for teaching supply chain management

Yao Zhao, Professor, Rutgers University, United States

Kim Minseok, Student, Rutgers Business School, United States

Shortage gaming, supply chain competition, and supply rationing are crucial topics in supply chain curricula but also challenging for instructors to deliver. We develop an online instructional game, the Hunger chain, which encourages the participation of students through an action-based competitive simulation in experiential learning of these topics effectively.

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Invited Session

245	Tuesday, 02:15 PM - 03:45 PM, Celebration 14	Track: Service Operations
	Invited Session: <b>Service Operations and Human Behavior</b>	
	Chair(s): Craig Froehle      David Rea	

115-0393 Splurging with your Side Hustle: The Effects of Compensation Structure on Consumption Behavior

Paige Tsai, Student, Harvard Business School, United States  
Ryan Buell, Professor, Harvard Business School, United States

We examine how the source and nature of individuals' compensation influences their consumption behavior. We find that individuals primarily purchase relative necessities with their primary income source and relative indulgences with their supplementary income sources. This effect is robust within and across all household income levels.

115-0572 Personality Determinants of Antisocial Behavior in Online Service Settings

Andrew Harrison, Associate Professor, University of Cincinnati, United States  
Craig Froehle, Professor, University of Cincinnati, United States  
David Rapien, Associate Professor, University of Cincinnati, United States

We examine how personality moderates responses to negative feedback in online service settings like social media and peer-grading platforms. A field experiment reveals how personality traits related to the Dark Triad influence whether individuals retaliate against others, work harder to win approval, or quietly remove themselves from the environment.

115-0986 Peak Event Self-Scheduling: Bookend Behavior and Perceived Control Implications for Demand

Mike Dixon, Associate Professor, Utah State Univ, United States  
Liana Victorino, Associate Professor, University of Victoria, Canada

Customers self-schedule peak events for experiential services in a predictable manner either the beginning or the end which can lead to a high degree of demand fluctuation for the peak event. We conduct an exploratory study and a scenario-based experiment to test if perceived control influences demand management.

115-1840 Multitasking in Livechat Support Centers

Robert Batt, Associate Professor, University of Wisconsin-Madison, United States  
Santiago Gallino, Assistant Professor, The Wharton School, United States

We explore the effect of multitasking on system performance in a livechat customer contact center. We find that while multitasking leads to increased chat handle time, the effect is does not increase linearly with multitasking level. We show that this can effect the optimal work assignment rule.

Invited Session

246	Tuesday, 02:15 PM - 03:45 PM, Celebration 15	Track: Information Systems and Operations Management
	Invited Session: <b>Interface of OM, IS, and Marketing Research</b>	
	Chair(s): Yuan Dong	

115-1447 Product Pricing and Live Streaming E-commerce Frequency Decisions

Yuan Dong, Student, Temple University, United States  
Guohou Shan, Student, Temple University, United States  
Subodha Kumar, Professor, Temple University, United States

Influencers can demonstrate products and interact with customers on Live streaming e-commerce (LSE) platforms, reducing product uncertainty and raising the consumers' purchasing intention. In this research, we analytically model product-oriented and influencer-oriented customers to understand how online stores alter LSE frequency and pricing decisions to boost their revenue better.

115-1623 Automated Process Improvement Based on Unstructured Data

Alexander Rochlitzer, Student, Kühne Logistics University, Germany  
Henrik Leopold, Associate Professor, Kühne Logistics University, Germany

We explore how process-related weaknesses described in unstructured data like customer support chats or social media posts can be aligned with data from (information) systems to gain insights into root causes of the weaknesses and to automatically develop improvement recommendations for an organisation's operations.

115-1708 Using Marketplace Store Banners

Hao Su, Assistant Professor, University of New Orleans, United States  
Martin Dresner, Professor, University of Maryland, United States

The study investigates how employment of the marketplace's store banner impacts sales performance for both private label products and non-private label products on an online marketplace. We find that directly branding private labels and using store banners on non-private label products are both associated with greater sales performance.

115-1747 Economics of Federated Learning in Online Advertising

Luoying Chen, Student, University of Texas at Dallas, United States  
Jianqing Chen, Professor, University of Texas at Dallas, United States  
Amit Mehra, Professor, University of Texas Dallas, United States



## Tuesday, 02:15 PM - 03:45 PM

Federated learning (FL) techniques allow firms to train machine learning models without collecting user data. In this work, we study the economic implications when a platform adopts FL in online advertising. We examine how such adoption affects the competition among advertisers and all the players' payoffs.

### Invited Session

247	Tuesday, 02:15 PM - 03:45 PM, Coral Spring 1	Track: Emerging Topics in Operations Management
	Invited Session: Data-Driven Decision Making in Inventory and Supply Chain Systems	
	Chair(s): Yuexing Li	

115-0551 The Impact of Recommending High-quality Content on Consumption and Production on User-generated content Platforms

Zhiyu Zeng, Student, Tsinghua University, China  
Zhiqi Zhang, Student, Washington University in St. Louis, United States  
Dennis Zhang, Associate Professor, Washington University in St. Louis, United States  
Tat Chan, Professor, Washington University in St. Louis, United States

While user-generated content (UGC) platforms provide users with high-quality content to increase content consumption, the impact of consuming high-quality content on the users' own productive behavior is seldom investigated. We examine how users' both content consumption and production are affected by peer users' content quality, and investigate the mechanism behind.

115-0555 Efficient Algorithms for Minimizing Compositions of Convex Functions and Random Functions with NRM Applications

Zikun Ye, Student, University of Illinois at Urbana Champaign, United States  
Xin Chen, Professor, Georgia Institute of Technology, United States  
Yifan Hu, Student, University of Illinois at Urbana Champaign, United States  
Niao He, Assistant Professor, ETH Zürich, Switzerland

we study a class of nonconvex stochastic optimization, where the objective function is a composition of a convex function and a random function. Leveraging an (implicit) convex reformulation via a variable transformation, we design a near-optimal Mirror Stochastic Gradient algorithm, and apply MSG in network revenue problems.

115-0766 A Practical End-to-End Inventory Management Model with Deep Learning

Meng Qi, Assistant Professor, Cornell University, United States  
Yuanyuan Shi, Assistant Professor, University of California San Diego, United States  
Yongzhi Qi, Research Scientist, ?, China  
Max Shen, Professor, University of California Berkeley, United States

We investigate data-driven multi-period inventory replenishment problem with uncertain demand and vendor lead time (VLT) and propose a one-step end-to-end (E2E) framework that uses deep-learning models to output the suggested replenishment amount directly from input features without any intermediate step.

115-1375 A Graph Neural Network Approach for Predicting Supply Chain Network Performance

Shuyu Chen, Student, Duke University, United States  
Yuexing Li, Assistant Professor, Johns Hopkins University, United States  
Jeannette Song, Professor, Duke University, United States  
Yehua Wei, Associate Professor, Fuqua School of Business, United States

Graph Neural Network (GNN) is a new machine learning tool that leverages graphical data structure for learning and prediction. We are the first to apply GNN to predict supply chain network performance by developing a novel graph transformation approach. The results indicate that our approach significantly outperforms several benchmarks.

### Invited Session

248	Tuesday, 02:15 PM - 03:45 PM, Coral Spring 2	Track: Emerging Topics in Operations Management
	Invited Session: Nanostore empirical studies: retail services for the poor in emerging markets	
	Chair(s): Jan Fransoo	

115-0151 Sales Increase Through Value-Added Services In The Nanostore Retail Channel

Rafael Escamilla, Student, Tilburg University, Netherlands  
Jan Fransoo, Professor, Tilburg University, Netherlands  
Robert Rooderkerk, Associate Professor, Rotterdam School of Management, Netherlands

We investigate an initiative by a manufacturer in Latin America to encourage the provision of value-added digital services by nanostores - mom & pop grocery retail microbusiness in emerging markets. Through detailed econometric analyses, we uncover how this initiative influences spatial competition between nanostores and convenience stores.

115-0154 Supply chain transformation and technology management challenges in rural Chinese nanostores

Guanyi Lu, Associate Professor, Florida State University, United States  
Xitong Guo, Professor, Harbin Institute of Technology, China  
Veronica Villena, Associate Professor, Arizona State University, United States  
Douglas Vogel, Professor, City U of HK, China  
Gregory Heim, Professor, Texas A&M University College Station, United States

## Tuesday, 02:15 PM - 03:45 PM

We study how an IT procurement system prescribed by the Chinese government for rural nanostores was used initially and how it evolved over time. We provide implications for IT research about technology management in rural developing areas and for managers to recognize pitfalls of managing IT projects in poor areas.

### 115-0158 Agent-choice in last-mile delivery of food security programs: impact, usage and implications

Rakesh Allu, Student, Cornell University, United States

Maya Ganesh, Assistant Professor, Indian Institute of Management Ahmedabad, India

Sarang Deo, Associate Professor, Indian School of Business, India

Sripad Devalkar, Associate Professor, Indian School of Business, India

Last-mile delivery in food security programs is executed through pre-assigned agents who enjoy monopoly power. We examine the impact of replacing pre-assignment with agent-choice. Using a natural experiment in India, we find a 6.6% increase in monthly uptake of grain. 4% of the increase is attributable to exercise of choice.

### 115-2066 Food Subsidies at the Base-of-the-Pyramid: Take-up, Substitution and Nutrition

Alp Sungu, Student, London Business School, United Kingdom

Ali Aouad, Assistant Professor, London Business School, Great Britain

Kamalini Ramdas, Professor, London Business School, United Kingdom

What are the nutritional impact and the substitution effect of in-kind food subsidies at the global base of the pyramid markets? To address these questions, we conduct a field experiment in a low-income settlement in Mumbai, India, where we randomly provide individuals with food subsidies and track their purchasing patterns.

## Contributed Session

249	Tuesday, 02:15 PM - 03:45 PM, Blue Spring 1	Track: Supply Chain Risk Management
	Contributed Session: COVID-19/Catastrophic Risk	
	Chair(s): Florian Lucker	

### 115-0321 IDENTIFYING AND RANKING SUPPLY CHAIN RISKS

Zach Zacharia, Associate Professor, Lehigh University, United States

Supply chain risks have increased with the growth in globalization, complexity, and natural disasters. Managers need to identify and prioritize different supply chain risks to develop proper mitigation strategies. This paper uses survey data collected every quarter on ten distinct supply chain risks to rank risks in the supply chain.

### 115-1456 Exploring Off-Site Stocking Decisions under Catastrophic Risk

Canan Gunes Corlu, Associate Professor, Boston University, United States

Bahar Biller, Senior Scientist, Sas Institute, United States

Elliot Wolf, NA, Chemours Company, United States

Enver Yucesan, Professor, INSEAD, France

We study off-site stocking decisions under catastrophic disruptions. We extend the classical newsvendor model accounting for the demand uncertainty to capture the cost of supply disruption and the cost of recovery. Our comprehensive experimental analysis provides insights for managing inventory under catastrophic risk.

### 115-1524 Disruption Mitigation and Pricing Flexibility

Oben Ceryan, Senior Lecturer, Bayes Business School, United Kingdom

Florian Lucker, Assistant Professor, Bayes Business School, United Kingdom

We study a firm that is exposed to supply disruptions. During a disruption, the firm may use reserve inventory and/or reserve capacity to serve demand. Further, the firm may increase the price during the disruption. We find that pricing flexibility may complement or substitute the use of inventory and capacity.

### 115-1617 Supply Chain Resilience and the COVID-19 Pandemic: Examination of Pertinent Variables

Henry Aigbedo, Associate Professor, Oakland University, United States

The COVID-19 Pandemic has negatively impacted global supply chains. As vaccines are administered and people become immune to COVID-19, most firms worldwide are beginning to return back to normal operations. In this exploratory study, we assess this recovery within the context of pertinent supply chain resilience variables.

## Invited Session

250	Tuesday, 02:15 PM - 03:45 PM, Blue Spring 2	Track: Empirical Research in Operations Management
	Invited Session: Service Platform and Sharing Economy	
	Chair(s): Lina Wang	

### 115-0515 Effects of Digital Freight Matching Apps on Air Freight Performance in Airline/Motor Carrier Competition

Zenan Zhou, Assistant Professor, Arizona State University, United States

Xiang Wan, Associate Professor, Ohio State University, United States

Walter Zinn, Professor, Ohio State University, United States

A. Knemeyer, Professor, Ohio State University, United States

## Tuesday, 02:15 PM - 03:45 PM

Digital freight matching (DFM) apps have the disruptive power to incumbent participants in the road freight sector. Considering motor carriers and airline carriers cooperate and compete with each other, we are interested to examine the effects of the DFM apps' diffusion in the motor carriers on airline carriers.

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### 115-0956 Modeling Drivers' Choices in a Crowdsourced Delivery System

Lina Wang, Assistant Professor, The Pennsylvania State University, United States  
Stanley Lim, Assistant Professor, Michigan State University, United States  
Elliot Rabinovich, Professor, Arizona State University Tempe, United States

We model the choices crowdsourced drivers make when selecting order bundles for last-mile delivery. Using operations data from a crowdsourced delivery platform, we empirically identify how crowdsourced drivers build their delivery workloads as a function of pay, delivery locations of the bundles, and distances between the bundles for density.

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### 115-1277 Market Thickness and Delivery Efficiency in Food-delivery Platforms

Ruomeng Cui, Professor, Emory University, United States  
Wenchang Zhang, Assistant Professor, Kelley School of Business, United States  
Zhanzhi Zheng, Student, UNC Kenan-Flagler Business School, United States

In food delivery platforms, market thickness entails the restaurant density in a geographic area. We study the implications of restaurant density and performances in food delivery platforms. We show that higher market thickness leads to shorter order wait times; it also boosts restaurants' sales and revenues.

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### 115-1866 Supply Constraints and Housing Rental Market Equilibrium in the Sharing Economy

Guofang Huang, Assistant Professor, Purdue University, United States  
Jianing Li, Student, Purdue University, United States  
Feng (Susan) Lu, Associate Professor, Purdue University, United States  
Qianli Xu, Algorithm Engineer, Sany Heavy Machinery Co., Ltd, China

By evidence from Airbnb, we study how supply constraints regulation on sharing platforms affects housing rental market equilibrium, including the impact on the platform's listing and local long-term rental market, in terms of quantity, price, and discussion on social welfare.

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## Invited Session

251	Tuesday, 02:15 PM - 03:45 PM, Rainbow Spring 1	Track: Empirical Research in Operations Management
	Invited Session: <b>Healthcare Policy and Innovation</b>	
	Chair(s): Jingwen Yang	

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### 115-0311 The More Monitoring, the Better Quality? Empirical Evidence From the Generic Drug Industry

Anqi Wu, Assistant Professor, Florida International University, United States  
Yixin Iris Wang, Assistant Professor, University of Illinois Urbana-Champaign, United States

This study examines the relationship between inspection frequency and manufacturing quality. While we find a significantly negative impact of inspections on product recalls, this impact is subject to diminishing returns. More importantly, we observe no evidence that supports the negative link between inspections and recalls for high-risk manufacturers.

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### 115-1284 Drug Shortages and New Drug Approvals: An Empirical Investigation

Iva Rashkova, Assistant Professor, Washington University, United States  
Panos Kouvelis, Professor, Washington University in St. Louis, United States

We leverage a combination of publicly available data sources to study the link between new drug approvals and drug shortages. We observe a positive correlation between the time-to-recovery for an individual drug-shortage event and the associated drug approval. Our results point to industry-wide capacity and resource allocation trends.

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### 115-1428 Precision Medicine Innovation: An Economic Impediment or a New Model of Drug Innovation?

Jingwen Yang, Assistant Professor, University of Nevada Las Vegas, United States  
Anant Mishra, Associate Professor, University of Minnesota, United States

We investigate the impact of precision medicine innovation on drug market performance. In contrast to the conventional wisdom regarding precision medicine contracting the drug market, we find that the introduction of precision indications is associated with significant increases in drugs sales. We further study a key factor moderating such impact.

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### 115-1457 Promoting Generics: Effects on Pharmaceutical Quality

In Joon Noh, Assistant Professor, Penn State University, United States  
Hessam Bavafa, Associate Professor, University of Wisconsin-Madison, United States  
Christian Blanco, Assistant Professor, Ohio State University, United States

Generic drugs are a cornerstone of affordable healthcare. We examine the pharmaceutical quality effects of the Generic Drug User Fee Amendments (GDUFA), a hallmark legislation enacted by Congress in 2012 that armed the FDA with resources to improve the timeliness of generic drug application reviews.

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Invited Session

252	Tuesday, 02:15 PM - 03:45 PM, Rainbow Spring 2	Track: Operational Excellence
	Invited Session: <b>Operational Excellence in Pharma</b>	
	Chair(s): Oliver von Dzengelevski      Matteo Bernasconi	

115-0226 Understanding OPEX in the Pharmaceutical Industry - Peculiarities, Challenges, and Similarities

Thomas Friedli, Professor, University of St. Gallen, Switzerland  
 Matteo Bernasconi, Student, Universitat St. Gallen, Switzerland  
 Mark Grothkopp, Student, Universitat St. Gallen, Switzerland

Pharmaceutical companies embarking on their OPEX journey profit from several benefits but encounter some challenges too. Based on a database with more than 400 manufacturing facilities, we show how OPEX deployment in the pharmaceutical industry differs from less regulated industries and what are the differences, similarities, and challenges.

115-0227 Predicting Quality Risk in the Pharmaceutical Industry: Adding OPEX Data to the Equation

Matteo Bernasconi, Student, Universitat St. Gallen, Switzerland  
 Mark Grothkopp, Student, Universitat St. Gallen, Switzerland  
 Thomas Friedli, Professor, University of St. Gallen, Switzerland

Quality risk management is crucial within pharmaceutical manufacturing. Regulators are using predictive models to predict quality risk and assign inspectors to riskier facilities. We provide insights from our two-years research project with the US FDA to investigate the integration of OPEX measures to improve the accuracy of the risk prediction

115-1425 Managing OPEX programs in the Pharmaceutical industry - A comparison to other industries

Mark Grothkopp, Student, Universitat St. Gallen, Switzerland  
 Matteo Bernasconi, Student, Universitat St. Gallen, Switzerland  
 Thomas Friedli, Professor, University of St. Gallen, Switzerland

Every large company nowadays has some sort of OPEX program. The content, such as applied tools, are in essence the same with slight adaptations depending on industries. The question remains how pharma companies manage these programs differently as they have been a late adopter of OPEX compared to other industries.

Contributed Session

253	Tuesday, 02:15 PM - 03:45 PM, Barrel Spring 1	Track: POM-Marketing Interface
	Contributed Session: <b>Loyalty</b>	
	Chair(s): Ariana Yu	

115-0005 Modular Capacitated Sales Force Deployment

Sven Müller, Professor, Rwth Aachen University, Germany  
 Lucas Weber, Student, OvGU, Germany

We present the sales force deployment problem with modular capacities, i.e., we allow for groups of sales representatives at one location. We solve non-linear, semi-infinite mixed integer problem by a branch-and-price algorithm that incorporates Benders decomposition. We find modular capacities not only increase profits but also fairness.

115-1781 Do Non-Compete Clauses Help or Hurt Firms in the Presence of Salesforce Owned Customer Loyalty?

Somnath Banerjee, Assistant Professor, North Dakota State University, United States  
 Lin Liu, Professor, Beihang University, China  
 Axel Stock, Associate Professor, College of Business, United States

Firms often recruit salespeople to build relationships with customers. In this scenario, customers develop loyalty not only to the firms, but also towards their salespeople. We employ a two-period game theoretic model of duopolistic competition and find that, counterintuitively, the possibility of poaching the competitor's representative can increase firm profits.

115-1932 Does Size Matter for Loyalty Points Redemptions?

Yang Chen, Student, Queen's University, Canada  
 Anton Ovchinnikov, Professor, Queens University, Canada  
 Nicole Robitaille, Assistant Professor, Queen's University, Canada

Prior research on loyalty programs typically finds rewards increase loyalty, without considering the impact of redemption size and consumer habits. We demonstrate these factors are significant predictors in fostering long-term loyalty, with smaller redemptions often outperforming larger ones. Our results demonstrate redemption is a key lever in loyalty program optimization.

Invited Session

254	Tuesday, 02:15 PM - 03:45 PM, Barrel Spring 2	Track: Procurement and Supplier Management
	Invited Session: <b>Strategic Decisions in Supply Chains and Platforms</b>	
	Chair(s): Anyan Qi	

## Tuesday, 02:15 PM - 03:45 PM

115-0090 Agile Contracting: Managing Incentives under Uncertain Needs

Shivam Gupta, Assistant Professor, University of Nebraska Lincoln, United States  
Anupam Agrawal, Associate Professor, Texas A&M University College Station, United States  
Jennifer Ryan, Professor, University of Nebraska Lincoln, United States

We capture key features of an agile software development project (e.g., project can be modularized via independent stories; stories are developed in time-boxed sprints; project's requirements can change over time) and characterize an optimal contract. We also compare the performance of the popular T&M contracts with the optimal contract.

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115-0383 Sustainable Supply Chain Finance and ESG Performance

Lingxiu Dong, Professor, Olin Business School, Washington Univ., United States  
Xiaoyu Wang, Student, Washington University in St. Louis, United States  
Fasheng Xu, Assistant Professor, Syracuse University, United States

In order to promote sustainable practices in the supply chain, companies take various supply chain financing methods to encourage their suppliers to comply with the sustainability code. Although originally designed to promote sustainability, we find that, on the contrary, sustainable supply chain finance solutions may discourage suppliers' sustainable practices.

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115-0391 Supply Chain Short-Term Financing for Responsible Production at Small and Medium-Sized Enterprises

Xiaole CHEN, Assistant Professor, Sun Yat-sen University, China  
Vernon Hsu, Professor, Chinese Univ of Hong Kong, Hong Kong, China  
Guoming Lai, Associate Professor, University of Texas Austin, United States  
Yang Li, Assistant Professor, Richard Ivey Business School, Canada

In recent years, companies have increasingly used supply chain financing instead of bank financing when engaging with financially constrained suppliers. We investigate the effectiveness of different financing mechanisms at supporting supply chain responsibility.

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### Invited Session

255	Tuesday, 02:15 PM - 03:45 PM, Rock Spring	Track: POM-Economics Interface
	Invited Session: Economics in Retail Operations	
	Chair(s): Xiajun Pan Hongseok Jang	

115-0273 Blockchain-enabled Resale

Rong Li, Associate Professor, Syracuse University, United States

Many luxury brands are trying to use Blockchain (e.g., LVMH's Aura, Arianee) to support peer-to-peer resales of their own products. Such Blockchain-enabled resales benefit both consumers (with authenticity and convenience) and luxury brands (with additional sales opportunities). This study investigates the value of Blockchain-enabled resale to brands and consumers.

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115-0554 Supplier Encroachment through Online Marketplaces

Hongseok Jang, Assistant Professor, Tulane University, United States  
Quan Zheng, Associate Professor, University of Science and Technology of China, China  
Xiajun Pan, Associate Professor, University of Florida, United States

We study whether a supplier should encroach on an online retail marketplace where both reselling and agency channels are available and its impact on stakeholders in e-commerce. We show that agency encroachment could lead to different results and managerial insights, comparing with traditional supplier encroachment through a direct channel.

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115-0918 Add-On Pricing Under Valuation Uncertainty

Quan Zheng, Associate Professor, University of Science and Technology of China, China  
Hongseok Jang, Assistant Professor, Tulane University, United States  
Na Zhang, Student, University of Florida, United States  
Xiajun Pan, Associate Professor, University of Florida, United States

We incorporate a hitherto neglected feature: the purchase time of the base good is separated with the consumption time of the add-on, leading to valuation uncertainty. Consumers can either purchase the add-on at a discount with valuation uncertainty or wait until the uncertainty is resolved but at a higher price.

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115-1022 Luxury Brands' Fight against Counterfeits - Public or Dark?

Lai Wei, Assistant Professor, Boston College, United States  
Larisa Kovalenko, Assistant Professor, Boston College, United States

Luxury products can face both deceptive and non-deceptive counterfeits at the same time. We characterize the optimal anti-counterfeit policies in generating higher revenues and policies that effectively decrease the volume of counterfeits sales, in a market consisting of two groups of customers, naive and sophisticated customers.

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### Invited Session

256	Tuesday, 02:15 PM - 03:45 PM, Regency Ballroom Q	Track: Revenue Management and Pricing
	Invited Session: Advances in Revenue Management and Assortment Optimization	
	Chair(s): Huanan Zhang Chengyi Lyu	

115-0208 Fair Assortment Planning

Qinyi Chen, Student, Massachusetts Institute of Technology, United States  
Negin Golrezaei, Professor, MIT Sloan School of Management, United States  
Fransisca Susan, Student, Massachusetts Institute of Technology, United States

We study a fair assortment planning problem, where items with similar merits are offered similar visibility. We propose an Ellipsoid-based framework to find near-optimal solutions to this problem, resulting in a polynomial-time 1/2-approx. algorithm and a PTAS. Our case study on the MovieLens dataset demonstrates the efficacy of our algorithms.

115-0544 Dynamic Pricing and Learning with Discounting

Zhichao Feng, Assistant Professor, Hong Kong Polytechnic Univ, Hong Kong, China  
Milind Dawande, Professor, University of Texas Dallas, United States  
Ganesh Janakiraman, Professor, University of Texas Dallas, United States  
Anyan Qi, Assistant Professor, University of Texas Dallas, United States

In practical settings, learning algorithms can take a substantial amount of time to converge, thereby raising the need to understand the role of discounting in learning. We illustrate the impact of discounting on the performance of learning algorithms by examining two representative dynamic pricing and learning problems.

115-1066 Coordinated Inventory Stocking and Assortment Personalization

Omar El Housni, Assistant Professor, Cornell University, United States  
Huseyin Topaloglu, Professor, Cornell University, United States  
Paat Rusmevichientong, Professor, University of Southern California, United States  
Yicheng Bai, Student, Cornell University, United States

We give approximation algorithms for a joint inventory allocation and assortment personalization problem motivated by an online retail setting, where we have a limited amount of storage capacity that needs to be allocated among multiple products to serve different customers that arrive over a selling horizon.

115-1598 Assortment optimization under the multiple discrete choice model

Heng Zhang, Assistant Professor, Arizona State University, United States  
Hossein Piri, Assistant Professor, University of Calgary, Canada  
Woonghee Huh, Professor, Sauder School of Business, UBC, Canada  
Hongmin Li, Professor, Arizona State University Tempe, United States

We consider an assortment optimization problem under the Multiple-Discrete-Choice (MDC) model, which captures the multi-option-multi-unit purchase behavior. We discuss an algorithm framework facilitates the design of FPTAS for the problem under a range of practical constraints and how to apply such models with real data for practical decision making.

**Invited Session**

257	Tuesday, 02:15 PM - 03:45 PM, Regency Ballroom O	Track: Empirical Research in Operations Management
	Invited Session: Empirical Advances of Blockchain Applications in SCM (I)	
	Chair(s): Stephan Wagner      Maximilian Klöckner	

115-0116 Exploring the Digital-Physical Interface in Blockchain Applications: Insights from the Luxury Goods Industry

Maximilian Klöckner, Post Doc/Researcher, ETH Zurich, Switzerland  
Alexander Fink, Innovation Manager, ETH Zurich, Germany  
Leonie Flückiger, Consultant, McKinsey & Company, Switzerland  
Christoph Schmidt, Post Doc/Researcher, Eth Zurich, Switzerland  
Stephan Wagner, Professor, ETH Zurich, Switzerland

In this study, we explore one of the key challenges of blockchain adoption in supply chains: The digital-physical interface. Leveraging a multiple case study approach, we investigate how firms in the Swiss luxury watch industry address and safeguard the connection between the physical watches and the digital blockchain record.

115-0178 Influences of Organizational Blockchain Network Periphery and Institutional Pressures on Supply Chain Collaboration

Kiran Patil, Student, University of North Texas, United States

Using institutional theory, this study suggests that peripheral organizations in the blockchain-based network will yield to institutional pressures and that blockchain's core tenets will inspire them to assume significant roles in supply chain collaboration efforts to gain legitimacy. The findings help practitioners emphasize blockchain's importance in inter-organizational planning for startups.

115-0513 Understanding Blockchain Technology Performance in Supply Chain Management with Computer Simulations and Experiment

Yu Xia, Professor, College of William and Mary, United States

We introduce three research projects that simulate blockchains in supply chain operations. The three projects represent a large and complicated supply chain, a NGO supply chain, and a vaccine-distribution supply chain respectively. The performances of blockchain technologies in supply chain management are then discussed and evaluated in various dimensions.

115-0862 A configurational view of the socio-technical environment of Industry 4.0 adopters

Érico Marcon, Student, Organizational Engineering Group, Brazil  
Giuliano Marodin, Associate Professor, University of South Carolina, United States  
Alejandro Frank, Associate Professor, Universidade Federal Do Rio Grande Do Sul, Brazil

## Tuesday, 02:15 PM - 03:45 PM

Organizational decisions for Industry 4.0 implementation demand a configurational perspective. We analyze how socio-technical configurations host better environments for Industry 4.0 and performance. Results show that companies should focus initially on organizational aspects, followed by worker improvements to reach a digital master level along with productivity, flexibility, and quality improvements.

### Invited Session

258	Tuesday, 02:15 PM - 03:45 PM, Regency Ballroom P	Track: Disruptive Technologies and Operations Management
	Invited Session: <b>Novel Technologies for Platforms and Service/Recommender Systems</b>	
	Chair(s): Tongxin Zhou	

115-0433 Impact of Self-Service Technology in Designing a Service Delivery System

JIE WANG, Student, The University of Hong Kong, Hong Kong, China

Lijun Ma, Professor, Shenzhen University, China

Weili Xue, Professor, Southeast University, China

Yong-Hong Kuo, Assistant Professor, The University of Hong Kong, Hong Kong, China

A typical service delivery system usually involves sales agents and/or self-service technologies to serve consumers by a coproduction process. We establish a principal-agent model to study the value of self-service technologies in designing a service delivery system wherein the sales agent's service cost is private information.

115-1859 Learning with Two-Sided Structured Data

Wanning Chen, Assistant Professor, University of Washington, United States

In this talk, we introduce new learning techniques developed for data with two-sided structure in recommender systems, panel data and e-commerce platforms. We show how to address new challenges brought by such a special structure and how to build structure-aware machine learning methods in this setting.

115-1992 Value of Information for Trade Finance

Jiding Zhang, Assistant Professor, New York University, China

S. Alex Yang, Associate Professor, London Business School, United Kingdom

Xiangfeng Chen, Professor, Fudan University, China

We study the value of information on trade finance platforms. Utilizing a dataset that records firms' financing behavior, we empirically investigate how firms decide whether to keep, cash, or transfer bills. We study how such behavior changes with firms' knowledge of financing needs of their upstream partners.

### Contributed Session

259	Tuesday, 02:15 PM - 03:45 PM, Silver Spring 1	Track: Data Science and Analytics
	Contributed Session: <b>Data Analytics Methods</b>	
	Chair(s): Zezhen (Dawn) He	

115-0620 A Double Judgment Approach Method for Evaluating the Efficiency of DMUs

Reza Gharoei Ahangar, Assistant Professor, Lewis College of Business, United States

This study introduces a novel method for determining the weights of input and output variables in the efficiency of decision-making units. We propose a double judgment approach, which reduces the number of variables needed to evaluate the efficiency of units so that data envelopment analysis can be more meaningfully employed.

115-1376 Learning Mixed Multinomial Logits with Provable Guarantees and its Applications in Multi-product Pricing

Yiqun Hu, research scientist, Amazon.com, United States

David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States

Zhenzhen Yan, Assistant Professor, Nanyang Technological University, Singapore

We propose a new algorithm that learns both mixture weights and component-specific logit parameters in a mixed MNL model, which has provable convergence guarantees for an arbitrary number of mixtures. We further provide a sample complexity analysis to show that only a polynomial number of samples is required.

115-2041 Bringing Data Into Dynamic Models: Guidelines For Advanced Estimation Methods

Jose Lopez, Student, MIT Sloan School of Management, United States

Hazhir Rahmandad, Associate Professor, Sloan School of Management, United States

Dynamic, non-linear models require customized methods for formal estimation. Increasing data availability and computational power provide opportunities, though many audiences remain unfamiliar. Synthesizing across literatures, we develop a pragmatic workflow to guide decision making and identify promising approaches for addressing recurring problems. Additionally, we provide detailed examples through different models.

115-2154 Big-data Driven Flood Disaster Risk Management

Huimin Wang, Professor, Hohai university, China

Jing huang, Professor, Hohai University, China

Gaofeng Liu, Professor, Hohai University, China

Lu Wang, Professor, Hohai university, China

## Tuesday, 02:15 PM - 03:45 PM

Flood disasters pose a significant risk to communities and economies worldwide. Big data analytics can provide real-time information for flood disaster risk management. Our project utilizes big data and artificial intelligence technologies to develop an intelligent perception technology, a data-driven and model-driven flood risk assessment model, and a decision-making platform.

### Invited Session

260	Tuesday, 02:15 PM - 03:45 PM, Silver Spring 2	Track: Inventory and Logistics Management
	Invited Session: Emerging Topics in Logistics	
	Chair(s): Suman Nirnanjan	

#### 115-0123 Blockchain-based Air Cargo Delay Prediction using Federated Learning

Rosalin Sahoo, Student, Penn State University University Park, United States

To address the security threats in air cargo sector, outline the features of blockchain and federated learning, emphasizing its application in air cargo delay prediction. The findings of our research show that the FL outperforms the centralized learning for delay prediction.

#### 115-0734 Does Gender Diversity in Corporate Organizations Lead to Responsible ESG Decisions?

Arunachalam Narayanan, Associate Professor, University of North Texas, United States

Suman Nirnanjan, Assistant Professor, University of North Texas, United States

Anto Verghese, Assistant Professor, University of North Texas, United States

Smriti Srivastava, Student, University of North Texas, United States

Pranay Prateek, Student, University of North Texas, United States

We focus on answering the research question if gender diversity (female representation) increases the company's involvement in environmental social governance (ESG) decisions. We explore the mediating role ESG plays in gender diversity impacting firm and supply chain performance. Specifically, we use data from retail and manufacturing sectors.

#### 115-1555 The role of Additive Manufacturing in fulfilling demands of Aerospace spare parts industry

Himali Patil, Student, University of North Texas, United States

Suman Nirnanjan, Assistant Professor, University of North Texas, United States

Arunachalam Narayanan, Associate Professor, University of North Texas, United States

Gopalakrishnan Narayanamurthy, Associate Professor, University of Liverpool, United Kingdom

Managing an efficient supply chain of aerospace spare parts is complex and expensive due to uncertainty in demand and high cost associated with required spare parts inventory levels. In this study, we investigate how Additive Manufacturing can benefit the operation of managing spare parts in aerospace industry using case study.

#### 115-1652 Social Sustainability Amidst Controversies: Influence of Focal Firm on Supplier's Social Sustainability Performance

Ellie Falcone, Assistant Professor, Oklahoma State University, United States

Satabdi Hazarika, Student, University of Arkansas - Fayetteville, United States

Brian Fugate, Associate Professor, University of Arkansas - Fayetteville, United States

This study analyzes MSCI (KLD) data, which collects CSR-related information from various publicly available sources, to investigate the buyer-supplier environmental fit and social sustainability fit. It also examines the role of buyer-supplier relationship length in it.

#### 115-2006 Static vs. Dynamic Trucking in Inventory Management with Environmental Considerations

Dincer Konur, Assistant Professor, Texas State University, United States

Gonca Yildirim, Assistant Professor, Gazi University, Turkey

We study a bi-objective stochastic inventory control system with cost and carbon emission minimization objectives. Two common policies are considered with explicit trucking decisions: continuous review (Q,R) policy with static trucking and period review (S,T) policy with dynamic trucking. These policies are compared for economic and environmental performance.

### Invited Session

261	Tuesday, 02:15 PM - 03:45 PM, Winter Park 49	Track: Product Innovation and Technology Management
	Invited Session: Data Driven Operations Management	
	Chair(s): Simin Li Nil Karacaoglu	

#### 115-1336 Impact of Sequential Diagnostic Decisions on Product Returns: Evidence from a Bike-Sharing Firm

Hailong Cui, Assistant Professor, University of Minnesota, United States

Jingxuan Geng, Student, Temple University, United States

Guangwen Kong, Associate Professor, Temple University, United States

Guo Li, Professor, Beijing Institute of Technology, China

Sampath Rajagopalan, Professor, University of Southern California, United States

We study a diagnostic decision for a bike maintenance in which an inspector and a worker sequentially decide whether to replace or repair a part of a bike. We explore how such decisions are affected by workers' or inspectors' skill level and incentives, which lead to over-treatment or under-treatment.

#### 115-1338 Predicting No-shows with Physician Preference

Yangzi Jiang, Student, Northwestern University Kellogg School o, United States



## Tuesday, 02:15 PM - 03:45 PM

Patients needing primary care sometimes don't show up for their appointment slot due to the prolonged waiting time. Working with the primary physicians from Northwestern Memorial hospital, we aim to predict the no-show patterns of patients based on their demographics, history, and their primary care physician's scheduling preference.

### Contributed Session

262	Tuesday, 02:15 PM - 03:45 PM, Winter Park 50	Track: Socially Responsible Operations
	Contributed Session: Emerging Issues in Socially Responsible Operations: Governments, NGOs and Businesses	
	Chair(s): Willem Haanstra	

115-0103 Do Consumers Perceive Corporate Social Responsibility Differently When Purchasing Services vs. Goods?

HANNAN SADJADY NAEENI, Assistant Professor, University of South Carolina Aiken, United States  
Hua (Meg) Meng, Associate Professor, Longwood University, United States

Literature suggests that low corporate social responsibility (CSR) negatively impacts the relationship between firms and consumers. Our results suggest that consumers react more negatively towards low CSR when the firm is a service provider rather than a good producer. We provide an underlying cognitive mechanism to explain why.

115-0359 Donating on the block: Exploring potentials and barriers to accepting cryptocurrencies in NPOs

Lars Friedrich, Student, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany  
Michael Mertel, Student, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany  
Katharina Hübner, Student, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany  
Kai-Ingo Voigt, Professor, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany

Previous studies suggest that cryptocurrencies can increase willingness to donate. Our study aims to identify opportunities and barriers to implementing a blockchain-based donation process for NPOs. By interviewing 42 NPOs, we find opportunities in building trust, improving processes and targeting new donors. Barriers include market volatility and loss of data.

115-1165 Participatory Societal Business Case development for Automated Train Operations

Willem Haanstra, Assistant Professor, University of Twente, Netherlands  
Jan Braaksma, Associate Professor, University of Twente, Netherlands

The implementation of Automated Train Operations is changing how railways are operated and managed in Europe. We outline a Participatory Design Science Research project on the development of a Societal Business Case framework for implementing ATO. This approach aims to assess societal impacts associated with implementing ATO in the Netherlands.

115-1956 Understanding Public Private Partnerships Structure decisions in E-Governance Projects

Sanjog Ray, Associate Professor, IIM Indore, India

Public private partnerships (PPP) have been the preferred mode for executing e-Governance projects as government lacks technology expertise. One of the key challenges is deciding on the appropriate PPP model. This study based on e-Governance PPP projects in India attempts to understand how PPP models are selected and structured.

Invited Session

**265**

Tuesday, 04:00 PM - 05:30 PM, Celebration 1

Track: Agriculture and Food Supply Chains

Invited Session: **Agricultural Innovations and Operations**

Chair(s): Fasheng Xu Haoran Yu

115-0844 First-mile Cooling Storage at Farm-gate Market: Quality and Pricing Competition

Zheyu Jiang, Student, University of Miami, United States

Xin Geng, Assistant Professor, University of Miami, United States

Nan Yang, Professor, University of Miami, United States

Agricultural supply chains at emerging markets face serious food loss because of small farmers' limited access to efficient cooling storage. Motivated by innovative business models, we study whether and how recent affordable and flexible cooling solutions can improve farmers' profits, by considering pricing and quality competition among farmers.

115-1319 Retailing Strategies of Imperfect Produce and the Battle Against Food Waste

Haoran Yu, Student, Syracuse University, United States

Burak Kazaz, Professor, Whitman School of Management, United States

Fasheng Xu, Assistant Professor, Syracuse University, United States

This study investigates how retailers should choose from three popular retailing strategies (discarding, bunching, and differentiating) to deal with the imperfect produce, and examines how retailers make ordering and pricing decisions. Our result shows that each strategy could be optimal under different conditions.

115-1643 Competitive Technology Adoption for Supply Transparency in Fresh Produce Retailing

N. Bora Keskin, Associate Professor, Duke University Durham, United States

Chenghuai Li, Student, Duke University, United States

Jeannette Song, Professor, Duke University, United States

Motivated by the adoption of technologies (e.g., Internet of Things and Blockchain) in fresh produce retailing, we consider a game theoretical model where competing retailers can adopt the technologies for better supply transparency. We characterize the impact of competition and merger on technological adoption, profit, food waste, and consumer surplus.

115-1709 Selling Agri-Tech Products: Firm Strategy, Farmer Incentives, and Government Subsidy

Xiao Tan, Student, Washington University in St. Louis, United States

Duo Shi, Assistant Professor, The Chinese Univ of Hong Kong, Shenzhen, China

Fuqiang Zhang, Professor, Washington University St Louis, United States

With the development of technology, there are many emerging agri-technology products that can help with improving output. We study the impact of agri-tech product adoption, like agricultural drones, on traditional agriculture supply chain. Farmers' purchasing strategies, the firm's pricing decisions, and government subsidy schemes are considered.

115-1905 Matching Platforms for Smallholder Supply Chains

Sergio Camelo Gomez, Student, Stanford University, United States

Joann de Zegher, Assistant Professor, MIT, United States

Dan Iancu, Associate Professor, Stanford University, United States

We design a platform that connects smallholder farmers with intermediaries that transport their fruit, and determines routes and payments to ensure compliance. We use a distributionally robust approach based on the Wasserstein metric to model commitment uncertainty, and through historical GPS data we measure the platform's potential for welfare improvement.

Invited Session

**266**

Tuesday, 04:00 PM - 05:30 PM, Celebration 2

Track: Behavioral Operations Management

Invited Session: **Performance in Behavioral Operations Management**

Chair(s): Gawon Yun

115-0271 How Tariff and Non-Tariff Barriers Affect Supply Chain Members' Decision

Shania Perdana, Student, National Sun Yat-Sen University, Taiwan

Chieh Lee, Associate Professor, National Sun Yat-Sen University, Taiwan

The government-imposed tariff or non-tariff barriers affect the manufacturer, making the manufacturer must plan a strategy to deal with these barriers. On the other side, the government aims for the better social welfare of supply chain members. This study explores which response works best for the manufacturer and the government.

115-1044 Discretion in Automated Supermarket Replenishment: Censorship Bias and Self-inflicted Stockouts

Bengu Ozdemir, Student, IE BUSINESS SCHOOL, Spain

Antti Tenhiala, Assistant Professor, IE BUSINESS SCHOOL, Spain

We study censorship bias to explain a paradox where retailers order less than algorithmic recommendations after a stockout. Accounting for endogeneity, we find that deviations that are susceptible to censorship bias lead to self-inflicted stockouts. With additional data analysis, we show that by blocking such deviations, retailers can reduce stockouts.

## Tuesday, 04:00 PM - 05:30 PM

115-1198 The Hidden Cost of Hidden Fees - Price Obfuscation in Online Platforms

Jose Lopez, Student, MIT Sloan School of Management, United States

Edward Anderson, Professor, University of Texas Austin, United States

Many popular consumer-facing platforms offer to reduce search costs and efficiently find lowest prices. However, their incentives may not directly align with consumers'. We study the effects of price obfuscation on performance, and augment current models to incorporate consumer behavioral learning, multiple sources of competitive pressure, trust, and reputation building.

115-1517 The Curvilinear Effect of Digital Interactions and Diversity on Project Team Performance

Vijaya Sunder M, Assistant Professor, Indian School of Business, India

Siddhartha Modukuri, Post Doc/Researcher, Indian School of Business, India

Digitally interactive platforms enabled ease of forming geographically and culturally diverse project teams and infinite interaction possibilities among project team members. However, our empirical results indicate curvilinear relationships between the level of diversity and digital interaction intensity on project team learning behaviors and project performance to advance project management literature

### Contributed Session

267	Tuesday, 04:00 PM - 05:30 PM, Celebration 3	Track: Healthcare Operations Management
	Contributed Session: Optimization Models for Healthcare	
	Chair(s): Narges Mohammadi	

115-0809 Disease Bundling or Specimen Bundling? Cost- and Capacity-Efficient Strategies for Multi-disease Testing with Genetic Assays

Douglas Bish, Professor, University of Alabama, United States

Ebru Bish, Professor, University of Alabama, United States

Hussein El Hajj, Assistant Professor, Santa Clara University, United States

We develop the Pareto frontier for cost- and capacity-efficient testing designs for infectious disease screening, considering multiplexing (disease bundling), where one assay detects multiple diseases using one specimen; and pooling (specimen bundling), where specimens from multiple subjects are tested with one assay. We develop structural properties and managerial insight.

115-1361 Design of Patient Visit Itineraries in Tandem Systems

Nan Liu, Associate Professor, Boston College, United States

Guohua Wan, Professor, Shanghai Jiao Tong University, China

Shan Wang, Assistant Professor, Sun Yat-sen University, China

We develop the first optimization modeling framework to provide each patient an individualized visit itinerary in a tandem service system. We show that, a well-designed patient visit itinerary which carefully addresses the interdependence among stages can significantly improve patient experience and provider utilization.

115-1722 Efficient Discovery of Cost-effective Policies in Sequential, Medical Decision Making Problems

Narges Mohammadi, Student, Imperial College London, United Kingdom

Reza Skandari, Assistant Professor, Imperial College London, United Kingdom

Anand Shah, Senior Lecturer, Imperial College London, United Kingdom

Cost-effectiveness analysis is used by policymakers to prioritize healthcare interventions. We develop an efficient algorithm that discovers the cost-effectiveness frontier and policies for sequential stochastic optimization problems and use it to devise easy-to-implement hearing loss screening strategies for patients with cystic fibrosis. We prove theoretical properties of the solution methods.

115-1731 Inverse Learning: A Data-driven Inverse Optimization Framework for Learning Optimal Solutions

Farzin Ahmadi, Student, Civil and Systems Engineering, United States

Fardin Ganjkanloo, Student, Johns Hopkins University, United States

Kimia Ghobadi, Assistant Professor, Johns Hopkins University, United States

Long-term diet adherence is key to realizing dietary goals. We introduce Inverse-Learning, a new framework to tackle the patient adherence problem, and provide a decision-support tool to enable gradual progression toward dietary goals. The framework balances patient preferences and expert-driven nutritional constraints and offers a range of options to decision-makers.

### Invited Session

268	Tuesday, 04:00 PM - 05:30 PM, Celebration 4	Track: Healthcare Operations Management
	Invited Session: Deceased-Donor Organ Procurement and Utilization Optimization	
	Chair(s): Diwakar Gupta	

115-0032 Split Liver Transplantation: An Analytical Decision Support Model

Yanhan (Savannah) Tang Tang, Student, Carnegie Mellon University, United States

Alan Scheller-Wolf, Professor, Carnegie Mellon University, United States

Sridhar Tayur, Professor, Carnegie Mellon University, United States

Emily Perito, Associate Professor, University of California, San Francisco, United States

John Roberts, Professor, University of California, San Francisco, United States

## Tuesday, 04:00 PM - 05:30 PM

Split liver transplantation (SLT) can potentially save two lives using one liver. To facilitate increased SLT usage, we formulate a multi-queue fluid model, incorporating size matching specifics, dynamic health conditions, transplant type, and fairness. We find the optimal organ allocation policy, and evaluate its performance versus other common allocations.

### 115-0355 Optimal Quality Oversight in Kidney Transplantation and Its Impact on Transplant Centers' Waitlist Management

Zahra Gharibi, Assistant Professor, California State University San Marcos, United States

Hung Do, Associate Professor, University of Vermont, United States

Michael Hahsler, Assistant Professor, Southern Methodist University, United States

Mehmet Ayyaci, Associate Professor, University of Texas Dallas, United States

Report card programs collect and publicize information on patient outcomes as a means of improving quality. However, it is unclear whether behavioral responses to such programs improve patient outcomes. We study the report cards as an incentive mechanism to induce socially-optimal medical decisions in the context of kidney transplantation.

### 115-0552 A Smarter Approach For Strategic Kidney Placement

Diwakar Gupta, Professor, University of Texas Austin, United States

Paola Martin, Assistant Professor, Indiana University Bloomington, United States

Jingyao Huang, Assistant Professor, University of Missouri At Kansas City, United States

Each deceased-donor kidney accept-or-decline decision is believed to result from a comparison of anticipated consequences of transplant versus staying on dialysis. We present evidence that some centers exercise "batch turn-downs" and "strategic placement". We investigate the impact of strategic decisions and evaluate strategies that could simultaneously improve fairness and efficiency.

### 115-0697 Improving family authorizations for organ donation via budget-neutral contracts

Diwakar Gupta, Professor, University of Texas Austin, United States

Paola Martin, Assistant Professor, Indiana University Bloomington, United States

Successful recovery of deceased-donor organs significantly depends on the referrals being timely. We propose and analyze a budget-neutral incentive scheme aimed at increasing the proportion of timely referrals. A calibrated numerical study with one OPO's data shows that annually up to 13.9 more donors may exist without requiring external funds.

## Invited Session

269	Tuesday, 04:00 PM - 05:30 PM, Celebration 5	Track: Healthcare Analytics
	Invited Session: Advances in Empirical Healthcare Operations	
	Chair(s): Guang Cheng	

### 115-0747 The Spillover Effect of Suspending Non-essential Surgery: Evidence from Kidney Transplant

Guihua Wang, Assistant Professor, University of Texas Dallas, United States

Minmin Zhang, Student, University of Texas at Dallas, United States

Tinglong Dai, Professor, Johns Hopkins University, United States

This study estimates the potential spillover effect of suspending non-essential surgery on patient access to essential health services. Using deceased-donor kidney transplantation as the clinical setting and a difference-in-differences approach, we find that a state-level suspension of non-essential surgery led to a 23.6% reduction in the transplant volume.

### 115-1205 The impact of increasing entry fee on emergency department demand: A territory-wide study

Hyun Seok (Huck) Lee, Associate Professor, KUBS(Korea University Business School), South Korea

Eric Park, Assistant Professor, The University of Hong Kong, Hong Kong, China

Timothy Rainer, Professor, The University of Hong Kong, Hong Kong, China

Using all patients' emergency department (ED) visit information in Hong Kong during 2014-2019, we empirically study the impact of an ED entry fee increase from HK\$100 to HK\$180 in June 2017 on ED patient visit behavior in the universal public health system of Hong Kong SAR.

### 115-1815 Impacts of Priority in Deceased-Donor Kidney Allocation: A Regression Discontinuity Analysis

Jiayi Liu, Assistant Professor, Virginia Tech, United States

Diwas KC, Professor, Emory University, United States

The severe shortage of deceased-donor kidneys has turned the allocation into a rationing problem. Leveraging a national kidney allocation policy that assigns priority based on a sharp cutoff, this study examines how patients are affected by, and respond to, the kidney allocation priority.

### 115-1920 Emergency Department Experiment in Displaying an Algorithmic Wait Time Prediction

Danqi Luo, Assistant Professor, UC San Diego, United States

Mohsen Bayati, Associate Professor, Stanford University, United States

Erica Plambeck, Professor, Stanford University, United States

Two approaches are field-tested for displaying an algorithmic prediction of low-acuity patients' wait time to see a physician in an emergency department. The first is the algorithmic prediction rounded to a multiple of 10 minutes, and the second is an interval designed to community uncertainty.

## Tuesday, 04:00 PM - 05:30 PM

### Contributed Session

272

Tuesday, 04:00 PM - 05:30 PM, Celebration 8

Track: Operational Excellence

Contributed Session: Operational Excellence in Transport and logistics

Chair(s): Li Ding

115-1106 A stitch in time saves nine? Effect of food delivery delays on customer re-ordering behavior

Maya Ganesh, Assistant Professor, Indian Institute of Management Ahmedabad, India

Debjit Roy, Professor, Indian Institute of Management Ahmedabad, India

Cloud-kitchen model has seen a steep increase in the last few years. We use order level data from two cities to construct an empirical model that helps understand the effect of food delivery delays on customer feedback and reordering behavior.

115-1412 Feasibility study of Digital Twin application for driving process improvement in an Insurance Firm

Maneesh Kumar, Professor, Cardiff University, United Kingdom

Mohit Shukla, Student, Cardiff University, United Kingdom

Amogh Chaube, Student, Cardiff University, United Kingdom

The research explores the feasibility of developing a digital twin model for improving an insurance firm's customer loan application process. Using process mapping, waste/bottleneck activities were identified and thereafter optimised using statistical and machine learning models such as Logistics regression, Decision tree, Random forest, resulting in process improvement by 42%.

### Contributed Session

273

Tuesday, 04:00 PM - 05:30 PM, Celebration 9

Track: Supply Chain Management

Contributed Session: Sustainable OM

Chair(s): Di Li

115-0382 Traversing between the arcs of sustainability collaboration: Implications for dyadic environmental performance

Antony Paulraj, Professor, NEOMA Business School, France

Constantin Blome, Professor, Lancaster University, Germany

Sichu Xiong, Student, University of Nottingham Ningbo Campus, China

Drawing on the 'arcs of integration' framework, this paper delves into different external collaboration strategies within the sustainability context and studies the effect of arcs of sustainability collaboration on dyadic environmental performance. This study contributes to extending the original 'arcs of integration' framework to the supply chain sustainability context.

115-1217 Investigation of Carbon emissions of Distribution Network - A Sustainability Perspective

Kottala Sri Yogi, Assistant Professor, Symbiosis Institute of Business Management, Hyderabad, India

Atul Kumar Sahu, Assistant Professor, Guru Ghasidas Vishwavidyalaya (A Central University), India

Mani Venkatesh, Associate Professor, Montpellier Business School, France

Research on sustainable supply chain management (SSCM) in Indian context is emerging. Increasingly, the problem of climate change is being accepted as a major challenge by policy makers around the world (Datta 2010). The main objective of the paper is to analyze the application of sustainable measures in distribution network.

115-1588 An integrated policy framework for sustainable supply chain management in Manufacturing Sector

Kottala Sri Yogi, Assistant Professor, Symbiosis International Deemed University, Pune, India, India

Mani Venkatesh, Associate Professor, Montpellier Business School, France

Main objective of this paper is to develop an integrated policy framework for sustainable supply chain management practices in manufacturing sector using Interpretive Structural Modelling and Best worst Method.

115-1674 Sustainable Supply Chain Management: An Empirical Study of the Chinese Foundry Industry

John Bancroft, Senior Lecturer, Oxford Brookes University, United Kingdom

Di Li, Senior Lecturer, University of Warwick, United Kingdom

Karan Vishwanath, Student, City University - London, United Kingdom

With rising pollution and the depletion of natural resources, sustainability within supply chain management continues to be a topic of paramount importance. This study explores the relationship between stakeholders, practices and performance of sustainable supply chain management in the Chinese foundry industry using survey data from foundry employees.

### Invited Session

274

Tuesday, 04:00 PM - 05:30 PM, Celebration 10

Track: Supply Chain Management

Invited Session: Recent Topics in Platform Economy

Chair(s): Joel Goh Eryn Juan He

115-0850 Virtual Stockpile Pooling with Dynamic Deployment for Emergency Supplies

Minxuan He, Post Doc/Researcher, University of Chinese Academy of Sciences, China

## Tuesday, 04:00 PM - 05:30 PM

Fang Liu, Associate Professor, University of Chinese Academy of Sciences, China

Jing-Sheng Song, Professor, Duke University Durham, United States

We consider an infinite horizon emergency supply stockpiling problem with uncertain emergency demand and regular demand. We investigate a static stockpile-deployment model as a benchmark and a virtual stockpile pooling with dynamic deployment with three stages in each period. We characterize the optimal policy and conduct an extensive numerical study.

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### 115-0864 Big Tech Regulation and Tech Entrepreneurship: Evidence from China

Ke Rong, Professor, Tsinghua University, China

D. Daniel Sokol, Professor, University of Southern California, United States

Di Zhou, Assistant Professor, Tongji University, China

Feng Zhu, Professor, Harvard Business School, United States

We evaluate the impact of China's "Anti-Monopoly Guidelines for Platform Economy" on tech entrepreneurship. We find that after the launch of this guideline, markets where tech giants had significant presence experienced declines in both entry and venture capital investments. The result suggests a chilling effect on entrepreneurship from tech regulation.

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### 115-1906 Disintermediation Governance and Complementor Innovation

Xia Han, Assistant Professor, Suzhou University, China

Gaoyang Cai, Student, Northwestern University, United States

Grace Gu, Assistant Professor, University of Southern California, United States

This study investigates how the governance policy of disintermediation affects complementors' innovation behavior in two-sided marketplaces. Leveraging a policy change to prevent disintermediation on Amazon.com, we find that the affected sellers significantly switched their innovation efforts to off-site channels as a result of the platform governance strategy.

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### 115-1914 Information Design for Revenue-Based Financing

Eryn Juan He, Assistant Professor, University of Utah, United States

Joel Goh, Associate Professor, NUS Business School, Singapore

VC funding has grown massively recently. However, less than 1% of the new companies ever raise VC funding. Revenue-based financing has emerged as an alternative, which is repaid based on a percentage of future revenues. We aim to develop insights into the value of RB financing, compared with traditional modes.

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## Invited Session

275	Tuesday, 04:00 PM - 05:30 PM, Celebration 11	Track: Manufacturing Operations
	Invited Session: <b>New Technology and New Methods in Operations</b>	
	Chair(s): Yu Xia	

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### 115-0331 Planning Specialists' Capacities: A Demand-Driven Approach

Hafez Shurrab, Assistant Professor, Penn State, United States

Amer Jazairy, Assistant Professor, Texas A&M University, United States

Aaron Glassburner, Assistant Professor, Air Force Institute of Technology, United States

In customer-order-driven, project-based operations (contrary to forecast-driven operations), planning and scheduling specialists' capacities (e.g., bid preparation, product customization) in response to demand fluctuations is becoming increasingly critical. Inspired by a demand-driven material requirement planning logic, we introduce a demand-driven capacity planning simulation model to accurately balance demand with specialists' capacities.

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### 115-0484 Throughput Optimization in Manufacturing Plant : A Data-Driven Approach

Alok Raj, Assistant Professor, Xavier Labor Relations Institute, India

Mayukh Majumdar, Assistant Professor, Knauss School of Business, United States

SAROJ SINGH, Project head, Tata steel, India

In this paper, we address a throughput enhancement problem arising in the manufacturing industry using a data-driven approach. The objective is to learn about the entire system, identify the inefficiencies, find a feasible solution, and implement it in practice.

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### 115-0960 Data Science-Based Monitoring of Slug-Flow Process in Continuous Chemical Manufacturing

Yanjun Qian, Assistant Professor, Virginia Commonwealth University, United States

In continuous chemical manufacturing, the slug-flow process plays a vital role in crystallization synthesis. In this work, we apply state-of-the-art data science methods to improve flow control for better crystallization quality using in-line imaging. Our framework will lead to scaling up the process without sacrificing slug uniformity.

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### 115-1261 Solving the Westenberger-Kallrath problem with reinforcement learning

Philipp Willms, Student, University of Kassel, Germany

Marcus Brandenburg, Professor, Flensburg University of Applied Sciences, Germany

We study solution approaches based on reinforcement learning to solve the classical Westenberger-Kallrath problem. With the help of a discrete-event simulation model and custom heuristics, we train separate agents to (1) find appropriate batch sizes and (2) schedule the production operations with the objective to minimize makespan.

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### 115-1356 How Blockchain Data Influences Supply Chain Decision Making

Tingting Chung, Associate Professor, College of William & Mary, United States

## Tuesday, 04:00 PM - 05:30 PM

Yu Xia, Professor, College of William and Mary, United States  
Nicola Ibba, Director, University of South Dakota, United States  
James Davies, Student, College of William & Mary, United States

The impact of blockchain on supply chain decision making has been theorized in several different ways. We report an experimental study that directly compares supply chain decision making with vs. without blockchain data available to the decision maker, using ChainDecision, an online interactive game we designed and built.

### Contributed Session

276	Tuesday, 04:00 PM - 05:30 PM, Celebration 12	Track: Humanitarian Operations and Crisis Management
	Contributed Session: <b>Best Paper Award of the College of Humanitarian Operations and Crisis Management</b>	
	Chair(s): Mohammad Moshtari	

115-2130 Aiming for research and practice impact in humanitarian operations: a critical review, challenges, and opportunities

Maria Besiou, Professor, Kuehne Logistics University, Germany  
Erica Gralla, Associate Professor, George Washington University, United States

Since the first papers on humanitarian operations, there has been discussion about the impact of our research on practice and on scholarship. This work reviews the literature and survey authors to see how we are doing so far, with an eye toward maintaining or redirecting the trajectory toward increasing impact.

115-2131 Market Systems in a Humanitarian Crisis - Making Food more Affordable and Available

Tristan Downing, Student, Massachusetts Institute of Technology, United States  
Jarrod Goentzel, Senior Lecturer, MIT, United States  
Maria Besiou, Professor, Kuehne Logistics University, Germany

Humanitarian organizations increasingly provide cash assistance but struggle to analyze market dynamics. Our system dynamics model combines population displacement with material and financial flows for market actors. Model application in Nigeria demonstrates the cost-effectiveness of market intervention and supports efforts to strengthen humanitarian development.

115-2132 To Earmark or to Non-Earmark? The Role of Control, Transparency and Warm-Glow.

Ozalp Ozer, Professor, University of Texas Dallas, United States  
Gloria Urrea, Assistant Professor, University of Colorado Boulder, United States  
Sebastian Villa, Assistant Professor, University of New Mexico, United States

Empirical evidence of how earmarking influences donors is scarce. Using three online experiments, we investigate how, when, and why earmarking affects three donors' decisions as well as three mechanisms potentially driving the earmarking effect (i.e., control, operational transparency, warm-glow). Our findings provide clear insights to design fundraising campaigns more effectively.

115-2133 Tweet in Unison? Examining Content Coordination and Social Media Engagement during Disasters.

Changseung (Chang) Yoo, Assistant Professor, McGill University, Canada  
Eunae Yoo, Assistant Professor, Indiana University Bloomington, United States  
Lu (Lucy) Yan, Associate Professor, Indiana University Bloomington, United States  
Alfonso Pedraza, Professor, Indiana University, United States

Disaster relief organizations often post social media content via multiple accounts on the same platform. Accounts represent distinct entities (e.g., national headquarters, local branch). Using Twitter data collected in partnership with the Canadian Red Cross, we examine how these organizations should coordinate content creation across their accounts.

### Contributed Session

277	Tuesday, 04:00 PM - 05:30 PM, Celebration 13	Track: Teaching/Pedagogy in POM
	Contributed Session: <b>Student Engagement and Motivation</b>	
	Chair(s): Elham Torabi	

115-0139 Teaching LogFrame for Project Monitoring and Evaluation

Tung Nguyen, Lecturer, International University - VNU HCMC, Vietnam

Teaching the logical framework (LogFrame) in a project management course broadens students' ability to manage project risks and design a comprehensive project monitoring and evaluation system. This paper illustrates how to use the risk register to develop the assumptions for the LogFrame in a community-based water supply project.

115-0426 SPARRING: Deliberate Practice in the POM Classroom

Francois Giraud-Carrier, Associate Professor, Weber State University, United States

More experiential learning is needed to better prepare students for the workplace. Using deliberate practice as the conceptual framework, we develop the SPARRING model, an instructional design model for experiential education, and discuss simple and easy techniques instructors can use to make their POM classes more experiential.

115-0547 Using Services Management Principals for Improving Student Engagement and Satisfaction

Elham Torabi, Assistant Professor, James Madison University, United States  
Baback Vaziri, Assistant Professor, James Madison University, United States

## Tuesday, 04:00 PM - 05:30 PM

Amy Connolly, Assistant Professor, James Madison University, United States

We introduce design concepts and systematic continuous teaching improvement approach inspired by service operations principals. We present implementation results of a five-year study including student course evaluations and assessment of learning data in both in-person and online modes of an undergraduate introductory operations management class.

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115-1761 Best practices in training for Innovation and Idea Management Systems in Healthcare

Kaveh Houshmand Azad, Lecturer, California State University Northridge, United States

This presentation reviews development and implementation of training programs for Innovation and Idea Management Systems, with a primary focus on healthcare institutions. This data-driven approach plays a key role in enabling operational and clinical functions to address safety and affordability of care, using improvement ideas from staff and physicians.

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### Invited Session

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278	Tuesday, 04:00 PM - 05:30 PM, Celebration 14	Track: Service Operations
	Invited Session: Platform Economics and Behaviors in Service	
	Chair(s): Tingliang Huang	

115-0901 Impact of Consumer Complaint Relevance on Product Recalls: An Empirical Investigation of the Automobile Industry

Weihan Jia, Student, Trinity College Dublin, Ireland

Yufei Huang, Associate Professor, Trinity College Dublin, Ireland

Xingjie Wei, Assistant Professor, Leeds University, United Kingdom

This paper uses text mining to analyze the similarity between the defects in car recalls and consumer complaints, then examine how such complaint relevance impacts the timing of recall decisions. We find that more relevant complaints lead to faster car recall decisions.

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115-0915 Managing Service Systems with Overconfident Customers

Na Zhang, Student, University of Florida, United States

Anand Paul, Professor, University of Florida, United States

Xu Sun, Assistant Professor, University of Florida, United States

We study a service system where true service times are unknown, and customers tend to use a small random sample as highly representative of service times and thus underestimate the variability of service times. This paper provides important implications for the manager's pricing and queue-length-information provision policies in service operations.

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115-1927 Behavior-Based Pricing in Two-Sided Platforms

Bozhuang Lei, Student, City University of Hong Kong, China

Xiaohan Zhang, Student, City University of Hong Kong, China

Yimin Yu, Associate Professor, City University of Hong Kong, Hong Kong, China

Behavior-based pricing (BBP), retail practice of price discrimination between past and new customers, is widely adopted by two-sided platforms. We formulate a duopoly two-period model with BBP to show that customer-side BBP can improve platforms' profits when the developer side is multi-homing, overturning the implication of traditional BBP on profitability.

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### Contributed Session

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279	Tuesday, 04:00 PM - 05:30 PM, Celebration 15	Track: Information Systems and Operations Management
	Contributed Session: Frontiers in Information Systems	
	Chair(s): Varada Krishnaswamy	

115-0232 What data is worth sharing? Classifying industrial data sharing in the triple bottom line

Lars Friedrich, Student, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany

The literature review aims to answer the question: What kind of data do companies share with other companies? We classify the types of data companies share into the concept of the triple bottom line. The results infer how frequently companies share economic (57), environmental (24), or social data (18).

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115-1533 Using Virtual Teams for Projects: The Impact of Varying Levels of Virtuality

Ade Arowolo, Student, Brock University, Canada

Ken Klassen, Professor, Brock University, Canada

Teju Herath, Professor, Brock University, Canada

We study the impact of virtuality (the proportion of work done virtually) on project team performance. Using the theoretical frameworks of Adaptive Structuration Theory and Transformational Leadership Theory, a survey was administered in various industries. Results demonstrate the moderating effects of virtuality on communication frequency, leadership effectiveness, and performance.

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115-1762 Disaster Recovery in Information Systems - Barter or Balance

Varada Krishnaswamy, Student, Virginia Tech, United States

Christopher Zobel, Professor, Virginia Tech, United States

A presumption underlying information system disaster recovery is that it is not an enterprise function. As evidenced in practice, functional business needs are presented independently of disaster recovery requirements. By making disaster recovery an objective of a particular business function, we demonstrate how it can become an operational necessity.

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## Tuesday, 04:00 PM - 05:30 PM

- 115-1922 Data Gatekeeper: Consumer Opt-out On a Content Platform  
Xuanqi Chen, Student, PolyU, China  
Yulan Wang, Professor, Hong Kong Polytechnic Univ, Hong Kong, China  
Gang Li, Professor, Xi'an Jiaotong University, China

Consumers provide data on content platforms (CP), but CPs may share data with the third part. Regulations require that consumers should be given the choice to deny data sharing. Our analytical model shows that the regulation may increase or decrease the advertising intensity, hurt consumers, benefit the CP.

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### Invited Session

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|-----|--|---|
| 280 | Tuesday, 04:00 PM - 05:30 PM, Coral Spring 1   | Track: Emerging Topics in Operations Management |
|     | Invited Session: <b>Interface between information, technology, and emerging OM practices</b> |   |
|     | Chair(s): Li Cheng   |   |

- 115-1237 The role of stakeholders in shaping supply chain ESG transparency  
Li Cheng, Assistant Professor, Michigan State University, United States  
Manmohan Sodhi, Professor, City University - London, United Kingdom  
Veronica Villena, Associate Professor, Arizona State University, United States

While past literature has noted the crucial role of individual stakeholder groups in driving the firm's disclosure of specific issues, our study examines the diversity of various stakeholders groups located upstream and downstream and its impact on supply chain transparency across a broad range of ESG issues.

- 115-1260 Losing the Title: How Symbolic Statuses Affect Online Volunteer Performance  
Vinit Tipnis, Student, Kelley School of Business, United States  
Eunae Yoo, Assistant Professor, Indiana University Bloomington, United States  
Fei Gao, Assistant Professor, Indiana University Bloomington, United States

Online volunteering platforms award symbolic statuses to their top volunteers based on performance. Through a quasi-experimental design, we study how the loss of such statuses can affect volunteer performance on these platforms. We provide recommendations for platforms to implement to improve volunteer performance.

- 115-1321 Environmental Disclosure in Supply Chains  
Jie Lian, Student, University of South Carolina, United States  
Sining Song, Assistant Professor, University of Tennessee Knoxville, United States  
Natalie (Ximin) Huang, Assistant Professor, University of Minnesota, United States  
Yan Dong, Professor, University of South Carolina, United States

This research studies the spillover effect of a firm in disclosing its environmental performance on its suppliers' decision to do the same. The firm's disclosure creates both a pressure to disclose and an opportunity to freeride. Using panel data and econometric analysis, we investigate the outcome of this tradeoff.

- 115-1468 Transportation Planning for E-commerce with Delivery Promise  
Wenyi Kuang, Assistant Professor, Fairleigh Dickinson University, United States  
Yanji Duan, Assistant Professor, University of North Florida, United States  
Angela Jones, Assistant Professor, Howard University, United States

This research builds on problems faced by retailers with guaranteed delivery promises. Using big data from a leading e-commerce retailer and based on results from different machine learning models, we propose an analytical model that provides guidance to retailers to achieve cost-effective assignments for cargo delivery scheduling across different channels.

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### Contributed Session

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|-----|--|---------------------------------------|
| 281 | Tuesday, 04:00 PM - 05:30 PM, Coral Spring 2                   | Track: Global Supply Chain Management |
|     | Contributed Session: <b>Panel: Global Manufacturing Trends</b> |                                       |
|     | Chair(s): Torsten Doering Matteo Kalchschmidt                  |                                       |

- 115-2129 Panel: Global Manufacturing Trends  
Torsten Doering, Assistant Professor, Minerva University, United States  
Steven Carnovale, Associate Professor, Florida Atlantic University, United States

This session hosted by the Global Manufacturing Research Group (GMRG) will start with a brief overview of GMRG activities and its global survey which addresses practices related to operations, innovation, plant culture, leadership, and supply chain management allowing operations management researchers to explore numerous relationships across many countries.

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### Invited Session

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|-----|--|-------------------------------------|
| 282 | Tuesday, 04:00 PM - 05:30 PM, Blue Spring 1        | Track: Supply Chain Risk Management |
|     | Invited Session: <b>Uncertainty and Resilience</b> |                                     |
|     | Chair(s): Zahra Azadi                              |                                     |

## Tuesday, 04:00 PM - 05:30 PM

### 115-0259 A Business Model with Product Rental

Ki Ling Cheung, Associate Professor, Hong Kong University of Science and Technology, Hong Kong, China  
Albert Ha, Professor, Hong Kong University of Science and Technology, China  
Jianyue Wang, Student, Hong Kong University of Science and Technology, Hong Kong, China

We develop a theoretical model to study a channel with both retail and rental. A manufacturer selling a product may also rent out it through a third party. We study when and how the addition of the rental option may benefit the manufacturer, and the impacts on social welfare.

### 115-0843 Risk absorption by manufacturers: An uncertain scenario

Shradha Kapoor, Student, Durham University, United Kingdom

Even though the Pandemic is over, in the new normal, we might still have to assume a possibility for the come back of unanticipated failure particularly in developing nations. The purpose of this paper is to investigate the risks absorbed by manufacturers using case study methodology during supply disruptions.

### 115-1552 AI and the future of jobs - Online job automation risk modelling, forecasting and clustering

Pierre Bouquet, Student, Massachusetts Institute of Technology, Switzerland  
Amin Kaboli, Lecturer, Swiss Federal Institute of Technology in Lausanne, Switzerland  
Yossi Sheffi, Professor, Massachusetts Institute of Technology, United States

This presentation introduces an online deep learning and data mining-based framework to assess automation risk across tasks, jobs, and sectors. A five-year forecast and clustering model helps anticipate job evolution, offering valuable insights for stakeholders to guide education, up-skilling, re-skilling, and hiring strategies, as well as identifying high-risk sectors.

### 115-1582 The Effect of Policy Uncertainty on Supply Chain Structure and Performance

Jafar Namdar, Post Doc/Researcher, Massachusetts Institute of Technology, United States  
Sachin Modi, Professor, Villanova University, United States  
Jennifer Blackhurst, Professor, University of Iowa, United States

We examine how firms adjust their sourcing decisions following Economic Policy Uncertainty (EPU) variations and whether such adjustments have any significant performance implications. We show that firms only react to EPU affecting their suppliers but do not adjust their supply bases in response to the host country's EPU.

### 115-2073 Competitive Pricing of Substitute Products under Supply Disruption

Varun Gupta, Associate Professor, University of North Georgia, United States  
Dmitry Ivanov, Associate Professor, Berlin School of Economics and Law, Germany  
Tsan-Ming Choi, Professor, University of Liverpool, United Kingdom

We study pricing of competitive substitute products in the presence of a supply disruption. Retailers often use responsive pricing to mitigate supply issues and manage demand in the short-term. In this setting, we explore equilibrium prices and sourcing strategies.

## Invited Session

283	Tuesday, 04:00 PM - 05:30 PM, Blue Spring 2	Track: Empirical Research in Operations Management
	Invited Session: Platform Operations	
	Chair(s): Yannis Stamatopoulos Nil Karacaoglu	

### 115-0964 Dynamic College Admissions

Ignacio Rios, Assistant Professor, Jindal School of Management, United States  
Tomas Larroucau, Assistant Professor, Arizona State University, United States

We study the determinants of college retention, and we identify two main channels that explain switches and dropouts: (i) initial mismatches, and (ii) learning. We provide empirical evidence for these two channels, we estimate a structural model of students' dynamic behavior, and we test several counterfactuals.

### 115-1275 Market Thickness and Delivery Efficiency in Food Delivery Platforms

Wenchang Zhang, Assistant Professor, Kelley School of Business, United States

In food delivery platforms, market thickness entails the restaurant density in a geographic area (i.e., a regional market). We study the implications of restaurant density and performances in food delivery platforms. We show that higher market thickness leads to shorter order wait times; it also boosts restaurants' sales and revenues.

### 115-1749 Information Integration in Peer-to-peer Markets

Peng-Chu Chen, Assistant Professor, The University of Hong Kong, Hong Kong, China  
Ran Tao, Student, The University of Hong Kong, Hong Kong, China

245 undergraduates who simulated funders gave ratings for 199 peer-to-peer funding requests, each depicted by a narrative (soft information) and a score (hard information). Results suggest that forming a rating requires an integration of information. The way in which narrative ambiguity, score types, and funder preferences affect ratings is nontrivial.

### 115-2016 When Platforms Go Public, Standards Drop

Guillaume Lapierre-Berger, Student, McGill University, Canada  
Juan Camilo Serpa, Associate Professor, McGill University, Canada  
Maxime Cohen, Professor, McGill University, Canada

## Tuesday, 04:00 PM - 05:30 PM

We argue that when an online platform transitions from private to public ownership, it will drop its screening standards to increase its user base (and revenue prospects). This tactic, however, imposes a cost on the platform's users. We substantiate this hypothesis with a diff-in-diffs analysis on two peer-to-peer lending platforms.

115-2128 Cents of Urgency: How Opening a Co-located Urgent Care Center Affects Emergency Department Arrivals

Simin Li, Assistant Professor, Tulane University, United States  
Achal Bassamboo, Professor, Northwestern University, United States  
Martin Lariviere, Professor, Northwestern University, United States

We show that a colocated UCC helps alleviate ED overuse. We find the number of ED low-acuity encounters decreases by 20.9% post colocated UCC opening. We find that the impact of a UCC on ED is stronger when it is colocated than when it is non-colocated but nearby an ED.

### Invited Session

284	Tuesday, 04:00 PM - 05:30 PM, Rainbow Spring 1	Track: Empirical Research in Operations Management
	Invited Session: Leveraging information in product and service supply chains	
	Chair(s): Xiaosong (David) Peng	

115-0250 The Downside, Upside, or Curvilinear side of Downtime? Evidence from Big Data

Guanyi Lu, Associate Professor, Florida State University, United States

We examine the effect of downtime on worker productivity in a retail context.

115-0308 Alternative information processing mechanisms in hospital supply chains

Xiaosong (David) Peng, Professor, Lehigh University, United States  
Barbara Flynn, Professor, Indiana University, United States  
Arunachalam Narayanan, Associate Professor, University of North Texas, United States  
Raymond Lei Fan, Assistant Professor, Grand Valley State University, United States

We apply IPT to investigate (i) the relationship between the two information processing strategies in a hospital's SC and its cost containment, clinical quality, and patient satisfaction performance, and (ii) how these relationships may be moderated by diversity in the hospital's SC partners, clinical specialties, and patients.

115-0953 The Effects of Signaling Blockchain-based Track and Trace on Consumer Purchases

Xiaosong (David) Peng, Professor, Lehigh University, United States

Employing transactional data from a leading global e-retailer, we design a quasi-natural experiment to estimate the signaling effect of Blockchain-based Track and Trace (BCT) on consumer purchases. We find supporting evidence that BCT can stimulate consumer purchases and these effects are moderated by the degree of product level information asymmetry.

115-1773 A Semi-parametric Bayesian Model for Arrival Processes

Kaan Kuzu, Associate Professor, Lubar College of Business, Supply Chain and Operations Management, United States  
Refik Soyer, Professor, School of Business, Decision Sciences and Statistics, United States  
Murat Tarimcilar, Professor, School of Business, Decision Sciences and Statistics, United States

To analyze and forecast arrival processes to queuing systems, we introduce a robust Bayesian semiparametric model. We implement the model and its extensions on two real call center data sets with different characteristics. Our results indicate that the proposed model has robust performance and outperforms several models used in literature.

### Contributed Session

285	Tuesday, 04:00 PM - 05:30 PM, Rainbow Spring 2	Track: Operational Excellence
	Contributed Session: Technology supporting Operational Excellence	
	Chair(s): Jayarajan Samuel	

115-0203 Sustainable Bioleaching of Lithium-ion Batteries for Critical Materials Recovery

Majid Alipanah, Student, University of Arizona, United States  
Hongyue Jin, Assistant Professor, University of Arizona, United States  
Yoshiko Fujita, Staff Scientist, Idaho National Laboratory, United States  
Andre Anderko, CTO, OLI Systems, United States  
David Reed, Senior Staff Scientist, Idaho National Laboratory, United States

Developing a sustainable bioleaching process is a promising alternative to conventional technologies for recycling lithium-ion batteries. This study optimized the bioleaching conditions through response surface methodology assisted by thermodynamic modeling. It resulted in >80% recovery of target metals and an improved net profit margin from -12% to 17%-26%.

115-1058 Effects of Software Version Homogeneity in Support Costs

Jayarajan Samuel, Assistant Professor, The University of Texas at Arlington, United States  
Amruutha Chandrasekar, Data Scientist, Ericsson Inc., United States  
Stephen Gilbert, Data Scientist, Ericsson Inc., United States

## Tuesday, 04:00 PM - 05:30 PM

Support of software products is a profitable and cost sensitive business. Keeping customer deployments in homogenous software versions is challenging but has high rewards. Using a unique dataset from a telecommunications firm, we draw causal insights on the effects of divergent software release deployments on cost.

115-1423 Using Business Intelligence (BI) to Support Operations Management Decisions

Maria Trindade, Post Doc/Researcher, Maria Alice Trindade, Italy

Nowadays, enterprises can analyze, in real-time, operational data, to identify supply-demand mismatches and act. In this research, we intend to address the value creation of using BI tools for this purpose. We explore the use of BI to monitor KPIs and support decisions at a real-world retailer in Portugal.

### Contributed Session

286

Tuesday, 04:00 PM - 05:30 PM, Barrel Spring 1

Track: POM-Marketing Interface

Contributed Session: Algorithm and Data-driven Marketing

Chair(s): Zhen Gu

115-1146 Cause Marketing and the Moderating Role of Compulsive Buying

Pi-Ying Yen, Assistant Professor, Macau University of Science and Technology, Macao, China

Hui Xiong, Associate Professor, Huazhong University of Science & Technology, China

Haoyu Liu, Assistant Professor, City University of Macau, Macao, China

Ying-Ju Chen, Professor, Hong Kong University of Science and Technology, Hong Kong, China

We investigate the sales impact of cause marketing among compulsive buyers, who repeatedly purchase in response to adverse events or emotions for a long time. Using four experiments, we uncover a significant negative interaction between compulsive buying and cause marketing; i.e., cause marketing fails to stimulate sales among compulsive buyers.

115-1178 Training Scalable Personalization Policies with Constraints

Haihao Lu, Assistant Professor, University of Chicago, United States

Duncan Simester, Professor, Massachusetts Institute of Technology, United States

Yuting Zhu, Assistant Professor, National University of Singapore, Singapore

We show how recent advances in linear programming can be adapted to the personalization of marketing actions with constraints.

115-1987 Information Design and Pricing in Two-sided Platforms: Customer-centric or Vendor-centric?

Zhen Gu, Student, UIUC, United States

We study how a platform's algorithm design and information pricing affect third-party sellers' competition and consumer search. We show that the more transparent algorithm has a non-monotonic effect on the competition between sellers and the consumer search. Different revenue models (subscription versus advertising) lead to various pricing schemes.

115-2104 Artificial Intelligence Customer Experience in the Luxury Retail Sector

Gunjan Malhotra, Associate Professor, IMT Ghaziabad, India

Gunjan Dandotiya, Student, IMT Ghaziabad, India

This study enhances research into AI applications in the luxury retail sector by presenting brand anthropomorphism, brand warmth, psychological ownership to understand the impact on purchase intention and word of mouth. The findings show that AI-enabled customer experience gains better retail experience; therefore, demand features that attract and motivate them.

### Invited Session

287

Tuesday, 04:00 PM - 05:30 PM, Barrel Spring 2

Track: Procurement and Supplier Management

Invited Session: Consumer Privacy, Blockchain, and Sustainable Supply Chains

Chair(s): Wenqing Zhang

115-0102 Sourcing's effect on quality risk to the public in U.S. pharmaceutical supply chain

Molly Hughes, Student, Logistics & Marketing Department, United States

Pharmacy Benefits Managers make sourcing decisions on behalf of health plans. This study looks at one sourcing practice, removing drugs from insurance coverage, and its effect on public risk. This research focuses on a current FTC concern by expanding the boundaries of SC risk into the work of public policy.

115-0451 Green Investment

Wenqing Zhang, Associate Professor, University of Minnesota Duluth, United States

Padmanabhan Prasad, Professor, St. Mary'S University, United States

Chia-Hsing Huang, Professor, Solbridge International School of Business, South Korea

Rajesh Rajaguru, Senior Lecturer, University of Tasmania, Australia

The adoption of green technologies by firms may provide benefits that do not exceed the costs of adoption many may seek alternate-green methods that can provide output that can achieve a satisfying level of strategic performance. We use a game-theoretic model to see how marketing sustainable practices through social media

## Tuesday, 04:00 PM - 05:30 PM

115-1578 Which Path to Take? Focus on Social, Environmental, or both Sustainability Dimensions

Ruth Schuelken, Student, University of Mannheim, Germany

Christoph Bode, Professor, University of Mannheim, Germany

John Macdonald, Associate Professor, Colorado State University Fort Collins, United States

When addressing sustainability, it is difficult to address the three dimensions of sustainability simultaneously. This paper draws on empirical data to examine when companies focus on the social dimension of sustainability, when they focus on the environmental dimension, and when they address both dimensions equally.

115-1795 Consumer Privacy and Dynamic Product Improvement

Jiong Sun, Associate Professor, Purdue University, United States

Yingchen Yan, Assistant Professor, Beihang University, China

We consider a non-durable good monopolist that collects consumers' purchase history in order to recognize them and subsequently tailor its product offerings for a finer market segmentation. Forward-looking consumers optimally make their decisions on product purchase and privacy disclosure. We develop a dynamic model to study the economic impacts.

### Invited Session

288

Tuesday, 04:00 PM - 05:30 PM, Rock Spring

Track: POM-Economics Interface

Invited Session: Emerging Topics on POM-Economics Interface

Chair(s): Seetharama Chandrasekhar Manchiraju

115-0247 Scaling sharing platforms with supply constraints with lease-to-earn contracts

Milind Sohoni, Professor, Indian School of Business, India

Achal Bassamboo, Professor, Northwestern University, United States

Neha Sharma, Student, Kellogg School of Management, United States

To operate at scale, platforms in emerging markets often finance assets and offer revenue share supply contracts. We find the optimal contract in such settings where the platform decides on revenue share to offer and monthly fee to charge the users. We also compare this to centralized platforms.

115-0354 Optimal Cardinal Contests

Goutham Takasi, Student, University of Texas at Dallas, United States

Ganesh Janakiraman, Professor, University of Texas Dallas, United States

Milind Dawande, Professor, University of Texas Dallas, United States

We study the problem of designing an optimal cardinal contest. We use mechanism design theory to derive an optimal cardinal mechanism, and provide a convenient implementation - a decreasing reward-meter mechanism - of the optimal contest. We establish the practicality of our mechanism by showing that it is "Obviously Strategy-Proof".

115-0496 The "Netflix Model": A New Payment Model for Asymptomatic Disease Management

Zhaowei She, Assistant Professor, Singapore Management University, Singapore

Yueran Zhuo, Assistant Professor, Mississippi State University, United States

Jagpreet Chhatwal, Associate Professor, Harvard University, United States

Turgay Ayer, Professor, Georgia Tech, United States

Several state governments (e.g., Louisiana and Washington) recently entered into Netflix-style procurement contracts with pharmaceutical companies. We analyze this novel subscription-based payment model from a mechanism design perspective, and characterize conditions under which such a contract would benefit both pharma and payer, as well as improve the overall market efficiency.

115-0787 Optimal Stockist Selection and Contract Design: Evidence from a Supply Chain in India

Wei Jiang, Assistant Professor, Hong Kong University of Science and Technology, Hong Kong, China

Jussi Keppo, Professor, National University of Singapore, Singapore

Yu Long, Student, Hong Kong University of Science and Technology, Hong Kong, China

Omkar Palsule-Desai, Assistant Professor, IIMA, India

This study concerns different types of incentives when manufacturers can learn, select, and contract with stockists. We propose a parsimonious structural model that incorporates Bayesian learning, bandit selection, contract design and structural estimation, and show that the optimal contract consists of three types of incentives: competition, career concerns, and compensation.

### Invited Session

289

Tuesday, 04:00 PM - 05:30 PM, Regency Ballroom Q

Track: Revenue Management and Pricing

Invited Session: Empirical Research with a Social Mission

Chair(s): Yao Cui Wee Kiat Lee

115-0550 Do Predictive Scheduling Laws Work?

Wee Kiat Lee, Student, Cornell University, United States

Yao Cui, Assistant Professor, Cornell University, United States

Karan Girotra, Professor, Cornell University, United States

## Tuesday, 04:00 PM - 05:30 PM

Unpredictable work schedules can negatively affect the welfare of service workers. Motivated by recent proposals to implement a predictive scheduling law, where employers must give advance notice for any schedule changes, we build a game-theoretic model to analyze the effect of the law and validate our findings with empirical evidence.

### 115-0740 Empirical Investigation of Side Effects of Price Change

Ozalp Ozer, Professor, University of Texas Dallas, United States  
Inki Sul, Assistant Professor, Carnegie Mellon University, United States  
A. Serdar Simsek, Associate Professor, University of Texas Dallas, United States

We empirically study the impact of a retailer's price adjustments of a product on customers' long term expenditure in the retailer using observational data. Through multiple approach we quantify the negative effect of price change on customer's long-term expenditure. We operationalize our estimates to increase retailer's revenue through simulation study.

### 115-1334 Timing Matters: Crowd-sourcing Workers in On-demand Freight Matching Platforms

Jingxuan Geng, Student, Temple University, United States  
Ziqi Dong, Student, Temple University, United States  
Guangwen Kong, Associate Professor, Temple University, United States  
Qiuping Yu, Associate Professor, Georgetown University, United States

We study a freight-matching platforms seeking carriers to fulfill requests from customers for a future pick-up date. We find that both the sourcing cost of drivers and the matching probability are associated with the request lead time.

### 115-2080 The Health Consequences of Financial Access: An Empirical Analysis of Credit Availability on Healthcare Outcomes

Andrew Wu, Assistant Professor, Ross School of Business, United States  
Yuan Ma, Student, Ross School of Business, United States  
Jun Li, Associate Professor, Ross School of Business, United States

Bank loans are crucial sources of finance for hospitals. This paper assesses the effect of increases in local credit supply on healthcare outcomes. We show that the total admissions drop when there are more credits available in local banks, and the decrease is driven by decreases in readmissions.

## Invited Session

290	Tuesday, 04:00 PM - 05:30 PM, Regency Ballroom O	Track: Empirical Research in Operations Management
	Invited Session: Empirical Advances of Blockchain Applications in SCM (II)	
	Chair(s): Stephan Wagner     Maximilian Klöckner	

### 115-0361 The Impact of Blockchain-enabled Supply Chain Management System on Financial Performance in Manufacturing Firms

Mohammad Raihanul Hasan, Assistant Professor, State University of Bangladesh, Bangladesh  
Shiming Deng, Professor, Huazhong University of Science & Technology, China

This paper examines financial performance and efficiency of inbound and outbound logistics of 144 Chinese manufacturing firms which adopted blockchain technology. Our data show that the mean change in return on asset, total inventory turnover, and Tobin-Q of these firms are 33%, 25%, and 23%, respectively, higher than comparable firms.

### 115-0592 How do blockchain-enabled smart contracts affect firms' operational efficiency?

Li Ding, Student, Georgia Institute of Technology, United States  
YANGCHUN XIONG, Student, University of Liverpool, United Kingdom  
Shu Guo, Lecturer, University of Liverpool, United Kingdom  
Hugo Lam, Professor, University of Liverpool, United Kingdom  
Tsan-Ming Choi, Professor, University of Liverpool, United Kingdom

We empirically examine the impact of blockchain-enabled smart contracts on firms' operational efficiency. Our analysis is based on the introduction and passage of state-level smart contract laws in the United States. We also explore how firms with different supply chain characteristics are affected differently by the smart contract laws.

### 115-1252 Operational Perspectives on Blockchain Applications

Stephan Wagner, Professor, ETH Zurich, Switzerland

Blockchain applications to support OSCM are growing rapidly. Rigorous empirical evidence concerning the design and implementation of blockchain in OSCM, stakeholder involvement, or the interaction with established OSCM approaches is still limited. We discuss expectations of the JOM special issue 'Operational Perspectives on Blockchain Applications' concerning theoretical and empirical advancements.

### 115-1488 The Role of Blockchain in Maritime Logistics

Johannes Schnelle, Student, Hamburg University of Technology, Germany  
Wolfgang Kersten, Professor, Hamburg University of Technology, Germany

Information technologies play an important role to enable coordination, cooperation, and visibility in logistics. Blockchain is discussed as an approach to promote digitalization. The aim of this research is to analyze the role of blockchain in maritime logistics and the requirements that need to be considered for adoption.

**Invited Session**

<b>291</b>	Tuesday, 04:00 PM - 05:30 PM, Regency Ballroom P	Track: Disruptive Technologies and Operations Management
	Invited Session: <b>Innovation and Security</b>	
	Chair(s): Xinxue Qu	

**115-1372 Pioneer or Laggard? Optimal Timing of Enterprise System Patching**

Qian Jia, Student, Nanjing University, China  
 Xinxue Qu, Assistant Professor, University of Notre Dame, United States  
 Zhengrui Jiang, Professor, Nanjing University, China

Patching is an effective way to protect enterprise systems from exploits, however, many enterprises struggle to decide when to patch and prioritize patches adequately. This work proposes an optimal dynamic patching policy based on a large-scale Markov decision process with balancing patching cost, patching failure cost, and exploitation cost.

**115-1384 Operation Dumbo Drop: To Airdrop or Not to Airdrop for Initial Coin Offering Success?**

Jian Li, Student, Xi'an Jiaotong University, China  
 Xiang(Shawn) Wan, Assistant Professor, Santa Clara University, United States  
 Kenny Cheng, Professor, University of Florida, United States  
 Xi Zhao, Professor, Xi'an Jiaotong University, China

To investigate the efficacy of token airdrop for Initial Coin Offerings (ICOs) success, we implement a regression discontinuity design by leveraging the quasi-randomization of a blockchain project's promotional airdrop campaign on the Ethereum platform. Our study contributes to the literature of ICOs and provides important and useful managerial implications.

**115-2044 Impact of online consumer reviews on Product Development: The moderating role of product differentiation**

Zhilei Qiao, Assistant Professor, UAB, United States

In the digital era, product developers can monitor customer satisfaction by analyzing customer reviews to update digital products. However, customer reviews are often ambiguous and difficult to interpret. In this study, we draw from the Behavioral Theory of the Firm to understand how customer feedback ambiguity influence product development.

**Contributed Session**

<b>292</b>	Tuesday, 04:00 PM - 05:30 PM, Silver Spring 1	Track: Data Science and Analytics
	Contributed Session: <b>Analytics for Supply Chain Operations and Finance</b>	
	Chair(s): Sara Behdad	

**115-0294 Quantum Computing Applications in Operations Management**

Gregory Deyong, Associate Professor, College of Business and Analytics, United States

Quantum computing offers improvements in many areas which are limited by computational complexity. While the improvements promised are attractive, there are shortcomings as well. These include failed searches and possibly identifying an incorrect solution. I will illustrate both the advantages and challenges that quantum computing presents to operations management.

**115-0595 Data-driven Market Assessment of Cryptocurrency Networks Behavior**

Behzad Esmaeilian, Assistant Professor, Tuskegee University, United States  
 Sara Behdad, Associate Professor, University of Florida, United States

As the concept of decentralized finance is gaining momentum and more cryptocurrencies are entering the market worldwide, understanding their market behavior becomes essential. This research clarifies the daily returns and market volatility of cryptocurrencies and utilizes clustering techniques to analyze the temporal patterns of several cryptocurrency clusters.

**115-0790 Dynamic Capabilities in Operations & Supply Chain - A Textual Analytic Approach**

George Kurian, Assistant Professor, Eastern New Mexico University, United States

This paper explores the use of the Dynamic Capabilities framework in the field of Operations & Supply Chain Management incorporating methods such as text mining and topic modeling.

**115-1948 A Data-Driven Approach for Optimal Operational and Financial Commodity Hedging**

Moritz Rettinger, Student, Technische Universität München, Germany  
 Christian Mandl, Professor, Technische Hochschule Deggendorf, Germany  
 Stefan Minner, Professor, Technical University of Munich, Germany

Commodity procurement problems have recently been studied using data-driven that either consider operational or financial hedging. We prove the optimality of a novel combined policy using both instruments and flexible decision granularities decoupled from the derivative's maturity and study the model's learning-stability and out-of-sample generalization on real-world commodity data.

**Invited Session****293**

Tuesday, 04:00 PM - 05:30 PM, Silver Spring 2

Track: Inventory and Logistics Management

Invited Session: **Transportation and Warehousing**

Chair(s): Nezh Altay

**115-0662 Distracted Driving Behavior on Industrial Operators: A Forklift Drivers Perspective**

Janeth Gabaldon, Student, University of North Texas, United States

Suman Niranjani, Assistant Professor, University of North Texas, United States

Arunachalam Narayanan, Associate Professor, University of North Texas, United States

brian sauser, Associate Professor, University of North Texas, United States

In intralogistics, such as warehouses and distribution centers, distractions in drivers' operators can pose a severe safety hazard for themselves and others. This study explores the self-report variables of respect for safety, cognitive failure, and polychronicity as antecedents of distracted driving to improve occupational health and safety for forklift drivers.

**115-0992 Exploring User Acceptance and the Willingness to Uptake Mobility-as-a-Service: A Developing Country Perspective**

Ozgur Kabadurmus, Lecturer, Clemson University, United States

Yasanur Kayikci, Assistant Professor, Sheffield Hallam University, United Kingdom

This study aims to understand the user acceptance and willingness to uptake Mobility-as-a-Service (MaaS), combining all public and private transport services in a unified gateway, in Istanbul, Turkey. The Theory of Planned Behavior is employed to measure users' intentions of utilizing MaaS mobile and web apps for their transportation needs.

**115-1292 Investigating the Complete Enumeration of Routing Subproblems in Hybrid Commercial Drones Sustainable LRP**

Nima Molavi, Assistant Professor, Elizabeth City State University, United States

Yue Zhang, Associate Professor, University of Toledo, United States

In the previous work, a hybrid commercial drones sustainable LRP has been modeled as a decomposed MILP and solved using GAMS-CPLEX by minimizing social, environmental, and economic costs. In this extension, the complete enumeration of routing subproblems is investigated to find the optimal routing and to improve the computation efficiency.

**Invited Session****294**

Tuesday, 04:00 PM - 05:30 PM, Winter Park 49

Track: Product Innovation and Technology Management

Invited Session: **Emerging Themes in PITM**

Chair(s): Lakshminarayana Nittala Sina Moghadas Khorasani

**115-0340 The Impact of Dual Conceptualizations of Brand Equity on Radical Product Launch Strategy**

Junghee Lee, Assistant Professor, University of Notre Dame, United States

Mallapragada Girish, Associate Professor, Indiana University, United States

Mitchell Olsen, Assistant Professor, University of Notre Dame, United States

Daewon Sun, Professor, University of Notre Dame, United States

Dennis Yu, Associate Professor, The Reh School of Business, United States

We examine how brand equity influences the product launching strategy of a market follower that achieves radical innovations by formalizing different perceptions of brand equity: Absolute and proportional. We show that the follower should launch the radical product more if consumers perceive brand equity absolutely, rather than proportionally.

**115-0815 Choice Bracketing in New Product Development**

Gaoyu Xie, Student, George Washington University, United States

Janne Kettunen, Associate Professor, George Washington University, United States

Matthias Seifert, Associate Professor, IE BUSINESS SCHOOL, Spain

We study the effect of narrow and broad bracketing on decision behavior in product development. We utilize laboratory experiments where we vary product evaluation (simultaneous vs sequential). Contrary to past research, we find decision makers to be more risk averse under the broadly bracketed tasks than narrowly bracketed tasks.

**115-1159 Designing Knowledge-driven Innovation Contests**

Lakshminarayana Nittala, Assistant Professor, University of Dayton, United States

Sanjiv Erat, Associate Professor, University of California San Diego, United States

We develop a framework for Innovation Contests that explicitly considers knowledge generation and transfer under different modes of learning. We characterize the effort allocation of contestants from a knowledge management perspective and derive insights for optimal contest design.

**115-1901 Impacts of Downstream Integration in a Supply Chain, Studying Retail Market Transition and Nano-Stores**

Syd Alavi, Student, University of Utah, United States

Glen Schmidt, Professor, University of Utah, United States

Nano-stores are small, privately owned, and operated grocery outlets common in emerging economies. These traditional outlets are being challenged by modern chain retail stores. Using a survey and statistical analysis of sales databases, we study the impacts of downstream integration in the grocery supply chain to understand this market transition.