

2022 Winter Simulation Conference (WSC 2022)

**Singapore
11-14 December 2022**

Pages 1-700



**IEEE Catalog Number: CFP22WSC-POD
ISBN: 978-1-6654-7662-1**

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP22WSC-POD
ISBN (Print-On-Demand):	978-1-6654-7662-1
ISBN (Online):	978-1-6654-7661-4
ISSN:	0891-7736

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Empirical Uniform Bounds for Heteroscedastic Metamodeling	1
<i>Yutong Zhang, Xi Chen</i>	
Estimating Confidence Regions for Distortion Risk Measures and Their Gradients	13
<i>Lei Lei, Christos Alexopoulos, Yijie Peng, James R. Wilson</i>	
Overlapping Batch Confidence Regions on the Steady-State Quantile Vector	25
<i>Raghuram Pasupathy, Dashi I. Singham, Yingchieh Yeh</i>	
Robust Simulation Design for Generalized Linear Models in Conditions of Heteroscedasticity or Correlation.....	37
<i>Andrew Gill, David J. Warne, Clare McGrory, James M. McGree, Antony M. Overstall</i>	
Gaussian Processes for High-Dimensional, Large Data Sets: A Review	49
<i>Mengrui Jiang, Giulia Pedrielli, Szu Hui Ng</i>	
Sample Average Approximation Over Function Spaces: Statistical Consistency and Rate of Convergence	61
<i>Zihe Zhou, Harsha Honnappa, Raghuram Pasupathy</i>	
A Sequential Method for Estimating Steady-State Quantiles Using Standardized Time Series.....	73
<i>Athanassios Lolas, J. Haden Boone, Christos Alexopoulos, David Goldsman, Kemal Dinçer Dingeç, Anup C. Mokashi, James R. Wilson</i>	
Tail Quantile Estimation for Non-Preemptive Priority Queues.....	85
<i>Jin Guang, Guiyu Hong, Xinyun Chen, Xi Peng, Li Chen, Bo Bai, Gong Zhang</i>	
Input Uncertainty Quantification for Quantiles	97
<i>Drupad Parmar, Lucy E. Morgan, Andrew C. Titman, Richard A. Williams, Susan M. Sanchez</i>	
Likelihood Ratio Density Estimation for Simulation Models	109
<i>Florian Puchhammer, Pierre L'Ecuyer</i>	
Density Estimators of the Cumulative Reward Up to a Hitting Time to a Rarely Visited Set of a Regenerative System	121
<i>Marvin K. Nakayama, Bruno Tuffin</i>	
Rare-Event Simulation Without Variance Reduction: An Extreme Value Theory Approach.....	133
<i>Yuanlu Bai, Henry Lam, Sebastian Engelke</i>	
Efficient Rare Event Estimation for Maxima of Branching Random Walks.....	145
<i>Michael Conroy, Mariana Olvera-Cravioto</i>	
A Classification Method for Ranking and Selection with Covariates	156
<i>Gregory Keslin, Barry L. Nelson, Matthew Plumlee, Bernardo K. Pagoncelli, Hamed Rahimian</i>	
Green Simulation Based Policy Optimization with Partial Historical Trajectory Reuse.....	168
<i>Hua Zheng, Wei Xie</i>	
Let's Do Ranking & Selection	180
<i>Barry L. Nelson</i>	

Distributed Agent-Based Simulation with Repast4Py	192
<i>Nicholson Collier, Jonathan Ozik</i>	
Hybrid Simulation Modeling Formalism Via O ² DES Framework for Mega Container Terminals.....	207
<i>Haobin Li, Xinhua Cao, Ek Peng Chew, Kok Choon Tan, Kaustav Kundu, Hongdan Chen</i>	
EMS Operations Management: Simulation, Optimization, and New Service Models	222
<i>Nan Kong, Juan C. Paz, Xiaoquan Gao</i>	
From Discovery to Production: Challenges and Novel Methodologies for Next Generation Biomanufacturing.....	238
<i>Wei Xie, Giulia Pedrielli</i>	
A Tutorial on How to Set Up a System Dynamics Simulation on the Example of Covid-19 Pandemic	253
<i>Stina Dellas, Abdelgafar Ismail, Hans Ehm, Anna Hartwick</i>	
Advanced Tutorial: Parallel and Distributed Methods for Scalable Discrete Simulation.....	268
<i>Philipp Andelfinger, Wentong Cai</i>	
Blockchain: A Review from the Perspective of Operations Researchers	283
<i>Hong Wan, Kejun Li, Yining Huang</i>	
Extending the Naming Game in Social Networks to Multiple Hearers Per Speaker.....	298
<i>Aradhana Soni, Kalyan S. Perumalla, Xueping Li</i>	
A Bayesian Uncertainty Quantification Approach for Agent-Based Modeling of Networked Anagram Games	310
<i>Xueying Liu, Zhihao Hu, Xinwei Deng, Chris J. Kuhlman</i>	
Identifying Correlates of Emergent Behaviors in Agent-Based Simulation Models Using Inverse Reinforcement Learning.....	322
<i>Faraz Dadgostari, Samarth Swarup, Stephen Adams, Peter Beling, Henning S. Mortveit</i>	
Agent-Based Modeling and Simulation of Multidimensional Impacts of Construction Labor Productivity Factors.....	334
<i>Lynn Shehab, Diana Salhab, Elyar Pourrahimian, Mohamed Elmenshawy, Farook Hamzeh</i>	
Simulating Emergency Evacuations with a Learnable Behavioural Model.....	346
<i>Muhammad Shalihin Bin Othman, Gary Tan</i>	
Simulation-Based Analysis of Evacuation Elevator Allocation for a Multi-Level Hospital Emergency Department	358
<i>Boyi Su, Jaeyoung Kwak, Ahmad Reza Pourghaderi, Michael H. Lees, Kenneth B. K. Tan, Shin Yi Loo, Ivan S. Y. Chua, Joy L. J. Quah, Wentong Cai, Marcus E. H. Ong</i>	
The Effect of Influencers on Societal Polarization	370
<i>John M. Betts, Ana-Maria Bliuc</i>	
A Heuristic-Based Airport Shopping Behavior Model with Agent-Based Simulation	382
<i>Yimeng Chen, Cheng-Lung Wu, Ngai Ki Ma</i>	
Modelling Aircraft Priority Assignment by Air Traffic Controllers During Taxiing Conflicts Using Machine Learning.....	394
<i>Vidurveer Duggal, Thanh-Nam Tran, Duc-Thinh Pham, Sameer Alam</i>	

A Multi-Agent Reinforcement Learning Approach for System-Level Flight Delay Absorption	406
<i>Kanupriya Malhotra, Zhi Jun Lim, Sameer Alam</i>	
Towards Automated Apron Operations - Training of Neural Networks for Semantic Segmentation Using Synthetic LiDAR Sensors	418
<i>Michael Schultz, Stefan Reitmann, Bernhard Jung, Sameer Alam</i>	
On the Role of HLA-Based Simulation in New Space.....	430
<i>Frank Morlang, Steffen Strassburger</i>	
Discrete- Event Supervisory Control for the Landing Phase of a Helicopter Flight.....	441
<i>James Horner, Tanner Trautrim, Cristina Ruiz Martin, Gabriel Wainer, Iryna Borshchova</i>	
Exploring Covid-19 Survivor Perception Toward Government's Policies in Responding to Covid- 19.....	453
<i>Anggraini D. Saputri, Hilya M. Arini</i>	
Effects of Information Sharing on Swarm Based Communication in Dynamic Environments.....	461
<i>Jenny Tran, Peter Fule, Claudia Szabo</i>	
Cyber Deception Metrics for Interconnected Complex Systems.....	473
<i>Md Ali Reza Al Amin, Sachin Shetty, Charles Kamhoua</i>	
A Dynamic Theory of Security Free-Riding by Firms in the WFH Age.....	484
<i>Ranjan Pal, Rohan Xavier Sequeira, Louise Zhu, Yushi She</i>	
Calibrating Simulation Models with Sparse Data: Counterfeit Supply Chains During Covid-19	496
<i>Isabelle M. Van Schilt, Jan H. Kwakkel, Alexander Verbraeck, Jelte P. Mense</i>	
Regional Maximum Hospital Capacity Estimation for COVID-19 Pandemic Patient Care in Surge Through Simulation.....	508
<i>Bahar Shahverdi, Hadi Ghayoomi, Elise Miller-Hooks, Mersedeh Tariverdi, Thomas D. Kirsch</i>	
Simulating Counterfeit Personal Protective Equipment (PPE) Supply Chains During Covid-19	521
<i>Layla Hashemi, Chu Chuan Jeng, Ahna Mohiuddin, Edward Huang, Louise Shelley</i>	
COVID-19 Supply Chain Planning: A Simulation-Optimization Approach.....	533
<i>Samaneh Maghoulan, Hande Musdal Ondemir, Mohammad Dehghanimohammabadi</i>	
Impact of Vaccination Policies for COVID-19 Using Hybrid Simulation	545
<i>Felisa J. Vázquez-Abad, Daniel Dufresne, Gi-Beom Park</i>	
Agent Based Simulatable City Digital Twin to Explore Dynamics of Covid-19 Pandemic.....	557
<i>Souvik Barat, Aditya Paranjape, Ritu Parchure, Shrinivas Darak, Vinay Kulkarni</i>	
Towards Reusable Building Blocks to Develop COVID-19 Simulation Models.....	569
<i>Shane A. Schroeder, Christopher Vendome, Philippe J. Giabbanelli, Alan M. Montfort</i>	
Modelling the Delta Covid-19 Wave in Mumbai	581
<i>Sandeep Juneja, Daksh Mittal</i>	
Modeling and Simulation for the Spread of Covid-19 in an Indian City: A Case Study.....	593
<i>Aditya A. Paranjape, Souvik Barat, Anwesha Basu, Rohan Salvi, Supratim Ghosh, Vinay Kulkarni</i>	

Evaluating the Covid-19 Screening Regime for Cross-Border Workers	605
<i>Yiqi Seow, Xiao Feng Yin, Haiyan Xu, Xiuju Fu, Zheng Qin, Hong Kiat Tan, Li Yang Hsu, Kiesha Prem, Sze Wee Tan</i>	
Effect of Vaccination on Risk of Exposure to Airborne Infectious Disease During the Boarding Process in a Commercial Aircraft Using Agent-Based Simulation	617
<i>Bruna H. P. Fabrin, Denise Beatriz Ferrari, José Danieel Leite, Amanda Zíngara Roza, Bren Dabela Luna</i>	
Assessing Transmission Risks of SARS-COV-2 Omicron Variant in U.S. School Facilities and Mitigation Measures.....	629
<i>Yifang Xu, Shuai Li, Qiang He, Siyao Zhu, Jiannan Cai</i>	
High-Resolution Shape Deformation Prediction in Additive Manufacturing Using 3D CNN	641
<i>Benjamin Standfield, Denis Gracanin, Rongxuan Wang, Zhenyu Kong</i>	
A New Application of Machine Learning: Detecting Errors in Network Simulations.....	653
<i>Maciej K. Wozniak, Luke Liang, Hieu Phan, Philippe J. Giabbanelli</i>	
Using Deep Learning for Simulation of Real Time Video Streaming Applications	665
<i>Abdolreza Abhari, Dipak Pudasaini</i>	
An Approach to Population Synthesis of Engineering Students for Understanding Dropout Risk	677
<i>Danika Dorris, Julie Ivy, Julie Swann</i>	
Discrete Event Simulation Using Distributional Random Forests to Model Event Outcomes.....	689
<i>Sean Reed, Magnus Löfstrand</i>	
Machine Learning Based Simulation for Fault Detection in Microgrids.....	701
<i>Joshua Darville, Temitope Runsewe, Abdurrahman Yavuz, Nurcin Celik</i>	
Exact Optimal Fixed Width Confidence Interval Estimation for the Mean.....	713
<i>Vikas Deep, Achal Bassamboo, Sandeep Juneja, Assaf Zeevi</i>	
Feature-Modified SEIR Model for Pandemic Simulation and Evaluation of Intervention Approaches.....	724
<i>Yingze Hou, Hoda Bidkhorri</i>	
Data-Driven Economic Analysis of Poultry Data Used in Complex Long-Term Egg Production Systems Combining Simulation and Machine Learning	736
<i>Rie Gaku, Louis Luangkesorn, Hiroshi Saito, Soemon Takakuwa</i>	
A Data-Driven Discrete Event Simulation Model to Improve Emergency Department Logistics	748
<i>Mohamed Nezar Abourraja, Luca Marzano, Jayanth Raghothama, Arsineh Boodaghian Asl, Adam S. Darwich, Sebastiaan Meijer, Sven Lethvall, Nina Falk</i>	
A Self-Adaptive Search Space Reduction Approach for Offshore Wind Farm Installation Using Multi-Installation Vessels.....	760
<i>Shengrui Peng, Helena Szczerbicka</i>	
Call Center Agent Scheduling Evaluation Using Discrete-Event Simulation: A Decision-Support Tool	772
<i>Samer Alsamadi, Cléa Martinez, Canan Pehlivan, Nicolas Cellier, Franck Fontanili</i>	
Maritime Disruption Impact Evaluation Using Simulation and Big Data Analytics	784
<i>Rong Zhou, Haiyan Xu, Xiuju Fu, Xiao Feng Yin, Zheng Qin, Liangbin Zhao, Pramod Verma, Mikael Lind</i>	

A System Dynamics Simulation-Based Sustainability Benchmarking.....	796
<i>Ann Francis, Albert Thomas</i>	
Smart City Digital Twins for Public Safety: A Deep Learning and Simulation Based Method for Dynamic Sensing and Decision-Making	808
<i>Xiyu Pan, Neda Mohammadi, John E. Taylor</i>	
Site Choice in Recreational Fisheries - Towards an Agent-Based Approach.....	819
<i>Kevin Haase, Harry V. Strehlow, Wolf-Christian Lewin, Oliver Reinhardt, Adelinde M. Uhrmacher</i>	
A Simulation Model for Cooperative Robotics in Dairy Farms	831
<i>Berry Gerrits, Martijn Mes, Peter Schuur, Robert Andringa</i>	
Using Simulation-Based Forecasting to Project Singapore's Future Residential Construction Demand and Impacts on Sustainability	843
<i>Elyar Pourrahimian, Malak Al Hattab, Salam Khalife, Mohamed Elmenshawy, Simaan Abourizk</i>	
Modular and Extensible Pipelines for Residential Energy Demand Modeling and Simulation	855
<i>Swapna Thorve, Anil Vullikanti, Samarth Swarup, Henning Mortveit, Madhav Marathe</i>	
Modeling and Simulation to Improve Real Electric Vehicles Charging Processes by Integration of Renewable Energies and Buffer Storage	867
<i>Konstantin Sing, Pierre Mertiny, Marco Pruckner</i>	
Importance Sampling for CoVaR Estimation.....	879
<i>Guangxin Jiang, Xin Yun</i>	
Combining Retrospective Approximation with Importance Sampling for Optimising Conditional Value at Risk	891
<i>Anand Deo, Karthyek Murthy, Tirtho Sarker</i>	
Portfolio Risk Measurement Via Stochastic Mesh with Average Weight.....	903
<i>Ben Feng, Guangwu Liu, Kun Zhang</i>	
Metamodeling for Variable Annuity Valuation: 10 Years Beyond Kriging	915
<i>Guojun Gan</i>	
Sequential Nested Simulation for Estimating Expected Shortfall	927
<i>Ou Dang, Ben Feng</i>	
Quantile Sensitivity Estimation Through Delta Family Method	939
<i>Zhenyu Cui, Kailin Ding</i>	
Simulation Model of a Multi-Hospital Critical Care Network	951
<i>Alexander R. Rutherford, Samantha L. Zimmerman, Mina Moeini, Rashid Barket, Steve Ahkioon, Donald E. G. Griesdale</i>	
How Does Imaging Impact Patient Flow in Emergency Departments?	961
<i>Vishnunarayan Girishan Prabhu, Kevin Taaffe, Marisa Shehan, Ronald Pirrallo, William Jackson, Michael Ramsay, Jessica Hobbs</i>	
A Reusable Discrete Event Simulation Model for Improving Orthopedic Waiting Lists	973
<i>Laura Boyle, Mark Mackay</i>	

Using Discrete-Event Simulation to Analyze the Impact of Variation on Surgical Training Programs.....	985
<i>Fumiya Abe-Nornes, Samir Agarwala, Nathan Smith, Rachel Zhang, Amy Cohn, Angela Thelen, Rishindra Reddy, Brian George</i>	
A Hierarchical Deep Reinforcement Learning Approach for Outpatient Primary Care Scheduling.....	997
<i>Mona Issabakhsh, Seokgi Lee</i>	
A Simulation-Optimization Framework to Improve the Organ Transplantation Offering System	1009
<i>Ignacio Erazo, David Goldsman, Pinar Keskinocak, Joel Sokol</i>	
Simulation-Optimization to Distinguish Optimal Symptom Free Waiting Period for Return-to-Play Decisions in Sport-Related Concussion.....	1021
<i>Gian-Gabriel P. Garcia, Lauren L. Czerniak, Mariel S. Lavieri, Spencer W. Liebel, Michael A. McCrea, Thomas W. McAllister, Paul F. Pasquina, Steven P. Broglio</i>	
Discrete Event Simulation to Evaluate Shelter Capacity Expansion Options for LGBTQ+ Homeless Youth.....	1033
<i>Yaren Bilge Kaya, Sophia Mantell, Kayse Lee Maass, Renata Konrad, Andrew C. Trapp, Geri L. Dimas, Meredith Dank</i>	
Simulation Model for Planning Dental Caries Prevention at the Regional Level	1045
<i>Maria Hajlasz, Bozena Mielczarek</i>	
A Simulation-Based Approach for Assessing the Impact of Uncertainty on Patient Waiting Time in the Operating Room	1057
<i>Leah Rifi, Franck Fontanili, Cléa Martinez, Maria Di Mascolo, Virginie Fortineau</i>	
Simulation and Analysis of Disruptive Events on a Deterministic Home Health Care Routing and Scheduling Solution	1069
<i>Guillaume Dessevre, Cléa Martinez, Franck Fontanili, Liwen Zhang, Christophe Bortolaso</i>	
Fatigue-Recovery Simulation Model to Analyze the Impact of Nursing Activities on Fatigue Level in an Intensive Care Unit.....	1081
<i>Vitor De Oliveira Vargas, Jung Hyup Kim, Alireza Kasaie, Laurel Despins</i>	
Could Earlier Availability of Boosters and Pediatric Vaccines Have Reduced Impact of COVID-19?	1092
<i>Erik T. Rosenstrom, Julie S. Ivy, Maria E. Mayorga, Julie L. Swann</i>	
The Issue of Trust and Implementation of Results in Healthcare Modeling and Simulation Studies.....	1104
<i>Alison Harper, Navonil Mustafee, Mike Yearworth</i>	
Workshift Scheduling Using Optimization and Process Mining Techniques: An Application in Healthcare.....	1116
<i>Alberto Guastalla, Emilio Sulis, Roberto Aringhieri, Stefano Branchi, Chiara Di Francescomarino, Chiara Ghidini</i>	
Utilizing Simulation to Update Routine Diabetic Retinopathy Screening Policies	1128
<i>Poria Dorali, Rosangel Limongi, Fariha Kabir Torsha, Christina Y. Weng, Taewoo Lee</i>	
Virtual Opioid User: Reproducing Opioid Use Phenomena with a Control Theory Model	1140
<i>Alexander Preiss, Anthony Berghammer, Georgiy Bobashev</i>	
Explainable AI for Data Farming Output Analysis: A Use Case for Knowledge Generation Through Black-Box Classifiers	1152
<i>Niclas Feldkamp, Jonas Genath, Steffen Strassburger</i>	

Simulating Prosumer Data Trading: Testing a Blockchain Smart Contract Based Control	1164
<i>David Bell, Naeem Bilal</i>	
An MVP Approach to Developing Complex Hybrid Simulation Models	1176
<i>William Jones, Philip Gun, Mehdi Foumani</i>	
Interfaces Between SD and ABM Modules in a Hybrid Model	1188
<i>Le Khanh Ngan Nguyen, Susan Howick, Itamar Megiddo</i>	
From Conceptualization of Hybrid Modelling & Simulation to Empirical Studies in Hybrid Modelling	1199
<i>Navonil Mustafee, Alison Harper, Masoud Fakhimi</i>	
Hybrid Simulation in Healthcare: A Review of the Literature	1211
<i>Eyüp Kar, Tillal Eldabi, Masoud Fakhimi</i>	
FACS-CHARM: A Hybrid Agent-Based and Discrete-Event Simulation Approach for Covid-19 Management at Regional Level.....	1223
<i>Anastasia Anagnostou, Derek Groen, Simon J. E. Taylor, Diana Suleimenova, Nura Abubakar, Arindam Saha, Kate Mintram, Maziar Ghorbani, Habiba Daroge, Tasin Islam, Yani Xue, Edward Okine, Nana Anokye</i>	
A System Dynamics Model for Studying the Resiliency of Supply Chains and Informing Mitigation Policies for Responding to Disruptions	1235
<i>William S. Bland, Andrew E. Hong, Lauren A. Rayson, Jennifer A. Richkus, Scott L. Rosen</i>	
A Hybrid Model of Multiple Team Membership and Its Impacts on System Design	1247
<i>Andrew J. Collins, Sheida Etemadidavan</i>	
Modeling and Simulation of Cyber-Physical Systems Using an Extensible Co-Simulation Framework.....	1258
<i>Jan Reitz, Tobias Osterloh, Jürgen Roßmann</i>	
Tutorial: Metamodeling for Simulation.....	1268
<i>Russell R. Barton</i>	
How to Build Valid and Credible Simulation Models.....	1283
<i>Averill M. Law</i>	
Resource Modeling in Business Process Simulation.....	1296
<i>Paolo Bocciarelli, Andrea D'Ambrogio, Gerd Wagner</i>	
Computer Assisted Military Experimentations	1311
<i>Erdal Cayirci, Ramzan Alnaimi, Sara Salem Alnabet</i>	
Simheuristics: An Introductory Tutorial.....	1325
<i>Angel A. Juan, Yuda Li, Majsa Ammouriova, Javier Panadero, Javier Faulin</i>	
Simulation: The Critical Technology in Digital Twin Development	1340
<i>Bahar Biller, Xi Jiang, Jinxin Yi, Paul Venditti, Stephan Biller</i>	
Defining DEVS Models Using the Cadmium Toolkit.....	1356
<i>Gabriel Wainer, Cristina Ruiz Martin</i>	
Digital Twin as an Aid for Decision-Making in the Face of Uncertainty.....	1371
<i>Vinay Kulkarni, Souvik Barat, Tony Clark, Balbir S. Barn</i>	

A Tutorial on Combining Flexsim with Python for Developing Discrete-Event Simheuristics.....	1386
<i>Jonas F. Leon, Paolo Marone, Mohammad Peyman, Yuda Li, Laura Calvet, Mohammad Dehghanimohammabadi, Angel A. Juan</i>	
Designing Mixed-Fleet of Electric and Autonomous Vehicles for Home Grocery Delivery Operation: An Agent-Based Modelling Study	1401
<i>Dhanan Sarwo Utomo, Adam Gripton, Philip Greening</i>	
Development of a Simulation Framework for Urban Ropeway Systems and Analysis of the Planned Ropeway Network in Regensburg, Germany	1413
<i>Simon Haimerl, Christoph Tschernitz, Tobias Schiller, Christoph Weig, Ulrich Briem, Stefan Galka</i>	
Design and Control of Shuttle-Based Storage and Retrieval Systems Using a Simulation Approach	1425
<i>Donghuang Li, Jeffrey S. Smith, Yingde Li</i>	
Dispatching Automated Guided Vehicles Considering Transport Load Transfers.....	1437
<i>Patrick Boden, Sebastian Rank, Thorsten Schmidt</i>	
Deadlock Avoidance Dynamic Routing Algorithm for a Massive Bidirectional Automated Guided Vehicle System.....	1449
<i>Kang Min Kim, Chang Hyun Chung, Young Jae Jang</i>	
A New Data Farming Procedure Model for a Farming for Mining Method in Logistics Networks.....	1461
<i>Joachim Hunker, Anne Antonia Scheidler, Markus Rabe, Hendrik Van Der Valk</i>	
An Adaptive Large Neighborhood Search Algorithm for Wind Farm Inspection Using a Truck with a Drone	1473
<i>Wenyu Tao, Xinjia Jiang, Dongqiang Zhao</i>	
Towards Deadlock Handling with Machine Learning in a Simulation-Based Learning Environment	1485
<i>Marcel Müller, Tobias Reggelin, Iegor Kutsenko, Hartmut Zadek, Lorena S. Reyes-Rubiano</i>	
Solving Facility Location Problems for Disaster Response Using Simheuristics and Survival Analysis: A Hybrid Modeling Approach.....	1497
<i>Bhakti Stephan Onggo, Xabier Martin, Javier Panadero, Canan Gunes Corlu, Angel A. Juan</i>	
Decision-Making Impacts of Originating Picking Waves Process for a Distribution Center Using Discrete-Event Simulation.....	1509
<i>Luiz Lang, Leonardo Chwif, Wilson Pereira</i>	
Order Release Strategies for a Collaborative Order Picking System.....	1521
<i>Quang-Vinh Dang, Tugce Martagan, Ivo Adan, Jan Kleinlugtenbelt</i>	
Closing the Gap: A Digital Twin as a Mechanism to Improve Spare Parts Planning Performance	1533
<i>Joan Stip, Lois Aerts, Geert-Jan Van Houtum</i>	
Development of Des Application for Factory Material Flow Simulation with Simpy	1545
<i>So-Hyun Nam, Seung-Heon Oh, Hee-Chang Yoon, Young-In Cho, Ki-Young Cho, Dong-Hoon Kwak, Jong Hun Woo</i>	
From Efficiency to Fairness: Design of Allocation Rules for Food Bank Operations	1557
<i>Jinpeng Liang, Guodong Lyu</i>	
Simulation of IT Data Integration to Optimize an Antibiotics Supply Chain with System Dynamics.....	1569
<i>Ines Julia Khadri, Joe Viana</i>	

A Simulation-Heuristic Approach to Optimally Design Drone Delivery Systems in Rural Areas	1581
<i>Xudong Wang, Kimon Swanson, Zeyu Liu, Gerald Jones, Xueping Li</i>	
Effect of Real-Time Truck Arrival Information on the Resilience of Slot Management Systems	1593
<i>Ratnaji Vanga, Yousef Maknoon, Lóránt A. Tavasszy, Sarah Gelper</i>	
Applying Simulation to Estimate Waiting Times and Optimize the Booking Size for Oversea Transportation Vessels	1603
<i>Matthias Winter, Klaus Altendorfer, Stefan Pickl</i>	
Modeling and Simulation of Food Bank Disaster Relief Operations	1614
<i>Monica Kothamasu, Eduardo Perez, Francis A. Mendez-Mediavilla</i>	
Simulation-Based Order Management for the Animal Feed Industry	1625
<i>Daniel Rippel, Michael Lütjen, Michael Freitag</i>	
An Agent-Based Simulation Model to Mitigate the Bull Whip Effect Via Information Sharing and Risk Pooling	1636
<i>Md. Zahidul Islam, Nettie Roozeboom, Payton Gunderson, Xueping Li, Andrew Junfang Yu</i>	
A Simulation-Optimization Model for Automated Parcel Lockers Network Design in Urban Scenarios in Pamplona (Spain), Zakopane, and Krakow (Poland)	1648
<i>Bartosz Sawik, Javier Faulin, Adrian Serrano-Hernandez, Aitor Ballano</i>	
Combining Survival Analysis and Simheuristics to Predict the Risk of Delays in Urban Ridesharing Operations with Random Travel Times.....	1660
<i>Erika M. Herrera, Javier Panadero, Angel A. Juan, Patricia Carracedo, Elena Perez-Bernabeu, Rocio De La Torre</i>	
Simulation Platform for Testing and Evaluation of CAV Trajectory Optimization and Signal Control Algorithm Integrated with Commercial Traffic Simulator.....	1672
<i>Luan Carvalho, Agustin Guerra, Xiaohan Wang, Pruthvi Manjunatha, Lily Elefteriadou</i>	
Achieving Sustainable Manufacturing by Embedding Sustainability KPIs in Digital Twins	1683
<i>Clarissa A. González Chávez, Maja Bärring, Marcus Frantzén, Arpita Annapavar, Danush Gopalakrishnan, Björn Johansson</i>	
Discrete-Event Simulation and Machine Learning for Prototype Composites Manufacture Lead Time Predictions.....	1695
<i>Jamie Karl Smith, Calum Dickinson</i>	
Using Data Farming and Machine Learning to Reduce Response Time for the User	1707
<i>Falk Stefan Pappert, Oliver Rose</i>	
Multi-Agent System Model for Dynamic Scheduling in Flexible Job Shop Subject to Random Machine Breakdown.....	1719
<i>Akposeiyifa Ebuegha, Simon Li</i>	
Real-Time Scheduling Based on Simulation and Deep Reinforcement Learning with Featured Action Space.....	1731
<i>Shufang Xie, Tao Zhang, Oliver Rose</i>	
Sequence Scrambling in Aggregated Mixed-Model Production Line Modeling.....	1740
<i>Sebastian Kroeger, Svenja Korder, Robin Schneider, Michael F. Zaeh</i>	

Applying a Hybrid Model to Solve the Job-Shop Scheduling Problem with Preventive Maintenance, Sequence-Dependent Setup Times and Unknown Processing Times	1750
<i>Joep Ooms, Alexander Hübl</i>	
A Framework for Rescheduling a Fixed-Layout Assembly System Using Discrete-Event Simulation	1762
<i>Harold Billiet, Rainer Stark</i>	
Optimal Team Formation and Job Assignment to Optimize Warehouse Operations	1772
<i>Avnish Kishor Malde, Tugçe Isik, Ryan Lockaby, Art Gantt, Guenter Thumser</i>	
Optimization of the Design of Modular Production Systems	1783
<i>Soeren Bergmann</i>	
Enabling Knowledge Discovery from Simulation-Based Multi-Objective Optimization in Reconfigurable Manufacturing Systems.....	1794
<i>Carlos Alberto Barrera Diaz, Henrik Smedberg, Sunith Bandaru, Amos H. C. Ng</i>	
Workload Control in High-Mix-Low-Volume Factories Through the Use of a Multi-Agent System	1806
<i>Jeroen B. H. C. Didden, Quang-Vinh Dang, Ivo J. B. F. Adan</i>	
A Tool-Based Approach to Assess Simulation Worthiness and Specify Sponsor Needs for SMEs	1818
<i>Ana Luiza Bicalho-Hoch, Felix Özkul, Nicolas Wittine, Sigrid Wenzel</i>	
Carbon Policies in Network Distribution: A Simulation Approach for Sustainable Supply Chains	1830
<i>Marina Meireles Pereira Mafia, Elias Ribeiro Da Silva, Arne Bilberg</i>	
Automatic Component-Based Synthesis of User-Configured Manufacturing Simulation Models	1841
<i>Alexander Mages, Carina Mieth, Jens Hetzler, Fadil Kallat, Jakob Rehof, Christian Riest, Tristan Schäfer</i>	
Development of a Data-Driven Simulation Model for an Assembly-to-Order System.....	1853
<i>Chin Soon Chong, Chin Sheng Tan, Peng Yu Tan, Guan Leong Tnay, Yang Kuei Lin</i>	
Potential of Simulation Effort Reduction by Intelligent Simulation Budget Management for Multi-Item and Multi-Stage Production Systems.....	1864
<i>Wolfgang Seiringer, Klaus Altendorfer, Juliana Castaneda, Lisardo Gayan, Angel A. Juan</i>	
Production Scheduling for Parallel Machines Using Simulation Techniques: Case Study of Plastic Packaging Factory	1876
<i>Jiratsaya Panasri, Nara Samattapapong, Sathitthep Sangthong</i>	
A Biased-Randomized Simheuristic for a Hybrid Flow Shop with Stochastic Processing Times in the Semiconductor Industry.....	1888
<i>Majsa Ammouriova, Javier Panadero, Madlene Leißau, Christoph Laroque, Christin Schumacher, Angel A. Juan</i>	
Simulation Case Study: How Arctic Shipping Shares the Flow of Cargo from Traditional Routes	1899
<i>Zhuo Sun, Tao Zhu</i>	
A Collision-Free Simulation Framework for ASCs in Automated Container Terminals	1911
<i>Zhuo Sun, Ziyang Qi</i>	
System-Level Simulation of Maritime Traffic in Northern Baltic Sea.....	1923
<i>Ketki Kulkarni, Fang Li, Cong Liu, Mashrura Musharraf, Pentti Kujala</i>	

Optimization of Hub-and-Spoke Maritime Network Considering Hub Port Failure.....	1935
<i>Zhuo Sun, Yiwen Su, Kaili Liu, Ran Zhang</i>	
Simulation-Optimization Approach for Integrated Scheduling at Wharf Apron in Container Terminals.....	1944
<i>Mengyu Zhu, Chenhao Zhou, Ada Che</i>	
Combination of Simulated Annealing Algorithm and Minimum Horizontal Line Algorithm to Solve Two-Dimensional Pallet Loading Problem	1956
<i>Yuchuan Hu, Yi Zuo, Zhuo Sun</i>	
Feeder Ship Routing Problem with Tidal Time Windows.....	1967
<i>Yuan Gao, Zhuo Sun</i>	
Yard Template Planning in a Transshipment Hub: Gaussian Process Regression	1979
<i>Bonggwon Kang, Jungtae Park, Soondo Hong, Permata Vallentino Eko Joatiko</i>	
Supervised Machine Learning for Effective Missile Launch Based on Beyond Visual Range Air Combat Simulations	1990
<i>Joao P. A. Dantas, Andre N. Costa, Felipe L. L. Medeiros, Diego Geraldo, Marcos R. O. A. Maximo, Takashi Yoneyama</i>	
A Meta-Heuristic Solution Approach to Isolated Evacuation Problems	2002
<i>Klaas Fiete Krutein, Linda Ng Boyle, Anne Goodchild</i>	
An Application of Automated Machine Learning Within a Data Farming Process	2013
<i>Lynne Serré, Maude Amyot-Bourgeois</i>	
An Anomaly in Intercept Time for Short Range Ballistic Re-Entry Vehicles.....	2025
<i>P. Bao U. Nguyen, Maude Amyot-Bourgeois, Brittany C. Astles</i>	
Intercept Considerations for Devising a Dipping Sonar Search Strategy to Locate an Approaching Submarine.....	2034
<i>Peter J. Young</i>	
Message Prioritization in Contested and Dynamic Tactical Networks Using Regression Methods and Mission Context.....	2046
<i>Rohit Gopalan, Md Hedayetul Islam Shovon, Benjamin Campbell, Vanja Radenovic, Kym McLeod, Leith Campbell, Dustin Craggs, Claudia Szabo</i>	
Robustness of Middleware Communication in Contested and Dynamic Environments	2058
<i>Claudia Szabo, Dustin Craggs, Dumitru Alin Balasoiu, Vanja Radenovic, Benjamin Campbell</i>	
Jeopardy Assessment for Dynamic Configuration of Collaborative Microservice Architectures	2070
<i>Glen Pearce, Alexis Pflaum, Dumitru Alin Balasoiu, Claudia Szabo</i>	
AI-Based Military Decision Support Using Natural Language	2082
<i>Michael Möbius, Daniel Kalfass, Thomas Doll, Dietmar Kunde</i>	
Experimenting with the Mosaic Warfare Concept	2094
<i>Erdal Cayirci, Ramzan Alnaimi, Sara Salem Hamad Alnabet, Sarah Abdulla Alali, Sara Mubarak Alhajri</i>	
Towards a Unifying Framework for Modeling, Execution, Simulation, and Optimization of Resource-Aware Business Processes.....	2106
<i>Asvin Goel</i>	

Creating PROV-DM Graphs from Model Databases	2118
<i>Pia Wilsdorf, Adelinde M. Uhrmacher</i>	
Seamless Simulation-Based Verification and Validation of Event-Driven Software Systems.....	2130
<i>Tom Meyer, Philipp Andelfinger, Andreas Ruscheinski, Adelinde M. Uhrmacher</i>	
Cross-Formalism Decomposition of Devs Coupled Models	2142
<i>Neal J. Debuhr, Hessam S. Sarjoughian</i>	
DEVS Model Design for Simulation Web App Deployment	2154
<i>Laurent Capocchi, Jean-François Santucci, Johanna Fericean, Bernard P. Zeigler</i>	
Composable Geo-Referenced Multi-Resolution Multi-Agent CA-Based DEVS, KIB, and PDE Models.....	2166
<i>Hessam S. Sarjoughian, Chao Zhang</i>	
A Generalized Model for Modern Hierarchical Memory System	2178
<i>Hamed Najafi, Jason Liu, Xiaoyang Lu, Xian-He Sun</i>	
Nonparametric Density Estimation - A Numerical Exploration.....	2189
<i>Paul F. Evangelista, Vikram Mittal</i>	
The Use of Simulation with Machine Learning and Optimization for a Digital Twin-A Case on Formula 1 DSS	2198
<i>Andrew Greasley, Gajanan Panchal, Avinash Samvedi</i>	
Exploiting the Levels of System Specification for Modeling of Mind	2210
<i>Bernard P. Zeigler</i>	
From Narratives to Conceptual Models Via Natural Language Processing	2222
<i>David Shuttleworth, Jose Padilla</i>	
Microscopic Vehicular Traffic Simulation: Comparison of Calibration Techniques	2234
<i>Casey Bowman, John A. Miller, Yulong Wang</i>	
Robust Simulation Optimization with Stratification	2246
<i>Pranav Jain, Eunshin Byon, Sara Shashaani</i>	
Optimizing Input Data Acquisition for Ranking and Selection: A View Through the Most Probable Best.....	2258
<i>Taeho Kim, Eunhye Song</i>	
Admission Control in the Presence of Arrival Forecasts with Blocking-Based Policy Optimization	2270
<i>Karthiyek Murthy, Divya Padmanabhan, Satyanath Bhat</i>	
Sequential Importance Sampling for Hybrid Model Bayesian Inference to Support Bioprocess Mechanism Learning and Robust Control.....	2282
<i>Wei Xie, Keqi Wang, Hua Zheng, Ben Feng</i>	
Distributionally Robust Optimization for Input Model Uncertainty in Simulation-Based Decision Making	2294
<i>Soumyadip Ghosh, Mark S. Squillante</i>	
Better Safe than Sorry – An Evaluation Framework for Simulation-Based Theory Construction	2306
<i>Marvin Auf Der Landwehr, Maik Trott, Maylin Wartenberg, Christoph Von Viebahn</i>	

Cheap Bootstrap for Input Uncertainty Quantification.....	2318
<i>Henry Lam</i>	
Distributional Discrimination Using Kolmogorov-Smirnov Statistics and Kullback-Leibler	
Divergence for Gamma, Log-Normal, and Weibull Distributions	2330
<i>Mario Andriulli, James K. Starling, Blake Schwartz</i>	
Combining Numerical Linear Algebra with Simulation to Compute Stationary Distributions	2342
<i>Zeyu Zheng, Alex Infanger, Peter W. Glynn</i>	
Constructing an Audio Dataset of Construction Equipment from Online Sources for Audio-Based	
Recognition	2354
<i>Gilsu Jeong, Changbum R. Ahn, Moonseo Park</i>	
Real-Time Activity Duration Extraction of Crane Works for Data-Driven Discrete Event	
Simulation	2365
<i>Manuel Jungmann, Lucian Ungureanu, Timo Hartmann, Hector Posada, Rolando Chacon</i>	
Reinforcement Learning-Based Transportation and Sway Suppression Methods for Gantry Cranes	
in Simulated Environment.....	2377
<i>Namkyoun Kim, Minhyuk Jung, Inseok Yoon, Moonseo Park, Changbum R. Ahn</i>	
Discrete Event Simulation for Port Berth Maintenance Planning	2386
<i>Ruqayah Alsayed Ebrahim, Shivanan Singh, Yitong Li, Wenyi Ji</i>	
A Tale of Three Simulations for Project Managers	2397
<i>Sanjay Jain</i>	
System Dynamics Modeling of the Construction Supply Chain in Industrial Modularized	
Construction Projects.....	2409
<i>Lingzi Wu, Simaan Abourizk, Kunkun Li</i>	
Construction Image Synthetization to Overcome a Small, Biased Real Training Dataset for DNN-	
Powered Visual Scene Understanding.....	2421
<i>Jinwoo Kim, Daeho Kim, Sanghyun Lee</i>	
Road User Localization for Autonomous Vehicle Infrastructure by Leveraging Surveillance Videos	2429
<i>Linjun Lu, Fei Dai</i>	
Urban Subsurface Mapping Via Deep Learning Based GPR Data Inversion.....	2440
<i>Mengjun Wang, Da Hu, Shuai Li, Jiannan Cai</i>	
Accelerating Training of Reinforcement Learning-Based Construction Robots in Simulation Using	
Demonstrations Collected in Virtual Reality.....	2451
<i>Lei Huang, Zhengbo Zou</i>	
Field-Based Assessment of Joint Motions in Construction Tasks with and Without Exoskeletons in	
Support of Worker-Exoskeleton Partnership Modeling and Simulation	2463
<i>Sean Tyler Bennett, Peter Gabriel Adamczyk, Fei Dai, Michael Wehner, Dharmaraj Veeramani, Zhenhua Zhu</i>	
Automated Integration of Infrastructure Component Status for Real-Time Restoration Progress	
Control: Case Study of Highway System in Hurricane Harvey	2475
<i>Yitong Li, Wenyi Ji, Fengxiu Zhang</i>	

Spatial Agent-Based Simulation of Connected and Autonomous Vehicles to Assess Impacts on Traffic Conditions	2487
<i>Shima Mohebbi, Pavithra Sripathanallur Murali</i>	
Simulation as a Soft Digital Twin for Maintenance Reliability Operations	2499
<i>Xueping Li, Thomas Berg, Gerald Jones, Kimon Swanson, Vincent Lamberti, Samantha L. Okowita, Luke Birt, Pugazenthi Atchayagopal</i>	
Quantifying Error Propagation in Multi-Stage Perception System of Autonomous Vehicles Via Physics-Based Simulation	2511
<i>Fenglian Pan, Yinwei Zhang, Larry Head, Jian Liu, Maria Elli, Ignacio Alvarez</i>	
Proxel-Based Simulation of Fault Trees in R	2523
<i>Parisa Niloofar, Hossein Haghbin, Sanja Lazarova-Molnar</i>	
Data-Driven Reliability Modeling of Smart Manufacturing Systems Using Process Mining	2534
<i>Jonas Friederich, Sanja Lazarova-Molnar</i>	
COVID-19 Suppression Using a Testing/Quarantine Strategy: A Multi-Paradigm Simulation Approach Based on a SEIR-TQ Compartmental Model.....	2546
<i>Samuel Ropert, Tomas Perez-Acle, Alejandro Bernardin</i>	
Characteristics of Simulation: A Meta-Review of Modern Simulation Applications	2558
<i>Hendrik Van Der Valk, Stephanie Winkelmann, Felix Ramge, Joachim Hunker, Katharina Langenbach, Markus Rabe</i>	
GPU-Accelerated Simulation Ensembles of Stochastic Reaction Networks.....	2570
<i>Till Köster, Leon Herrmann, Philipp Andelfinger, Adelinde Uhrmacher</i>	
Design and Deployment of a Simulation Platform: Case Study of an Agent-Based Model for Youth Suicide Prevention.....	2582
<i>Joshua Huddleston, Michael C. Galgoczy, Kareem A. Ghumrawi, Philippe J. Giabbanelli, Ketra L. Rice, Nisha Nataraj, Margaret M. Brown, Christopher R. Harper, Curtis S. Florence</i>	
py2PowerDEVS: Construction and Manipulation of Large Complex Structures for PowerDevs Models Via Python Scripting	2594
<i>Ezequiel Pecker-Marcosig, Matías Bonaventura, Esteban Lanzarotti, Lucio Santi, Rodrigo Castro</i>	
Batching on Biased Estimators.....	2606
<i>Shengyi He, Henry Lam</i>	
Distributional Input Uncertainty.....	2617
<i>Motong Chen, Zhenyuan Liu, Henry Lam</i>	
Automatically Explaining a Model: Using Deep Neural Networks to Generate Text from Causal Maps	2629
<i>Anish Shrestha, Kyle Mielke, Tuong Anh Nguyen, Philippe J. Giabbanelli</i>	
Human Imperceptible Attacks and Applications to Improve Fairness	2641
<i>Xinru Hua, Huanzhong Xu, Jose Blanchet, Viet Anh Nguyen</i>	
Towards AI Robustness Multi-Agent Adversarial Planning in Game Play.....	2653
<i>Yan Lu, Sachin Shetty</i>	
A Customizable Reinforcement Learning Environment for Semiconductor Fab Simulation.....	2663
<i>Benjamin Kovács, Pierre Tassel, Martin Gebser, Georg Seidel</i>	

Simulation of the Internal Electric Fleet Dispatching Problem at a Seaport: A Reinforcement Learning Approach.....	2675
<i>Matteo Brunetti, Giovanni Campuzano, Martijn Mes</i>	
Forecasting with Visibility Using Privacy Preserving Federated Learning.....	2687
<i>Bo Zhang, Wen Jun Tan, Wentong Cai, Allan N. Zhang</i>	
Use of Reinforcement Learning for Prioritizing Communications in Contested and Dynamic Environments.....	2699
<i>Dustin Craggs, Kin Leong Lee, Vanja Radenovic, Benjamin Campbell, Claudia Szabo</i>	
Quantile-Based Policy Optimization for Reinforcement Learning.....	2712
<i>Jinyang Jiang, Yijie Peng, Jiaqiao Hu</i>	
Reinforcement Learning with Discrete Event Simulation: The Premise, Reality, and Promise.....	2724
<i>Sahil Belsare, Emily Diaz Badilla, Mohammad Dehghanmohammabadi</i>	
Analysis of Measure-Valued Derivatives in a Reinforcement Learning Actor-Critic Framework.....	2736
<i>Kim Van Den Houten, Emile Van Krieken, Bernd Heidergott</i>	
Enhanced Simulation Metamodeling Via Graph and Generative Neural Networks.....	2748
<i>Wang Cen, Peter J. Haas</i>	
An Efficient Dynamic Sampling Policy for Monte Carlo Tree Search	2760
<i>Gongbo Zhang, Yijie Peng, Yilong Xu</i>	
Using Generative Adversarial Networks to Validate Discrete Event Simulation Models.....	2772
<i>José Arnaldo Barra Montevechi, Gustavo Teodoro Gabriel, Afonso Teberga Campos, Carlos Henrique Dos Santos, Fabiano Leal, Michael E. F. H. S. Machado</i>	
Interpretable User Behavioral Analysis and Personalized Recommendation with Side Information.....	2784
<i>Chen Feng, Ruijiu Mao</i>	
A Simulation-Aided Deep Reinforcement Learning Approach for Optimization of Automated Sorting Center Processes	2795
<i>Deepak Mohapatra, Aritra Pal, Ankush Ojha, Supratim Ghosh, Marichi Agarwal, Chayan Sarkar</i>	
Predictive Maintenance Powered by Machine Learning and Simulation	2807
<i>Mernout Burger, Csaba A. Boer, Edwin Straub, Yvo A. Saanen</i>	
Applied Reinforcement Learning for Decision Making in Industrial Simulation Environments	2819
<i>Ashwin Devanga, Emily Diaz Badilla, Mohammad Dehghanmohammabadi</i>	
Can Machines Solve General Queueing Problems?	2830
<i>Opher Baron, Dmitry Krass, Eliran Sherzer, Arik Senderovich</i>	
Simulation Based Approach for Reconfiguration and Ramp Up Scenario Analysis in Factory Planning.....	2842
<i>Florian Schmid, Jan Schneidewind, Tobias Wild, Stefan Galka, Lukas Schuhhegger, Tobias Vogl</i>	
Simulation Optimization for Supply Chain Decision Making.....	2853
<i>Bodhibrata Nag, Ranjan Pal</i>	
Enterprise Digital Twins for Risk Free Business Experimentations.....	2864
<i>Souvik Barat, Vinay Kulkarni, Kaustav Bhattacharya</i>	

Digital Twins for Dynamic Management of Blockchain Systems	2876
<i>Georgios Diamantopoulos, Nikos Tziritas, Rami Bahsoon, Georgios Theodoropoulos</i>	
Real- Time Spatio-Temporal Databases: Bridging the Gap Between Experimental Digital Twins and Databases	2888
<i>Moritz Alfrink, Jürgen Roßmann</i>	
Validation of Digital Twins: Challenges and Opportunities.....	2900
<i>Edward Y. Hua, Sanja Lazarova-Molnar, Deena P. Francis</i>	
Online Validation of Simulation-Based Digital Twins Exploiting Time Series Analysis	2912
<i>Giovanni Lugaresi, Sofia Gangemi, Giulia Gazzoni, Andrea Matta</i>	
Optimizing Digital Twin Synchronization in a Finite Horizon	2924
<i>Baris Tan, Andrea Matta</i>	
Data-Based Digital Twin of an Automated Guided Vehicle System.....	2936
<i>Isabella Lichtenstern, Florian Kerber</i>	
Warehouse Digital Twin: Simulation Modeling and Analysis Techniques.....	2947
<i>Michael E. Kuhl, Rukshar Bhisti, Sriparvathi Shaji Bhattathiri, Maojia P. Li</i>	
Data-Driven Simulation for Production Balancing and Optimization: A Case Study in the Fashion Luxury Industry	2957
<i>Andrea Nunziatini, Virginia Fani, Bianca Bindi, Romeo Bandinelli, Mario Tucci</i>	
Towards a Digital Twin of a Robot Workcell to Support Prognostics and Health Management	2968
<i>Deogratias Kibira, Brian A. Weiss</i>	
Simulation Teaching During the Pandemic: Report of an Experience in a Higher Education Private Institution	2980
<i>Leonardo Chwif, Wilson Pereira</i>	
Agent Based Learning Environment for Survey Research.....	2991
<i>Jayendran Venkateswaran, Sayli Shiradkar, Deepak Choudhary</i>	
Participatory Simulation to Support Transactional Curriculum Inquiry	3003
<i>Robert W. Brennan, Peter Goldsmith, Nancy Nelson</i>	
Central Limit Theorems for Constructing Confidence Regions in Strictly Convex Multi-Objective Simulation Optimization	3015
<i>Susan R. Hunter, Raghu Pasupathy</i>	
Fixed Budget Ranking and Selection with Streaming Input Data	3027
<i>Yuhao Wang, Enlu Zhou</i>	
Policy Evaluation with Stochastic Gradient Estimation Techniques.....	3039
<i>Yi Zhou, Michael C. Fu, Ilya O. Ryzhov</i>	
Non-Myopic Knowledge Gradient Policy for Ranking and Selection	3051
<i>Kexin Qin, L. Jeff Hong, Weiwei Fan</i>	
Importance Sampling for Rare-Event Gradient Estimation.....	3063
<i>Yuanlu Bai, Shengyi He, Henry Lam, Guangxin Jiang, Michael C. Fu</i>	
Thompson Sampling Meets Ranking and Selection	3075
<i>Yijie Peng, Gongbo Zhang</i>	

A Logistic Regression and Linear Programming Approach for Multi-Skill Staffing Optimization in Call Centers	3087
<i>Thuy Anh Ta, Tien Mai, Fabian Bastin, Pierre L'Ecuyer</i>	
An Inexact Variance-Reduced Method for Stochastic Quasi-Variational Inequality Problems with an Application in Healthcare	3099
<i>Zeinab Alizadeh, Brianna M. Otero, Afroz Jalilzadeh</i>	
Dynamic Scheduling of Maintenance by a Reinforcement Learning Approach - A Semiconductor Simulation Study	3110
<i>Michael Geurtsen, Ivo Adan, Zumbul Atan</i>	
Optimal Computing Budget Allocation for Multi-Objective Ranking and Selection Under Bernoulli Distribution.....	3122
<i>Tianlang Zhao, Xiao Jin, Loo Hay Lee</i>	
Automatic Differentiation for Gradient Estimators in Simulation.....	3134
<i>Matthew T. Ford, Shane G. Henderson, David J. Eckman</i>	
Achieving Diversity in Objective Space for Sample-Efficient Search of Multiobjective Optimization Problems.....	3146
<i>Eric Hans Lee, Bolong Cheng, Michael McCourt</i>	
Object-Oriented Implementation and Parallelization of the Rapid Gaussian Markov Improvement Algorithm	3158
<i>Mark Semelhago, Barry L. Nelson, Eunhye Song, Andreas Wächter</i>	
Multi-Fidelity Discrete Optimization Via Simulation	3170
<i>Dongyang Li, Haitao Liu, Xiao Jin, Haobin Li, Ek Peng Chew, Kok Choon Tan, Yun Hui Lin</i>	
An Empirical Review of Model-Based Adaptive Sampling for Global Optimization of Expensive Black-Box Functions	3182
<i>Nazanin Nezami, Hadis Anahideh</i>	
Bandit-Based Multi-Start Strategies for Global Continuous Optimization	3194
<i>Phillip Guo, Michael C. Fu</i>	
Landscape Modification Meets Surrogate Optimization: Towards Developing an Improved Stochastic Response Surface Method	3206
<i>Michael C. H. Choi, Venkatkrishna Karumanchi</i>	
Simulation-Based Sets of Similar-Performing Actions in Finite Markov Decision Process Models	3217
<i>Wesley J. Marrero</i>	
A Proximal Algorithm for Sampling from Non-Smooth Potentials	3229
<i>Jiaming Liang, Yongxin Chen</i>	
A Dynamic Credibility Model with Self-Excitation and Exponential Decay	3241
<i>Himchan Jeong, Bin Zou</i>	
A Computational Study of Probabilistic Branch and Bound with Multilevel Importance Sampling	3251
<i>Hao Huang, Pariyakorn Maneekul, Danielle F. Morey, Zelda B. Zabinsky, Giulia Pedrielli</i>	
Machine Learning Powered Capacity Planning for Semiconductor Fab	3263
<i>Keyhoon Ko, Seokcheol Chang, Won-Jun Lee, Byung-Hee Kim</i>	

Deep Reinforcement Learning for Queue-Time Management in Semiconductor Manufacturing	3275
<i>Harel Yedidsion, Prafulla Dawadi, David Norman, Emrah Zarifoglu</i>	
Imitation Learning for Real-Time Job Shop Scheduling Using Graph-Based Representation.....	3285
<i>Je-Hun Lee, Hyun-Jung Kim</i>	
Fab-Wide Scheduling of Semiconductor Plants: A Large-Scale Industrial Deployment Case Study	3297
<i>Ioannis Konstantelos, Johannes Wiebe, Robert Moss, Sebastian Steele, Dennis Xenos, Tina O'Donnell, Sharon Feely</i>	
Monte Carlo Tree Search-Based Algorithm for Dynamic Job Shop Scheduling with Automated Guided Vehicles	3309
<i>Duyeon Kim, Hyun-Jung Kim</i>	
A New AMHS Testbed for Semiconductor Manufacturing	3318
<i>Kwanwoo Lee, Siyong Song, Daesoon Chang, Sangchul Park</i>	
Criticality Measures for Time Constraint Tunnels in Semiconductor Manufacturing.....	3326
<i>Benjamin Anthouard, Valeria Borodin, Stéphane Dauzère-Pérès, Quentin Christ, Renaud Roussel</i>	
Putting a Price Tag on Hot Lots and Expediting in Semiconductor Manufacturing.....	3338
<i>Philipp Neuner, Stefan Haeussler, Julian Fodor, Gregor Blossey</i>	
Scheduling Jobs with Uncertain Ready Times on a Single Batch Processing Machine	3349
<i>Jens Rocholl, Fajun Yang, Lars Mönch</i>	
Learning Dispatching Rules for Energy-Aware Scheduling of Jobs on a Single Batch Processing Machine	3360
<i>Daniel Sascha Schorn, Lars Mönch</i>	
Application of a Simulation Model to Forecast Cycle Time Based on Static Model Input.....	3372
<i>Syahril Ridzuan Ab Rahim, Gwendolene Haw, Wei Jin Lee, Oliver Diehl</i>	
Graph Representation and Embedding for Semiconductor Manufacturing Fab States	3382
<i>Benedikt Schulz, Christoph Jacobi, Andrej Gisbrecht, Angelidis Evangelos, Chew Wye Chan, Boon Ping Gan</i>	
Building a Digital Twin of the Photolithography Area of a Real-World Wafer FAB to Validate Improved Production Control.....	3394
<i>Patrick C. Deenen, Rick A. M. Adriaensen, John W. Fowler</i>	
Demonstration of the Feasibility of Real Time Application of Machine Learning to Production Scheduling.....	3406
<i>Amir Ghasemi, Kamil Erkan Kabak, Cathal Heavey</i>	
Study of Relationships Between Scheduling Objectives in Semiconductor Manufacturing	3418
<i>Jérémie Berthier, Stéphane Dauzère-Pérès, Claude Yugma, Rémi Poinas, Alexandre Lima</i>	
Impact of Production Planning Approaches on Wafer Fab Performance During Product Mix Changes	3430
<i>Tobias Völker, Lars Mönch, Reha Uzsoy</i>	
Towards Decentralized Decisions for Managing Product Transitions in Semiconductor Manufacturing	3442
<i>Carlos Leca, Edward P. Fitts, Karl Kempf, Reha Uzsoy</i>	

Energy-Efficient Semiconductor Manufacturing: Establishing an Ecological Operating Curve.....	3453
<i>Anna Hopf, Abdelgafar Ismail, Hans Ehm, Daniel Schneider, Gunther Reinhart</i>	
A Planning Model for Incorporating Renewable Energy Sources into Semiconductor Supply Chains.....	3465
<i>Michael Werner, Lars Mönch, Jei-Zheng Wu</i>	
Simulating Energy and Security Interactions in Semiconductor Manufacturing: Insights from the Intel Minifab Model	3477
<i>Gabriel A. Weaver, Jacob Shusko, John J. Hasenbein, Erhan Kutanoglu, Gonzalo Martinez- Medina, Krystel K. Castillo-Villar, Paulo C. G. Costa</i>	
Autonomous Scheduling in Semiconductor Back-End Manufacturing.....	3489
<i>Jelle Adan, Alp Akcay, John Fowler, Marc Albers, Michael Geurtsen</i>	
Demand Predictability Evaluation for Supply Chain Processes Using Semantic Web Technologies Use Case.....	3501
<i>Nour Ramzy, Philipp Ulrich, Lancelot Mairesse, Hans Ehm</i>	
Simulated-Based Analysis of Recovery Actions Under Vendor-Managed Inventory Amid Black Swan Disruptions in the Semiconductor Industry: A Case Study from Infineon Technologies AG	3513
<i>Manuel Fernando Lopera Diaz, Hans Ehm, Abdelgafar Ismail</i>	
Increasing Supply Chain Robustness During Allocation in a Just-In-Time Supply Set-Up.....	3525
<i>Volker Dörrsam, Jan-Philip Erdmann, Patrick Moder</i>	

Author Index