Proceedings of the 2007 Winter Simulation Conference

Washington DC
9-12 December 2007

Pages 1-475
# Table of Contents

**Keynote Address** ................................................................. 1  
*Susan Smyth*

**Fortieth Anniversary Special Panel: Landmark Papers** .................................................. 2  
*David Goldsman, Pierre Lécuyer, David H. Withers, James O. Henriksen  
and Nilay Tanik Argon*

**Introduction to Simulation** .................................................................................. 14  
*David Goldsman*

**Representing and Generating Uncertainty Effectively** ........................................... 26  
*W. David Kelton*

**The Optimizing-Simulator: Merging Simulation and Optimization Using Approximate  
Dynamic Programming** .................................................................................. 31  
*Warren B. Powell*

**Fundamentals of Simulation Modeling** ...................................................................... 42  
*Paul J. Sanchez*

**Introduction to Modeling and Generating Probabilistic Input Processes for Simulation** .................................................. 51  
*Micheal E. Kuhl, Natalie M. Steiger, Emily K. Lada, Mary Ann Wagner  
and James R. Wilson*

**Statistical Analysis of Simulation Output Data: the Practical State of the Art** ............. 65  
*Averill M. Law*

**Work Smarter, Not Harder: Guidelines for Designing Simulation Experiments** .......... 72  
*Susan M. Sanchez*

**Agent-Based Modeling and Simulation: Desktop Abms** ........................................... 83  
*Charles M. Macal and Michael J. North*

**Tips for Successful Practice of Simulation** ............................................................ 95  
*Deborah A. Sadowski*

**Inside Discrete-Event Simulation Software: How It Works and Why It Matters** ........... 101  
*Thomas J. Schriber and Daniel T. Brunner*

**Verification and Validation of Simulation Models** .................................................. 112  
*Robert G. Sargent*

**Defense and Homeland Security Applications of Multi-Agent Simulations** ............... 126  
*Thomas W. Lucas, Susan M. Sanchez, Lisa R. Sickinger, Felix Martinez  
and Jonathan W. Roginski*

**Statistical Analysis of Simulation Output: State of the Art** ..................................... 138  
*Christos Alexopoulos*

**Recent Advances in Ranking and Selection** ......................................................... 150  
*Seong-Hee Kim and Barry L. Nelson*
Real Options Valuation ......................................................... 161
   Barry R. Cobb and John M. Charnes

Regression Models and Experimental Designs: a Tutorial for Simulation Analysts .......... 171
   Jack P.C. Kleijnen

Making Sure You Tackle the Right Problem: Linking Hard and Soft Methods in Simulation Practice ......................................................... 183
   Michael Pidd

Enterprise Simulation - a Practical Application in Business Planning ......................... 193
   Robert Suggs and Brian Lewis

The Simulation Power of Automod ...................................................................... 198
   Todd LeBaron and Craig Jacobsen

Simulation Implements Demand-Driven Workforce Scheduler for Service Industry .......... 207
   Marcelo Zottolo, Edward J. Williams and Onur M. Ulgen

Extendsim 7 ............................................................................. 214
   David Krahl

Simulation 101 Software: Workshop and Beyond .................................................. 221
   Barry Lawson and Lawrence Leemis

A Researcher's Discipline ................................................................................. 225
   Ray J Paul

Clinic: Aggregating Subsystem Models Into an Automotive Total Plant Throughput Model ...... 229
   Jeffrey Scott Miller, Randy Combs, D.J. Medeiros, Earnest Foster, Jeffrey Tew and Onur Ulgen

Clinic: Correlated Inputs in an Automotive Paint Shop Fire Risk Simulation ............... 238
   Debra Elkins, Bahar Biller, A. Christine LaFleur, Earnest Foster, Jeffrey Tew and James R. Wilson

Human Terrain Data - What Should We Do With It? .............................................. 248
   Barry G. Silverman

Monte Carlo Methods in the Physical Sciences ...................................................... 254
   Malvin H. Kalos

Game-Theoretic Probability and Defensive Forecasting ........................................... 260
   Glenn Shafer

Controlled Sequential Bifurcation for Software Reliability Study ............................... 269
   Jun Xu, Feng Yang and Hong Wan

New Greedy Myopic and Existing Asymptotic Sequential Selection Procedures: Preliminary Empirical Results ...................................................... 277
   Stephen E. Chick, Jurgen Branke and Christian Schmidt

A Tournament Framework for the Ranking and Selection Problem ......................... 285
   Enver Yucesan
An Efficient Algorithm in the HLA Time Management .................................................. 564
Buquan Liu, Yiping Yao and Huaimin Wang

The SISO CSPI Pkg Standard for Commercial Off-The-Shelf Simulation Package
Interoperability Reference Models ................................................................................. 573
Simon J. E. Taylor, Navonil Mustafee, Stephen J. Turner, Malcolm Y. H. Low,
Steffen Strassburger and John Ladbrook

Applying CSPI Reference Models for Factory Planning .................................................. 582
Steffen Strassburger, Thomas Schulze and Marco Lemessi

User-Friendly Scheduling Tools for Large-Scale Simulation Experiments .................... 589
Heath A. James, Ken A. Hawick and Chris J. Scogings

Semantics of Petri Nets: a Comparison ........................................................................ 596
Gabriel Juhas, Fedor Lehocki and Robert Lorenz

Duality in High Level Petri-Nets - a Basis to Do Diagnoses ........................................ 608
Jorg R. Muller and Eckehard Schnieder

How to Synthesize Nets From Languages - a Survey ................................................... 616
Robert Lorenz, Sebastian Mauser and Gabriel Juhas

Automatic Generation of Simulation Models for Semiconductor Manufacturing .......... 627
Ralph Mueller, Christos Alexopoulos and Leon F. McGinnis

Transformations for Accelerating MCMC Simulations With Broken Ergodicity .......... 637
Mark Fleischer

Alternative Thread Scoring Methods in Qualitative Event Graphs .................................. 646
Ricki G. Ingalls and Douglas J. Morrice

Optimistic Parallel Discrete Event Simulation of the Event-Based Transmission Line
Matrix Method .............................................................................................................. 655
David W. Bauer Jr. and Ernest H. Page

A Co-Design Modeling Approach for Computer Network Systems ............................ 664
Weilong Hu and Hessam S. Sarjoughian

Composability and Component-Based Discrete Event Simulation .............................. 673
Arnold Buss and Curtis Blais

Visual Exploration and Evaluation of Climate-Related Simulation Data ....................... 682
Thomas Noke, Michael Flechsig and Uwe Bohm

Simvis: Interactive Visual Analysis of Large and Time-Dependent 3D Simulation Data .... 691
Helmut Doleisch

Towards a Conceptual Framework for Visual Analytics of Time and Time-Oriented Data 700
Wolfgang Aigner, Alessio Bertone, Silvia Miksch, Christian Tominski
and Heidrun Schumann

Visualization Techniques Utilizing the Sensitivity Analysis of Models ....................... 709
Ivo Kordapaneni, Pavel Kordik and Pavel Slavik
Using Flexible Points in a Developing Simulation of Selective Dissolution in Alloys ................................870
Joseph C. Carnahan, Erin C. Carson, Paul F. Reynolds, Jr., Steven A. Policastro and
Robert G. Kelly

Agile Optimization for Coercion ........................................................................879
Lingjia Tang and Paul F. Reynolds, Jr.

Simulation Metamodels for Modeling Output Distribution Parameters ..................889
Isabel R. Santos and Pedro R. Santos

Monte Carlo Simulation in Financial Engineering ................................................898
Nan Chen and L. Jeff Hong

Sensitivity Estimates From Characteristic Functions ..............................................911
Paul Glasserman and Zongjian Liu

Kernel Estimation for Quantile Sensitivities .........................................................920
Guangwu Liu and L. Jeff Hong

A Confidence Interval for Tail Conditional Expectation Via Two-Level Simulation ..........928
Hai Lan, Barry L. Nelson and Jeremy Staum

Efficient Monte Carlo Methods for Convex Risk Measures in Portfolio Credit Risk Models ..937
Jorn Dunkel and Stefan Weber

Estimating Tranche Spreads By Loss Process Simulation .......................................946
Kay Giesecke and Baeho Kim

Approximations and Control Variates for Pricing Portfolio Credit Derivatives ..........955
Zhiyong Chen and Paul Glasserman

Efficient Estimation of Option Price and Price Sensitivities Via Structured Database
Monte Carlo (SDMC) .........................................................................................963
Gang Zhao, Tarik Borogovac and Pirrooz Vakili

American Option Pricing Under Stochastic Volatility: a Simulation-Based Approach ........971
Arunachalam Chockalingam and Kumar Muthuraman

Monte Carlo Methods for Valuation of Ratchet Equity Indexed Annuities ..................977
Ming-hua Hsieh and Yu-fen Chiu

Non-Gaussian Asset Allocation in the Federal Thrift Savings Plan ........................983
Scott T. Nestler

Path-Wise Estimators and Cross-Path Regressions: an Application to Evaluating
Portfolio Strategies .........................................................................................992
Martin B. Haugh and Ashish Jain

An Empirical Comparison Between Nonlinear Programming Optimization and
Simulated Annealing (SA) Algorithm Under a Higher Moments Bayesian Portfolio
Selection Framework .....................................................................................1000
Jingjing Lu and Merrill Liechty

Enabling Industrial Scale Simulation / Emulation Models ...................................1007
Michael Johnstone, Doug Creighton and Saeid Nahavandi
Generic Simulation of Automotive Assembly for Interoperability Testing .................................................. 1014
Deogratias Kibira and Charles R. McLean

Distributed Simulation for Interoperability Testing Along the Supply Chain ............................................... 1023
Sanjay Jain, Frank Riddick, Andreas Craens and Deogratias Kibira

Panel: Distributed Simulation in Industry - a Real-World Necessity Or Ivory Tower Fancy?........ 1032
Peter Lendermann, Leon F. McGinnis, Steffen Straburger, Matthias U. Heinicke,
Charles McLean and Simon J.E. Taylor

Representation and Simulation of Stochastic PetriNet Models Using Xpnml ........................................... 1042
Hyunsou Lee, Bikram Sharda and Amarnath Banerjee

Simulation-Based, Ontology Driven Resource Plan Development ............................................................ 1051
Michael Graul, Perakath Benjamin, Arthur Keen and Frank Boydstun

Using Ontologies for Simulation Integration ................................................................................................. 1060
Perakath Benjamin, Kumar Akella and Ajay Verma

Using Meta-Level Ontology Relations to Measure Conceptual Alignment and
Interoperability of Simulation Models ............................................................................................................ 1069
Levent Yilmaz

Conceptual Modeling of Information Exchange Requirements Based on Ontological Means .......... 1079
Andreas Tolk and Charles D. Turnitsa

From Domain Ontologies to Modeling Ontologies to Executable Simulation Models .................... 1087
Gregory A. Silver, Osama Al-Haj Hassan and John A. Miller

NGfast: a Simulation Model for Rapid Assessment of Impacts of Natural Gas Pipeline
Breaks and Flow Reductions At U.S. State Borders and Import Points.................................................. 1097
Edgar C. Portante, Brian A. Craig and Stephen M. Folga

System Implementation Issues of Dynamic Discrete Disaster Decision Simulation System
(D4S2) - Phase I ........................................................................................................................................... 1106
Shengnan Wu, Larry J. Shuman, Bopaya Bidanda, Matthew Kelley, Bryan Lawson,
Ken Sochats and Carey D. Balaban

Simulation of Time to First Water Application for the First Interstate Bank Fire .......................... 1114
Robert Till

Hospital Capacity Planning for Efficient Disaster Mitigation During a Bioterrorist Attack .......... 1118
Jomon Aliyas Paul and Govind Hariharan

Allocation of Resources for Hospital Evacuations Via Simulation ......................................................... 1127
Esengul Tayfur and Kevin Taaffe

Modeling Bioterrorism Preparedness With Simulation in Rural Healthcare System .................. 1134
Lisa Pativatsiri, Elliot J. Montes, Jr. and Ouyang Xi

Comparision of Potential Paths Selected By a Malicious Entity With Hazardous Materials :
Minimization of Time Vs. Minimization of Distance .............................................................................. 1140
Rakesh Nunne and Pamela Murray-Tuite

An Initial Simulation Model for Aiding Policy Analysis in Urban Insurgencies .......................... 1147
Edward G. Anderson Jr.
A Public Health Application of Data Analysis for Homeland Security ........................................ 1156
    Marjorie Greene and Robert Eek

Cyber Attack Modeling and Simulation for Network Security Analysis ........................................ 1159
    Michael E. Kuhl, Jason Kistner, Kevin Costantini and Moises Sudit

Hierarchical Planning and Multi-Level Scheduling for Simulation-Based Probabilistic
Risk Assessment ......................................................................................................................... 1168
    Hamed S. Nejad, Dongfeng Zhu and Ali Mosleh

The Range of Predictions for Calibrated Agent-Based Simulation Models ........................................ 1177
    Dong Fang Shi and Roger J. Brooks

Upgraded Cellular Automata Based Group-Work Interaction Simulation ...................................... 1186
    Dong Shengping and Hu Bin

Spatial Emergence of Genotypical Tribes in an Animat Simulation Model ...................................... 1195
    Ken A. Havick, Chris J. Scogings and Heath A. James

Agent-Model Validation Based on Historical Data ........................................................................ 1202
    Lance E. Champagne and Raymond R. Hill

An Exploration-Based Taxonomy for Emergent Behavior Analysis in Simulations ....................... 1211
    Ross Gore and Paul F. Reynolds, Jr.

Modeling Organizational Adaptation: a Replication of Levinthal's Model of
Emergent Order .......................................................................................................................... 1220
    Brian F. Tivna

Panel: Agent-Based Modeling of Mass Egress and Evacuations .................................................. 1226
    Douglas A. Samuelson, Austin Zimmerman, Joshua Thorp, Pat McCormick, Matt Parker,
    Stephen Guerin, Owen Densmore and Tom McCormick

Simulation of Passenger Check-In At a Medium-Sized Us Airport .............................................. 1231
    Simone Appelt, Rajan Batta, Li Lin and Colin Drury

Advanced National Airspace Traffic Flow Management Simulation
Experiments and Validation ......................................................................................................... 1240
    George Hunter, Ben Boisvert and Kris Ramamoorthy

IRS Post-Filing Processes Simulation Modeling: a Comparison of DES With Econometric
Microsimulation in Tax Administration ....................................................................................... 1247
    Arnold Greenland, Erica Layne Morrison, David Connors, John L. Guyton and Michael
    Sebastiani

Agent-Based Modeling and Simulation of Wildland Fire Suppression ........................................ 1254
    Xiaolin Hu and Yi Sun

Modeling and Simulation of Group Behavior in E-Government Implementation .......................... 1263
    Jiang Wu and Bin Hu

Emergency Departments Nurse Allocation to Face a Pandemic Influenza Outbreak .................... 1271
    Florentino Rico, Ehsan Salari and Grisselle Centeno

Military Keynote Address ............................................................................................................ 1278
    John C. Deal

lxxxiv
Validating a Network Simulation Testbed for Army Uavs ...................................................... 1279

Simulation-Aided Path Planning of UAV ............................................................................... 1285
Farzad Kamrani and Rassul Ayani

Self-Organized UAV Swarm Planning Optimization for Search and Destroy
Using Swarmfare Simulation .................................................................................................... 1294
Dustin J. Nowak, Ian Price and Gary B. Lamont

Simulation of Army Unmanned Aerial Vehicle Communications ........................................ 1303
Richard Chapman, Drew Hamilton, Daniel Box, Mark Kuhr, Jonathan MacDonald and
Stephen Hamilton

Applying Parallel and Distributed Simulation to Remote Network Emulation ....................... 1307
Yan Gu and Richard Fujimoto

Application of BML to Inter-Agent Communication in the Itsimbw Simulation Environment .... 1316
Philipp Hugelmeyer, Ulrich Schade and Thomas Zoller

Using a Low-Resolution Entity Model for Shaping Initial Conditions for High-Resolution
Combat Models ...................................................................................................................... 1323
Darryl Ahner, Arnold Buss and John Ruck

Model-Based Measurement of Situation Awareness .............................................................. 1332
W. Scott Neal Reilly, Sean L. Guarino and Bret Kellihan

A Simulation Model for Military Deployment ........................................................................ 1340
Ugur Z. Yildirim, Ihsan Sabuncuoglu and Barbaros Tansel

Analyzing Air Combat Simulation Results With Dynamic Bayesian Networks ..................... 1349
Jirka Poropudas and Kai Virtanen

Integration of Underwater Sonar Simulation With a Geographical Information System ........... 1357
Yanshen Zhu, Serge Sala-Diakanda, Luis Rabelo, Jose Sepulveda and Maria Bull

Using Discrete Event Simulation to Examine Marine Training At the Marine Corps
Communication-Electronics School ...................................................................................... 1366
Jon Davenport, Charles Neu, William Smith and Susan Heath

A Knowledge-Based Method for the Validation of Military Simulation .................................. 1374
Feiyun Min, Ping Ma and Ming Yang

Blending Systems Engineering Principles and Simulation-Based Design Techniques to
Facilitate Military Prototype Development ........................................................................... 1382
Stephanie J. Lackey, Jonathan T. Harris, Linda C. Malone and Denise M. Nicholson

Feasibility Study of Variance Reduction in the Logistics Composite Model ............................. 1389
George P. Cole, III, Alan W. Johnson and J. O. Miller

A Simulation Framework for Energy Efficient Data Grids ..................................................... 1396
Ziliang Zong, Xiao Qin, Xioajun Ruan, Kiranmai Bellam, Timing Yang and
Adam Manzanares

An Elliptical Cryptographic Algorithm for RF Wireless Devices ........................................... 1403
Robert Steven Owor, Khalil Dajani, Zephyrinus Okonkwo and John Hamilton
Real-Time Prediction in a Stochastic Domain Via Similarity-Based Data-Mining .................................................. 1409
Timo Steffens, Philipp Hugelmeyer and Schloss Birlinghoven

Tutorial: Advances and Challenges in Healthcare Simulation Modeling ............................................................ 1415
Sally C. Brailsford

Can Health Care Benefit From Modeling and Simulation Methods in the Same Way As Business and Manufacturing Has? ................................................................. 1428
Jasna Kuljis, Ray J. Pau and Lampros K. Stergioulas

Towards a Framework for Healthcare Simulation .................................................................................................. 1433
Tillal Eldabi and Terry Young

Interconnected Des Models of Emergency, Outpatient, and Inpatient Departments of a Hospital ......................... 1440
Murat M. Gunal and Michael Pidd

A Discrete Event Model of Clinical Trial Enrollment At Eli Lilly and Company .................................................... 1446
Bernard M. McGarvey, Nancy J. Dynes, Burch C. Lin, Wesley H. Anderson, James P. Kremidas and James C. Felli

Important Factors in Screening for Colorectal Cancer ......................................................................................... 1454
Reza Yaesoubi and Stephen D. Roberts

Roles for Autonomous Physiologic Agents; an Oxygen Supply and Demand Example ............................................ 1462
Meyer Katzper

Targeted Strategies for Tuberculosis in Areas of High Hiv Prevalence: a Simulation Study ................................. 1466

Improving Primary Care Access Using Simulation Optimization ............................................................................ 1473
Hari Balasubramanian, Ritesh Banerjee, Melissa Gregg and Brian T. Denton

An Approach to Hospital Planning and Design Using Discrete Event Simulation ................................................. 1480
Ian W. Gibson

Bi-Criteria Evaluation of an Outpatient Procedure Center Via Simulation .......................................................... 1489
Todd R. Huchka, Brian T. Denton, Serhat Gul and John W. Fowler

“See and Treat” or “See” and “Treat” in an Emergency Department ..................................................................... 1498
Ruth Davies

Modeling of Patient Flows in a Large-Scale Outpatient Hospital Ward By Making Use of Electronic Medical Records ....................................................................................... 1502
Soemon Takakuwa and Daisuke Katagiri

A Hybrid Epidemic Model: Combining the Advantages of Agent-Based and Equation-Based Approaches .......... 1511
Georgiy V. Bobashev, D. Michael Goedecke, Feng Yu and Joshua M. Epstein

A Stochastic Equation-Based Model of the Value of International Air-Travel Restrictions for Controlling Pandemic Flu ...................................................................................... 1517
D. Michael Goedecke, Georgiy V. Bobashev and Feng Yu

A Flexible, Large-Scale, Distributed Agent Based Epidemic Model ....................................................................... 1522
Jon Parker
Simulating Pandemic Influenza Risks of Us Cities ................................................................. 1527
Catherine Dibble, Stephen Wendel and Kristofer Carle

A Teragrid-Enabled Distributed Discrete Event Agent-Based Epidemiological Simulation .......... 1530
Douglas J. Roberts and Diglio A. Simoni

Utilizing Model Characteristics to Obtain Efficient Parallelization in the Context of Agent
Based Epidemiological Models ................................................................................................ 1534
Steven Naron and Segev Wasserkrug

Simulating the Patient Move: Transitioning to a Replacement Hospital ..................................... 1541
Marshall Ashby, Martin Miller, David Ferrin and Tanner Flynn

Maximizing Hospital Financial Impact and Emergency Department
Throughput With Simulation ........................................................................................................ 1545
David M. Ferrin, Marty J. Miller and Diana L. McBroom

Merging Six Emergency Departments Into One: a Simulation Approach .................................. 1553
Martin Miller, David Ferrin, Marshall Ashby, Tanner Flynn and Niloo Shahi

Comparing Simulation Alternatives Based on Quality Expectations ............................................. 1558
Joshua Bostire, Shengyong Wang, Tejas Gandhi and Krishnaswami Srihari

Effect of Coupling Between Emergency Department and Inpatient Unit on the
Overcrowding in Emergency Department .................................................................................. 1565
Erik M. W. Kolb, Taesik Lee and Jordan Peck

Manufacturing Process Management Using a Flexible Modeling and Simulation Approach ........ 1573
Dulio Curcio, Francesco Longo and Giovanni Mirabelli

Application of Design of Experiments on the Simulation of a Process in an
Automotive Industry .................................................................................................................. 1580
Jose Arnaldo Barra Montevechi, Alexandre Ferreira de Pinho, Fabiano Leal and
Fernando Augusto Silva Marins

Productivity Improvement in Appliance Manufacturing .............................................................. 1589
Charles Harrell and Bruce Gladwin

Using Multi-Criteria Modeling and Simulation to Achieve Lean Goals ...................................... 1594
Gerald W. Evans and Suraj M. Alexander

"Pull" Replenishment Performance As a Function of Demand Rates and Setup Times Under
Optimal Settings ....................................................................................................................... 1603
Silvanus T. Enns

Measuring Manufacturing Throughput Using Takt Time Analysis and Simulation ...................... 1612
Jun Duanmu and Kevin Taaffe

Modeling and Simulation of Hard Disk Drive Final Assembly Using a Hdd Template ................... 1620
Ahad Ali and Robert de Souza

Evaluation of Operational Policies in the Design Phase of Material Handling Networks ................ 1630
Ardavan Asef-Vaziri
Simulation of Continuous Behavior Using Discrete Tools: Ore Conveyor Transport ............................................. 1634
Marcelo Moretti Fioroni, Luiz Augusto G. Franzese, Caio Eduardo Zanin, Jose Furia,
Luciano de Toledo Perfetti, Donizeti Leonardo and Nilson Laudelino da Silva

Establishing Man-Machine Ratio Using Simulation ......................................................................................... 1642
Hoay Hoon Ong

Aintshop Production Line Optimization Using Response Surface Methodology .............................................. 1646
Berna Dengiz and Onder Belgin

A Test Implementation of the Core Manufacturing Simulation Data Specification ...................................... 1652
Marcus Johansson, Bjorn Johansson, Anders Skoogh, Swee Leong, Frank Riddick,
Y. Tina Lee, Guodong Shao and Par Klingstam

Modeling and Simulation of Retrieving Process ............................................................................................. 1661
Shih Y. Chin and Jose H. C. G. Junior

Determining Safety Stocks in the Presence of Workload-Dependent Lead Times ...................................... 1670
Seza Orcun, Sıla Çetinkaya and Reha Uzsoy

A Hybrid Inventory Control System Approach Applied to the Food Industry ........................................ 1678
David Claudio, Jie Zhang and Ying Zhang

Improved Simple Simulation Models for Semiconductor Wafer Factories ................................................ 1687
Oliver Rose

Simulation Framework for Complex Manufacturing Systems With Automated Material Handling ............. 1692
Rene Driessel and Lars Monch

Using Quantiles in Ranking and Selection Procedures .................................................................................. 1701
Jennifer M. Bekki, John W. Fowler, Gerald T. Mackulak and Barry L. Nelson

Application of Combined Discrete-Event Simulation and Optimization Models in Semiconductor Enterprise Manufacturing Systems .................................................. 1708
Gary Godding, Hessam Sarjoughian and Karl Kempf

Simulation Experimental Investigation on Job Release Control in Semiconductor Wafer Fabrication ........... 1716
Chao Qi, Appa Iyer Sivakumar and Stanley B. Gershwin

Sensitivity Analysis on Causal Events of Wip Bubbles By a Log-Driven Simulator ..................................... 1726
Ryo Hirade, Rudy Raymond and Hiroyuki Okano

Predicting Cluster Tool Behavior With Slow Down Factors ...................................................................... 1734
Robert Unbehaun and Oliver Rose

An Analysis of Tool Capabilities in the Photolithography Area of an Asia Fab ........................................... 1740
P. J. Byrne, Cathal Heavey and Kamil Erkan Kabak

Simulation Results and Formalism for Global-Local Scheduling in Semiconductor Manufacturing Facilities .................................................................................. 1747
Mickael Bureau, Stephane Daucere-Peres, Claude Yugma, Leon Vermieren
and Jean-Bernard Maria
Hierarchical Distributed Simulation for 300mm Wafer Fab.................................................. 1753
    Sheng Xu and Leon F. McGinnis

Survey of Research in Modeling Conveyor-Based Automated Material Handling Systems in Wafer Fabs.................................................. 1760
    Dina Nazal and Ahmed El-Nashar

Reusable Tool for 300mm Intrabay Amhs Modeling and Simulation ........................................... 1768
    Ahmed El-Nashar and Khaled S. El-Kilany

A Simulation-Based Framework for Quantifying the Cold Regions Weather Impacts on Construction Schedules........................................................................... 1777
    Adham Shahin, Simaan AbouRizk, Yasser Mohamed and Siri Fernando

Simulation Assisted Match-Up Rescheduling of Flexible Production Systems Subject to Execution Exceptions .................................................................................. 1784
    Wilhelm Dangelmaier, Kiran R. Mahajan, Mark Aufenanger and Thomas Seeger

Reflective Simulation for On-Line Workload Planning and Control ............................................ 1793
    Roberto Revertria and Flavio Tonelli

Stochastic Rollout and Justification to Solve the Resource-Constrained Project Scheduling Problem.............................................................. 1799
    Ningxiong Xu, Linda Nozick, Orr Bernstein and Dean Jones

Online Multiobjective Single Machine Dynamic Scheduling With Sequence-Dependent Setups Using Simulation-Based Genetic Algorithm With Desirability Function........ 1807
    Adeline T. H. Ang and Appa Iyer Sivakumar

A Metaheuristic Algorithm for Simultaneous Simulation Optimization and Applications to Traveling Salesman and Job Shop Scheduling With Due Dates ................................ 1814
    Jiri Mejisky

A Web-Based Simulation Optimization System for Industrial Scheduling........................................ 1823
    Marcus Andersson, Henrik Grimm, Anna Persson and Amos Ng

Modeling and Simulation for Customer Driven Manufacturing System Design and Operations Planning........................................................................................................... 1832
    Juhani Heilala, Arttu Salmela, Jari Montonen and Pasi Jarvenpa

Simulation Improves End-Of-Line Sortation and Material Handling Pickup Scheduling At Appliance Manufacturer .......................................................... 1842
    Neetesh Kale, Marcelo Zottolo, Onur M. Ulgen and Edward J. Williams

An Object-Oriented Framework for Simulating Full Truckload Transportation Networks ............ 1848
    Manuel D. Rossetti and Shikha Nangia

Assessing Tram Schedules Using a Library of Simulation Components........................................ 1857
    Elisangela Mieko Kanacilo and Alexander Verbraeck

Supply Chain Simulation Modeling Made Easy: an Innovative Approach........................................ 1866
    Dayana Cope, Mohamed Sam Faye, Mansoorah Mollaghasemi and Assem Kaylani

Simulating Air Traffic Blockage Due to Convective Weather Conditions ..................................... 1876
    Liling Ren, John-Paul B. Clarke, Dawei Chang, Senay Solak, Earl Barnes and Ellis Johnson

xciv
Towards a User-Centred Road Safety Management Method Based on Road Traffic Simulation ................................................................. 1884
   Andreas Gregoriades

Dddas-Based Multi-Fidelity Simulation for Online Preventive Maintenance Scheduling in Semiconductor Supply Chain ........................................................................ 1894
   Nurcin Koyuncu, Seungho Lee, Karthik K. Vasudevan, Young-Jun Son and Parag Sarfarar

A Simulation-Based Algorithm for Supply Chain Optimization ........................................................................................................... 1903
   Takeshiki Yoshizumi and Hiroyuki Okano

A Toolbox for Simulation-Based Optimization of Supply Chains ........................................................................................................... 1911
   Christian Almeder and Margaretha Preusser

IBM Supply-Chain Network Optimization Workbench: an Integrated Optimization and Simulation Tool for Supply Chain Design ........................................................................ 1919
   Hongwei Ding, Wei Wang, Jin Dong, Minmin Qiu and Changrui Ren

Using Empirical Demand Data and Common Random Numbers in an Agent-Based Simulation of a Distribution Network .............................................................. 1926
   William J. Sawaya III

A Comparison of Scheduling Approaches for a Make-To-Order Electronics Manufacturer ....... 1932
   Susan K. Heath and Douglas J. Morrice

Simulation of Scheduled Ordering Policies in Distribution Supply Chains ................................................................................................. 1940
   Lucy G. Chen and Srinagesh Gavirneni

Stability Analysis of the Supply Chain By Using Neural Networks and Genetic Algorithms ........... 1947
   Alfonso Sarmiento, Luis Rabelo, Ramamoorthy Lakkoju and Reinaldo Moraga

A Supply Chain Paradigm to Model Business Processes At the Y-12 National Security Complex ........................................................................................................... 1956
   Reid Kress, Jack Dixon, Tom Insalaco and Richard Rinehart

Appraisal of Airport Alternatives in Greenland By the Use of Risk Analysis and Monte Carlo Simulation ........................................................................................................... 1965
   Kim Bang Salling and Steen Leleur

A Simulation Study on the Uses of Shuttle Carriers in the Container Yard ................................................. 1973
   Loo Hay Lee, Ek Peng Chew, Kok Choon Tan, Huei Chuen Huang, Wenquan Lin,
   Yongbin Han and Tian Heong Chan

A Simulation Model With a Low Level of Detail for Container Terminals And Its Applications ........................................................................................................... 1982
   Byung-Hyun Ha, Eun-Jung Park and Chan-Hee Lee

A Simulation Model to Improve Warehouse Operations ......................................................................................... 1991
   Jean Philippe Gagliardi, Jacques Renaud and Angel Ruiz

Project Planning Using an Interactive, Structured Modeling Environment ................................................. 1998
   Ian Flood

A Message-Based Architecture to Enable Runtime User Interaction on Concurrent Simulation-Animations of Construction Operations ......................................................... 2007
   Prasant V. Rekapalli and Julio C. Martinez
Ontology-Centered Integration of Project Management, Cost and Resource Modeling With
Analysis, Simulation and Visualization: a Case Study of Space Port Operations ..............................2011
Paul Fishwick, Zach Ezzel, Nabeel Yousef, David J. Miranda, Haluk Akin, Luis C. Rabelo
and Jose Sepulveda

Expecting the Unexpected: Representing, Reasoning About, and Assessing Construction
Project Contingencies ..........................................................................................................................2020
G. Ryan Anderson, Nilufar Onder and Amlan Mukherjee

Agent-Based Simulation for Collaborative Cranes ........................................................................2030
Cheng Zhang and Amin Hammad

Communication and Process Simulation of Set-Based Design for Concrete Reinforcement ..........2036
John-Michael Wong, Kristen Parrish, Iris D. Tommelein and Bozidar Stojadinovic

Process Flowcharting and Simulation of House Structure Components Production Process ........2045
Haitao Yu, Mohamed Al-Hussein and Reza Nasseri

Construction Noise Prediction and Barrier Optimization Using Special Purpose Simulation ..........2052
Anupama Gannorowa and Janaka Y. Ruwanpura

Modeling and Representation of Non-Value Adding Activities Due to Errors and Changes in
Design and Construction Projects .................................................................................................2061
Sangwon Han, SangHyun Lee, Mani Golparvar Fard and Feniosky Pena-Mora

Special Purpose Simulation Template for Workflow Analysis in Construction ..............................2069
Sivakumar Palaniappan, Anil Sawhney, Howard H. Bashford and Kenneth D. Walsh

Simulation Tool for Manpower Forecast Loading and Resource Leveling ....................................2078
Mikhail Hanna and Janaka Y. Ruwanpura

Simulation-Based Planning for Precast Production With Two Critical Resources .........................2083
Xiaofeng Zhai, Robert L. K. Tong, Hans C. Bjorrsen and David K. H. Chua

Permutation-Based Elitist Genetic Algorithm Using Serial Scheme for Large-Sized
Resource-Constrained Project Scheduling .......................................................................................2091
Jin-Lee Kim

Program Planning Under Uncertainty ..............................................................................................2098
Kabeh Vaziri, Paul Carr and Linda Nozick

Simulation and Uncertainty Modeling of Project Schedules Estimates ..........................................2107
Ivan Ourdev, Simaon Abourizk and Mohammed Al-Bataineh

Qualitative Simulation of Construction Performance Using Fuzzy Cognitive Maps ......................2113
Manjula Dissanayake and Simaan M. Abourizk

Optimal Work Breaks in Deterministic and Probabilistic Repetitive Projects ...............................2120
Photios G. Ioannou and Chachrist Srisuwunrat

Optimal Scheduling of Probabilistic Repetitive Projects Using Completed Unit and Genetic
Algorithms ...........................................................................................................................................2130
Chachrist Srisuwunrat and Photios G. Ioannou

xcvi
Flexible Modeling of Linear Schedules for Integrated Mathematical Analysis ........................................... 2138
Gunmar Lucko

Enabling Smooth and Scalable Dynamic 3d Visualization of Discrete-Event Construction Simulations in Outdoor Augmented Reality ................................................................. 2147
Amir H. Behzadan and Vineet R. Kamat

Validation of Simulated Real World Tcp Stacks ......................................................................................... 2156
Sam Jansen and Anthony McGregor

Effective Workforce Lifecycle Management Via System Dynamics Modeling and Simulation ........ 2166
Lianjun An, Jun-Jang Jeng, Young M Lee and Changrui Ren

Parallel Cross-Entropy Optimization ...................................................................................................... 2175
Gareth E. Evans, Jonathan M. Keith and Dirk P. Kroese

Predicting the Impact on Business Performance of Enhanced Information System Using Business Process Simulation ................................................................. 2182
Yifei Tan and Soemon Takakuwa

Using Intelligent Agents to Understand Management Practices and Retail Productivity .............. 2191
Peer-Olaf Siebers, Uwe Aickelin, Helen Celia and Chris W. Clegg

Ifao-Simo: a Spatial-Simulation Based Facility Network Optimization Framework ................................. 2200
Ming Xie, Wei Wang, Wenjun Yin

Discrete Event Simulation Modeling of Resource Planning and Service Order Execution for Service Businesses ........................................................................................................ 2206
Young M. Lee, Lianjun An, Sugato Bagchi, Daniel Connors, Shubir Kapoor, Kaan Katicioogl, Wei Wang and Jing Xu

Simulation of Adaptive Project Management Analytics ........................................................................... 2213
Lea A. Deleris, Sugato Bagchi, Shubir Kapoor, Kaan Katicioogl, Richard Lam and Steve Buckley

Agent-Based Simulations of Service Policy Decisions ........................................................................... 2220
Richard B. Lam

Using Simulation to Predict Market Behavior for Outbound Call Centers ........................................... 2226
Paulo J. de Freitas Filho, Geovani Ferreira da Cruz, Rui Seara and Guilherme Steinmann

Partial Cross Training in Call Centers With Uncertain Arrivals and Global Service Level Agreements .................................................................................................................... 2231
Thomas R. Robbins, Terry P. Harrison and D. J. Medeiros

A Model for Contact Center Analysis and Simulation ........................................................................... 2238
Juan M. Huerta

Modeling the Performance of Low Latency Queueing for Emergency Telecommunications ........ 2245
Denise M. Bevilacqua Masi, Martin J. Fischer and David A. Garbin

Using Event Simulation to Evaluate Internet Protocol Enhancements for Special Services ............. 2255
David A. Garbin, Patrick McGregor and Denise M. Bevilacqua Masi

xcvii
J-Saedes: a Java-Based Simulation Software to Improve Reliability and Availability of Computer Systems and Networks ........................................ 2264
   Angel A. Juan, Joan M. Marques, Javier Faulin and Mateo Sorroche

Simio: a New Simulation System Based on Intelligent Objects ...................................... 2272
   C. Dennis Pegden

Combining Network Reductions and Simulation to Estimate Network Reliability ............ 2280
   Abdullah Konak

   Seda Ozmutlu, Huseyin C. Ozmutlu and Buke Bıyık

What I Wish They Would Have Taught Me (Or That I Would Have Better Remembered!) in School ................................................................. 2294
   Charles R. Standridge, David M. Ferrin, Daniel A. Finke, Carley Jurishica and Catherine M. Harmonosky

Supporting Parametrization of Business Games for Multiple Educational Settings ........ 2301
   Stijn-Pieter van Houten and Alexander Verbraeck

Teaching Simulation to Business Students Summary of 30 Years of Experience .......... 2306
   Ingolf Stahl

High-Performance Computing Enables Simulations to Transform Education ................. 2315
   Dan M. Davis, Thomas D. Gottschalk and Laurel K. Davis

Developing and Implementing a High School Simulation Course to Provide Rigor and Relevance to the Curriculum ........................................... 2323
   Beverly Bie Kuch

A Simulation Course for High School Students ......................................................... 2332
   David Goldsman

Beyond the University: Simulation Education on the Job .......................................... 2336
   Peter Tag and David Krah

Economic Assessment of Energy Systems With Simulation and Linear Programming ...... 2341
   Fermin Mallor, Cristina Azcarate and Rosa Blanco

Mathematical Models and Simulation for Project Portfolios Optimization ................ 2342
   Rongpeng Cao, Wei Ding and Bonnie Ray

Castelldelfels Project: Modeling and Simulation of the Computer System That Gives Support to the Virtual Campus of the Open University of Catalonia ......................... 2343
   Angel A. Juan, Javier Faulin, Joan M. Marques and Pau Fonseca

Comparison of On-Line Scheduling Algorithms: Quantifying the Effects of Shared Information Using a Simple Supply Chain Model .................................. 2344
   Jairo R. Montoya-Torres and Gloria Rodrigues-Verjan

Simulation of the Pig Iron Transportation System in Companhia Siderurgica De Tubarão .... 2345
   Alain de Norman et d'Audenhove and Bruno Miessa de Barros
Modeling the Indiana Coal Rail Transportation Infrastructure .................................................. 2346
Thomas F. Brady

A Conceptual Model to Support the Integration of Inter-Organizational Healthcare Information Systems .................................................. 2347
Hongmei Chi and Lang Zhao

Effectively Generating Random Test Data Via Cellular Automata ........................................... 2348
Hongmei Chi and Edward L. Jones

Combining Latin Hypercube Designs and Discrete Event Simulation in a Study of a Surgical Unit .................................................. 2349
Christian Dehlendorff, Murat Kulaaci and Klaus K. Andersen

Randomless As a Critical Point: Simulation Fitting Better Planning of Distribution Centers ....... 2350
Marcelo K. Fugihara, Alain d'Audenhove and Neuton T. Karassawa

Pod: the Structure of Simulation Software and Model Reuse .................................................. 2351
Yariv N. Marmor and David Sinreich

Flight Time Allocation for a Fleet of Aircraft Through Reinforcement Learning ..................... 2352
Ville Mattila

Devs Specification and Implementation of Siman Blocks Using Modelica Language ............... 2353
Victorino Sanz, Alfonso Urquia and Sebastian Dormido

Application of the Traveling Salesman Problem Heuristics to the Reallocation of Equipment in a Small-Scale Bakery Aiming At Minimizing Bread Production Time ..................................... 2354
Shih Y. Chin, Anselmo R. P. Neto and Eduardo V. G. Filho

A Comparison Between System Dynamics and Agent Based Modeling and Opportunities for Cross-Fertilization .......................................................... 2355
Luminita Stemate, Codrin Pasca and Ivan Taylor

Comparing the Use of Discrete-Event Simulation and System Dynamics Models ................ 2356
Antueila A. Tako and Stewart Robinson

Visual Support for Modeling and Simulation of Cell Biological Systems .............................. 2357
Andrea Unger, Susanne Biemann, Mathias John, Adelinde Uhrmacher and Heidrun Schumann

An Adaptive Metamodeling-Based Method for Simulation Optimization ............................. 2358
Maria Guadalupe Villarreal Marroquin and Mauricio Cabrera-Rios

Soa-Conform Modeling As a Highlevel Standard for Discrete Modeling and Simulation .......... 2359
Thomas Wiedemann

Arena in the Petrochemical Operations Environment ............................................................ 2360
Lorraine Malherbe

Limitations in the Use of Mathematical Models to Support Investment Decisions ................. 2361
Mario Jorge Lima and Guilherme de Aquino Barbosa

A Comparison of Inventory Optimization and Discrete-Event Simulation for Supply Chain Analysis ............................................................................. 2362
Erin Murphy

xcix
Security Checkpoint Optimizer Simulation Tool for Passenger Screening Prototyping .......................... 2363
  Diane Wilson, Robert Pryor, S. Annie So and Eric K. Roe

Checkout … Kroger’s Store Front Simulator .................................................................................. 2364
  John Osborne and Matthew Duffin

Passenger Simulation Modeling to Identify Optimum Customs Staffing Levels At Lax .................. 2365
  Gareth Coville

Using Data Mining Tools to Build Integrated Discrete-Event Simulations .................................................. 2366
  David Ames Holland and Scott C. R. Henry

Tips and Tricks for Using Simulation Doe to Assess the Complex Interactions of Your Process .................................. 2367
  Marietsa Louise McCreary

Stochastic Modelling As a Decision Making Tool in an Integrated Green-Brown Fields Growth Program At the Sasol Secunda Site, South Africa .................................................. 2368
  Anette Van der Merwe

Applying Variable Rate Processing to Queueing Simulation Models At Mimeo.Com .............. 2369
  Paul D. Babin and Allen Greenwood

A Simulation Case Study of Patient Flow At the University of South Alabama Medical Center ........................................................................................................................................... 2370
  Donna Retzlaff-Roberts and Sharon Ezelle

How Can Dynamic Disease Modeling Support Strategic Marketing At Pharmaceutical & Biotech Companies? ................................................................................................................................. 2371
  Radhesh B. Nair

A Financial Simulation of an International Business Graduate School .............................................. 2372
  John Stocker, Conrado Gempesaw and Kliment Nachkov

Providence Breast Health Center Throughput ............................................................................. 2373
  Jemba Senkandwa

Manufacturing and Distribution Integrated Solution At Votorantim Cimentos ................................ 2374
  Alain Norman d’Audenhove and Rodrigo Cintra Villas Boas