

James J. Nutaro

Contact Information

Mailing address: Oak Ridge National Laboratory
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Employment

Joint Faculty, University of Tennessee – Knoxville, Department of Electrical Engineering and Computer Science, Knoxville, Tennessee. January 2010 – present.

Advised PhD and Master students, taught a course on Discrete Event Systems, and mentored graduate and undergraduate students participating in internship programs at ORNL.

Research Staff (January 2005 – October 2011), Senior Research Staff (October 2011 – October 2014), and Distinguished R&D Staff (October 2014 – present), Oak Ridge National Laboratory, Oak Ridge, Tennessee

My activities have included:

Creation of the RCSIM radio propagation model (2005-2006). This technology was licensed by ORNL to NetwoRCSim, LLC in 2012 for commercial development.

Simulation modeling for studies of reliability and throughput of the Uranium Processing Facility at Y-12 (2007-2011).

ORNL's lead for the Department of Energy's Advanced Security Acceleration Project for the Smart Grid (2009-2013).

Creation of the Toolkit for Hybrid Modeling of Electric power Systems (2006-2007, 2010-2011).

Development of simulation tool development for DOE's Son of Energy Plus (2014-present).

Development of advanced control concepts for energy efficiency and peak reduction in small to medium commercial buildings (2013-present).

Research Assistant Professor, Arizona Center for Integrative Modeling and Simulation, University of Arizona, Tucson, Arizona. April 2004 – January 2005.

Taught a course on Parallel Simulation, which covered topics in distributed interactive simulations and parallel discrete event simulation, and Discrete Event Systems, which covered topics in systems theory, modeling methods, and simulation algorithms.

Systems Engineer, Northrop Grumman Information Technology, Ft. Huachuca, Arizona.

Sept. 2002 – April 2004.

Developed simulated environments for testing Link-11 and Link-16 radio systems. These simulation tools are used for laboratory testing and in large-scale training and testing exercises.

Systems engineer, Raytheon Missile Systems, Tucson, Arizona. May 2000 – Sept. 2002.

I worked at Raytheon in their systems engineering division, which provided simulation technologies to support flight tests, requirements studies, and systems integration. I was primarily involved in the development of simulation middleware that was used for visualizing telemetry data during flight tests and integrating simulation models for a variety of testing and analysis activities.

Education

University of Arizona, Computer Engineering. B.Sc., 1997.

University of Arizona, Computer Engineering (minor in Mathematics). M.Sc., 2000.

Thesis: “Time Management and Interoperability in Distributed Discrete Event Simulation”, July 2000

Advisor: Dr. Bernard Zeigler

University of Arizona, Computer Engineering (minor in Mathematics). Ph.D., 2003.

Thesis: “Parallel Discrete Event Simulation with Application to Continuous Systems”, December 2003

Advisor: Dr. Bernard Zeigler

Publications

Books and book chapters

James J. Nutaro. Building Software for Simulation: Theory and Algorithms with Applications in C++. John Wiley and Sons, 2010.

Budhendra Bhaduri, James Nutaro, Cheng Liu, Thomas Zacharia. Ultra-Scale Computing for Emergency Evacuation. Wiley Handbook of Science and Technology for Homeland Security, Sept. 2009.

James Nutaro. Discrete event simulation of continuous systems. Handbook of Dynamic System Modeling. P.A. Fishwick Ed., Chapman and Hall/CRC Press, 2007.

Journal articles

James Nutaro, Glenn Allgood, and Teja Kuruganti. “Towards improving software security by using simulation to inform requirements and conceptual design,” The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology, doi:10.1177/1548512915591049, published online 17 June 2015.

James Nutaro, David Fugate, Teja Kurugantia, Jibonananda Sanyal, and Michael Starke. “Cost Effective Retrofit Technology for Reducing Peak Power Demand in Small and Medium Commercial Buildings,” Science and Technology for the Built Environment, DOI: 10.1080/23744731.2015.1047719, published online 27 May 2015.

James Nutaro. "An extension of the OpenModelica compiler for using Modelica models in a discrete event simulation," *SIMULATION*, vol. 90, no. 12, pp. 1328-1345, December 2014.

Sydney, A., J. Nutaro, C. Scoglio, D. Gruenbacher, N. Schulz. "Simulative Comparison of Multiprotocol Label Switching and OpenFlow Network Technologies for Transmission Operations," *IEEE Transactions on Smart Grid*, vol. 4, no. 2, pp. 763-770, June 2013.

James Nutaro, Phani Teja Kuruganti, Vladimir Protopopescu, Mallikarjun Shankar. "The split system approach to managing time in simulations of hybrid systems having continuous and discrete event components," *SIMULATION*, vol. 88, no. 3, pp. 281-298, March 2012.

J. Nutaro and V. Protopopescu. "Calculating Frequency at Loads in Simulations of Electro-Mechanical Transients," *IEEE Transactions on Smart Grid*, vol. 3, no.1, pp. 233-240, March 2012.

J. Nutaro and V. Protopopescu. "A New Model of Frequency Delay in Power Systems," *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 59, no.11, pp. 840-844, Nov. 2012.

J. Schryver, J. Nutaro, M.J. Haire. "Metrics for availability analysis using a discrete event simulation method," *Simulation Modelling Practice and Theory*, vol. 21, no. 1, pp. 114-122, February 2012.

Alexandre Muzy, Rajanikanth Jammalamadaka, Bernard P Zeigler, and James J Nutaro. "The Activity-tracking paradigm in discrete-event modeling and simulation: The case of spatially continuous distributed systems," *SIMULATION*, vol. 87, no. 5, pp. 449-464, May 2011.

Jianping Xue, Thomas McCurdy, Janet Burke, Budhendra Bhaduri, Cheng Liu, James Nutaro, and Lauren Patterson. "Analyses of school commuting data for exposure modeling purposes," *Journal of Exposure Science and Environmental Epidemiology*, vol. 20, pp. 68-79, 2010.

H.S. Sarjoughian, J.J. Nutaro, G. Josh. "Collaborative Component-based System Modeling," *Journal of Simulation*, vol. 5, pp. 77-88, May 2010.

Eddie Mak, Saurabh Mittal, Moon-Ho Hwang, and James J. Nutaro. "Automated Link-16 Testing Using the Discrete Event System Specification and Extensible Markup Language," *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, vol. 7, pp. 39-62, January 2010.

J. Nutaro and V. Protopopescu. "The Impact of Market Clearing Time and Price Signal Delay on the Stability of Electric Power Markets," *IEEE Transactions on Power Systems*, vol. 24, no. 3, pp.1337-1345, August 2009.

A. Muzy, J.J. Nutaro, B.P. Zeigler, P. Coquillard. "Modeling and simulation of fire spreading through the activity tracking paradigm," *Ecological Modelling*, vol. 219, nos. 1-2, pp. 212-225, November 2008.

J. Nutaro. "On constructing optimistic simulation algorithms for the discrete event system specification," *ACM Transactions on Modeling and Computer Simulation*, vol. 19, no. 1, 2008.

J. Nutaro, P.T. Kuruganti, R. Jammalamadaka, T. Tinoco, and V. Protopopescu. "An Event Driven, Simplified TLM Method for Predicting Path-Loss in Cluttered Environments," IEEE Transactions on Antennas and Propagation, vol. 56, no. 1, pp. 189-198, January 2008.

Steven Bridges, Bernard P. Zeigler, James Nutaro, Dane Hall, Tom Callaway, and Dale Fulton. "Evolving Enterprise Infrastructure for Model & Simulation Based Testing of Net-Centric Systems," ITEA Journal, vol. 29, pp. 51-61, 2008.

James Nutaro, Phani Teja Kuruganti, Mallikarjun Shankar, Laurie Miller, and Sara Mullen. "Integrated modeling of the electric grid, communications, and control," International Journal of Energy Sector Management, vol. 2, no. 3, pp. 420-438, 2008.

Budhendra L. Bhaduri, Cheng Liu, James J. Nutaro, Lauren A. Patterson. "Geospatial Modeling and Simulation Based Approach for Developing Commuting Patterns of School Children," CSI Communications, vol. 32, no. 9, 2008.

James Nutaro and Bernard Zeigler. "On the stability and performance of discrete event methods for simulating continuous systems," Journal of Computational Physics, vol. 227, no. 1, pp. 797-819, November 2007.

James Nutaro. "A discrete event method for wave simulation," ACM Transactions on Modeling and Computer Simulation, vol. 16, no. 2, pp. 174-195, 2006.

Saurabh Mittal, Eddie Mak, James J Nutaro. "DEVS-based dynamic model reconfiguration and simulation control in the enhanced DoDAF design process," The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology, vol. 3, no. 4, pp. 239-267, 2006.

James Nutaro and Hessam Sarjoughian. "Design of Distributed Simulation Environments: A Unified System-Theoretic and Logical Processes Approach," SIMULATION, vol. 80, no. 11, pp. 577-589, November 2004.

James Nutaro and Phil Hammonds. "Combining the Model/View/Control Design Pattern with the DEVS Formalism to Achieve Rigor and Reusability in Distributed Simulation," The Journal of Defense Modeling and Simulation, vol. 1, no. 1, pp. 19-28, April 2004.

Conference papers

J. Nutaro, D. Fugate, T. Kuruganti, B. Fricke, and J. Wallace. "Refrigerated display case defrosting using inferential ice sensing," Proceedings of the 24th IIR International Congress of Refrigeration, Yokohama, Japan, 16-22 August 2015.

James Nutaro and Bernard Zeigler. "Towards a Probabilistic Interpretation of Validity for Simulation Models," Proceedings of the 2015 Spring Simulation Multi-conference, Alexandria, Virginia, 12-15 April 2015.

Özgür Özmen and James Nutaro. "Activity Diagrams for DEVS Models: A Case Study Modeling Health Care Behavior," Proceedings of the 2015 Spring Simulation Multi-conference, Alexandria, Virginia, 12-15 April 2015.

James Nutaro, Ozgur Ozmen, and Jack Schryver. "Disaggregation and refinement of system dynamics models via agent-based modeling," In Proceedings of the 2014 Summer Simulation Multiconference (SummerSim '14), Article 11, 7 pages, 2014.

J. Nutaro, D. Fugate, T. Kuruganti, M. Starke. "An inexpensive retrofit technology for reducing peak power demand in small and medium commercial buildings," Proceedings of the 3rd International High Performance Buildings Conference at Purdue, July 2014.

Michael Starke, James Nutaro, Philip Irminger, Ben Ollis, Teja Kuruganti, David Fugate. "Integration of Photovoltaics into Building Energy Usage through Advanced Control of Rooftop Unit," Proceedings of the 3rd International High Performance Buildings Conference at Purdue, July 2014.

Mohammed M Olama, Allen W McNair, Sreenivas R Sukumar, James J Nutaro. "A qualitative readiness-requirements assessment model for enterprise big-data infrastructure investment," SPIE Sensing Technology and Applications, pp. 91220E-91220E-8, May 2014.

James Nutaro, Glenn Allgood, Teja Kuruganti, and Darren Highfill. "Using simulation to engineer cybersecurity requirements," In Proceedings of the Eighth Annual Cyber Security and Information Intelligence Research Workshop (CSIIRW '13), Article 45 , 4 pages, 2013.

Sreenivas R Sukumar, Mohammed M Olama, Allen W McNair, James J Nutaro. "Concept of operations for knowledge discovery from Big Data across enterprise data warehouses," SPIE Defense, Security, and Sensing, pp. 875805-9, May 2013.

Mohammed M Olama, James Nutaro. "Secure it now or secure it later: the benefits of addressing cyber-security from the outset," SPIE Defense, Security, and Sensing, pp. 87570L-6, May 2013.

Ike Patterson, James Nutaro, Glenn Allgood, Teja Kuruganti, and David Fugate. "Optimizing investments in cyber-security for critical infrastructure," In Proceedings of the Eighth Annual Cyber Security and Information Intelligence Research Workshop (CSIIRW '13), Article 20 , 4 pages, 2013.

Bernard P. Zeigler, James Nutaro, Chungman Seo, Steven Hall, Pamela Clark, Michael Rilee, Sidney Bailin, Thomas Speller, and Walter Powell. "Frontier modeling support environment: flexibility to adapt to diverse stakeholders," In Proceedings of the 2012 Symposium on Theory of Modeling and Simulation - DEVS Integrative M&S Symposium (TMS/DEVS '12), Article 23 , 11 pages, 2012.

T. Kuruganti, J. Nutaro, S. Djouadi. "Event-based transmission line matrix method for simulating site-specific multipath propagation characteristics," Military Communications Conference (MILCOM 2012), pp.1-6, October 2012.

J. Nutaro and V. Protopopescu. "Discrete sensing and actuation in a simulation of frequency responsive loads," 2012 IEEE Energytech, pp.1-6, May 2012.

S.R. Sukumar and J.J. Nutaro. "Agent-Based vs. Equation-Based Epidemiological Models: A Model Selection Case Study," 2012 ASE/IEEE International Conference on BioMedical Computing (BioMedCom), pp.74-79, December 2012.

Nutaro, J.J.; Schryver, J.C.; Haire, M.J., "The throughput, reliability, availability, maintainability (TRAM) methodology for predicting chemical plant production," Reliability and Maintainability Symposium (RAMS), 2012 Proceedings - Annual , vol., no., pp.1,6, 23-26 Jan. 2012

James Horey, Edmon Begoli, Raghul Gunasekaran, Seung-Hwan Lim, and James Nutaro. "Big data platforms as a service: challenges and approach," In Proceedings of the 4th USENIX conference on Hot Topics in Cloud Computing (HotCloud'12), 2012.

Kalyan S. Perumalla, James J. Nutaro, and Srikanth B. Yoginath. "Towards high performance discrete-event simulations of smart electric grids," In Proceedings of the First International Workshop on High Performance Computing, Networking and Analytics for the Power Grid (HiPCNA-PG '11), pp. 51-58, 2011.

J. Nutaro. "Designing power system simulators for the smart grid: Combining controls, communications, and electro-mechanical dynamics," 2011 IEEE Power and Energy Society General Meeting, pp.1-5, July 2011.

Budhendra Bhaduri, Xiaohui Cui, Cheng Liu, Jennifer Santos-Hernandez, Benjamin Preston, Jack Schryver, James Nutaro, Stan Hadley, Richard Medina, Hoe Kyoungh Kim. "Knowledge Discovery for Exploring the Relations between Climate Change and Population Dynamics," GeoComputation, 2011.

Xiao Ma, S.M. Djouadi, T.P. Kuruganti, J.J Nutaro, and Li Husheng. "Control and estimation through cognitive radio with distributed and dynamic spectral activity," American Control Conference (ACC), pp. 289-294, June-July 2010.

S.R. Sukumar, M.M Olama, M. Shankar, S. Hadley, J.J. Nutaro, V. Protopopescu, S. Malinchik, B. Ives. "Modeling resource, infrastructure, and policy cost layers for optimizing renewable energy investment and deployment," IEEE Conference on Innovative Technologies for an Efficient and Reliable Electricity Supply (CITRES), pp. 151-158, Sept. 2010.

Yanyan Li, M.M. Olama, J.J. Nutaro. "Frequency waves, Grid Friendly Appliances and geographic limits in a smart grid," IEEE Conference on Innovative Technologies for an Efficient and Reliable Electricity Supply (CITRES), pp. 220-224, Sept. 2010.

S.R. Sukumar, M. Shankar, M. Olama, J. Nutaro, S. Malinchik, B. Ives. "A methodology to consider combined electrical infrastructure and real-time power-flow impact costs in planning large-scale renewable energy farms," IEEE Energy Conversion Congress and Exposition (ECCE), pp. 674-678, Sept. 2010.

M. Shankar, J. Nutaro, J. Stovall. "Evolution of communication and control for electric grid load management," IEEE Power and Energy Society General Meeting, pp. 1-7, July 2010.

Glenn O. Allgood, Phani Teja Kuruganti, James Nutaro, Jay Saffold. "Assured communications and combat resiliency: the relationship between effective national communications and combat efficiency," Proc. SPIE 7305, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VIII, 73050V, May 2009.

Xiao Ma, S.M. Djouadi, T.P. Kuruganti, J.J. Nutaro, H. Li. "Optimal estimation over unreliable communication links with application to cognitive radio," Proceedings of the 48th IEEE Conference on Decision and Control, held jointly with the 2009 28th Chinese Control Conference, pp.4062-4067, Dec. 2009.

N.C. Dexter, K.L. Kruse, J.J. Nutaro, R.C. Ward. "A computational model of cell

migration in response to biochemical diffusion,” First Annual ORNL Biomedical Science & Engineering Conference (BSEC 2009), pp. 1-4, March 2009.

Yi Sun and James Nutaro. “Performance Improvement Using Parallel Simulation Protocol and Time Warp for DEVS Based Applications,” In Proceedings of the 12th IEEE/ACM International Symposium on Distributed Simulation and Real-Time Applications (DS-RT '08), pp. 277-284, 2008.

J. Nutaro, S. Jarboe, B. Zeigler, D. Fulton. "A Method for Generating Synthetic Air Tracks," 12th IEEE/ACM International Symposium on Distributed Simulation and Real-Time Applications, pp. 245-251, Oct. 2008.

Budhendra L. Bhaduri, Eddie A. Bright, Phil R. Coleman, Cheng Liu, James J. Nutaro. “Integration of Activity Patterns through High Resolution Population Distribution and Dynamics,” Advances in Mass Transit and Travel Behavior Research (MTTBR-08), 2008.

S. Bhattacharyya, J. Nutaro, L.E. Miller, T. Kuruganti, M. Shankar. “Power system smart control and verification,” Proceedings of the Tenth IASTED International Conference, vol. 617, 2008.

James Nutaro, Phani Teja Kuruganti, Laurie Miller, Sara Mullen, and Mallikarjun Shankar. “Integrated Hybrid-Simulation of Electric Power and Communications Systems,” Proceedings of the 2007 IEEE Power Engineering Society General Meeting, pp. 1-8, June 2007.

James Nutaro, Phani Teja Kuruganti. "Fast, Accurate RF Propagation Modeling and Simulation Tool for Highly Cluttered Environments," IEEE Military Communications Conference 2007 (MILCOM 2007), Oct. 2007.

James Nutaro. “A Second Order Accurate Adams-Bashforth Type Discrete Event Integration Scheme,” 21st International Workshop on Principles of Advanced and Distributed Simulation (PADS '07), pp. 25-31, June 2007.

James Nutaro, Teja Kuruganti, and Mallikarjun Shankar. “Seamless Simulation of Hybrid Systems with Discrete Event Software Packages,” Proceedings of the 40th Annual Simulation Symposium, pp. 81-87, March 2007.

Andy Loebel, James Nutaro, Teja Kuruganti, Rajanikanth Jammalamadaka. “Quantifying the vulnerability of tactical data networks,” IEEE Military Communications Conference 2007 (MILCOM 2007), Oct. 2007.

James Nutaro, Kara Kruse, Richard Ward, Elizabeth O'Quinn, Matthew Woerner, Barbara Beckerman, Stacy Kirkpatrick, Deidra Mountain, and Oscar Grandas. “A discrete cell migration model,” In Proceedings of the 2007 Summer Computer Simulation Conference (SCSC '07), pp. 811-816, 2007.

James Nutaro, Richard Ward, Glenn Allgood, Alexander Parfenov, and Jason Holmstedt. “Data Coupling and Downcasting in Discrete Event Simulation Software,” In the Proceedings of the 2006 DEVS Integrative M&S Symposium (DEVS'06), part of the 2006 Spring Simulation Multi-Conference, pp. 167-174, April 2006.

Richard C. Ward, Line C. Pouchard, James J. Nutaro. “Integrative computational frameworks for multiscale digital human modeling and simulation,” Computational

Science–ICCS, pp. 814-821, 2006.

Phani Teja Kuruganti and James Nutaro. “A Comparative Study of Wireless Propagation Simulation Methodologies: Ray Tracing, FDTD, and Event Based TLM,” In the Proceedings of the 2006 Huntsville Simulation Conference, October 2006.

Muzy, A, A. Aiello, P.A. Santoni, B.P. Zeigler, J.J. Nutaro, R. Jammalamadaka. "Discrete event simulation of large-scale spatial continuous systems," 2005 IEEE International Conference on Systems, Man and Cybernetics, vol. 4, pp.2991-2998, October 2005.

A. Muzy and J. Nutaro. “Algorithms for efficient implementations of the DEVS & DSDEVS abstract simulators,” In 1st Open International Conference on Modeling & Simulation, pp. 401-407, June 2005.

James Nutaro. “Constructing multi-point discrete event integration schemes,” In Proceedings of the 37th Winter Simulation Conference (WSC '05), pp. 267-273, 2005.

R. Jammalamadaka, J.J. Nutaro, M.E. Gettings, Bernard P Zeigler. “DEVS Re-Implementation of an Agent-Based Valley Fever Model,” DEVS Integrative and Modeling Symposium, 2005.

James Nutaro. “Risk-free optimistic simulation of DEVS models,” In Proceedings of the 2004 Advanced Simulation Technology Conference, 2004.

James Nutaro and Hessam S.Sarjoughian. “A unified view of time and causality and its application to distributed systems,” In Proceedings of the 2003 Summer Computer Simulation Conference, July 2003. (best paper award)

James J. Nutaro, Bernard P. Zeigler, Rajanikanth Jammalamadaka, and Salil R. Akerkar. “Discrete event solution of gas dynamics within the DEVS framework,” In International Conference on Computational Science, volume 2660 of Lecture Notes in Computer Science, pages 319-328. Springer, 2003.

B.P. Zeigler, D. Fulton, J. Nutaro, P. Hammonds. “M&S Enabled Testing of Distributed Systems: Beyond Interoperability to Combat Effectiveness Assessment,” 9th Annual Modeling and Simulation Workshop, ITEA White Sands Chapter, December 2003.

James Nutaro and Hessam Sarjoughian. “Speedup of a sparse system simulation,” In Proceedings of the Fifteenth Workshop on Parallel and Distributed Simulation (PADS '01), pp. 193-199, 2001.

B.P. Zeigler, H.S. Sarjoughian, Sunwoo Park, J.J. Nutaro, J.S. Lee, Y.K. Cho. "DEVS modeling and simulation: a new layer of middleware," Third Annual International Workshop on Active Middleware Services, pp.22-31, August 2001.

T. Lake, B.P. Zeigler, H.S. Sarjoughian, J. Nutaro. “DEVS simulation and HLA lookahead,” Simulation Interoperability Workshop (SIW), no. 00S-SIW-160, 2000.

H. Sarjoughian, J. Nutaro, and B. Zeigler. “Collaborative DEVS Modeler,” International Conference on Web-based Modeling and Simulation, 1999.

Reports

Jibonananda Sanyal, James J. Nutaro. The MODBUS XML Schema Definition

Specification: Version 0.9b. Oak Ridge National Laboratories software documentation, October 2014.

Jibonananda Sanyal, James J. Nutaro. Modbus XML Driver Generation Guide. Oak Ridge National Laboratories software documentation, October 2014.

Philip R. Boudreaux, Jeffrey D. Munk, Roderick K. Jackson, Anthony C. Gehl, April E. Parkison, James J. Nutaro. Improving Heat Pump Water Heater Efficiency by Avoiding Electric Resistance Heater Use. Oak Ridge National Laboratories report, ORNL/TM-2014/483, October 2014.

James Nutaro, Zhi Li, Vladimir A. Protopopescu, Aleksandar D. Dimitrovski, Mallikarjun Shankar. A Potential Cyber-attacks on Power Systems through Load Manipulation. Oak Ridge National Laboratories report, ORNL/TM-2014/434, October 2014.

Laura L. Pullum, Arvind Ramanathan, Sreenivas R. Sukumar, James J. Nutaro, Ozgur Ozmen, Chad A. Steed, Xiaohui Cui. Verification and Validation of Agent-Based Disease Spread Models - Year 1 Report. Oak Ridge National Laboratories report, ORNL/TM-2013/304, May 2013.

Supriya Chinthavali, Aleksandar D. Dimitrovski, Steven J. Fernandez, Christopher S. Groer, James J. Nutaro, Mohammed M. Olama, Olufemi A. Omitaomu, Mallikarjun Shankar, Kyle L. Spafford, Bogdan Vacaliuc. Real Time Simulation of Power Grid Disruptions. Oak Ridge National Laboratories report, ORNL/TM-2012/483. November 2012.

Isabelle B. Snyder, James. J. Nutaro, John D. Kueck. Alternate Models for Power System Simulation Studies for Frequency Responsive Load. Oak Ridge National Laboratories report, ORNL/TM-2011/439, February 2012.

James Nutaro and Robert Coop. TRAM - Discrete Event Simulation Software for Calculating Throughput, Reliability, Availability, and Maintainability Metrics: Software Description Document Revision 6. Oak Ridge National Laboratories report, ORNL/TM-2009/180, November 2010.

Roger A. Kisner, Wayne W. Manges, Lawrence Paul MacIntyre, James J. Nutaro, J.K. Munro, Paul D. Ewing, Mostofa Howlader, Phani Teja Kuruganti, Richard M. Wallace, Mohammed M. Olama. Cybersecurity through Real-Time Distributed Control Systems. Oak Ridge National Laboratories report, ORNL/TM-2010/30, February 2010.

Arjun Shankar, James Nutaro, Glenn Allgood, Mohammed Olama. Simulation Framework for Demand Response Analysis and Control System. California Institute for Energy and Environment. July, 2009. Available online at https://www.smartgrid.gov/sites/default/files/doc/files/Simulation_Framework_for_Demand_Response_Analysis_Control_Sy_200903.pdf

Presentations

James Nutaro. Putting Operational Software into Constructive Simulations. Keynote address at the Ground Vehicle Systems Engineering & Technology Symposium, Novi, Michigan, 4-6 August 2015.

Bogdan Vacaliuc, James J. Nutaro, Daniel B. Koch, Benjamin E. Huey, Stephen Fulton

Smith. A Frequency Data Recorder for Multiple Generator Tracking. Presented at Modeling, Simulation, And Optimization for the 21st Century Electric Power Grid, October 2012.

James J. Nutaro, Jack C. Schryver, Jonathan Marvin Haire, Denise L. Lee. Using the Throughput, Reliability, Availability, and Maintainability (TRAM) Methodology to Predict and Relieve "Gridlock" in Process Plant Material Flows. Presented at the American Nuclear Society 2011 Winter Meeting, Oct.-Nov. 2011.

James J. Nutaro, Jack C. Schryver, Jonathan Marvin Haire, Denise L. Lee. Discrete Event Simulation Modeling for Throughput, Reliability, Availability, and Maintainability (TRAM) Assessments. Presented at the American Nuclear Society 2011 Annual Meeting, June 2011.

James J. Nutaro, Isabelle B. Synder, John D. Kueck. Frequency responsive load. Presented at CERTS, Oct. 2010.

Steven J. Fernandez, Stacy J. Prowell, James J. Nutaro. Behavior-Based Anomaly Detection: Capabilities and Future Directions. Presented at CyberCap, Aug. 2010.

Cheng Liu, Budhendra L. Bhaduri, and James J. Nutaro. High Resolution Visualization in Geographic Information Science/Transportation. Presented at 2008 meeting of the Association of American Geographers, April 2008.

Richard C. Ward, Line Catherine Pouchard, James J. Nutaro. Integrative Computational Frameworks for Multiscale Digital Human Modeling and Simulation. Presented at the International Conference on Computational Sciences, May 2006.

R.C. Ward, J.J. Nutaro, K.L. Kruse, E.C. O'Quinn, A.R. Reedy-Jackson, M.M. Woerner. Kinetics of Vascular Remodeling: Comparison of Solver Approaches. Presented at APS Southeastern Section Meeting, 2006.

Invited talks

James Nutaro. Introduction to simulation and co-simulation processes and techniques. Invited lecture at the 2013-02 Co-Simulation of Energy and ICT Systems, Stockholm, Sweden, November 28-29, 2013.

James Nutaro. ADEVS co-simulation platform. Invited lecture at the 2013-02 Co-Simulation of Energy and ICT Systems, Stockholm, Sweden, November 28-29, 2013.

James J. Nutaro. A Smart Grid = A Software Grid: Why automation will unleash a wave of new M&S tools for the electric power system. Presented at the Bridging the Gap, March, 2013. Available online at http://web.ornl.gov/adm/partnerships/events/2013_BTG/Presentations/12_Nutaro_2013BTG.pdf

James Nutaro. A Smart Grid = A Software Grid: Computational challenges at peta-, exa-, and zetta-scales. Presented at the Fall Creek Falls Conference, October 25, 2010. <http://computing.ornl.gov/workshops/FallCreek10/presentations/nutaro.pdf>

James J. Nutaro. Discrete event models in biology: Problems, solutions, and food for thought. Presented at Biomedical Science & Engineering Conference, 2009. BSEC 2009. First Annual ORNL. March 2009.

James Nutaro, Phani Teja Kuruganti, Vladimir Protopopescu, and Mallikarjun Shankar. Modeling Power Systems of the Future Information Technology and Power System Dynamics. Invited talk at Los Alamos National Laboratory. 2009.

Plenary speaker, 2006 DEVS Symposium, “Integrating DEVS and Modern Parallel Discrete Event Simulation Technology”.

Citation metrics

h-index 14, i10-index 24 with 642 total citations (calculated with Google Scholar)

Professional Service and Associations

Area editor for SIMULATION: Transactions of the Society for Modeling and Simulation International (SCS) and the ACM Transactions on Modeling and Computer Simulation (TOMACS).

Member, IEEE and SCS.

Program Committee of SIMULTECH 2015

Session chair: Advanced Controls, 2014 Purdue Conference on High Performance Buildings

Member of the IEEE Task Force on Interfacing Techniques for Simulation Tools, 2013-2014.

Invited panelist, Discussion on Synergies and Cross-Cutting Themes, Modeling, Simulation and Optimization for the 21st Century Electric Power Grid, October 21-25, 2012

Invited panelist, Department of Energy Computational Needs for the Next Generation Electrical Grid, April 19-20 2011.

Technical Program Committee, Symposium on Theory of Modeling and Simulation - DEVS Integrative M&S Symposium (DEVS 2010)

Steering committee, HPCS 2008: High Performance Computing and Simulation Symposium

Session chair: Training and Virtual Environments, The Huntsville Simulation Conference, HSC 2006

Session chair: Asynchronous Methods II, 21st International Workshop on Principles of Advanced and Distributed Simulation (PADS 2007).

General Chair, 2007 DEVS Integrative M&S Symposium (DEVS'07)

Session chair: DEVS and Multi-formalism modeling, 2005 Winter Simulation Conference.

Technology Transfer

Developed and copyrighted the ORNL RCSim software, which won an R&D 100 award in 2012. This software was licensed to NetwoRCSim, LLC in 2012 for commercial development.

ORNL Invention Disclosure 200701857. Teja Kuruganti and James Nutaro. A scalable device for predicting radio reception quality in wireless networks. Jan. 2007.

ORNL Invention Disclosure 200701904. Vladimir Protopopescue, Mallikarjun Shankar, Teja Kuruganti, James Nutaro. A method for partitioning hybrid models that facilitates simulator construction. March 2007.

ORNL Invention Disclosure 201002459. Steven Fernandez, Mallikarjun Shankar, James Nutaro, Yilu Liu, Aleksandar Dimitrovski, Olufemi Omitaomu, Chris Groer, Kyle Spafford, Ranga Vatsavai. Real-Time Simulation of Power Grid Disruptions. Oct. 2010.

ORNL Invention Disclosure 201202836. Bogdan Vacaliuc, James Nutaro, Danial Kock, Benjamin Huey, Steven Fernandez. A Frequency Data Recorder with Multiple Generator Tracking. March 2012.

ORNL Invention Disclosure 201303212. Wade McNair, Mohammed Olama, James Nutaro, Sreenivas Sukumar. Data Management Maturity Model. Nov. 2013.

ORNL Invention Disclosure 201403329. Jack Schryver, Ozgur Ozmen, James Nutaro. Integrated Sustained Behavior Methodology. May 2014.

Open source software package “Toolkit for Hybrid Modeling of Electrical Power Systems (THYME)”, first published in 2011, most recent revisions published in 2013.

Open source software package “A discrete event system simulator (adevs)”. First published in 2000, most recent revisions published in 2014.

Grants

RT Sync, “Enhancement of Ballistic Missile Defense System Level Simulation Operations through Multi-Core Processing”, PI, FY 2014-2015. \$30,000.

ISSAC Corporation, “Mutli-Core Simulation Architecture for Missile Defense Models”, PI, FY 2014-2015. \$31,000.

ORNL LDRD, “Off-grid Building Management System”, FY 2015. \$1,350,000.

ORNL LDRD, “To the Nation's Health: Computational National Healthcare Model for Value-Based-Purchasing Cost Projections”, FY 2014-2015. \$740,000.

ORNL LDRD, “Hybridizing HPC: Modern Cray Architectures for Big Data Problems”, FY 2013-2014, \$1,288,000.

DOE EERE, “Seamless Interoperability in Building Automation Using Self-Mapping and Discovery of Sensors, Actuators, and Data”, PI FY 2013. \$260,000

ORNL LDRD, “Fully-virtualized Computational Energy Infrastructure Model for Improved Cyber Resilience”, FY 2012-2013. \$1,278,000.

ORNL LDRD, “Real-Time Simulation of Power Grid Disruptions”, FY 2011-2013, \$1,391,000.

RT Sync, “High Performance, Open Source Simulation Engines for Frontier and Complex Event Modeling Simulation & Analysis (CEMSA): Real-Time Analysis Communication Environment (RACE)”, PI, FY 2011. \$25,000

ORNL LDRD, “The Eastern U.S. as a test-bed for Smart Grid technologies: a virtual power system enabled by ultra-scale computing”, PI, FY 2010-2011. \$775,000.

ORNL SEED. “Qualitative System Identification for Tumor Modeling: Knowledge

Discovery from Observations of In Vivo Tumors”, PI, FY 2010-2011. \$182,000.

Department of Energy Advanced Security Acceleration Project for the Smart Grid, PI, FY 2009-2012. \$1,500,000.

ORNL LDRD, “A Knowledge Discovery Framework for America’s Transportation System”, FY 2008-2010. \$725,000.

ORNL LDRD, “Ensuring Dynamic Power Grid Stability: Integrated Electric and Information Grid Modeling”, FY 2006-2007. \$889,900.

ORNL SEED, “Discrete Event-Based Simulation of Electromagnetic Wave Propagation in Highly Cluttered Environments”, PI, FY 2006-2007. \$156,000.

NSF Collaborative Research: CDI-Type II--Integrated Weather and Wildfire Simulation and Optimization for Wildfire Management, FY 2009, \$295,541.

NSF CSR-CSI: System Integration of Dynamical Data Driven Wildfire Spread and Firefighting Modeling, Simulation, and Optimization, FY 2007, \$120,000.

RT Sync, “Modeling and simulation software engineering for simulation based system testing”, PI, FY 2006-2007. \$79,000.

Awards

R&D 100 Award for ORNL’s RCSIM Software, 2012.

Certificate of Achievement for Exceptional Service in the National Interest as part of the Future Force Integrated Support Team, Sept. 2009.

Joint Interoperability Test Command Golden Eagle Award for outstanding performance in support of the development of the Standard Interface for Multiple Platform Link Evaluation Gateway, Sept. 2004.

Best paper award at the 2003 Summer Simulation Multi-conference, July 2003.

Mentoring

I have been involved almost every year with ORNL’S RAMS internship program. Students that I have mentored through this program include:

Yesenia Velasco, Summer of 2014. Yesenia worked on a problem of forecasting tumor growth by building models using induction from series of images.

Holly Ray, Summer of 2011. Holly investigated battery and other energy storage technologies that could be used to provide frequency regulation at the distribution level by organizing residential-sized energy storage devices into a large, distributed storage system.

DeMarcus Thomas, Summer of 2010. Thomas developed software for converting file formats for a variety of voxel-based 3D modeling tools into the mesh file format that is used by ORNL’s RCSim radio signal propagation software.

Tasha Fernandez, Summer of 2009. Tasha worked on methods for the analysis and design of networked control systems. Her focus was on congestion control algorithms that discard data rather than queue it and thereby reduce delay at the cost of data loss, and to understand this trade-off affects the performance of the controller.

Abigail Snyder, Summer of 2008. Abigail investigated the effect of meshing strategies on dispersion error within ORNL's RCSim radio signal propagation software.

Cedrick Collins, Summer of 2008. Cedric created a parallelized version of a non-linear analysis code that accelerated its use to calibrate a model for forewarning of epileptic seizures.

Travis Whitlow, Summer of 2007. Travis converted a research-class FORTRAN code for nonlinear statistical analysis of time-serial data to a parallelized code that runs on the ORNL Institutional Cluster.

Kenroy Willson, Summer of 2005. Kenroy developed a software library that modularized the dynamic pieces of a traffic simulation. This work supported the development of traffic modeling tool set by creating reusable components for data import and export, traffic routing algorithms, and visualization.

Through other ORNL internship programs, I have mentored students from universities, community colleges, and high schools, some of whom include:

Thomas Tinoco, Summer of 2006. Thomas designed experiments and collected data to validate the RCSIM radio propagation model that was then being developed at ORNL. This work was later described in paper published in IEEE Transactions on Antennas and Propagation.

Laurie Miller, Summer of 2007. Laurie worked on the development of electrical power system models and new simulation tools for "smart" electrical grids. This work was featured in a journal article published in International Journal of Energy Sector Management and at the IEEE Annual Simulation Symposium.

Robert Coop. 2006 – 2008. Robert was engaged in a wide variety of activities, including the development of graphical modeling tools used in performance evaluation studies for the Y-12 Uranium Processing Facility (UPF), simulation interoperability software in support of our work at the Joint Interoperability Test Command (via a subcontract through RT Sync), and the development of forest fire simulations with the support of an NSF grant.

Loni Albretch. Summer of 2012. Loni was a high school senior at Oak Ridge High School who came to ORNL through the RAMS program. She calibrated and then validated an influenza model for the Spanish Flu by using historical records, and then adjusted this model to investigate "what-if" scenarios for the Swine Flu that was prevalent just prior to her internship.

April Parkison. 2013-2014. April developed an algorithm and software for anticipating near term hot-water demand in homes. This software played a central role in the model-predictive control system of a new, hybrid-heat pump water heater that was developed at ORNL.