

**Susan Mniszewski, smm@lanl.gov
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Expertise

Large-scale Agent-based Modeling and Simulation

- Modeling the spread of infectious disease through detailed synthetic population social networks to understand the impact of mitigation strategies and behavior changes.
- Dynamic activity scheduling for population models using optimization, utility, priority, and time constraints.

Computational Co-Design

- Development of molecular dynamics (MD) proxy applications used to explore new programming models and algorithms for emerging hardware and software capabilities.
- Exploration of sparse matrix and graph-based linear scaling approaches for quantum molecular dynamics (QMD) on multicore, accelerated, and distributed architectures.
- Discrete event Application Simulators for Accelerated Molecular Dynamics (AMD) methods to assess algorithmic behavior and runtime performance based on a software/hardware design space.

Diverse computational background - Other past work includes large-scale hydrology modeling, ontology-based clustering and protein similarity matching, wavelet-based distance visualization, automated data interpretation for analytical chemistry, default hierarchy learning for text-to-phoneme translation, link encryption, and more.

Positions

Scientist, Information Sciences, Focus Lead for Computational Co-Design, Computer, Computational, & Statistical Sciences Division (1998-Present)
Team Leader, Data Mining, Computing Division (1995-1998)
Technical Staff Member, Computing Division (1986-1995)
Project Leader, Electronics Research, Center for Computer Security (1985-1986)
Technical Staff Member, Electronics Division (1978-1985)

Education

B. S. Computer Science, Illinois Institute of Technology (with Honors) (1976).
Engineering Sciences Management Training Program (1984).

Awards & Patents

R & D 100 Award, Mantevo Suite 1.0 of Co-Design Mini-apps (2013)
Los Alamos Award Program (LAAP), Mantevo Suite 1.0 Co-Design Mini-apps (2013)
LANL Large Team Distinguished Performance Award, H1N1 Pandemic Study (2009)
Los Alamos Award Program (LAAP), H1N1 Pandemic Study (2009)
Best Paper Award, NAACSOS Conference (2007)
Los Alamos Award Program (LAAP), NISAC Los Angeles Avian Flu Study (2005)
LANL Large Team Distinguished Performance Award, IRS Fraud Detection (1996)
Patent for Method for Encryption and Transmission of Digital Keying Data (1988)

Selected Publications

1. **Mniszewski SM**, Junghans C, Voter AF, Perez D, Eidenbenz, SJ, TADSim: Discrete Event-based Performance Prediction for Temperature Accelerated Dynamics, *ACM Transactions on Modeling and Computer Simulation (TOMACS)*, Volume 25, Issue 3, Article No. 15 (2015).
2. Fairchild G, Hickmann KS, **Mniszewski SM**, Del Valle SY, Hyman JM, Optimizing Human Activity Patterns using Global Sensitivity Analysis, *Computational & Mathematical Organization Theory*, Volume 20, Issue 4, pp. 394-416 (2014).
3. **Mniszewski SM**, Manore CA, Bryan C, Del Valle SY, Roberts D, Towards a Hybrid Agent-based Model for Mosquito Borne Disease, *Proceedings of 2014 Summer Simulation Multi-Conference (SummerSim '14)* (2014).
4. **Mniszewski SM**, Del Valle SY, Priedhorsky R, Hyman JM, Hickman KS. Understanding the Impact of Face Mask Usage through Epidemic Simulation of Large Social Networks. In *Theories and Simulations of Complex Social Systems* Intelligent Reference Library, Springer-Verlang, Volume 52 pp. 97-115 (2014).
5. Del Valle SY, **Mniszewski SM**, Hyman JM. Modeling the Impact of Behavior Changes on the Spread of Pandemic Influenza. In *Modeling the Interplay Between Human Behavior and Spread of Infectious Diseases*. Springer-Verlang; XIII, 329, pp. 59-77 (2013).
6. Galli E, Eidenbenz S, **Mniszewski S**, Teuscher C, Cuellar L, Ewers M, ActivitySim: Large-Scale Agent-based Activity Generation for Infrastructure Simulation, *Proceedings of the 2009 Spring Simulation Multiconference* (2009).
7. Del Valle S, Stroud P, **Mniszewski S**, Dynamic Contact Patterns and Social Structure in Realistic Social Networks. In *Social Networks: Development, evaluation and influence*. Nova Science Publishers (2008).
8. **Mniszewski S**, Del Valle S, Stroud P, Riese J, Sydoriak S, Pandemic Simulation of Antivirals + School Closures: Buying Time until Strain-specific Vaccine is Available, *Computational & Mathematical Organization Theory*, 14:209-221 (2008).
9. **Mniszewski S**, Del Valle S, Stroud P, Riese J, Sydoriak S, EpiSimS Simulation of a Multi-component Strategy for Pandemic Influenza, *Proceedings of the 2008 Spring Simulation Multiconference* (2008).
10. Stroud P, Del Valle S, Sydoriak S, Riese J, **Mniszewski S**, Spatial Dynamics of Pandemic Influenza in a Massive Artificial Society, *Journal of Artificial Societies and Social Simulation*, Vol. 10, no. 4 9 (2007).
11. Stroud PD, Sydoriak SJ, Riese JM, Smith JP, **Mniszewski SM**, Romero PR, Semi-empirical Power-law Scaling of New Infection Rate to Model Epidemic Dynamics with Inhomogeneous Mixing, *Mathematical Biosciences*, Vol. 203, pp. 301-318 (2006).
12. Verspoor K, Cohn J, **Mniszewski S**, Joslyn C, A Categorization Approach to Automated Ontological Function Annotation, *Protein Sci*, 15: 1544-1549 (2006).
13. Verspoor K, Cohn J, Joslyn C, **Mniszewski S**, Rechtsteiner A, Rocha LM, Simas T, Protein Annotation as Term Categorization in the Gene Ontology using Word Proximity Networks, *BMC Bioinformatics*, vol 6, suppl 1 (2005).
14. Joslyn CA, **Mniszewski SM**, Fulmer A, Heaton GG, The Gene Ontology Categorizer, *Bioinformatics*, v. 20:s 1, pp. 169-177 (2004).