

Modeling & Simulation Publications 2010

Journals

Published

Stuart I. Campbell, Stephen D. Miller, Jean-Christophe Bilheux, Michael A. Reuter, Peter F. Peterson, James A. Kohl, James R. Trater, Sudharshan S. Vazhkudai, and Vickie E. Lynch, "The SNS/HFIR Web Portal System for SANS," *J. of Physics: Conference Series*, XIV International Conference on Small-Angle Scattering, September 13–18, 2009, Oxford, England.

L. R. Shenton and K. O. Bowman, "The Derivative of a Continued Fraction," *Far East Journal of Applied Mathematics*, 35(3), 363–371, (2009).

K. O. Bowman and L. R. Shenton, "The Pearson and Hansmann Manifolds for Statistical Distributions," *Far East Journal of Theoretical Statistics*, 29(2), 157–173, (2009).

Cyrus W. Taft, Aaron J. Hussey, Teja Kuruganti, John N. Sorge, Asis Nasipuri, "Low-Cost Wireless Sensors Can Improve Monitoring in Fossil-Fueled Power Plants," *POWER Magazine*, Feb. 2010.

K. B. Cochran, R. H. Dodds, and K. D. Hjelmstad, "The Role of Strain Ratcheting and Mesh Refinement in Finite Element Analyses of Plasticity Induced Crack Closure," *Intl. J. of Fatigue*, June 2010.

K. O. Bowman and L. R. Shenton, "Definite Integrals, Some Involving Residue Theory, Evaluated by the Maple Code," *Far East Journal of Theoretical Statistics*, 31(2), 107–116, (2010).

K. O. Bowman. and L. R. Shenton, "A Fascinating Series Due to Stieltjes," *Far East Journal of Applied Mathematics*, 43(1), 57–63, (2010).

S.P. Hirshman, K.S. Perumalla, V.E. Lynch, R. Sanchez, "BCYCLIC: A Parallel Block Tridiagonal Matrix Cyclic Solver," *J. of Computational Physics*, 229, 6392–6404, (2010).

L. W. Owen, J. M. Canik, R. J. Groebner, J. D. Callen, X. Bonnin, and T. H. Osborne, "Comparing 1.5D ONETWO and 2D SOLPS Analyses of Inter-ELM H-mode Plasma in DIII-D," *Nuclear Fusion*, 50, 064017, (2010).

J. D. Callen, R. J. Groebner, T. H. Osborne, J. M. Canik, L. W. Owen, A. Y. Pankin, T. Rafiq, T. D. Rognlien and W. M. Stacey, "Analysis of Pedestal Plasma Transport," *Nuclear Fusion*, 50, 064004, (2010).

S. Mordijck, L.W. Owen, R.A. Moyer, "Increased Particle Transport Due to Resonant Magnetic Perturbations Modeled with a Vacuum Field Line Tracing Code and a 2D Fluid Code," *Nuclear Fusion*, 50, 034006, (2010).

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David E. Newman, Benjamin A. Carreras, Vickie E. Lynch, and Ian Dobson, "Exploring Complex Systems Aspects of Blackout Risk, Mitigation," to appear in *IEEE Transactions On Reliability*, 2011.

Submitted

J. C. Schryver, "An Extended Rationality Framework for Understanding Strategic Choice and Political Violence," *Rationality and Society*, June 2010.

J. C. Schryver, J. J. Nutaro, and M. J. Haire, "Metrics for Availability Using a Discrete Event Simulation Method," *ACM Transactions on Modeling and Computer Simulations*, July 2010.

Sudip K. Seal and Kalyan S. Perumalla, "Reversible Parallel Discrete Event Formulation of a TLM-based Radio Signal Propagation Model," *ACM Transactions on Modeling and Computer Simulation*, Aug. 2010 (*revised version submitted upon first review*).

Kalyan S. Perumalla, Brandon G. Aaby, Srikanth B. Yoginath and Sudip K. Seal, "Towards Highly Interactive, GPU-based Evaluation of Vehicle Transport Scenarios at State-Scale," *SIMULATION: Transactions of the Society for Modeling and Simulation International*, Sept. 2010, (*under review*).

Kalyan S. Perumalla and Sudip K. Seal, "Discrete Event Modeling and Massively Parallel Execution of Epidemic Outbreak Phenomena," *SIMULATION Special Issue on Parallel and Distributed Simulation*, Sept. 2010, (*under review*).

Books/Chapters

Published

Kalyan S. Perumalla, "Computational Spectrum of Agent Model Simulation," Book Chapter in *Modeling Simulation and Optimization*, IN-TECH Publishers, ISBN 978-953-7619-36-7, Belgium, April 2010.

K. O. Bowman and L. R. Shenton, "The Gamma Distribution, International Encyclopedia of Statistical Science," *Springer-Verlag*, Sept. 2010.

K. O. Bowman and L. R. Shenton, "Omnibus Test for Departures from Normality," *International Encyclopedia of Statistical Science*, Springer-Verlag, Sept. 2010.

M. M. Olama, S. M. Djouadi and C. D. Charalambous, "Wireless Fading Channel Models: From Classical to Stochastic Differential Equations," In *Stochastic Control*, Published by SCIYO, Vienna, Austria, Sept. 2010.

Accepted

None.

Conference Abstracts/Papers

Published

J. Lake, G. Allgood, M. M. Olama, T. Rose, and D. Brumback, "Capacity Utilization Study for Aviation Security Cargo Inspection Queuing System," *Proceedings of the INFORMS Conference*, Oct. 2009.

Kalyan S. Perumalla, "Switching to High Gear: Opportunities for Grand-scale Real-time Parallel Simulations," *International Symposium on Distributed Simulation and Real-time Applications*, Singapore, Oct. 25–28, 2009.

G. Allgood, M. M. Olama, T. Rose, and D. Brumback "Performance Evaluation and Optimization for Aviation Security Cargo Inspection Queuing System," *Proceedings of the ANNIE Conference*, pp. 67-74, Nov. 2009.

G. Allgood M. M. Olama, and J. Lake, "Threat Anticipation and Deceptive Reasoning Using Bayesian Belief Networks," *Proceedings of the ANNIE Conference*, pp. 59–66, Nov. 2009.

Ma Xiao, Seddik M. Djouadi, Teja P. Kuruganti, James J. Nutaro, and H. Li, "Optimal Estimation over Unreliable Communication Links with Application to Cognitive Radio," *48th IEEE Conference on Decision and Control*, Shanghai, China, Dec. 16–18, 2009.

Kalyan S. Perumalla, "High-Performance Simulations for Capturing Feedback and Fidelity in Complex Networked Systems," *SIAM Parallel Processing Conference (PP10)*, Feb. 2010.

Kalyan S. Perumalla, Brandon G. Aaby, Srikanth B. Yoginath and Sudip K. Seal, "Towards Highly Interactive, GPU-based Evaluation of Evacuation Transport Scenarios at State-Scale," *National Evacuation Conference*, Feb. 2010.

Kalyan S. Perumalla, Brandon G. Aaby, and Sudip K. Seal, "Efficient Simulation of Agent-based Models on Multi-GPU and Multi-core Clusters," *ICST International Conference on Simulation Tools and Techniques*, Mar. 2010. (**Best Paper Finalist**)

Kalyan S. Perumalla, " $\mu\pi$: A Scalable and Transparent System for Simulating MPI Programs," *ICST International Conference on Simulation Tools and Techniques*, Mar. 2010.

Vickie Lynch, Hans-Beat Buergi, Juerg Hauser, Christina Hoffmann, Tara Michels-Clark, and Steve Miller, "Differential Evolution Optimization of Diffraction Pattern Models with Clones," *MAR10 Meeting of The American Physical Society*, Mar. 14–18, 2010, Portland, Oregon.

Vickie Lynch, Hans-Beat Buergi, Juerg Hauser, Christina Hoffmann, and Tara Michels-Clark, "Supercomputers for Studying Stacking Disorder of a Tetracyclic Benzene Derivative," *Sinergia Progress Meeting*, Knoxville, TN, Apr. 6–10, 2010.

M. M. Olama, K. Davenport, and G. Allgood, "A Bayesian Belief Network of Terrorist Motivations," *Proceedings of the SPIE Defense, Security and Sensing Conference*, vol. 7666, 11 pages, Apr. 2010.

G. Allgood, M. M. Olama, and J. Lake, "Enhancing Complex System Performance Using Discrete-Event Simulation," *Proceedings of the Spring Simulation Multiconference*, Apr. 2010.

G. Allgood, M. M. Olama, J. Lake, and D. Brumback, "Performance Evaluation Study for Aviation Cargo Inspection System Using Various Capacity Utilization Measures," *Proceedings of the SPIE Defense, Security and Sensing Conference*, vol. 7666, 12 pages, Apr. 2010.

G. Allgood, M. M. Olama, J. Lake, and D. Brumback, "Capacity Utilization Study for Aviation Security Cargo Inspection Queuing System," *SPIE Defense, Security and Sensing Conference*, Apr. 2010.

Ann E. Wells, Sharon A. Bewick, Kara L. Kruse, Richard C. Ward, and John P. Biggerstaff, "Modeling the Effect of Tumor Cell Growth When in the Presence of Natural Killer Cells," *2010 Second Annual ORNL Biomedical Science & Engineering Conference*, May 25–26, 2010, Oak Ridge, TN, IEEE Catalog Number: [not yet available].

Laura L. Pullum, Christopher T. Symons, Robert M. Patton, and Barbara G. Beckerman. "Architecture-Level Dependability Analysis of a Medical Decision Support System,"

International Conference on Software Engineering (ICSE) Workshop on Software Engineering in Health Care, 2010. SEHC '10. Cape Town, South Africa, May 2010.

Ma Xiao, Seddik M. Djouadi, Teja P. Kuruganti, James J. Nutaro, and Husheng. Li, “Control and Estimation through Cognitive Radio with Distributed and Dynamic Spectral Activity” *American Control Conference*, June 2010.

Kalyan S. Perumalla and Sudip K. Seal, “Reversible Parallel Discrete Event Execution of Large-scale Epidemic Outbreak Models,” *IEEE/ACM/SCS International Workshop on Principles of Advanced and Distributed Simulation*, June 2010 (**Best Paper Finalist**).

Kalyan S. Perumalla and Christopher D. Carothers, “Compiler-based Automation Approaches to Reverse Computation,” *Workshop on Reverse Computation*, June 2010.

S. Yin, T. L. Dickson, P. T. Williams, and B. R. Bass, “Verification of New Capabilities of Deterministic Load Module of FAVOR 09.1,” Paper number PVP2010-25439, *Proceedings of 2010 ASME Pressure Vessels and Piping Division Conference*, July 18–22, 2010, Bellevue, Washington.

D. Rudland, R. Kurth, B. Bishop, P. Mattie, H. Klasky and D. Harris, “Development of Computational Framework and Architecture for Extremely Low Probability of Rupture (xLPR) Code,” PVP2010-25963, *Proceedings of ASME 2010 Pressure Vessel and Piping Conference*, July 18–22, 2010, Bellevue, WA.

Hans Beat Bürgi, Jürg Hauser, and Vickie Lynch, “Beyond Single-Crystal Structure Determination Interpretation of 3D Disorder Diffuse Scattering,” *The First Element: In Memory of Bob Bau session, 2010 ACA Annual Meeting*, Chicago, IL, July 24–29, 2010.

T. L. Dickson, Eric Focht, and Mark Kirk, “Review of Proposed Methodology for a Risk-Informed Relaxation to ASME Section XI– Appendix G,” paper number PVP2010-25010, *proceedings of 2010 American Society of Mechanical Engineers*, Bellevue, Washington, July 2010.

Tara Michels-Clark, Hans Beat Bürgi, Jürg Hauser, Christina Hoffmann, and Vickie Lynch, “Modeling Diffuse Scattering in a 1D Disordered Crystal Using a Probabilistic Layer Stacking Model,” *2010 ACA Annual Meeting*, Chicago, IL, July 24–29, 2010.

Vickie Lynch, Hans-Beat Buergi, Juerg Hauser, Christina Hoffmann, and Tara Michels-Clark, “Progress on Using Supercomputers for Studying Stacking Disorder of a Tetracyclic Benzene Derivative,” *Sinergia Progress Meeting*, Zurich, Switzerland, Sept. 14–17, 2010.

Y. Li, M. M. Olama and J. Nutaro, “Frequency Waves, Grid Friendly Appliances and Geographic Limits in Smart Grid,” *Proceedings of the IEEE Conference on Innovative Technologies for an Efficient and Reliable Electricity Supply*, Sept. 2010.

S. Sukumar, M. M. Olama, M. Shankar, S. Hadley, V. Protopopescu, S. Malinchik, and B. Ives, "Modeling Resource, Infrastructure, and Policy Cost Layers for Optimizing Renewable Energy Investment and Deployment," *Proceedings of the IEEE Conference on Innovative Technologies for an Efficient and Reliable Electricity Supply*, Sept. 2010.

S. Sukumar, M. M. Olama, Jim Nutaro, M. Shankar, S. Malinchik and B. Ives, "A Methodology to Consider Electrical Infrastructure and Real-Time Power-Flow Impact Costs Together in Planning Large-Scale Renewable Energy Farms," *Proceedings of the IEEE Energy Conversion Congress and Exposition (ECCE) Conference*, Sept. 2010.

S. Sukumar, M. Shankar, M. M. Olama, S. Hadley, V. Protopopescu, S. Malinchik and B. Ives. "Quantifying State-Policy Incentives for the Renewable Energy Investor" *Proceedings of the 2010 IEEE Energy Conversion Congress and Exposition (ECCE) Conference*, Sept. 2010.

M. M. Olama, G. O. Allgood, K. M. Davenport, and J. C. Schryver, "A Bayesian Belief Network of Threat Anticipation and Terrorist Motivations," *Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IX*, Edward M. Carapezza (Ed.), *Proc. of SPIE Vol. 7666 76660V-1*, doi: 10.1117/12.849464.

Robert M. Patton, Barbara G. Beckerman, Thomas E. Potok, and Jim N. Treadwell, "Genetic Algorithm for Analysis of Abdominal Aortic Aneurysms in Radiology Reports," *6th GECCO Workshop on Medical Applications of Genetic and Evolutionary Computation in conjunction with the 2010 Genetic and Evolutionary Computation Conference*, (GECCO 2010).

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Christopher D. Carothers, and Kalyan S. Perumalla, "On Deciding between Conservative and Optimistic Approaches on Massively Parallel Platforms," *Winter Simulation Conference*, Washington, D.C., accepted July 2010.

R. H. Morris and C. D. Sulfredge, "Facility Targeting, Protection and Mission Decision Making using the VISAC Code," *Proceedings of the MODSIM 2010 Conference*, Hampton, VA, Oct. 13–15, 2010.

Carlos C. Rojas, Robert M. Patton, and Barbara G. Beckerman, "Characterizing Mammography Reports for Health Analytics," to be published in the proceedings of the *ACM International Health Informatics 9IHI Conference*, Washington, D.C, Nov. 2010.

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C. Griffin, J. C. Schryver, A. C. Jose, C. Jiao, and E. Begoli, "Extraction of Affect, Entities, and Affective Relationships from Text," *IEEE Intelligence and Security Informatics (ISI 2010)*, 2010.

X. Ma, M. M. Olama, S. M. Djouadi and C. D. Charalambous, "Estimation and Identification of Time-Varying Long-Term Fading Channels via the Particle Filter and the EM Algorithm," *Submitted to the IEEE Radio and Wireless Symposium*, Jan. 2011.

Sudip K. Seal, Kalyan S. Perumalla, and Steven P. Hirshman, "Revisiting Parallel Solvers for Block Tri-diagonal Systems of Equations," *International Parallel and Distributed Processing Symposium*, Anchorage, AK, Sept. 2010 (*under review*).

Poster Presentations

Vickie Lynch, Tara Michels-Clark, Christina Hoffmann, Jürg Hauser, Thomas Weber, Steven Miller, and Hans-Beat Bürgi "Using Supercomputing to Model Modulated Diffuse Structures," *Women in Science Poster Session*, Apr. 26, 2010.

Ann E. Wells, Sharon A. Bewick, Kara L. Kruse, Richard C. Ward, and John P. Biggerstaff, "Modeling the Effect of Tumor Cell Growth When in the Presence of Natural Killer Cells," *Women in Science Poster Session*, April 26, 2010, Oak Ridge National Laboratory, Oak Ridge, TN.

Christina Hoffmann, Vickie Lynch, Tara Michels-Clark, Jürg Hauser, Thomas Weber, Steven Miller, and Hans-Beat Bürgi, "Understanding the Intricate Interplay of Structure and Function of Materials," *DOE Review Poster Session*, Apr. 27, 2010.

Gauld, Jillian S. and Beckerman, Barbara G., "Applying data mining methods to blast-related mild traumatic brain injury', *Poster Session, Biomedical Sciences and Engineering Center Conference 2010*, Oak Ridge, TN, May 25–26, 2010. (IEEE Xplore)

Nakeisha Turk, Christina Hoffmann, and Vickie Lynch, "Utilizing C Programming to Generate a Probabilistic Five-Layer Model," *NCCS and Summer Students Poster Sessions*, Aug. 10–11, 2010.

Adeola Odutola and Vickie Lynch, "Testing and Documentation of Integrated Spectral Analysis Workbench (ISAW)," *RAMS Student Poster Session*, Aug. 11, 2010.

Jillian S. Gauld and Barbara G. Beckerman, "Analyzing Endoleaks and Predicting Outcomes After Aneurysm Repair," *RAMS Student Poster Session*, Aug. 11, 2010.

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Bengea Sorin, Teja Kuruganti, David Schwenk, et al. “Wireless Platform for Energy Efficient Building Control Retrofits,” *Poster for SERDP & ESTCP Partners in Environmental Technology Technical Symposium & Workshop*, Dec. 2010.

Reports/TMs/Letter Reports

Beckerman, Barbara G., Gleason Shaun S., Kerekes, Ryan A., McMillan, April D., Nishikawa, Robert M., Paquit, Vincent C., Patton, Robert M., and Symons, Christopher T., LDRD Report (LOIS # 5237), *Data Analytics for Medicine Using Semi-Supervised Learning*, Nov. 2009.

Teja Kuruganti, James Nutaro, Glenn Allgood, et. al (ASAP-SG Team), “Security Profile for Advanced Metering Infrastructure,” *OpenSG-Smartgridipedia*, Nov. 2009.

Teja Kuruganti, “Self Actuating Condition Monitoring Sensor Network and Energy Harvesting Sensors - Smart Networks,” Contributing Author, EPRI report, Dec. 2009.

Shaun S. Gleason, Barbara G. Beckerman, Ryan A. Kerekes, Richard C. Ward, Michael A. Dyer, David J. Solecki, and Stanislav S. Zakharenko, *Development of Computational Methods for Neurobiological Imaging Research: 2009 Annual Progress Report*, LDRD report 22679, Jan. 2010.

T. L. Dickson, P. T. Williams, and S. Yin “Fracture Analysis of Vessels – Oak Ridge FAVOR, v09.1, Computer Code: User’s Guide,” ORNL/TM-2010/4, Oak Ridge National Laboratory, Oak Ridge, TN, Jan. 2010.

P. T. Williams, T. L. Dickson, and S. Yin, “Fracture Analysis of Vessels – Oak Ridge FAVOR, v09.1, Computer Code: Theory and Implementation of Algorithms, Methods, and Correlations,” ORNL/TM-2010/5, Oak Ridge National Laboratory, Oak Ridge, TN, Jan. 2010.

R. Kisner, W. Manges, L. MacIntyre, J. Nutaro, J. Munro, P. Ewing, M. Howlander, P. Kuruganti, R. Wallace, and M.M. Olama, “Cybersecurity through real-time distributed control systems,” Technical Report, Department of Energy's (DOE) Information Bridge: DOE Scientific and Technical Information, Oak Ridge National Laboratory, ORNL/TM-2010/30, Feb. 2010.

M. T. EricksonKirk and Terry Dickson, “Recommended Screening Limits for Pressurized Thermal Shock, Office of Nuclear Regulatory Research,” NUREG 1874, March, 2010.

R. D. Cheverton, T. L. Dickson, R. K. Nanstad, E. D. Blakeman, H. A. Kmiecik, and I. Remec, "Impact of 2008/2009 Dosimetry and Surveillance Data on the HFIR Vessel Radiation Embrittlement Trend Curve, Hydrostatic Proof Test Conditions, Pressure/Temperature Limits, and Life Extension," ORNL/RRD/QLR,10-1, Apr. 10, 2010.

H. B. Klasky, B. R. Bass, M. T. Kirk, and G. L. Stevens, "Embrittlement Project Software Requirements Specifications," ORNL/LTR-2010/250, Oak Ridge National Laboratory, Oak Ridge, TN, Apr., 2010.

R. C. Ward, A. L. Sjoreen, and K. F. Eckerman, "Air Dispersion Modeling for Building 3026C/D Demolition," ORNL/TM-2009/261 (June 2010).

G. S. Davidson, R. C. Ward, D. Schoenwald, R. Ferrell, A. Sorokine, J. Bollinger, E. Shine, V. Ghosh, C. Czajkowski, L. Neymotin, D. Stampf, and J. Strasburg, "Data Mining for Ontology Development," Sandia Report: SAND2010-3708 (June 2010).

H. B. Klasky, P.T. Williams, S. Yin, and B. R. Bass, "Structural Integrity Assessments Modular-Probabilistic Fracture Mechanics (SIAM-PFM): User's Guide for xLPR," ORNL/LTR-2010/247, Oak Ridge National Laboratory, Oak Ridge, TN, July 30, 2010.

Teja Kuruganti, James Nutaro, Glenn Allgood, et. al (ASAP-SG Team), "Security Profile for Distribution Management," *OpenSG-Smartgridipedia*, July 2010.

B. Richard Bass, Hilda B. Klasky, Mark T. Kirk, and Gary L. Stevens, "Overview of the NRC-Sponsored Embrittlement Database Project," ORNL/LTR-2010/249, Oak Ridge National Laboratory, Oak Ridge, TN, Aug. 2010.

Kara L. Kruse, Paul T. Williams, and B. Richard Bass, "Stress Intensity Factors for HFIR HB-2 Nozzle Corner," ORNL/TM-2010/242, Oak Ridge National Laboratory, Oak Ridge, TN, Sept. 24, 2010.

H. B. Klasky, P.T. Williams, S. Yin, and B. R. Bass, "Structural Integrity Assessments Modular-Probabilistic Fracture Mechanics (SIAM-PFM): SIAM-xLPR Project Report," ORNL/LTR-2010/248, Oak Ridge National Laboratory, Oak Ridge, TN, Sept. 30, 2010.

J. C. Schryver, "Reliability Dynamic Simulation Modeling of the Uranium Processing Facility (UPF) Chemical Processing System," UPF doc. No. AR-EJ-801768-A017, Sept. 2010.

J. C. Schryver, "Dynamic Reliability Simulation Modeling of the Uranium Processing Facility (UPF) Metal Working Systems," UPF doc. No. AR-EJ-801768-A018, Sept. 2010.

J. C. Schryver, "Dynamic Reliability Simulation Modeling of the Uranium Processing Facility (UPF) Assembly and Disassembly Systems," UPF doc. No. AR-EJ-801768-A019, Sept. 2010.

Srikanth B. Yoginath, Kalyan S. Perumalla, Paul T. Williams and Richard Bass, "An Incremental Parallelization Approach Applied to the ORNL/NRC FAVOR Code," ORNL/TM-2010/176. Oak Ridge National Laboratory, Oak Ridge, TN, (*under review*).