

Sessions for Friday, May 03

Friday, 08:00 AM - 09:30 AM

Friday, 08:00 AM - 09:30 AM, Piscataway	Track: Environmental Operations Management
Contributed Session: Practices of Green IT	
Chair(s): Davis Alves	

093-1916 65 Practices of Green IT: Acceptance at a Brazilian Information Security Company

Davis Alves, Professor, Universidade Paulista - Unip, Brazil
Anderson Barbosa, Green IT Enthusiastic, Universidade Nove De Julho, Brazil
Aline Caldeira, Green IT Enthusiastic, Faculdade de Informatica e Administracao, Brazil
Marcelo Romero, Green IT Enthusiastic, Universidade São Francisco, Brazil
Paula Coelho, Green IT Enthusiastic, Universidade Paulista - UNIP, Brazil

A survey has identified 65 Green IT Practices (Alves, 2016), however, the acceptance of these practices by companies of different segments is questioned. Through a questionnaire aimed at IT professionals, this research aims to verify which of the 65 Green IT practices are acceptable by a Brazilian information security company.

093-2260 Operational Green IT Implementations for Risk Management: Green Governance for Carbon Disclosure

Xue Ning, Student, University of Colorado Denver, United States
Jiban Khuntia, Assistant Professor, University of Colorado Denver, United States
Terence Saldanha, Assistant Professor, Washington State University Pullman, United States
Nigel Melville, Associate Professor, University of Michigan, United States

This study examines how operational green IT implementations for carbon monitoring and standards-based verification process mitigate the firm-level risk perception for climate change for better carbon disclosure. Matched data for more than 100 firms support a relevant model and hypotheses. Implications for green governance using IT is discussed.

093-1940 65 Practices of Green IT: Acceptance in a Brazilian Company of IT Outsourcing

Davis Alves, Professor, Universidade Paulista - Unip, Brazil
Marcelo Romero, Green IT Enthusiastic, Universidade São Francisco, Brazil
Aline Caldeira, Green IT Enthusiastic, Faculdade de Informatica e Administracao, Brazil
William Lima, Green IT Enthusiastic, Universidade Paulista - UNIP, Brazil
Leandro Moreira, Green IT Enthusiastic, Fundação Getúlio Vargas, Brazil

A questionnaire was made in 65 IT Practices (Alves, 2016), however, it questions the culture of company practices by different assumptions. Through the selection of IT professionals, this research aims to verify which IT practices are acceptable to a multinational IT outsourcing company.

093-1930 65 Practices of Green IT: Acceptance in a Brazilian Company of Information Technology

Davis Alves, Professor, Universidade Paulista - Unip, Brazil
Aline Caldeira, Green IT Enthusiastic, Faculdade de Informatica e Administracao, Brazil
Marcelo Romero, Green IT Enthusiastic, Universidade São Francisco, Brazil
William Lima, Green IT Enthusiastic, Universidade Paulista - UNIP, Brazil
Paula Coelho, Green IT Enthusiastic, Universidade Paulista - UNIP, Brazil

A survey has identified 65 Green IT Practices (Alves, 2016), however, the acceptance of these practices by companies of different segments is questioned. Through a questionnaire aimed at IT professionals, this research aims to verify which of the 65 Green IT practices are acceptable by a Brazilian information technology company.

Friday, 08:00 AM - 09:30 AM, Northwest	Track: POM in Food and Agriculture
Contributed Session: Agri-Supply Chain Management	
Chair(s): Marcelo Sá	

093-0045 Food Supply Chain Management: The Role of Sustainable Dyadic Relationships

Luai Jraisat, Senior Lecturer, University of Northampton.ac.uk, United Kingdom

The paper aims to explore high-order themes concerning sustainable-dyadic-relationships (SDRs) involving information sharing along food supply chains. Five multiple-case studies of SDRs are conducted to examine the topic of fresh fruit and vegetable supply chains. The findings support the development of a new conceptual framework and provide implications for management.

093-0158 Risk, Resilience, and Sustainability in Supply Chain Networks: A Case Study of the Food Industry

Kudzai Chiwenga, Student, University of Bradford, United Kingdom

Research's main purpose is to investigate how firms within a supply chain network collaborating in relation to mitigating risk and vulnerability can attain resilience and sustainability. The research concentrates mainly on how collaboration between the focal firm and actors within its supply chain network can enhance sustainability and resilience.

093-0327 Agribusiness 4.0: Proposing a Model for the Supply Chain of Soybeans

Anderson Amorin, Student, Faculdade Meridional IMED, Brazil
Camille Backes, Student, Faculdade Meridional IMED, Brazil
Guilherme Vargas, Assistant Professor, Faculdade Meridional IMED, Brazil
Henrique Machado, Student, ????, Brazil

Friday, 08:00 AM - 09:30 AM

We study how Industry 4.0 can affect the supply chain of soybeans. For this, a systematic review was carried out on characteristics of the Industry 4.0 and technologies applied to the soybean supply chain. Subsequently, a conceptual model of a supply chain of soybean 4.0 was elaborated and validated.

093-2056 The Role of Collaboration for Agri-Food Supply Chains Water Resilience

Marcelo Sá, Professor, Universidade Nove de Julho, Brazil
Susana Pereira, Professor, Fundacao Getulio Vargas, Brazil
Priscila Miguel, Professor, Fundacao Getulio Vargas, Brazil

This research aimed to understand the role of supply chain collaboration during a slow onset disruption. A qualitative research was carried out through multiple case studies in two Brazilian agri-food supply chain. The main findings indicate the type of relationship between horizontal and vertical collaboration with others resilience elements.

Friday, 08:00 AM - 09:30 AM, Morgan

Track: Public Sector Operations Management

4 Invited Session: Sustainability in the food and education industries

Chair(s): Dan Bumblauskas

093-0930 Food Security: Analysis of Virtual Water Embodiment in Inter-Industry Flows Under Alternative Crop Policies

Ettore Settanni, Post Doc/Researcher, Institute for Manufacturing, Department of Engineering, United Kingdom
Jagjit Singh Srail, Reader, University of Cambridge, United Kingdom

Analytics are developed to unravel structural interdependencies for selected agri-food value networks in the Indian regional economy and the wider world economy. Scenarios are formulated to evaluate the impact of a transition away from highly specialized wheat-paddy cropping patterns on local water resources and water embodiment in international trade.

093-1456 Farming Logistics Operations Enabled by Intelligent Autonomous Vehicles for High-value Sustainable Crops

Naoum Tsolakis, Post Doc/Researcher, Cambridge University, United Kingdom
Jagjit Singh Srail, Reader, University of Cambridge, United Kingdom

This research aims to investigate the use of intelligent autonomous vehicles in farming logistics operations for the optimized use of resources and increased operational efficiency in agri-fields, applicable to the case of high-value crops in India. To that end, navigation patterns are identified and a vehicle routing algorithm is designed.

093-0376 Sustainable Built Environment and Academic Performance

Anita Lee-Post, Associate Professor, University of Kentucky, United States
Chon-Huat Goh, Associate Professor, Rutgers University, United States

To what extent does a sustainably built environment contribute to academic success? In addressing this question, we propose and validate a model that captures the relationship between the design of a sustainably built environment and academic support. Implications for sustainable operations in an academic context will be discussed.

093-0121 Blockchain in Food Distribution for Public Goods

Dan Bumblauskas, Associate Professor, University of Northern Iowa, United States
Brett Dugan, Co-Founder, Bytable Foods, United States
Jacy Rittmer, Co-Founder, Bytable Foods, United States

How can blockchain more accurately and transparently move goods through supply chains? Learn about initiatives being developed on the front line of blockchain with a case study from Bytable Foods - a midwestern USA startup company utilizing blockchain technology in tracking food. Specific examples include egg and cattle distribution.

Friday, 08:00 AM - 09:30 AM, Kalorama

Track: Emerging Topics in Operations Management

5 Contributed Session: Emerging Topics in Supply Chains

Chair(s): Zhixin Chen

093-0032 Supply Chain Digital Twin for Managing Resilience and Disruption Risks

Dmitry Ivanov, Professor, Berlin School of Economics and Law, Germany

In this paper we present methodological principles and a generalized design of a digital supply chain twin. For example, a decision-support system that integrates optimization, simulation, and data analytics for pro-active resilient supply chain design and reactive real-time disruption risk management.

093-0825 Importance of Environmental, Learning, and Technology Orientations for Preparedness and Alertness in Tourism SCs

Santanu Mandal, Associate Professor, Amrita Vishwa Vidyapeetham, India

We explore the role of environmental, technology, and learning orientations in the development of tourism SC preparedness and alertness. Responses from 122 hotel and tour managers were analyzed using SmartPLS 2.0.M3. Results showed orientations to enhance preparedness and alertness resulting in enhanced sustainable tourism SC performance.

093-1613 Retailer Financing vs Crowdfunding: Impacts of Exclusive Channels and Influencer Marketing

Zhixin Chen, Student, School of Management, China
Jie Wu, Professor, School of Management, China
Xiang Ji, Post Doc/Researcher, School of Management, China

Since more and more online retailers open their own crowdfunding platforms, there emerges one issue which is whether a retailer should finance a capital constraint supplier or induce it to do crowdfunding. We show that a retailer can have more incentives to finance a regular supplier than an exclusive supplier.

Friday, 08:00 AM - 09:30 AM

Friday, 08:00 AM - 09:30 AM, Jay	Track: Manufacturing Operations
6 Invited Session: Manufacturing Systems Optimization	
Chair(s): Qipeng Zheng	

093-1912 A Decomposition-Based Approach for Analyzing Network of Polling Queues

Ravi Suman, Student, University of Wisconsin-Madison, United States
Ananth Krishnamurthy, Professor, University of Wisconsin-madison, United States

We develop a decomposition-based approach to analyze tandem polling queues under different strategies, namely the independent, synchronous polling, and out-of-sync strategies. Under Markovian assumptions for arrival and service times, we estimate queue lengths and waiting times, compare the performance under different manufacturing settings, and provide managerial insights.

093-1971 Dynamic Decisions on Processing Rates in Make-to-Order Production Systems

Raik Stolletz, Professor, University of Mannheim, Germany
Jannik Vogel, Student, University of Mannheim, Germany

The digitalization in supply chains allows for detailed forecasts of upcoming changes in demands. We assume flexible production rates and associated costs to it. Optimal changes in processing rates are investigated in a stochastic setting. We present a time-dependent queueing model which is integrated in an optimization approach.

093-2351 Stochastic Network Flow Models for Photolithography (LITHO) Process

Qipeng Zheng, Assistant Professor, University of Central Florida, United States
Mengnan Chen, Student, University of Central Florida, United States

In a semiconductor wafer fab, there are multiple product types that have different due dates and different process flows. Since Photolithography (LITHO) process can be considered as the bottleneck step of each photo layer in wafer production, we propose stochastic network flow models to optimize the schedule.

Friday, 08:00 AM - 09:30 AM, Holmead East	Track: Global Supply Chain Management
7 Invited Session: Procurement in Global Economy	
Chair(s): Shouqiang Wang	

093-0055 Better to Bend than to Break: Sharing Supply Risk Using the Supply-Flexibility Contract

Mehdi Hosseinabadi Farahani, Student, University of Texas Dallas, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Haresh Gurnani, Professor, Wake Forest University, United States
Ganesh Janakiraman, Professor, University of Texas Dallas, United States

We analyze a contract in which a supplier, who is exposed to disruption risk, offers a supply-flexibility contract comprising of a wholesale price and a "flexibility fraction" to a buyer facing random demand. We show that profits for both players increase by the introduction of flexibility into the contract.

093-0091 Procurement with Cost and Non-Cost Attributes: Cost Sharing Mechanisms

Shivam Gupta, Assistant Professor, University of Nebraska Lincoln, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Ganesh Janakiraman, Professor, University of Texas Dallas, United States
Shouqiang Wang, Assistant Professor, University of Texas Dallas, United States

We propose a cost-sharing mechanism for a buyer facing two-dimensional private information on cost and non-cost attributes. We show, both theoretically and numerically, that the best cost-sharing mechanism is near-optimal and is robust to the presence of costly, but unobservable efforts of the contractors.

093-0273 G2G Contracts for India's Pulses Procurement: Ad-Hoc Bargaining Versus Long-Term Contracts

Liyong Mu, Assistant Professor, University of Delaware, United States
Bin Hu, Associate Professor, Naveen Jindal School of Management, United States
Srinagesh Gavirneni, Professor, Cornell University, United States

India depends on pulses as a vital source of protein, yet has faced pulses crises driven by insufficient and uncertain internal yields and ad-hoc importing policies. The government is experimenting with long-term importing policies. Inspired by this practice, we examine G2G ad-hoc versus long-term contracts under the Nash-Bargaining framework.

093-0416 "Now or Later?": When to Deploy Qualification Screening in Open-Bid Auction for Re-Sourcing

Wen Zhang, Student, University of Texas Dallas, United States
Elena Katok, Professor, University of Texas Dallas, United States
George Chen, Assistant Professor, London Business School, United Kingdom
Zhixi Wan, Associate Professor, University of Oregon, United States

We consider when qualified and multiple not-yet-qualified suppliers compete in an open-bid auction. By characterizing the dynamic structure of the suppliers' equilibrium strategies, we can calculate the buyer's expected cost under post-qualification which is computationally impossible to compute otherwise. We identify scenarios where post-qualification is mostly valuable to the buyer.

Friday, 08:00 AM - 09:30 AM, Holmead West	Track: Finance and Operations Management
8 Invited Session: Supply Chain Finance I	
Chair(s): Qiaohai Hu	

Friday, 08:00 AM - 09:30 AM

093-0474 Dynamic Inventory Management with Inventory-Based Financing

Vernon Hsu, Professor, Chinese Univ of Hong Kong, Hong Kong

We consider a multi-period stochastic inventory management problem where a cash-constrained firm can obtain additional working capital through an inventory-based financing facility by pledging its inventory to obtain loans from a lender.

093-1044 Sourcing Decisions with Financially Distressed Suppliers

Andreas Gernert, Student, Ebs Business School, Germany

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

David Wuttke, Assistant Professor, Ebs Business School, Germany

In a game-theoretic model we study the impact of sourcing decisions on supplier default risk. Allowing for strategic interactions among a buyer and two competing, non-symmetric suppliers, we identify several mechanisms that explain when suppliers may even benefit from financial distress.

093-2338 Newsvendor Model as an Exchange Option on Demand and Supply Uncertainty

Ran Ji, Assistant Professor, George Mason University, United States

Bardia Kamrad, Professor, Georgetown University, United States

Under a contingent claims framework, we develop a single period model in the context of an exchange option in a discounted NPV maximization setting in the classical newsvendor problem. Both demand and yield variables are modeled as Wiener processes. The prospect of improving average yield is also investigated.

093-1090 The Effectiveness of Supplier Buy Back Finance

Weiming Zhu, Assistant Professor, I E S E, Spain

Facing a budget-constrained buyer, a novel approach for large suppliers is adopting buy-back financing schemes to relieve their downstream partners and reduce channel costs. We, both theoretically and empirically, analyze the efficiency of these financing schemes and explore their impact on operational decisions and contract design.

Friday, 08:00 AM - 09:30 AM, Gunston East

Track: Purchasing and Supplier Management

9 Invited Session: **Blockchain and information sharing in supply chains**

Chair(s): Christoph Schmidt

093-1029 Blockchain and Supply Management

Dale Rogers, Professor, Arizona State University Tempe, United States

Thomas Choi, Professor, Arizona State University Tempe, United States

CAPS Research filed a report on blockchain and supply management in 2018. It tried to accomplish three things: define blockchain, discuss the current state of the technology, and offer use-case examples. This presentation will offer an overview of that report.

093-0561 Exploring the Role of IP Protection in Asymmetric Buyer-Supplier Relationships

Alexander Fink, Student, Swiss Federal Institute of Technology Zurich, Switzerland

Stephan Wagner, Professor, Swiss Federal Institute of Technology Zurich, Switzerland

Our study investigates the use and impact of intellectual property (IP) protection in collaboration with established buying firms and new venture suppliers. We choose a multiple case study approach based on semi-structured interviews and contribute to the knowledge-based view by examining formal and informal knowledge sharing and transferring patterns.

093-0776 Blockchain in Supply Chain Management - Transaction Costs and Technology Adoption

Christoph Schmidt, Student, Eth Zurich, Switzerland

Stephan Wagner, Professor, Swiss Federal Institute of Technology Zurich, Switzerland

We utilize the transaction cost theory to get an early idea of how blockchain, the most prominent form of distributed ledger technology, might influence supply chain management regarding governance decisions, opportunistic behavior, and business uncertainty. Beyond transaction costs, we explore additional factors influencing technology adoption in Additive Manufacturing.

Friday, 08:00 AM - 09:30 AM, Gunston West

Track: Next Generation Operations

10 Invited Session: **Additive Manufacturing**

Chair(s): Ali Parlakturk

093-0109 Product Line Design with 3D Printing: The Uniqueness-Quality Trade-Off

Lingxiu Dong, Professor, Washington University 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

Due to its additive manufacturing mechanism, 3D printing is able to handle some product designs impractical for traditional methods. However, it is also more difficult to obtain high product quality with 3D printing due to its technical and material limitations. This paper investigates the interplay between those two properties.

093-0139 3D printing of Spare Parts via IP License Contracts

Rob Basten, Associate Professor, Eindhoven University of Technology, Netherlands

Bram Westerweel, Student, Eindhoven University of Technology, Netherlands

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

Friday, 08:00 AM - 09:30 AM

A manufacturer can sell spare parts to its customers directly or offer a license agreement on the parts' design so that customers use a local 3D printing service provider to supply parts. We characterize the optimal contract structure and generate insights into the degree of centralization of the supply chain.

093-0567 Decentralized Customization with 3D Printing: Drivers of Retail Level 3D Printing

Nagarajan Sethuraman, Student, University of North Carolina Chapel Hill, United States
Ali Parlakturk, Associate Professor, University of North Carolina Chapel Hill, United States
Jayashankar Swaminathan, Professor, University of North Carolina Chapel Hill, United States

In this paper, we study the trade-offs involved in decentralized customization enabled by 3D printing at retail stores. We develop an analytical model that considers in-store 3D printing as a component of the firm's broader product line strategy.

11	Friday, 08:00 AM - 09:30 AM, Fairchild East	Track: Socially Responsible Operations
	Invited Session: Managing Sustainable Products	
	Chair(s): Iva Rashkova	

093-0084 Designing Sustainable Products Under Co-Production Technology

Yen-Ting Lin, Associate Professor, University of San Diego, United States
Haoying Sun, Assistant Professor, University of Kentucky, United States
Shouqiang Wang, Assistant Professor, University of Texas Dallas, United States

We study a firm's product line design strategy under co-production technology and green consumers. The firm makes a traditional product using high-quality material and introduces a co-product with lower-quality material. We show that the firm's pricing strategy is non-monotonic in material cost and it may strategically repel some consumers.

093-0355 Sustainable or Not? Role of Valuation Uncertainty and Operational Flexibility in Product Line Design

Lingxiu Dong, Professor, Washington University St Louis, United States
Iva Rashkova, Assistant Professor, Washington University St Louis, United States
Weiqing Zhang, Student, Washington University St Louis, United States

We consider a monopolist selling products of traditional and sustainable qualities to heterogeneous consumers. Unique features of the model are the uncertain consumer valuation and the relationship between development and production costs. We characterize the resulting company's optimal strategy and implications for consumer welfare and development waste.

093-1807 The Impact of Crop Minimum Support Price (MSP) on Crop Production and Farmer Welfare

Prashant Chintapalli, Assistant Professor, Indian Institute of Management Bangalore, India
Christopher Tang, Professor, University of California Los Angeles, United States

We examine the effectiveness of MSP in safeguarding farmers' income and ensuring sufficient production of different crops. We show that if a crop's MSP is too low it could hurt the earnings of the farmers of the crop. We discuss the procedure to find MSPs that are Pareto improving for farmers.

093-2058 Key Factors in Green Product Line Design

Monire Jalili, Assistant Professor, Cleveland State University, United States
Tolga Aydinliyim, Associate Professor, Baruch College, United States
Nagesh Murthy, Professor, University of Oregon, United States

We consider a monopolist selling base and green product versions to consumers whose differential (dis)utilities vary by consumer type and depend on the firm's quality decision (i.e., the recycled content in the green version.) We analyze quality and price decisions and characterize whether/when a uniformly green product line sustains optimally.

12	Friday, 08:00 AM - 09:30 AM, Fairchild West	Track: Economics Models in Operations Management
	Contributed Session: Economic models in supply chain management	
	Chair(s): Asela Kulatunga	

093-1253 Global Supply Chain Networks and Tariff Rate Quotas

Anna Nagurney, Professor, University of Massachusetts Amherst, United States
Deniz Besik, Student, University of Massachusetts Amherst, United States
Ladimer Nagurney, Associate Professor, University of Hartford, United States

We develop a global supply chain network model in which profit-maximizing firms engage in competition in the presence of quantitative trade policy instruments in the form of tariff rate quotas. The modeling and computational framework utilizes variational inequality theory. A case study on global avocado trade is also presented.

093-0306 What Price, Optimality? A Location Model for Economic Development

Jaehwan Jeong, Assistant Professor, Radford University, United States
Joyendu "Joy" Bhadury, Professor, Radford University, United States

While traditional location models find "optimal" locations, we present a model suitable for application in economic development that identifies the potential costs in making any given site "optimal" for location. Borrowing approaches from inverse optimization, we model the problem and propose a solution methodology. Initial empirical results will be presented.

093-0722 Group Purchasing Mechanisms

Behzad Hezarkhani, Associate Professor, Brunel University, United Kingdom
Greys Susic, Associate Professor, Marshall School of Business, United States

Friday, 08:00 AM - 09:30 AM

We study mechanisms to manage group purchasing. The buyers are cost-sensitive and willing to buy a range of product quantities at different prices. We introduce a mechanism with the property that some buyers' strategic deviation from truthful bidding can only make the others better off.

093-2406 Investigating the Opportunities for Optimizing Land Side Logistics Import and Export Operations in Sri Lanka

Namal Bandaranayake, Senior Lecturer, University of Peradeniya, Sri Lanka

Asela Kulatunga, Associate Professor, University of Peradeniya, Sri Lanka

This paper focuses on the handling of landside operations of Sri Lankan export and import operations done by a number of parities. Hence, many resources are underutilized. This research investigates the possibilities for optimization of overall landside logistics operations.

13	Friday, 08:00 AM - 09:30 AM, Embassy	Track: Environmental Operations Management
	Invited Session: Business Model Innovation in Renewable Energy and Demand Response	
	Chair(s): Safak Yucel	

093-1773 Impact of Inconvenience and Liquidity Constraints on the Usage of Off-Grid Solutions: Evidence From Rwanda

Bhavani Shanker Uppari, Assistant Professor, Singapore Management University, Singapore

We investigate the viability of recharge-based off-grid lighting models under poverty. In collaboration with a firm in Rwanda, we collected the bulb usage data from randomized experiments. We build a structural model that incorporates the light consumption dynamics and use it to evaluate changes to the existing model.

093-1841 Demand Response in Wholesale Electricity Markets

Baris Ata, Professor, University of Chicago, United States

Asligul Serasu Duran, Assistant Professor, Haskayne School of Business, Canada

Ozge Islegen, Assistant Professor, Kellogg School of Management, United States

This project explores the impact of the participation and compensation of demand response (DR) providers in the wholesale electricity market over the long term. We model the equilibria in an electricity market under various scenarios of DR participation, and investigate the impact of different DR compensation policies.

093-1349 Non-Ownership Business Models for Solar Energy

Vishal Agrawal, Associate Professor, Georgetown University, United States

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

Safak Yucel, Assistant Professor, Georgetown University, United States

In addition to the traditional sales model, solar power companies, such as SolarCity and Sunrun, have introduced innovative non-ownership business models: leasing and power purchase agreements. We study a solar power company's business model decisions and how they affect the environment, customers, and utility firms.

14	Friday, 08:00 AM - 09:30 AM, Du Pont	Track: Revenue Management and Pricing
	Invited Session: Data Driven Project Management	
	Chair(s): Jing Zhou Houcai Shen	

093-1356 Optimal Pricing and Information Disclosure Strategy for Crowdfunding of New Product Development

Jue LIU, Student, Nanjing University, China

Xiaofeng LIU, Associate Professor, Zhongnan University of Economics and Law, China

Houcai Shen, Professor, Nanjing University, China

This paper investigates the optimal information disclosure and pricing strategies for crowdfunding of new product development under quality uncertainty. Different from previous research, we find that it can be both favorable and unfavorable with information disclosure.

093-1489 Resource Planning and Crashing for Project Management: A Distributionally Robust Approach

Lianmin Zhang, Assistant Professor, Nanjing University, China

We study a problem that arises in the resource planning and crashing of many projects. The exact probability distribution of the task is unknown, but it belongs to a certain family of distributions. The optimal decisions can be derived by solving a mixed-integer programming problem.

093-2441 Moderating Effects of Project Characteristics on the Relationship Between ICT Usage and Collaborative Product Development

Chathurani Silva, Professor, University of Sri Jayewardenepura, Sri Lanka

Sanjay Mathrani, Professor, Massey University, New Zealand

Nihal Jayamaha, Professor, Massey University, New Zealand

Using a relational resource and organizational information theory-based model including multidimensional ICT usage and collaborative product development performance measures, this study investigated moderating effects of project complexity and uncertainty of the direct and indirect relationships between ICT usage and new product quality, commercial success, and time performance, through collaboration performance.

093-0281 Dynamic Learning and Market Making in Spread Betting Markets with Informed Bettors

John Birge, Professor, University of Chicago, United States

Yifan Feng, Student, University of Chicago, United States

Bora Keskin, Assistant Professor, Duke University Durham, United States

Adam Schultz, Senior Quantitative Researcher, Wealthfront Inc., United States

Friday, 08:00 AM - 09:30 AM

We study the profit maximization problem of a market maker in a spread betting market. Anonymous bettors with heterogeneous strategic behavior and information levels participate in the market. The non-omnipotent market maker strives to extract information from the market while guarding against the strategic manipulation of an informed bettor.

16	Friday, 08:00 AM - 09:30 AM, Coats	Track: Social Media and Internet of Things
	Invited Session: Internet of Things	
	Chair(s): Ashish Agarwal	

093-0900 Operational Execution and POP Display Effectiveness: Evidence from the Adoption of an IoT Technology

Yannis Stamatopoulos, Assistant Professor, The University of Texas at Austin, United States

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

Jacob Zeng, Student, The University of Texas at Austin, United States

This study uses the adoption of an innovative IoT technology by a brick-and-mortar retail chain in the United States to evaluate the operational execution of promotional inventory campaigns and its impact on the effectiveness of those campaigns.

093-1615 Generating Marketing Outcome Through Internet of Things (IoT)

Beenish Tariq, Assistant Professor, National University of Science & Technology Pakistan, Pakistan

Sadaf Taymor, Lecturer, National University of Science & Technology Pakistan, Pakistan

This paper highlights the effectiveness of data stored from operational use of IoT for generating marketing related outcomes: business intelligence for product development, product support, and customer relationship management. Furthermore, it explains how IoT can provide support to improve communication ties between product manufacturer and product support through target markets.

093-2027 Uncovering Offline Conversion Funnel with Internet-of-Things: The Case of WiFi Tracking in Retail Industry

Xing Lan, Student, University of Texas Austin, United States

Jun Duan, Associate Professor, University of Texas Austin, United States

Tianshu Sun, Assistant Professor, University of Southern California, United States

Our study showcases the value of IoT technology in offline business applications. By leveraging a comprehensive dataset that combines IoT data on consumer traffic, we find a significant "visit effect" towards the increase in sales. We also demonstrate marked improvements in profits by designing customized marketing strategies using IoT.

093-0688 Artificial Intelligence and Big Data Analytics to Tackle Urban Mobility Issues

Shalique Sidhikh, Student, Indian Institute of Management Kozhikode, India

Rajeev A, Student, IIMK, India

Sandeep Sivakumar, Student, IIMK, India

Rahul Ramachandran, Student, IIMK, India

The study proposes an Artificial Intelligence based framework as a solution to improve the driving habits of citizens as well as reduce the burden of traffic abiding citizens by incentivising them through various measures. The framework is grounded on big data analytics to cluster people based on driving habits.

17	Friday, 08:00 AM - 09:30 AM, Columbia 1	Track: Scheduling and Logistics
	Invited Session: Scheduling with a Social Impact	
	Chair(s): Nourhan (Nouri) Sakr	

093-0481 Improving Operating Room Scheduling: The Value of Using Data to Deal with Variable Surgeries

Rodrigo Carrasco, Assistant Professor, Universidad Adolfo Ibáñez, Chile

Macarena Azar, Student, Universidad Adolfo Ibáñez, Chile

Surgery variability has been one of the critical difficulties in operating room scheduling. In this work we tackle the issue by using historical data to develop chance constraints for our scheduling model. Our approach allows accounting for surgery variability, improving schedule performance.

093-0641 Managing Appointment Booking Under Customer Choices

Nan Liu, Assistant Professor, Boston College, United States

Peter Van De Ven, Scientific Staff Member, Centrum Wiskunde & Informatica (CWI), Netherlands

Bo Zhang, Research Staff Member, IBM Research, United States

Motivated by the increasing use of online appointment booking platforms, we study how to offer appointment slots to customers in order to maximize the total number of slots booked. We develop two models, non-sequential offering and sequential offering, to capture different types of interactions between customers and the scheduling system.

093-0925 Legal Assignments and Fast EADAM with Consent via Classical Theory of Stable Matchings

Xuan Zhang, Student, Columbia University, United States

Legal assignments and EADAM algorithm extend stable assignments in the school-choice problems. We prove that legal assignments are stable assignments in a sub-instance and give an $O(E)$ algorithm to obtain this sub-instance, thus also giving an $O(E)$ implementation of the EADAM algorithm.

093-0348 Combinatorial Scheduling for Adaptive ML in Cyber-Security

Ojas Parekh, Principal Member of Technical Staff, Sandia National Labs, United States

Cynthia Phillips, Senior Scientist, Sandia National Labs, United States

Vladena Powers, Student, Columbia University, United States

Friday, 08:00 AM - 09:30 AM

Nourhan (Nouri) Sakr, Student, Columbia University, United States

Cliff Stein, Professor, Columbia University, United States

Our work leverages combinatorial scheduling to design budgeted defense strategies against evolving adversaries. We study adaptive URL classification, reduce it to a game-theoretic model and use a scheduling interpretation of real-data and theoretical analyses to drive the design of useful algorithms with approximately optimal solutions.

Friday, 08:00 AM - 09:30 AM, Columbia 2 Track: Operational Excellence

18 Invited Session: Operational Excellence in Pharma

Chair(s): Thomas Friedli Steffen Eich

093-0472 Perspectives, Opportunities, and Limitations of Operational Excellence in Pharma

Andre Mendes de Carvalho, Student, University of Minho, Portugal, United States

Paulo Sampaio, Associate Professor, University of Minho, Portugal

Eric Rebentisch, Lecturer, Massachusetts Institute of Technology, United States

Pharma organizations face increasing pressure to optimize processes and become agile. Although having much to gain from such efforts, challenges arise: a highly regulated environment, different conceptions of quality, and a cultural mindset of rigor that, beyond R&D, has little room for experimentation. A review on perspectives, opportunities, and limitations.

093-1204 The Role of Culture in Operational Excellence

Nuala Calnan, Post Doc/Researcher, Dublin Institute of Technology, Ireland

Thomas Friedli, Professor, Institute of Technology Management, Switzerland

Findings indicate that the best potential to sustainably impact patient-relevant outcomes lie in the integration of three critical areas of influence for the pharmaceutical industry: operational excellence, knowledge excellence, and cultural excellence. The Excellence Framework combines the cultural excellence of a learning organization with excellence in knowledge creation and utilization.

093-0214 Linking Operational KPIs and Regulatory Quality Compliance Outcomes

Steffen Eich, Student, Institute of Technology Management, Switzerland

Thomas Friedli, Professor, University Of St. Gallen, Switzerland

Interventions from regulatory authorities are a proven measure for evaluating quality performance and quality risk in pharmaceutical manufacturing. Previous research analyzed FDA inspection outcomes regarding location or company type. We present a first approach to link the data with operational KPIs from the manufacturing sites.

093-0215 Operationalization of the Pharmaceutical Production System Model (PPSM)

Thomas Friedli, Professor, Institute of Technology Management, Switzerland

Steffen Eich, Student, Institute of Technology Management, Switzerland

A stable Pharmaceutical Quality System (PQS) provides key elements of assurance and oversight necessary for pharmaceutical manufacturing and quality control laboratory processes. The PPSM provides a holistic perspective on pharmaceutical manufacturing, its enabling factors, and performance outcomes. We present our approach for measuring both of these aspects.

Friday, 08:00 AM - 09:30 AM, Columbia 3 Track: Product Innovation and Technology Management

19 Contributed Session: Innovation and Information Technology

Chair(s): Allan O'Connor

093-0865 The Impact of Union Density on Technology Investment

David Zhang, Assistant Professor, Lehigh University, United States

Douglas Mahony, Associate Professor, Lehigh University, United States

The Management and Economics literatures have produced mixed results when examining the effect of union density on innovation and IT investments. In addressing these mixed findings, this study extends this stream of research and explores the relationship between union density and IT investment at the industry level.

093-2318 Managing Product Pipelines During Technology Advancements

Hossein Jahandideh, Data Scientist, Google, United States

Data-center and cloud computing technology is constantly advancing. When a new generation of hardware is being introduced, the supply of the old generation needs to be cut in advance (due to its lead-time). This talk focuses on the trade-offs that are considered in finding the optimal cut-off point.

093-0973 The Difficult Choice of SMES for Green Innovation: Government vs Firms? An Operations' Digitization Perspective

Yuqing Lin, Student, Nanyang Technological University, Singapore

Mariana Giovanna Andrade Rojas, Assistant Professor, Nanyang Technological University, Singapore

This paper presents a bipartite network model to examine the effects of government and firm-firm collaboration on SMEs green innovation. Results show that government-firm bipartite centrality has a greater effect on green innovation than firm-firm centrality does. Moreover, operations digitization decreases the positive effect of government centrality on green innovation.

093-2154 Ecosystems in Industry Platforms and Entrepreneurial Contexts: Competing or Synchronised Agendas?

Allan O'Connor, Associate Professor, University of South Australia, Australia

Rowena Vnuk, Student, University of South Australia, Australia

Friday, 08:00 AM - 09:30 AM

Ecosystems comprise dynamic sets of interactions. While some suggest an ecosystem embodies the interactions and interdependencies within industry platforms others are emphasizing the enabling of entrepreneurial action. This presentation will examine the linkages between ecosystems in the industry platform and entrepreneurial contexts and the implications for learning regions.

20	Friday, 08:00 AM - 09:30 AM, Columbia 4	Track: Healthcare Analytics
	Invited Session: Behavioral Analytics for Operating Rooms Management	
	Chair(s): Vikram Tiwari	

093-0205 Understanding Standardization in Hospital Settings

Kejia Hu, Assistant Professor, Vanderbilt University, United States

Vikram Tiwari, Associate Professor, Vanderbilt University Medical Center, United States

In this research, we want to understand how standardization exists in hospital operations and the impacts it leads to in hospital performance.

093-0809 Organizational and Behavioral Determinants of Surgical Theater Scheduling

Soo-Hoon Lee, Associate Professor, Old Dominion University, United States

Phillip Phan, Professor, Johns Hopkins University, United States

Tinglong Dai, Associate Professor, Johns Hopkins University, United States

Nehama Moran, RN, Johns Hopkins Hospital, United States

Jerry Stonemetz, Clinical Associate, Johns Hopkins Hospital, United States

We aim to uncover organizational and behavioral drivers underlying operating room over-and-under scheduling. By analyzing a large dataset from Johns Hopkins Medicine comprising of patient and clinician demographics, surgical procedures, operational, and team structure, we find that team composition influences scheduling deviations and have implications for patient outcomes.

093-1857 Reducing Perioperative Phases of Care Durations Through Improved Efficiency

Seyed Amin Seyed Haeri, Student, Clemson University, United States

Jaeyoung Kim, Student, Clemson University, United States

Lawrence Fredendall, Professor, Clemson University, United States

Yann Ferrand, Assistant Professor, Clemson University, United States

Kevin Taaffe, Associate Professor, Clemson University, United States

Dee San, Associate Professor, Medical University Of South Carolina, United States

This study used a patient-level dataset with over 32,000 surgical cases where timestamps recorded specific start and end times of key activities. Time durations of each step within the pre-operative, intra-operative, and post-operative phases are analyzed to identify patterns to improve perioperative efficiency, and reduce phases of care durations.

093-0054 Allocation of Operating Room Block Capacity Among Surgeons Using Data Envelopment Analysis

Vikram Tiwari, Associate Professor, Vanderbilt University Medical Center, United States

Warren Sandberg, Professor, Vanderbilt University Medical Center, United States

We developed a Data Envelopment Analysis based method to objectively assist surgical service chiefs in reallocating operating rooms' (OR) capacity among surgeons. The technique compares an individual's performance relative to their peers with respect to how efficiently the individual converts a set of allocated-capacity based inputs into OR utilization-based outputs.

21	Friday, 08:00 AM - 09:30 AM, Columbia 5	Track: Retail Operations
	Invited Session: E-Commerce	
	Chair(s): Guang Li	

093-0140 Online Assortment Optimization When Consumers Refine Their Search

Zhichao Feng, Student, University of Texas Dallas, United States

Shengqi Ye, Assistant Professor, University of Texas Dallas, United States

Dorothee Honhon, Associate Professor, University of Texas Dallas, United States

When the consumer is not familiar with the product category, the online retailer's assortment may trigger interest in a specific product feature, leading the consumer to refine their search, and focus only on products with this feature. Taking this into consideration, this paper studies the online retailer's optimal assortment decision.

093-1530 Value of Promotions with Delayed Incentives: An Empirical Investigation of Gift Card Promotions

Bharadwaj Kadiyala, Assistant Professor, Hong Kong University of Science and Technology, Hong Kong

Ozalp Ozer, Professor, University of Texas Dallas, United States

Serdar Simsek, Assistant Professor, University of Texas Dallas, United States

Gift cards have become a popular vehicle for promotional campaigns run by many departmental, consumer electronic, and online retail stores. Using a proprietary data set from a large department store, we investigate how customers respond to these promotions as well as its effectiveness as a promotional vehicle for retailers.

093-2265 Money-Back Guarantees When Physical and Online Retailers Compete

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

Tingliang Huang, Associate Professor, Boston College, United States

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

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

Friday, 08:00 AM - 09:30 AM

We study pricing and product return policies when physical and online stores compete. We find that the online store offers money-back guarantees when its salvage advantage outweighs total return hassle. Interestingly, better quality may hurt the online store. Moreover, showrooming may benefit the physical store and harm the online store.

093-2225 Designing Shipping Policies for E-Tailers: The Role of Topping-Up Behavior to Qualify for Free Shipping

Guang Li, Assistant Professor, Queen's University, Canada

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

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

We study the optimal contingent free shipping (CFS) policy for online retailers in integrated marketing and operational planning. Under this policy, customers enjoy free shipping if their total purchase amount in a single order exceeds certain pre-determined threshold; otherwise, they pay a flat shipping fee.

22 Friday, 08:00 AM - 09:30 AM, Columbia 6 Track: Healthcare Operations Management

Contributed Session: Improving service quality and patient experience I

Chair(s): Vishal Ahuja

093-1089 Measuring Hospital Process Service Quality Under the Background of Mobile Internet

Min Zhang, Professor, Tianjin University, China

Ran Wang, Student, Tianjin University, China

Jingjing Xiong, Associate Professor, Wenzhou Medical University, China

Mobile technology has greatly changed patients' perceived quality. Based on literature review, focus groups, and two field surveys, this paper conceptualized, constructed, refined and tested a multiple-item scale containing three dimensions (environment quality, human-human quality, and human-technology quality), which reflected key aspects of hospital process service quality in mobile context.

093-0332 Improving Performance Metrics in Physician Offices - Field Project Experiences

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

In this paper, we describe our experiences from field projects to improve patient cycle time, satisfaction, and clinical outcomes in physician offices across a hospital network. We will discuss the role of patient characteristics, processes, staff culture, and physician involvement in determining performance outcomes.

093-0955 A Healthcare Quality Management Event Study: Outcome of Using the Baldrige Excellence Framework

Heng (John) Xie, Student, University of North Texas, United States

Xianghui (Richard) Peng, Assistant Professor, Penn State University Erie, United States

Victor Prybutok, Professor, University of North Texas, United States

This study examines the benefits associated using a Baldrige Award structure. We use an event study methodology to analyze patient satisfaction data in the HCAHPS database. The results show that effective quality management practices as measured by a Baldrige Award application improve hospital performance as measured by patient satisfaction.

093-0957 Healthcare Quality Management Practice and Theory: Comparing Findings from the Literature with Industry Practice

Heng (John) Xie, Student, University of North Texas, United States

Xianghui (Richard) Peng, Assistant Professor, Penn State University Erie, United States

Victor Prybutok, Professor, University of North Texas, United States

This study employs meta-analysis and text mining to investigate the relationship of quality management practice and operations in the healthcare industry. We compare the findings from the literature to healthcare industry practice. The results show that moderating factors exist between the relationship of performance and quality management practices.

093-1289 Maintaining Continuity in Service: An Empirical Examination of Primary Care Physicians

Vishal Ahuja, Assistant Professor, Southern Methodist University, United States

Carlos Alvarez, Associate Professor, Texas Tech University, United States

Bradley Staats, Professor, University of North Carolina Chapel Hill, United States

In service operations where customers have repeated interactions with service providers, it is critical to understand the importance of maintaining continuity of service, whether customer-types with complex needs need to be prioritized and can there be too much continuity. We study these questions in the context of healthcare.

23 Friday, 08:00 AM - 09:30 AM, Columbia 7 Track: Supply Chain Management

Invited Session: Platform systems and gig economy

Chair(s): Edward Anderson Kaitlin Daniels

093-0024 The New Role of B2B Platform: Pricing Games of Platform-Based Collective Bargaining on Logistics Service

Xiaohan Ding, Student, School of Management, China

Nan Liu, Professor, Zhejiang University, China

This paper explores a new role of B2B platform as a third party coordinator in logistics operations for online transaction. We propose analytical models to derive the platform's impact on other players (i.e., the users, 3PLs) under different circumstances. Some useful managerial insights are further provided based on numerical analyses.

093-2395 Pricing, Quality and Competition at On-Demand Healthcare Service Platforms

Yixuan Liu, Student, University of Texas Austin, United States

Xiaofang Wang, Associate Professor, Renmin University of China, China

Friday, 08:00 AM - 09:30 AM

Stephen Gilbert, Professor, McCombs School of Business, United States

Guoming Lai, Associate Professor, University of Texas Austin, United States

We consider on-demand healthcare platforms that allow patients to seek care online from distributed doctors. We develop a strategic queueing model and find that in equilibrium a higher commission rate always lowers doctor participation and service quality, but it may increase the service price if it significantly softens the competition.

093-2404 Surge Pricing Under Spatial Spillover: Evidence From Uber's Operations

Nitin Joglekar, Associate Professor, Questrom School of Business, United States

Kyungmin (Brad) Lee, Student, Questrom School of Business, United States

Marcus Bellamy, Assistant Professor, Boston University, United States

We investigate how a platform accounts for surge-pricing by estimating a spatial panel model. We find that Uber's pricing policies involve both capacity spillover and price spillover across adjacent zones. We then conduct counterfactual analyses to provide insights for managing congestion, while accounting for consumer and labor welfare.

093-1295 Dynamic Performance of Platform Systems Under Delayed Investment Effects

Edward Anderson, Professor, University of Texas Austin, United States

We build a system dynamics computer simulation model of a two-sided platform system which permits an analysis of platform performance under investment for numerous sequential periods. We look at several investment levers with delayed effects, such as price setting, investment in integration tools, etc.

24	Friday, 08:00 AM - 09:30 AM, Columbia 8	Track: Supply Chain Management
	Invited Session: Games in Supply Chains	
	Chair(s): Wenqiang Xiao Xinyi Zhao	

093-0590 Negotiation in Competitive Supply Chains: The Kalai-Smorodinsky Bargaining Solution

Qi Feng, Professor, Purdue University, United States

Yuanchen Li, Student, Purdue University, United States

George Shanthikumar, Professor, Purdue University, United States

We study bargaining in a two-tier supply chain with supply/retail competition. Compared to the previous studies in which the Nash bargaining solution is widely applied, we adopt an alternative solution, the Kalai-Smorodinsky bargaining solution, in competing supply chains, and establish its connection to the Nash bargaining solution.

093-0640 Value of Insurance in a Capital-Constrained Supply Chain

Wenli Wang, Associate Professor, Taiyuan University of Science&Technology, China

Gangshu Cai, Associate Professor, Santa Clara University, United States

We consider a supply chain consisting of one supplier and a capital-constrained retailer in need of short-term financing from a competitive bank. We find a Pareto Zone where the supplier will encourage the retailer to buy insurance and the supply chain can be partially coordinated.

093-2116 Trade Credit and Long-Term Investment

Leon Chu, Associate Professor, USC, United States

S. Alex Yang, Associate Professor, London Business School, United Kingdom

Trade credit is an important form of external financing and an integrated part in supply chain contracts. We propose a normal theory of trade credit based on how it modifies the two contracting parties' bargaining position and thus stimulate more efficient long-term investment.

093-0786 Operational Signaling with Financial Constraint and Market Competition

Xinyi Zhao, Student, New York University, United States

Guoming Lai, Associate Professor, University of Texas Austin, United States

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

This paper studies a firm's financing and information decision amid market competition under information asymmetry. We characterize the firm's optimal strategy by formulating a multiple-receiver signaling game model. The equilibrium structure is based on the firm's internal capital level and the competition intensity.

25	Friday, 08:00 AM - 09:30 AM, Columbia 9	Track: Behavioral Operations Management
	Invited Session: Behavioral Issues in Operations	
	Chair(s): John Aloysius	

093-1698 Impact of Metric-Alignment on Supply Chain Performance: A Behavioral Experiment Study

Arunachalam Narayanan, Assistant Professor, University of Houston, United States

Rafay Ishfaq, Associate Professor, Auburn University, United States

This paper evaluates the impact of aligning performance metrics across different supply chain echelons on managerial decision-making that can improve supply chain performance. In a behavioral experiment study, supply chain decisions made by 556 participants are evaluated to study the interaction effect of metric-alignment and information sharing on SC performance.

093-1756 When Models Meet Managers: Integrating Statistical Model-Based and Judgmental Forecasting

John Aloysius, Professor, University of Arkansas, United States

Enno Siemsen, Professor, University of Wisconsin, United States

Rebekah Brau, Student, University of Arkansas, United States

Friday, 08:00 AM - 09:30 AM

Big data analytics and machine learning increasingly features in forecasting practice. However, practitioners continue to use judgment to incorporate private information to improve the accuracy of statistical model forecasts. Our research examines how statistical models and human judgment may be integrated to improve forecast accuracy in different forecasting environments.

093-1845 Collocation: The Secret to Supply Chain Collaboration

Siqi Ma, Assistant Professor, University of Akron, United States

John Aloysius, Professor, University of Arkansas, United States

Li Hao, Assistant Professor, University of Arkansas, United States

Collocation is known to be advantageous in supply chain relationships. The literature has documented operational reasons for why collocation is beneficial. Our research however looks beyond the purely operational benefits and examines whether there are behavioral reasons why collocation may be beneficial.

26	Friday, 08:00 AM - 09:30 AM, Columbia 10	Track: Product Innovation and Technology Management
	Invited Session: Contracts and Incentives for Innovation.	
	Chair(s): Niyazi Taneri Karthik Ramachandran	

093-0225 More Investment Less Profit? An Investment Conundrum of New Technology Adoption In Supply Chains

Junghye Lee, Assistant Professor, Tulane University, United States

We study how the technology provider should manage its supply chain where the adopter cannot invest enough due to its financial constraint. We find that the adopter may earn less profit even though it can invest more, which in turn hurts the provider.

093-0992 Project Selection and Success: Insights from the Drug Development Process

Panos Markou, Post Doc/Researcher, Cambridge University, United Kingdom

Stylianos Kavadias, Professor, Cambridge University, United Kingdom

Nektarios Oraipoulos, Assistant Professor, Cambridge University, United Kingdom

Selecting the right R&D projects is challenging because of the uncertainty and complexity surrounding those selection decisions. We examine how operational factors (technological uncertainty, competitive development projects, and the presence of project transaction costs) drive the selection decision, and we provide evidence on how these factors meaningfully contribute to productivity.

093-1363 Parallel Innovation Contests

Ersin Korpeoglu, Assistant Professor, University College London, United Kingdom

C. Gizem Korpeoglu, Assistant Professor, University College London, United Kingdom

Isa Hafalir, Professor, University of Technology Sydney, Australia

We study innovation contests where multiple organizers seek solutions from agents and the quality of an agent's solution depends on her effort and uncertainty. We find that when uncertainty is sufficiently large, organizers benefit from agents' entry to multiple contests and organizer profit is unimodal in the number of contests.

093-1477 The Effect of Flexibility in Delegating Innovation

Morvarid Rahmani, Assistant Professor, Georgia Institute of Technology, United States

Karthik Ramachandran, Associate Professor, Georgia Institute of Technology, United States

Clients often engage external providers to generate innovative solutions for their problems. Providers can improve solution quality by increasing the intensity of their efforts, while clients decide when to stop the project. We explore how the client's flexibility in stopping influences the progress and efficiency of the delegated innovation project.

27	Friday, 08:00 AM - 09:30 AM, Columbia 11	Track: Inventory Management
	Invited Session: Managing Stochastic Inventory Systems	
	Chair(s): Chaolin Yang	

093-0970 Dual-Index Policies for Serial Systems with Dual Delivery Modes and Batch Orders

Wu Jie, Professor, University of Science and Technology of China, China

Qiang Wang, Student, University of Science and Technology of China, China

Chaolin Yang, Associate Professor, Shanghai Univ. of Finance and Economics, China

Yi Yang, Associate Professor, Zhejiang University, China

Consider a stochastic serial inventory system with dual delivery modes and general lead time difference of the two modes and batch orders. We study the dual-index echelon-(R,nQ) policies, show its optimality for the special lead time difference, and analyze the dual-index echelon-(R,nQ) policies for general lead times using simulation-based optimization.

093-0743 Optimal Policies for the Dual Sourcing Problem from a Supply Chain Perspective

Youssef Boulaksil, Associate Professor, United Arab Emirates Univ, United Arab Emirates

Younes Hamdouch, Associate Professor, United Arab Emirates Univ, United Arab Emirates

Kilani Ghoudi, Professor, United Arab Emirates Univ, United Arab Emirates

Jan Fransoo, Professor, Kuehne Logistics University, Germany

We study the dual sourcing problem from a supply chain's perspective by analytically comparing the performance of two different policies. We show analytically that the obtained results are different from the known results of optimizing a single-stage inventory system and we define conditions under which each policy is optimal.

093-1037 Managing a Hybrid RDC-DC Inventory System

Friday, 08:00 AM - 09:30 AM

Xiaoyue Yan, Student, Cornell University, United States

We study a hybrid RDC-DC serial inventory system. We propose two simple and easy-to-implement heuristic policies for the system. The first heuristic policy combines the characteristics of the echelon-base-stock policy and the dual-index policy. We then develop another heuristic policy based on the three-index policy and multimodularity of the problem.

28 Friday, 08:00 AM - 09:30 AM, Columbia 12 Track: Service Operations

Contributed Session: Aviation & Consumer Review Systems

Chair(s): Liqiang Huang

093-2028 Is Quality an Entry Barrier? The Case of the Airline Industry

Amirhossein Alamdar Yazdi, Assistant Professor, Adelphi University, United States

Adams Steven, Assistant Professor, University of Maryland, United States

It has been found that incumbent airlines change their on-time performance when faced with new entry in their market albeit with mixed findings. We investigate if improving on-time performance inhibits and/or prolongs actual entry. Our findings provide managerially relevant contributions to the literature in quality as competitive tools.

093-2024 Non-Price Reactions to Price Competition

Amirhossein Alamdar Yazdi, Assistant Professor, Adelphi University, United States

Adams Steven, Assistant Professor, University of Maryland, United States

Mohammad Ali Alamdar Yazdi, Assistant Professor, Johns Hopkins University, United States

We conduct a simultaneous analysis of the effects of threat of entry/exist of Southwest Airlines on incumbent carriers' on-time performance as well as yield. The results show that the effects depend highly on the general, long run on-time performance and pricing policy of incumbent carriers.

093-0284 Going Beyond Review Information Given: The Impacts of Innovative Review Systems

Jie Zhang, Associate Professor, Zhejiang University of Finance & Economics, China

Liqiang Huang, Associate Professor, Zhejiang University, China

The results suggest that review systems with rich social presence significantly increases consumers' perceived review quality and review credibility, but decreases their perceptions on the review information understandability. Meanwhile, we also find that the perceived review quality, review credibility, and review information understandability significantly affect consumers' review adoption behavior.

29 Friday, 08:00 AM - 09:30 AM, Monroe

Track: Humanitarian Operations and Crisis Management

Invited Session: Analytical Approaches to Humanitarian Operations

Chair(s): Nezhil Altay

093-0173 The Impact of Donors' Behavior as Incentive Providers on Aid Agencies' Operational Decisions

Fuminori Toyasaki, Associate Professor, York University, Canada

Emel Arikian, Assistant Professor, Vienna Univ of Econ & Business Admin, Austria

Lena Silbermayr, Assistant Professor, Vienna Univ of Econ & Business Admin, Austria

Introducing the concept of leader-follower game into a stylized two-stage stochastic model. Our research examines the interaction between an aid agency's procurement timing and its financing under demand uncertainty in the presence of uncertain budget constraints.

093-0821 Collaborative Prepositioning Network Design for Regional Disaster Response

Burcu Balçik, Associate Professor, Ozyegin University, Turkey

Selene Silvestri, Post Doc/Researcher, Hec Montreal, Canada

Marie-Ève Rancourt, Associate Professor, Hec Montreal, Canada

Gilbert Laporte, Professor, Hec Montreal, Canada

We present a collaborative prepositioning strategy for the Caribbean to strengthen regional response capacity. We propose an insurance-based method for sharing the prepositioning costs among the partner countries. We show that a significant reduction in total inventory can be achieved by applying collaborative prepositioning as opposed to a decentralized policy.

093-1018 Optimal Control of Parallel Queues for Managing Volunteer Convergence

Gabriel Zayas-Caban, Assistant Professor, University of Wisconsin-Madison, United States

Emmett Lodree, Associate Professor, University of Alabama Tuscaloosa, United States

David Kaufman, Assistant Professor, University of Michigan-Dearborn, United States

Volunteer convergence refers to the influx of volunteers into affected areas after large-scale disasters. Unlike most labor assignment problems in operations management, volunteer convergence is characterized by random arrival and abandonment of workers. We introduce a Markov decision process model that optimizes admission and assignment decisions in this context.

30 Friday, 08:00 AM - 09:30 AM, Lincoln East

Track: Humanitarian Operations and Crisis Management

Contributed Session: Collaboration in Humanitarian Operations

Chair(s): Renata Anderson

093-0643 Development and Use of Social Capital in Disaster Relief: From Dormant to Active Stage

Iana Shaheen, Student, University of South Florida, United States

Arash Azadegan, Associate Professor, Rutgers University, United States

Friday, 08:00 AM - 09:30 AM

Collaborative relationships in humanitarian supply chains are important. In this study, we explore how these relationships lead to social capital. We analyze responses from 55 managers to explore how collaborative relationships are viewed, strengthened, and applied by different types of organizations responding to disasters.

093-0861 Who Takes the Lead? How Power and Status Holders Impact the Information Exchange in Humanitarian Clusters

Lea Rüsçh, Student, Kuehne Logistics University, Germany
Maria Besiou, Professor, Kuehne Logistics University, Germany
Niels Van Quaquebeke, Professor, Kuehne Logistics University, Germany

In our study, we intend to investigate barriers and facilitators of successful information sharing in the humanitarian field. Thereby, we particularly focus on the information flows between organizations in humanitarian cluster meetings, which stand for the objective of successful coordination, and the role leadership plays in this context.

093-1630 Decentralized Policies for Time Allocation in Family Planning Outreach

Lisanne van Rijn, Student, Erasmus University Rotterdam, Netherlands
Harwin De Vries, Lecturer, INSEAD, France
Luk Van Wassenhove, Professor, INSEAD, France

Decentralized decision-making processes are often preferred in development organizations, but the corresponding lack of coordination may lead to sub-optimal outcomes. The extent of this has not yet been quantified. We investigate (de)centralized time allocation policies for family planning outreach teams in Uganda and show that decentralized policies perform near optimal.

093-1951 Critical Moment: Closure and Handover in Humanitarian Projects

Renata Anderson, Lecturer, Northern Kentucky University Highland Heights, United States

The research seeks to understand the challenges and strategies of collaboration used by humanitarians during the closure and the handover of the projects. A qualitative study was performed with people with experience in coordinate humanitarian projects. Evidence shows that this is a critical moment for the nature of the collaboration.

31	Friday, 08:00 AM - 09:30 AM, Lincoln West	Track: Empirical Research in Operations Management
	Invited Session: Empirical Research in Retail Operations	
	Chair(s): Hyun Seok (Huck) Lee	

093-0363 The Value of Rapid Delivery in Omnichannel Retailing

Marshall Fisher, Professor, The Wharton School, University of Pennsylvania, United States
Santiago Gallino, Assistant Professor, The Wharton School, United States
Xu Joseph (Jiaqi), Assistant Professor, Carnegie Mellon University, United States

We study the effect of faster deliveries in omnichannel retail using the opening of a distribution center as a quasi-experiment. Using difference-in-differences approach, we show sales increase in both online and offline channels. We examine the evolution of the effect and interactions with existing brand presence and customer experience.

093-1064 Pick-up, Delivery, or Both? An Online Grocer's Optimal Fulfillment Models

Chloe Glaeser, Assistant Professor, Kenan-Flagler Business School, United States
Xuanming Su, Professor, University of Pennsylvania, United States
Ken Moon, Assistant Professor, The Wharton School, United States

We partner with an online grocery retailer to answer the practice-based question of the optimal mix of delivery zones and fulfillment models using data-driven analytics. Based on empirical evidence, we build and estimate a structural model and perform a counter-factual analysis to estimate the revenue increase from additionally offering delivery.

093-1664 Impact of Downsizing Stores on Supplier Performance

Vidya Mani, Assistant Professor, Penn State University University Park, United States
Doug Thomas, Professor, University of Virginia, United States

We use longitudinal transaction data on retail stores that were downsized to one-fifth of the store size to evaluate the impact of downsizing decisions on supplier performance. We find that reduction in supplier spend reduces the supplier service level while reduction in variability improves supplier performance.

093-1555 Bifurcating Order Fulfillment Channels in E-Commerce

Hyun Seok (Huck) Lee, Assistant Professor, Oregon State University, United States
Yusoon Kim, Associate Professor, Oregon State University, United States
Junbo Son, Assistant Professor, University of Delaware, United States

Large e-commerce marketplaces increasingly bring order fulfillment function in-house, resulting in the two internally competing order fulfillment channels – conventional fulfillment by merchant (FBM) and emergent fulfillment by platform (FBP). Using transactions and logistics data in the e-commerce setting, we compare the two channels through uncovering distinctive underlying mechanisms.

33	Friday, 08:00 AM - 09:30 AM, Jefferson West	Track: Supply Chain Risk Management
	Invited Session: Supply Chain Financing and Contracting	
	Chair(s): Xiuli He Nina Yan	

093-1707 Optimal Order Policy for Capital-Constrained Supplier with Online SCF: From a Data-Driven Optimization Perspective

Nina Yan, Professor, Central University of Finance And Economics, China
Zhineng Chen, Student, Central University of Finance And Economics, China

Friday, 08:00 AM - 09:30 AM

Using data-driven newsvendor model, we examine the optimal ordering strategy for capital-constrained supplier of e-marketplace with online supply chain finance. Through analytical and numerical analysis, we compare the performance of our proposed approach to others, and explore the interaction between operational and financing decisions based on data.

093-1601 Who Should Finance the Supply Chain? Impacts of Demand Disruption and Information Asymmetry

Jie Wu, Professor, University of Science and Technology of China, China
ying zha, Student, University of Science and Technology of China, China
Duo Shi, Assistant Professor, The Chinese Univ of Hong Kong, Shenzhen, China
Xiang Ji, Student, University of Science and Technology of China, China

We study the financial decisions of a supply chain under demand disruption and information asymmetry. We show that the retailer can have more incentives to borrow money from the manufacturer rather than from the bank when facing disruption. This effect can be enlarged by increasing of information asymmetry.

093-2090 Risk Sharing Contracts in Supply Chains: A Dynamic Equilibrium Perspective

Shivani Shukla, Assistant Professor, University of San Francisco, United States
Jose Cruz, Associate Professor, University of Connecticut, United States

In this paper, we develop a framework for a dynamic equilibrium in risk sharing contracts between profit-maximizing manufacturers and retailers that face idiosyncratic income uncertainty. We analyze the impact of strategic sharing on supply chain disruption risks and costs and we evaluate the supply chain performance of risk.

34	Friday, 08:00 AM - 09:30 AM, Georgetown East	Track: Supply Chain Risk Management
	Invited Session: Supply Chain Management: Technology Risks and Financial Perspectives	
	Chair(s): Shi Chen	

093-1409 A Trade Credit Supply Chain From a Financial Perspective With ROI-Maximize

Panos Kouvelis, Professor, Washington University St Louis, United States
Yunzhe Qiu, Student, Washington University St Louis, United States

Instead of maximizing the expected cash flow, we model a trade-credit supply chain when a capital-constrained newsvendor-style retailer maximizes financial efficiency metrics, i.e., ROI. We find that although the ROI-maximizer has a more conservative ordering strategy, the supply chain's efficiency is improved since the supplier decreases the wholesale price.

093-0597 Client Selection for a Risk-Sensitive Commodity Options Underwriter with Poisson Demand

Belleh Fontem, Assistant Professor, University of Mary Washington, United States
Megan Price, Student, ?????, United States

We consider a worst-case client selection problem for a risk-sensitive underwriter of an option contract on a commodity with geometric Brownian motion spot price trajectories. We propose heuristics for the resulting non-linear binary integer programming problem and report experimental results on multiple instances.

093-2071 Inventory Management for Supply Chains Facing Uncertain Input Price and Demand of a New Product

Shi Chen, Assistant Professor, University of Washington, United States
Junfei Lei, , ,
Kamran Moynzadeh, Professor, University of Washington, United States

This paper considers a supplier-buyer relationship in the presence of uncertain input price and demand. Under two common types of procurement contracts - the fixed wholesale price and the guaranteed supplier margin contracts, we derive the supplier's optimal stocking decisions as well as the buyer's optimal purchase time and quantity decisions.

35	Friday, 08:00 AM - 09:30 AM, Georgetown West	Track: Teaching/Pedagogy in POM
	Invited Session: Panel: Online and Blended Education in SCM	
	Chair(s): Eva Ponce-Cueto	

093-2445 Impact of Online and Blended Education in SCM

Eva Ponce-Cueto, Associate Professor, Massachusetts Institute of Technology, United States
Josue Velazquez-Martinez, Assistant Professor, Massachusetts Institute of Technology, United States

The impact of online/blended education in SCM will be discussed in this session. We will compare traditional Master's Degree with Blended Master's Degree in SCM. We will share the experience and lessons learned implementing the MITx MicroMasters and Blended Master's Program in SCM at MIT.

36	Friday, 08:00 AM - 09:30 AM, Cabinet	Track: Sustainable Operations
	Invited Session: Topics in Sustainable Operations (1)	
	Chair(s): David Drake	

093-1383 How Does Flexibility Affect Environmental Performance? Empirical Evidence From the Electricity Generation Industry

David Drake, Assistant Professor, University of Colorado Boulder, United States
Suresh Muthulingam, Assistant Professor, Penn State University University Park, United States

We examine how flexibility affects greenhouse gas emissions in the electricity generation industry. Our results show that flexibility has a significant impact on the environmental performance of power generating units in the industry.

Friday, 08:00 AM - 09:30 AM

093-1898 Does Environmental Performance Predict Quality Risk at Pharmaceutical Plants?

Christian Blanco, Assistant Professor, Ohio State University, United States

John Gray, Associate Professor, Ohio State University, United States

In Joon Noh, Student, Ohio State University, United States

We merge pharmaceutical plant-level outcomes related to environmental performance (from the Environmental Protection Agency [EPA]) and quality (from the Food and Drug Administration [FDA]). We explore whether, when, and how these two dimensions of performance are related.

093-2153 Donations for the Refugee Crisis: Cash versus In-Kind Assistance

Telesilla Kotsi, Student, Kelley School of Business, United States

Owen Wu, Associate Professor, Indiana University, United States

Alfonso Pedraza-Martinez, Associate Professor, Indiana University, United States

Motivated by the Greek response to the 2017 refugee crisis, we analyze trade-offs between cash and in-kind assistance. Cash assistance allows for spending flexibility and supports local economy, but is complicated by the presence of market power. We examine the impact of market structures on allocation decision of humanitarian organizations.

093-2204 Kicking Ash: Who (or What) Is Winning the War on Coal?

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

Jeff York, Assistant Professor, University of Colorado Boulder, United States

Power generators throughout the U.S. have recently shed coal capacity at an unprecedented rate. Multiple stakeholders have claimed credit - gas executives, policy makers, renewables advocates, and environmental NGOs. Through a survival analysis, we explore the extent to which each has impacted the expected life of coal-fired power generating units.

Friday, 08:00 AM - 09:30 AM, Intl Ballroom East

Track: Supply Chain Analytics

37 Invited Session: **Inventory and Quality Management**

Chair(s): Zhenyu Hu

093-0814 Strategic Investment in Shared Suppliers with Quality Deterioration

Youngsoo Kim, Assistant Professor, University of Alabama Tuscaloosa, United States

Dharma Kwon, Assistant Professor, University of Illinois Urbana-Champaign, United States

Anupam Agrawal, Associate Professor, Texas A&M University College Station, United States

This paper studies buyer firms' investment decisions when one firm can free-ride on the other's investment. A major finding is that the repetitive nature of the investment induces inefficient delays in investment. We also estimate the resulting inefficiency by using primary data, concluding that coordination can achieve substantial cost savings.

093-0881 Delegating Search in the Pharmaceutical Research Pipeline

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

Iliia Tsetlin, Professor, INSEAD, Singapore

Sameer Hasija, Associate Professor, INSEAD, Singapore

We model a pharmaceutical firm seeking to conduct a search for acquisition opportunities and consider the decision of whether to outsource this search. We identify the optimal dynamic contract and show that sensitivity to quality leads to optimality of in-house search, while sensitivity to speed leads to optimality of outsourcing.

093-2330 Leveraging POS and IOH Data to Detect Phantom Inventory

Sergio Caballero Caballero, Lecturer, Massachusetts Institute of Technology, United States

Francisco Jauffred, Lecturer, Massachusetts Institute of Technology, United States

This paper leverages daily point-of-sales data and inventory on-hand data to detect phantom inventory at customers' retail stores for a major CPG manufacturer. The methodology is implemented at a SKU-level in more than 150 stores in the US. Our approach provides timely and more accurate predictions compared to existing solutions.

093-0665 Multilocation Newsvendor Problem: Centralization and Inventory Pooling

Chaolin Yang, Associate Professor, Shanghai Univ. of Finance and Economics, China

Zhenyu Hu, Assistant Professor, National University of Singapore, Singapore

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

We study a multilocation newsvendor model with a risk-averse retailer owning multiple retail stores, each of which is operated by a risk-averse manager. We distinguish the concepts of centralization and inventory pooling in this setting and show that centralization brings more value when the store managers are sufficiently risk-averse.

Friday, 09:45 AM - 11:15 AM

39	Friday, 09:45 AM - 11:15 AM, Piscataway	Track: Closed Loop Supply Chains
	Contributed Session: Closed Loop Supply Chain Networks	
	Chair(s): Qiaofeng Li	

093-0462 Closing the Loop: Modeling Environmental Production and Supply Networks

Sabine Baumann, Professor, Jade University, Germany

Current production and supply network research addresses sets of phases or linear cause-effect-relationships, insufficiently capturing forward and reverse activities. This paper introduces a framework with standardized modules for combination into product-independent production and supply networks. These cover the entire product lifecycle including complex structures and interdependencies for improved sustainability.

093-1886 An Optimization Model to Design a Beverage Container Reverse Logistics Network

Saman Hassanzadeh Amin, Assistant Professor, Ryerson University, Canada

Babak Mohamadpour Tosarkani, Student, Ryerson University, Canada

In this presentation, a novel optimization model is introduced to configure a multi-echelon, multi-product, multi-period beverage container reverse logistics network. A scenario-based possibilistic approach is described to handle the uncertainty in the parameters. The mathematical model is extended to a multi-objective model.

093-2229 Integrated Performance Assessment for Circularity: A study of Food Supply Chains

Denis Niedenzu, Student, Cambridge University, United Kingdom

Naoum Tsolakis, Post Doc/Researcher, Cambridge University, United Kingdom

Mukesh Kumar, Lecturer, University of Cambridge, United Kingdom

Contrary to existing studies that have a myopic view over circularity of an individual product or process, this research proposes an integrated framework that captures the systems level implications of multiple products and processes from a circular supply network viewpoint.

093-0732 Technology Choice and Network Design for Reverse Supply Chain Under Multiple Uncertainties

Qiaofeng Li, Student, Tsinghua University, China

Zhi-Hai Zhang, Associate Professor, Tsinghua University, China

Gisela Lanza, Professor, Karlsruhe Institute of Technology, Germany

The paper considers a flexible technology choice and network design problem for multi-product reverse supply chain under multiple uncertainties to minimize the total cost. A two-stage adaptive robust model is proposed, extensive numerical experiments are conducted, and an industrial case study is considered to illustrate the proposed approach.

40	Friday, 09:45 AM - 11:15 AM, Oak Lawn	Track: Revenue Management and Pricing
	Invited Session: Data Driven Online Resource Allocation	
	Chair(s): Jacob Feldman	

093-0354 The Anheuser Busch InBev Trailer Problem: An Application of Online Resource Allocation and Inventory Selection

Xingxing Chen, Assistant Professor, University of Richmond, United States

Jacob Feldman, Assistant Professor, Washington University St Louis, United States

In this paper we introduce and study the AB trailer problem, which considers how AB ships its beer to wholesalers via third party delivery trucks. In this problem, AB must select the weights and inventory levels of preloaded trailers of beer which are then matched to arriving delivery trucks.

093-1103 A Constant-Factor Approximation Algorithm for Network Revenue Management

Yuhang Ma, Student, Cornell University, United States

Paat Rusmevichientong, Professor, University of Southern California, United States

Mika Sumida, Student, Cornell University, United States

Huseyin Topaloglu, Professor, Cornell University, United States

We provide a constant-factor approximation algorithm for network revenue management problems. We construct a policy using value function approximations that are expressed as linear combinations of basis functions. If each product uses at most L resources, then our policy obtains at least $1/(1+L)$ of the optimal total expected revenue.

093-1116 Engaging Users in an Online Marketplace: Insights From Field Experiments

Maxime Cohen, Assistant Professor, New York University, United States

Apostolos Filippas, Assistant Professor, Stevens Institute of Technology, United States

C. Daniel Guetta, Lecturer, Columbia University, United States

What incentives should online marketplaces offer their users to keep them engaged on their platforms? In partnership with an innovative startup, we design and run several field experiments with new users and existing non-active users to compare different incentive schemes and analyze their efficacy in the short and long term.

093-1488 Unified Action Spaces for Online Allocation Problems

Jackie Baek, Student, Massachusetts Institute of Technology, United States

Will Ma, Post Doc/Researcher, Google Research, United States

We unify online allocation problems in revenue management and computer science by abstracting the decisions into "actions" that provide different immediate rewards and distributions over items consumed. We prove a $1/2$ -approximation for the assortment problem with matroid constraints, and for reusable resources in the combinatorial auction setting.

Friday, 09:45 AM - 11:15 AM

42	Friday, 09:45 AM - 11:15 AM, Morgan	Track: Public Sector Operations Management
	Invited Session: Improving Operational Outcomes in Public Sector and Non-Profit Organizations	
	Chair(s): Milind Sohoni	

093-1607 Beneficiary Choice Modeling, Demand Estimation and Policy Design in Public Welfare Programs

Maya Ganesh, Student, Indian School of Business, India
Sarang Deo, Assistant Professor, Indian School of Business, India
Sripad Devalkar, Assistant Professor, Indian School of Business, India

We model the decision making behavior of households availing benefits under a public welfare scheme. Using large scale program data from India's food security program, we determine the impact of availability and accessibility on households' choice of outlets to avail their benefits from and its impact on policy design.

093-2049 Donor Actions to Affect Health Product Capacity to Serve Low-Income Countries

Burak Kazaz, Professor, Syracuse University, United States
Scott Webster, Professor, Arizona State University Tempe, United States
Prashant Yadav, Professor, Harvard University, United States

Compared to high-income countries, investment in health-product capacity to serve low-income country markets carries greater risk, and there is lower ability/willingness to pay. We define a model and study the effect of alternative actions by a donor to incentivize a firm to invest in capacity to serve low-income countries.

093-1564 Increasing the Fellowship Acceptance Rate at a Non-Profit Organization in the Education Sector

Milind Sohoni, Professor, Indian School of Business, India
Sandeep Chitla, Student, Indian School of Business, India
Arun Kumar Rout, Student, UT Dallas, United States

Non-profit organizations face challenges in hiring the "right talent." We analyze the operational challenges faced by Teach for India, an NPO working in the education sector in India. We empirically establish the causal impact of a few operational interventions and propose a data-driven optimization model to increase the yield.

43	Friday, 09:45 AM - 11:15 AM, Kalorama	Track: Emerging Topics in Operations Management
	Invited Session: Pricing and Operations Strategies in Cloud Computing Market	
	Chair(s): Shi Chen	

093-0392 How to Sell a Dataset? Pricing Policies for Data Monetization

Sameer Mehta, Student, University of Texas Dallas, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Ganesh Janakiraman, Professor, University of Texas Dallas, United States
Vijay Mookerjee, Professor, University of Texas Dallas, United States

The wide variety of pricing policies used in practice by data-sellers suggests that, as of yet, there is no common understanding on how datasets should be priced. We formulate a tractable model of a data-seller's problem of optimally pricing a dataset, and exploit its special structure to obtain near-optimal pricing policies.

093-1331 Selecting a Portfolio of Mobile Ad-Exchanges Under Supply Uncertainty

leila Hosseini, Student, University of Texas Dallas, United States
Shaojie Tang, Assistant Professor, The University of Texas at Dallas, United States
Vijay Mookerjee, Professor, University of Texas Dallas, United States

We consider an ad-delivery firm which needs to select a set of ad-exchanges and determine its bidding strategy. By working with more than one ad-exchange, the procurement cost can be lowered. However, this lower cost needs to be balanced with the additional cloud computing costs and extra participation costs.

093-2068 On-Demand and Low-Priority Services with Limited Capacity: Pricing Schemes for Cloud Platforms

Shi Chen, Assistant Professor, Foster School of Business, United States
Kamran Moinzadeh, Professor, University of Washington, United States
Yong Tan, Professor, Foster School of Business, United States

In recent years, some cloud providers introduced the low-priority preemptible services to attract demand for their surplus capacities. In this study, we examine three questions: Under which conditions should a provider introduce the low-priority service? How should she determine the optimal price? And how to improve the current pricing scheme?

44	Friday, 09:45 AM - 11:15 AM, Jay	Track: Manufacturing Operations
	Invited Session: Revenue Optimization for Manufacturing Operations	
	Chair(s): Peng Li	

093-0107 Battery Management of Automated Guided Vehicles: Developing a Research Agenda

Qazi Kabir, Assistant Professor, State University of New York at Oneonta, United States
Yoshinori Suzuki, Professor, Iowa State University, United States

A structured literature review on the battery management of automated guided vehicles (AGVs) was conducted to study how the performance of an AGV system can be improved through efficient battery management. The research generated two research themes and raised some research questions that can help build future research agenda.

Friday, 09:45 AM - 11:15 AM

093-0733 The Effect of Flow Time on Productivity and Production

Douglas Thomas, Economist, NIST, United States
Anand Kandaswamy, Economist, NIST, United States

We examine the impact that material, finished goods, and work-in-process flow time have on productivity and production measured using the multifactor productivity index and manufacturing value added. A total of 12 models are presented and four simulations are developed to examine the impact of flow time.

093-1800 Optimal Recharge Policy for Battery Electric Vehicles (BEVs)

Peng Li, Student, Rutgers Business School, United States
Chunliu Zhou, Student, Dalian University of Technology, United States
Lian Qi, Associate Professor, Rutgers University, United States

We propose a novel policy to address some issues as follows 1). How to optimize operations and reduce the high inventory cost of batteries; 2) How many batteries should be stocked based on (s,S) policy; and 3) How many swapping and rechargers facilities will be completed at each station.

45	Friday, 09:45 AM - 11:15 AM, Holmead East	Track: Global Supply Chain Management
	Invited Session: Impact of Emerging Technologies on Supply Chain	
	Chair(s): Yue Zhang	

093-0393 Capacity Expansion with a Bundled Supply of Capacity Attributes: An Application to Cloud Computing

Mohammad Arbabian, Student, University of Washington, United States
Shi Chen, Assistant Professor, University of Washington, United States
Kamran Moinzadeh, Professor, University of Washington, United States

We study the well-known problem of expanding capacity of server attributes in a cloud company where supply of attributes is bundled. We consider a cost minimization problem in a continuous review, finite, horizon setting. Furthermore, the best server configurations to be deployed each cycle are studied.

093-0807 Information Issues on On-Demand Platforms

Puping Jiang, Student, Washington University St Louis, United States

Ridesharing platforms commonly offer drivers payment that depends on demand condition and bonus that is contingent on the number of rides completed. In this paper, we explain the existence of bonuses in the context of competing platforms and the corresponding information issues.

093-0832 Optimal Battery Purchasing and Charging Strategy at Electric Vehicle Battery Swap Stations

Bo Sun, Student, HKUST, Hong Kong
Xu Sun, Student, Columbia University, United States
Ward Whitt, Professor, Columbia University, United States

We introduce a dynamic fluid model to describe charging operations at an EV battery swap station facing non-stationary demands for battery swap and non-stationary prices for recharging batteries, with the objective of finding an optimal battery purchasing and charging policy that best trades off battery investment cost and operating cost.

093-0094 Stock or Print? Impact of 3D Printing on Spare Parts Logistics

Jing-Sheng Song, Professor, Duke University Durham, United States
Yue Zhang, Assistant Professor, Penn State University University Park, United States

We present a general framework to study the design of spare parts logistics in the presence of 3D printing technology. We consider multiple parts facing stochastic demands, and adopt procure/manufacture-to-stock versus print-on-demand to highlight the main difference of production modes featured in traditional manufacturing and 3D printing.

46	Friday, 09:45 AM - 11:15 AM, Holmead West	Track: Finance and Operations Management
	Invited Session: Supply Chain Finance II	
	Chair(s): Rong Li	

093-0066 Sustainability Building of an Agricultural Supply Chain with the Capital-Constrained Farmer in Developing Economies

Zelong Yi, Assistant Professor, Shenzhen University, China
Yulan Wang, Associate Professor, Hong Kong Polytechnic Univ, Hong Kong
Ying-Ju Chen, Associate Professor, Hong Kong University of Science and Technology, Hong Kong

We consider an agricultural supply chain consisting of a capital-constrained farmer and an intermediary platform. The smallholder farmer sells products through the intermediary platform, but lacks financial resources for production. We examine the best financing format for the smallholder farmer, the platform, and the sustainability of the whole supply chain.

093-0147 Credit Risk Propagation Along Supply Chains: Evidence from the CDS Market

Senay Agca, Associate Professor, George Washington University, United States
Volodymyr Babich, Associate Professor, Georgetown University, United States
John Birge, Professor, University of Chicago, United States
Jing Wu, Assistant Professor, City University of Hong Kong, Hong Kong

We find that credit risk propagates through multiple supply chain tiers for both positive and negative credit shocks. Risk propagation is magnified with longer-term supply-chain relations, trade credit, sales contribution, differentiated products, and customer leverage, and it is moderated when a customer is investment grade or has more inventory.

Friday, 09:45 AM - 11:15 AM

093-0606 A Supply Chain Theory of Factoring and Reverse Factoring
Panos Kouvelis, Professor, Washington University St Louis, United States
Fasheng Xu, Student, Washington University St Louis, United States

We develop a supply chain theory of factoring (recourse and non-recourse) and reverse factoring showing when these post-shipment financing schemes should be adopted and who really benefits from the adoption.

093-1513 How Do Strategic Factors Affect Earnings Based On Textual Analysis of Annual Report?
Yuan Song, Student, Tongji University, China
Hongwei Wang, Professor, Tongji University, China
Shouyi Wang, Assistant Professor, University of Texas Arlington, United States

This paper studies the association between earnings and strategic factors based on textual analysis of annual reports. We calculate the word frequency of 20 strategic categories in Chinese annual reports from 2001 to 2017. For different markets and industries, the factors affecting earnings are different.

47	Friday, 09:45 AM - 11:15 AM, Gunston East	Track: Purchasing and Supplier Management
	Invited Session: Supplier innovation	
	Chair(s): Tingting Yan	

093-0149 Value Slippage and Interdependence in Buyer-Supplier Relationships
Stephan Wagner, Professor, Swiss Federal Institute of Technology Zurich, Switzerland
Dennis Schuler, Post Doc/Researcher, Swiss Federal Institute of Technology Zurich, Switzerland

This study concerns value creation and value sharing in buyer supplier relationships. It studies and develops a novel conceptual model of the relationship between supplier innovation and financial performance. In this context, value slippage and interdependence is considered. Dyadic panel data is used to test the model.

093-0078 The Influence of a Firm's Supply Network on its Innovation Capability: Innovation Depth and Breadth
Shubhobrata Palit, Student, Georgia Tech, United States
Soumen Ghosh, Professor, Georgia Institute of Technology, United States
Marcus Bellamy, Assistant Professor, Boston University, United States

We examine how the innovation breadth and depth of a firm's suppliers drive its innovation as well as the moderating effects of network structure and absorptive capacity. Using the patent and supply chain relationship data, we find empirical support suggesting both main and moderating effects on a firm's innovation capability.

093-0924 Knowledge Sources, Knowledge Objectives and Innovation Performance
Ravi Srinivasan, Assistant Professor, Loyola University Maryland, United States
Adrian Choo, Assistant Professor, Michigan State University, United States
Sriram Narayanan, Associate Professor, Michigan State University, United States
Soumopid Sarkar, Professor, University of Evora, Portugal

Using a large scale survey based on innovation data from 2008 and 2010, we validate the importance of breadth of innovation objectives and knowledge sources on innovation performance. We find that both innovation sources and objectives are positively related to innovation performance. Although, this relationship has diminishing returns.

093-0114 Buyer-Supplier Structural Equivalence and Supplier Innovation Value: Evidence from the PACE Awards
Sangho Chae, Assistant Professor, Tilburg University, Netherlands
Yang Yang, Assistant Professor, University of Texas at El Paso, United States
Tingting Yan, Associate Professor, Wayne State University, United States

Adopting a social capital perspective, we examine how the structural dimension of social capital affects a supplier's innovation value to an OEM. Specifically, we consider how OEM-supplier structural equivalence impacts a dyad-level innovation outcome and supplier innovation value under different levels of relational and cognitive capital.

48	Friday, 09:45 AM - 11:15 AM, Gunston West	Track: Next Generation Operations
	Invited Session: Blockchain Finance and Business Applications	
	Chair(s): Hubert Pun	

093-0362 Smart Contracts in the Insurance Sector
Alpen Sheth, Chief product officer, Etherisc, United States
Hemang Subramanian, Assistant Professor, Florida International University, United States

Smart contracts improve overall welfare in transactions that have huge costs. However, smart contracts are not well understood in the context of multi-sided markets. In this paper, using data and methods from an insurance platform, etherisc, we model and derive equilibrium conditions of efficiencies for smart contracts.

093-0454 Blockchain-Based Supply Chain Financing: An Obligatory Right Transferring Reverse Factoring Model
Mihalis Giannakis, Professor, Audencia Business School, France

We develop a blockchain-based obligatory right transferring reverse factoring model for a 3-tier supply chain. We show how the use of blockchains can improve supply chain financing and mitigate the financial bullwhip effect by reducing the cash to cash cycle and the cost rate of information transparency.

Friday, 09:45 AM - 11:15 AM

093-0947 Quantifying Financial Impacts of Blockchain in Cash Conversion Systems
Weiwei Chen, Associate Professor, Rutgers Business School, United States
Benjamin Melamed, Professor, Rutgers University, United States
Ben Sopranzetti, Professor, Rutgers University, United States

Blockchain technology holds out the promise of revolutionizing supply chain operations, for example, by speeding up inventory replenishment and receivables collection as well as reducing monitoring and transaction costs. This paper presents a model that quantifies the financial impacts of the aforesaid speed-ups in the context of cash conversion systems.

093-1735 Inventory Management for Blockchain System
Jasmine (Aichih) Chang-Shi, Student, Rutgers Business School, United States
Michael Katehakis, Professor, Rutgers University, United States
Jim (Junmin) Shi, Associate Professor, Tuchman School of Management, United States

Blockchain has been widely embraced as a disruptive technology for inventory management. This study examines the Newsvendor model for a blockchain system. It aims to shed light on how blockchain adoption impacts the optimal inventory decisions, illustrated with some selected demand types, such as Uniform and Normal distributions.

49	Friday, 09:45 AM - 11:15 AM, Fairchild East	Track: Socially Responsible Operations
	Invited Session: Economic Models and Contracts for Sustainable Supply Chains	
	Chair(s): Shivam Gupta	

093-0148 Industrial Symbiosis: Operational Impact and Firms' Willingness to Implement
Yunxia Zhu, Assistant Professor, University of Nebraska Lincoln, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Srinagesh Gavirneni, Professor, Cornell University, United States
Vaidy Jayaraman, Associate Professor, Greatlaks institute of management, India

Inspired by a real-world example of a paper-sugar symbiotic complex, we study the impact of competition on a firm's willingness to implement an industrial symbiotic system. We characterize the firm's operational optimal/equilibrium decisions for its two products - both in the presence and absence of a symbiotic system.

093-0679 Guaranteed Support Prices in Agriculture: Operational Decisions and Welfare Implications
Harish Guda, Student, The University of Texas at Dallas, United States
Tharanga Rajapakshe, Assistant Professor, University of Florida, United States
Milind Dawande, Professor, University of Texas Dallas, United States
Ganesh Janakiraman, Professor, University of Texas Dallas, United States

A Guaranteed Support Price (GSP) for a crop is a guaranteed per-unit price, announced before the growing season, at which a governmental entity promises to procure the crop from farmers. We derive analytically supported insights on the welfare implications of a GSP scheme and examine related questions.

093-0790 Electricity Pricing with Limited Consumer Response
Fariba Farajbakhsh Mamaghani, Student, University of Texas Dallas, United States
Saed Alizamir, Assistant Professor, Yale University, United States
Shouqiang Wang, Assistant Professor, University of Texas Dallas, United States

We construct a demand model to describe how rationally inattentive consumers make consumption decisions in response to their ambient environment for a given price and how firms take advantage of it to optimize their profit. Subsequently, we investigate implication of monopolistic firm's pricing decision on social welfare and system reliability.

50	Friday, 09:45 AM - 11:15 AM, Fairchild West	Track: Economics Models in Operations Management
	Invited Session: Learning in Dynamic Decision Making and Investment under Incomplete Information	
	Chair(s): Nur Sunar	

093-0763 Impact of Short-Termism on Long-Term Value: An Investigation of Competitive Markets
XIAOYAN LIU, Student, Cornell University, United States
William Schmidt, Assistant Professor, Cornell University, United States

We study how a firm's desire to maximize its capital market valuation and to limit competitive entry can interactively affect the firm's operational decisions and long-term profits when the firm has private information about its market demand. We show a certain level of short-termism can benefit a firm's long-term profits.

093-1438 An Interactive Bayesian Method for Multicriteria Sorting Problems
Canan Ulu, Associate Professor, Georgetown University, United States
Tom Shively, Professor, University of Texas Austin, United States

Firms categorize suppliers based on performance, credit agencies classify customers according to their risks; graduate programs decide which applicants to accept. We develop an interactive Bayesian method that aids a decision maker with such a multicriteria sorting problem by learning about their preferences and exploiting that knowledge.

093-1592 Strategic Information Sharing in a Market-Pulled Technology Supply Chain
Wenxin Xu, Assistant Professor, The Hong Kong Polytechnic University, Hong Kong

Friday, 09:45 AM - 11:15 AM

This project studies the interactions between a technology supplier who introduces a new technology that has unknown profitability and downstream manufacturers, who adopts the new technology into their products. The model takes account of the information spillover effect of the manufacturers' adoption.

093-1770 Competitive Investment with Bayesian Learning: Choice of Business Size and Timing

Nur Sunar, Assistant Professor, Kenan-Flagler Business School, United States

Siyun Yu, Analyst, Cox Automotive, United States

Vidyadhar Kulkarni, Professor, University of North Carolina Chapel Hill, United States

Our study is motivated by challenges in launching a new business idea or entering an unknown market. Our paper shows that an increase in the probability of a favorable investment (compared to an unfavorable one) can continuously decrease a leader's expected discounted profit and investment size in equilibrium.

51	Friday, 09:45 AM - 11:15 AM, Embassy	Track: Environmental Operations Management
	Invited Session: Sustainability through climate action, food waste reduction, and responsible consumption	
	Chair(s): Yangfang Zhou	

093-0989 Resilience and Causes of Food Waste: A Case Study of Retail Store Operations

Camila Moraes, Student, Federal University of São Carlos, Brazil

Flávio Costa, Student, Federal University of São Carlos, Brazil

Andrea Silva, Professor, Federal University of São Carlos, Brazil

Ivete Delai, Associate Professor, Federal University of São Carlos, Brazil

Carla Pereira, Associate Professor, State University of Santa Catarina, Brazil

The paper identifies how resilience reduces food waste causes in retail through a case study in a Brazilian retail store. Flexibility, communication, visibility, collaboration, and supply chain design reduce seasonality, short shelf life, lack of commitment, and transport equipment failures. We conclude that resilience can indeed mitigate food waste in retail.

093-0291 How Your and Your Customer's Pro-Environmental Practices May Affect Your Sales

Chien-Ming Chen, Associate Professor, Nanyang Technological University, Singapore

Dixon Ho, Assistant Professor, University of Technology Sydney, Singapore

Using data from US manufacturers, we find that a manufacturer with improved PEPs obtains higher sales only from customers with a high level of PEPs. We also find that sales are higher when the manufacturer's PEP level is not higher than its customers' PEP level.

093-1774 Predicting Carbon Abatement Outcomes Using Text Analysis

Christian Blanco, Assistant Professor, Ohio State University, United States

Firms may choose not to disclose financial information on carbon abatement opportunities for various reasons. We will explore some of the reasons why firms may not disclose financial information on carbon abatement activities using over 40,000 carbon abatement opportunities reported to CDP from 2011-2016.

093-1869 Distribution Strategies for Reducing Food-Wastage in Schools

Debjit Roy, Associate Professor, Indian Institute of Management Ahmedabad, India

Elena Belavina, Assistant Professor, Cornell University, United States

Karan Girotra, Professor, Cornell University, United States

Nathan Kallus, Assistant Professor, Cornell University, United States

Mid-day meal schemes are popular government subsidized schemes run in developing economies which incentivizes children to attend school. We develop a simulation model using realistic vehicle travel paths to test alternate distribution strategies for meeting the demand for meals in schools.

52	Friday, 09:45 AM - 11:15 AM, Du Pont	Track: Revenue Management and Pricing
	Invited Session: Innovative Methods and Applications in Pricing and Revenue Management	
	Chair(s): Hongmin Li GWANGJAE YU	

093-0210 Revenue Management and Pricing Under New Choice Models

Ruxian Wang, Associate Professor, Johns Hopkins University, United States

We characterize the structure of optimal solutions to various revenue management and pricing under new choice models.

093-0431 Commission Contracts in On-Demand Matching

Ming Hu, Professor, University of Toronto, Canada

Yun Zhou, Assistant Professor, McMaster University, Canada

We consider an on-demand matching platform's decision on price, wage, and commission in different market conditions. With the objective of maximizing expected revenue, we provide a worst-case performance bound of the fixed-rate commission contract, relative to the optimal revenue. We also investigate the potential impact of minimum wage requirement.

093-1577 Dynamic Pricing with Strategic Customers

Opher Baron, Professor, University of Toronto, Canada

Simai He, Professor, Shandong University of Finance&Economics, China

Hongsong Yuan, Assistant Professor, Shanghai Univ. of Finance and Economics, Cocos (Keeling) Islands

Friday, 09:45 AM - 11:15 AM

Consumers often buy a lot more during a sales period, which affects future sales when they still have excess inventory. We consider how to optimize the profit with such strategic consumer behavior.

093-1839 New Bounds for Assortment Optimization Under the Nested Logit Model

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

We consider the assortment optimization problem under the nested logit model and obtain new bounds on the gap between the optimal expected revenue and an upper bound based on a certain continuous relaxation of the assortment problem. We show that the bounds carry over to the cardinality constrained case.

093-1459 Capacitated and Bounded Pricing Under Multinomial Logit Choices

Gwangjae Yu, Student, Arizona State University, United States

Hongmin Li, Associate Professor, Arizona State University Tempe, United States

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

We consider a constrained pricing problem in which a firm determines prices of multiple products when the capacity and/or price of the products are constrained. We characterize the optimal solution and present efficient solution approaches. We illustrate the practical application of the problem in the hotel industry.

53	Friday, 09:45 AM - 11:15 AM, Cardozo	Track: Data Science
	Invited Session: Empirical Operations Management	
	Chair(s): Robert Bray	

093-1136 An Empirical Study of Caller Behavior Under a Callback Option

Brett Hathaway, Student, University of North Carolina Chapel Hill, United States

Seyed Emadi, Assistant Professor, University of North Carolina Chapel Hill, United States

Vinayak Deshpande, Professor, University of North Carolina Chapel Hill, United States

Using data from a US commercial bank, we perform an empirical study of caller behavior under a callback option. We formulate a structural model of the caller decision-making process and impute their underlying preferences. We conduct counterfactual analyses of how various callback policies affect service quality and system throughput.

093-1192 Inventory Decision Biases in the Field: Evidence From a Pharmacy Retail Chain

Yixin Iris Wang, Assistant Professor, University of Illinois Urbana-Champaign, United States

Jun Li, Assistant Professor, University of Michigan - Ann Arbor, United States

Stephen Leider, Assistant Professor, University of Michigan Ann Arbor, United States

Managers sometimes deviate from the ordering quantities recommended by the decision support system. Using historical data, we investigate the drivers of managers' deviation decisions and identify several behavior biases.

093-1581 Customer Preference and Station Network in the London Bike Share System

Pu He, Student, Columbia University, United States

Fanyin Zheng, Assistant Professor, Columbia University, United States

Elena Belavina, Assistant Professor, Cornell University, United States

Karan Girotra, Professor, Cornell University, United States

We study customer preference for the bike-share system in the city of London. We estimate a structural demand model on the station network to learn the preference parameters and use the estimated model to provide insights on the design and expansion of the bike-share system.

093-2088 Data Analytics in Auto Supply Chains

Ahmet Colak, Assistant Professor, Clemson University, United States

Robert Bray, Associate Professor, Northwestern University, United States

Combining public and private auto industry data, we derive novel consumer-level and firm-level variables that influence quality improvement in recalls. Accounting for various product characteristics and spillover effects, we study a panel data from 1994 to 2015. We use data analytics and structural estimation to text mine automotive quality drivers.

54	Friday, 09:45 AM - 11:15 AM, Coats	Track: Social Media and Internet of Things
	Invited Session: Word of Mouth in Digital Marketing	
	Chair(s): Samayita Guha	

093-1903 Search Engine Advertising and Contractual Strategies Between a Parent Firm and its Online Search Infomediary

Siddharth Bhattacharya, Student, Temple University, United States

Abhishek Roy, Assistant Professor, Temple University, United States

Subodha Kumar, Professor, Temple University, United States

Sunil Wattal, Associate Professor, Temple University, United States

Growing trends in online search advertising show firms increasingly utilizing online search infomediaries (OSI) to advertise on their behalf. The focus of our research is to find what optimal pricing and advertising strategies between firms and these OSIs maximize profits and how does presence of other competitors affect these strategies.

093-2042 Guilty By Association: Spillover Effects of Hosting "Bad" Online Reviews

Subodha Kumar, Professor, Temple University, United States

Paul Pavlou, Professor, Temple University, United States

Friday, 09:45 AM - 11:15 AM

Yulia Vorotyntseva, Post Doc/Researcher, Temple University, United States

Online reviews of products and services are prone to biases, yet according to previous research consumers tend to overestimate their validity. We use a series of behavioral experiments to address this issue further by investigating the role of known cognitive biases in consumers' interpretation of online reviews and subsequent decisions.

093-2174 An Examination of Engagement of Satirical and Traditional News Stories in Social Media

Debashish Ghose, Student, Temple University, United States

Subodha Kumar, Professor, Temple University, United States

Susan Mudambi, Professor, Temple University, United States

Many social media users enjoy entertaining news satire from sources like TheOnion.com. Unlike traditional news, satire often features celebrities and leading brands to comedic effect. We empirically investigate whether and how brand names and language use lead to higher engagement of satirical news in comparison to traditional news.

093-0893 Impact of the Interplay Between Review Volume and Rating in Digital Platforms on Sales

Samayita Guha, Student, Temple University, United States

Naveen Kumar, Assistant Professor, ?????, United States

Joydeep Srivastava, Professor, Temple University, United States

Subodha Kumar, Professor, Temple University, United States

Consumers now increasingly depend on user-generated reviews. Based on the data collected from a digital-platform, we empirically examine the impact of interaction between the number of reviews and the average rating on sales.

55	Friday, 09:45 AM - 11:15 AM, Columbia 1	Track: Scheduling and Logistics
	Invited Session: Operation Analytics and Optimization	
	Chair(s): Lixin Tang Yang Yang	

093-0994 Research on Batch Modeling and ADP Algorithm for Unit Commitment Problem

Gelegen Che, Student, Northeastern University, China

Lixin Tang, Professor, Northeastern University, China

This paper focuses on the stochastic scheduling problem of power system with wind turbines in which a batch division strategy is proposed to reduce the complexities of the problem. Value function approximation based on approximate Dynamic Programming method (VFA-ADP) is designed to solve the problem.

093-1200 Optimal Parts Feeding Policy Decision for Mix-Module Assembly System

Lve Tao, Student, Northeastern University, China

Lixin Tang, Professor, Northeastern University, China

Yang Yang, Associate Professor, Northeastern University, China

We aimed to decide the optimal feeding policy for different parts in different production scenarios. Besides three traditional feeding policies, we studied some variant strategies, such as downsizing and sequencing, a multi-level inventory system on which the feeding procedure relied is also considered.

093-1244 Machine-Learning Based Models for the Estimation of Manufacturing Flow Time

S MAHESH, Student, Indian Institute of Technology Madras, India

Rajendran Chandrasekharan, Professor, Indian Institute of Technology Madras, India

Large volumes of data in the shop floor database make the scheduling system amenable to machine-learning techniques. The work explores new dispatching rules and due date setting methodologies coupled with machine-learning techniques for manufacturing systems, modeled using simulation and evaluated using several measures of performance.

093-1266 The Dynamic Allocation Problem for Open-Order Slab with the Consideration of Energy Consumption

Guilin Feng, Student, Northeastern University, China

Lixin Tang, Professor, Northeastern University, China

Ying Meng, Lecturer, Northeastern University, China

The dynamic allocation problem for open-order slab is to allocate the combination of slab to unfulfilled orders with consideration of energy consumption. An integer programming model is formulated. Then, an approximate dynamic programming algorithm is developed to obtain near-optimal solution. Finally, the performance is evaluated by experiments.

093-1275 Vehicle Scheduling in the Open-Pit Mine via Reinforcement Learning

Fengyuan Shi, Student, Northeastern University, China

Lixin Tang, Professor, Northeastern University, China

This paper focuses on a homogeneous vehicle scheduling in the open-pit mine, which is described as Markov decision process formulation. Reinforcement learning method is utilized to learn real-time and online policy used to allocate vehicle to task. Finally, a case study is conducted to show the performance of the decomposition policy.

56	Friday, 09:45 AM - 11:15 AM, Columbia 2	Track: Operational Excellence
	Invited Session: Operational Excellence & Recalls in Pharma	
	Chair(s): Thomas Friedli Steffen Eich	

093-0706 Business Strategy and Dynamic Capabilities to Manage Pharmaceutical Projects - An Exploratory Study in India

Jigeesh Nasina, Professor, Department of Operations & IT, India

Friday, 09:45 AM - 11:15 AM

Raja Shekar Reddy M, Associate Professor, Administrative Staff College of India (ASCI), Hyderabad, India

Prabhukumar A, Professor, School of Management Studies, Jawaharlal Nehru Technological University, Hyderabad, India

Pharmaceutical companies should upgrade capabilities to meet demands and maintain competitive advantage. This study looked at case studies and surveys in India to assess the influence of various factors on pharmaceutical project success. Structural equation modeling of data results show that both business strategy and dynamic capabilities are necessary antecedents.

093-2044 The Cherry Picking Effect

Christina Phillips, Lecturer, University of Leeds, United Kingdom

Konstantinos Nikolopoulos, Professor, Bangor University, United Kingdom

We define the effect of customer batch preferencing on operations as observed in a pharmaceutical manufacturer, and explore methods to model this as a systemic input to operational models. The effect is similar to the rationing behavior described in the bullwhip effect literature causing stochastic sales spikes.

093-2309 Recalls, Innovation, and Learning: An Empirical Examination of Interrelationships

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

Ujjal Mukherjee, Assistant Professor, University of Illinois Urbana-Champaign, United States

This research seeks to enhance our understanding of the impact of product recalls on organizational learning by distinguishing between design-related and process-related recalls, and by incorporating innovation orientation as a facilitator of such learning. Our hypotheses are tested on longitudinal data from the medical devices and pharmaceuticals manufacturing industries.

093-0221 Does the Effectiveness of Automotive Recall Process Affect Market Share? An Empirical Study

Anto Verghese, Assistant Professor, University of Wisconsin-Whitewater, United States

David Peng, Associate Professor, University of Houston, United States

Arunachalam Narayanan, Assistant Professor, University of Houston, United States

Using automotive recalls data from 2000 to 2018, we examine the impact of recall responsiveness on recall completion ratio at the brand level. Subsequently, we determine if recall completion ratio positively impacts market share. We further explore if product type moderates the proposed relationships.

58	Friday, 09:45 AM - 11:15 AM, Columbia 4	Track: Healthcare Analytics
	Invited Session: Designing and Learning from Clinical Trials	
	Chair(s): John Silberholz	

093-0767 Bayesian Sequential Learning for Clinical Trials of Multiple Correlated Medical Interventions

Ozge Yapar, Student, University of Pennsylvania, United States

Stephen Chick, Professor, INSEAD, France

Noah Gans, Professor, University of Pennsylvania, United States

We address the design of adaptive trials that consider the cost-effectiveness of multiple alternatives. Our goal is to identify a sequential sampling policy that dynamically decides the interventions to which patients should be allocated and when to stop patient recruitment to maximize expected population-level benefit minus the trial cost.

093-1002 Dynamic Programming for Adaptive Dose-Finding Clinical Trials

Amin Khademi, Assistant Professor, Dr., United States

Amir Ali Nasrollahzadeh, Student, Clemson University, United States

Identifying the right dose is one of the most important decisions in drug development. Adaptive designs are promoted to conduct dose-finding clinical trials as they are more efficient and ethical compared to static designs. However, current techniques in response-adaptive designs of dose allocations are complex and need significant computational effort.

093-1859 Value-Based Clinical Trial Design to Account for Features of Pragmatic Trials

Andres Alban, Student, INSEAD, France

Stephen Chick, Professor, INSEAD, France

Martin Forster, Lecturer, University of York, United Kingdom

We extend existing Bayesian models of two-armed clinical trials which balance sampling costs and social welfare of technology adoption decisions to handle specificities of pragmatic trials and of technology adoption durations. We optimize the recruitment rate and duration of such trials and apply the model to data from published studies.

093-1909 Adaptive Clinical Trial Designs with Surrogates: When Should We Bother?

Arielle Anderer, Student, University of Pennsylvania, United States

Hamsa Bastani, Assistant Professor, University of Pennsylvania, United States

John Silberholz, Assistant Professor, University of Michigan, United States

Surrogate outcomes have long been used in clinical trials when a true outcome is too expensive or time-consuming to measure. In this work we propose optimal adaptive clinical trial designs that integrate surrogate and true outcomes, and we analytically and empirically characterize regimes where our designs are especially beneficial.

59	Friday, 09:45 AM - 11:15 AM, Columbia 5	Track: Healthcare Operations Management
	Invited Session: Managing Capacity and Patient Flows	
	Chair(s): Pengyi Shi	

Friday, 09:45 AM - 11:15 AM

093-0644 Managing Outpatient Care Services Under Strategic Walk-In Patients

Nan Liu, Assistant Professor, Boston College, United States
Willem Jaarsveld, Van, Assistant Professor, tu/e, Netherlands
Shan Wang, Student, Shanghai Jiao Tong University, China
Guanlian Xiao, Student, tu/e, China

In outpatient care, patients may choose to book an appointment or to walk in directly, depending on their health condition and the utility of each option. We discuss how an outpatient care provider should manage their capacity taking into account such strategic behavior of patients.

093-1358 Managing Quality of Care for Healthcare Services: The Role of Social Learning and Competition

Linggong QI, Student, City University of Hong Kong, China
Zhan Pang, Associate Professor, Purdue University, United States
Sergei Savin, Professor, University of Pennsylvania, United States

We study a healthcare market where hospitals are competing on quality, which may be inferred from online patients' reviews when it is unknown and patients are sensitive to both quality-of-care and waiting times. We analyze the rational equilibrium behavior of patients and Nash equilibrium quality decisions.

093-1949 Proactive Care with Degrading Class Types

Yue Hu, Student, Columbia University, United States
Carri Chan, Associate Professor, Columbia University, United States
Jing Dong, Assistant Professor, Columbia University, United States

Early treatment of less severe patients may reduce the need for more expensive resources later, but could also reduce available resources for more critical patients. We propose a two-class multi-server queueing model to understand how patients should be prioritized when proactive care can be used in a resource-limited healthcare setting.

60	Friday, 09:45 AM - 11:15 AM, Columbia 6	Track: Healthcare Operations Management
	Contributed Session: Improving service quality and patient experience II	
	Chair(s): Dana Johnson	

093-1893 Patient Experience: Service Operations in Healthcare

Alexis Strong, Student, Cornell University, United States
Rohit Verma, Professor, Cornell University, United States

Value Based Care (VBC) put a spotlight on patient experience in the U.S. Researchers have yet to create a framework that represents the full ecosystem of the patient experience across the healthcare journey. This paper leverages two annual surveys to develop that framework and explore optimization using service operations.

093-1494 An Investigation of the Effects of Performance Feedback on Quality Improvement in US Hospitals

Onyi Nwafor, Assistant Professor, University of North Carolina Greensboro, United States
Norman Johnson, Professor, University of Houston, United States

A widely-accepted tenet in healthcare is that operational performance feedback stimulates quality improvement. However, there is a paucity of empirical research to support this notion. We apply a process theory of organizational decision-making to investigate the effect of performance feedback on quality improvement and organizational factors that affect this relationship.

093-2073 Factors Influencing Service Quality in Hospitals

Vivekanand Khanapuri, Professor, National Institute of Industrial Engineering, Mumbai, India
Priyanka Singh, Student, National Institute of Industrial Engineering, India

This study identifies factors influencing service quality in the healthcare sector. Framework comprising of factors related to technical and functional quality influence service developed. Data on customer experience in hospitals is captured and analyzed in SMARTPLS. Factors with a high path coefficient identified include explicit and implicit service along with support facilities

093-0949 The Role of Family Commitment for Patient Satisfaction: A Study of Korean Healthcare

Joonhyuk Bok, Student, Rensselaer Polytechnic Institute, United States
Christopher McDermott, Professor, Rensselaer Polytechnic Institute, United States

We explore the extent to which different levels of caregiver commitment are associated with perceptions of healthcare quality and patient satisfaction in an in-patient care setting. We would like to see the effect of caregiver commitment on healthcare quality and patient satisfaction with a moderator of family caregivers.

093-1746 SEM Predicting Overall Patient Satisfaction in Rural Healthcare Systems

Quinton Nottingham, Associate Professor, Virginia Polytechnic Institute And State University, United States
Sameer Kumar, Professor, University of St. Thomas, United States
Dana Johnson, Professor, Michigan Technological University, United States
Sheneeta White, Associate Professor, University of St. Thomas, United States

Quality of care and psychometric variables serve as strong predictors of overall patient satisfaction with doctor and healthcare systems. SEM was used to uncover the strength of the relationships of a healthcare unit that is part of a larger Midwestern rural system.

Friday, 09:45 AM - 11:15 AM

61	Friday, 09:45 AM - 11:15 AM, Columbia 7	Track: Supply Chain Management
	Contributed Session: Strategic Decision Making and Mechanism Design	
	Chair(s): Nan Liu	

093-1013 Backup Order Matters: Optimal Two-Stage Order Policy of Capital-Constrained Retailers with Different Financing Schemes

Nina Yan, Professor, Central University of Finance And Economics, China
Bing Yan, Student, Central University of Finance And Economics, China

Considering the capital-constrained retailer with a two-stage ordering opportunity, we discuss optimal ordering strategies under different financing schemes based on capital gap or credit lines. Through comparative analysis, we find whether backup ordering would be adopted depends highly on retailer's capital constraint and bank loan offerings.

093-1017 Ex-Ante and Ex-Post Subcontracting Between Two Competing Bidders

Sijing Deng, Assistant Professor, South China Normal University, China

We consider a procurement auction between two capacity constrained bidders. Due to the capacity constraint, neither bidder is able to individually fulfill the buyer's project. We investigate ex-ante and ex-post subcontracting between bidders, and find that subcontract timing has a fundamental impact on bidders' behavior and profits.

093-0057 A Study of Two-Stage Pricing Schemes of "Redirect" Logistics Services

Yu Zhang, Student, Zhejiang University, China
Nan Liu, Professor, Zhejiang University, China

A "redirect" service allows customers to adjust the arrival time of the goods in transit, thus increasing the flexibility of the logistics service. However, this flexibility is more costly for logistics service providers. Therefore, it is necessary to design appropriate pricing mechanisms to ensure the sustainability of this flexible service.

62	Friday, 09:45 AM - 11:15 AM, Columbia 8	Track: Supply Chain Management
	Contributed Session: Sustainable Supply Chains	
	Chair(s): Constantin Blome	

093-0111 Challenges in Sustainable Supply Chain

Amulya Gurtu, Assistant Professor, University of Wisconsin, Green Bay, United States

This is an empirical study of challenges in implementing sustainable practices in supply chain management (SCM). A survey of SCM professional and organization leaders has been designed. The survey is currently being administered to understand the issues and challenges/barriers from the perspective of SCM professionals in the USA.

093-0489 A Meta-Analysis of Sustainable Supply Chain Management and its Relationship to Performance

Lu Xu, Assistant Professor, University of North Georgia, United States
Xianghui (Richard) Peng, Assistant Professor, Penn State University Erie, United States
Victor Prybutok, Professor, University of North Texas, United States

We conduct a meta-analysis on the empirical studies in sustainable supply chain management. The results allow an evaluation of relationships between sustainable supply chain management practices and performance in terms of economic sustainability, environmental sustainability, and social sustainability. We also examine the contingent effects of contextual factors.

093-2452 Role of Power Dynamics for Greening Investment in Sustainable Supply Chain-Contracts, Efficiency and Channel Performance

Abhishek Srivastava, Student, Indian Institute of Management Kozhikode, India
Arqum Mateen, Assistant Professor, Indian Institute of Management Kozhikode, India

We consider a two echelon supply chain where the retailer and the manufacturer can invest into greening innovation. A Stackelberg game is used, with manufacturer-dominance and retailer-dominance scenarios, depending upon their relative power. We analyze the impact of both greening investment choice and pricing decisions on supply chain profit.

093-1935 Buyer-Supplier Social and Environmental Asymmetries and Performance: Assessing Both Sides of the Relationship

Maria Montes-Sancho, Associate Professor, University of Carlos III Madrid, Spain
Elcio Tachizawa, Associate Professor, EAE Business School, Spain
Constantin Blome, Professor, University of Sussex, United Kingdom

Supply chain partners attempt to share values and behaviours to achieve high performance outcomes. Prior studies have tended to overlook buyer-supplier asymmetries, focusing on just one side. Building on the literature of homophily and complementary assets, this study empirically analyzes how the imbalances in the sustainability subdimensions affect their performance.

63	Friday, 09:45 AM - 11:15 AM, Columbia 9	Track: Behavioral Operations Management
	Invited Session: Behavioral Influences in Project Management and Platform Design	
	Chair(s): Basak Kalkanici	

093-1392 Enterprise Social Media Platform Design and White Collar Productivity

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

Friday, 09:45 AM - 11:15 AM

Enterprise social media platforms (ESMPs) have been widely adopted by companies to promote help between employees, but with mixed results. We experimentally study different ESMP designs and how they affect helping behavior and productivity. We show that setting helping goals with non-monetary rewards significantly improves participant performance and helping behavior.

093-1633 Managing System Availability - The Effects of Advice and Decision Support on Performance

Ulrich Thonemann, Professor, University of Cologne, Germany
Christiane Haubitz, Student, University of Cologne, Germany
Cedric Lehmann, Post Doc/Researcher, University of Cologne, Germany

We consider a decision maker who manages inventory for servicing technical systems. He/she must decide on the order quantities of multiple products to optimize the availability of the system. This is a common and complex task. We analyze how information and decision support can help increase performance.

64	Friday, 09:45 AM - 11:15 AM, Columbia 10	Track: Product Innovation and Technology Management
	Invited Session: Collaborative R&D	
	Chair(s): Svenja Sommer	

093-1385 Incentive Metrics for Team Projects in the Presence of Task Interdependence and Uncertainty

Jeremy Hutchison-Krupat, Senior Lecturer, University of Cambridge, United Kingdom
Antoine Feylessoufi, Student, University of Cambridge, United Kingdom
Stylianios Kavadias, Professor, Cambridge University, United Kingdom

We analyze how team and individual incentives affect an organization's propensity to adopt a risky strategic project. We recognize that these projects are mostly carried out by a cross-functional team of specialists whose tasks are interdependent and uncertain, and the degree to which their tasks interact is also uncertain.

093-2047 Managing New Product Knowledge Between Competing Firms

Gulru Ozkan-Seely, Assistant Professor, University of Washington Bothell, United States
Cheryl Gaimon, Professor, Georgia Institute of Technology, United States

We explore knowledge transfer, development (KD) and market strategies of two firms' new products competing in the same market. We develop conditions for firms to engage in KT and KD, and enter the marketplace, and examine the impact of firm and market characteristics, such as absorptive capacity and valuation uncertainty.

093-2007 Optimal Supplier Allocation in Collaborative Product Development with Internal Competition

Svenja Sommer, Associate Professor, Hec Paris, France
Timofey Shalpegin, Lecturer, University of Auckland, New Zealand
Christian Van Delft, Associate Professor, Hec Paris, France

We consider a firm, who employs competing internal teams for the development of a single product, but needs to involve key suppliers in this process. We explore how the internal competition affects the suppliers' collaborative efforts and firm profits, and how the firm should allocate the teams to potential suppliers.

65	Friday, 09:45 AM - 11:15 AM, Columbia 11	Track: Inventory Management
	Invited Session: New Topics in Inventory Management	
	Chair(s): Xiangyu Gao	

093-0852 Data-Driven Approach for Demand Forecasting and Inventory Control of Slow-Moving Items

Sheng Bi, Student, National University of Singapore, Singapore
Long He, Assistant Professor, National University of Singapore, Singapore
Chung-Piaw Teo, Professor, National University of Singapore, Singapore

We consider the demand forecasting and inventory control problem with intermittent usage. We first use a portfolio approach using an estimate of the joint distribution of demand and interarrival time. We then propose a distributionally robust model to determine the state-dependent order-up-to levels.

093-1081 Driving Inventory System Simulations with Unknown Demand Models

Canan Gunes Corlu, Assistant Professor, Boston University, United States
Alp Akcay, Assistant Professor, Eindhoven University of Technology, Netherlands

We consider the simulation inventory systems with unknown demand models. Our goal is to investigate the impact of the uncertainty on the performance measures that is due to the estimation the unknown demand models and their parameters especially in the presence of limited amounts of historical demand data.

093-1549 Inventory Repositioning in On-Demand Product Rental Networks

Xiaobo Li, Assistant Professor, National University of Singapore, Singapore
Saif Benjaafar, Professor, University of Minnesota, United States
Daniel Jiang, Assistant Professor, University of Pittsburgh, United States
Xiang Li, Supply Chain Manager, Target, United States

We study a product rental network with rental units distributed across multiple locations. Customers could decide how long to keep a unit and where to return it. We characterize the optimal repositioning policy. We also construct a new ADP algorithm that is practically efficient and asymptotically optimal.

093-1718 Inventory Repositioning in Multi-Location Systems with Lateral Transshipments

Friday, 09:45 AM - 11:15 AM

Joern Meissner, Professor, Kuehne Logistics University, Germany

Olga Senicheva (Rusyaeva), Lecturer, Purdue University, United States

Decisions on where, how much, and when to reposition inventory between multiple locations are made in anticipation of future stock-outs, might result in unnecessary movements of stock. In this work, we examine inventory systems with proactive transshipments, analyze an optimal structure of transshipment network, and provide a near-optimal transshipment policy.

66	Friday, 09:45 AM - 11:15 AM, Columbia 12	Track: Service Operations
	Invited Session: Service Operations Strategy	
	Chair(s): Kamalini Ramdas Amrita Kundu	

093-0494 Challenges of Online Retail in Emerging Markets

Antonio Moreno, Associate Professor, Harvard University, United States

The talk discusses some of the challenges of online retail in emerging markets, focusing on issues such as infrastructure and management of payments.

093-1680 Does Online Training Work in Retail?

Marshall Fisher, Professor, The Wharton School, United States

Santiago Gallino, Assistant Professor, The Wharton School, United States

Serguei Netessine, Professor, The Wharton School, United States

A knowledgeable retail sales associate (SA) can explain the features of available product and give a customer confidence in their choice or suggest alternatives. Thus, an important research question is how much, if at all, does training on product features increase a SA's sales productivity?

093-2134 Improving Customer Compatibility with Operational Transparency

Ryan Buell, Associate Professor, Harvard Business School, United States

MoonSoo Choi, Student, Harvard Business School, United States

When marketing their offerings to prospective customers, companies often shroud the operational tradeoffs inherent in their offerings in favor of emphasizing their advantages. Through a large-scale field experiment with a nationwide retail bank, we investigate how providing prospective customers with transparency into an operation's tradeoffs affects acquisition and engagement.

093-0774 Is After Sales Service Important for Technology Adoption in Emerging Markets?

Amrita Kundu, Student, London Business School, United Kingdom

Kamalini Ramdas, Professor, London Business School, United Kingdom

We empirically assess the impact of after-sales service on adoption and continued use of new technology in emerging markets. In particular, we measure after-sales service quality provided by a solar distribution company operating in off-grid communities in Uganda and quantify its impact on future adoptions and sales of the company.

67	Friday, 09:45 AM - 11:15 AM, Monroe	Track: Humanitarian Operations and Crisis Management
	Invited Session: Emerging topics in Humanitarian Operations and Crisis Management	
	Chair(s): Shouqiang Wang	

093-0041 Designing Supply Chain Against Bioattacks

Peter Yun Zhang, Student, Massachusetts Institute of Technology, United States

Nikos Trichakis, Associate Professor, MIT, United States

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

We study the problem of designing supply chain against bioattacks. We propose a model that integrates key facets: medical countermeasure (MCM) stock level, capacity, shipment, and dispensing. We also explicitly capture the interaction between defender and attacker.

093-0050 Supply Management for the Immediate Relief Period of Rapid-Onset Disasters

Mahyar Eftekhari, Assistant Professor, Arizona State University Tempe, United States

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

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

To fulfill beneficiaries' demands, humanitarian organizations should design a cost-efficient and time-effective procurement policy. We consider and analyze two common supply management policies: pre-positioning and local-purchasing. Our analysis takes demand, supply, and budget uncertainties into account.

093-0751 Disaster Management: Impact of Mitigation on Preparedness and Response

Shabnam Rezapour, Assistant Professor, Florida International University, United States

Reza Zanjirani Farahani, Associate Professor, Kingston University London, United Kingdom

Alfonso Pedraza-Martinez, Associate Professor, Indiana University, United States

Anchored in the disaster management cycle, stochastic cost-minimization models are developed to answer: i) What the best inventory prepositioning strategy in the preparedness phase is and ii) How disaster mitigation affect disaster preparedness and response. The models are solved using real data from a hurricane-prone region in the US.

093-0413 Warning Against Recurring Risks: An Information Design Approach

Saed Alizamir, Assistant Professor, Yale University, United States

Francis De Vericourt, Professor, ESMT, Germany

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

Friday, 09:45 AM - 11:15 AM

Public agencies typically emit warnings to the stake-holders about potential disastrous events. In a repeated setting, they need to incentivize the public to take preventive actions in the current period while managing their credibility in the future. We characterize the optimal warning policy that balances such a tradeoff.

68	Friday, 09:45 AM - 11:15 AM, Lincoln East	Track: Humanitarian Operations and Crisis Management
	Contributed Session: Data Analytics and Humanitarian Operations	
	Chair(s): Gopalakrishnan Narayanamurthy	

093-1320 Quantifying Disaster Risk in Hurricane Florence to Support Sheltering Decisions

Duygu Pamukcu, Student, Virginia Tech, United States
Andy Arnette, Assistant Professor, University of Wyoming, United States
Christopher Zobel, Professor, Virginia Tech, United States

This study looks at quantifying the risk of a natural disaster by measuring it as a function of different indicators of hazard severity, in order to support more effective decision-making for emergency responses. The resulting risk measure is evaluated in the context of managing emergency shelters during Hurricane Florence.

093-1188 The Role of Big Data Analytics and Artificial Intelligence in Disaster Relief Operations

Rameshwar Dubey, Associate Professor, Montpellier Business School, France

The role of innovative technologies in disaster relief operations is gaining significant attention from humanitarian operations management scholars. In this study we present a survey based study to explain the role of big data analytics and artificial intelligence on coordination among various humanitarian actors engaged in relief operations.

093-0145 Does Operations Management Contribute to Make Corporate Governance More Effective in Terms of Sustainability?

Cristina Sancha, Associate Professor, OBS Business School, Spain
Leopoldo Gutierrez, Associate Professor, University of Granada, Spain
Ignacio Tamayo-Torres, Associate Professor, University of Granada, Spain
Cristina Gimenez, Professor, Esade Business School, Spain

The objective of this paper is to better understand the relationship between governance and sustainability OM practices adopting the ESG (Environment, Social, Governance) focus. More specifically, by using secondary data, we aim to reveal the role played by sustainability OM practices in deploying an effective sustainability governance strategy.

093-1814 Humanitarian Relief Operations Using Satellite Bigdata Analytics

Narayan Nagendra, Student, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany
Gopalakrishnan Narayanamurthy, Lecturer, University of Liverpool, United Kingdom
Roger Moser, Assistant Professor, University of St. Gallen, Switzerland

In this paper, we discuss how satellite bigdata analytics built over real-time weather information, geospatial data and deployed over a cloud-computing platform, aided in achieving improved coordination and collaboration between rescue teams for humanitarian relief efforts in the case of Kerala floods in 2018.

69	Friday, 09:45 AM - 11:15 AM, Lincoln West	Track: Empirical Research in Operations Management
	Invited Session: Emerging Topics in Empirical Operations Management	
	Chair(s): Weiming Zhu	

093-0298 Estimating and Optimizing the Impact of Photo Assortment in Sharing Economy

Hanwei Li, Student, Massachusetts Institute of Technology, United States
David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States
Xiao Wu, Post Doc/Researcher, Massachusetts Institute of Technology, United States
Weiming Zhu, Assistant Professor, I E S E, Spain

We employ Neural Networks to discern the quality and the context of Airbnb photos, then we construct a consumer choice model to estimate the impact of photo quality and photo assortment on apartment revenue. Finally, we derive an optimal assortment strategy through counterfactual analysis.

093-0657 Are All Outlets in a Service Network Equally Important? Measuring Outlets Influence Using Network Analysis

Qiuping Yu, Assistant Professor, Indiana University, United States
Masha Shunko, Assistant Professor, University of Washington, United States
Shawn Mankad, Assistant Professor, Cornell University, United States

Consider a network of service outlets sharing the same brand. Improving performance at one location may have a different impact on other outlets: from a negative impact of cannibalization, to a positive impact of reputation or knowledge spillover. We causally identify such network effect using a large dataset from a major restaurant chain.

093-2078 Externalities of Online Market Expansion

Wenchang Zhang, Student, University of Maryland, United States
Wedad Elmaghraby, Professor, University of Maryland, United States

Expansion strategy is one of the keys to the success of online platforms. We empirically identify the positive externalities of the expansion of a multi-market platform. In particular, including a low-tier market significantly increases the buyers' retention in its high-tier market. Our findings provide implications on platform's expansion strategy.

Friday, 09:45 AM - 11:15 AM

70	Friday, 09:45 AM - 11:15 AM, Jefferson East	Track: Panels & Meetings
	Invited Session: Practice Leaders 1	
	Chair(s): Claire Senot Carrie Queenan	

093-2428 Practice Leaders Forum 1

Amit Garg, CEO, CRMantra, Inc., United States

Kevin Knarr, Senior Vice President, Operations Modernization and Performance Effectiveness, United Health Group, United States

Linda Whitaker, VP Science, Cognira, United States

This session presents various operational challenges, solutions and innovations observed by practice leaders in customer relationship management, healthcare, and retail industries respectively. Their views open up research opportunities for OM researchers.

71	Friday, 09:45 AM - 11:15 AM, Jefferson West	Track: Supply Chain Risk Management
	Invited Session: Supply Chain Risk Management and New Product Development	
	Chair(s): Suresh Sethi Xishu Li	

093-2002 Managing Flexible Seat Capacity in Airline Revenue Management

Zhichao Feng, Student, University of Texas Dallas, United States

Ang Li, Scientist II, PROS Inc, United States

In many European airlines, business seats are exactly the same as economy seats except middle seats are kept empty in business class. Therefore, seating capacity is flexible in the sense that each seat can be allocated to either business or economy. Considering this flexibility, we study the optimal capacity control.

093-1959 Stock Rationing in an M/E_k/1 Make-to-Stock System with Limited-Patience Spot Customers

Weina Ma, Post Doc/Researcher, Erasmus University Rotterdam, Netherlands

Chiel van Oosterom, Assistant Professor, Erasmus University Rotterdam, Netherlands

Rommert Dekker, Professor, Erasmus University Rotterdam, Netherlands

We take into account real-time information on replenishment orders and waiting customers from different classes in stock rationing. Spot customers can be rejected, satisfied, or put on the waiting list. They may also leave after having waited too long. The problem is modeled as a Markov decision process.

093-1925 Launching Next-generation Products in a Competitive Market

Xishu Li, Assistant Professor, Erasmus University Rotterdam, Netherlands

Rob Zuidwijk, Professor, Rotterdam School of Management, Netherlands

René De Koster, Professor, Rotterdam School of Management, Netherlands

Suresh Sethi, Professor, University of Texas Dallas, United States

Most product transits failed, some even led to company bankruptcies. We study how a firm should launch a next-generation product, which is a quality upgrade to the existing product, in a competitive market.

72	Friday, 09:45 AM - 11:15 AM, Georgetown East	Track: Supply Chain Risk Management
	Invited Session: Information, Advertising and Supply Chain Competition	
	Chair(s): Hongyan Xu	

093-1484 Optimal Sales Effort of the Seller and Buyers in Social E-Commerce

Lei Guan, Assistant Professor, Beijing Institute of Technology, China

Haiwen Ma, Student, Beijing Institute of Technology, China

Lianmin Zhang, Assistant Professor, Nanjing University, China

In Social E-commerce, both the seller and buyers can work as the sales agent. In this research, we study the optimal sale efforts to maximize the seller's revenue when considering different sequences of actions. The dynamic decision process of buyers is also investigated.

093-0212 Optimal Advertising Outsourcing Strategy with Different Effort Levels and Uncertain Demand

Yue Xie, Assistant Professor, Zhejiang University of Technology, China

Wanhua HE, Student, University of Hong Kong, Hong Kong

Wai-Ki Ching, Professor, University of Hong Kong, Hong Kong

Allen H. Tai, Lecturer, Hong Kong Polytechnic Univ, Hong Kong

This paper studies the issue of advertising, outsourcing, and production planning for a manufacturer facing asymmetric advertising cost and uncertain market demand. A contract, taking into account both advertising effort level and payment, is introduced to incentivize the advertising agency to report the exact cost. Optimal strategies are obtained.

093-0030 Manufacturer's Information Sharing Strategy Under Upstream Competition and Endogenous Capacity Allocation

He Huang, Professor, Chongqing University, China

Xiaomin Liu, Student, Chongqing University, China

Hongyan Xu, Professor, Chongqing University, China

In this paper, we investigate the manufacturer's information sharing strategy when two suppliers compete for the supply and decide their capacity allocation.

Friday, 09:45 AM - 11:15 AM

73	Friday, 09:45 AM - 11:15 AM, Georgetown West	Track: Teaching/Pedagogy in POM
	Invited Session: Games and Experiential Learning in POM	
	Chair(s): Xun Xu	

093-0405 Hunger Game - A Competitive Supply Chain Simulation

Ju Myung (JM) Song, Assistant Professor, San Jose State University, United States

We invented an online game for OM class, called "Hunger Game", in which a group of students will compete with each other under a supply shortage when playing. We will discuss how it works and the effectiveness of it to understand the Newsvendor model, supply shortage, information's role, and a fair share concept.

093-2161 Disaster Response Game

Michael Klein, Assistant Professor, San Jose State University, United States

Peter Jackson, Professor, Singapore University of Technology and Design, Singapore

Miho Mazereeuw, Associate Professor, Massachusetts Institute of Technology, United States

We develop a software platform for disaster response. We include administration interfaces for designing cases for different disaster scenarios, along with interfaces for the corresponding multi-player disaster response games.

093-1449 Why Use Experiential Learning Games in Your Classroom?

Ozalp Ozer, Professor, University of Texas Dallas, United States

We will discuss why, how, and when teaching and learning fundamental concepts in OM and SCM through role-based interactive games can create fun, engaging, and effective discussions in the classroom. To do so, we will demonstrate and show how some of these games are currently used in various schools.

093-1548 Teaching Operations Management Using In-Class Games

Xun Xu, Assistant Professor, California State University Stanislaus, United States

Motivating students to learn operations management can improve their learning efficiency. I present several in-class games that can help students learn operations management and management science related contents with more interests. Each in-class game is theory-based and has been proved to be efficient and welcomed by students.

74	Friday, 09:45 AM - 11:15 AM, Cabinet	Track: Sustainable Operations
	Contributed Session: Case Studies in Sustainable Operations	
	Chair(s): Stefania Boscarì	

093-1858 Sustainability Practices in Port Terminals in Brazil

Wilson Hilsdorf, Assistant Professor, Centro Universitario Da Fei, Brazil

Tomaz Calcerano, Student, Centro Universitario Da Fei, Brazil

Based on a literature review on sustainability practices, the objective of this work was to investigate which sustainability practices are being applied in port terminals in Brazil. The multiple case study aims to acquire the answers of five terminals, located in the three largest Brazilian ports.

093-2241 Towards an "Intrinsic" and "Extrinsic" Motivation of Sustainable Business Model Adoption Among Established Firms

Christian Bautista, Student, University of Texas Rio Grande Valley, United States

High consumerism and serious climate change problems have encouraged corporations to embrace sustainability motivated by intrinsic (altruism, brand prestige redemption, and competitive necessity) and extrinsic (regulations and stakeholders' activism) drivers. This investigation is a comparative analysis between these two motivators in order to provide a framework for corporate sustainability strategy.

093-2356 The Relationship Between Innovations and Sustainable Supply Chain Management Practices: Insights From Case Research

Muratcan Erkul, Associate Professor, Kutztown University, United States

Hale Kaynak, Professor, University of Texas Rio Grande Valley, United States

Innovation creation is a complex process in sustainable supply chains. In this paper, we explore the relationship between different levels and types of innovations, and sustainable supply chain management (SSCM) practices. We utilized a multi case study approach to understand how internal and external SSCM practices are developed in firms.

093-1696 Stakeholder Engagement for Effective Environmental Practice Implementation

Stefania Boscarì, Assistant Professor, University of Groningen, Netherlands

Taco Van Der Vaart, Professor, University of Groningen, Netherlands

Cheng Yong Xiao, Student, University of Groningen, Netherlands

Although the sustainability literature highlighted the role of stakeholders (e.g., suppliers, employees, customers) for effective environmental management, empirical studies overlooked this factor. Connecting the natural resource-based view with stakeholder theory, we explored how stakeholder engagement affects environmental practice-performance relationships. Results from a survey of manufacturers worldwide provide partial support for our hypotheses.

75	Friday, 09:45 AM - 11:15 AM, Intl Ballroom East	Track: Supply Chain Analytics
	Invited Session: Contract, Pricing and Inventory	
	Chair(s): Tong Wang	

093-0160 Disruption Risk Mitigation in Supply Chains - The Risk Exposure Index Revisited

Yini Gao, Assistant Professor, Singapore Management University, Singapore

Friday, 09:45 AM - 11:15 AM

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

Chung-Piaw Teo, Professor, National University of Singapore, Singapore

Zhenzhen Yan, Student, Nanyang Technological University, Singapore

In this paper, we propose a method to integrate probabilistic assessment of disruption risks into the REI approach and measure supply chain resiliency by analyzing the worst-case CVaR of total lost sales under disruptions. We show that the optimal inventory positioning strategy can be characterized by a conic program.

093-0174 Online Learning and Optimization of (Some) Cyclic Pricing Policies in the Presence of Patient Customers

Huanan Zhang, Assistant Professor, Penn State University, United States

Stefanus Jasin, Associate Professor, University of Michigan, United States

We consider the joint learning and optimization problem of cyclic pricing policies in the presence of patient customers. We introduce a larger family of policies called threshold-regulated policies, and design a learning algorithm that can converge to an optimal threshold-regulated policy with a tight regret rate.

093-1863 Selective Newsvendor Problem with Integrated Marketing, Sales, and Operations

Jianing Zhi, Lecturer, Penn State University Erie, United States

Burcu Keskin, Professor, University of Alabama Tuscaloosa, United States

We consider a company that has to strategically select a fraction of customers to serve with limited sale forces and quantity dependent lead-time. We build a profit maximization MILP model to determine selling price and inventory procurement policy. A solution approach named R-search is proposed to find the optimal solution.

093-1585 The Total Business Volume Commitment Contract and Inventory Replenishment

Tong Wang, Assistant Professor, Shanghai Jiaotong University, China

Quan Yuan, Associate Professor, Zhejiang University, China

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

Motivated from situations in a leading trading company, we study the dynamic inventory planning problem under the total business volume commitment contract. Both single and multiple products scenarios are considered in this work.

Friday, 01:45 PM - 03:15 PM

77	Friday, 01:45 PM - 03:15 PM, Piscataway	Track: Closed Loop Supply Chains
	Contributed Session: Circular Economy with Remanufacturing Consideration	
	Chair(s): Kathryn Stecke	

093-1645 Pricing and Reduction Decision for a Remanufacturing-Supply-Chain with Different Charge Methods on Carbon-Emission

Kaifu Yuan, Professor, Guizhou University of Finance & Economics, China

Xiaoxia Wang, Student, School of Business Administration, Guizhou University of Finance and Economics, China

Weili Chen, Student, School of Business Administration, Guizhou University of Finance and Economics, China

Xiaohong Xiao, Professor, School of Business Administration, Guizhou University of Finance and Economics, China

Suresh Sethi, Professor, University of Texas Dallas, United States

A remanufacturing-supply-chain with different charge methods on carbon-emission is investigated, which includes a manufacturer and a retailer. Using methods of no-charge, partial-charge, and full-charge, the manufacturer and retailer profit-maximization models are derived, and the solution procedures are presented to determine optimal pricing and reduction decisions and related results are compared.

093-0234 Close-Loop Supply Chain Structures with Remanufacturing Under Carbon Tax Regulation

Guowei Dou, Assistant Professor, Shenzhen University, China

This paper studies the hybrid manufacturing-and-remanufacturing production planning in three different close-loop supply chains under carbon tax regulation. The environmental and economic performance of the three supply chains are compared to find which collection structure is most effective concerning remanufacturing.

093-2224 Consumer Adoption and Economic Performance of Circular Business Models: The Case of Washing Machines

Ece Guliz Gulserliler, Student, INSEAD, France

Luk Van Wassenhove, Professor, INSEAD, France

Joseph Blackburn, Emeritus Professor, Vanderbilt University, United States

We examine the circular economy mandate for leasing instead of buying a product from both consumer's and manufacturer's perspectives. Through a survey, we assess consumer preferences between leasing and purchasing. We discuss the implications of these preferences for a transition to circular business models.

78	Friday, 01:45 PM - 03:15 PM, Oak Lawn	Track: Marketing and Operations Management
	Invited Session: Advertising and Promotions in Supply Chains	
	Chair(s): Moutaz Khouja	

093-0713 The Feedback Stackelberg Equilibriums in Two-Period Inventory Model

Xiuli He, Associate Professor, University of North Carolina Charlotte, United States

Tao Li, Assistant Professor, Santa Clara University, United States

Suresh Sethi, Professor, University of Texas Dallas, United States

Xin Liu, Assistant Professor, Elon University, United States

We consider a decentralized two-period supply chain consisting of a manufacturer and a retailer. Assuming that both the manufacturer and the retailer are either forward-looking or myopic, we characterize the retail prices, the wholesale prices, and the order quantities under the Feedback Stackelberg Equilibrium and compare different scenarios.

093-0922 Buy-One-Get-One vs Price Reduction Promotions in Supply Chains

Yuefeng Li, Student, University of Electronic Science and Technology of China, China

Jingming Pan, Professor, University of Electronic Science and Technology of China, China

Moutaz Khouja, Professor, University of North Carolina Charlotte, United States

Jing Zhou, Associate Professor, University of North Carolina Charlotte, United States

We derive the optimal policy of a manufacturer-retailer supply chain offering a buy-one-get one (BOGO) promotion in a two-period model. We compare the results of this policy to price reduction promotion. We investigate the effects of stockpiling and consumer holding costs on both promotions.

093-1960 Design and Pricing of Subscription Services Under Model Uncertainty

Yuan-Mao Kao, Student, Duke University Durham, United States

N. Bora Keskin, Assistant Professor, Duke University Durham, United States

Kevin Shang, Professor, Duke University Durham, United States

We consider a firm providing service to its customers while facing uncertainty about the customers' preferences. The firm dynamically adjusts the price and duration of service to resolve said uncertainty. We analyze the firm's optimal contracts under perfect information, and design a policy that performs well under model uncertainty.

093-2025 Joint Fulfillment and Pricing Decisions for Omni-Channel Retailers

Khosro Pichka, Student, University of Wisconsin-Milwaukee, United States

Xiaohang Yue, Associate Professor, University of Wisconsin - Milwaukee, United States

Layth Alwan, Associate Professor, University of Wisconsin Milwaukee, United States

Omni-channel retailers meet demand with e-fulfillment centers for online orders or by in-store inventory. We consider the added dimension that e-fulfillment centers can fulfill the in-store demands. Retailers can benefit from pricing decisions to control customers' channel preference and maximize the total profit by considering both revenue and fulfillment costs.

Friday, 01:45 PM - 03:15 PM

79	Friday, 01:45 PM - 03:15 PM, Northwest	Track: POM in Food and Agriculture
	Contributed Session: Systems Modeling in Agriculture	
	Chair(s): Canberk Ucel	

093-0584 Optimization of Fresh Agricultural Products Supply Chain Network Based on Carbon Footprint in China

Zhiduan Xu, Professor, Xiamen University, China

Firstly, measure the carbon footprint of the fresh agri-products industry using the EIO-LCA under non-fresh-cut and fresh-cut patterns. Secondly, construct a network optimization model for fresh agri-products' supply chain considering the carbon footprint under the two operating patterns. Finally, set parameters by field surveys and references, and solve models using GA.

093-1199 Influence of Community Supervision on Farmers' Green Production Behavior in a Geographical Indication Protection Zone

Yanli Yu, Student, Northwest A&F University, China

The research shows that there is a huge difference between the application behaviors of geographical indication brands and that community supervision has a significant promoting effect on green production of tea farmers' drug application; especially given that the monitoring effect between farmers is more significant. Sometimes a tea farmers' drug application is unkind behavior.

093-1999 Adapting Real-Time Kinematics for Increased Efficiency in Precision Agriculture for Developing Countries

Hanuv Mann, Assistant Professor, University of Winnipeg, Canada

Nehul Gullaiya, Founding Partner, Egon Blue LLP., India

This research combines the practitioner's and academic's perspective to study the implementation of emerging precision-agriculture technologies integrated with ICT for developing nations with the aim of greater food-security. Specifically, we focus on the experimental technique of GPS integrated with real-time kinematics for multipurpose application across the entire agricultural production cycle.

093-2211 Exploring the Trends and Challenges in Agricultural Supply Chains

Canberk Ucel, Student, The Wharton School, United States

Marshall Fisher, Professor, The Wharton School, United States

John Macduffie, Professor, The Wharton School, United States

Agriculture industry has gone through outstanding economic and organizational changes in the past century, but hasn't attracted much business scholarship until recently. I draw lessons from the book, "The Machine that Changed the World", to explore various trends and challenges in farming and agricultural supply chains.

80	Friday, 01:45 PM - 03:15 PM, Morgan	Track: Public Sector Operations Management
	Invited Session: Operational Improvements in Developing Economies	
	Chair(s): Iva Rashkova	

093-0204 The Role of "Inclusive Innovation" in Promoting Social Sustainability

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

Morvarid Rahmani, Assistant Professor, Georgia Institute of Technology, United States

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

We develop a framework for social sustainability from the lens of emerging economies and the role that innovation can play in this context. We put forward "inclusive innovation" as a unifying approach that enables the collaborative integration of social issues of relevance to underserved populations in operation management decisions.

093-1741 Does Higher Availability Lead to Higher Use? Vaccine Stock Availability and Immunization Coverage in Nigeria

Emily Goding, Researcher, Africa Resource Centre, Nigeria & World Food Program, Rome, Italy, Italy

Eirini Spiliotopoulou, Assistant Professor, Tilburg University, Netherlands

Prashant Yadav, Professor, Harvard Medical School, United States

We use data from Nigeria to estimate the effect of vaccine availability on routine immunization coverage and to identify factors which affect this relationship. We find that vaccine stockouts significantly decrease the number of children immunized and that for most vaccines, the effect lasts for several months after a stockout.

093-1806 Contracts to Increase Vaccine Effectiveness and Availability

Taylor Corcoran, Student, UCLA Anderson School of Management, United States

Fernanda Bravo, Assistant Professor, UCLA Anderson School of Management, United States

Elisa Long, Associate Professor, UCLA Anderson School of Management, United States

Two key players in vaccine markets are pharmaceutical companies, who develop and manufacture vaccines, and global health organizations (GHOs), who procure vaccines for countries. We analyze contracts where vaccine price is tied to vaccine effectiveness and study their impact on the ability of GHOs to contain disease outbreaks.

093-1028 Donor Funding for Drug Availability

Iva Rashkova, Assistant Professor, Washington University St Louis, United States

We present a model of donor budget allocation for drug procurement in developing countries. The donor funding can be a lump-sum disbursement, per-unit subsidy, or both. We show that that the two types of funding exhibit a risk-hedging synergy and apply the model to 48 African countries using real data.

Friday, 01:45 PM - 03:15 PM

81	Friday, 01:45 PM - 03:15 PM, Kalorama	Track: Emerging Topics in Operations Management
	Invited Session: Data-driven Prescriptive Analytics	
	Chair(s): Kejia Hu	

093-0919 Reducing Orthopedic Surgery Times: Managing Tightly-Coupled Team Familiarity and Bottlenecks

David Moore, Fellow, Stanford University, United States

Michael Lapré, Associate Professor, Vanderbilt University, United States

In orthopedic surgery, we argue and find that the team experience that reduces procedure time consists only of the pairs of team members who need to tightly coordinate activities. If the bottleneck pair is tightly coupled, (i) procedures take longer, and (ii) surgeons rely more on individual experience.

093-1121 Wait or No Wait? Examining the Role of Remote Waiting in Influencing Customers' Perception

Kejia Hu, Assistant Professor, Vanderbilt University, United States

Xun Xu, Assistant Professor, California State University Stanislaus, United States

Via online customer reviews collected from social media, we analyze and compare customers' perceptions toward restaurant services before and after the launch of a remote waiting app. We found the virtual waiting changes the customers' perceived quality of restaurant services. We discuss implications of reducing customers' perceived waiting time.

093-1388 Data Integration for Decision Making in Operations Management

Qi Feng, Professor, Purdue University, United States

George Shanthikumar, Professor, Purdue University, United States

With the development of technology and data availability, increasing attention is paid to data-driven and data-integrated decision making in practice and research. In this talk, we propose a framework of Operational Data Analytics and demonstrate its application through the example of newsvendor model.

82	Friday, 01:45 PM - 03:15 PM, Jay	Track: Manufacturing Operations
	Invited Session: Sustainability and Manufacturing	
	Chair(s): Dincer Konur	

093-0762 Environmental R&D Investments Under Consumer, Competitive, and Regulatory Pressures

Arda Yenipazarli, Associate Professor, Georgia Southern University, United States

This paper presents a two-stage duopoly competition model that demonstrates how consumers' intrinsic costs (due to altruistic concerns) and brand preferences, competitor actions, and regulatory requirements can impact firms' incentives to exert R&D efforts to reduce the environmental cost of their production processes.

093-1084 Revisiting the Zero-Inventory Property in Remanufacturing

Meltem Denizel, Associate Professor, Iowa State University, United States

The tactical level problem in disassembly operations for meeting the separate demands for disassembled component parts over a planning horizon, resembles the uncapacitated lot sizing problem. However, the well-known zero-inventory property does not hold. We address this issue and show how zero-inventory property manifests itself in this context.

093-1801 Joint Energy Management of Manufacturing Plant and On-Site Microgrid Using Neural-Network Based Reinforcement Learning

Wenqing Hu, Assistant Professor, Missouri University of Science and Technology, United States

Zeyi Sun, Assistant Professor, Missouri University of Science and Technology, United States

Yunchao Zhang, Student, Missouri University of Science and Technology, United States

A Markov Decision Process (MDP) model for modeling the joint control of on-site microgrid with renewable sources and manufacturing plant towards sustainability is proposed. A Q-learning iteration combined with function approximation through a neural network is schemed to solve the proposed MDP model and identify the optimal control policy.

093-1159 Balancing Labor Requirements in a Semiconductor Manufacturing Environment

Dincer Konur, Assistant Professor, Texas State University, United States

Patrick Dwyer, Project Manager, Intel Corporation, United States

Semiconductor production follows cycles with heavy construction requirements. During a cycle, the manufacturing facility needs to be heavily modified for the new technology. This modification is labor intensive, but because of scheduling requirements, the labor usage might vary significantly. This study investigates methods to balance labor usage through a cycle.

83	Friday, 01:45 PM - 03:15 PM, Holmead East	Track: Retail Operations
	Invited Session: Waste Management in Retail	
	Chair(s): Dorothee Honhon	

093-0339 The Impact of "Minimum Life on Receipt" (MLOR) Agreements on Perishable Product Supply Chains

Sandra Transchel, Associate Professor, Kuehne Logistics University, Germany

In food supply chains, "Minimum-life-on-receipt" agreements are key components in contracts that specify the minimum remaining shelf life that the retailer is willing to accept. We investigate the impact of MLOR agreements on the profitability and waste performance of the retailer, the supplier, and the supply chain as a whole.

093-0662 A Predictive-Prescriptive Model for Food Allocation

Debjit Roy, Associate Professor, Indian Institute of Management Ahmedabad, India

Friday, 01:45 PM - 03:15 PM

Elena Belavina, Assistant Professor, Cornell University, United States

Nathan Kallus, Assistant Professor, Cornell University, United States

Karan Girotra, Professor, Cornell University, United States

Mid-day meal schemes are popular government subsidized schemes ran in developing economies which incentivizes children to attend school. We first identify the factors that can improve the effectiveness of such state-run food distribution schemes and then develop a predictive-prescriptive model for optimal allocation of food to different schools.

093-1742 Buy-One-Get-One-Free: Impact on Waste and Profit

Dorothee Honhon, Associate Professor, University of Texas Dallas, United States

Qi Wu, Assistant Professor, Case Western Reserve University, United States

We study how different forms of promotions (buy-one-get-one-free today/next week) affect food waste in retail stores and post-purchasing. We show that in some cases, the firm can improve its profit and reduce the food waste at the same time by choosing the proper promotion strategy.

84 Friday, 01:45 PM - 03:15 PM, Holmead West Track: Operational Excellence

Invited Session: **The social side of Operational Excellence**

Chair(s): Stefania Boscari Thomas Bortolotti

093-0255 National and Organizational Cultural Work in OM: Cumulative Research

Richard Metters, Professor, Texas A&M University College Station, United States

Operations are embedded within both the contexts of the culture of the organization and the prevailing national culture. We present a comprehensive (hopefully) look at what OM scholars have found.

093-0693 Lean Manufacturing Effectiveness: The Role of Empowering Leadership

Khaled Hassan, Student, Esade Business School, Spain

Cristina Gimenez, Professor, Esade Business School, Spain

Jordi Trullen, Associate Professor, Esade Business School, Spain

Cristina Sancha, Associate Professor, Online Business School, Spain

The objective of this paper is to reveal the role played by empowering leadership in deploying an effective lean manufacturing strategy. Our underlying assumption is that those lean team leaders with empowering characteristics will improve the motivation, commitment, and well-being of their team members, leading to higher levels of performance.

093-1697 The Social Side of Improvement Programs: Critical Success Factors and the Effect of Contingencies

Thomas Bortolotti, Assistant Professor, University of Groningen, Netherlands

Companies implement improvement programs to achieve operational excellence. Literature identifies various critical success factors for such socio-technical programs, which can vary across contexts. This study focuses on the critical success factors with stronger impacts on the social side of improvement programs, analyzing the effect of major contingencies.

86 Friday, 01:45 PM - 03:15 PM, Gunston West Track: Next Generation Operations

Contributed Session: **Big Data Analysis**

Chair(s): Ramakrishnan Ramanathan

093-1542 Big Data and Performance Measurement in Real-Time

Dariush Khezrimotlagh, Assistant Professor, Pennsylvania State University Harrisburg, United States

Performance measurement is essential for companies to provide a transparent view for decision-making and to improve performance management. Today's massive data is generated in real-time. A mathematical method is proposed to show how big companies, with thousands of branches, can continuously track the performance of each branch in real-time.

093-2277 A Maturity Model to Run Operations in Smart Communities Using Blockchain

Nikhil Varma, Assistant Professor, Ramapo College of New Jersey, United States

Tammi Redd, Associate Professor, Ramapo College of New Jersey, United States

This research focuses on building a maturity model to build smart-communities using Blockchain technology. Blockchain will provide a digital identity to each individual and device in this network and this identity will be operationalized to facilitate transactions. The operations will be managed by the IOT devices.

093-1230 Augmented Visibility of Food Supply Chains: Real-Time Procurement and Distribution Processes Enabled by Digital Technologies

Luciano Batista, Senior Lecturer, Aston Business School, United Kingdom

Ramakrishnan Ramanathan, Professor, University of Bedfordshire, United Kingdom

Wantao Yu, Professor, Roehampton university, United Kingdom

This paper reports the initial findings of a study exploring the integration of IoT- Big Data-Blockchain technologies to enable augmented visibility of procurement and distribution processes in food supply chains. These technologies support the creation of supply chains highly responsive to contingent disruptions that can potentially lead to food waste/loss.

87 Friday, 01:45 PM - 03:15 PM, Fairchild East Track: Socially Responsible Operations

Invited Session: **Socially Responsible and Innovative Operations**

Chair(s): Xiaojin Liu

093-0097 Inspection Monitoring of Food Safety Practices in the Brazilian Beef Supply Chain

Friday, 01:45 PM - 03:15 PM

Rafael Teixeira, Assistant Professor, College of Charleston, United States

Daniel Rodrigues, Lecturer, University of Passo Fundo, Brazil

Jeff Shockley, Associate Professor, Virginia Commonwealth University, United States

A multi-level analysis of the agency and facility-location factors that may reduce the number and rate of contamination cases among beef processors in Brazil. The findings suggest that agency, local resource availability, and the variety of slaughterhouse inspections are critical institutional factors that indicate effective case detection.

093-0253 A Multilevel Analysis of a Firm's Ranking Mobility Regarding Environmental Performance

Zuoming Liu, Assistant Professor, University of North Georgia, United States

This study adopts class-mobility model from sociology to analyze the ranking mobility of a corporation's environmental performance over time and identify firm-level and industry-level covariates that contribute to the mobility. It provides references for practitioners to deal with different covariates so as to align with their operational environmental strategy.

093-0326 Comparison of E-Waste Take-Back Policies

Feifei Shan, Student, University of Science and Technology of China, China

Wenli Xiao, Assistant Professor, University of San Diego, United States

Yen-Ting Lin, Associate Professor, University of San Diego, United States

We analyze three main types of e-waste take-back legislations: advance recycling fee, extended producer responsibility, pre-disposal fee. We obtain the conditions under which one policy dominates the other two and the impact of different parameters. We provide suggestions to policy makers on the adoption of e-waste take-back legislation.

093-0541 The Role of Corporate-Social Responsibility in the Relationship between R&D and Mergers and Acquisitions

Yuqi Peng, Student, University of South Carolina, United States

Sining Song, Assistant Professor, University of Tennessee Knoxville, United States

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

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

Recently CSR has attracted a lot of attention in operations literature and practice. However, how CSR impacts firm innovation, especially the relationship between R&D investment and M&A, has not been studied. Our research provides useful insight into the complex dynamics among CSR, firm innovation, R&D investment, and M&A.

Friday, 01:45 PM - 03:15 PM, Fairchild West

Track: Economics Models in Operations Management

88 Invited Session: Online Platforms and Information Design

Chair(s): CAN KUCUKGUL

093-0506 Persuading Customers to Buy Early: The Value of Personalized Information Provisioning

Kimon Drakopoulos, Assistant Professor, University of Southern California, United States

Shobhit Jain, Student, University of Southern California, United States

Ramandeep Randhawa, Associate Professor, University of Southern California, United States

We study the pricing and information provisioning game of a seller who is (ex-post) better informed about product availability. Using a Bayesian persuasion framework, we find that public information provisioning has limited value while personalized information provisioning is profitable, having attributes like personalized pricing.

093-0804 Optimal Contract for Machine Repair and Maintenance

Feng Tian, Student, University of Michigan - Ann Arbor, United States

Peng Sun, Professor, Duke University Durham, United States

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

A principal hires an agent to repair a machine when it's down and maintain it when it's up. If the agent exerts effort, the downtime is shortened and uptime is prolonged. Effort is unobservable to the principal. The principal designs the optimal contract to induce the agent's full effort.

093-2064 Learning and Revenue Maximization in Service Platforms

Kostas Bimpikis, Assistant Professor, Stanford University, United States

Yiingos Papanastasiou, Assistant Professor, University of California Berkeley, United States

Wenchang Zhang, Student, University of Maryland, United States

Platforms such as Upwork have reduced search and information frictions in the service industry. We provide the optimal design of information provision policy taking into account that the quality of new providers is unknown and information about them can only be generated via transactions.

093-1890 Information Design of Time-Locked Sales Campaigns for Online Platforms

CAN KUCUKGUL, Student, University of Texas Dallas, United States

Ozalp Ozer, Professor, University of Texas Dallas, United States

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

In this paper, by adopting the framework of Bayesian persuasion, we investigate how an online platform should design its information provision strategy for a time-locked sales campaign. With a high performance mechanism that engineers social learning we show parsimonious message space and sufficient information obfuscation are optimal.

Friday, 01:45 PM - 03:15 PM, Embassy

Track: Environmental Operations Management

68 Invited Session: Issues in environmental operations

Chair(s): Adem Orsdemir

Friday, 01:45 PM - 03:15 PM

093-0229 Economic and Environmental Implications of Biomass Commercialization in Agricultural Processing

BUKET AVCI, Assistant Professor, Singapore Management University, Singapore
Onur Boyabatli, Associate Professor, Singapore Management University, Singapore
BIN LI, Student, Singapore Management University, Singapore

We consider a processor who procures a commodity input to produce a commodity output and biomass. We investigate how spot price uncertainty and procurement strategy shape the value of commercialization. We evaluate the net emissions and find that commercialization is environmentally friendly only when biomass demand is not high.

093-0853 Product Sourcing and Distribution Strategies Under Recall and Disruption Risks

Long He, Assistant Professor, National University of Singapore, Singapore
Ying Rong, Professor, Shanghai Jiao Tong University, China
Zuo-Jun Max Shen, Professor, University of California Berkeley, United States

We discuss how to alleviate the consequences of product recalls in the perspective of (outbound) product distribution strategy in joint with (inbound) sourcing decision. The trade-off considered is among the benefit of risk pooling the impacts of product recalls as well as supply disruption risk.

093-1423 Supplier Planned Replacement and Contracting for Reuse at a Third Party Remanufacturer

Aditya Vedantam, Assistant Professor, State University of New York at Buffalo, United States
Ananth Iyer, Professor, Purdue University, United States

Motivated by a dataset provided by a third party remanufacturer in the information technology asset disposition industry, we study the impact of age-based planned replacement and contracting on end-of-use disposition decisions, replacement costs, and environment. Our model captures the lifecycle environmental impact from repair and reuse in the secondary market.

90	Friday, 01:45 PM - 03:15 PM, Du Pont	Track: Revenue Management and Pricing
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90	Invited Session: New Models on Revenue, Pricing Management and Choice	
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90	Chair(s): Ruxian Wang Chenxu Ke	
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093-0089 3D Printing vs. Traditional Flexible Technology: Implications for Operations Strategy

Lingxiu Dong, Professor, Washington University 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

The emerging 3D printing technology represents an advancement of flexible manufacturing. This paper uses the discrete choice framework to compare the implications of 3D printing and the traditional flexible technology.

093-0352 The Exponential Choice Model: Assortment Optimization and Application to Public Transit Choice Prediction in San

Jacob Feldman, Assistant Professor, Washington University St Louis, United States

In this paper, we consider the yet-uncharted assortment optimization problem under the Exponential Choice model, where the objective is to determine the revenue maximizing set of products that should be offered to customers. Our main algorithmic contribution comes in the form of a fully polynomial-time approximation scheme (FPTAS).

093-1671 The Role of Product and Market Information in an Online Marketplace

Shiliang Cui, Assistant Professor, Georgetown University, United States
Shu Hu, Lecturer, Ningbo Supply Chain Innovation Institute, China
Mike Wei, Assistant Professor, University at Buffalo, United States

We study how the provision of product information and/or market information affects buyers' and sellers' behavior in an online marketplace and how said online marketplace performs financially (i.e., sales and sales volume) as a result.

093-0082 Main Products and Recommendations: Substitution and Complementarity

Chenxu Ke, Post Doc/Researcher, Johns Hopkins University, United States
Ruxian Wang, Associate Professor, Johns Hopkins University, United States

This paper studies assortment and pricing for main products and personalized recommendations regarding associated complementary products, a common practice in recent e-commerce to enhance consumers' shopping experiences. Our framework reveals that personalized recommendations for complementary products not only generate a new stream of revenue, but also enhance consumer surplus.

91	Friday, 01:45 PM - 03:15 PM, Cardozo	Track: Data Science
	Contributed Session: Recommendation and Assortment Planning Algorithms	
	Chair(s): Emily Mower	

093-1612 Neighborhood Selection to Maximize Recommendation Diversity

Pelin Atahan, Assistant Professor, Ozyegin University, Turkey

Recommendation systems are utilized in many domains such as e-commerce, social networks, entertainment, and apps. Recent studies have recognized the importance of diversity for evaluating recommendation quality. We propose a methodology that optimizes neighborhood selection to maximize recommendation diversity without compromising accuracy when making recommendations.

093-0227 Learning Customer Preferences from Personalized Assortments

Yifan Feng, Student, University of Chicago, United States
Rene Caldentey, Professor, University of Chicago, United States
Christopher Ryan, Associate Professor, University of Chicago, United States

Friday, 01:45 PM - 03:15 PM

A company wishes to identify the most popular version of a product from a menu of alternative options. We study how to dynamically individualize the set of versions shown to each customer, so that the company can learn from customer choices at the fastest speed.

093-2087 Multinomial Logit Contextual Bandits for Dynamic Assortment Selection

Min-hwan Oh, Student, Columbia University, United States

Garud Iyengar, Professor, Columbia University, United States

We study a dynamic assortment selection problem where the seller offers an assortment of products whose features as well as customer contexts are known. We propose a method which simultaneously optimizes assortment selections balancing between exploration and exploitation and learns customer's preference. We show our proposed method achieves near-optimal regret.

92	Friday, 01:45 PM - 03:15 PM, Coats	Track: Social Media and Internet of Things
	Invited Session: Social media and digital platforms	
	Chair(s): Tingting Nian	

093-0402 Deep Learning of Big Data and Field Experiment: Analytics for Customer Selection and Campaign Targeting

Kunpeng Zhang, Assistant Professor, University of Maryland, United States

Xueming Luo, Professor, Temple University, United States

Firms seek to better understand heterogeneity in the customer response to marketing campaigns which can boost campaign targeting effectiveness. This paper integrates deep-learning algorithms, big data analytics, and field experiment response heterogeneity to enhance campaign targeting effectiveness.

093-0899 Multi-Dimensional Observational Learning in Social Networks

Liangfei Qiu, Assistant Professor, University of Florida, United States

Arunima Chhikara, Student, University of Florida, United States

Asoo Vakharia, Professor, University of Florida, United States

The prevalence of consumers sharing their purchases on social media platforms (e.g., Instagram) and the use of this information by potential future consumers have substantial implications for online retailing. We examine how product characteristics and the type of information provider jointly moderate the purchase decision in a social network setting.

093-1740 Bias, Blindness, and Bursted Bubble: Examination of Public Sentiment on Twitter

Daniel Kim, Student, George Washington University, United States

Yixin Lu, Assistant Professor, George Washington University, United States

We study the variation of public sentiment on two major public events: 2016 US Presidential election and the more recent Facebook-Cambridge Analytica data scandal. Despite the differences in the nature of the two events, we find the general patterns of bias and blindness among Twitter users are quite consistent.

093-1933 Maximizing Clicks in a Budget Constrained Ad-Campaign

Zhen Sun, Assistant Professor, The George Washington University, United States

Abhijeet Ghoshal, Assistant Professor, University of Wisconsin-Milwaukee, United States

Radha Mookerjee, Assistant Professor, University of Texas Dallas, United States

We develop a policy for an ad-campaign run by a demand side intermediary (aggregator) that maximizes the expected number of clicks while meeting advertiser's impression requirements and without exceeding the aggregator's budget. We demonstrate the optimality of the solution and also establish that it is a static policy.

93	Friday, 01:45 PM - 03:15 PM, Columbia 1	Track: Scheduling and Logistics
	Contributed Session: Managing warehouse and fulfillment operations	
	Chair(s): Xiaocheng Li	

093-0750 How to Handle Time-Critical Warehouse Orders?

René De Koster, Professor, Rotterdam School of Management, Netherlands

Felix Weidinger, Student, Friedrich-Schiller Universität Jena, Germany

Nils Boysen, Professor, Friedrich-Schiller Universität Jena, Germany

E-commerce fulfillment companies offer customers timed same-day deliveries. We develop a model, for real-time milkrun batch picking processes, followed by sorting and packing by order, with the objective to minimize order lateness and picking costs. We solve the offline integrated model heuristically and then solve and evaluate the online model.

093-0263 Management and Design of Robotic Sorting Systems

Bipan Zou, Assistant Professor, School of Business Administration, China

Yeming Gong, Professor, Business School, France

René De Koster, Professor, Rotterdam School of Management, Netherlands

E-commerce fulfillment operations require rapid sorting solutions for parcels in hubs. Robotic sorting is a new method to sort parcels cheaply on a very small footprint. We discuss new models that may help to optimally design such systems for cost and performance, as well as to evaluate different operational policies.

093-2066 Online Linear Programming with Production Costs

Michael Fairley, Student, Department of Management Science and Engineering, Stanford University, United States

Xiaocheng Li, Student, Department of Management Science and Engineering, Stanford University, United States

Friday, 01:45 PM - 03:15 PM

Yinyu Ye, Professor, Department of Management Science and Engineering, Stanford University, United States

We consider a sequential decision-making problem where a sequence of orders arrive and we must decide to accept or decline the order before the next order is revealed. The problem provides both quantitative and qualitative insights for shipping pricing and warehouse management.

94	Friday, 01:45 PM - 03:15 PM, Columbia 2	Track: Finance and Operations Management
	Invited Session: Tutorial: What OM researchers should know about Blockchain technology	
	Chair(s): Volodymyr Babich	

093-0366 What OM Researchers Should Know About Blockchain Technology

Volodymyr Babich, Associate Professor, Georgetown University, United States

Gilles Hilary, Professor, Georgetown University, United States

Blockchain has grown in prominence, but it's full of potential and the downsides are not fully understood yet, especially with respect to Operations Management. After reviewing the technical foundations, we explore multiple business and policy aspects. We identify key strengths and main weaknesses and discuss research themes of applying Blockchain technology to OM.

95	Friday, 01:45 PM - 03:15 PM, Columbia 3	Track: Product Innovation and Technology Management
	Contributed Session: Innovation, Learning, and Capabilities	
	Chair(s): HINA MUNIR	

093-1296 Technology and Routine Learning in High-Tech After-Sales Services

Fédde Zijlstra, Student, Eindhoven University of Technology, Netherlands

Alex Alblas, Assistant Professor, Eindhoven University of Technology, Netherlands

Fred Langerak, Professor, Eindhoven University of Technology, Netherlands

Firms learn from after-sales services. The question is, how? Based on 10 years of field data from a high-tech firm we demonstrate that technology and routine based learning takes place on both the machine and service office level. These findings contribute to a better understanding of learning in after-sales services.

093-1656 The Use of Roadmap in Innovation-Oriented Planning

Daiane Belchior, Student, CPS, Brazil

Eliane Simoes, Professor, CPS, Brazil

Marcelo Okano, Professor, CPS, Brazil

This study aims to discuss the use of roadmap in innovation-oriented planning, observing the main activities that support the construction of roadmaps, their application, and how the innovation process occurs through these elaborate roadmaps based on the concepts of strategic planning and innovation.

093-0978 Developing Capabilities Along the Value Chain to Sustain Innovations in Emerging Markets

Anshuman Tripathy, Associate Professor, Indian Institute of Management Bangalore, India

Shikha Safaya, Post Doc/Researcher, Indian Institute of Management Bangalore, India

We observe that sustaining non-proprietary technological innovations in emerging markets is difficult due to resource constraints and poor delivery and logistics mechanisms. Through detailed case studies of three firms, we observe that these firms needed to grow along the value to achieve sustainable business models needing to develop new capabilities..

093-1745 Disentangling the Effect of Contextual Factors on Entrepreneurial Intentions: An Asian Developing Country Perspective

HINA MUNIR, Student, Northwestern Polytechnical University, China

cai jianfeng, Professor, Northwestern Polytechnical University, China

sidra ramzan, Student, Northwestern Polytechnical University, China

Based on a 2/3rd young population, Pakistan being a developing country is unable to enhance entrepreneurial intentions (EIs) among youth. This study disentangles the effect of contextual factors on EIs and proposes a sustainable growth model considering the institutional, environmental, and social factors' influence on EIs among young people.

96	Friday, 01:45 PM - 03:15 PM, Columbia 4	Track: Healthcare Analytics
	Invited Session: Healthcare Analytics in Resource-limited Settings	
	Chair(s): Can Zhang	

093-1748 Risk Stratification Models for Community-Based Screening of Diabetes and Hypertension in Low-Resource Settings

Justin Boutilier, Post Doc/Researcher, Massachusetts Institute of Technology, United States

Timothy Chan, Associate Professor, University of Toronto, Canada

Sarang Deo, Associate Professor, Indian School of Business, India

Manish Ranjan, CEO, NanoHealth, India

In this paper, we develop machine learning-based risk stratification models that are tailored for community-based screening programs in low-resource settings. We use real data collected by community health workers in India to demonstrate that our models can significantly improve risk stratification accuracy, program yield, and cost-effectiveness for diabetes and hypertension.

093-0471 Cost Prediction Model of Healthcare Service System

sangoh shim, Associate Professor, Hanbat National University, South Korea

Friday, 01:45 PM - 03:15 PM

A model for predicting cost of healthcare management and a concept of design of an integrated healthcare system for remote collaboration are developed. The cost model is based on the prediction of utilization and attendant costs by using a stochastic model and system design that shows a remote collaboration under a clouding environment.

093-2219 Resource Allocation for Hepatitis C Elimination

Qiushi Chen, Assistant Professor, Penn State University University Park, United States
Turgay Ayer, Associate Professor, Georgia Tech, United States
Jagpreet Chhatwal, Assistant Professor, Harvard University, United States

Despite the recent availability of new antiviral treatment, Hepatitis C elimination remains challenging due to high treatment cost and unawareness of infection. With an analytical infectious disease model, we study optimal allocation of resources to scale-up screening and treatment that can achieve the World Health Organization's elimination goal by 2030.

093-1443 Prioritizing Hepatitis C Treatment in US Prisons

Turgay Ayer, Associate Professor, Georgia Tech, United States
Can Zhang, Assistant Professor, Duke University Durham, United States
Anthony Bonifonte, Student, Georgia Institute of Technology, United States
Anne Spaulding, Associate Professor, Emory University, United States
Jagpreet Chhatwal, Assistant Professor, Harvard University, United States

Prison systems offer a unique opportunity to control the HCV epidemic because of the high concentration of the disease among the prison population. However, providing treatment to all inmates is prohibitively expensive. In this study, we propose a restless bandit modeling framework to support HCV treatment prioritization decisions in prison systems.

97	Friday, 01:45 PM - 03:15 PM, Columbia 5	Track: Healthcare Operations Management
	Invited Session: Data-Driven Models in Healthcare Operations	
	Chair(s): Vahid Sarhangian	

093-2387 A Network-Based Formulation for Scheduling Clinical Rotations

Andre Cire, Assistant Professor, University of Toronto, Canada
Adam Diamant, Assistant Professor, York University, Canada
Tallys Yunes, Associate Professor, University of Miami, United States
Alejandro Carrasco, , ,

We investigate the practices of a medical school that must assign a cohort of students to a series of clinical rotations. We propose a network-flow model that leverages the structure of the data to compactly represent feasible schedules. Our analysis indicates significant cost reductions in comparison to current scheduling policies.

093-2388 Machine Learning For Predicting Heart Failure Readmission

Sauleh Siddiqui, Assistant Professor, Johns Hopkins University, United States

Predicting risk of heart failure (HF) readmission has gained increasing attention, with existing studies mainly using administrative data. We will focus on using clinical data from EMR for predicting HF readmission by doing pattern recognition with time series clinical data.

093-2389 Dynamic Resource Allocation in an Emergency Department: A Queueing Model with Time-Varying Arrival

Nilay Argon, Associate Professor, University of North Carolina Chapel Hill, United States
Serhan Ziya, Associate Professor, University of North Carolina Chapel Hill, United States
Yunan Liu, Professor, North Carolina State University, United States
Ling Zhang, Student, North Carolina State University, United States

Motivated by daily operations in a hospital emergency department, we study a multi-server tandem queueing system. We are interested in the optimal allocation of resources among patients at different stages of service. We solve an optimal control problem to minimize the overall operational costs.

093-2390 Flexible Designs for Off-Placing Patients in In-Patient Wards

Carri Chan, Associate Professor, Columbia University, United States
Vahid Sarhangian, Assistant Professor, University of Toronto, Canada
Yuan Zhing, Assistant Professor, The University of Chicago, United States

A common practice in hospitals is the off-placement of admitted emergency department (ED) patients to a non-primary in-patient ward (IW) when the primary ward is at full capacity. We evaluate and compare the performance of practical flexible designs for routing patients from the ED to IW by analyzing queueing models.

98	Friday, 01:45 PM - 03:15 PM, Columbia 6	Track: Healthcare Operations Management
	Contributed Session: Outpatient operations	
	Chair(s): Xiaobing Liu	

093-1294 A Multi-Period Vehicle Routing Problem with Service Priority Solution for Community Health Clinics

Olavo Diogo, Student, Coppead Graduate Business School, Brazil
Eduardo de Vargas, Assistant Professor, Coppead Graduate School of Business, Brazil
Peter Wanke, Associate Professor, Coppead Graduate School of Business, Brazil

The article describes the problem of routing and scheduling health teams of a community clinic over a service territory after the districting problem has been addressed. A solution based on Multi-Period VRP with Service Priority is suggested for the case of Community Clinics.

Friday, 01:45 PM - 03:15 PM

093-1987 Advance Online Scheduling with Overtime: A Primal-Dual Approach

Esmail Keyvanshokoo, Student, Industrial and Operations Engineering, United States
Cong Shi, Assistant Professor, Department of Industrial Engineering, United States
Mark Van Oyen, Professor, University of Michigan, United States

We study an online advance scheduling problem with reward and service time heterogeneity and budgeted overtime in which patients arrive one by one. By solving an online LP, we design online optimization algorithms and prove a worst-case performance guarantee. A case study of outpatient clinic scheduling is conducted.

093-1131 Effect of Behavioral Factors on Patients' Delay/Earliness

Hedayat Alibeiki, Assistant Professor, California State University San Marcos, United States

A qualitative assessment was performed to better understand the barriers patients face on arriving to their appointment on time. The survey included questions to identify patients': 1) understanding of "appointment time" concept, 2) perceived historical arrival pattern, and 3) intention for arrival in future.

093-1144 A Combination Model Based on Entropy Method for Hospital Daily Outpatient Visits Forecasting

Xiaobing Liu, Professor, Faculty of Management and Economics, Dalian University of Technology, China
Manman Zu, Student, Faculty of Management and Economics, Dalian University of Technology, China
Fulai Gu, Student, the First Affiliated Hospital of Dalian Medical University, China
Fanghong Xue, Lecturer, Faculty of Management and Economic, Dalian University of Technology, China

In view of the poor prediction accuracy and stability caused by the complexity of both linear and non-linear characteristics of hospital daily outpatient visits, this study constructs a combination model applied entropy method. This binary model improves validity of forecasting by taking the advantages of both SARIMA and BPNN.

Friday, 01:45 PM - 03:15 PM, Columbia 7

Track: Supply Chain Management

99 Contributed Session: Supply Chain and Network Design

Chair(s): Funda Sahin

093-1150 Designing an Ambidextrous Supply Chain

Javad Feizabadi, Associate Professor, Malaysia Institute for Supply Chain Inno, Malaysia

A set of decisions have to be made in SC design which are very interrelated. Three approaches of making choices and analyzing interdependency patterns are: integral, modular, and open innovation. Two contextual variables are noted to examine the moderating effect on ambidexterity: environmental uncertainty and cognitive ability using an NK.

093-0341 The Geography of Multinationals', Suppliers', and Retailers' Networks

Matteo Kalchschmidt, Professor, Universita Degli Studi Di Bergamo, Italy

The paper investigates the relationship between the geographic localization of the supply network and the retail chain of 11 multinationals in the fashion and textile industry. We propose a framework to analyze suppliers' and retailers' geographical distributions relying on three indicators: network size, networks' relative proximity, and their spatial concentration.

093-2346 Socio-Technical Approach to Network Design

Funda Sahin, Associate Professor, University of Houston, United States
Powell Robinson, Professor, University of Houston, United States

Using design science method, we propose a solution that integrates social and technical components of network design. The generic design of the study is a hierarchical model that enhances decision-making through better risk management while considering complex cost-service trade-offs.

Friday, 01:45 PM - 03:15 PM, Columbia 8

Track: Supply Chain Management

100 Invited Session: Supply Chain Risk - Modeling and Management

Chair(s): Vishwakant Malladi

093-0747 Drone-Aided Road Recovery and Relief Distribution in Disasters

Shabnam Rezapour, Assistant Professor, Florida International University, United States
Mohammad Amin Farzaneh, Student, Florida International University, United States

Recovery of primary roads accelerates relief distribution in disasters. In this paper, three interconnected models are proposed for damage assessment and recovery of primary roads in a way to maximize the speed of relief distribution. The models are tested for a road network in the southeast coast of the US.

093-1565 Supply Chain Performance with a Target-Oriented Retailer

Lucy Chen, Associate Professor, National University of Singapore, Singapore
Qinshen Tang, Student, National University of Singapore, Singapore

We study a supply chain with one supplier and one retailer. The supplier sets the wholesale price to maximize her profit, whereas the retailer decides the order quantity to maximize his ability to reach a target profit. We investigate how the retailer's target-oriented preference affects the supply chain performance.

093-1626 Multi-Tiered Supply Chain Risk Management

Georg Schorpp, Consultant, e2e Analytics, United States
Feryal Erhun, Professor, Cambridge University, United Kingdom
Hau Lee, Professor, Stanford University, United States

Friday, 01:45 PM - 03:15 PM

We study contracting for a three-tier supply chain consisting of buyer, supplier, and sub-supplier where disruptions of random length occur at sub-supplier. We study how buyer and supplier can guarantee that correct level of emergency capacity is reserved when the buyer has limited supply chain visibility beyond supplier.

093-1523 The Facility Location Problem with Joint Disruptions

Vishwakant Malladi, Professor, Indian School of Business, India
Kumar Muthuraman, Associate Professor, University of Texas Austin, United States

We use subordinated Markov chains to model the probability of the correlated risk of disruptions in the facility location problem. We construct algorithms to calibrate and optimize the model for high-dimensional systems using fewer parameters. This approach with contrasts existent methods assume simpler models for joint disruption probabilities.

Friday, 01:45 PM - 03:15 PM, Columbia 9

Track: Behavioral Operations Management

Contributed Session: Behavioral Issues in Supply Chain Management (1)

Chair(s): Milind Padalkar

093-1024 The Impact of Supply Chain on Preannouncement Rivalry: A Competitive Dynamics Perspective

Laharish Guntuka, Student, University of Maryland, United States
Curtis Grimm, Professor, University of Maryland, United States
David Cantor, Associate Professor, Iowa State University, United States

We explore how a firm responds to a rival's new product preannouncement. Capitalizing on the awareness-motivation-capability and competitive dynamics literatures, we explore how organizational and supply chain factors influence a firm's response strategy. We test our theoretical model by using 3 behavioral experiments.

093-1605 Interactions between Trade Promotion and Product Line Design with Demand Uncertainty

Jie Wu, Professor, University of Science and Technology of China, China
Yu Jiang, Student, University of Science and Technology of China, China
Xiang Ji, Student, University of Science and Technology of China, China

This paper studies a manufacturer's optimal decisions on trade promotion and product line design when the manufacturer sells through an independent retailer to uncertain market. The two major types of trade promotion, off-invoice and scan-back, are taken into consideration. We show that, when consumers have discrete demand uncertainty, a manufacturer

093-0315 Towards A Theory in Behavioral Supply Chain Risk Management

Christopher Kwaramba, Assistant Professor, East Carolina University, United States
Ying Liao, Assistant Professor, East Carolina University, United States
Quinton Nottingham, Associate Professor, Virginia Polytechnic Institute And State University, United States
Christopher Zobel, Professor, Virginia Polytechnic Institute And State University, United States

We study the topic area of supply chain risk management by addressing the lack of a clearly defined and unified approach to accounting for human risk behavior in supply chain risk management studies.

093-1079 Small Networks as Keepers of Organizational Assets and Goals: A Morphological Study

Milind Padalkar, Professor, BENNETT UNIVERSITY, India

Small networks emerge in environments characterized by performance pressures or idiosyncratic leadership. They use information as currency of exchange to evolve routines, rituals, and boundaries. Using multiple case study, I study their morphological progression and show that such networks can be instrumental to securing an organization's purpose and/or its key assets.

Friday, 01:45 PM - 03:15 PM, Columbia 10

Track: Product Innovation and Technology Management

Invited Session: Information and Technology Management in Supply Chain Management

Chair(s): Hyoduk Shin

093-0596 Information Sharing on Platforms

Zekun Liu, Student, Washington University St Louis, United States
Dennis Zhang, Assistant Professor, Washington University St Louis, United States
Fuqiang Zhang, Professor, Washington University St Louis, United States

We develop a game-theoretic model where multiple sellers compete on a retail platform. We find that the platform always has incentives to share the information. We characterize the optimal information sharing strategy under different practical constraints.

093-2368 A Strategic Approach to Vendor Managed Inventory

Ozalp Ozer, Professor, University of Texas Dallas, United States
Bharadwaj Kadiyala, Assistant Professor, Hong Kong University of Science and Technology, Hong Kong
Alain Bensoussan, Professor, University of Texas at Dallas, United States

Classic Vendor Managed Inventory agreements render communication of demand signals and lost-sales information between participating firms as non-credible, leading parties to abolish such agreements. We propose a dynamic learn-and-screen mechanism to better manage VMI agreements. Inventory decisions in this mechanism serve a strategic purpose and satisfy customer demand.

093-2367 Financial Cross-Ownership and Information Dissemination in a Supply-Chain

Noam Shamir, Assistant Professor, Tel Aviv University, Israel
Yossi Aviv, Professor, Washington University St Louis, United States

Friday, 01:45 PM - 03:15 PM

Financial cross-ownership describes a situation in which one company has stocks of its rival. We examine the way this investment tool affects the incentives to acquire demand information and the competition level in the market.

093-1179 Supplier Audit Information Sharing and Responsible Sourcing

Albert Ha, Professor, Hong Kong University of Science and Technology, Hong Kong

Weixin Shang, Associate Professor, Lingnan Univ, Hong Kong

Yunjie Wang, Assistant Professor, Renmin University of China, China

We study the incentive for competing manufacturers to share supplier audit information in a market with some consumers who boycott a manufacturer if supplier responsibility violations occur. We characterize the manufacturers' equilibrium audit information sharing decisions and sourcing strategies, and show how they depend on the model parameters.

093-2072 Operational Efficiency, Cybersecurity Investment, and Information Sharing Among Competing Firms

Hyoduk Shin, Associate Professor, University of California San Diego, United States

Noam Shamir, Assistant Professor, Tel Aviv University, Israel

In response to the recent cyber-attacks on Home Depot and Target, legislative efforts have been underway, encouraging (but, not requiring) information sharing on such threats. One hurdle is that companies raise competitive concerns about pooling cyber threat information. We explore different information sharing policies and its ramification on cyber attacks.

103	Friday, 01:45 PM - 03:15 PM, Columbia 11	Track: Inventory Management
	Invited Session: Inventory Control Models for Single- and Multi-Echelon Systems	
	Chair(s): Johan Marklund	

093-0895 Asymptotic Optimality in Lost Sales Inventory Systems: Projected Inventory Level Policies

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

Joachim Arts, Associate Professor, University of Luxembourg, Luxembourg

We consider the canonical periodic review lost sales' inventory system with positive lead-times and stochastic i.i.d. demand. 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 its asymptotic optimality.

093-1031 Safety Stock Placement in Dual-Sourced Supply Chains: A Successive Approximation Approach

Stefan Minner, Professor, Technische Universitat Munchen, Germany

We present an extension of the guaranteed service approach to safety stock placement in supply chains including multiple sourcing options and service level constraints. We present a new solution approach based on linear programming with successive approximation and performance guaranteed.

093-1057 Spare Parts Management Under Double Demand Uncertainty

Geert-Jan Van Houtum, Professor, Eindhoven University of Technology, Netherlands

Tarkan Tan, Associate Professor, Technische Universiteit Eindhoven, Netherlands

Erwin Wingerden, Student, Technische Universiteit Eindhoven, Netherlands

We consider the spare parts inventory control during the first years of the exploitation phase of capital goods. For a single location, multi-item inventory problem with Poisson demand processes and uncertainty in the estimated demand rates, we show the effect of the uncertainty on the optimal policy and costs.

093-1217 Inventory Control in Distribution Systems With Quantity Based Shipment Consolidation

Johan Marklund, Professor, Lund University, Sweden

Filip Malmberg, Student, Lund University, Sweden

We consider a centralized one-warehouse-multiple-retailer inventory system with quantity based shipment consolidation to groups of non-identical retailers facing Poisson demand. For this system, we present an exact method for determining the inventory level distributions at all stock-points, the expected inventory and shipment costs, fill rates, and transport emissions.

104	Friday, 01:45 PM - 03:15 PM, Columbia 12	Track: Service Operations
	Invited Session: Managing Services	
	Chair(s): Konstantinos Stouras	

093-0769 Bundle Pricing of Congested Services

Chenguang Wu, Assistant Professor, Hong Kong University of Science and Technology, Hong Kong

Luyi Yang, Assistant Professor, Johns Hopkins University, United States

This paper studies whether a service firm (e.g., an amusement park) should sell all its congested services (e.g., rides) as a bundle (bundle pricing) or separately (à la carte pricing). We show how the presence of congestion-driven delay in service systems alters the prescriptive guidance from the product bundling literature.

093-1496 Strategic Decisions in Systems with Batch Arrivals

Olga Bountali, Assistant Professor, University of Toronto, Canada

Apostolos Burnetas, Professor, National and Kapodistrian University of Athens, Greece

Lerzan Ormeci, Associate Professor, Koc University, Turkey

Customers in batch-arrival systems vacillate upon the "join-balk" dilemma: should each member decide under the objective of maximizing his individual revenue or should they all aim to maximize the batch welfare? We consider a Markovian queue and address the question above under two decision frameworks.

Friday, 01:45 PM - 03:15 PM

093-0452 Dueling Crowdsourcing Contests

Konstantinos Stouras, Assistant Professor, Michael Smurfit Graduate School of Business, Ireland

Sanjiv Erat, Associate Professor, Rady School of Management, United States

Kenneth Lichtendahl Jr., Assistant Professor, Darden School of Business, United States

The design of sourcing a task to the crowd is not only affected by the choices of the designer, but it is also impacted by the choices of any other competing designers that organize contests in parallel. We study equilibria among mechanisms and discuss implications for service operations.

105	Friday, 01:45 PM - 03:15 PM, Monroe	Track: Humanitarian Operations and Crisis Management
	Invited Session: Tutorial on Humanitarian Operations	
	Chair(s): Maria Besiou Erica Gralla	

093-2412 Tutorial on Humanitarian Operations

Maria Besiou, Professor, Kuehne Logistics University, Germany

Erica Gralla, Assistant Professor, George Washington University, United States

Humanitarian organizations reached an unprecedented number of 92.8 million people in need in 2016. While humanitarian operations in response to emergencies and development needs increase, so does research in these areas. In this tutorial we discuss the evolution of humanitarian operations research along with areas that are less explored.

106	Friday, 01:45 PM - 03:15 PM, Lincoln East	Track: Humanitarian Operations and Crisis Management
	Contributed Session: Understanding Humanitarian Supply Chains	
	Chair(s): Muhammad Azmat	

093-0011 Challenges in Establishing Initial Humanitarian Supply Chains

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

This study presents preliminary findings of research conducted with first responders in humanitarian crises. Using interviews and supporting data collected following events in Nepal (2015), Philippines (2013) and Haiti (2010), we examine the challenges of establishing initial humanitarian supply chains in the aftermath of a crisis event.

093-0046 The Role of Risk and Resilience in Humanitarian Supply Chains: A Qualitative Study

Luai Jraisat, Senior Lecturer, University of Northampton.ac.uk, United Kingdom

The study examines the role of risk and resilience in humanitarian supply chains. This follows an abductive approach where Transaction Cost Economics (TCE) is used to guide data collection and analysis, and semi-structure interviews within a qualitative study are conducted to provide key insights for researchers and policy makers.

093-0195 Post-Disaster Humanitarian Logistics Planning: A Time-to-Survive Framework

Yini Gao, Assistant Professor, Singapore Management University, Singapore

Guodong Lyu, Student, National University of Singapore, Singapore

We consider the post-disaster relief resource logistic planning problem with uncertainties in the transportation capacities and demands. We propose to use Time-to-Survive as a performance measure for relief effort and adopt a two-stage distributionally robust approach to determine the optimal transportation plan, which can be solved by a SDP problem.

093-0458 Locating Drone-Based Stations for Disaster Recovery

Cihan Tugrul Cicek, Student, University of California Berkeley, United States

Zuo-Jun Max Shen, Professor, University of California Berkeley, United States

Disaster recovery work demands facing challenging situations and environments. A new location problem for drone base stations (DBSs) have been introduced to help speed recovery work in telecommunication. Due to rapid deployment and mobility property, DBSs can significantly increase the efficiency in management of post-disaster operations by providing wireless communication.

093-0380 Identification of Critical Success Factors (CSF) in Faith Based Humanitarian Organizations' Supply Chain

Muhammad Azmat, Student, Vienna Univ of Econ & Business Admin, Austria

Maria Besiou, Professor, Kuehne Logistics University, Germany

Sebastian Kummer, Professor, Vienna Univ of Econ & Business Admin, Austria

An aid organization's supply chain needs to have an end to end synchronization in order to facilitate the beneficiaries, but this synchronization can be disrupted by religious values. This empirically evident exploratory research investigates the magnitude of disruption caused by religious involvement and supply chain differences of different humanitarian organizations globally.

107	Friday, 01:45 PM - 03:15 PM, Lincoln West	Track: Empirical Research in Operations Management
	Invited Session: Empirical Research in Revenue Management and Pricing	
	Chair(s): Ovunc Yilmaz	

093-0333 Dynamic Pricing and Transparency in On-Demand Services

Ryan Buell, Associate Professor, Harvard Business School, United States

Nil Karacaoglu, Student, Kellogg School of Management, United States

Antonio Moreno, Associate Professor, Harvard University, United States

Friday, 01:45 PM - 03:15 PM

On-demand services adopt dynamic pricing practices to match supply and demand. We investigate how customers perceive the trade-offs between increased prices, waiting time, and unavailability. Furthermore, we examine how operational transparency can influence customers' fairness perception and satisfaction in the context of dynamic pricing. We adopt theories on fairness perceptions.

093-0707 Payment Modes and Order Cancellation: Empirical Evidence from an Online Travel Agency in China

Huan Zheng, Professor, Shanghai Jiao Tong University, China
Zilin Hao, Student, Shanghai Jiao Tong University, China
Junxiong Yin, Student, University of Southern California, United States

In this study, we empirically explore how consumers choose different payment modes when booking hotel rooms and strategically cancel their bookings from transaction data of a large Online Travel Agency in China. We find that strategic consumers will keep monitoring price fluctuations and then decide whether they should cancel.

093-0782 Pricing for Heterogeneous Products: Analytics for Ticket Reselling

Rim Hariss, Student, MIT Operations Research Center, United States
Max Biggs, Student, Operations Research Center, United States
Charles Herrmann, Data Scientist, BCG Gamma, United States
Michael Lingzhi, Student, MIT Operations Research Center, United States
Georgia Perakis, Professor, Massachusetts Institute of Technology, United States

We construct an optimization based ticket trading strategy that a major secondary ticket reseller is piloting as well as a novel method for heterogeneous treatment effect estimation for classification. Trading on NBA ticket listings, our approach yields a seller's revenue up to \$9.6 million for a single season.

093-1877 Football Ticket Pricing for Multiple Sale Channels with Heterogeneous Fans

Ovunc Yilmaz, Assistant Professor, University of Notre Dame, United States
Hayri Arslan, Post Doc/Researcher, Queens University, Canada
Robert Easley, Professor, University of Notre Dame, United States
Ruxian Wang, Associate Professor, Johns Hopkins University, United States

Using the ticket sale data of a college football team, we investigate how fans make their decisions in different channels (i.e., season tickets and single-game tickets) and provide important insights for pricing.

108	Friday, 01:45 PM - 03:15 PM, Jefferson East	Track: Panels & Meetings
	Invited Session: Practice Leaders 2	
	Chair(s): Carrie Queenan Claire Senot	

093-2429 Practice Leaders Forum 2

Dino Petrarolo, Senior Vice President, Competitive Capabilities Int, South Africa
Colin Kessinger, Managing Director, End-To-End Analytics, United States
Constantine Moros, Director & CESA Advisory Markets Coordinator, EY (Ernst & Young) - Advisory Services, Greece

This session presents various operational challenges, solutions and innovations observed by practice leaders in sustainability, supply chain, and management consulting respectively. Their views open up research opportunities for OM researchers.

109	Friday, 01:45 PM - 03:15 PM, Jefferson West	Track: Supply Chain Risk Management
	Contributed Session: Supply Chain Resilience	
	Chair(s): Chunsheng Li	

093-0971 Project Driven Supply Chain: An Evaluation of Project Network Resilience

Anjali Shishodia, Student, NITIE, Mumbai, India
Priyanka Verma, Assistant Professor, National Institute of Industrial Engineering, Mumbai, India
Karuna Jain, Professor, National Institute of Industrial Engineering, Mumbai, India

Disruptive events expose projects to unforeseen risks and impacts performance. To measure project resilience, project characteristics such as activities' resourcefulness with scheduling constraints, suppliers' and contractors' performance are considered. The approach is presented via construction project case and network resilience score is computed to predict project performance.

093-0969 Evaluation of Contractor Resilience in Project Driven Supply Chain: A Case Study

Anjali Shishodia, Student, NITIE, Mumbai, India
Priyanka Verma, Assistant Professor, National Institute of Industrial Engineering, Mumbai, India
Karuna Jain, Professor, National Institute of Industrial Engineering, Mumbai, India

Contractors are expected to enhance the project performance through effective contract management. In this paper, factors imparting resilience capabilities in contractors are identified to combat risks. A case study is also presented from the construction sector wherein the identified resilience capabilities of associated contractors are assessed.

093-1729 Employee Capabilities and Resilience in Complex Supply Chains

Sebastian Gehrlein, Student, University of Mannheim, Germany
Christoph Bode, Professor, University of Mannheim, Germany

So far, supply chain resilience has been mainly investigated at the firm and the supply chain level, but relatively little is known about the role of HR skills in this context. We identify and empirically test personality characteristics and capabilities that enable decision makers to cope with supply chain disruptions.

Friday, 01:45 PM - 03:15 PM

093-0288 Supply Chain Resilience: Theoretical Construct and Measurement Development

Chunsheng Li, Student, Hong Kong Polytechnic Univ, Hong Kong
Christina Wong, Associate Professor, The Hong Kong Polytechnic University, Hong Kong
Chee Wong, Professor, Leeds University, United Kingdom
Sakun Boon-Itt, Associate Professor, Thammasat University, Thailand

This study conceptualized supply chain resilience in the risk management context and developed a measurement model based on Porter's Value Chain. Validated through a multi-method research, the measurement scales provide a useful reference for firms to evaluate their supply chain resilience efforts and identify areas of improvement.

110 Friday, 01:45 PM - 03:15 PM, Georgetown East Track: Supply Chain Risk Management

Invited Session: **Managing Risks Along the Supply Chain**

Chair(s): Xiao Huang

093-0028 Category Captainship in the Presence of Retail Competition

Alper Nakkas, Assistant Professor, The University of Texas at Arlington, United States
Yasin Alan, Assistant Professor, Vanderbilt University, United States
Mumin Kurtulus, Associate Professor, Vanderbilt University, United States

Category Captainship (CC) is a retailing practice in which a retailer delegates some category management decisions to a manufacturer. We analytically examine the operational implications of CC in the presence of retail competition. Our study leads to novel insights into the impact of CC on retailers, manufacturers, and consumers.

093-0175 Data-Driven Reoptimization Approaches for the Stochastic Commodity Warehouse Problem

Christian Mandl, Student, Technische Universitat Munchen, Germany
Selvaprabu Nadarajah, Assistant Professor, University of Illinois at Chicago, United States
Stefan Minner, Professor, Technische Universitat Munchen, Germany
Srinagesh Gavirneni, Professor, Cornell University, United States

We present different non-parametric and machine learning-inspired data-driven approaches to solve the Stochastic Commodity Warehouse Problem, which is the fundamental problem in inventory trading and merchant operations within volatile commodity markets. Furthermore, we compare the solution methods based on real commodity price data from 2000 to 2017.

093-0536 Managing Reputation Risk in Supply Chains

Vibhuti Dhingra, Student, University of British Columbia, Canada
Harish Krishnan, Professor, University of British Columbia, Canada

When a supplier fails to comply with social and environmental standards, the buyer's reputation suffers. We study the role of a risk-sharing contract in managing this reputation risk. We find that risk-sharing can both decrease and increase supplier violations, and we show that the buyer can benefit in each case.

093-0864 Buyer Finance, Supply Risk, and Extended Payments

Mohamed Ait Mansour, Post Doc/Researcher, Concordia University, Canada
Xiao Huang, Associate Professor, Concordia University, Canada
Vincent Hovelaque, Professor, IGR-IAE de Rennes, Université de Rennes 1, France
Jean-Laurent Viviani, Professor, IGR-IAE de Rennes, Université de Rennes 1, France

We consider a large buyer procuring from a risky and capital-constrained supplier under wholesale price contract. The buyer may offer finance to the supplier, and in return, request the remaining balance be paid on an extended term. We characterize the optimal design of the wholesale contract and the financing scheme.

111 Friday, 01:45 PM - 03:15 PM, Georgetown West Track: Teaching/Pedagogy in POM

Invited Session: **Making Operations Management a Better Course**

Chair(s): Ardavan Asef-Vaziri

093-2208 Action Learning in Operations and Supply Chain Management

Stanley Fawcett, Professor, Weber State University, United States
Amydee Fawcett, Assistant Professor, Weber State University, United States

Collaborative action learning promises to: • Enhance student engagement • Improve learning outcomes • Get better teaching evaluations • Have more fun in the classroom In this session, we will demonstrate a range of action-learning activities from the use of metaphors and object lessons to think-pair-share activities to real-time games.

093-0535 Pedagogy in POM Using New Technologies and Concepts

Kaushik Sengupta, Professor, Hofstra University, United States

POM teaching has evolved through the years in terms of topics and technologies. We discuss how the use of technologies has changed our teaching and how new conceptual areas have evolved as core discussion areas. Emerging topics like Blockchain, Humanitarian Supply Chains etc., will be included in discussions.

093-0651 Experiential Undergraduate Operations Management Course Engages Students

Julia Miyaoka, Professor, San Francisco State University, United States
Leyla Ozsen, Associate Professor, San Francisco State University, United States
Yabing Zhao, Assistant Professor, San Francisco State University, United States

Friday, 01:45 PM - 03:15 PM

Susan Cholette, Professor, San Francisco State University, United States

We describe an experiential operations management course for undergraduate business students that includes computer labs and "hands-on" group activities. We find that this format of the course engages students while improving student performance compared to that of traditional lectures.

093-0579 A Web-Based Simulation Game to Review Basic Statistics and Economics Concepts in an OM Course.

Ardavan Asef-Vaziri, Professor, California State University Northridge, United States

We show how several basic statistics and economics topics can be exercised and linked in a web-based simulation game in two sessions of an Operations Management course. Active learning in a virtual-world motivates the students to trust and learn the course material, and get better prepared for real-world applications.

112	Friday, 01:45 PM - 03:15 PM, Cabinet	Track: Sustainable Operations
	Invited Session: Challenges and Opportunities in Sustainable OM	
	Chair(s): Tim Kraft	

093-1019 Reducing Waste by Learning from Environmental Inspections: Empirical Evidence from Unconventional Wells in Pennsylvania

Vidya Mani, Assistant Professor, Penn State University University Park, United States

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

We examine whether manufacturing units learn to reduce waste when they gain experience with environmental inspections. Specifically, we explore how different facets of inspection experience gained either directly at a manufacturing unit or vicariously at other manufacturing units support waste reduction.

093-1431 Is Sharing Economy Green?

Paolo Letizia, Assistant Professor, University of Tennessee Knoxville, United States

Paolo Roma, Assistant Professor, Universita Degli Studi Di Palermo, Italy

Fahimeh Rahmanniyay, Student, University of Tennessee Knoxville, United States

We study the environmental impact of sharing economy by considering the different incentives of a product manufacturer, sharing platform, consumers, and peer-to-peer providers. The main trade-off is between the production of less products by the manufacturer and the higher utilization of the shared products by the consumers.

093-1921 Volunteer Management: Job Design and Work Allocation

Baris Ata, Professor, University of Chicago, United States

Joy Field, Associate Professor, Boston College, United States

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

Mustafa Tongarlak, Assistant Professor, Bogazici University, Turkey

We study how non-profit organizations can design jobs and allocate jobs to volunteers to increase their social impact.

093-2213 Positive Externalities of E-Waste Laws: Quasi-Experimental Evidence from California and Florida

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

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

We investigate the positive externalities of e-waste legislation on broader disposal behaviors using a quasi-experimental setup.

113	Friday, 01:45 PM - 03:15 PM, Intl Ballroom East	Track: Supply Chain Analytics
	Invited Session: Using Analytics to Manage Inventory	
	Chair(s): Paolo Letizia	

093-0523 Inventory Dispersion in a Sequential Inventory System with Demand Forecast Evolution

Isik Bicer, Assistant Professor, Erasmus University Rotterdam, Netherlands

Florian Lucker, Assistant Professor, Cass Business School, United Kingdom

We develop a dynamic-optimization model to optimize the order quantities in a multi-echelon setting with demand-forecast evolution. Using our generalized optimization model, we compare lead-time-reduction and process-redesign strategies that were investigated in isolation in the literature. We then develop a decision typology showing effective practical approaches to mitigate supply-demand mismatches.

093-1793 A Non-Parametric Approach for Setting Safety Stocks for a Continuous Review Inventory Policy

John Saldanha, Associate Professor, John Chambers College of Business & Econ, United States

Brad Price, Assistant Professor, West Virginia University, United States

Doug Thomas, Professor, University of Virginia, United States

We propose a bootstrap algorithm as a non-parametric approach to calculate statistically sound estimates for setting inventory policies directly from lead time and demand data. We offer theoretically-grounded guidance on bootstrap inputs that yield the least biased estimates. Results from numerical experiments and an industry application indicate promising results.

093-2032 Inventory Control for Items with Extremely Intermittent Demand

Marco Bijvank, Assistant Professor, University of Calgary, Canada

A manufacturer of Flexible Intermediate Bulk Containers changed their supply chain strategy from make-to-order to make-to-stock. However, their customers order very infrequently and in large quantities. We study replenishment policies for items with such intermittent demand characteristics where traditional approaches (such as the Croston method) do not work.

Friday, 01:45 PM - 03:15 PM

093-2148 What Prevents the Application of Inventory Theory in Practice?

Sean Willems, Professor, University of Tennessee Knoxville, United States

My talk will draw on many real-world implementations where I can share before and after data, make clear what academic assumptions needed modification, and present several cases where practitioners would not implement our academic models. I will define the important dimensions many academic models are missing.

Friday, 04:30 PM - 06:00 PM

115	Friday, 04:30 PM - 06:00 PM, Piscataway	Track: Closed Loop Supply Chains
	Contributed Session: Returns and Warranties Issues in Supply Chains	
	Chair(s): Barry Cobb	

093-0646 Warranty Matching in a Consumer Electronics Closed-Loop Supply Chain

Andre Calmon, Assistant Professor, INSEAD, France
Stephen Graves, Professor, Massachusetts Institute of Technology, United States
Stef Lemmens, Post Doc/Researcher, INSEAD, France

We analyze the warranty matching problem that emerges in a closed-loop supply chain. In our setting, there are two warranties in place: the customer warranty and an OEM warranty. We introduce and evaluate three matching strategies to reduce mismatch costs resulting from the misalignment between customer warranty and OEM warranty.

093-1915 Creating Value From False Failure Returns

Eylem Koca, Assistant Professor, Ozyegin University, Turkey

In a comprehensive two-period model addressing information, return policies, trade-in rebates, and product generations, we identify the optimal conditions for the seller to choose remanufacturing, open-box sales, or salvaging, when faced with false-failure returns from strategic consumers. We also investigate implications of consumer moral hazard and implications on sustainability performance.

093-2006 Yield Paradox in Closed Loop Supply Chains with Auto-and Cross-Correlated Demand and Return Processes

Takamichi Hosoda, Professor, Aoyama Gakuin University, Japan
Stephen Disney, Professor, Cardiff University, United Kingdom
Li Zhou, Associate Professor, Greenwich Business School, United Kingdom

We investigate the dynamics of a closed-loop supply chain with VAR(1) demand and return processes. It is shown that the manufacturing cost is convex in the yield rate at the remanufacturer, which is an undesirable characteristic from a sustainability viewpoint. We consider replenishment policies that overcome this issue.

093-1315 Forward Cycle Time Distributions for Returnable Transport Items

Barry Cobb, Professor, Virginia Military Institute, United States
Linda Li, Assistant Professor, Missouri State University, United States

Forward cycle time distributions for returnable transport items are developed for periods with incomplete data, and these distributions are utilized to create an estimate of future container returns. The method used to estimate distributions employs an adaptive exponential smoothing method that accounts for seasonality to forecast the parameters.

116	Friday, 04:30 PM - 06:00 PM, Oak Lawn	Track: Marketing and Operations Management
	Invited Session: New Models of OM-Marketing Interface	
	Chair(s): Meng Li	

093-0051 Clearance Sales with Auction

Yufei Huang, Associate Professor, Trinity College Dublin, Ireland
Bowe Chen, Assistant Professor, University of Glasgow, United Kingdom

We consider a retailer selling products in two periods: the normal selling season and the clearance season in which the remaining products are auctioned off. We study the retailer's optimal pricing strategy and auction design, by characterizing consumers' trade-off between buying at the guaranteed price and entering the auction.

093-0528 Impact of Free Shipping Threshold on Different Channels: Evidence from an Online Retailer

Fujie Jin, Assistant Professor, Indiana University Bloomington, United States
Fei Gao, Assistant Professor, Indiana University Bloomington, United States
Jianbin Li, Professor, Huazhong University of Science & Technology, China

We use a unique data set from a Chinese online retailer to empirically study the impacts of a free shipping threshold on consumer shopping behaviors in different channels.

093-0666 Firm Technology Adoption: Optimal Timing and Employee Incentives

Yuqian Xu, Assistant Professor, University of Illinois Urbana-Champaign, United States
Lingjiong Zhu, Assistant Professor, Florida State University, United States

In this paper, we consider a firm's decision on innovative technology adoption. We first characterize the optimal timing of technology adoption and then we study the incentive wage contract to motivate employees to use the new technology.

093-0770 Brushing to the Top: Product Rankings, Customer Search, and Fake Orders

Chen Jin, Assistant Professor, Department Of Information Systems and Analytics, Singapore
Luyi Yang, Assistant Professor, Johns Hopkins University, United States
Kartik Hosanagar, Professor, The Wharton School, United States

This paper studies a growing practice on major e-commerce platforms (such as Alibaba and JD.com) called "brushing", whereby sellers place fake orders of their own products to inflate sales and boost rankings.

093-1180 Should Omnichannel Retailers Allow In-Store Returns of Online Purchases?

Punya Chatterjee, Student, Penn State University State College, United States
Aydin Alptekinoglu, Associate Professor, Penn State University University Park, United States

Friday, 04:30 PM - 06:00 PM

Nicholas Petruzzi, Professor, Penn State University State College, United States

We investigate when an omnichannel retailer should allow in-store returns of online purchases. The retailer has two substitutable products to offer, both available online, that differ by the uncertainty consumers have over their valuation. The retailer sets prices and store assortment in addition to the store return policy.

117	Friday, 04:30 PM - 06:00 PM, Northwest	Track: POM in Food and Agriculture
	Contributed Session: Big Data in Agricultural Management	
	Chair(s): Nambirajan Thangasamy	

093-0207 Big Data Innovation for Agritech Businesses: Knowledge Transfer Adaptation Model for AI Collective Knowledge

Tetsuro Goto, Post Doc/Researcher, Hosei University, Japan

Haruo Horaguchi, Professor, Hosei University, Japan

Agricultural operations management is led by technological innovation using big data for AI. An agritech information provider gathers information by sensing nitrogen, temperature, humidity, etc., to fertilize the crop and paddy fields, to make seeding prescription, and to spray pesticides. Decision making is optimized for farmers.

093-0337 Industry 4.0 Applications in Agriculture: Cyber- Physical Agricultural Systems (CPAS)

Rohit Sharma, Student, National Institute of Industrial Engineering, Mumbai, India

Anjali Shishodia, Student, NITIE, Mumbai, India

In this data driven era, the future of agriculture seems optimistic with the application of Industry 4.0 technologies such as CPS, IoS, IoT, Blockchain, Cloud Computing and Big Data. This paper highlights a framework depicting Cyber Physical Agricultural Systems (CPAS) which will enhance the agricultural productivity and decision-making.

093-1854 System and Capability Approach to Enhance Farmers' Agribusiness Growth: Study Using Exploratory Factor Analysis

S Madhiyarsi, Student, Pondicherry University, India

Nambirajan Thangasamy, Professor, Pondicherry University, India

This research work starts from research background that provides the urgency and needs to take up farmers' agri-business as a subject area in order to enhance agri-business performance and growth. Quantitative and qualitative data are presented, evaluated, and analyzed. Exploratory factor analysis is used to evaluate and analyze data.

118	Friday, 04:30 PM - 06:00 PM, Morgan	Track: Public Sector Operations Management
	Contributed Session: Case Studies in Public Sector Operations Management	
	Chair(s): Saulo Amâncio-Vieira	

093-0701 Effects of Delays in Public Building Projects in Ghana

Ebenezer Adaku, Senior Lecturer, GIMPA, Ghana

Yakub Alhassan, Student, GIMPA, Ghana

Richard Ohene Asiedu, Lecturer, GIMPA, Ghana

Samuel Famiyeh, Associate Professor, GIMPA, Ghana

Developing countries face fiscal challenges. However, in the midst of the fiscal challenges is the endemic phenomenon of delays in public building projects which have consequences for the public purse. This study seeks to unravel the critical effects of delays in public building projects in Ghana for policy information.

093-1853 Efficiency in Basic Health Units: A Case Study in a Developing Country

Camila Ferri, Student, Londrina State University, Brazil

Saulo Amâncio-Vieira, Professor, Londrina State University, Brazil

Vera Suguihiro, Professor, Londrina State University, Brazil

The present study aims to analyze the efficiency of the Basic Health Units of Londrina, Brazil. This research can be classified as descriptive and quantitative. A census was carried out, raising data on the costs of each unit, as well as values related to the productivity of the servers.

093-1862 Relationship Between Costs and Educational Performance: A Longitudinal Analysis in Brazilian Municipal Schools

Saulo Amâncio-Vieira, Professor, Londrina State University, Brazil

Thiago Ferreira, Professor, Londrina State University, Brazil

Vera Suguihiro, Professor, Londrina State University, Brazil

This paper aims to analyze the evolution of the relationship between costs and performance of the municipal elementary school units of Londrina. The research is characterized as quantitative and descriptive. The evolution of the Ideb are above the average and the socioeconomic level has a strong association with the performance.

093-1835 Implementation of the Electronic Information System (SEI): A Londrina City Hall Case Study

Luiz Feitosa, Student, Universidade Estadual de Londrina, Brazil

Saulo Amâncio-Vieira, Professor, Londrina State University, Brazil

This study aims to understand the history of the implementation of the Electronic Information System (SEI) occurring in the city of Londrina - PR. The research has a qualitative approach with a descriptive-exploratory character. It was concluded that the SEI approached the municipality to a more public-oriented management model.

Friday, 04:30 PM - 06:00 PM

119	Friday, 04:30 PM - 06:00 PM, Kalorama	Track: Emerging Topics in Operations Management
	Invited Session: Platform Operations	
	Chair(s): Robert Swinney Soudipta Chakraborty	

093-0595 Information Sharing on Retail Platforms

Zekun Liu, Student, Washington University St Louis, United States
Dennis Zhang, Assistant Professor, Washington University St Louis, United States
Fuqiang Zhang, Professor, Washington University St Louis, United States

This paper studies the information sharing strategy for a retail platform on which multiple competing sellers distribute their products. The platform owns superior demand information and can adopt different information sharing strategies. We investigate the platform's optimal information sharing strategy under two potential constraints, privacy and fairness.

093-2050 Relationships in Online Marketplaces

Elena Belavina, Assistant Professor, Cornell University, United States
Karan Girotra, Professor, Cornell University, United States
Ken Moon, Assistant Professor, The Wharton School, United States
Jiding Zhang, Student, The Wharton School, United States

Our study investigates trade-enhancing relationships and relationship-specific investments made by the participants in these increasingly important markets. We propose relevant methods for assessing the economic value of relationships and explore prescriptive implications for marketplace operations and design.

093-2133 Rewarding Loyalty: Bonus Schemes in the Gig-Economy

Kaitlin Daniels, Assistant Professor, Washington University St Louis, United States
Puping Jiang, Student, Washington University St Louis, United States
Fuqiang Zhang, Professor, Washington University St Louis, United States

Increasingly gig-economy platforms pay workers lump sum payments (i.e. bonuses) as a reward for completing sufficiently many services within a short time frame (e.g. a week). We investigate the design of these bonuses.

093-0068 Designing Rewards-Based Crowdfunding Campaigns for Strategic Backers

Soudipta Chakraborty, Student, Duke University Durham, United States
Robert Swinney, Associate Professor, Duke University Durham, United States

We study a model of rewards-based crowdfunding with the all or nothing funding mechanism popularized by Kickstarter. We determine how a creator should design her campaign when the uncertainty of receiving the reward makes backers behave strategically.

120	Friday, 04:30 PM - 06:00 PM, Jay	Track: Manufacturing Operations
	Contributed Session: Production Planning and Scheduling	
	Chair(s): Anand Kandaswamy	

093-1904 Inventory and Scheduling Policies for a Hybrid MTS-MTO Manufacturing System

Andreas Schoechtel, Manager Operations, Thermo Fisher Scientific, Germany

We investigate inventory and scheduling policies for a hybrid system which employs both Make-to-Stock (MTS) and Make-to-Order (MTO) manufacturing strategies. We use real data from a global Laboratory Equipment manufacturer. Our results show that prioritization and expediting has a substantial positive effect on company profit.

093-1151 A Hierarchical Method for Production Planning Based on Standard of Scheduled Time and Quantity

Xiaobing Liu, Professor, Faculty of Management and Economics, Dalian University of Technology, China
Xuejing Zhu, Student, Faculty of Management and Economics, Dalian University of Technology, China
Fanghong Xue, Lecturer, Faculty of Management and Economics, Dalian University of Technology, China
Lin Lin, Student, CRRR DALIAN R&D CO.,LTD., China

In order to overcome the instability of production planning for complex products, we establish a data model named Standard of Scheduled Time and Quantity, and propose the mapping relationship with network planning. Then, a hierarchical network planning model was developed which improved the accuracy and feasibility of the plan.

093-2451 Predicting the Performance of Production Lines with Stochastic Learning

Thilini Ranasinghe, Professor, University of Peradeniya, Sri Lanka
C.D. Senanayake, Senior Lecturer, University of Peradeniya, Sri Lanka
Kanthen Perera, Senior Lecturer, University of Peradeniya, Sri Lanka

In this research, we develop simulation and analytical models to predict the performance of production lines subject to stochastic learning. We use empirical data collected from the apparel manufacturing industry to develop these models. We also show the impact of worker heterogeneity on the performance of these systems.

093-0735 Patents, Innovation, and Manufacturing Productivity

Anand Kandaswamy, Economist, NIST, United States
Douglas Thomas, Economist, NIST, United States

What is the relationship between innovation (as measured by patents activity) and productivity in the manufacturing context? The authors use statistical models to analyze a recent data set and present their conclusions.

Friday, 04:30 PM - 06:00 PM

121	Friday, 04:30 PM - 06:00 PM, Holmead East	Track: Sustainable Operations
	Contributed Session: Circular Economy	
	Chair(s): Santosh Nandi	

093-0485 Product Recovery Decision-Making in the Context of Internet of Things: A Review and Generic Roadmap

Kai Meng, Post Doc/Researcher, Massachusetts Institute of Technology, United States
Xianghui (Richard) Peng, Assistant Professor, Penn State University Erie, United States
Ying Cao, Assistant Professor, Penn State University Erie, United States
Victor Prybutok, Professor, University of North Texas, United States

We provide a state of the art review on End-of-Life (EOL) product recovery decision-making in the context of Internet of Things. We contextualize an implementation framework to enable sustainable EOL product management based on enriched information. We propose a generic roadmap for model and methodology selection to assist practitioners.

093-0581 Remanufacturing of Multi-Component Systems with Product Substitution

Baolong Liu, Student, Arizona State University, United States
Felix Papier, Professor, Essec Business School, France

This research investigates inventory and production management of a system serving demand for new and remanufactured products and allowing for substitution between both. To minimize weighted-sum economic cost and environmental impact, we analyze single-component products, show the threshold-type optimal policies, and also analyze multi-component products and develop a close-to-optimal heuristic.

093-0920 Circular Economy in the Fresh Fruit Supply Chain in Brazil

Andre Souza, Professor, Universidade de Fortaleza, Brazil
Fernando Luiz Viana, Professor, Universidade de Fortaleza, Brazil

This paper evaluates the application of the principles of Circular Economy (eco-design, reduction, reuse, recycling, reclassification and renewal) in the fresh fruit supply chain in Brazil, which has contributed to the reduction of food waste, to improve the economic and environmental performance in supply chain firms.

093-1502 A Contingency Approach for Supply Chain Preparedness to Pursue Circular Economy Business Models (CEBM)

Santosh Nandi, Assistant Professor, University of South Carolina, United States
Hale Kaynak, Professor, University of Texas Rio Grande Valley, United States

A growing stream in circular economy research is about CEBM. However, the understanding about how firms could integrate CEBM practices with supply chain partners is limited. Given the rise in supply chain complexities, this study suggests a contingency framework about how firms' supply chain preparedness help them in pursuing CEBM.

122	Friday, 04:30 PM - 06:00 PM, Holmead West	Track: Operational Excellence
	Invited Session: Panel: Teaching Operational Excellence	
	Chair(s): Torbjørn Netland Rachna Shah	

093-2396 Teaching Operational Excellence

Dan Bumblauskas, Associate Professor, University of Northern Iowa, United States
Matthias Thurer, Professor, Jinan University, China
Torbjørn Netland, Assistant Professor, Eth Zurich, Switzerland
Barry Render, Emeritus Professor, Rollins College, United States
Eric Olsen, Professor, California Polytechnic State University San Luis Obispo, United States
Aravind Chandrasekaran, Associate Professor, Ohio State University, United States

In this panel/workshop, we have invited leading OEX scholars to share their insight on how to teach operational excellence. The session covers a few practical examples and ends with a roundtable discussion.

123	Friday, 04:30 PM - 06:00 PM, Gunston East	Track: Purchasing and Supplier Management
	Invited Session: Coordination, competition and contracting	
	Chair(s): Ryan Choi	

093-1142 The Direct and Indirect Effects of Cross-Functional Transactive Memory System Alignment on Supply Chain Disruptions

Scott Ellis, Associate Professor, Georgia Southern University, United States
Kevin Scheibe, Associate Professor, Iowa State University, United States
Jennifer Blackhurst, Professor, University of Iowa, United States

A transactive memory system (TMS) consists of three elements: actors' specialization of knowledge, credibility or cognitive trust of actors' knowledge, and ability to coordinate between the actors in the TMS. Using dyadic survey and matched objective data, we examine how cross-functional TMS's mitigate the frequency and magnitude of supply disruptions.

093-1445 Sustainable Partnerships in Food Security and International Trade

Jiho Yoon, Assistant Professor, Kansas State University, United States
Sri Talluri, Professor, Michigan State University, United States

Sustainable partnerships have become key to success in sectors such as food security and international trade. We investigate how an exporting firm and an importing firm strategically coordinate a sustainable relationship.

Friday, 04:30 PM - 06:00 PM

093-2156 An Oddity of Triad Relationship in Supply Chain

Ryan Choi, Assistant Professor, Eastern Michigan University, United States

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

We investigate the relationship between supply management practices and supply chain performances and provide a simple characterization of multiple-tiered suppliers' responses to buyer's practices in terms of the various market conditions. The paper discuss how supplier management practices should be transferred upstream (or downstream) to improve overall supply chain performance.

124	Friday, 04:30 PM - 06:00 PM, Gunston West	Track: Next Generation Operations
	Invited Session: Omni Channel Retail	
	Chair(s): Chloe Glaeser	

093-0191 Why Retailers Should Care About Net Neutrality: The Impact of Website Performance on Online Retail

Santiago Gallino, Assistant Professor, The Wharton School, United States

Nil Karacaoglu, Student, Kellogg School of Management, United States

Antonio Moreno, Associate Professor, Harvard University, United States

The share of e-commerce sales is rapidly increasing and so are the associated losses caused by website outages and slow websites. Using two different research designs – panel data with fixed effects and generalized synthetic control with elastic net – we estimate sizable adverse effects of website speed slowdowns on online sales.

093-0730 The Effect of Multi-Channel and Omni-Channel Retailing on Physical Stores

Fei Gao, Assistant Professor, Indiana University Bloomington, United States

Shiliang Cui, Assistant Professor, Georgetown University, United States

Vishal Agrawal, Associate Professor, Georgetown University, United States

We study how a multi-channel or omni-channel retailer should decide the number and size of physical stores. We also study the effect of three common omni-channel strategies: showroom stores, return flexibility, and in-store pick-up.

093-1560 Managerial Incentives, Operational Decisions, and Firm Outcomes: Evidence From a Quasi-Experiment at a Retail Chain

Saravanan Kesavan, Associate Professor, University of North Carolina Chapel Hill, United States

Camelia Kuhnen, Associate Professor, Kenan-Flagler Business School, United States

Hyun Seok (Huck) Lee, Assistant Professor, Oregon State University, United States

Using archival data, we examine the impact of an incentive change (from being purely dependent on store performance to being dependent upon both store and corporate performance) at a retail chain on stores' financial and operational outcomes as well as some of the underlying operational decisions made by managers.

125	Friday, 04:30 PM - 06:00 PM, Fairchild East	Track: Socially Responsible Operations
	Invited Session: Food Safety Operations	
	Chair(s): Duo Shi Lingxiu Dong	

093-0397 Systemic Risk Management of Food Supply Chains

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

Qi Yang, Student, Massachusetts Institute of Technology, United States

Retsef Levi, Professor, MIT, United States

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

Due to China's dispersed agricultural supply chain, regulatory agencies have complicated decisions with regard to the focus of their testing. Using data collected on China FDA food safety tests, along with other supply chain data, we used supply chain analytics to identify key risk drivers in the supply chain.

093-1241 Integrated Optimization of Cultivation, Fertilizer Application, and Harvesting

Lusheng Shao, Senior Lecturer, University of Melbourne, Australia

Yangfang Zhou, Assistant Professor, Singapore Management University, Singapore

Onur Boyabatli, Associate Professor, Singapore Management University, Singapore

We consider the integrated optimization of key operational decisions in farm planning with uncertain farm yield and labor cost. We model this problem as a two-stage stochastic program and characterize the optimal decisions. We then examine how these uncertainties affect farm profitability and sustainability.

093-0183 Food Safety Audits in the Developing Economies: Centralization vs. Decentralization

Lingxiu Dong, Professor, Washington University St Louis, United States

Iva Rashkova, Assistant Professor, Washington University St Louis, United States

Duo Shi, Assistant Professor, The Chinese Univ of Hong Kong, Shenzhen, China

A commonly believed cause for the food safety problems in the developing economies is that the government's auditing system is decentralized. In this paper, we analytically investigate how agency structure and the food safety outcome interact by studying a canonical two-tier supply chain with the corresponding agencies.

126	Friday, 04:30 PM - 06:00 PM, Fairchild West	Track: Economics Models in Operations Management
	Invited Session: Economics of supply chain management and competition	
	Chair(s): Adem Orsdemir	

Friday, 04:30 PM - 06:00 PM

093-0196 Supply Chain Competition: A Market Game Approach

C. Gizem Korpeoglu, Assistant Professor, University College London, United Kingdom
Ersin Korpeoglu, Assistant Professor, University College London, United Kingdom
Soo-Haeng Cho, Associate Professor, Carnegie Mellon University, United States

We develop a novel model of a supply chain with multiple suppliers and multiple retailers based on a market-game mechanism that captures both suppliers' seller power and retailers' buyer power. We study supply chain expansion to include more suppliers or retailers and the integration of local supply chains.

093-0434 Price Competition Under Social Comparison and Demand Uncertainty

Yun Zhou, Assistant Professor, McMaster University, Canada
Ming Hu, Professor, University of Toronto, Canada
Tony Haitao Cui, Associate Professor, University of Minnesota, United States

We study a price competition problem under a duopoly setting. Either of the two firms receive a positive utility if it outperforms the competitor in revenue and incurs a disutility if outperformed. We show that depending on the demand variability, the social comparison behavior may intensify or alleviate competition.

093-1183 Long-Term Salesforce Compensation

Long Gao, Assistant Professor, University of California Riverside, United States

We study a long-term salesforce compensation problem in a dynamic environment, where salespeople can learn from over time. We characterize the optimal compensation plan and provide new managerial recommendations.

093-1072 To Commit or Not to Commit: Product Rollover Strategies in a Supply Chain

Adem Orsdemir, Assistant Professor, University of California Riverside, United States
Elodie Adida, Associate Professor, University of California Riverside, United States

When launching products manufacturers can phase out the old generation of the product (single rollover) or can sell the old generation (dual rollover). We investigate whether manufacturers should commit to a single rollover or not. We find committing to single rollover can hurt even when a single rollover arises in equilibrium.

127	Friday, 04:30 PM - 06:00 PM, Embassy	Track: Environmental Operations Management
	Invited Session: Issues in Environmental Operations Management	
	Chair(s): Erin Mckie	

093-0069 Supplier Development in a Multi-Tier Supply Chain

Ozgen Karaer, Assistant Professor, Middle East Technical University, Turkey
Tim Kraft, Assistant Professor, Sloan School of Management, United States
Pinar Yalcin, Student, Middle East Technical University, Turkey

We examine how a buyer can use a full-control strategy to develop the sustainable quality capabilities of his tier-1 and tier-2 suppliers. In particular, we consider how the buyer's and the suppliers' decisions are impacted by consumers' demand sensitivity to sustainable quality and the division of the supply chain margin.

093-0278 Supply Chain Network Structure and Environmental Information Disclosure

Marcus Bellamy, Assistant Professor, Boston University, United States
Suvrat Dhanorkar, Assistant Professor, Penn State University State College, United States
Ravi Subramanian, Associate Professor, Georgia Tech, United States

Recognizing that supply network structure has implications for a focal firm's ability to access environmental information embedded in its supply network, this paper draws on structural, environmental, and financial data from Bloomberg to test the relationship between a focal firm's supply network structure and its extent of environmental information disclosure.

093-2203 Offering Trade-Ins for Competitor's Used Products

Narendra Singh, Assistant Professor, Indian School of Business, India

The firms increasingly offer trade-ins for their competitors' used products. While such trade-ins may allow a firm to compete more aggressively, they may also increase resale value of competitors' products. I study the implications of a firm offering trade-ins to consumers who own used products sold by a competing firm.

128	Friday, 04:30 PM - 06:00 PM, Du Pont	Track: Revenue Management and Pricing
	Invited Session: Revenue Management for Online Advertising	
	Chair(s): John Turner	

093-0310 Effect of Complex Multimedia Advertising Campaigns: A Causal Inference Model for Big Data

Pengyuan Wang, Assistant Professor, University of Georgia, United States
Guiyang Xiong, Assistant Professor, Syracuse University, United States
Will Wei Sun, Assistant Professor, University of Miami, United States
Jian Yang, Director, Oath Inc., United States

This study introduces a novel tree-structured causal inference model, which is nonparametric, flexible, computationally efficient, and suitable to analyze complicated nonlinear effects. The model enables automatic segmentation of consumers, allowing advertisers to better optimize the allocation of ad resources via accurate targeting.

Friday, 04:30 PM - 06:00 PM

093-0498 Managing Digital Advertising Campaigns

Naren Agrawal, Professor, Santa Clara University, United States
Sami Najafi Asadolahi, Assistant Professor, Santa Clara University, United States
Stephen Smith, Professor, Santa Clara University, United States

Advertising agencies manage numerous ad campaigns for multiple clients in real-time. Because of uncertainties in the demand from campaigns for viewers, and the rate at which the target viewers visit websites, ensuring that campaigns proceed according to plan is a difficult challenge. We describe a methodology to manage such campaigns.

093-0908 Markov Chain Models for Controlling the Exposure Frequency Distribution of Online Advertising

Ali Hojjat, Assistant Professor, University of New Hampshire, United States
John Turner, Associate Professor, University of California, Irvine, United States

Recent trends in online advertising show that explicit reach and frequency specifications are preferred over aggregate impression or budget goals. We propose ad serving policies that can achieve a desired frequency distribution for an online ad campaign, over a fixed or rolling horizon, using Markov Chain models.

093-0902 Waterfall Revenue Optimization for Online Advertising

Dmitri Arhipov, Researcher, University of California, Irvine, United States
John Turner, Associate Professor, University of California, Irvine, United States
Michael Dillencourt, Professor, University of California, Irvine, United States
Amelia Regan, Professor, University of California, Irvine, United States

Advertisers pay a fixed price for impressions they accept and the ad network sequentially polls advertisers from a list until either an advertiser accepts the slot or time runs out. We formulate a stochastic optimization problem where advertisers vary in their time-to-decision and the prices they pay.

129	Friday, 04:30 PM - 06:00 PM, Cardozo	Track: Data Science
	Contributed Session: Forecasting and Optimization	
	Chair(s): Ruihao Zhu	

093-1529 One Step-Ahead Predictive Ability in Nested Regression Models

Stergios Fotopoulos, Professor, Washington State University Pullman, United States
Silu Lyu, Student, Washington State University Pullman, United States

Out-of-sample tests of predictive accuracy play a significant role in economics and finance. Predicted errors are computed for nested regression models and test statistics are determined to test the predicted ability of models. Asymptotic results are evaluated for the statistics which play a significant role in decision making.

093-1720 Cross-Temporally Coherent Forecasts for Decision Making

Nikolaos Kourentzes, Professor, Lancaster University Management School, United Kingdom
George Athanasopoulos, Professor, Monash University, Australia

Organizations rely on multiple forecasts to support decision making for different functions and planning horizons. Given different starting information and models, forecasts will differ, leading to misaligned decisions. We propose how to construct aligned forecast across all decision-making dimensions, supporting a single view of the future, with a "one-number" forecast.

093-0715 Zero-Inflated Fuzzy Time Series in Supply Chain

Henrique Ewbank, Post Doc/Researcher, Sao Paulo State University - UNESP, Brazil
Peter Wanke, Associate Professor, Coppead Graduate School of Business, Brazil

Accurate forecasting has a high impact on inventory management, allowing low levels of inventory, savings on holding costs and lost sale costs. This work studies a real-world time series of medicine demand. Authors used a zero-inflated fuzzy time series approach and compared their results with other methods from literature.

093-1470 The Bayesian Optimization Algorithm: Why OR Should Adopt It!

Myles Garvey, Assistant Professor, William Paterson University, United States
Jim Samuel, Assistant Professor, William Paterson University, United States
Rajiv Kashyap, Professor, William Paterson University, United States

Many discrete optimization problems are based on traditional metaheuristics. However, in the age of data science and machine learning, we should optimize with algorithms that "learn". One such algorithm is the "Bayesian Optimization Algorithm". Methods for employing this algorithm in OR/MS applications will be discussed.

093-0110 Learning to Optimize Under Non-Stationarity

Wang Chi Cheung, Assistant Professor, Department of ISEM, Singapore
David Simchi-Levi, Professor, Massachusetts Institute of Technology, United States
Ruihao Zhu, Student, MIT, United States

We introduce algorithms that achieve state-of-the-art dynamic regret bounds for non-stationary linear stochastic bandits setting. It captures natural applications such as ads allocation in a changing environment. We show how the difficulty posed by the non-stationarity can be overcome by a novel marriage between stochastic and adversarial bandits learning algorithms.

130	Friday, 04:30 PM - 06:00 PM, Coats	Track: Social Media and Internet of Things
	Contributed Session: Business Applications of Social Media	
	Chair(s): Niraj Kumar	

Friday, 04:30 PM - 06:00 PM

093-1324 The Battle for Homes: Is Home Sharing Disrupting Rental or Housing Markets?

Wei Chen, Assistant Professor, University of Arizona, United States

Zaiyan Wei, Assistant Professor, Purdue University, United States

Karen Xie, Assistant Professor, University of Denver, United States

We study the impact of home sharing on local real estate markets by leveraging a quasi-experiment on Airbnb. We find that home sharing has a greater impact on rental markets than housing markets. In addition, a 1% increase in Airbnb properties leads to larger increases in rents than home values.

093-1264 An Empirical Study on Authenticating Fake News on Social Media

Ajit Kumar, Student, National Institute of Industrial Engineering, Mumbai, India

Anil Kumar, Student, Tata Institute of Social Science (TISS) Mumbai, India

Gautam Prakash, Assistant Consultant, TCS, India

A social media platform is an excellent resource for news due to the low cost of storage. Individuals authenticate this news based on trust and credibility of message and source. In this empirical study, we have tested the authentication strategies. The research benefits individuals and organizations in strategic planning.

093-1123 Impact of Environmental Policy Change on Business Operations: Insights from Social Media Analytics

Niraj Kumar, Associate Professor, University of Liverpool, United Kingdom

This study aims to understand the impact of environmental policy change on business operations with the help of social media analytics. Social media data, collected before and after the policy change, are analyzed to understand the operational decision making of the manufacturing organizations.

131	Friday, 04:30 PM - 06:00 PM, Columbia 1	Track: Scheduling and Logistics
	Contributed Session: Planning, Scheduling and Routing in Production and Other Systems	
	Chair(s): Reha Uzsoy	

093-1872 Exact Algorithms for Production Planning Problem with Multiple Capacity Modules, Piecewise Concave Costs, and Subcontracting

Kartik Kulkarni, Student, Virginia Polytechnic Institute And State University, United States

Manish Bansal, Assistant Professor, Virginia Polytechnic Institute And State University, United States

We present a generalized production planning problem in which the total production capacity in each time period is the summation of binary multiples of n capacity modules of different sizes. We also consider a production planning problem with piecewise concave production costs. We develop exact algorithms to solve the aforementioned problems.

093-2135 Cleaning Plans for Mined Zones

Carolay Camacho, Student, Fundación Universidad del Norte, Colombia

Ruben Yie-Pinedo, Professor, Universidad del Norte, Colombia

This project consists of designing a decision support model for cleaning mined zones, using an optimization model that minimizes the risk associated to the cleaning of such zones. Considering the problem complexity, a meta-heuristic that finds the optimal route for the cleaning plan will be applied.

093-1924 Batch Allocation, Component Placement, and Additive Manufacturing System Performance

Maaz Kapadia, Student, North Carolina State University, United States

Binil Starly, Professor, North Carolina State University, United States

Reha Uzsoy, Professor, North Carolina State University, United States

Donald Warsing, Associate Professor, North Carolina State University, United States

We use a genetic algorithm to find profit-maximizing part sequences and physical orientations for an additive manufacturing system that fulfills due-date-specific orders for custom parts with varying shapes, sizes, structures, and surface quality requirements. Numerical experiments demonstrate the impact of allocation and placement strategies on the system profit.

132	Friday, 04:30 PM - 06:00 PM, Columbia 2	Track: Finance and Operations Management
	Invited Session: Empirical Research on OM-Finance Interface I	
	Chair(s): William Schmidt	

093-0836 Trade Credit Provision and Inventory Performance

Christopher Chen, Student, London Business School, United Kingdom

Nitish Jain, Assistant Professor, London Business School, United Kingdom

S. Alex Yang, Associate Professor, London Business School, United Kingdom

Long payment terms from trade credit are believed to be harmful to suppliers and is the driving force behind legislation across the globe, limiting its duration. Exploiting a natural experiment due to French regulation, we test theories on the relationship between trade credit and inventory decisions among European retailers.

093-2094 Manufacturing Productivity with Worker Turnover

Ken Moon, Assistant Professor, The Wharton School, United States

We use a dataset from China-based FATP facilities producing millions of consumer electronic goods weekly, yet exhibiting worker turnover exceeding 300% annually. Worker turnover impacts productivity by disrupting critical workflows and relationships. Estimating endogenous turnover as an equilibrium using reinforcement learning, we prescribe compensation reducing variable costs by 5% (\$135M).

093-0859 Inventory and Firm Performance: A Material and Financial View of an Interdependent Relationship

Robert Obermaier, Professor, University of Passau, Germany

Friday, 04:30 PM - 06:00 PM

Florian Kaiser, Student, Universitaet Passau, Germany

We investigate empirically the causal logic underlying the relationship between inventory efficiency and firm performance. The data set consists of 332 German manufacturing firms with 3,028 firm year observations and is based on annual financial data from 1990 to 2016. We use a panel vector autoregressive (PVAR) model.

093-0134 Operational Disruptions, Firm Risk, and Control Systems

William Schmidt, Assistant Professor, Cornell University, United States

Ananth Raman, Professor, Harvard University, United States

Using a natural experiment, we show that firms with credible control systems experience a materially smaller increase in their risk and a smaller decrease in their market value in the aftermath of an operational disruption. We provide evidence that lower information asymmetry between the firm and investors drive these benefits.

133 Friday, 04:30 PM - 06:00 PM, Columbia 3

Track: Product Innovation and Technology Management

Contributed Session: Partnerships in New Product Development

Chair(s): Marc Roessler

093-0976 Rights of First Negotiation and Rights of First Refusal in New Product Development Partnerships

Shantanu Bhattacharya, Associate Professor, Singapore Management University, Singapore

Sameer Hasija, Associate Professor, INSEAD, Singapore

Niyazi Taneri, Assistant Professor, National University of Singapore, Singapore

Guangyu Wan, Assistant Professor, Hunan university, China

Strategic control rights, such as the right of first negotiation (ROFN) and the right of first refusal (ROFR), are commonly used in the pharmaceutical industry for creating partnerships between biotech and pharmaceutical firms. We build a stylized principal-agent model to study the contract design problem with the ROFN and ROFR.

093-2319 Path Dependency and Structuring Partnerships in New Product Development

John Ettlie, Professor, Saunders College of Business, United States

Synchronizing partnerships entered a significant regression equation to predict new product success rate ($\text{Beta}=.293, p=.001$); 2) in a second, step-wise regression to predict the profitability percentage of new products; coordinated partnerships were the only significant dimension to enter the equation ($\text{Beta}=.256, p=.004$) controlling for scale and other variables.

093-0537 Complementarities Between Vertical Integration and Product Differentiation - A Case of Automobile Industry

Faisal Khurshid, Student, Mr, Hong Kong

Woo-Yong Park, Assistant Professor, Mr, Hong Kong

Felix Chan, Professor, Mr, Hong Kong

Given the conflicting findings regarding the impact of vertical integration on performance, this study suggests that when product market competition is strong aligning the firm's strategies, regarding product differentiation and vertical integration, it is essential for superior performance. An analysis of the U.S. hybrid electric vehicle market supports this argument.

093-2299 Perceptual Influences of Explicit and Tacit Knowledge Transfer on Product Innovativeness - An Experimental Study

Marc Roessler, Student, Rwth Aachen University, Germany

Peter Letmathe, Professor, Rwth Aachen University, Germany

Fehmi Yueksel, Student, Rwth Aachen University, Germany

Innovativeness depends on the human factor in organizations. This experimental study investigates the effect of tacit versus explicit knowledge transfer on innovativeness. We show that knowledge transfer is subject to social influences. By using creative priming, we find that tacit knowledge transfer is only superior in an adequate social environment.

134 Friday, 04:30 PM - 06:00 PM, Columbia 4

Track: Healthcare Analytics

Invited Session: Analytics for Hospital Management

Chair(s): Nan Liu Pengyi Shi

093-0533 Elective Portfolio and Patient Discharge Policies in Hospital Environments

Hessam Bavafa, Assistant Professor, University of Wisconsin-Madison, United States

Lerzan Ormeci, Associate Professor, Koc University, Turkey

Sergei Savin, Professor, University of Pennsylvania, United States

Vanitha Virudachalam, Student, University of Pennsylvania, United States

We consider a hospital that maximizes profitability through two levers: the size and composition of its portfolio of elective procedures, and early discharges, which can relieve pressure on hospital resources. We find the optimal patient portfolio and discharge thresholds which we compare to the policies in two realistic settings.

093-0656 On Scheduling Appointments in Tandem Service Systems

Shan Wang, Student, Shanghai Jiao Tong University, China

Nan Liu, Assistant Professor, Boston College, United States

Guohua Wan, Professor, Shanghai Jiao Tong University, China

In many healthcare settings, patients come for a series of services instead of a single one. A canonical example is infusion service: patients get their blood drawn first, then go to see the doctor, and finally receive treatment. We study how to manage appointment scheduling in such tandem service systems.

Friday, 04:30 PM - 06:00 PM

093-1817 New Tools for Predicting a Hospital Readmission

Stacey Mumbower, Assistant Professor, University of South Carolina, United States
Ronda Hughes, Associate Professor, University of South Carolina, United States
John Brooks, Professor, University of South Carolina, United States
Neset Hikmet, Professor, University of South Carolina, United States
Benjamin Schooley, Assistant Professor, University of South Carolina, United States

Utilizing a hospital's electronic health record platform, we added three risk assessment tools for nurses to use to standardize and improve the discharge planning process. Hospital readmissions were then predicted with the additional information using both a standard approach and a machine learning approach to compare predictive ability.

093-1811 Capacity Management in Inpatient Wards with Off-Service Placement and a Network View

Jing Dong, Assistant Professor, Columbia University, United States
Pengyi Shi, Assistant Professor, Purdue University, United States
Fanyin Zheng, Assistant Professor, Columbia University, United States

Using patient level data from a large teaching hospital in Singapore, we empirically study the impact of patient off-service placement on individual-level patient outcomes. We use simulation to quantify the impact of system-level congestion.

135 Friday, 04:30 PM - 06:00 PM, Columbia 5 Track: Healthcare Operations Management

Invited Session: **Technology and Information-Enabled Healthcare Operations Management**

Chair(s): Douglas Morrice

093-0915 Does Telemedicine Reduce Emergency Department Congestion? Evidence from New York State

Shujing Sun, Student, University of Rochester, United States
Feng (Susan) Lu, Associate Professor, Purdue University, United States
Huaxia Rui, Associate Professor, University of Rochester, United States

We investigate the role of telemedicine in enhancing emergency department efficiency. Using all the EDs data in NY, we show that ED telemedicine adoption significantly reduces average patients' length of stay and waiting time, and such efficiency improvement does not come at the expense of care quality or patient cost.

093-1061 The Impact of Custom Contracting and the Infomediary Role of Healthcare GPOs

Rajib Saha, Assistant Professor, Indian School of Business, India
Abraham Seidmann, Professor, University of Rochester, United States
Vera Tilson, Associate Professor, University of Rochester, United States

Most US hospitals purchase supplies through group purchasing organizations (GPOs), believed to lower costs due to demand aggregation. We reveal how the practice of custom contracting allows GPO vendors to exploit information asymmetry and earn even higher profits at the expense of the GPO member hospitals.

093-1855 Calling for Care? The Risky Proposition of Teletriage in Healthcare Demand Management

Ozden Cakici, Assistant Professor, American University, United States
Alex Mills, Associate Professor, Baruch College, United States

We study the impact of introducing teletriage to a healthcare system with traditional, or open-access primary care, and an Emergency Department (ED). Using a POMDP model, we find that while teletriage would benefit patients, it could be costly for the payer and increase ED usage. Our study provides these conditions.

093-0953 Coordinated Scheduling for In-Clinic and Virtual Medicine Patients in a Multi-Station Network

Douglas Morrice, Professor, The University of Texas at Austin, United States
Jingyao Huang, Student, The University of Texas at Austin, United States

Coordinated services and virtual medicine are the two innovative concepts being employed in the transformation from provider-centered care to patient-centered care. In this paper, we consider a patient appointment scheduling problem that combines those two concepts. More specifically, we study coordinated scheduling for both in-clinic and virtual medicine patients.

136 Friday, 04:30 PM - 06:00 PM, Columbia 6 Track: Healthcare Operations Management

Contributed Session: **Emergency Department operations**

Chair(s): Luis Lopez

093-1849 Accommodating Arrival Variability in Emergency Departments

Martin Land, Associate Professor, University of Groningen, Netherlands
Oskar Roemeling, Assistant Professor, University of Groningen, Netherlands
Kees Ahaus, Professor, University of Groningen, Netherlands
Ilse Grasmeijer, Student, University of Groningen, Netherlands

Earlier research in Emergency Departments showed a rather weak relationship between patient arrival intensity and length of stay. In a mixed-method study combining analysis of quantitative time series, work sampling, and direct observation data with qualitative interview data, we reveal the mechanisms applied by physicians to accommodate the arrival variability.

093-1950 Physician-Staffing in Emergency Rooms: Opening the Black-box of ER Care via a Multi-Class Multi-Stage Network

Caglar Caglayan, Student, Georgia Institute of Technology, United States
Yunan Liu, Associate Professor, North Carolina State University, United States

Friday, 04:30 PM - 06:00 PM

Turgay Ayer, Associate Professor, Georgia Tech, United States

Kalyan Pasupathy, Associate Professor, Mayo Clinic, United States

Mustafa Sir, Assistant Professor of Healthcare Systems Engineering, Mayo Clinic, United States

Keeping waiting times at acceptable levels is critical for ERs. However, optimizing physician-staffing levels to achieve this goal is a challenge due to unscheduled time-varying arrivals, medium-to-long service times, multiple patient classes and multiple treatment stages. In this talk, we discuss a queueing-theory-based staffing approach based on multi-class multi-stage network.

093-1905 Rethinking Patient Triage for Faster, More Cost-Effective Care in the Emergency Department

Elham Torabi, Assistant Professor, James Madison University, United States

Craig Froehle, Professor, University of Cincinnati, United States

Christopher Miller, Assistant Professor, Case Western Reserve University, United States

Sub-optimal capacity management in the ED is partly due to the inadequacy of the ESI triage system. Using partitioning methods, we identified sub-groups of ESI-3 patients to be redirected to the fast track without compromising quality-of-care. We evaluated the effect of this policy on system performance using discrete-event simulation.

093-1919 Triage Variability in Emergency Rooms

Roy Zuniga, Professor, INCAE, Costa Rica

Luis Lopez, Professor, INCAE, Costa Rica

Triage in emergency rooms is a common tool used to assign scarce resources to pursue life preservation and the efficient allocation of resources. When patients arrive at the emergency department, triage consistency and conformity is expected, but is it really the case? Findings tell a different story from the expected.

137 Friday, 04:30 PM - 06:00 PM, Columbia 7 Track: Supply Chain Management

Contributed Session: Supply Chain Coordination and Integration

Chair(s): Stephen Disney

093-0456 Mutual Trust Supply Chain Information Platform and Innovative Financial Scheme Based on Blockchain Technology

Huiqin Yang, Student, Peking University, China

We establish a blockchain information platform, linking supply chain alliance, financial institutions, and regulatory authority. After comparing the traditional credit financing and the innovative blockchain prepayment token financing, we find supplementing supply chain capital with blockchain token can reduce the financing cost and alleviate the financing difficulties of SMEs.

093-0557 Contract Design in a Supply Chain with Product Recall

Bin Dai, Professor, Wuhan University, China

shimiao chen, Student, Wuhan University, China

Traditional manufacturers often bear the recall costs that leads to a decrease in the quantity of order. We discuss three contracts by sharing the revenue and recall costs between a supplier and a manufacturer to induce recall efforts and order. We also find the coordination conditions for contracts.

093-1285 A Moderation Effect of Buyer-Supplier Trust on Relationships Between Supply Chain Integration and Procurement Performance

Hong Wang, Student, Warwick Manufacturing Group, China

Di Li, Lecturer, Birmingham City University, United Kingdom

Daqiang Chen, Associate Professor, Zhejiang Gongshang University, China

Supply Chain Integration (SCI) has been widely applied within the automotive industry. However, the extant literature overlooks its impact on procurement performance, which is one of the key SC functions, especially post-Brexit. This research reveals a significant correlation between SCI and procurement performance, moderated by the trust between suppliers and buyers.

093-2325 Supply Chain Coordination by Trading Pricing Power for Information

Xiaoyu Shen, Assistant Professor, Chongqing University of Posts and Telecommunications, China

Hongyan Xu, Professor, Chongqing University, China

He Huang, Professor, Chongqing University, China

Considering that a dominant buyer with pricing power orders from a supplier possessing private capacity information, we examine the scenarios under which supply chain coordination can be easily achieved by exchanging the pricing power for information, justifying the prevalence of wholesale price contract and the value of information asymmetry.

093-2303 When the Bullwhip Effect is an Increasing Function of the Lead Time

Gerard Gaalman, Retired, University of Groningen, Netherlands

Stephen Disney, Professor, Cardiff University, United Kingdom

Xun Wang, Lecturer, Cardiff University, United Kingdom

We show a positive impulse response of the demand process leads to a bullwhip effect that always increases in the lead time when the order-up-to policy is used. Using the pole-zero analysis, we reveal when the ARMA demand impulse is positive.

138 Friday, 04:30 PM - 06:00 PM, Columbia 8 Track: Supply Chain Management

Invited Session: Economic Models for Strategic Decision-Making in Supply Chain and Operations Management

Chair(s): Abhishek Roy

093-0464 Dynamics of Competition in an On-Demand Economy: A Differential Games Approach

Friday, 04:30 PM - 06:00 PM

Samayita Guha, Student, Temple University, United States
Emre Demirezen, Assistant Professor, 3M Company, United States
Subodha Kumar, Professor, Temple University, United States

The viability and success of ride hailing platforms such as Uber or Lyft, depend on how they manage their demand and pool of available drivers. In this paper, we examine how ride hailing platforms can meet demand with supply in a competitive setting.

093-1466 Supplier Encroachment in a Non-Exclusive Reselling Channel

Parshuram Hotkar, Student, McCombs School of Business, United States
Stephen Gilbert, Professor, McCombs School of Business, United States

We explore the impact of encroachment when the reseller carries the product of more than one manufacturer. We allow for different levels of substitution depending upon the product and the channel and show that the lack of exclusivity of the reseller changes many of the traditional understandings of supplier encroachment.

093-2155 Smart Contract for Supply Chains of Distributors and Manufacturer

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

In this project, I study partial coordination of decentralized supply chain consisting of two distributors and a manufacturer over multi-period horizon. Smart contracts that include information sharing and terms on it are designed and their impact on the performance of each entity at the equilibrium is analyzed.

093-2178 Strategic Inventory in Non-Exclusive Reselling Environments

Abhishek Roy, Assistant Professor, Temple University, United States
Stephen Gilbert, Professor, McCombs School of Business, United States
Guoming Lai, Associate Professor, University of Texas Austin, United States

Although the effects of strategic inventory resulting from dynamic contracts in bilateral monopolies are well known, those effects are altered when competing manufactures sell partially substitutable products through a common retailer. In contrast to a bilateral monopoly, contracts including both price and quantity commitments may arise in equilibrium.

139	Friday, 04:30 PM - 06:00 PM, Columbia 9	Track: Behavioral Operations Management
	Invited Session: Behavioral Issues in Supply Chain Management (Experiments)	
	Chair(s): Eirini Spiliotopoulou	

093-1787 The Impact of Service Level on Inventory Decisions

Jaime Andrés Castañeda, Assistant Professor, Universidad del Rosario, Colombia
Sebastian Villa, Assistant Professor, Universidad De Los Andes, Colombia

This study analyzes how a service level concern influences inventory decisions. We explicitly model a service level target in the Newsvendor problem, providing an analytical solution. Building on the analytical solution, we develop a behavioral study to analyze the effect of different penalization costs on subjects' ordering decisions.

093-2095 How Supply Chain Risks Influence Supplier Selection and Ordering Decisions: A Behavioral Investigation

Vincent (Junhao) Yu, Student, University of Minnesota, United States
Karen Donohue, Professor, University of Minnesota, United States

This study combines modeling and experimental methods to investigate buyer ordering behavior when facing suppliers with different types and levels of risks. Risks considered include reliability-related risks that disrupt the flow of supply and responsibility-related risks that influence the flow of customer demand.

093-2210 Robotics: Collaborative Order Picking with Pick-Support AGV's

Alexandros Pasparakis, Student, Rotterdam School of Management, Netherlands
Jelle De Vries, Assistant Professor, Rotterdam School of Management, Netherlands
René De Koster, Professor, Rotterdam School of Management, Netherlands

Automated guided vehicles (AGV's) are increasingly used for transport in warehouse and production processes. Human workers can use these systems in various configurations. For example, a worker can follow the AGV, or an AGV can follow the worker. We study the implications of these setups using a real-effort experiment.

093-1602 Fairness Ideals in Resource Allocation: The Case of Inventory Pooling

Spiliotopoulou Eirini, Assistant Professor, Tilburg University, Netherlands

We study fairness ideals regarding inventory allocation when multiple stores are serviced from the same inventory pool. Experimental data shows that fairness consideration plays a significant role in the allocations proposed, while participants base their proposals on realized demands (thinking along fill rates) rather than absolute profits.

140	Friday, 04:30 PM - 06:00 PM, Columbia 10	Track: Product Innovation and Technology Management
	Invited Session: Empirical Research in Innovation and Operations Management	
	Chair(s): Hyunwoo Park	

093-0386 Overcoming Integration Costs in Team Innovation: The Role of Gender Composition

Tian Chan, Assistant Professor, Emory University, United States
Haibo Liu, Assistant Professor, University of California Riverside, United States
Steffen Keck, Assistant Professor, University of Vienna, Austria

Friday, 04:30 PM - 06:00 PM

Wenjie Tang, Assistant Professor, National University of Singapore, Singapore

Innovation teams incur integration costs when attempting to converge. Such costs magnify when team-members are highly diverse or when the invention is non-decomposable. Using patent and experiment data, we show that teams with one or more women-members generate more valuable patents over all-men teams under high integration costs.

093-0394 Social Orientation and Firm Innovation from a Project Management Perspective

Xiaojin Liu, Assistant Professor, Virginia Commonwealth University, United States

Raul Chao, Associate Professor, University of Virginia, United States

This study addresses the questions of whether and how firm social orientation influences firm innovation. We propose mechanisms geared toward either proactive or reactive social orientation in project funding. Integrating large scale archival datasets, we empirically investigate the long term impact of social orientation on firm innovation.

093-1874 Reducing Wasteful Government Spending: An Empirical Study on Rebaselining in U.S. Federal Government Technology Programs

Anant Mishra, Associate Professor, University of Minnesota, United States

Dwaipayan Roy, Student, University of Minnesota, United States

Kingshuk Sinha, Professor, University of Minnesota, United States

We conceptualize and empirically examine the drivers of changes in the "baseline" - an aggregate plan which represents the original budget, schedule, and scope - of US Federal Government Information Technology programs. The findings of our study have important policy implications for minimizing the wastage of US taxpayer contributions.

093-1736 Workplace Environment Transparency, Employee Satisfaction, and Firm Innovation Performance

Hyunwoo Park, Assistant Professor, Ohio State University, United States

Morvarid Rahmani, Assistant Professor, Georgia Institute of Technology, United States

We study the relationship between employee satisfaction measured in multiple dimensions and firm innovation performance measured by patenting activities. Our preliminary analysis indicates that transparency and multi-faceted employee satisfaction have mixed and nuanced relationships with innovation performance.

Friday, 04:30 PM - 06:00 PM, Columbia 11

Track: Inventory Management

141 Invited Session: Stochastic Inventory Management

Chair(s): Joachim Arts

093-2038 Asymptotic Optimality of (r, nQ) Replenishment Policies for Serial Inventory Systems with Lost Sales

Marco Bijvank, Assistant Professor, University of Calgary, Canada

Tim Huh, Professor, Sauder School of Business, UBC, Canada

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

We study multi-stage serial inventory systems with periodic reviews, deterministic lead times, and stochastic demand where excess demand is lost, and show that order-up-to policies are asymptotically optimal as the penalty cost grows large (i.e., high service levels). Furthermore, we illustrate the cost-effectiveness of these policies for moderate service levels.

093-0791 Asymptotic Optimality of Constant-Order Policies in Joint Pricing and Inventory Control Models

Xin Chen, Professor, Industrial & Systems Engineering, United States

Alexander Stolyar, Professor, University of Illinois Urbana-Champaign, United States

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

We study a joint pricing and inventory control problem with replenishment lead times. Although this fundamental problem has been extensively studied in the literature, the structure of the optimal policy remains poorly understood. We prove a simple constant-order and dynamic pricing policy is asymptotically optimal as the lead time grows.

093-1000 Controlling Distribution Inventory Systems with Shipment Consolidation and Compound Poisson Demand

Lina Johansson, Student, Lund University, Sweden

Danja R. Sonntag, Assistant Professor, University of Mannheim, Germany

Johan Marklund, Professor, Lund University, Sweden

Gudrun P. Kiesmueller, Professor, Universitaet Magdeburg, Germany

We consider a one-warehouse-multiple-retailer inventory system with compound Poisson demand and time-based shipment consolidation. Our aim is to develop computationally attractive heuristics to determine the shipment intervals and the required amount of safety stock that minimize total cost. A numerical study illustrates that the proposed heuristics perform very well.

093-0716 Deep Reinforcement Learning to Solve Dual Sourcing Inventory Problems

Joren Gijsbrechts, Student, KU Leuven, Belgium

Robert Boute, Associate Professor, KU Leuven, Belgium

Jan Van Mieghem, Professor, Northwestern University, United States

Dennis Zhang, Assistant Professor, Washington University St Louis, United States

We provide proof of concept that deep reinforcement learning (DRL) can be applied to the classic, intractable, dual sourcing inventory problem. Step-by-step guidance on how to apply DRL to a real data set is proffered together with a careful discussion of its performance, strengths, and weaknesses.

Friday, 04:30 PM - 06:00 PM, Columbia 12

Track: Retail Operations

142 Invited Session: Assortment Planning and Discrete Choice Modeling

Chair(s): Ying Cao Guang Li

Friday, 04:30 PM - 06:00 PM

093-1075 Assortment Optimization for a Multi-Stage Choice Model

Yunzong Xu, Student, Massachusetts Institute of Technology, United States

Zizhuo Wang, Assistant Professor, University of Minnesota, United States

Motivated by practical selling scenarios that require previous purchases to unlock future options, we consider a multi-stage assortment optimization problem where the seller makes sequential assortment decisions with commitment and the customer makes sequential choices to maximize utility.

093-1889 Sample Boxes for Retail Products: Bundling Experience Goods to Leverage Consumer Uncertainty

Alireza Yazdani, Student, University of Oregon, United States

Eren Cil, Associate Professor, University of Oregon, United States

Michael Pangburn, Associate Professor, University of Oregon, United States

Consumers often try a few varieties of an experience product before they establish their shopping routine. Sample boxes create value through helping consumers resolve their valuation uncertainties of these varieties earlier and at a lower cost. We study how firms and consumers share this added value under different market scenarios.

093-1956 Robust Demand Estimation with Customer Choice-Based Models for Sales Transaction Data

Jongho Im, Assistant Professor, Yonsei University, South Korea

Sanghoon Cho, Student, University of South Carolina, United States

Mark Ferguson, Professor, University of South Carolina, United States

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

We propose a statistical procedure that can estimate the effect of product attributes and unobservable lost sales under a choice-based demand model using only historical sales transactions, product availability data, and market share information. A set of simulation studies is conducted in comparison to several existing methods.

093-2249 Tell Me What I Want: A Study of Assortment Planning for Learning Consumers

Dorothee Honhon, Associate Professor, University of Texas Dallas, United States

Canan Ulu, Associate Professor, Georgetown University, United States

Yulia Vorotyntseva, Post Doc/Researcher, Temple University, United States

We develop a model that incorporates consumer learning into a firm's assortment problem. Consumer's prior beliefs affects their choice of a product from a given category, and the subsequent experience, in turn, affects their beliefs and future choices. We analyze the firm's optimal assortment policy in this setting.

Friday, 04:30 PM - 06:00 PM, Monroe

Track: Humanitarian Operations and Crisis Management

143 Invited Session: **Non-traditional Humanitarian Crises**

Chair(s): Kezban Yagci Sokat

093-0513 Can Policies with Limited Enforcement Reduce Harm? Evidence from Transshipment Bans

Hamsa Bastani, Assistant Professor, University of Pennsylvania, United States

Joann de Zegher, Assistant Professor, MIT, United States

Transshipment bans are espoused as a partial solution to illegal fishing and forced labor in seafood supply chains. Despite significant enforcement challenges, we find that transshipment bans reduce transshipments by 57%, while only increasing landing fish costs by 3.2%. Surprisingly, bans do not appear to cause significant strategic evasion.

093-1990 Network Interdiction Models to Disrupt Human Trafficking Supply Chains

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

Xiaodan XIE, Student, Ohio University, United States

This presentation provides a characterization of human trafficking networks (HTN) using a supply chain framework and a Network Interdiction Model (NIM) under incomplete information to cripple them. Results provide relevant insights aimed to inform law enforcement agencies in designing anti-trafficking policies and strategies.

093-2157 How Supply Chains Break

Shawn Bhimani, Student, University of Leicester, United States

We present an econometric analysis of the types and causes of supply chain failure, including a framework to better predict, prevent and understand catastrophic supply chain disruptions. This is critical for continuity of operations in corporate, military, and humanitarian supply chains, as well as for breaking illegal supply chains.

093-0176 Modeling Human Trafficking

Kezban Yagci Sokat, Lecturer, Northwestern University, United States

Nezih Altay, Associate Professor, Depaul University, United States

Human trafficking has become a serious concern for society and the global economy. While there has been a lot of attention in this topic in the social contexts, there is little in the humanitarian operations community. We investigate the impact of different laws.

093-1526 Understanding Labor Trafficking

Kezban Yagci Sokat, Lecturer, Northwestern University, United States

Nezih Altay, Associate Professor, Depaul University, United States

Modern day slavery has become an alarming issue in supply chains. We investigate company policies on labor trafficking and their impact on company performance.

Friday, 04:30 PM - 06:00 PM

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Friday, 04:30 PM - 06:00 PM, Lincoln East

Track: Humanitarian Operations and Crisis Management

Contributed Session: Hunger Relief and Supply Chain Performance

Chair(s): Kate Hughes

093-0237 Product Availability, Consumer Stockpiling, and Hurricane Disasters: Empirical Evidence from a Natural Experiment

Xiaodan Pan, Assistant Professor, Concordia University, Canada

Martin Dresner, Professor, University of Maryland, United States

Benny Mantin, Professor, University of Luxembourg, Luxembourg

Jun Zhang, Scientist, NOAA's Atlantic Oceanographic & Meteorological Laboratory, United States

As exogenous events, hurricanes provide a natural experiment to test retail operations performance during natural disasters. We study consumer stockpiling behavior prior to the onset of hurricane landfalls, with a focus on the impact of this behavior on in-store product availability for various formats of retail store outlets.

093-0965 Solving Food Insecurity: Can Supply Chain Managements Bring About Time, Form, Place and Possession Utility?

Misty Blessley, Assistant Professor, Temple University, United States

Saif Mir, Assistant Professor, College of Charleston, United States

Food insecurity, or being without reliable access to enough nutritious food at an affordable cost, is a problem that continues to plague every corner of the globe. Our qualitative research reveals how needing all four economic utilities presents hunger relief challenges, and asks how supply chain management can help.

093-1883 Empirical Study of the Value of Agricultural Supply Chain Relationships in Mbale, Uganda

Megan Peters, Student, The George Washington University, United States

Erica Gralla, Assistant Professor, George Washington University, United States

We implement a field study in Uganda with USAID to empirically determine a set of common sources of relationship value (e.g. loans, credit) for farmers and agribusinesses. We develop a methodology for measuring these aspects of supply chain relationships, highlighting the differences between relationships in developed and developing economic contexts.

093-1984 An Exploratory Review of the Challenges in "Human Baby Milk" Logistics in the Indonesian Context

Bhanupriya Parasar, Student, Stamford International University, Thailand

Kate Hughes, Senior Lecturer, Stamford Int. University in Bangkok, Thailand

Rajavadivel Santhanakrishnan, Student, Stamford International University, Thailand

Chirag Naithani, Student, Stamford International University, Thailand

"Milk banks" in hospitals are a unique solution for providing sustenance for babies unable to feed from their mother. In Europe and the USA this is extended into a delivery service. In Indonesia, this service is more complex with the requirement for a customer-to-customer solution for baby milk distribution.

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Friday, 04:30 PM - 06:00 PM, Lincoln West

Track: Empirical Research in Operations Management

Contributed Session: Supply Chain Management

Chair(s): Suman Niranjana

093-0848 A two-stage Network DEA Model for big-data-based supply chain analysis

Zheng Weijie, Student, Huazhong University of Science & Technology, China

Xianhao Xu, Professor, Huazhong University of Science & Technology, China

Yeming Gong, Professor, Business School, France

For the impact of big data investment on business performance of multinational enterprises, we construct an improved two-stage network DEA model. We build a framework to understand the role of big data investment and supply chain operations performance in business performance.

093-0323 How Firm's Relational Capabilities Influence the Development of Dynamic Capabilities: The Case of Emerging Economies

Ritu Singh, Student, Indian Institute of Management Raipur, India

Parikshit Charan, Assistant Professor, Indian Institute of Management Raipur, India

Using the theory of relational view, this study investigates how firm's relational capabilities affect the development of dynamic capabilities and performance in emerging economies using AMOS-SEM technique. The survey analysis of 219 firms indicates that when competition intensifies, the internal relational capability helps in building the dynamic capabilities more effectively.

093-0993 The Location Decision Revisited: The Drivers of Plant Openings and Closures in the Automotive Industry

Ioannis Siskos, Student, Vlerick Business School, Germany

Matthias Holweg, Professor, Oxford University, United Kingdom

Ann Vereecke, Professor, Vlerick Business School, Belgium

Luk Van Wassenhove, Professor, INSEAD, France

In this work we empirically investigate how macro-level factors influence the openings and closures of car assembly plants, using 200 opening and 82 closure cases between 2000 and 2015 in 30 countries. We extend the literature by further examining both events simultaneously.

093-2443 Effect of Consumer Personality and Culture on Loyalty: Role of Supply Chain Flexibility

Suman Niranjana, Associate Professor, Savannah State University, United States

Raymond Elliot, Student, Savannah State University, United States

David Simmonds, Assistant Professor, Savannah State University, United States

Friday, 04:30 PM - 06:00 PM

We conduct a two-country study (U.S. and India), where we analyze the effect that personality, culture, behavior of consumer, and service quality has on consumers trust, attitudes, and perceived customer service level, and thus lead to consumer loyalty. These relationships are analyzed with Supply Chain flexibility as a moderator.

147	Friday, 04:30 PM - 06:00 PM, Jefferson West	Track: Supply Chain Risk Management
	Invited Session: Economics models in operations	
	Chair(s): Wenxin Xu	

093-1467 Target Ratcheting and Incentive Dynamics

Iny Hwang, Associate Professor, Seoul National University, South Korea

Youngsoo Kim, Assistant Professor, University of Alabama Tuscaloosa, United States

Michael Lim, Associate Professor, Seoul National University, South Korea

Using agency model, we study how dynamic incentive is affected by the interplay between capability ambiguity and performance noise. We find that performance noise has contrasting consequences for ratchet effects depending on capability ambiguity. Our result has implications for the firm's choice on managers under uncertainty between insider and outsider.

093-2081 A Learning Algorithm for Capacity Provisioning of Queueing Systems with Impatient Customers

Shining Wu, Assistant Professor, The Hong Kong Polytechnic University, Hong Kong

We study the capacity provisioning problem of a service system where system information is unknown. Customers are impatient and may abandon the system. We develop learning algorithm for the firm to maximize its long run profit by adjusting service capacity on the fly as more data are collected during operations.

093-2103 The Drivers of Environmental Improvement, Or They Are Not

Anton Shevchenko, Assistant Professor, Concordia University, Canada

Wenxin Xu, Assistant Professor, The Hong Kong Polytechnic University, Hong Kong

Karthik Murali, Assistant Professor, Oregon State University, United States

Our goal is to understand how the government should intervene to pressure incumbent industry members to make significant investments in a new, environmentally sustainable technology.

148	Friday, 04:30 PM - 06:00 PM, Georgetown East	Track: Supply Chain Risk Management
	Invited Session: Managing the Supply Chain Disruptions and the Ripple Effect: Models and Risk Analytics	
	Chair(s): Dmitry Ivanov	

093-0241 Coordinating a Multi-Stage Supply Chain Under Disruption Risk

Florian Lucker, Assistant Professor, Cass Business School, United Kingdom

Sunil Chopra, Professor, Kellogg School of Management, United States

We study multi-stage supply chains with centralized and decentralized structures. We show that managing a decentralized supply chain results in sub-optimal performance relative to a centralized supply chain. We discuss ways to mitigate the misalignment in the decentralized supply chain.

093-0243 Competitive Sourcing of Substitute Products Under Supply Disruption

Dmitry Ivanov, Professor, Berlin School of Economics and Law, Germany

Varun Gupta, Assistant Professor, Penn State University Erie, United States

Tsan-Ming Choi, Professor, Hong Kong Polytechnic Univ, Hong Kong

We study the effects of a capacity disruption on price-setting decisions for substitute products in a two-supplier, one-retailer supply chain setting. We examine the equilibrium pricing strategies of the suppliers and retailer and reveal the differences and commonalities in pricing based on timing.

093-0645 Personal and Organizational Relationships in Humanitarian Supply Chains

Iana Shaheen, Student, University of South Florida, United States

Mariia Khilkovskaia, Student, University of South Florida, United States

Arash Azadegan, Associate Professor, Rutgers University, United States

This study examines the importance of personal and organizational relationships among humanitarian actors before and after disasters. By analyzing the responses from 20 organizations, we find that while most humanitarian organizations utilize their organizational relationships during inactive stages, personal relationships become more critical during active stages of disaster relief.

093-1640 Disruption Tails or What is the Supply Chain Recovery? A Retail Supply Chain Simulation

Dmitry Ivanov, Professor, Berlin School of Economics and Law, Germany

We study production-ordering behaviour in a retail supply chain (SC) in recovery and post-disruption periods with disruption risks. Disruption-driven changes in SC behaviour may result in backlog and delayed orders, the accumulation of which in the post-disruption period we call "disruption tails".

149	Friday, 04:30 PM - 06:00 PM, Georgetown West	Track: Teaching/Pedagogy in POM
	Contributed Session: Action Learning in POM Courses	
	Chair(s): Xiangjing Chen	

093-2207 Cultivating an Action Learning Culture

Stanley Fawcett, Professor, Weber State University, United States

Amydee Fawcett, Assistant Professor, Weber State University, United States

Friday, 04:30 PM - 06:00 PM

The Wall Street Journal headline read, "Many Colleges Fail to Improve Critical-Thinking Skills." The AACSB is placing more emphasis on "learning by doing" and high-impact practices. Action learning (aka, experiential education) enhances student engagement and improves learning outcomes. This workshop show how to cultivate a collaborative, action-learning culture.

093-2258 The Impact of Experiential Learning on Cross-Functional Team

LILLIAN FOK, Associate Professor, Western Washington University, United States

AUDREY TAYLOR, Professor, Western Washington University, United States

Xiaoyu Shen, Assistant Professor, Chongqing University of Posts and Telecommunications, China

This study applies experiential learning principles to a cross-functional team comprised of undergraduate and graduate Accounting and Supply Chain Management students to solve capacity-related problems for a company. The research broadens students' understanding that business problems need multi-disciplinary involvement. The post-project survey captured the impact of EL on students.

093-2304 An Inquiry-Based Learning Exercise for Teaching Inventory Management

Matthew Drake, Associate Professor, Duquesne University, United States

Ryan Atkins, Assistant Professor, Duquesne University, United States

We describe an inquiry-based learning classroom exercise designed to enhance students' understanding of the analysis required to establish order quantities and reorder points. Students are given a scenario with several parameters missing from the description and have to request the required data from the instructor.

093-1365 Impact of Assessment Gamification on Student Attitude & Satisfaction in O&SCM Course

Hee Yoon Kwon, Student, University of Rhode Island, United States

Koray Ozpolat, Associate Professor, College of Business, United States

We deviate from the existing piecemeal approach of gamified course design and implement gamification in course elements meaningful to students and examine the effects on students' attitude and satisfaction.

093-2185 ASU Operations Management Review: A Way Forward for OM Research

Yimin Wang, Assistant Professor, Arizona State University Tempe, United States

Seongkyoon Jeong, Student, Arizona State University, United States

Seth Washispack, Student, Arizona State University, United States

Xiangjing Chen, Student, W.P. Carey School of Business, United States

Decreasing the distance between innovative knowledge in the OM literature and its beneficiaries is critical for our field to stay relevant. Using a structured and relevance-enhanced approach in a seminar setting, we developed a review delivering up-to-date knowledge to OM stakeholders, with promising benefits to PhD students, faculty, and practitioners.

150	Friday, 04:30 PM - 06:00 PM, Cabinet	Track: Sustainable Operations
	Invited Session: Tutorial: Secondary Markets for Electronics; Design Challenges and Opportunities	
	Chair(s): Wedad Elmaghraby	

093-2446 Secondary Markets for Electronics; Design Challenges and Opportunities: A Tutorial

Wedad Elmaghraby, Professor, University of Maryland, United States

This tutorial presents current research in market design for secondary markets in electronics. To resell returned and used electronic merchandise that flows back to retailers and OEMS, online Business-to-Consumer and Business-to-Business marketplaces have emerged. These markets present interesting operational challenges, encompassing inventory management, pricing and revenue management, and sustainability issues.
