

Radu I. Siminiceanu, Ph.D.

Senior Research Scientist	e-mail: radu@nianet.org
National Institute of Aerospace	phone: (757) 325 6910
100 Exploration Way,	fax: (757) 325 6988
Hampton, VA 23666, USA	URL: research.nianet.org/~radu

Employment

- December 2009 – present: Senior Research Scientist, National Institute of Aerospace, Hampton, Virginia, USA
- February 2004 – December 2009: Research Scientist, National Institute of Aerospace, Hampton, Virginia, USA

Research interests

- Formal Methods; Automated Verification;
- Logic and Stochastic Analysis;
- Symbolic Model Checking:
 - co-author and implementer of the SMART symbolic model checker;
 - author and co-implementer of the `evmdd` decision diagram library and `evmdd-smc` symbolic model checker
<http://research.nianet.org/~radu/evmdd/>
- Air Traffic Management; Avionics;
- Fault Tolerant Systems; Clock Synchronization; Self-Stabilization;
- Human-Computer Interaction; Human Error in System Safety;

Education

- August 1998 - December 2003 : Ph.D. in Computer Science, The College of William and Mary, Williamsburg, Virginia.
Ph.D. thesis: “*Structural Model Checking*”.
- October 1997 - June 1998: M.S. in Computer Science, “Alexandru I. Cuza” University of Iași, Romania.
M.S. thesis: “*A New Approach to Deadlock-free Message Routing in Wormhole Networks*”.

- October 1992 - June 1997 : B.S. in Computer Science,
“Alexandru I. Cuza” University of Iași, Romania.
Honors thesis: “*Deadlock Detection Techniques in Wormhole Message Routing*”.

Honors and Awards

- 2003 *Steven K. Park* Graduate Student Research Award,
The College of William and Mary, Department of Computer Science;
- Valedictorian, “Al.I. Cuza” University of Iași,
Department of Computer Science, class of 1997;
- Valedictorian, “C.Negruzzi” High School of Iași, class of 1992;
- First prize, student research section,
the National Contest in Computer Science, Craiova, Romania, October 1996;
- First prize, programming team contest,
the National Contest in Computer Science, Craiova, Romania, October 1996;

Grants

- January 2008 - December 2010:
“*Formal verification and automated testing for diagnostic and monitoring systems using hybrid abstraction*”.
Investigators: John Rushby, SRI International (PI), Radu Siminiceanu, NIA (co-PI).
NASA Grant NNX08AC59A, \$399,906.
- March 2006 - September 2010:
“*Spacecraft Autonomy for In-Space Operation*”.
Investigators: César A. Muñoz and Radu Siminiceanu.
NASA Cooperative Agreement NCC-1-02043, \$640,436.

Scholarships and Fellowships

- August 2003 - December 2003: Teaching Fellowship, College of William and Mary;
- January 1998 - August 2003: Research Assistantship, College of William and Mary;
- July-August, 1999 and 2000: Summer internship at ICASE (Institute for Computer Applications in Science and Engineering), NASA Langley Research Center, Hampton, Virginia;
- August - December 1998: Teaching Assistantship, College of William and Mary;
- October 1992 - June 1997: National Department of Education of Romania Fellowship for undergraduate students.

Teaching Experience

- November 2007: Lecturer, NASA Langley PVS Training Class;
- August-December 2003: Teaching Fellow, College of William and Mary: CSci241, Data Structures;
- August-December 1998: Teaching Assistant, College of William and Mary: CSci243 – Discrete Structures of Computer Science, CSci 321 – Database Systems;
- Jan-Aug 1998: Teaching Fellow, “Al.I. Cuza” University - Iași, Romania: Software Engineering.

Publications

- Refereed conference papers
 - N.Catáño and R. Siminiceanu, *A Machine-Checked Proof of a State Space Construction Algorithm*, NASA Formal Methods Symposium (NFM 2010), Washington, DC, NASA /CP-2010-216215, p. 57–66, Apr 2010.
 - A.Galloway, J.T.Mühlberg, G.Lüttgen, and R.Siminiceanu, *Model Checking the Linux Virtual File System*, Verification, Model Checking, and Abstract Interpretation (VMCAI) 2009, Savannah, GA, Lecture Notes in Computer Science vol.5403, pp.74–88, January 2009.
 - R.Siminiceanu, R.Butler, and C.Muñoz, *Experimental Evaluation of a Planning Language Suitable for Formal Verification*, Model Checking and Artificial Intelligence (MoChArt 2008), Lecture Notes in Computer Science vol. 5348, pp. 132–146, Patras, Greece.
 - M.Chung, G.Ciardo, and R. Siminiceanu, *Hashing, Caching, and Garbage Collection for Distributed State Space Construction*, Parallel and Distributed Model Checking (PDMC) 2007, Berlin, Germany.
 - R.Siminiceanu and G.Ciardo, *New Metrics for Static Variable Ordering in Decision Diagrams*, Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2006), Lecture Notes in Computer Science vol. 3920, pp. 90–104, Vienna, Austria, March 2006;
 - J.Ezekiel, G.Lüttgen, and R.Siminiceanu *Can Saturation be Parallelised? On the Parallelisation of a Symbolic State-Space Generator*, Parallel and Distributed Model Checking (PDMC 2006), Bonn, Germany, August 2006.
 - R.Siminiceanu and G.Ciardo, *Formal Verification of the NASA Runway Safety Monitor*, Automated Verification of Critical Systems (AVoCS 2004), Electronic Notes in Computer Science vol. 128 (6), pp. 179–194, London, UK, September 2004;

- G.Ciardo, R.L.Jones, A.S.Miner, and R.Siminiceanu, *Logical and Stochastic Modeling with SMART*, Performance *TOOLS* 2003, pp.78–97, Urbana, Illinois, September 2003;
 - G.Ciardo and R.Siminiceanu, *Structural Symbolic CTL Model Checking of Asynchronous Systems*, Computer Aided Verification (*CAV* 2003), LNCS vol. 2725, pp. 40–53, Boulder, Colorado, July 2003;
 - G.Ciardo, R.Marmorstein, and R.Siminiceanu, *Saturation Unbound*, Tools and Algorithms for the Construction and Analysis of Systems (*TACAS* 2003), LNCS vol.2619, pp. 379–393, Warszawa, Poland, April 2003;
 - G.Ciardo and R.Siminiceanu, *Using Edge-Valued Decision Diagrams for Symbolic Generation of Shortest Paths*, Formal Methods in Computer-Aided Design (*FM-CAD* 2002), LNCS vol. 2517, pp. 256–273, Portland, Oregon, November 2002;
 - G.Ciardo, G.Lüttgen, and R.Siminiceanu, *Saturation: An Efficient Iteration Strategy for Symbolic State-space Generation*, Tools and Algorithms for the Construction and Analysis of Systems (*TACAS* 2001), LNCS vol.2031, pp. 328–342, Genova, Italy, Apr.2001;
 - G.Ciardo, G.Lüttgen, and R.Siminiceanu, *Efficient Symbolic State-Space Construction for Asynchronous Systems*, International Conference on Theory and Application of Petri Nets (*ICATPN* 2000), LNCS vol.1825, pp. 103–122;
- Journal papers
 - M.Bolton, E.Bass, and R.Siminiceanu, *A systematic approach to model checking human-automation interaction using task analytic models*, IEEE Transactions on Systems, Man, and Cybernetics, to appear.
 - J.Ezekiel, G.Lüttgen and R.Siminiceanu, *To Parallelise or to Optimise?*, Journal of Logic and Computation, vol. 21(1), pp.85-120, Oxford University Press, 2011.
 - R.Siminiceanu and G.Ciardo, *Formal Verification of the NASA Runway Safety Monitor*, Special Issue of the International Journal on Software Tools for Technology Transfer (STTT), Vol. 9 (1), pp. 63–76, February 2007;
 - G.Ciardo, R.L.Jones, A.S.Miner, and R.Siminiceanu, *Logical and Stochastic Modeling with SMART*, J. Performance Evaluation, Vol. 63, pp. 578–608;
 - G.Ciardo, R.Marmorstein, and R.Siminiceanu, *The Saturation Algorithm for State Space Generation of Asynchronous Systems*, Special Issue of the International Journal on Software Tools for Technology Transfer (STTT), Vol. 8 (1), pp. 4–25;

- Book chapters
 - R.Siminiceanu and G.Ciardo, *Model Checking for Avionics*, in S.Gnesi and T.Margaria editors, FMICS Handbook for Industrial Critical Systems, IEEE Computer Society Press, to appear.
- Tools & Workshop papers
 - P.Roux and R.Siminiceanu, *Model Checking with Edge-valued Decision Diagrams*, NASA Formal Methods Symposium, (NFM 2010), Washington, DC, NASA /CP-2010-216215, pp.222–226, Apr 2010.
 - B.Dutertre, J.Rushby, A.Tiwari, C.Muñoz, and R.Siminiceanu, *Formal Verification and Automated Testing for Diagnostic and Monitoring Systems*, AIAA Guidance, Navigation and Control Conference (GNC 2008), Honolulu, August 2008.
 - M.Bolton, E.Bass, and R.Siminiceanu, *Using Formal Methods to predict Human Error and System Failures*, 2nd Int'l Conference, Applied Human Factors and Ergonomics (AHFEI 2008), Las Vegas, July 2008.
 - G.Ciardo, R.L.Jones, A.S.Miner, R.Marmorstein, and R.Siminiceanu, *SMART: Stochastic Model-checking Analyzer for Reliability and Timing*, IEEE International Computer Performance and Dependability Symposium (IPDS 2002), Urbana-Champaign, Illinois;
- Technical Reports
 - R.Siminiceanu, N.Cataño, I.Ahmed, *Automated Verification of Specifications with Tpestates and Access Permissions*, NASA Langley Research Center, CR-2011-217170, Aug 2011.
 - P.Roux, R.Siminiceanu, *Model-Checking with Edge-Valued Decision Diagrams*, NASA Langley Research Center, CR-2010-216710, July 2010.
 - C.Csar and R.Siminiceanu, *Salt: a Tool for Trace Format Conversion*, NASA LaRSS report, June 2008.
 - A.Galloway, J.T.Mühlberg, G.Lüttgen, and R.Siminiceanu, *Model-checking Part of a Linux File System*, University of York, TR 2007-423.
 - J.Ezekiel, G.Lüttgen, and R.Siminiceanu, *An Anticipated Firing Saturation Algorithm For Shared-Memory Architectures*, University of York, TR 2007-422.
 - R.Butler, R.Siminiceanu, and C.Muñoz, *The ANMLite Language and Logic For Specifying Planning Problems*, NASA Langley Research Center, TM 2007-215088.
 - R.Siminiceanu, *Model Checking Abstract PLEXIL Programs with SMART*, National Institute of Aerospace TR 2007-02, NASA TM 2007-214543.
 - R.Butler, C.Muñoz, and R.Siminiceanu, *Solving the AI Planning + Scheduling Problem Using Model Checking via Automatic Translation from the Abstract Plan Preparation Language APPL to the Symbolic Analysis Laboratory (SAL)*, NASA Langley Research Center, TM 2007-215089.

- C.Muñoz and R.Siminiceanu, *In-Trail Procedure Algorithm for Enhanced Oceanic Operations*, National Institute of Aerospace Technical Report, 2007-06;
- M-Y.Chung, G.Ciardo, and R.Siminiceanu *Distributed Saturation*, NASA Langley Research Center, CR-2007-214682, July 2009, and National Institute of Aerospace Technical Report 2007-05;
- J.Ezekiel, G.Lüttgen, and R.Siminiceanu, *A Parallel Saturation Algorithm on Shared Memory Architectures*, NASA Langley Research Center, CR-2007-214543, July 2009, and National Institute of Aerospace TR 2007-01;
- R.Siminiceanu, *Modeling Checking Abstract PLEXIL Programs with SMART*, National Institute of Aerospace TR 2007-02;
- M.Malekpour and R.Siminiceanu, *Comments on the Byzantine Self-Stabilizing Pulse Synchronization Protocol: Counterexamples*, NASA/TM 2006-213951;
- C.Muñoz, R.Siminiceanu, V.Carreño, G.Dowek, *KB3D Reference Manual*, NASA/TM 2005-213769;
- G.Ciardo, G.Lüttgen, and R.Siminiceanu, *Saturation: An Efficient Iteration Strategy for Symbolic State-space Generation*, Institute for Computer Applications in Science and Engineering (ICASE) TR No. 2001-5, NASA/CR-2001-210663;
- G.Ciardo, G.Lüttgen, and R.Siminiceanu, *Efficient Symbolic State-Space Construction for Asynchronous Systems*, Institute for Computer Applications in Science and Engineering (ICASE) TR No. 99-50, NASA/CR-1999-209827;
- Theses
 - R.Siminiceanu, *Structural Model Checking*, Ph.D. Thesis, College of William and Mary, December 2003;
 - R.Siminiceanu, *A New Approach to Deadlock-Free Wormhole Routing*, M.S. Thesis, University of Iași, Romania, June 1998;
- Miscellanea
 - G.Ciardo, A.S.Miner, R.L.Jones, R.Marmorstein, R.Siminiceanu, *The SMART User Manual*, <http://www.cs.ucr.edu/~ciardo/SMART/>;
 - R.Siminiceanu, *Genetic Algorithms for TSP (Traveling Salesman Problems)*, student section, Romanian Symposium on Computer Science (RoSyCS '96), Iași, Romania, June 1996.

Journal and Conference Refereeing

- NASA Langley Formal Methods (LFM) 2008–2010.
- Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2006.
- Concurrency Theory International Conference (CONCUR) 2006.

- American Institute of Aeronautics and Astronautics (AIAA) Journal of Aerospace Computing, Information, and Communication, 2006.
- International Symposium on Distributed Computing (DISC) 2006.
- Formal Methods in Computer Aided Design (FMCAD) 2004.
- Theorem Proving in Higher Order Logics (TPHOLS) 2004.
- Journal of Information Science and Engineering (JISE) 2004.
- International Conference on the Theory and Applications of Petri Nets, 2000-2003.

Professional Affiliations

- Member, American Institute of Aeronautics and Astronautics (AIAA).