

David M. Nicol

Director, Information Trust Institute
Professor of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
457 Coordinated Science Laboratory
1308 West Main Street
Urbana, IL 61801

dmnicol@illinois.edu
voice: (217) 244-1925
fax: (217) 244-5685

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Education

Ph.D.	Computer Science	University of Virginia	1985
M.S.	Computer Science	University of Virginia	1983
B.A.	Mathematics (Phi Beta Kappa)	Carleton College	1979

Employment

<i>Director, Information Trust Institute</i> January 2011–present.	<i>University of Illinois at Urbana-Champaign</i>
<i>Professor of Electrical and Computer Engineering</i> September 2003–present.	<i>University of Illinois at Urbana-Champaign</i>
<i>Acting Director</i> May 2003–August 2003.	<i>ISTS</i>
<i>Assoc. Director for Research and Development</i> July 2002–May 2003.	<i>ISTS</i>
<i>Professor of Computer Science</i> 1998–2003. Chair: July 2000–July 2002. Sabbatical—Spring 2000: Oxford University Department of Computing .	<i>Dartmouth College</i>
<i>Associate Professor of Computer Science</i> 1996–1998. Vice Chair : July 1999-June 2000.	<i>Dartmouth College</i>
<i>Associate Professor of Computer Science</i> 1992–1996. Sabbatical—Fall 1993 through Spring 1994 : Institute for Computer Application Studies, and Carleton College.	<i>College of William and Mary</i>
<i>Assistant Professor of Computer Science</i> 1987–1992.	<i>College of William and Mary</i>
<i>Staff Scientist</i> 1985–1987.	<i>ICASE, NASA Langley Research Center</i>
<i>Programmer Analyst</i> 1979–1982. Design Lead 1980-1982, CDC Site Representative ABLE System, Zweibruecken AFB West Germany, 1982.	<i>Control Data Corporation</i>

Honors and Awards

“Reconocimiento Especial”, Tecnológico De Monterrey, (honoring my text-book “Discrete-Event Systems Simulation”), 2010.

Best Paper Award, Malware 2010.

Best Paper Award, Conference on Principles of Advanced and Distributed Simulation, 2008.

ACM SIGSIM Distinguished Contributions Award, inaugural winner, 2007.

Fellow of the ACM, 2006.

Best Paper Award, Conference on Principles of Advanced and Distributed Simulation, 2005.

Best Paper Award, IPSI-2004 Studencia Conference, 2004.

IEEE Fellow, 2003.

Marion and Jason Whiting Fellowship for study at Oxford University, 2000.

Best Paper Award, 9th Annual Conference on Parallel and Distributed Simulation, 1995.

Alumni Fellowship Award, given by the William and Mary Society of the Alumni for excellence in teaching, 1992.

Great Performer’s Award (1980), Employee Excellence Award (1982) Control Data Corporation.

Consulting

- Consultant* *Los Alamos National Laboratory*
Served on external review team evaluating LANL's program in Computational Physics and Applied Mathematics, 2010.
- Consultant* *Institut National de Recherche en Informatique et Automatique (INRIA)*
Assessed proposed multi-year research program on understanding and management of large scale instructure for distributed computing.
2008.
- Consultant* *Institut National de Recherche en Informatique et Automatique (INRIA)*
Led team of international experts in assessing 11 INRIA multi-year research programs in high performance computing on distributed Grid networks. 2008.
- Consultant* *Department of Homeland Security*
Assessment of DHS program in process modeling of coupled critical infrastructures. 2006.
- Consultant* *NASA*
Assessment of a proposed NASA standard for simulation model development, experimental design, documentation, and reporting. 2006.
- Consultant* *Sandia National Laboratories*
Aid in design of distributed simulation language and toolset for internal Sandia use, study of distributed simulations of DoE complex enterprise systems, study of utility of fluid based communication models, design of wireless systems in critical infrastructure communications. 1996-2006.
- Consultant* *National Science Foundation*
Assess research proposals in the areas of high performance computing, performance evaluation, and computer/communication security. 1987-present.
- Consultant* *GRCI Corporation*
Assist system architect Emmet Beeker in GRCI contract proposal development for high performance analytic military simulations. 2000-2003.
- Developer* *Supercomputing 99, 00, 01, and 02 Conferences*
Developed, maintained and operated web sites for technical conference and tutorial submission, management, and evaluation. Provide technical assistance for authors, reviewers, and program committee. People I trained for the Supercomputing contract have turned this into a business.
- Consultant* *Universities Space Research Association*
Assisted USRA in preparation of \$5M/year proposal to NASA for development of a Research Center in Earth Sciences. 1999.
- Science Council* *Center of Excellence in Space Data and Information Science, NASA Goddard Space Center*
Served on CESDIS technical oversight board, making program recommendations to NASA Goddard. Member 1995-1999. Served as chair, 1998-1999.
- Consultant* *ATT Research*
Worked with Albert Greenberg and Boris Lubachevsky on problems in parallel simulation of computer and communication networks. 1992-1996.
- Consultant* *IBM Research*
Worked with Phil Heidelberger on problems in parallel simulation of computer and communication networks. 1992-1996.
- Consultant* *Institute for Computer Applications in Science and Engineering*
Did basic research in control and modeling of high performance computations motivated by problems of interest to NASA, particularly reliability modeling. Developed and managed a visitors program for ICASE in performance and reliability analysis. 1987-1996.

Research Interests

Analysis of computer and communication systems, particularly with respect to trust metrics and their evaluation; quantitative methods for security evaluation. High performance computing, parallel algorithms. Modeling and simulation methodologies.

Funding

PI and co-PI on \$64,677,510 of awarded support since 1988.

AWARDED

National Security Agency , \$960,000, 2011-2012, <i>Tablet for Science of Security</i> , co-PI : William Sanders, José Meseguer	PI
Dept. of Naval Research , \$1,192,650, 2010-2011, <i>Center for Assured Critical Application and Infrastructure Security</i> co-PI : William Sanders	PI
Illinois Dept. of Commerce and Economic Opportunity , \$2,500,500, 2010-2011, <i>Illinois Center for a Smarter Electric Grid (ICSEG)</i> co-PIs : Thomas Overbye, Himanshu Khurana, William Sanders, Peter Sauer	co-PI
Rockwell-Collins , \$660,000, 2008-2011 <i>COTS Architecture for Multi-level Security</i> , co-PI : William Sanders	PI
Boeing , \$2,170,000, 2011 <i>Trusted Software Center</i>	PI
Air Force , \$83,800, 2009-2010 <i>DURIP : Timing Traffic Analysis Testbed</i> , co-PI : William Sanders, Negar Kiyavash, Todd Coleman	co-PI
EPRI , \$50,000, 2008-2009 <i>Evaluation of Secure Authentication Supplement of the DNP3 Specification</i> , co-PI : William Sanders, Himanshu Khurana	co-PI
I3P/DHS , \$500,000, 2007-2009 <i>Global Policy for Survivable Process Control Networks</i> co-PI : William Sanders	PI
I3P/DHS , \$600,000, 2007-2009 <i>End-to-End Assessment of Identity Management Systems</i> co-PI : William Sanders, Carl Gunter	PI
NSF , \$500,000, 2008-2011 <i>CT-ISG: Traffic Analysis : Attacks, Defenses, and Fundamental Limits</i> , co-PIs : Nikita Borisov, Todd Coleman, Negar Kiyavash	co-PI
Dept. of Energy , \$250,000 9/08-9/09 <i>Trustworthy Communication Architecture for Converged SCADA Applications</i> , co-PIs : William Sanders, Himanshu Khurana	co-PI
NSF , \$412,000, 2006-2009 <i>Survivable Trust for Critical Infrastructure: Detecting and Preventing Attacks with Vulnerability Signatures</i> , co-PIs : William Sanders, Nikita Borisov	co-PI

- NSF**, \$7,500,000, 2005-2010 co-PI
Trustworthy Cyber Infrastructure for the Power Grid, co-PIs : William Sanders, Ravi Iyer, Roy Campbell, Peter Sauer
- I3P**, \$240,000, 2005-2007 co-PI
Unifying Stakeholders and Security Programs to Address SCADA Vulnerability and Infrastructure Interdependencies
 co-PI : William Sanders
- Boeing**, \$484,000, 2005-2009 co-PI
Algorithms for Quantifying Security and Survivability, co-PI : William Sanders
- NSF**, \$360,000, 2002-2005 co-PI
Survivable Trust for Critical Infrastructure
 co-PIs : Sean Smith, Chris Hawblitzel
- Mellon Foundation**, \$1,649,977, 2002-2003 co-PI
Transforming Academic Computing with Public Key Infrastructure
 PI : Sean Smith
 Co-PIs : Bob Brentrup, Larry Levine
- Department of Justice**, \$18,000,000, 2002-2003 PI
Institute for Security Technology Studies
Institute for Information Infrastructure Protection
- Department of Justice**, \$15,000,000, 2000-2001 co-PI
Institute for Security Technology Studies
 PI Susan Prager, Provost of Dartmouth College
 Co-PIs : Lewis Duncan, George Cybenko, Joseph Henderson
- Internet2 and ATT**, \$200,000, 2000-2002 co-PI
Internet2 PKILab
 Co-PIs : Sean Smith, Larry Levine
- DARPA**, \$1,700,000, 2000-2003 PI
Spatio-Temporal Dynamics of the Global Internet
- NSF**, \$1,400,000, 1998-2003 PI
Systems Science for Physical Geometric Algorithms
 NSF Research Infrastructure award
 Co-PIs : David Kotz, Dan Rockmore, Bruce Donald
- NSF**, \$224,000, 1998-2001 PI
A Fluid Methodology and Tool for Complex Large-Scale Networks
- DARPA**, \$3,310,931, 1996-1999 co-PI
Scalable Self-Organizing Simulations
 co-PI : Andrew Ogielski
- NSF**, \$1,500,000, 1995-1998 co-PI
Simulations Of Integrated Communications Systems
 co-PIs: Andrew Ogielski, Richard Fujimoto, Diane Souvaine
- NSF**, \$125,918 co-PI
Acquisition of a Parallel Graphics Computer for Inter-disciplinary Research
- NASA**, \$20,000, 1995-1996 PI
Reliability Interface Tool Extension

<i>David M. Nicol (Funding)</i>	6
CACC , \$16,000, 1995-1996 <i>Integrated Modeling</i>	PI
Center for Innovative Technology , \$39,989, 1995 <i>Integrated Environment for performance, reliability, and availability modeling</i>	PI
NASA , \$135,000, 1992-1995 <i>Parallel Algorithms for the Simulation and Analysis of Discrete Time Petri Nets</i>	PI
NSF , \$131,000, 1992-1995 <i>Static and Dynamic Load Balancing of Parallel Discrete-Event Simulations on Distributed Memory Architectures</i>	PI
NASA , \$57,500, 1989-1992 <i>Parallelization of Performance Tools</i>	PI
NASA , \$110,000, 1990-1993 <i>The Reliability Estimation System Testbed</i>	PI
NSF , \$104,000, 1989-1992 <i>Automated Methods for Run-Time Performance Optimization of Sparse and Irregular Numerical Applications</i>	PI
US Army , \$178,000, 1988-1991 <i>Reliable Real-Time Processing of Sensor Data in Embedded Avionics Computing Systems</i> Co-PIs : Steve Park, Phil Kearns	co-PI
NASA , \$105,000, 1990-1992 <i>Writing Software for 2010</i> co-PI: Keith Miller	co-PI
NASA , \$78,745, 1989-1990 <i>Parallelization of ERBE Data Processing</i>	PI
Center for Innovative Technology , \$39,000, 1989-1990 <i>Parallelization of Performability Design Tools</i>	PI
NASA , \$25,000, 1989-1990 <i>Hypercube Equipment Grant</i>	PI
DFL Ltd. , \$25,000, 1988-1989 <i>Mapping Issues in Parallel Simulations</i>	PI

Publications

PH.D. DISSERTATION

1. David M. Nicol
The Automated Partitioning of Simulations for Parallel Execution
Ph.D. thesis, University of Virginia, August 1985.

BOOKS

1. Jerry Banks, John Carson, Barry Nelson and David Nicol
Discrete-Event System Simulation.
Prentice-Hall, 3rd Edition (2000), 4th Edition (2005), 5th Edition (2009)

Journal Publications

- [1] David M. Nicol. Hacking the lights out : The computer virus threat to the electrical grid. *Scientific American*, 305(1):70–75, July 2011.
- [2] J. Huang and D.M. Nicol. An approach to formal semantics based calculus of trust. *IEEE Internet Computing*, 14(5):38–46, Sept./Oct. 2010.
- [3] David M. Nicol, Matt Davis, and Tom Overbye. A testbed for power system security evaluation. *International Journal of Information and Computer Security*, 2009.
- [4] David M. Nicol and Nabil Schear. Models of privacy preserving traffic tunneling. *Simulation : Transactions of the Society for Modeling and Simulation International*, 85(9):589–607, 2009.
- [5] Hamed Okhravi and David M. Nicol. Application of trusted network technology to industrial control networks. *International Journal of Critical Infrastructure Protection*, 2009.
- [6] Hamed Okhravi and David M. Nicol. Evaluation of patch management strategies. *International Journal of Computational Intelligence : Theory and Practice*, 3(2):103–111, December 2008.
- [7] David M. Nicol, William H. Sanders, Sankalp Singh, and Mouna Seri. Useable global network access policy for process control systems. *IEEE Security & Privacy*, 6(6):30–36, Nov.-Dec. 2008.
- [8] David M. Nicol. Efficient simulation of internet worms. *ACM Transactions on Modeling and Computer Simulation*, 18(2):5:1–5:32, 2008.
- [9] M. Liljenstam, D.M. Nicol, Y. Yuan, G. Yan, and J. Liu. Rinse: the real-time interactive network simulation environment for network security exercises. *Simulation : Transactions of the Society for Modeling and Simulation International*, 82(1):43–59, Jan. 2006.
- [10] D.M. Nicol G. Yan. High performance simulation of low-resolution network flows. *Simulation : Transactions of the Society for Modeling and Simulation International*, 82(1):21–42, Jan. 2006.
- [11] M. Zhao, S.W. Smith, and D. M. Nicol. The performance impact of BGP security. *IEEE Network*, pages 42–48, November/December 2005.
- [12] David M. Nicol. Modeling and simulation in security evaluation. *IEEE Security and Privacy*, pages 71–74, September/October 2005.
- [13] J. Liu, Y. Yuan, D. Nicol, R. Gray, C. Newport, D. Kotz, and L. Perrone. Empirical validation of wireless models in simulations of ad hoc routing protocols. *Simulation : Transactions of the Society for Modeling and Simulation International*, 81(4):307–323, 2005.

- [14] David M. Nicol, William H. Sanders, and Kishor S. Trivedi. Model-based evaluation: From dependability to security. *IEEE Trans. on Dependability and Security*, 1(1):48–65, 2004.
- [15] David M. Nicol, Sean Smith, and Meiyuan Zhao. Evaluation of efficient security for BGP route announcements using parallel simulation. *Simulation Practice and Theory*, 12(3-4):187–216, 2004.
- [16] David M. Nicol and Guanhua Yan. Discrete-event fluid modeling of tcp background traffic. *ACM TOMACS*, 14(3):211–250, 2004.
- [17] Weizhen Mao and David M. Nicol. On k -ary n -cubes : Theory and applications. *Discrete Applied Mathematics*, 129(1):171–193, 2003.
- [18] David M. Nicol. Utility analysis of network simulators. *International Journal of Simulation : Systems, Science, and Technology*, 2003.
- [19] David Nicol and Jason Liu. Composite synchronization for parallel discrete event simulation. *IEEE Transactions on Parallel and Distributed Systems*, 13(5):433–446, May 2002.
- [20] Heidi Ammerlahn, David Nicol, Michael Goldsby, and Michael Johnson. A geographically distributed enterprise system. *Future Generation Computer Systems*, 17(2):135–146, October 2000.
- [21] Gianfranco Ciardo, David Nicol, and Kishor Trivedi. Simulation of fluid stochastic Petri nets. *IEEE Transactions on Software Engineering*, 25(2):207–217, March/April 1999.
- [22] James Cowie, David Nicol, and Andy Ogielski. Modeling the global internet. *IEEE Computing in Science and Engineering*, 1(1):42–50, Jan.-Feb. 1999.
- [23] Brian Premore and David Nicol. Transformation of ns TCP models to TED. *ACM Performance Evaluation Review*, 25(4):40–48, March 1998.
- [24] Graham Horton, David Nicol, V. Kulkarni, and Kishor Trivedi. Fluid stochastic Petri nets: Theory applications and solution techniques. *European Journal of Operational Research*, 105(1):184–201, February 1998.
- [25] Gianfranco Ciardo, David Nicol, and Josh Gluckman. Distributed state space generation of discrete-state stochastic models. *INFORMS Journal on Computing*, 10(1):82–93, January 1998.
- [26] Tom Cormen and David Nicol. Performing out-of-core FFTs on parallel disk systems. *Parallel Computing*, 24(1):5–20, January 1998.
- [27] Tom Cormen and David Nicol. Out-of-core FFTs with parallel disks. *ACM Performance Evaluation Review*, 25(3):3–12, December 1997.
- [28] Scott Leutenegger and David Nicol. Efficient bulk-loading of gridfiles. *IEEE Transactions on Knowledge and Data Engineering*, 9(3):410–420, May/June 1997.
- [29] Shahid Bokhari and David Nicol. Balancing contention and synchronization on the Intel Paragon. *IEEE Concurrency*, 5(2):74–84, April-June 1997.
- [30] David Nicol and Gianfranco Ciardo. Automated parallelization of discrete state-space generation. *Journal of Parallel and Distributed Computing*, 47:153–167, 47 1997.
- [31] Phillip Dickens, David Nicol, and Philip Heidelberger. Parallelized direct execution simulation of message passing programs. *IEEE Transactions on Parallel and Distributed Systems*, 7(10):1090–1105, October 1996.
- [32] Phillip Dickens, David Nicol, Paul Reynolds, and Mark Duva. Analytic comparison of bounded time warp and yawns. *ACM Transactions on Modeling and Computer Simulation*, 6(4):297–320, October 1996.
- [33] David Nicol and Philip Heidelberger. Parallel execution for serial simulators. *ACM Transactions on Modeling and Computer Simulation*, 6(3):210–242, July 1996.
- [34] David Nicol and Weizhen Mao. On bottleneck partitioning of k -ary n -cubes. *Parallel Processing Letters*, 6(6):389–399, June 1996.

- [35] David Nicol, Rahul Simha, and Don Towsley. Static assignment of complex tasks using stochastic majorization. *IEEE Transactions on Computers*, 45(6):730–741, June 1996.
- [36] David Nicol. Conference program management using the internet. *IEEE Computer*, 29(3):112–113, March 1996.
- [37] Weizhen Mao and David Nicol. Isomorphic routing on torodial meshes. *ORSA Journal on Computing*, 8(1):63–73, Winter 1996.
- [38] David Nicol and Philip Heidelberger. A comparative study of parallel algorithms for simulating continuous time Markov chains. *ACM Transactions on Modeling and Computer Simulation*, 5(4):326–354, October 1995.
- [39] David Nicol. Automated parallel simulation of timed Petri-nets. *Journal of Parallel and Distributed Computing*, 29(1):60–74, August 1995.
- [40] David Nicol and Dan Palumbo. Reliability analysis of complex models using SURE bounds. *IEEE Transactions on Reliability*, 44(1):46–53, March 1995.
- [41] Gianfranco Ciardo, David Nicol, and Larry Leemis. On the minimum of a set of independent geometrically distributed random variables. *Statistics and Probability Letters*, 23:313–326, 1995.
- [42] David Nicol. Non-committal barrier synchronization. *Parallel Computing*, 21:529–549, 1995.
- [43] David Nicol, Dan Palumbo, and Michael Ulrey. Integrating reliability analysis with a performance tool. *Communications in Reliability Maintainability and Supportability*, 1995.
- [44] David Nicol and Richard Fujimoto. Parallel simulation today. *Annals of Operations Research*, 53:249–286, December 1994.
- [45] David Nicol. Rectilinear partitioning of irregular data parallel computations. *Journal of Parallel and Distributed Computing*, 23(2):119–134, November 1994.
- [46] David Nicol, Albert Greenberg, and Boris Lubachevsky. Massively parallel algorithms for trace-driven cache simulations. *IEEE Transactions on Parallel and Distributed Systems*, 5(8):849–859, August 1994.
- [47] Alok Choudhary, Bhagirath Harahari, David Nicol, and Rahul Simha. Assignment of processors for pipeline computations. *IEEE Transactions on Parallel and Distributed Systems*, 5(4):439–445, April 1994.
- [48] Bruno Gaujal, Albert Greenberg, and David Nicol. A sweep algorithm for massively parallel simulation of circuit-switched networks. *Journal of Parallel and Distributed Computing*, 18(4):484–500, August 1993.
- [49] Philip Heidelberger and David Nicol. Conservative parallel simulation of Markov chains using uniformization. *IEEE Transactions on Parallel and Distributed Systems*, 4(8):906–921, August 1993.
- [50] David Nicol and Philip Heidelberger. Optimistic parallel simulation of Markov chains using uniformization. *Journal of Parallel and Distributed Computing*, 18(4):395–410, August 1993.
- [51] David Nicol. The cost of conservative synchronization in parallel discrete-event simulations. *Journal of the ACM*, 40(2):304–333, April 1993.
- [52] David Nicol. Conservative parallel simulation of priority class queueing networks. *IEEE Transactions on Parallel and Distributed Systems*, 3(3):294–303, May 1992.
- [53] Keith Miller, L. Morell, David Nicol, Richard Noonan, Steve Park, Branson Murrill, and Jeff Voas. Estimating the probability of failure when testing reveals no failures. *IEEE Transactions on Software Engineering*, 18(1):33–42, January 1992.
- [54] David Nicol. Inflated speedups in parallel simulations via `malloc()`. *International Journal on Simulation*, 2:413–426, 1992.
- [55] David Nicol and David O’Hallaron. Improved algorithms for mapping pipelined and parallel algorithms. *IEEE Transactions on Computers*, 40(3):295–306, March 1991.

- [56] Rex Kincaid, David Nicol, Dana Richards, and Doug Shier. A multi-stage linear array assignment problem. *Operations Research*, 38(6):993–1005, Nov.-Dec. 1990.
- [57] David Nicol and Joel Saltz. An analysis of scatter decomposition. *IEEE Transactions on Computers*, 39(11):1337–1345, November 1990.
- [58] David Nicol and Jr. Paul Reynolds. Optimal dynamic remapping of data parallel computations. *IEEE Transactions on Computers*, 39(2):206–219, February 1990.
- [59] David Nicol. Parallelization of sparse dynamic programming problems. *ORSA Journal on Computing*, 2(2):162–173, Spring 1990.
- [60] David Nicol. Performance bounds on self-initiating parallel discrete event simulations. *ACM Transactions on Modeling and Computer Simulation*, 1(1):24–50, 1990.
- [61] David Nicol. Optimal partitioning of random programs across two processors. *IEEE Transactions on Software Engineering*, 15(2):134–141, February 1989.
- [62] David Nicol, Joel Saltz, and James Townsend. Delay point schedules for irregular parallel computations. *International Journal on Parallel Programming*, 18(1):69–90, February 1989.
- [63] David Nicol and Joel Saltz. Dynamic remapping of parallel computations with varying resource demands. *IEEE Transactions on Computers*, 37(9):1073–1087, September 1988.
- [64] David Nicol and Frank Willard. Problem size, parallel architecture, and optimal speedup. *Journal of Parallel and Distributed Computing*, 5:404–420, August 1988.
- [65] David Nicol. Expected performance of m-solution backtracking. *SIAM Journal on Computing*, 17(1):114–127, February 1988.
- [66] Joel Saltz, Vijay Naik, and David Nicol. Reduction of the effects of the communication delays in scientific algorithms on message passing mimd architectures. *SIAM Journal on Scientific and Statistical Computing*, 8(1), January 1987.

Conference Publications

- [67] David M. Nicol Thomas D. Nicol. Combating unauthorized load signal analysis with targeted event masking. In *Proceedings of Hawaii International Conference on System Sciences*, Maui, HI, January 2012. To appear.
- [68] Yuhao Zheng David M. Nicol, Dong Jin. S3F—a second generation scalable simulation framework. In *Proceedings of the 2011 Winter Simulation Conference*, Phoenix, AZ, December 2011. To appear.
- [69] Guanhua Yan Dong Jin, David M. Nicol. An event buffer flooding attack in DNP3 controlled SCADA systems. In *Proceedings of the 2011 Winter Simulation Conference*, Phoenix, AZ, December 2011. To appear.
- [70] Yuhao Zheng David M. Nicol, Dong Jin. A virtual time system for OpenVZ-based network emulations. In *Proceedings of the 2011 Symposium on Principles of Advanced and Distributed Simulation*, pages 1–10, Nice, France, June 2011.
- [71] D. Jin and D.M. Nicol. Fast simulation of background traffic through fair queueing networks. In *Proceedings of the 2010 Winter Simulation Conference*, pages 2935–2946, Baltimore, MD, December 2010.
- [72] T. Khirwadkar, K.C. Nguyen, D.M. Nicol, and T. Başar. Methodologies for evaluating game theoretic defense against DDOS attacks. In *Proceedings of the 2010 Winter Simulation Conference*, pages 697 – 707, Baltimore, MD, December 2010.
- [73] S. Nelikar, D.M. Nicol, and J. Choi. Role-base differentiation for insider detection algorithms. In *Proceedings of the 2010 ACM CCS Workshop on Insider Threats*, Chicago, IL, October 2010.

- [74] K. Thomas and D.M. Nicol. The Koobface botnet and the rise of social malware. In *Proceedings of the MALWARE 2010 Conference*, Nancy, France, October 2010.
- [75] K. Thomas, C. Grier, and D.M. Nicol. unfriendly: Multi-party privacy risks in social networks. In *Proceedings of the 2010 Privacy Enhancing Technologies Symposium*, pages 236–252, Berlin, Germany, July 2010. Published by Springer-Verlag, Lecture notes in Computer Science, volume 6205/2010.
- [76] D. Jin and D.M. Nicol. An efficient Gigabit Ethernet switch model for large-scale simulation. In *Proceedings of the 2010 Conference on Principles of Advanced and Distributed Simulation*, Atlanta, GA, May 2010.
- [77] Y. Zheng and D.M. Nicol. Validation of radio channel models using an anechoic chamber. In *Proceedings of the 2010 Conference on Principles of Advanced and Distributed Simulation*, Atlanta, GA, May 2010.
- [78] S. Bai and D. M. Nicol. Acceleration of wireless channel simulation using GPUs. In *Proceedings of European Wireless 2010*, pages 841–848, Lucca, Italy, April 2010.
- [79] D. M. Nicol, W. H. Sanders, M. Seri, and S. Singh. Experiences validating the Access Policy Tool in industrial settings. In *Proceedings of Hawaii International Conference on System Sciences*, Honolulu, HI, January 2010.
- [80] H. Okhravi and D. M. Nicol. Trustgraph: Trusted graphics subsystem for high assurance systems. In *Proceedings of the IEEE Annual Computer Security Applications Conference (ACSAC'09)*, Honolulu, HI, December 2009.
- [81] M.Y. Uddin, D.M. Nicol, T. Abdelzaher, and R. Kravets. A post-disaster mobility model for delay tolerant networking. In *Proceedings of the 2010 Winter Simulation Conference*, pages 2785–2796, Austin, TX, December 2009.
- [82] H. Okhravi and D. M. Nicol. Policyglobe: A framework for integrating network and operating system security policies. In *Proceedings of CCS 2009 Workshop on Assurable & Usable Security Configuratin (SafeConfig)*, Chicago, IL, November 2009.
- [83] S. Bai and D. M. Nicol. GPU coprocessing for wireless network simulation. In *Proceedings of the 2009 Symposium on Application Accelerators in High Performance Computing*, Urbana, Illinois, July 2009.
- [84] D. M. Nicol, C. M. Davis, and T. Overbye. A virtual power system testbed for cyber-security decision support. In *Proceedings of the 2009 INFORMS Simulation Society Workshop on Simulation: At the Interface of Modeling and Analysis*, University of Warwick, UK, June 2009.
- [85] J. Huang and D. M. Nicol. A calculus of trust and its application to PKI and identity management. In *Proceedings of IDTrust 2009*, pages 23–37, NIST, Gaithersburg, MD, April 2009.
- [86] N. Schear and D. M. Nicol. Performance analysis of real traffic carried with encrypted cover flows. In *Proceedings of the 2008 Conference on Principles of Advanced and Distributed Simulation*, Rome, Italy, June 2008.
- [87] H. Okhravi and D. M. Nicol. Application of trusted network technology to industrial control networks. In *2nd IFIP WG 11.10 International Conference on Critical Infrastructure Protection*, Fairfax, VA, March 2008.
- [88] D.M. Nicol. Analysis of local address scanning by puppetnets. In *Proceedings of the 2007 Conference on Quantitative Evaluation of Systems*, pages 258–268, Edinburgh, Scotland, September 2007.
- [89] D. M. Nicol, S. Hanna, F. Stratton, and W. Sanders. Modeling worm defense using stochastic activity networks. In *Proceedings of the 2007 Symposium on Simulation of System Security*, Norfolk, VA, April 2007.
- [90] David M. Nicol, Rose Tsang, Heidi Ammerlahn, and Michael Johnson. Detection of nuclear material at border crossings by correlating movement and radition measurements. In *Proceedings of the 2006 Winter Simulation Conference*, Monterey, CA, December 2006.
- [91] David M. Nicol. The impact of stochastic variability on worm detection. In *Proceedings of 2006 ACM Conference on Computer and Communications Security (CCS 2006)*, Alexandria, VA, November 2006.

- [92] David M. Nicol. Top speed of flash worms revisited. In *Proceedings of the International Mediterranean Simulation Multiconference*, pages 21–30, Barcelona, Spain, October 2006.
- [93] David M. Nicol. Tradeoffs between model abstraction, execution speed, and accuracy. In *Proceedings of the International Mediterranean Simulation Multiconference*, pages 13–20, Barcelona, Spain, October 2006.
- [94] D. Nicol, M. Liljenstam, and J. Liu. Advanced concepts in network simulation. In *Proceedings of 2005 Winter Simulation Conference*, Orlando, FL, December 2005.
- [95] D. Nicol and H. Okhravi. Simulation of binary code protection. In *Proceedings of 2005 Winter Simulation Conference*, Orlando, FL, December 2005.
- [96] M. Zhao, S. Smith, and D. Nicol. Aggregated path authentication for efficient BGP security. In *Proceedings of the 2005 ACM Conference on Computer and Communications Security (CCS 2005)*, pages 128–138, Alexandria, VA, November 2005.
- [97] D. Nicol. Models and analysis of active worm defense. In *Proceedings of Mathematical Methods, Models and Architectures for Computer Networks Security Workshop*, St. Petersburg, Russia, September 2005.
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Book Chapters

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Public Domain Software

I have over the years developed several pieces of software which I have placed in the public domain.

1. **DaSSF**
The Dartmouth implementation of the Scalable Simulation Framework. A high performance parallel simulation kernel with C++ API, highly portable. It is in active use in DoE laboratories, industry (e.g. Motorola), and academic research projects. It is most commonly used to model communication and computer systems.
2. **SSFNet**
SSFNet is a public domain body of software for the modeling and simulation of computer systems, using the SSF Java API. My research team has contributed significantly to the software at this site.
3. **WIMPE**
In 1996, in conjunction with my role as Program Chair of the ACM Sigmetrics conference I developed what I believe was the first web-based system for paper submission and reviewing management. I parameterized this system to be configurable for other conferences, called it Web Interface for Managing Programs Electronically (WIMPE), and made it available for use by others. It passed through six revisions in the period 1996-2003, and was used by several hundred conferences and workshops. A colleague took WIMPE and used it to launch a conference management custom software development company, Linklings (linklings.com).
4. **RITE**
The Reliability Interface Tool Extension (RITE) is a program written to support path-based analysis of complex hardware systems. It is designed to be integrated with a system design tool such as BoNES Designer and ADEPT (it has been integrated with both of these). RITE provides a master-slave interface to the system modeling tool, where RITE is master. It queries the system modeling tool for information about the model, information that allows RITE to construct path-based Markovian analysis of the probability of failure.
5. **NON-COMMITAL SYNCHRONIZATION BARRIER**
This is code that implements an algorithm I developed of a barrier synchronization, with the twist that a process can change its mind and back out of the barrier in response to receipt of a new message. It is tricky coding, and so I make available source code that is parameterized to work with different message passing libraries. While developed in the early 1990's, this code still gets a few downloads a month by sources other than bots.

Keynote Addresses

KEYNOTE ADDRESSES

- 2011: *"Wrestling With Reality – Integrating New Security Solutions into Existing Control Systems*, 4th International Symposium on Resilient Control Systems, August 2011.
- 2011: *Towards Connectivity Metrics for Cyber-Security*, 2011 CACR Higher Education Cyber-Security Summit, April 2011.
- 2010: *Securing the Perimeter : Challenges in Enforcing Global Access Control*, 6th Annual Cyber Security and Information Intelligence Workshop, Oak Ridge National Labs, April 2010.
- 2009: *Melding Power Devices, Electrical Simulation, and Computer Simulation (A Testbed for Power System Security Evaluation)*, SIMUTools'09 (2nd International Conference on Simulation Tools and Techniques).
- 2005: *Models and Analysis of Active Worm Defense*, International Workshop on Mathematical Methods, Models and Architectures for Computer Networks Security, St. Petersburg, Russia.
- 2003: *Multiscale Modeling and Simulation of Worm Effects on the Internet Routing Infrastructure*, Performance Tools 2003 Conference, Urbana, IL.
- 2003: *Network Security Research using High Performance Simulation*, 7th Workshop on Distributed Supercomputing (SOS7), Durango, CO.
- 1999: *Simulation : The 3rd Leg of Science*, CESDIS Workshop on Simulation, NASA Goddard Research Center, Greenbelt, MD.
- 1997: *Parallel Simulation : So Who Cares?*, 1997 Conference on Parallel and Distributed Simulation. Lockenhaus, Austria.
- 1997: *Parallel Simulation : Past, Present, Future*, Annual Simulation Symposium, Atlanta, GA.

Professional Activities

SERVICE ACTIVITIES

ACM Distinguished Lecturer, 2006-present.

EDITORIAL ACTIVITIES

Associate Editor, *Performance Evaluation*, 2005-present.

Editor-in-Chief, *ACM Transactions on Computer Modeling and Simulation*, 1997-2003.

Area Editor, *ACM Transactions on Computer Modeling and Simulation*, 1996-1997.

Associate Editor, *ACM Transactions on Computer Modeling and Simulation*, 1990-1996.

Associate Editor, *ORSA Journal on Computing*, 1990-1997.

ADVISORY ACTIVITIES

Executive Committee, Winter Simulation Conference, 2009-present.

Steering Committee, *IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS)*, 2010-present.

Steering Committee, Workshop on Principles of Advanced and Distributed Simulation, 2005-2009.

Science Council, Center of Excellence in Space Data and Information Science, 1995-1999, Chair 1998-1999.

CMG Computer Science Advisory Committee, 1994-1995, Chair 1995.

Executive Committee, Virginia/ICASE/Langley Program in High Performance Computing and Communication, 1995-1996.

Steering Committee, Workshop on Parallel and Distributed Simulation, 1992-1994.

CONFERENCE ORGANIZATION

General Chair, Winter Simulation Conference 2006.

General Chair, Workshop on Principles of Advanced and Distributed Simulation, 2005.

Program Chair, 2001 MASCOTS conference.

Program Chair, 1996 ACM Sigmetrics Conference.

Tools Chair, 1995 Petri Net and Performance Modeling Conference.

Tutorial Chair, 1994 ACM Sigmetrics Conference.

Publicity/Exhibits Chair, 1992 ORSA Conference on the Interface of Operations Research and Computer Science.

General Chair, 1990 Workshop on Parallel and Distributed Simulation.

Program Chair, 1989 Workshop on Parallel and Distributed

Program Committee, PADS (1992-2002), Winter Simulation Conference (1989, 1991), ACM Sigmetrics (1991-1993, 1998-1999, 2002), MASCOTS (2002), Communication Networks and Distributed Systems Modeling Conference (2002), International Performance, Computing and Communications Conference (2002). There are surely others. I've lost count.

PROFESSIONAL MEMBERSHIPS

IEEE, Fellow.

ACM, Fellow.

INFORMS, member.

IFIPS Working Group 7.3 (for performance evaluation).