Curriculum Vitae
Matthew B. Dwyer

Business Address:
Department of Computer Science
University of Virginia
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Research Interests

Specification and automated validation and verification of software systems.

Education

PhD (computer science) 1995, University of Massachusetts at Amherst. Advisor: Lori A. Clarke; dissertation title: "Data Flow Analysis for Verifying Correctness Properties of Distributed Systems".

MS (computer science), 1989, University of Massachusetts at Boston.

BS (electrical engineering), 1985, University of Rochester, Rochester, NY.

Positions Held

Professor, Department of Computer Science, University of Virginia, August 2018 - present.

Professor, Department of Computer Science and Engineering, University of Nebraska - Lincoln, July 2004 - July 2018.

Chair, Department of Computer Science and Engineering, University of Nebraska - Lincoln, July 2013 - June 2018.

Extraordinary Professor, Department of Mathematical Sciences - Computer Science Division, Stellenbosch University, Sep. 2011 - Dec. 2017.

Associate Professor, Department of Computing and Information Sciences, Kansas State University, July 1999 - June 2004.

Assistant Professor, Department of Computing and Information Sciences, Kansas State University, Aug 1995 - July 1999.

Research Assistant, Department of Computer Science, University of Massachusetts at Amherst, Sept 1990 - July 1995.

Lecturer, Department of Mathematics and Computer Science, University of Massachusetts at Boston. January 1989 - January 1990.

Senior Engineer, Intermetrics Inc., Cambridge, MA, Sept 1985 - Aug 1990.

Software Developer, Computer Science Department, University of Rochester, Rochester, NY May 1985 - Sept 1985

Software Developer, Bausch & Lomb Inc., Rochester, NY, May 1984 - May 1985

Honors

Robert Thomson Distinguished Professor in Engineering and Applied Science, University of Virginia, 2020 - present

ACM Fellow, 2019

ACM SIGSOFT Distinguished Service Award, 2019

CICS Outstanding Alumni Achievement in Research Award, University of Massachusetts at Amherst, 2019

David Lorge Parnas Fellow, Lero - The Irish Software Research Centre, 2018

ACM SIGSOFT ESEC/FSE Test of Time Award, 2018

John C. Knight Faculty Fellow, University of Virginia, 2018 - 2020

ACM Distinguished Paper Award, SIGSOFT, ICSE, 2016

Leonard A. Lovell Professor of Engineering, University of Nebraska, 2014 - 2018

ACM Distinguished Paper Award, SIGSOFT, ISSTA, 2013

IEEE Fellow, 2013

Fulbright Research Scholar (University of Stellenbosch, South Africa), 2011

ACM SIGSOFT Impact Paper Award, 2010

International Conference on Software Engineering Most Influential Paper Award, 2010

ACM Distinguished Scientist, 2007

ACM Distinguished Paper Award, SIGSOFT, FSE, 2006

Henson Professor of Software Engineering, University of Nebraska, 2004 - 2014

NASA Turning Goals into Reality Award, for contributions to the Java PathFinder Model Checker, 2003

Research Excellence Award, College of Engineering, Kansas State University, 2000

NSF Faculty Early Career Development Award, 1997

University of Massachusetts at Boston, Computer Science Outstanding Graduate Student Award, 1989

Grants

National Science Foundation, Grant CCF-2019239, *Focusing Incremental Abstraction-based Verification on Neural Network Input Distributions*, PI, Sept. 2020 - Aug. 2022, $510,000

DARPA ARCOS contract FA8750-20-C-0507, through Lockeed-Martin Advanced Technology Laboratories, *CertGATE: Certification from Generation of Automated Test Evidence*, PI, April 2020 - March 2024, $1,830,000.

National Science Foundation, Grant CCF-1900676, *Rearchitecting Neural Networks for Verification*, PI, July 2019 - June 2023, $1,250,000.

Army Research Office, Award W911NF1910054, *Predictive Failure Avoidance*, PI, January 2019 - December 2021, $550,000.

National Science Foundation, Grants CCF-1617916 and CCF-1901769, *Measurable Program Analysis*, PI, July 2016 - June 2019, $499,000.

National Science Foundation, Grant CCF-1449626, *Mapping Software Analysis Problems to Efficient and Accurate Constraints*, PI, Aug. 2014 - July 2016, $75,000.

National Science Foundation, Grant CCF-1346769, *CIVL: A Concurrency Intermediate Verification Language*, co-PI with Siegel, S. (U. Delaware), Aug. 2013 - July 2016, $300,000.

NSA/CMU Science of Security Lablet, *Race Vulnerability Study and Hybrid Race Detection*, co-PI with Srisa-an, W., July 2013 - June 2017, $176,000.

Computing Research Association, Collaborative Research Experience for Undergraduates, co-PI with Choueiry, B., Aug 2011 - Aug 2012, $24,000.

Air Force Office of Scientific Research, *Safeguarding End-User Military Software*, co-PI with Rothermel, G., Cohen, M., Elbaum, S., Sarma, A., and Srisa-An, W., Sep 2010 - Aug 2014, $3,955,290.

Air Force Office of Scientific Research, *Enhancing the Dependability of Complex Missions through Automated Analysis*, co-PI with Elbaum, S., Sep 2009 - Oct 2012, $580,000.

National Science Foundation, Grant CCF-0915526, *T2T: A Framework for Amplifying Testing Resources*, co-PI with Elbaum, S., Aug 2009 - Aug 2012, $491,688.

National Aeronautics and Space Administration, Grant NNX08AV20A, *Differential Symbolic Execution: Supporting Evolution of High-Assurance Software*, PI with Elbaum, S., Jul 2008 - Jun 2011, $674,959.

National Science Foundation, Grant CNS-0720654, *Predictable Adaptive Residual Monitoring for Real-time Embedded Systems*, PI with Elbaum, S. and Goddard, G., Sep 2007 - Mar 2011, $500,000.

Lockheed Martin, Software Technology Initiative, *Integrated Software Quality*, PI with Elbaum, S. and Rothermel, G., Jun 2007 - Dec 2007, $60,000.

NASA Jet Propulsion Laboratory, Award 1286178, *Parallel Model Checking*, PI, Jun 2006 - Oct 2006, $42,000.

National Science Foundation, Grant CCR-0541263, *Collaborative Research: Finite-State Verification for High-Performance Computing*, PI, Apr 2006 - Mar 2009, $300,000.

National Science Foundation, Grant CCR-0454203, *CRI: Collaborative Research : A Community Resource to Support Controlled Experimentation with Program Analysis and Software Testing Techniques*, co-PI with Elbaum, S., and Rothermel, G., Jul 2005 - Jun 2009, $820,000.

National Science Foundation, Grant CCR-0429149, *Collaborative Research : Program Analysis Techniques to Support Dependable RTSJ Applications*, PI with Elbaum, S., Goddard, S., and Rothermel, G., Sep 2004 - Aug 2007, $210,000.

National Science Foundation, Grant CCR-0411043, *Building Scalable and Adaptive Garbage Collectors for Server Systems*, co-PI with Srisa-an, W., and Elbaum, S., Aug 2004 - June 2007, $280,000.

Defense University Research Instrumentation Program, *Parallel Analysis of Models for Distributed Real-time Systems*, PI with Andresen, D., Hatcliff, J., and Wallentine, V., April 2004 - March 2005, $399,500.

IBM Eclipse Innovation Award, *Tool-support for Project-oriented Model Checking Education*, PI with Hatcliff, J., Jan 2004 - Dec 2004, $25,000

National Science Foundation, Grant CCR-0306607, *Bogor : A Model Checking Framework for Dynamic Software*, PI with Hatcliff, J., Aug 2003 - Aug 2005, $180,000.

Lockheed-Martin, *High-Assurance Infrastructure for Developing Embedded Software*, co-PI with Hatcliff, J., and Singh, G., Apr 2003 - Dec 2003, $180,000.

Intel Corporation, Award 11462, *Equipment support for Bandera*, PI, May 2002, $10,000.

Army Research Office, Award DAAD190110564, *Software Model Checking for Embedded Systems*, PI with Hatcliff, J., and Avrunin, G., May 2001 - May 2006, $3,100,000.

DARPA IXO through Air Force Research Laboratory, Awards AFRL-F33615-00-C-3044, *Automatic Derivation, Integration, and Verification of Synchronization Aspects in Object-oriented Design Methods*, co-PI with Hatcliff, J., Mizuno, M., Neilsen, M., and Singh, G., July 2000 - July 2004, $2,258,093.

Honeywell Technology Center and NASA Langley Research Center, Cooperative Agreement NCC-1-399, *Automatic Finite-state Verification for Avionics Software*, PI, June 2000 - Oct. 2004, $149,905.

National Science Foundation, Grant INT-9981558, *Integrating Platforms for Finite-state Verification*, co-PI with Hatcliff, J, and Schmidt, D.A., April 2000 - March 2002, $15,467.

Sun Microsystems, AEG Grant, *Towards Model Checking Java Programs*, PI, Sept. 1999 - Aug. 2000, $27,375.

National Science Foundation, Grant CCR-9901605, *A Model Construction Tool Suite for Finite-state Verification of Java*, co-PI with Hatcliff, J, and Schmidt, D.A., Sept. 1999 - Aug. 2001, $62,000.

National Aeronautics and Space Administration, Grant NAG-2-1209, *Model Construction for Finite-State Verification : Application of Abstract Interpretation and Partial Evaluation*, PI with Schmidt, D.A., and Hatcliff, J., April 1998 - April 2000, $458,000.

National Science Foundation, Grant CCR-9708184, *Experimental Study of Static Analysis Techniques for Concurrent Software*, PI, Sept. 1997 - Aug. 2001, $78,000.

National Science Foundation CAREER award, CCR-9703094, *Engineering High-Quality Concurrent Software*, PI, June 1997 - May 2001, $225,500.

National Science Foundation, Grant MRI-9724289, *Acquisition of Upgraded High Performance Multiprocessors for Computational Research in Science and Engineering*, co-PI with Rahman, T.S., Smith, P.E., Chakrabarti, J.K., and Lin, C.D., Sept. 1997 - Aug. 2000, $350,000.

National Science Foundation, Grant DUE-9751194, *Emphasizing Software Quality in Undergraduate Programming Laboratories*, PI with Gustafson, D., May 1997 - April 1999, $22,000.

National Science Foundation, Grant CISE-9617360, *Tools for Analysis and Development of Concurrent Programs*, co-PI with Singh, G., Wallentine, V, Neilsen, M., and Mizuno, M., Feb. 1997 - Jan. 1998, $25,000.

National Science Foundation, Grant CCR-9633388, *Logical Support for High-Assurance Software Evolution*, co-PI with Howard, B., Schmidt, D.A., and Stoughton, A., Sept. 1996 - Aug. 1998, $200,000.

Edited Volumes

Herbsleb, J.D. and Dwyer, M.B. (editors), *Proceedings of the Future of Software Engineering*, FOSE 2014, May, 2014.

Leavens, G.T. and Dwyer, M.B. (editors), *Proceedings of the 27th Annual ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications*, Oct., 2012.

Dwyer, M.B. and Tip, F. (editors), *Proceedings of the 20th International Symposium on Software Testing and Analysis*, July, 2011.

Dwyer, M.B. and Gruhn, V. (editors), *Proceedings of the 30th International Conference on Software Engineering*, May, 2008.

Dwyer, M.B. and Lopes, A. (editors), *Proceedings of the 10th International Conference on Fundamental Approaches to Software Engineering*, Mar., 2007.

Dwyer, M.B. (editor), *Proceedings of the ACM SIGSOFT 12th International Symposium on Foundations of Software Engineering*, Nov., 2004.

Dwyer, M.B. and Krogh, B. (editors), *Proceedings of the 2003 Monterey Workshop on Software Engineering for Embedded Systems : from Requirements to Implementation*, Sep. 2003.

Dwyer, M.B. and Palsberg, J. (editors), *Proceedings of the 2002 ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering*, Nov., 2002.

Dwyer, M.B. (editor), *Model Checking Software*, Lecture Notes in Computer Science 2057, Springer-Verlag, May, 2001.

Full Refereed Publications

Gerrard, M, Borges, M., Dwyer, M.B., and Filieri, A., *Conditional Quantitative Program Analysis*, in **IEEE Transactions on Software Engineering**, (to appear)

Hildebrandt, C., Elbaum, S., Bezzo, N., and Dwyer, M.B., *Feasible and Stressful Trajectory Generation for Mobile Robots*, in **Proceedings of the International Symposium on Software Testing and Analysis**, July, 2020.

Xu, D., Shriver, D., Dwyer, M.B., and Elbaum, S., *Systematic Generation of Diverse Benchmarks for DNN Verification*, in **Proceedings of the International Conference on Computer Aided Verification**, July, 2020.

Shriver, D., Elbaum, S., Dwyer, M.B., and Rosenblum, D.S., *Evaluating Recommender System Stability with Influence-Guided Fuzzing*, in **Proceedings of the Thirty-Second AAAI Conference on Artificial Intelligence**, January, 2019.

Sherman, E. and Dwyer M.B., *Structurally Defined Conditional Data-flow Static Analysis*, in **Proceedings of the 24th International Conference on Tools and Algorithms for the Construction and Analysis of Systems**, April, 2018.

Huckelheim, J., Luo, Z., Luporini, F., Kukreja, M., Lange, M., Gorman, G., Siegel, S.F., Dwyer, M.B., and Hovland, P.D., *Towards Self-Verification in Finite Difference Code Generation*, in **Proceedings of the First International Workshop on Software Correctness for HPC Applications**, Nov., 2017.

Gerrard, M., and Dwyer, M.B., *Comprehensive Failure Characterization*, in **Proceedings of the 32nd International Conference for Automated Software Engineering**, Nov., 2017.

Nguyen,T., Dwyer, M.B., and Visser, W., *SymInfer: Inferring Program Invariants Using Symbolic States*, in **Proceedings of the 32nd International Conference for Automated Software Engineering**, Nov., 2017.

Dwyer, M.B., Filieri, A., Geldenhuys, J., Gerrard, M., Păsăreanu, C.S., and Visser, W., *Probabilistic Program Analysis*, in **Grand Timely Topics in Software Engineering**, June, 2017.

Rizzi, E.F., Elbaum, S., and Dwyer, M.B., *On the Techniques we Create, the Tools we Build, and their Misalignments: a Study of KLEE*, in **Proceedings of the 38th International Conference on Software Engineering**, May, 2016.

Stolee, K., Elbaum, S., and Dwyer, M.B., *Code Search with Input/Output Queries: Generalizing, Ranking and Assessment*, in **Journal of Systems and Software**, vol. 116, June 2016.

Sherman, E., and Dwyer, M.B., *Exploiting Domain and Program Structure to Synthesize Efficient and Precise Data Flow Analyses*, in **Proceedings of the 30th International Conference for Automated Software Engineering**, Nov., 2015.

Siegel, S., Zheng, M., Luo, Z., Zirkel, A., Edenhofner, J., Dwyer, M.B., and Rogers, M., *CIVL: the Concurrency Intermediate Verification Language*, in **Proceedings of the International Conference for High Performance Computing, Networking, Storage, and Analysis**, Nov., 2015.

Sherman, E., Garvin, B., and Dwyer, M.B., *Deciding Type-Based Partial-Order Constraints for Path-Sensitive Analysis*, in **ACM Transactions on Software Engineering and Methodology**, 24(3), May, 2015.

Swanson, J., Cohen, M.B., Dwyer, M.B., Garvin, B.J., and Firestone, J., *Beyond the Rainbow: Self-Adaptive Failure Avoidance in Configurable Systems*, in **Proceedings of the 22nd ACM SIGSOFT International Symposium on Foundations of Software Engineering**, Nov., 2014.

Luckow, K.S., Pasareanu, C.S., Dwyer, M.B., Filieri, A., and Visser, W., *Exact and Approximate Probabilistic Symbolic Execution for Non-deterministic programs*, in **Proceedings of the 29th International Conference on Automated Software Engineering**, Sep., 2014.

Rizzi, E.F., Dwyer, M.B., and Elbaum, S., *Safely Reducing the Cost of Unit Level Symbolic Execution through Read/Write Analysis*, in **ACM Software Engineering Notes – Proceedings of the JPF Workshop**, 39(1), Jan., 2014.

Purandare, P., Dwyer, M.B., and Elbaum, S., *Optimizing monitoring of finite state properties through monitor compaction*, in **Proceedings of the International Symposium on Software Testing and Analysis**, Jul., 2013.

Visser,W., Geldenhuys, J., and Dwyer, M.B., *Green: Reducing, Reusing, and Recycling Constraints in Program Analysis*, in **Proceedings of the 20th ACM SIGSOFT Symposium on Foundations of Software Engineering**, Nov., 2012.

Purandare, P., Darsie, J., Elbaum, S., and Dwyer, M.B., *Extracting Conditional Component Dependence for Distributed Robotic Systems*, in *Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems*, Oct., 2012.

Visser, W., Dwyer, M.B., and Whalen, M.W., *The Hidden Models of Model Checking*, in **Software and System Modeling**, 11(4), Oct., 2012.

Zhang, P.Y., Elbaum, S., and Dwyer, M.B., *Compositional Load Test Generation for Software Pipelines*, in **Proceedings of the International Symposium on Software Testing and Analysis**, Jul., 2012.

Geldenhuys, J., Dwyer, M.B., and Visser, W., *Probabilistic Symbolic Execution*, in **Proceedings of the International Symposium on Software Testing and Analysis**, Jul., 2012.

Anthony, D.J., Bennet, W.P., Vuran, M.C., Dwyer, M.B., Elbaum, S.G., Lacy, A., Engels, M., and Wehtje W., *Sensing Through the Continent: Towards Monitoring Migratory Birds Using Cellular Sensor Networks*, in **Proceedings of the 11th International Conference on Information Processing in Sensor Networks**, Apr., 2012.

Shi, J., Cohen, M.B., and Dwyer, M.B., *Integration Testing of Software Product Lines Using Compositional Symbolic Execution*, in **Proceedings of the 15th International Conference on Fundamental Approaches to Software Engineering**, Mar., 2012.

Diep, M., Dwyer, M.B., and Elbaum, S. *Lattice-based Sampling for Path Property Monitoring*, in **ACM Transactions on Software Engineering and Methodology**, 21(2), Dec., 2011.

Zhu, H., Goddard, S., and Dwyer, M.B., *Response Time Analysis of Hierarchical Scheduling: the Synchronized Deferrable Servers Approach*, in **Proceedings of the 32nd IEEE Real-time Systems Symposium**, Dec., 2011.

Zhang, P.Y., Elbaum, S., and Dwyer, M.B., *Automatic Generation of Load-Tests*, in **Proceedings of the 26th IEEE/ACM International Conference on Automated Software Engineering**, Nov., 2011.

Li, D., Srisa-an, W., and Dwyer, M.B., *SOS: Saving Time in Dynamic Race Detection with Stationary Analysis*, in **Proceedings of the ACM International Conference on Systems, Programming, Languages and Applications**, Oct., 2011.

Purandare, R., Dwyer, M.B., and Elbaum, S. *Monitoring Finite State Properties: Algorithmic Approaches and their Relative Strengths*, in **Proceedings of the 2nd International Conference on Runtime Verification**, Sep., 2011.

Garvin, B., Cohen, M.B., and Dwyer, M.B., *Evaluating Improvements to a Meta-Heuristic Search for Constrained Interaction Testing*, in **Empirical Software Engineering : An International Journal**, 16(1), 2011.

Anthony, D., Bennet, P., Vuran, M.C., Dwyer, M.B., Elbaum, S., and Chavez-Ramirez, F., *Simulating and Testing Mobile Wireless Sensor Networks*, in **Proceedings of the 13th ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems**, Oct., 2010.

Purandare, R., Dwyer, M.B., and Elbaum, S. *Monitor Optimization via Stutter-Equivalent Loop Transformation*, in **Proceedings of the ACM International Conference on Systems, Programming, Languages and Applications**, Oct., 2010.

Sherman, E., Garvin, B., and Dwyer M.B., *A Slice-based Decision Procedure for Type-based Partial Orders*, in **Proceedings of the International Joint Conference on Automated Deduction**, Jul., 2010.

Tkachuk, O, and Dwyer, M.B., *Domain-Specific Environment Generation for Modular Software Model Checking*, in **IET Software** (a journal of The Institution of Engineering and Technology), 4(3), 2010.

Zhu, H., Goddard, S., and Dwyer, M.B., *Selecting Server Parameters for Predictable Runtime Monitoring*, in **Proceedings of IEEE Real-Time and Embedded Technology and Applications Symposium**, Apr., 2010.

Yang, G., Dwyer, M.B., and Rothermel, G., *Regression Model Checking*, in **Proceedings of the 25th International Conference on Software Maintenance**, Sep., 2009.

Sherman, E., Dwyer, M.B., and Elbaum, S., *Saturation-based Testing of Concurrent Programs*, in **Proceedings of the 7th joint meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering**, pp. 53–62, Aug., 2009

Zhu, H., Dwyer, M.B., and Goddard, S., *Predictable Runtime Monitoring*, in **Proceedings of the Euromicro Conference on Real-time Systems**, June 2009.

Garvin, B., Cohen, M.B., and Dwyer, M.B., *An Improved Meta-Heuristic Search for Constrained Interaction Testing*, in **Proceedings of the International Symposium on Search-based Software Engineering**, pp. 13–22, May 2009.

Person, S., and Dwyer, M.B., *Generalized Abstract Symbolic Summaries*, in **Proceedings of the NASA Symposium on Formal Methods**, Apr. 2009.

Elbaum, S, Chin, H.N., Dwyer, M.B., and Jorde, M., *Carving and Replaying Differential Unite Test Cases from System Test Cases*, in **IEEE Transactions on Software Engineering**, 35(1), pp. 29–45, Feb. 2009.

Person, S., Dwyer M.B., Elbaum, S., and Pasareanu, C.S., *Differential Symbolic Execution*, in **Proceedings of the Sixteenth ACM SIGSOFT Symposium on Foundations of Software Engineering**, pp. 226–237, Nov., 2008.

Diep, M., Elbaum, S., and Dwyer M.B., *Trace Normalization*, in **Proceedings of the 19th IEEE International Symposium on Software Reliability Engineering**, pp. 67–76, Nov., 2008.

Dwyer M.B., Diep, M., and Elbaum, S., *Reducing the Cost of Path Property Monitoring Through Sampling*, in **Proceedings of the 23rd IEEE/ACM International Conference on Automated Software Engineering**, pp. 228–237, Sep., 2008.

Jorde, M., Elbaum, S., and Dwyer M.B., *Increasing Test Granularity by Aggregating Unit Tests*, in **Proceedings of the 23rd IEEE/ACM International Conference on Automated Software Engineering**, pp. 9–18, Sep., 2008.

Cohen, M.B., Dwyer, M.B., and Shi, J., *Constructing Interaction Test Suites for Highly-Configurable Systems in the Presence of Constraints: a Greedy Approach*, in **IEEE Transactions on Software Engineering**, 34(5), pp. 633–650, 2008.

Dwyer M.B. and Purandare, R., *Residual Dynamic Typestate Analysis : Exploiting Static Analysis Results to Reformulate and Reduce the Cost of Dynamic Analysis*, in **Proceedings of the 22nd IEEE/ACM International Conference on Automated Software Engineering**, pp. 124–133, Nov., 2007.

Cohen, M.B., Dwyer, M.B., and Shi, J., *Exploiting Constraint Solving History to Construct Interaction Test Stuites*, in **Proceedings of the Testing Academic and Industrial Conference**, pp. 121–132, Sep., 2007.

Cohen, M.B., Dwyer, M.B., and Shi, J., *Interaction testing of highly-configurable systems in the presence of constraints*, in **Proceedings of the International Symposium on Software Testing and Analysis**, pp. 129–139, July, 2007.

Dwyer M.B., Elbaum, S., Person, S., and Purandare, R., *Parallel Randomized State-space Search*, in **Proceedings of the 29th International Conference on Software Engineering**, pp. 3–12, May, 2007.

Dwyer M.B., Kinneer, A., and Elbaum, S., *Adaptive Online Program Analysis*, in **Proceedings of the 29th International Conference on Software Engineering**, pp. 220-229, May, 2007.

Ranganath, V.P., Amtoft, T., Banerjee, A., Dwyer, M.B., and Hatcliff, J., *A New Foundation For Control-Dependence and Slicing for Modern Program Structures*, in **ACM Transactions on Programming Languages and Systems**, 29(5), Aug., 2007.

Elbaum, S., Chin, H.N., Dwyer M.B., and Dokulil, J., *Carving Differential Unit Test Cases from System Test Cases*, in **Proceedings of the Fourteenth ACM SIGSOFT Symposium on Foundations of Software Engineering**, pp. 253–264, Nov., 2006.

Dwyer M.B., Person, S., and Elbaum, S., *Controlling Factors in Evaluating Path-sensitive Error Detection Techniques*, in **Proceedings of the Fourteenth ACM SIGSOFT Symposium on Foundations of Software Engineering**, pp. 92–104, Nov., 2006.

Robby, Rodriguez, E., Dwyer, M.B., and Hatcliff, J., *Checking JML Specifications Using an Extensible Software Model Checking Framework*, in **International Journal on Software Tools for Technology Transfer**, Springer-Verlag, 8(3), pp. 280–299, 2006.

Dwyer M.B., Hatcliff, J., Hoosier, M., Ranganath, V.P., Robby, and Wallentine, T., *Evaluating the Effectiveness of Slicing for Model Reduction of Concurrent Object-Oriented Programs*, in **Proceedings of the 12th International Conference on Tools and Algorithms for the Construction and Analysis of Systems**, Lecture Notes in Computer Science 3920, pp. 73–89, April, 2006.

Iosif R., Dwyer, M.B., and Hatcliff, J., *Translating Java for Multiple Model Checkers: the Bandera Back-End*, **Formal Methods in System Design**, 26(2), pp. 137–180, 2005.

Ranganath, V.P., Amtoft, T., Banerjee, A., Dwyer, M.B., and Hatcliff, J., *A New Foundation For Control-Dependence and Slicing for Modern Program Structures*, in **Proceedings of the 14th International European Symposium on Programming Languages and Systems**, Lecture Notes in Computer Science 3444, pp. 77–93, April, 2005.

Rodriguez, E., Dwyer, M.B., Flanagan, C., Hatcliff, J., Leavens,G., and Robby, *Extending Sequential Specification Techniques for Modular Specification and Verification of Multi-Threaded Programs*, in **Proceedings of the 19th European Conference on Object-Oriented Programming**, Lecture Notes in Computer Science 3586, pp. 551-576, June, 2005.

Dwyer, M.B., Clarke, L.A., Cobleigh, J.M., and Naumovich, G. *Flow Analysis for Verifying Properties of Concurrent Software Systems*, **ACM Transactions on Software Engineering and Methodology**, 13(4), pp. 349–430, 2004.

Hoosier, M., Dwyer, M.B., Hatcliff, J., and Robby, *A Case Study in Domain-customized Model Checking for Real-time Component Software* in **Proceedings of the First International Symposium on Leveraging Applications of Formal Method (ISoLA)**, Lecture Notes in Computer Science 4313, pp. 161-180, Oct. 2004.

Dwyer, M.B., Robby, Tkachuk, O., and Visser, W., *Analyzing Interaction Orderings with Model Checking*, in **Proceedings of the 19th International Conference on Automated Software Engineering**, pp. 154–163, Sep., 2004.

Dwyer, M.B., Hatcliff, J., Prasad V.R., and Robby, *Exploiting Object Escape and Locking Information in Partial Order Reductions for Concurrent Object-Oriented Programs*, **Formal Methods in System Design**, 25(2), pp. 199–240, 2004.

Robby, Rodriguez, E., Dwyer, M.B., and Hatcliff, J., *Checking Strong Specifications Using an Extensible Model Checking Framework*, in **Proceedings of the 10th International Conference on Tools and Algorithms for the Construction and Analysis of Systems**, Lecture Notes in Computer Science 2988, pp. 404–420, April, 2004.

Rodriguez, E., Dwyer, M.B., Hatcliff, J., and Robby, *A Flexible Framework for the Estimation of Coverage Metrics in Explicit State Software Model Checking*, in **Proceedings of the 2004 International Workshop on Construction and Analysis of Safe, Secure, and Interoperable Smart Devices (CASSIS)**, Lecture Notes in Comptuer Science 3362, pp. 210–228, March 2004.

Hatcliff, J., Robby, and Dwyer, M.B., *Verifying Atomicity Specifications for Concurrent Object-Oriented Software Using Model Checking*, in **Proceedings of the 5th International Conference on Verification, Model Checking, and Abstract Interpretation**, Lecture Notes in Computer Science 2937, pp. 175–190, Jan., 2004.

Tkachuk,O., Dwyer, M.B., and Păsăreanu, C.S., *Automated Environment Generation for Software Model Checking*, in **Proceedings of the 18th International Conference on Automated Software Engineering**, pp. 116–129, Oct., 2003.

Dwyer, M.B., Robby, Hatcliff, J., and Deng, X., *Space Reductions for Model Checking Quasi-cyclic Systems*, in **Proceedings of the 3rd International Conference on Embedded Software**, Lecture Notes in Computer Science 2855, pp. 173–189, Oct., 2003.

Tkachuk,O., and Dwyer, M.B., *Adapting Side Effects Analysis for Modular Program Checking*, in **Proceedings of the 4th joint meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering**, pp. 188–197, Sep., 2003

Robby, Dwyer, M.B., and Hatcliff, J., *Bogor : An Extensible and Highly-Modular Software Model Checking Framework*, in **Proceedings of the 4th joint meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering**, pp. 267–276, Sep., 2003

Păsăreanu, C.S., Dwyer, M.B., and Visser, W., *Finding Feasible Abstract Counter-examples*, in **International Journal on Software Tools for Technology Transfer**, Springer-Verlag, 5(1), pp. 34–48, 2003.

Robby, Dwyer, M.B., Hatcliff, J., and Iosif, R., *Space-Reduction Strategies for Model Checking Dynamic Software*, in **Proceedings of the 2nd Workshop on Software Model Checking**, Electronic Notes in Computer Science, 89(3), June, 2003

Hatcliff, J., Deng, X., Dwyer, M.B., Jung, G., and Prasad, V.R., *Cadena: An Integrated Development, Analysis, and Verification Environment for Component-based Systems*, in **Proceedings of the 25th International Conference on Software Engineering**, pp. 160–173, May, 2003.

Hatcliff,J., Dwyer M.B., Păsăreanu, C.S., and Robby, *Foundations of the Bandera Abstraction Tools*, in **The Essence of Computation: Complexity, Analysis, Transformation**, Lecture Notes in Computer Science 2566, pp. 172–203, 2002.

Deng, X., Dwyer, M.B., Hatcliff, J., Jung, G., Robby and Singh, G., *Model-checking Middleware-based Event-driven Real-time Embedded Software*, in **Proceedings of the 1st Symposium on Formal Methods for Components and Objects**, Lecture Notes in Computer Science 2852, pp. 154–181, Nov., 2002.

Corbett, J.C., Dwyer M.B., Hatcliff J, and Robby, *Expressing Checkable Properties of Dynamic Systems: The Bandera Specification Language*, in **International Journal on Software Tools for Technology Transfer**, Springer-Verlag, 4(1), pp. 34–56, 2002.

Deng, X., Dwyer, M.B., Hatcliff, J., and Mizuno, M., *Invariant-based Specification, Synthesis and Verification of Synchronization in Concurrent Programs*, in **Proceedings of the 24th International Conference on Software Engineering**, pp. 442–452, May, 2002.

Dwyer, M.B., Hatcliff, J., Joehanes, R., Laubach, S., Păsăreanu, C.S., Robby, Visser, W. and Zheng, H., *Tool-supported Program Abstraction for Finite-state Verification*, in **Proceedings of the 23rd International Conference on Software Engineering**, pp. 177–187, May, 2001.

Păsăreanu, C.S., Dwyer, M.B., and Visser, W., *Finding Feasible Counter-examples when Model Checking Abstracted Java Programs*, in **Proceedings of the 7th International Conference on Tools and Algorithms for the Construction and Analysis of Systems**, Lecture Notes in Computer Science 2031, pp. 284–298, April, 2001.

Hatcliff, J., Dwyer, M.B., and Zheng, H., *Slicing Software for Model Construction*, in **Journal of Higher-Order and Symbolic Computation**, 13(4), pp. 315–353, Kluwer, 2000.

Corbett, J.C., Dwyer M.B., Hatcliff J, and Robby, *A Language Framework for Expressing Checkable Properties of Dynamic Software*, in **SPIN Model Checking and Software Verification**, Lecture Notes in Computer Science 1885, pp. 205-223, Aug, 2000.

Corbett, J.C., Dwyer, M.B., Hatcliff, J, Laubach, S., Păsăreanu, C.S., Robby, and Zheng, H., *Bandera : Extracting Finite-state Models from Java Source Code*, in **Proceedings of the 22nd International Conference on Software Engineering**, pp. 439–448, June, 2000.

Hatcliff, J., Corbett, J.C., Dwyer, M.B., Sokolowski, S., and Zheng, H., *A Formal Study of Slicing for Multi-threaded Programs with JVM Concurrency Primitives* in **Proceedings of the Sixth Static Analysis Symposium**, Lecture Notes in Computer Science 1694, pp. 1–18, Sep., 1999.

Păsăreanu, C.S., Dwyer, M.B. and Huth, M. *Assume-Guarantee Model Checking of Software : A Comparative Case Study*, in **Theoretical and Practical Aspects of SPIN Model Checking**, Lecture Notes in Computer Science 1680, pp. 168–183, Sept, 1999.

Dwyer, M.B., Avrunin, G.S., and Corbett, J.C., *Patterns in Property Specifications for Finite-state Verification*, in **Proceedings of the 21st International Conference on Software Engineering**, pp. 411-420, May, 1999.

Dwyer, M.B. and Hatcliff, J., *Slicing Software for Model Construction*, in **Proceedings of ACM Workshop on Partial Evaluation and Semantics-based Program Manipulation**, pp. 105–118, Jan, 1999.

Dwyer, M.B. and Păsăreanu, C.S., *Filter-based Model Checking of Partial Systems*, in **Proceedings of the 6th ACM SIGSOFT Symposium on Foundations of Software Engineering**, pp, 189–202, Nov, 1998.

Hatcliff, J., Dwyer, M.B., and Laubach, S., *Staging Static Analysis Using Abstraction-based Program Specialization*, in **Proceedings of the International Symposium on Programming Languages, Implementations, Logics, and Programs**, Lecture Notes in Computer Science 1490, pp. 134–151, Sept, 1998.

Dwyer, M.B., Hatcliff, J. and Nanda, M., *Using Partial Evaluation to Enable Verification of Concurrent Software*, in **ACM Computing Surveys**, 30(3), Sept, 1998.

Dwyer, M.B. and Păsăreanu, C.S., *Model Checking Generic Container Implementations*, in **Generic Programming – International Seminar on Generic Programming**, Lecture Notes in Computer Science 1760, pp. 162–177, April, 1998.

Dwyer, M.B., Avrunin, G.S. and Corbett, J.C., *Property Specification Patterns for Finite-state Verification*, in **Proceedings of the 2nd Workshop on Formal Methods in Software Practice**, pp. 7–15, March, 1998.

Dwyer, M.B. and Wallentine, V., *A Framework for Parallel Adaptive Grid Simulations*, in **Concurrency : Practice and Experience**, 9(11), pp. 1293–1310, Nov, 1997.

Dwyer, M.B., *Modular Flow Analysis for Concurrent Software*, in **Proceedings of the 12th International Conference on Automated Software Engineering**, pp. 264–273, Nov, 1997.

Dwyer, M.B. and Schmidt, D.A., *Limiting State Explosion with Filter-Based Refinement*, in **Proceedings of the Workshop on Verification, Model Checking and Abstract Interpretation**, Oct, 1997.

Dwyer, M.B., Carr, V. and Hines, L., *Model Checking Graphical User Interfaces Using Abstractions*, in **Proceedings of the 6th European Software Engineering Conference together with 5th ACM SIGSOFT Symposium on the Foundation of Software Engineering**, Lecture Notes in Computer Science 1301, pp. 244–261, Sept., 1997.

Dwyer, M.B. and Wallentine, V, *Object-Oriented Coordination Abstractions for Parallel Software*, in **Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications**, pp. 1034–1043, June, 1997.

Dwyer, M.B., Craig, M.J. and Runquist, E, *An Application-Independent Concurrency Skeleton in Ada-95*, in **Proceedings of the TRI-Ada'96 Conference**, pp. 179–492, Dec, 1996.

Dwyer, M.B. and Clarke, L.A., *A Compact Petri Net Representation and Its Implications for Analysis*, in **IEEE Transactions on Software Engineering**, 22(11), pp. 794–810, Nov, 1996.

Dwyer, M.B. and Clarke, L.A., *A Flexible Architecture for Building Data Flow Analyzers*, in **Proceedings of the 18th International Conference on Software Engineering**, pp. 554–564, March 1996.

Dwyer, M.B., Clarke, L.A. and Nies, K.L., *A Compact Petri Net Representation for Concurrent Programs*, in **Proceedings of the 17th International Conference on Software Engineering**, pp. 147–157, April, 1995.

Dwyer, M.B. and Clarke, L.A., *Data Flow Analysis for Verifying Properties of Concurrent Programs*, in **Proceedings of the 2nd SIGSOFT Symposium on Foundations of Software Engineering**, published as Software Engineering Notes 19(5), pp. 62–75, Dec, 1994.

Short and Tool Publications

Gerrard, M., and Dwyer, M.B., *ALPACA : A Large Portfolio-based Alternating Conditional Analysis*, in **Proceedings of the 41st International Conference on Software Engineering**, May, 2019.

Zheng, M., Edenhofner, J.G., Luo, Z., Gerrard, M.J., Rogers, M.S., Dwyer, M.B., and Siegel, S., *CIVL: Applying a General Concurrency Verification Framework to C/Pthreads Programs (Competition Contribution)*, in **Proceedings of the 22nd International Conference on Tools and Algorithms for the Construction and Analysis of Systems**, March, 2016.

Zheng, M., Rogers,M., Luo, Z., Dwyer, M.B., and Siegel, S., *CIVL: Formal Verification of Parallel Programs*, in **Proceedings of the 30th International Conference for Automated Software Engineering**, Nov., 2015.

Wang, Y., Person, S., Elbaum, S., and Dwyer, M.B., *A Framework to Advise Tests Using Tests*, in **Proceedings of the 36th International Conference on Software Engineering**, June, 2014.

Sarma, A., Person, S., Rungta, N., Branchaud, N. and Dwyer, M.B., in *Development Context Driven Change Awareness and Analysis Framework*, in **Proceedings of the 36th International Conference on Software Engineering**, June, 2014.

Garvin, B., Cohen, M.B., and Dwyer, M.B., *Using Feature Locality: Can We Leverage History to Avoid Failures During Reconfiguration?*, in **Workshop on Assurance for Self-Adaptive Systems**, Sep., 2011.

Dwyer, M.B., *Data Flow Analysis for Software Dependability: The Very Idea*, in **Engineering of Software: The Continuing Contributions of Leon J. Osterweil**, pp. 7–16, 2011.

Dwyer, M.B., and Elbaum, S. *Unifying Verification and Validation Techniques : Relating Behavior and Properties through Partial Evidence*, in **Workshop on Future of Software Engineering Research**, Nov., 2010.

Dwyer, M.B., Purandare, R., and Person, S. *Runtime Verification in Context : Can Optimizing Error Detection Improve Fault Diagnosis?*, in **Proceedings of the 1st International Conference on Runtime Verification**, Nov., 2010.

Dwyer, M.B. and Purandare,R., *Residual Checking of Safety Properties*, in **Proceedings of the 15th International Workshop on Model Checking Software**, pp. 1–2, Aug., 2008.

Diep, M., Elbaum, S., and Dwyer M.B., *Reducing Irrelevant Trace Variations*, in **Proceedings of the 22nd IEEE/ACM International Conference on Automated Software Engineering**, Nov, 2007.

Dwyer M.B., Hatcliff, J., Pasareanu, C., Robby, and Visser, W., *Formal Software Analysis : Emerging Trends in Software Model Checking* (invited), in **Future of Software Engineering**, 2007.

Kinneer A., Dwyer M.B., and Rothermel, W., *Sofya: Supporting Rapid Development of Dynamic Program Analyses for Java*, in **Proceedings of the 29th International Conference on Software Engineering**, May, 2007.

Deng X., Dwyer M.B., Hatcliff J., Hoosier M., and Robby, *Customizable Model Checking for Embedded Software*, in **Information Security Research**, Wiley, 2007.

Dwyer, M.B., Hatcliff, J., Hoosier, M., and Robby, *Bogor : A Flexible Framework for Creating Software Model Checkers* (invited), in **Proceedings of Testing : Academic and Industrial Conference - Practice and Research Techniques**, Aug., 2006.

Cohen, M, Dwyer, M.B., and Shi, J., *Coverage and Adequacy in Software Product Line Testing*, in **Proceedings of the International Workshop on the Role of Software Architecture in Analysis and Testing**, July, 2006.

Dwyer, M.B., Hatcliff, J., Hoosier, M., and Robby, *Building Your Own Software Model Checker Using the Bogor Extensible Model Checking Framework* (tool paper), in **Proceedings of the 17th International Conference on Computer Aided Verificatin**, July, 2005.

Dwyer, M.B. and Leue, S., *Special Section on the Algorithmics of Software Model Checking*, in **International Journal on Software Tools for Technology Transfer**, Springer-Verlag, 6(4), 257–259, 2004.

Dwyer, M.B., Hatcliff, J., Hoosier, M., and Robby, *Supporting Model Checking Education using BOGOR/Eclipse*, the **Proceedings of the 2004 OOPSLA Workshop on Eclipse Technology eXchange (eTX/OOPSLA 2004)**, Oct., 2004.

Deng, X., Dwyer, M.B., Hatcliff, J., and Mizuno, M., *SyncGen: An Aspect-Oriented Framework for Synchronization* (tool paper), in **Proceedings of the 10th International Conference on Tools and Algorithms for the Construction and Analysis of Systems**, Lecture Notes in Computer Science 2988, Springer-Verlag, April, 2004.

Childs, A., Greenwald, J., Ranganath, V.P., Deng, X., Dwyer, M.B., Hatcliff, J., Jung, G., Shanti, P., and Singh, G., *Cadena: An Integrated Development Environment for Analysis, Synthesis, and Verification of Component-Based Systems* (tool paper), in **Proceedings of the 7th International Conference on Fundamental Approaches to Software Engineering**, Lecture Notes in Computer Science 2984, Springer-Verlag, April, 2004.

Ranganath, V.R., Childs, A., Greenwald, J., Dwyer, M.B., Hatcliff, J., and Singh, G., *Cadena: Enabling CCM-based Application Development in Eclipse*, the Proceedings of the 2003 OOPSLA Workshop on Eclipse Technology eXchange (eTX/OOPSLA'2003).

Hatcliff, J., Deng, X., Dwyer, M.B., Jung, G., Prasad, V.R, and Robby, *Slicing and Partial Evaluation of CORBA Component Model Designs for Avionics Systems*, in **Proceedings of the 2003 ACM SIGPLAN workshop on Partial evaluation and semantics-based program manipulation**, June, 2003.

Dwyer, M.B., *Software Model Checking: The Bandera Approach* (invited), in **Proceedings of the Fifth International Conference on Formal Methods for Open Object-Based Distributed Systems**, March, 2002.

Hatcliff,J., and Dwyer, M.B., *Using the Bandera Tool Set to Model-Check Properties of Concurrent Java Software* (invited), in **Proceedings of the 12th International Conference on Concurrency Theory**, Aug., 2001.

Avrunin, G.S., Corbett, J.C., and Dwyer, M.B., *Benchmarking Finite-state Verifiers*, in the **International Journal of Software Tools for Technology Transfer**, 2(4), 317-320, April, 2000.

Corbett, J.C., Dwyer M.B., Hatcliff J, and Robby, *Bandera: A Source-level Interface for Model Checking Java Programs* (tool paper), in **Proceedings of the 22nd International Conference on Software Engineering**, June, 2000.

Dwyer, M.B., and Hatcliff, J., *Adapting Programming Language Technologies for Finite-state Verification*, in **ACM Software Engineering Notes**, 25(1), Jan., 2000.

Dwyer, M.B., Hatcliff, J., and Schmidt, D., *Bandera: Tools for Automated Reasoning about Software System Behavior* (invited), in **ERCIM News**, 36, Jan., 1999.

Dwyer, M.B., Howard, B., Schmidt, D., and Stoughton, A., *Logical Support for High-Assurance Software Evolution*, in **ACM Software Engineering Notes**, 22(5), Sep., 1998.

Naumovich, G., Clarke, L.A., Osterweil, L.J., and Dwyer, M.B., *Verification of Concurrent Software with FLAVERS*, in **Proceedings of the 19th International Conference on Software Engineering**, May, 1997.

Naumovich, G., Clarke, L.A., Osterweil, L.J., and Dwyer, M.B., *Gaining Confidence in Distributed Systems*, in **Proceedings of the Tenth International Software Quality Week**, May, 1997.

Software Development

Each of these projects is collaborative in nature

ALPACA (`https://bitbucket.org/mgerrard/alpaca`), a program analysis framework that soundly characterizes the input domain that reaches a specified target state (2018 - present)

CIVL (`http://http://vsl.cis.udel.edu/civl/`), a symbolic execution-based model checker for concurrent C programs (2013 - present)

Green (`http://github.com/green-solver`), an framework for reusing SMT query solutions (2012 - present)

ProbSym (now integrated into `https://github.com/SymbolicPathFinder`), a Symbolic PathFinder extension for computing exact path probabilities (2012 - present)

Sofya (`http://sofya.unl.edu`), an extensible run-time monitoring framework (2005 - 2009)

Bogor (`http://bogor.projects.cis.ksu.edu`), an extensible, highly-modular model checking framework (2003 - 2007)

Cadena (`http://cadena.projects.cis.ksu.edu`), component-based design, analysis and synthesis toolset (2002 - 2006)

SyncGen (`http://www.cis.ksu.edu/~saves`), synchronization synthesis and verification toolset (2001 - 2005)

Bandera (`http://bandera.projects.cis.ksu.edu`), Java model extraction toolset (1999 - 2006)

Specification Patterns (`http://www.cis.ksu.edu/santos/spec-patterns`), repository of formal specification templates (1997 - present)

PAGS, programming frameworks for concurrent systems (1997 - 1999)

FLAVERS (`http://laser.cs.umass.edu/tools/flavers`), static analysis system (1994 - 2004)

Seminars and Colloquiua

Alternating Conditional Analysis, University of Virginia, Mar. 2018,Stellenbosch University, Oct., 2018, University of Limerick, University College Cork, University College - Dublin, Apr 2019.

Evaluating Program Analysis Research: Two steps forward, one step back, University of Delaware, Nov. 2016.

Writing paper reviews that you would be happy to receive, ICSE Doctoral Symposium June 2014 and June 2015, University of Limerick, University College Cork, University College - Dublin, Apr 2019.

Probabilistic Symbolic Execution, University of Delaware, Mar. 2014, University of Kentucky, Sep. 2014.

Reusing Constraint Solving, UNL, Apr. 2012, University of Utah, Dec. 2013.

Unifying Testing and Analysis through Behavioral Coverage, 26th IEEE/ACM International Conference on Automated Software Engineering, Nov. 2011 (Keynote), Stellenbosch University, Oct. 2011.

Exploiting Partial Success in Applying Automated Formal Methods, McGill University, Nov. 2010, 12th International Conference on Formal Engineering Methods, Nov. 2010 (Keynote).

Optimizing Runtime Monitors : Combining Static and Dynamic Techniques, 1st International Conference on Runtime Verification, Nov. 2010 (Keynote).

Regression Model Checking, NASA Software Health Management Meeting, Nov. 2009.

Differential Symbolic Execution, NASA Software Health Management Meeting, May 2009.

Residual Checking of Safety Properties, 15th SPIN Workshop on Model Checking of Software, Aug. 2008 (Keynote), University of Iowa, Sep. 2008, University of California - Irvine Oct. 2008 (Distinguished Lecture).

Formal Software Analysis, Future of Software Engineering, International Conference on Software Engineering, May 2007.

Coverage and Adequacy in Software Product Line Testing, University of Dortmund, May 2006.

Controlling Factors in Evaluating Path-sensitive Error Detection Techniques, Dagstuhl, Apr. 2006, NASA Jet Propulsion Laboratory, Aug. 2006, Michigan State University Nov. 2006 (Distinguished Lecture).

Bogor : An Extensible and Highly-modular Model Checking Framework, University of Massachusetts, Mar. 2005, Michigan State University Nov. 2006.

Atomicity Specification and Checking, NASA Ames Research Center, Feb. 2005, Komaba Workshop, 2005.

Cadena: An Integrated Development Environment for Analysis, Synthesis, and Verification of Component-Based Systems, CIP/SW URI Review, Annapolis, MD, Aug. 2004.

Checking Cadena Designs with Quasi-cyclic Search, University of Pennsylvania, May 2004.

Domain-specific Model Checking, IBM Watson Research Center, Oct. 2003, University of Nebraska, Feb. 2004, Japan Society for Software Science and Technology Conference, 2005 (Keynote).

Partial Order Reductions for Object-Oriented Programs, Carnegie Mellon, March. 2003, Brown University, Apr., 2003.

Analyzing Event-driven Component-based Designs, Georgia Tech, Feb. 2003, Williams College, Apr., 2003, Worcester Polytechnic Institute, Apr., 2003, Brown University, Apr., 2003.

Model Checking Software Artifacts, University of Washington, Seattle, WA, USA, Oct 2002, University of Nebraska, Feb. 2003.

Tutorial on Software Model Checking, at ETAPS'2002 in Grenoble, France, April 2002, at FSE'2002 in Charleston, SC, USA, Nov 2002.

Software Model Checking with Bandera, Microsoft Research Laboratory, March, 2000, NASA Ames Laboratory, March, 2000, VERIMAG Grenoble, France, June, 2000, Purdue University, Nov, 2001, FMOODS-2002, The Netherlands, March, 2002.

Bandera : Extracting Finite-state Models from Java Source Code, NASA Ames Laboratory, Dec, 1998, DARPA Formal Methods Workshop, May, 1999, INRIA Sophia-Antipolis, Sep, 1999

Filter-based Model Checking of Partial Systems, 2nd Great Plains Programming Languages Meeting, April, 1998, 1st Symposium on Generic Programming, April, 1998, 6th SIGSOFT Symposium on Foundations of Software Engineering, Oct, 1998.

Lowering Barriers to the Use of Formal Methods in Software Practice, MCC/Motorola ASSETT Symposium, June, 1998

Property Specification Patterns for Finite-state Verification, 2nd Workshop on Formal Methods in Software Practice, March, 1998, University of Massachusetts, May, 1998

Modular Flow Analysis for Concurrent Software, Great Plains Programming Languages Meeting, May, 1997, 12th Conference on Automated Software Engineering, Nov, 1997

Model Checking Graphical User Interfaces Using Abstractions, 5th SIGSOFT Symposium on Foundations of Software Engineering, Sept, 1997

A Framework for Parallel Adaptive Grid Simulations, ACM Workshop on Java in Scientific Computing, June, 1997

Object-Oriented Coordination Abstractions for Parallel Software, Parallel and Distributed Programming, Technology and Applications Conference, June, 1997

Application-Independent Concurrency Skeletons, University of Massachusetts, July, 1996, Wichita State University, Nov, 1996, Oklahoma State University, Nov, 1996, TRI-Ada, Dec, 1996, Kansas State Center for Scientific Supercomputing, Dec, 1996

A Flexible Architecture for Building Data Flow Analyzers, 18th International Conference on Software Engineering, April, 1996

A Compact Petri Net Representation for Concurrent Programs, 17th International Conference on Software Engineering, April, 1995

Research Students and Post-Doctoral Associates

Radu Iosif (Post-doc, 2001-2002)

Hongjun Zheng (Post-doc, 1999-2001)

Mitchel Gerrard (PhD, 2014-present)

Dong Xu (PhD, 2017-present)

David Shriver (PhD, 2018-present)

Will Leeson (PhD, 2019-present)

Soneya Binta Hossain (PhD, 2019-present)

Swaroopa Dola (PhD, 2020-present)

Haitao Zhu (PhD, graduated 2013)

Jiangfan Shi (PhD, graduated 2012)

Elena Sherman (PhD, graduated 2012)

Du Li (PhD, graduated 2012)

Rahul Purandare (PhD, graduated 2011)

Suzette Person (PhD, graduated 2009)

Oksana Tkachuk (PhD, graduated 2008)

Robby (PhD, graduated 2004)

Corina Păsăreanu (PhD, graduated 2001)

Eric Rizzi (MS, graduated 2016)

Michael Rogers (MS, graduated 2015)

Yurong Wang (MS, graduated 2013)

Peng Du (MS, graduated in 2010)

Guowei Yang (MS, graduated in 2009)

Ian Cottingham (MS, graduated in 2009)

Elena Sherman (MS, graduated 2008)

Chris Thiel (MS, graduated 2007)

Yu Chen (MS, graduated 2005)

Todd Wallentine (MS, graduated 2003)

Wenying Sun (MS, graduated 2001)

Badarinath Kopparapu (MS, graduated 2001)

Anne Hill (MS, graduated 2000)

Muralidharan Narayanan (MS, graduated 1999)

Matthias Martin (MS, graduated 1999)

Michael Novak (MS, graduated 1999)

Matthew Craig (MS, graduated 1997)

Fulvio Casali (MS, graduated 1997)

Kristi Hankley (MS, graduated 1997)

Jun Wu (MS, graduated 1997)

Courses Developed and Taught

Requirements Modelling (2018)

Compilers (1995-2007,2009-2012, 2014)

Advanced Compilers (1998, 2001, 2006, 2009, 2013)

Senior Design (2010-2012)

Software Engineering (2006-2007, 2010)

Software Model Checking (2004, 2006)

Software Specification (2000-2002)

Specification and Verification of Reactive Systems (1996-1997, 1999-2000)

Parallel Programming (1996-1997)

Software Management (1997)

Software Verification and Validation (1996)

Professional Activities

Journal Review:

- IEEE Transactions on Software Engineering (1996-2008,2010-2012,2014-2015,2018), **Editor in Chief** (2014-2017), **Associate Editor** (2006-2009)
- Communications of the ACM : Research Highlights, **Editorial Board Member** (2013-2016)
- ACM Transactions on Programming Languages and Systems (2000-2002,2004,2012), **Associate Editor** (2009-2015)
- Software Tools for Technology Transfer (2000-2007), **Co-editor in Chief** (2001-2007)
- ACM Transactions on Software Engineering and Methodology (1999-2004,2006,2009,2011-2012,2014-2015)
- Journal of Automated Software Engineering (1999-2004)
- Journal of Software Architecture (2004)
- Requirements Engineering Journal (2002)
- IEEE Transactions on Systems, Man and Cybernetics (1998)

Book Review:

- Cambridge Press (2006)
- Addison-Wesley (2001,2003)
- Scott-Jones (2002)

Conference Organization

- 44th International Conference on Software Engineering (ICSE'2022), **General Chair**
- 41st International Conference on Software Engineering (ICSE'2019), **New Faculty Symposium co-Chair**
- 40th International Conference on Software Engineering (ICSE'2018), **Most Influential Paper co-Chair**
- Future of Software Engineering (FOSE'2014), **Program co-Chair**
- ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA'2012), **Program Chair**
- International Symposium on Software Testing and Analysis (ISSTA'2011), **General Chair**
- 33rd International Conference on Software Engineering (ICSE'2011), **Workshops co-Chair**
- 32nd International Conference on Software Engineering (ICSE'2010), **Doctoral Symposium co-Chair**
- 30th International Conference on Software Engineering (ICSE'2008), **Program co-Chair**
- 6th joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT International Symposium on the Foundations of Software Engineering (ESEC/FSE'2007), **Workshops co-Chair**
- International Conference on Fundamental Approaches to Software Engineering (FASE'2007), **Program co-Chair**
- 28th International Conference on Software Engineering (ICSE'2006), **Formal Research Demonstrations co-Chair**
- 12th International Symposium on the Foundations of Software Engineering (FSE'2004), **Program Chair**
- 10th Monterey Workshop: Workshop on Software Engineering for Embedded Systems (SEES'2003), **Program co-Chair**

- Program Analysis for Software Tools and Engineering (PASTE'2002), **Program co-Chair**
- Eighth SPIN Workshop on Model Checking Software (SPIN'2001), **Program Chair**

Program Committees

- 34th International Conference on Automated Software Engineering (ASE'2019)
- 27th International Symposium on the Foundations of Software Engineering (FSE'2018)
- 40th International Conference on Software Engineering (ICSE'2018)
- 11th joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT International Symposium on the Foundations of Software Engineering (ESEC/FSE'2017)
- 25th International Symposium on the Foundations of Software Engineering (FSE'2016)
- 39th International Conference on Software Engineering (ICSE'2017), **Program Board**
- 24th International Symposium on the Foundations of Software Engineering (FSE'2016)
- 22nd International Symposium on the Foundations of Software Engineering (FSE'2014)
- 35th International Conference on Software Engineering (ICSE'2013)
- ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA'2013)
- ACM SIGPLAN 2013 Conference on Programming Language Design and Implementation (PLDI'2013) – External Review Committee
- 5th NASA Symposium on Formal Methods (NFM'2013)
- 27th European Conference on Object-Oriented Programming (ECOOP'2013)
- 18th International Symposium on Formal Methods (FM'2012)
- 26th European Conference on Object-Oriented Programming (ECOOP'2012)
- 33rd International Conference on Software Engineering (ICSE'2011)
- 33rd International Conference on Software Engineering – New and Emerging Results Track (ICSE'2011)
- 1st International Conference on Runtime Verification (RV'2010)
- 2nd NASA Symposium on Formal Methods (NFM'2010)
- ACM SIGPLAN 2010 Conference on Programming Language Design and Implementation (PLDI'2010) – External Review Committee
- 32nd International Conference on Software Engineering (ICSE'2010)
- ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA'2009)
- 16th SPIN Workshop on Model Checking Software (SPIN'2009)
- 1st NASA Symposium on Formal Methods (NFM'2009)
- 31st International Conference on Software Engineering (ICSE'2009).
- 2nd Testing : Academic and Industrial Conference (TAIC-PART'2007)
- 14th SPIN Workshop on Model Checking Software (SPIN'2007)
- 4th Workshop on Dynamic Analysis (WODA'2007)
- 29th International Conference on Software Engineering (ICSE'2007)
- First Alloy Workshop (2006)
- ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA'2006)
- International Symposium on Software Testing and Analysis (ISSTA'2006)
- International Conference on Fundamental Approaches to Software Engineering (FASE'2006)

- 5th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT International Symposium on the Foundations of Software Engineering (ESEC/FSE'2005)
- 27th International Conference on Software Engineering (ICSE'2005)
- 11th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS'2005)
- 2004 OOPSLA Workshop on Eclipse Technology eXchange (eTX/OOPSLA'2004)
- Specification and Verification of Component-Based Systems Workshop (SAVCBS'2004)
- International Conference on Formal Engineering Methods (ICFEM'2004)
- ACM SIGPLAN 2004 Conference on Programming Language Design and Implementation (PLDI'2004)
- International Symposium on Software Testing and Analysis (ISSTA'2004)
- International Conference on Fundamental Approaches to Software Engineering (FASE'2004)
- Specification and Verification of Component-Based Systems Workshop (SAVCBS'2003)
- ACM Workshop on Partial Evaluation and Program Manipulation (PEPM'2003)
- International Conference on Computer Aided Verification (CAV'2003)
- 10th SPIN Workshop on Model Checking Software (SPIN'2003)
- 25th International Conference on Software Engineering (ICSE'2003)
- Tools and Algorithms for the Construction and Analysis of Systems (TACAS'2002)
- Program Analysis for Software Tools and Engineering (PASTE'2001)
- 23rd International Conference on Software Engineering (ICSE'2001)
- The First International Workshop on Automated Program Analysis, Testing and Verification (2001)
- 10th International Workshop on Software Specification and Design (IWSSD'2000)
- 8th International Symposium on the Foundations of Software Engineering (FSE'2000)
- 22nd International Conference on Software Engineering (ICSE'2000)
- Tools and Algorithms for the Construction and Analysis of Systems (TACAS'2000)
- 7th European Software Engineering Conference/ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE'1999)

Steering Committees

- International Symposium on Software Testing and Analysis (**Chair 2012**, 2011-present)
- ACM SIGPLAN Conference on Systems, Programming, Languages, and Applications: Software for Humanity (SPLASH) (2012-2016)
- SIGSOFT Executive Committee (2005-2012)
- International Conference on Software Engineering (2004-2011)
- European Joint Conferences on Theory and Practice of Software (2005-2008)
- Fundamental Approaches to Software Engineering (2005-2008)
- SPIN Workshop on Model Checking Software (2001-2003)
- Program Analysis for Software Tools and Engineering (**Chair** 2002-2003, 2004)

Grant Review:

- US National Science Foundation
- US Air Force Office of Scientific Research
- US Army Research Office
- UK Engineering and Physical Sciences Research Council

- National Sciences and Engineering Research Council of Canada
- Netherlands Organization for Scientific Research
- Swedish Research Council
- Singapore National Research Foundation

Professional Organizations:

- ACM SIGSOFT (Secretary/Treasurer 2005-2009, Vice Chair 2009-2012)
- IEEE Computer Society (member 1984-present)
- Association for Computing Machinery (member 1984-present)

Outreach:

- Girl Scouts "Tap into your App-potential" Summer Camp (2015-2017)
- Girls Researching Our World (`http://www.ksu.edu/grow/`) (2002-2003)
- Elementary School Programming Club (1997-1999)

University Activities

Graduate Admissions-UVA *Chair* (2018-present)

Department Chair-UNL (2013-2018)

College of Arts and Sciences Mentoring Committee-UNL (2015-2016)

College of Arts and Sciences Executive Committee-UNL (2014-2015)

Cancellor's Nebraska Innovation Campus Committee-UNL (2013-2015)

Department Personel Committee-UNL (2009-2012), *Chair* (2011-2012)

Department Undergraduate Curriculum Committee-UNL *Chair* (2009-2011,2012-2013)

Department Hiring Committee-UNL *Chair* (2008-2009)

Department Advisory Committee-UNL (2006-2008)

Senior Vice Chancellor's Research Advisory Committee-UNL (2005-2008)

Department Space and Facilities Committee-UNL *Chair* (2004-2008)

College of Engineering Endowed Chairs Committee-UNL (2004-2011)

College of Engineering Research Excellence Award Committee-KSU (2001-2003)

Department Seminar Committee-KSU (1998-2003)

Department Strategic Planning Committee-KSU (1998-2003)

Department MSE Commitee-KSU (1995-2002), *Chair* (1999-2002)

Dean's Evaluation Committee-KSU (2002)

University Technology Advisory Committee-KSU (1999-2001)

Department Hiring Committee-KSU (1996-1999)