Curriculum Vitae

George S. Avrunin

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Degrees

BS (Mathematics), 1972, University of Michigan
MA (Mathematics), 1974, University of Michigan
PhD (Mathematics), 1976, University of Michigan

Experience

University of Massachusetts
- Assistant Professor, 1976–1982
- Associate Professor, 1982–1991
- Professor, 1991–2020
- Professor Emeritus, since 2020
- Associate Department Head, 2002–2008, 2016–2018 (Acting Head, Fall 2005 and Fall 2017)
- Department Head, 2008–2011
- Adjunct Professor of Computer Science, since 1992

University of Virginia
- Visiting Assistant Professor, 1980

Memberships

American Mathematical Society
Association for Computing Machinery
Association for Women in Mathematics
Mathematical Association of America

Selected Honors and Professional Service

ACM Distinguished Scientist, 2006

ACM SIGSOFT Impact Paper Award, 2021

University of Massachusetts College of Natural Sciences Outstanding Service and Outreach Award, 2012

Associate Editor, ACM Transactions on Software Engineering and Methodology, 2005–2012

National Science Foundation Awards Panels (1998, 1999, 2003, 2007, 2008, 2010)

ACM International Symposium on Software Testing and Analysis: General Chair 2004; member of Steering Committee 2002–2012 (chair 2004–2006); Program Committee 1998, 2000, 2002, 2006, 2009, 2011, 2012.

ACM SIGSOFT Symposium on the Foundations of Software Engineering: Program Committee 2006

ACM Workshop on Software Engineering for Health Care: Program Committee 2011, 2012, 2013

ACM SPIN Workshop on Software Model Checking: Program Committee 2001, 2005

Computer Aided Verification: Program Committee 2003

ACM & IEEE International Conference on Software Engineering: Program Committee 1999, 2002, 2003, 2005, 2006

ACM & IEEE International Conference on Automated Software Engineering: Program Committee 2008

IEEE International Conference on Distributed Computing Systems: Program Committee 1999

IEEE International Conference on Engineering Complex Computer Systems: Program Committee 1997

IEEE Real-Time Systems Symposium: Program Committee 1994

Grants

Co-principal investigators: J. E. Humphreys and G. S. Avrunin. "Modular Representations and Cohomology Rings of Groups", National Science Foundation grant MCS-830248. June 1, 1983 to November 30, 1985. $65,300.

Co-principal investigators: J. C. Wileden and G. S. Avrunin. "Analysis Support for Development of Concurrent Software Systems", National Science Foundation grant CCR-8806970. July 15, 1988 to December 31, 1990. $223,738.

Co-principal investigators: J. C. Wileden and G. S. Avrunin. "Improving and Extending Constrained Expression Analysis Techniques", Office of Naval Research grant N00014-89-J-1064. October 1, 1988 to September 30, 1991. $282,886.

Principal investigator: G. S. Avrunin. "Constrained Expression Analysis of Concurrent Systems", National Science Foundation Grant CCR-9106645. September 15, 1991 to August 28, 1994. $136,231.

Co-principal investigators: G. S. Avrunin and J. C. Wileden. "Constrained Expression Analysis of Real-Time Systems", Office of Naval Research Grant N00014-89-J-1064 (modification of previous award). October 1, 1991 to January 31, 1994. $228,537.

Principal investigator: G. S. Avrunin. "Automated Analysis of Concurrent Systems", National Science Foundation Grant CCR-9407182. September 1, 1994 to August 31, 1997. $206,461.

Principal investigator: G. S. Avrunin. "Experimental Study of Static Analysis Techniques for Concurrent Software", National Science Foundation Grant CCR-9708184. September 1, 1997 to August 31, 2001. $1,434,337.

Principal investigator: G. S. Avrunin. "Software Model Checking for Embedded Systems", Army Research Office Agreement DAAD190110564. May 1, 2001 to October 31, 2006. $1,257,450.

Co-principal investigators: L. A. Clarke, G. S. Avrunin, E. A. Henneman, L. J. Osterweil. "Improving the Safety and Efficiency of Medical Processes", National Science Foundation Grant CCF-0427071. October 1, 2004 to September 30, 2008. $1,448,468.

Co-principal investigators: S. F. Siegel, G. S. Avrunin. "Finite-State Verification for High-Performance Computing", National Science Foundation Grant CCF-0541035. April 15, 2006 to March 31, 2009. $546,000.

Co-principal investigators: L. A. Clarke, G. S. Avrunin, E. A. Henneman, L. J. Osterweil. "Process-Centered, Analysis-Driven System Development Applied to Human-Intensive Medical Processes", National Science Foundation Grant CCF-0820198, July 1, 2008 to June 30, 2011. $500,000.

Co-principal investigators: G. S. Avrunin, L. Reilly Carlisle, V. Gruneiro, M. S. Thrasher. "The Western Massachusetts Mathematics Partnership (WMMP)", National Science Foundation Grant DUE-1050627. April 15, 2011 to March 31, 2013. $299,854.

Co-principal investigators: L. J. Osterweil, G. S. Avrunin, L. A. Clarke. "Process-Based Technology to Support Comparison and Evaluation of the Security of Elections", National Science Foundation Grant CNS-1258588. October 1, 2012 to September 30, 2013. $75,000.

Co-principal investigators: L. A. Clarke, G. S. Avrunin, L. J. Osterweil. "Context-Aware, Dynamic, Smart Checklists: Key Cyber-Infrastructure for Systems Delivering Quality Health Care", National Science Foundation Grant IIS-1239334. October 1, 2012 to September 30, 2015. $1,350,467. (Collaborative proposal with Massachusetts General Hospital, total amount $1,800,000.)

Co-principal investigators: G. S. Avrunin, L. A. Clarke, L. J. Osterweil. "Developing Standardized Intraoperative Process Models to Enhance Surgical Safety", National Institutes of Health Grant 1R01HL126896-01A1, September 1, 2016 to August 31, 2019. $558,154. (subcontract on award to Harvard Medical School)

Co-principal investigators: G. S. Avrunin, L. A. Clarke, L. J. Osterweil. "A Novel Cognitive-Based Guidance System to Improve Surgical Safety", National Institutes of Health Grant 2R01HL126896-04A1, July 1, 2020 to June 30, 2024. $999,063. (subcontract on award to Harvard Medical School)

Publications

Books and Chapters in Books

Clyde H. Coombs and George S. Avrunin. *The Structure of Conflict*. Lawrence Erlbaum Associates, Hillsdale, NJ, 1988. 264 pages.

George S. Avrunin and Jack C. Wileden. Improvements in automated analysis of concurrent and real-time software. In André M. van Tilborg and Gary M. Koob, editors, *Foundations of Real-Time Computing: Formal Specifications and Methods*, chapter 8, pages 195–215. Kluwer Academic Publishers, 1991.

Shangzhu Wang, George S. Avrunin, and Lori A. Clarke. Plug-and-Play Architectural Design and Verification. In R. de

editors, *Architecting Dependable Systems V*, number 5135 in LNCS, pages 273–297. Springer, 2008.

Papers in Refereed Journals

Clyde H. Coombs and George S. Avrunin. Single-peaked functions and the theory of preference. *Psych. Rev.*, 84:216–230, 1977.

Reprinted in: E. D. Lantermann and H. Feger, editors, *Similarity and Choice*, Hans Huber Publishers, Bern (1980), pp. 182–207.

Clyde H. Coombs and George S. Avrunin. A theorem on single-peaked preference functions in one dimension. *J. Math. Psych.*, 16:261–266, 1977.

George S. Avrunin. A vanishing theorem for second degree cohomology. *J. Algebra*, 53:382–388, 1978.

George S. Avrunin. 2-cohomology of some unitary groups. *Ill. J. Math.*, 24:317–332, 1980.

George S. Avrunin. The image of the restriction map on 2-cohomology. *Arch. Math. (Basel)*, 34:502–508, 1980.

George S. Avrunin. Annihilators of cohomology modules. *J. Algebra*, 69:150–154, 1981.

George S. Avrunin. Generic cohomology for twisted groups. *Trans. Amer. Math. Soc.*, 268:247–253, 1981.

George S. Avrunin and Leonard L. Scott. A Quillen stratification theorem for modules. *Bull. Amer. Math. Soc. (N.S.)*, 6:75–78, 1982.

George S. Avrunin and Leonard L. Scott. Quillen stratification for modules. *Invent. Math.*, 66:277–286, 1982.

George S. Avrunin and Jack C. Wileden. Describing and analyzing distributed software system designs. *ACM Transactions on Programming Languages and Systems*, 7(3):380–403, July 1985.

George S. Avrunin, Laura K. Dillon, Jack C. Wileden, and William E. Riddle. Constrained expressions: Adding analysis capabilities to design methods for concurrent software systems. *IEEE Transactions on Software Engineering*, SE-12(2):278–292, 1986.

Reprinted in: S. M. Shatz and J.-P. Wang, editors, *Tutorial: Distributed-Software Engineering*, IEEE Computer Society Press, Washington, DC (1989), pp. 258–271.

Laura K. Dillon, George S. Avrunin, and Jack C. Wileden. Constrained expressions: Toward broad applicability of analysis methods for distributed software systems. *ACM Transactions on Programming Languages and Systems*, 10(3):374–402, July 1988.

George S. Avrunin, Ugo A. Buy, James C. Corbett, Laura K. Dillon, and Jack C. Wileden. Automated analysis of concurrent systems with the constrained expression toolset. *IEEE Trans. Softw. Eng.*, 17(11):1204–1222, November 1991.

George S. Avrunin and Jon F. Carlson. Nilpotency degree of cohomology rings in characteristic two. *Proc. Amer. Math. Soc.*, 118(2):239–343, 1993.

George S. Avrunin, James C. Corbett, Laura K. Dillon, and Jack C. Wileden. Automated derivation of time bounds in uniprocessor concurrent systems. *IEEE Trans. Softw. Eng.*, 20(9):708–719, September 1994.

James C. Corbett and George S. Avrunin. Using integer programming to verify general safety and liveness properties. *Formal Methods in System Design*, 6:97–123, January 1995.

George S. Avrunin, James C. Corbett, and Laura K. Dillon. Analyzing partially-implemented real-time systems. *IEEE Trans. Softw. Eng.*, 24(8):602–614, August 1998.

George S. Avrunin, James C. Corbett, and Matthew B. Dwyer. Benchmarking finite-state verifiers. *Software Tools for Technology Transfer*, 2(4):317–320, 2000.

Stephen F. Siegel and George S. Avrunin. Improving the precision of INCA by eliminating solutions with spurious cycles. *IEEE Trans. Softw. Eng.*, 28(2):115–128, 2002.

Elizabeth A. Henneman, Rachel Cobleigh, Kimberly Frederick, Ethan Katz-Bassett, George S. Avrunin, Lori A Clarke, Leon J. Osterweil, Chester

Andrzejewski, Jr., Karen Merrigan, and Phillip L. Henneman. Increasing patient safety and efficiency in transfusion therapy using formal process definitions. *Transfusion Medicine Reviews*, 21(1):49–57, January 2007.

Jamieson M. Cobleigh, George S. Avrunin, and Lori A. Clarke. Breaking up is hard to do: An evaluation of automated assume-guarantee reasoning. *ACM Transactions on Software Engineering and Methodology*, 17(2): Article 7, 1–52, 2008.

Stephen F. Siegel, Anastasia Mironova, George S. Avrunin, and Lori A. Clarke. Combining symbolic execution with model checking to verify parallel numerical programs. *ACM Transactions on Software Engineering and Methodology*, 17(2): Article 10, 1–34, 2008.

Elizabeth A. Henneman, Rachel Cobleigh, George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, and Philip L. Henneman. Designing property specifications to improve the safety of the blood transfusion process. *Transfusion Medicine Reviews*, 22(4):291–299, October 2008.

Stefan Christov, Bin Chen, George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, David Brown, Lucinda Cassells, and Wilson Mertens. Formally defining medical processes. *Methods of Information in Medicine*, 47(5):392–398, 2008.

Wilson C. Mertens, Stefan C. Christov, George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, Lucinda J. Cassells, Jenna L. Marquard. Using process elicitation and validation to understand and improve chemotherapy ordering and delivery. *The Joint Commission Journal on Quality and Patient Safety*, 38(11):497–505, November 2012.

Stefan C. Christov, Jenna L. Marquard, George S. Avrunin, Lori A. Clarke. Assessing the effectiveness of five process elicitation methods: A case study of chemotherapy treatment plan review. *Journal of Applied Ergonomics*, 59:364–376, 2017.

Leon J. Osterweil, Matt Bishop, Heather M. Conboy, Huong Phan, Borislava I. Simidchieva, George S. Avrunin, Lori A. Clarke, and Sean Peisert. Iterative analysis to improve key properties of critical human-intensive processes: An election security example. *ACM Transactions on Privacy and Security*, 20(2):Article 5, 31 pages, 2017.

Leon J. Osterweil, Heather M. Conboy, Lori A. Clarke, and George S. Avrunin. Process-model-driven guidance to reduce surgical procedure errors: An expert opinion. *Seminars on Thoracic and Cardiovascular Surgery*, 31:453–457, 2019.

RD Dias, MA Zenati, HM Conboy, LA Clarke, LJ Osterweil, Avrunin GS, and SJ Yule. Dissecting cardiac surgery: A video-based recall protocol to elucidate team cognitive processes in the operating room. *Annals of Surgery*, published online ahead of print, July 24, 2019. doi: 10.1097/SLA.0000000000003489

LR Kennedy-Metz, HM Conboy, A Liu, RD Dias, RE Harari, A Gikandi, A Shapeton, LA Clarke, LJ Osterweil, GS Avrunin, T Chaspari, S Yule, MA Zenati. A novel multimodal, intraoperative cognitive workload assessment of cardiac surgery team members. J Thorac Cardiovasc Surg. 2025 Jul;170(1):287-296. doi: 10.1016/j.jtcvs.2024.07.050.

Papers in Highly Refereed Conferences

Jack C. Wileden and George S. Avrunin. Toward automating analysis support for developers of distributed software. In *Proceedings of the Eighth International Conference on Distributed Computing Systems*, pages 350–357. IEEE Computer Society Press, June 1988.

George S. Avrunin, Laura K. Dillon, and Jack C. Wileden. Experiments with automated constrained expression analysis of concurrent software systems. In Richard A. Kemmerer, editor, *Proceedings of the ACM SIGSOFT '89 Third Symposium on Software Testing, Analysis and Verification*, pages 124–130, December 1989.

George S. Avrunin, Ugo A. Buy, and James C. Corbett. Integer programming in the analysis of concurrent systems. In Kim Guldstand Larsen and Arne Skou, editors, *Computer Aided Verification, 3rd International Workshop Proceedings*, volume 575 of *Lecture Notes in Computer Science*, pages 92–102, Aalborg, Denmark, July 1991. Springer-Verlag.

George S. Avrunin, Ugo A. Buy, James C. Corbett, Laura K. Dillon, and Jack C. Wileden. Experiments with an improved constrained expression toolset. In *Proceedings of the Symposium on Testing, Analysis, and Verification (TAV4)*, pages 178–187. ACM SIGSOFT, October 1991.

James C. Corbett and George S. Avrunin. A practical method for bounding the time between events in concurrent real-time systems. In Thomas Ostrand and Elaine Weyuker, editors, *Proceedings of the 1993 International Symposium on Software Testing and Analysis (ISSTA)*, pages 110–116, Cambridge, MA, June 1993. ACM Press.

James C. Corbett and George S. Avrunin. Towards scalable compositional analysis. In David Wile, editor, *Proceedings of the Second ACM SIGSOFT Symposium on Foundations of Software Engineering*, pages 53–61, New Orleans, December 1994. ACM Press.

George S. Avrunin. Symbolic model checking using algebraic geometry. In Rajeev Alur and Thomas A. Henzinger, editors, *Computer Aided Verification, 8th International Conference*, volume 1102 of *Lecture Notes in Computer Science*, pages 26–37, New Brunswick, NJ, July/August 1996. Springer-Verlag.

George S. Avrunin, James C. Corbett, and Laura K. Dillon. Analyzing partially-implemented real-time systems. In *Proceedings of the 19th International Conference on Software Engineering*, pages 228–238, Boston, May 1997.

Gleb Naumovic, George S. Avrunin, Lori A. Clarke, and Leon J. Osterweil. Applying static analysis to software architectures. In Mehdi Jazayeri and Helmut Schauer, editors, *Software Engineering—ESEC/FSE '97*, volume 1301 of *Lecture Notes in Computer Science*, pages 77–93, Zurich, September 1997. Springer Verlag.

Gleb Naumovich and George S. Avrunin. A conservative data flow algorithm for detecting all pairs of statements that may happen in parallel. In *Proceedings of 6th International Symposium on the Foundations of Software Engineering*, pages 24–34, November 1998.

Gleb Naumovich, George S. Avrunin, and Lori A. Clarke. Data flow analysis for checking properties of concurrent Java programs. In *Proceedings of the Twenty-First International Conference on Software Engineering*, pages 399–410, Los Angeles, May 1999.

Matthew B. Dwyer, George S. Avrunin, and James C. Corbett. Patterns in property specifications for finite-state verification. In *Proceedings of the Twenty-First International Conference on Software Engineering*, pages 411–420, Los Angeles, May 1999.

Gleb Naumovich, George S. Avrunin, and Lori A. Clarke. An efficient algorithm for computing MHP information for concurrent Java programs. In O. Nierstrasz and M. Lemoine, editors, *Software Engineering—ESEC/FSE '99. 7th European Software Engineering Conference held jointly with the 7th ACM SIGSOFT Symposium on the Foundations of Software Engineering*, number 1687 in LNCS, pages 338–354, Toulouse, September 1999.

Stephen F. Siegel and George S. Avrunin. Improving the precision of INCA by preventing spurious cycles. In Mary Jean Harrold, editor, *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis*, pages 191–200, Portland, OR, August 2000. ACM Press.

Rachel L. Smith, George S. Avrunin, Lori A. Clarke, and Leon J. Osterweil. PROPEL: An approach supporting property elucidation. In *Proceedings of the Twenty-Fourth International Conference on Software Engineering*, pages 11–21, Orlando, FL, May 2002.

Jianbin Tan, George S. Avrunin, and Lori A. Clarke. Heuristic-based model refinement for FLAVERS. In *Proceedings of the Twenty-Sixth International Conference on Software Engineering*, pages 635–644, Edinburgh, May 2004.

Jianbin Tan, George S. Avrunin, Lori A. Clarke, Shlomo Zilberstein, and Stefan Leue. Heuristic-guided counterexample search in FLAVERS. In Matthew Dwyer, editor, *Proceedings of the 12th ACM SIGSOFT Symposium on the Foundations of Software Engineering*, pages 201–210, Newport Beach, CA, November 2004.

Stephen F. Siegel and George S. Avrunin. Modeling wildcard-free MPI programs for verification. In *Symposium on Principles and Practice of Parallel Programming (PPoPP '05)*, pages 95–106, Chicago, IL, June 2005.

Jianbin Tan, George S. Avrunin, and Lori A. Clarke. Managing space for finite-state verification. In *Proceedings of the 28th International Conference on Software Engineering*, pages 152–161, Shanghai, May 2006.

Shangzhu Wang, George S. Avrunin, and Lori A. Clarke. Architectural building blocks for plug-and-play design. In Ian Gorton, George T. Heneman, Ivica Crnkovic, Heinz W. Schmidt, Judith A. Stafford, Clemens A. Szyperski, and Kurt Wallnau, editors, *Proceedings of the 9th International SIGSOFT Symposium on Component-Based Software Engineering (CBSE 2006)*, number 4063 in LNCS, pages 98–113, Västerås, Sweden, June 2006.

Stephen F. Siegel, Anastasia Mironova, George S. Avrunin, and Lori A. Clarke. Using model checking with symbolic execution to verify parallel numerical programs. In Mauro Pezzé, editor, *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis*, pages 157–168, Portland, ME, July 2006.

Jamieson M. Cobleigh, George S. Avrunin, and Lori A. Clarke. Breaking up is hard to do: An investigation of decomposition for assume-guarantee reasoning. In Mauro Pezzé, editor, *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis*, pages 97–108, Portland, ME, July 2006.

Rachel L. Cobleigh, George S. Avrunin, and Lori A. Clarke. User guidance for creating precise and accessible property specifications. In *Proceedings of the 14th ACM SIGSOFT Symposium on the Foundations of Software Engineering*, pages 208–218, Portland, OR, November 2006.

Bin Chen, George S. Avrunin, Elizabeth A. Henneman, Lori A. Clarke, Leon J. Osterweil, and Philip L. Henneman. Analyzing medical processes. In *ICSE '08: Proceedings of the 30th International Conference on Software Engineering*, pages 623–632, Leipzig, May 2008.

Lori A. Clarke, George S. Avrunin, and Leon J. Osterweil. Using software engineering technology to improve the quality of medical processes (Keynote Address). In *ICSE Companion '08: Companion of the 30th International Conference on Software Engineering*, pages 889–898, Leipzig, May 2008.

Danhua Wang, Jingui Pan, George S. Avrunin, Lori A. Clarke, and Bin Chen. An automatic failure mode and effect analysis technique for processes defined in the Little-JIL process definition language. In *Proceedings of the 22nd International Conference on Software Engineering and Knowledge Engineering*, San Francisco, July 2010.

Stefan C. Christov, George S. Avrunin, and Lori A. Clarke. Online deviation detection for medical processes. In *American Medical Informatics Association Annual Symposium*, pages 395–404, November 2014.

Heather M. Conboy, George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, Julian M. Goldman, Steven J. Yule, Marco A. Zenati, and Stefan C. Christov. Cognitive support during high-consequence episodes of care in

cardiovascular surgery. *Proceedings of the 2017 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)*, 3 pages, 2017.

Roger Daglius Dias, Heather Conboy, Jennifer Gabany, Lori Clarke, Leon Osterweil, George S. Avrunin, David Arney, Julian Goldman, Giuseppe Riccardi, Steven Yule, and Marco A Zenati. Development of an interactive dashboard to analyze cognitive workload of surgical teams during complex procedural care. In *2018 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)*, pages 77–82, 2018.

George S. Avrunin, Stefan C. Christov, Lori A. Clarke, Heather M. Conboy, Leon J. Osterweil, and Marco A. Zenati. Process driven guidance for complex surgical procedures. In *American Medical Informatics Association Annual Symposium*, pages 175–184, November 2018.

Heather M. Conboy, Lauren R. Kennedy-Metz, George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, Roger D. Dias, and Marco A. Zenati. Digital Cognitive Aids to Support Adapation of Surgical Processes to COVID-19 Protective Policies. In *IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)*, pages 205–210, 2020.

Mahdi Ebnali, Lauren Kennedy-Metz, Heather Conboy, Lori Clarke, Leon Osterweil, George Avrunin, Christian Miccile, Maria Arshanskiy, Annette Phillips, Marco Zenati, and Roger Dias. A Coding Framework for Usability Evaluation of Digital Health Technologies. In *24th International Conference on Human-Computer Interaction (HCI International 2022)*, June-July 2022.

Papers in Other Conferences and Workshops

George S. Avrunin and Jack C. Wileden. Algebraic techniques for the analysis of concurrent systems. In *Proceedings of the Sixteenth Hawaii International Conference on Systems Sciences*, pages 51–57, 1983.

George Avrunin and Jan Demers. Exploring symmetry with first graders. http://mathforum.org/mathed/mime/avrunin.html, 1997. (Invited report for the Math Forum's Mathematicians in Mathematics Education page).

Matthew B. Dwyer, George S. Avrunin, and James C. Corbett. Property specification patterns for finite-state verification. In Mark Ardis, editor, *Proceedings of FMSP '98, the Second Workshop on Formal Methods in Software Practice*, pages 7–15, Clearwater Beach, FL, March 1998.

Rachel L. Smith, George S. Avrunin, and Lori A. Clarke. From natural language requirements to rigorous property specifications. In *Workshop on Software Engineering for Embedded Systems (SEES 2003): From Requirements to Implementation*, pages 40–46, Chicago, IL, September 2003.

Stephen F. Siegel and George S. Avrunin. Verification of MPI-based software for scientific computation. In Susanne Graf and Laurent Mounier, editors, *Model Checking Software: 11th International SPIN Workshop*, number 2989 in LNCS, pages 286–303, Barcelona, April 2004. Springer-Verlag.

George S. Avrunin, Stephen F. Siegel, and Andrew R. Siegel. Finite-state verification for high-performance computing. In Phillip Johnson, editor, *Proceedings of the Second International Workshop on Software Engineering for High Performance Computing System Applications*, pages 68–73, St. Louis, MO, May 2005.

Lori A. Clarke, Yao Chen, George S. Avrunin, Bin Chen, Rachel Cobleigh, Kim Frederick, Elizabeth A. Henneman, and Leon J. Osterweil. Process programming to support medical safety. In Mingshu Li, Barry Boehm, and Leon J. Osterweil, editors, *Unifying the Software Process Spectrum: International Software Process Workshop, SPW 2005*, number 3840 in LNCS, pages 347–359, Beijing, May 2005.

George S. Avrunin, Lori A. Clarke, Elizabeth A. Henneman, and Leon J. Osterweil. Complex medical processes as context for embedded systems. In *Proceedings of the Workshop on Innovative Techniques for the Certification of Embedded Systems*, San Jose, CA, April 2006. Proceedings published in *ACM SIGBED Review* 3(4), 2006.

Bin Chen, George S. Avrunin, Lori A. Clarke, and Leon J. Osterweil. Automatic fault-tree derivation from Little-JIL process definitions. In Qing Wang, Dietmar Pfahl, David M. Raffo, and Paul Werinck, editors, *Proceedings of SPW/ProSim 2006*, number 3966 in LNCS, pages 150–158, Shanghai, May 2006.

Shangzhu Wang, George S. Avrunin, and Lori A. Clarke. Verification support for plug-and-play architectural design. Extended abstract in *Proceedings of the Workshop on the Role of Software Architecture in Testing and Analysis*, Portland, ME, July 2006, 2006.

Leon J. Osterweil, George S. Avrunin, Bin Chen, Lori A. Clarke, Rachel L. Cobleigh, Elizabeth A. Henneman, and Philip L. Henneman. Engineering medical processes to improve their safety: An experience report. In J. Ralyte, S. Brinkemper, and B. Henderson-Seelers, editors, *Situational Method Engineering: Fundamentals and Experiences*, pages 267–282, Geneva, September 2007. Springer.

Stefan Christov, Bin Chen, George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, David Brown, Lucinca Cassells, and Wilson Mertens. Rigorously defining and analyzing medical processes: An experience report. In *Workshop on Model-Based Trustworthy Health Information Systems*, September 2007.

Stephen F. Siegel and George S. Avrunin. Verification of halting properties for MPI programs using nonblocking operations. In Franck Capello, Thomas Herault, and Jack Dongarra, editors, *Recent Advances in Parallel Virtual Machine and Message Passing Interface: 14th European PVM/MPI*

Users' Group Meeting, volume 4757 of *Lecture Notes in Computer Science*, pages 326–334, Paris, September/October 2007. Springer-Verlag.

Jenna L. Marquard, Stefan Christov, Philip L. Henneman, Lori A. Clarke, Leon J. Osterweil, George S. Avrunin, Donald L. Fisher, Elizabeth A. Henneman, Megan M. Campbell, Tuan A. Pham, and Qi Ming Lin. Studying rigorously defined health care processes using a formal process modeling language, clinical simulation, observation, and eye tracking. In *Proceedings of NDM9, the 9th International Conference on Naturalistic Decision Making*, pages 239-240, London, June 2009.

Leon J. Osterweil, Lori A. Clarke, and George S. Avrunin. An integrated collection of tools for continuously improving the processes by which health care is delivered: A tool report. In *Third International Workshop on Process-Oriented Information Systems in Healthcare (ProHealth '09)*, Ulm, Germany, September 2009.

Stefan Christov, George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, and Elizabeth A. Henneman. A benchmark for evaluating software engineering techniques for improving medical processes. In Lori A. Clarke and Jens Weber-Jahnke, editors, *SEHC '10: Proceedings of the 2010 ICSE Workshop on Software Engineering in Health Care*, pages 50–56, Cape Town, South Africa, May 2010.

Lori A. Clarke, Leon J. Osterweil, and George S. Avrunin. Supporting human-intensive systems. In *Proceedings of 2010 FSE/SDP Workshop on the Future of Software Engineering Research*, pages 87–01, Santa Fe, NM, 2010. ACM.

George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, Stefan C. Christov, Bin Chen, Elizabeth A. Henneman, Philip L. Henneman, Lucinda Cassells, and Wilson Mertens. Experience modeling and analyzing medical processes: UMass/Baystate medical safety project overview. In *1st ACM International Health Informatics Symposium*, pages 316–325, Arlington, VA, November 2010.

Heather M. Conboy, George S. Avrunin, and Lori A. Clarke. Process-based derivation of requirements for medical devices. In *1st ACM International Health Informatics Symposium*, pages 656–665, Arlington, VA, November 2010.

Danhua Wang, Jingui Pan, George S. Avrunin, Lori A. Clarke, and Bin Chen. An automatic failure mode and effect analysis technique for processes defined in the Little-JIL process definition language. In *22nd International Conference on Software Engineering and Knowledge Engineering*, pages 765–770, July 2010.

George S. Avrunin, Lori A. Clarke, Leon J. Osterweil, Julian M. Goldman, and Tracy Rausch. Smart checklists for human-intensive medical systems. In *Proceedings of the Workshop on Open Resilient human-aware Cyberphysical Systems (WORCS-2012)*, June 2012.

Huong Phan, George S. Avrunin, Matt Bishop, Lori A. Clarke, and Leon J. Osterweil. A systematic process-model-based approach for synthesizing attacks and evaluating them. In *Proceedings of the 2012 Electronic Voting Technology Workshop/Workshop on Trustworthy Elections*, Bellevue, WA, August 2012.

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