Yuriy Brun

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Research Interests

My research interests are in software system engineering, focusing on building self-adaptative systems through behavioral model inference and automated program repair.

Education

UNIVERSITY OF SOUTHERN CALIFORNIA: ..... Los Angeles, CA, USA

5/2008 **Doctor of Philosophy in Computer Science**
Dissertation: Self-assembly for discreet, fault-tolerant, and scalable computation on Internet-sized distributed networks
Advisor: Prof. Nenad Medvidović

5/2006 **Master of Science in Computer Science**

MASSACHUSETTS INSTITUTE OF TECHNOLOGY: ..... Cambridge, MA, USA

9/2003 **Master of Engineering in Electrical Engineering and Computer Science**
Thesis: Fault identification via dynamic analysis and machine learning
Advisor: Prof. Michael D. Ernst

6/2003 **Bachelor of Science in Computer Science and Engineering**

6/2003 **Bachelor of Science in Mathematics**

Employment History

UNIVERSITY OF MASSACHUSETTS: ..... Amherst, MA, USA

9/2012 – present Assistant Professor
Co-director: Laboratory for Advanced Software Engineering Research (LASER)
Co-director: Programming Languages and Systems at Massachusetts (PLASMA)

UNIVERSITY OF WASHINGTON: ..... Seattle, WA, USA

9/2009 – 8/2012 NSF CRA Postdoctoral Computing Innovation Fellow

UNIVERSITY OF SOUTHERN CALIFORNIA: ..... Los Angeles, CA, USA

7/2008 – 9/2009 Postdoctoral Research Associate:
Center for Systems and Software Engineering

8/2003 – 6/2008 Research and Teaching Assistant:
Laboratory for Molecular Science, Software Architectures Group

MASSACHUSETTS INSTITUTE OF TECHNOLOGY: ..... Cambridge, MA, USA

2/2002 – 6/2003 Research and Teaching Assistant:
Program Analysis Group

9/1999 – 1/2002 Undergraduate Research Assistant:
Cognitive Machines Group, Ocean Engineering Testing Tank, Mathematics Department

WATERS CORPORATION: ..... Milford, MA, USA

5/2000 – 8/2000 Programmer: Automated Testing Group

5/1999 – 8/1999 Research Assistant: Core Technology Group

Honors, Awards, Fellowships

2017	Lilly Fellowship for Teaching Excellence
2017	College of Information and Computer Science Outstanding Teacher Award
2017	ICSA 2017 Best Paper Award for [C28]
2016	UMass Distinguished Teaching Award finalist
2015	IEEE Transactions on Software Engineering spotlight paper recognition for [J20]
2015	Google Faculty Research Award
2015	ICSE 2015 Distinguished Reviewer Award
2015	National Science Foundation CAREER Award
2014	Microsoft Research Software Engineering Innovation Foundation (SEIF) Award
2013	IEEE Transactions on Software Engineering spotlight paper recognition for [J14]
2013	IEEE TCSC Young Achiever in Scalable Computing Award
2011	ACM SIGSOFT Distinguished Paper Award for [C10]
2010	Howard Hughes Medical Institute Future Faculty Fellow
2009–11	NSF CRA Computing Innovation Fellowship for Postdoctoral Research (CI Fellow)
2008	ACM Doctoral Dissertation Competition Finalist (international) for [N6]
2008	University of California Entrepreneurship Academy Grant
2007–08	USC Graduate School Dissertation Completion Fellow
2007	Outstanding Teaching Assistant Award (USC)
2003–07	USC Viterbi School of Engineering Doctoral Fellow
2004	Department of Defense National Defense Science and Engineering Graduate (NDSEG) Fellowship Honorable Mention
2004	Nominated for ACM SIGSOFT Distinguished Paper Award for [C1]

Research Grants

[G12] SHF: Medium: Collaborative Research: Semi and fully automated program repair and synthesis via semantic code search.

NSF:	The National Science Foundation (Co. #1564162)
duration:	July 1, 2016 – June 30, 2020
PIs:	Yuriy Brun
	Claire Le Goues (Carnegie Mellon University)
	Kathryn Stolee (North Carolina State University)
	$1,209,182; UMass portion **$400,000**

[G11] Cybercorps scholarship for service at the University of Massachusetts Amherst.

NSF:	The National Science Foundation (Co. #1565521)
duration:	January 1, 2016 – December 31, 2020
PI:	Brian Levine
coPIs:	Wayne Burleson, Eric Sommers, Marc Liberatore, and Mila Sherman
senior personnel:	Emery Berger, Yuriy Brun, Lori Clarke, Daniel Holcomb, Amir Houmansadr, Lixian Gao, Krista Gile, Arjun Guha, Gerome Miklau, Anna Nagurney, and Ryan Wright
	$4,189,000

[G10] Understanding flaky tests using performance-aware behavioral models.

Google:	Faculty Research Award
duration:	September 1, 2015 – August 31, 2016
sole PI	**$61,193**

[G9] TWC: Medium: Collaborative: Developer crowdsourcing: Capturing, understanding, and addressing security-related blind spots in APIs.

NSF: The National Science Foundation (Co. #1513055)
duration: September 1, 2015 – August 31, 2019
PIs: Yuriy Brun
Justin Cappos (NYU Polytechnic School of Engineering)
Daniela Oliveira and Natalie Ebner (University of Florida)
$1,216,000; UMass portion **$398,759**

[G8] CAREER: Improving software quality using dynamically inferred models.

NSF: The National Science Foundation (Co. #1453474)
duration: March 1, 2015 – February 29, 2020
sole PI **$581,780**

[G7] SHF: EAGER: Collaborative Research:
Demonstrating the feasibility of automatic program repair guided by semantic code search.

NSF: The National Science Foundation (Co. #1446683)
duration: July 1, 2014 – June 30, 2016
PIs: Yuriy Brun
Claire Le Goues (Carnegie Mellon University)
Kathryn Stolee (Iowa State University)
$287,912; UMass portion **$104,372**

[G6] Augmenting testing with performance-aware behavioral models.

MSR SEIF: Microsoft Research Software Engineering Innovation Foundation
duration: July 1, 2014 – June 30, 2015
sole PI **$40,000**

[G5] Testing privacy-preserving distributed systems on DETERLab.

DARPA: The Defense Advanced Research Projects Agency (Co. #N66001-11-C-4021)
Safer Warfighter Communications (SAFER) program
duration: November 1, 2013 – October 31, 2014
PIs: Yuriy Brun
Sam Malek (George Mason University)
Nenad Medvidovic (University of Southern California)
$300,000; UMass portion **$84,000**

[G4] sTile: Private computing in the open.

IARPA: The Intelligence Advanced Research Projects Activity (Co. #N66001-13-1-2006)
duration: September 27, 2013 – September 26, 2014
PIs: Yuriy Brun
Nenad Medvidovic (University of Southern California)
Sam Malek (George Mason University)
$300,000; UMass portion **$84,000**

[G3] Travel grant for future of software engineering 2013 symposium.

NSF: The National Science Foundation (Co. #1341994)
duration: July 1, 2013 – June 30, 2014
sole PI **$15,000**

[G2] Speculation and continuous validation for software development.

MSR SEIF:	Microsoft Research Software Engineering Innovation Foundation
duration:	July 1, 2010 – June 30, 2011
with	Michael D. Ernst (University of Washington)
	Reid Holmes (University of Washington)
	David Notkin (University of Washington)
	$25,000

[G1] Self-adaptive software systems.

NSF:	The National Science Foundation CRA Computing Innovation Fellowship
duration:	September 15, 2009 – September 14, 2011
with	David Notkin (University of Washington)
	$267,500

Publications

Refereed Journal Articles

[J22] Seung Yeob Shin, Yuriy Brun, Hari Balasubramanian, Philip L. Henneman, and Leon J. Osterweil. Discrete-Event Simulation and Integer Linear Programming for Constraint-Aware Resource Scheduling. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 2017. Previous version appeared as University of Massachusetts Computer Science technical report UM-CS-2014-009.

[J21] Ivan Beschastnikh, Patty Wang, Yuriy Brun, and Michael D. Ernst. Debugging Distributed Systems. *Communications of the ACM*, 59(8):32–37, August 2016. A previous version appeared in ACM Queue 14(2):91–110, March/April 2016, DOI: 10.1145/2909480.

[J20] Claire Le Goues, Neal Holtschulte, Edward K. Smith, Yuriy Brun, Premkumar Devanbu, Stephanie Forrest, and Westley Weimer. The ManyBugs and IntroClass Benchmarks for Automated Repair of C Programs. *IEEE Transactions on Software Engineering (TSE)*, 41(12):1236–1256, December 2015. DOI: 10.1109/TSE.2015.2454513.

[J19] Jie Chen, Xiwei Xu, Leon J. Osterweil, Liming Zhu, Yuriy Brun, Len Bass, Junchao Xiao, Mingshu Li, and Qing Wang. Using Simulation to Evaluate Error Detection Strategies: A Case Study of Cloud-Based Deployment Processes. *Journal of Systems and Software*, 110:205–221, December 2015. DOI: 10.1016/j.jss.2015.08.043.

[J18] Philip L. Henneman, Seung Yeob Shin, Yuriy Brun, Hari Balasubramanian, Fidela Blank, and Leon J. Osterweil. Using Computer Simulation to Study Nurse-to-Patient Ratios in an Emergency Department. *The Journal of Nursing Administration*, 45(11):551–556, November 2015. DOI: 10.1097/NNA.0000000000000262.

[J17] Yuriy Brun, Jae young Bang, George Edwards, and Nenad Medvidovic. Self-Adapting Reliability in Distributed Software Systems. *IEEE Transactions on Software Engineering (TSE)*, 41(8):764–780, August 2015. Extended and revised version of [C8]. DOI: 10.1109/TSE.2015.2412134.

[J16] Kıvanç Muşlu, Yuriy Brun, Michael D. Ernst, and David Notkin. Reducing feedback delay of software development tools via continuous analyses. *IEEE Transactions on Software Engineering (TSE)*, 41(8):745–763, August 2015. Extended and revised version of [C16]. DOI: 10.1109/TSE.2015.2417161.

[J15] Ivan Beschastnikh, Yuriy Brun, Jenny Abrahamson, Michael D. Ernst, and Arvind Krishnamurthy. Using declarative specification to improve the understanding, extensibility, and comparison of model-inference algorithms. *IEEE Transactions on Software Engineering (TSE)*, 41(4):408–428, April 2015. Extended and revised version of [C15]. DOI: 10.1109/TSE.2014.2369047.

[J14] Yuriy Brun, Reid Holmes, Michael D. Ernst, and David Notkin. Early Detection of Collaboration Conflicts and Risks. *IEEE Transactions on Software Engineering (TSE)*, 39(10):1358–1375, October 2013. Recognized as a Spotlight Paper. Extended and revised version of [C10]. DOI: 10.1109/TSE.2013.28.

[J13] Yuriy Brun and Nenad Medvidovic. Entrusting Private Computation and Data to Untrusted Networks. *IEEE Transactions on Dependable and Secure Computing (TDSC)*, 10(4):225–238, July/August 2013. DOI: 10.1109/TDSC.2013.13.

[J12] Yuriy Brun. Efficient 3-SAT algorithms in the tile assembly model. *Natural Computing*, 11(2):209–229, 2012. Extended and revised version of [C7]. DOI: 10.1007/s11047-011-9299-0.

[J11] Ivan Beschastnikh, Yuriy Brun, Michael D. Ernst, Arvind Krishnamurthy, and Thomas E. Anderson. Mining temporal invariants from partially ordered logs. *ACM SIGOPS Operating Systems Review*, 45(3):39–46, December 2011. A previous version appeared in the Proceedings of the Workshop on Managing Systems via Log Analysis and Machine Learning Techniques (SLAML), 2011. DOI: 10.1145/2094091.2094101.

[J10] Nenad Medvidovic, Hossein Tajalli, Joshua Garcia, Yuriy Brun, Ivo Krka, and George Edwards. Engineering heterogeneous robotics systems: A software architecture-based approach. *IEEE Computer*, 44(5):61–71, May 2011. DOI: 10.1109/MC.2010.368.

[J9] Sam Malek, George Edwards, Yuriy Brun, Hossein Tajalli, Joshua Garcia, Ivo Krka, Nenad Medvidovic, Marija Mikic-Rakic, and Gaurav Sukhatme. An architecture-driven software mobility framework. *Journal of Systems and Software*, 83(6):972–989, June 2010. DOI: 10.1016/j.jss.2009.11.003.

[J8] Yuriy Brun and Dustin Reishus. Path finding in the tile assembly model. *Theoretical Computer Science*, 410(15):1461–1472, April 2009. Extended and revised version of [C5]. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2008-802. DOI: 10.1016/j.tcs.2008.12.008.

[J7] Yuriy Brun. Solving satisfiability in the tile assembly model with a constant-size tileset. *Journal of Algorithms*, 63(4):151–166, 2008. Extended and revised version of [W5]. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2008-801. DOI: 10.1016/j.jalgor.2008.07.002.

[J6] Yuriy Brun. Solving NP-complete problems in the tile assembly model. *Theoretical Computer Science*, 395(1):31–46, April 2008. Extended and revised version of [C4]. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2007-703. DOI: 10.1016/j.tcs.2007.07.052.

[J5] Yuriy Brun. Nondeterministic polynomial time factoring in the tile assembly model. *Theoretical Computer Science*, 395(1):3–23, April 2008. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2007-707. DOI: 10.1016/j.tcs.2007.07.051.

[J4] Yuriy Brun. Arithmetic computation in the tile assembly model: Addition and multiplication. *Theoretical Computer Science*, 378(1):17–31, June 2007. Extended and revised version of [C3]. DOI: 10.1016/j.tcs.2006.10.025.

[J3] Dustin Reishus, Bilal Shaw, Yuriy Brun, Nickolas Chelyapov, and Leonard Adleman. Self-assembly of DNA double-double crossover complexes into high-density, doubly connected, planar structures. *Journal of the American Chemical Society (JACS)*, 127(50):17590–17591, November 2005. DOI: 10.1021/ja0557177.

[J2] Nickolas Chelyapov, Yuriy Brun, Manoj Gopalkrishnan, Dustin Reishus, Bilal Shaw, and Leonard Adleman. DNA triangles and self-assembled hexagonal tilings. *Journal of the American Chemical Society (JACS)*, 126(43):13924–13925, October 2004. DOI: 10.1021/ja0458120.

[J1] Daniel Vekhter, Alex Rasin, and Yuriy Brun. Mutual exclusion algorithms in distributed networks. *Journal of Student Research, Science and Technology*, 2(1):65–67, February 1997.

Refereed Conference Publications

[C28] Jae young Bang, Yuriy Brun, and Nenad Medvidovic. Continuous Analysis of Collaborative Design. In *Proceedings of the IEEE International Conference on Software Architecture (ICSA)*, pages 97–106, Gothenburg, Sweden, April 2017. Acceptance rate: $\frac{21}{95} \approx 22\%$. Best Paper Award. DOI: 10.1109/ICSA.2017.45.

[C27] Qianqian Wang, Yuriy Brun, and Alessandro Orso. Behavioral Execution Comparison: Are Tests Representative of Field Behavior? In *Proceedings of the 10th IEEE International Conference on Software Testing, Verification, and Validation (ICST)*, pages 321–332, Tokyo, Japan, March 2017. Acceptance rate: $\frac{36}{135} \approx 27\%$. DOI: 10.1109/ICST.2017.36.

[C26] Yalin Ke, Kathryn T. Stolee, Claire Le Goues, and Yuriy Brun. Repairing Programs with Semantic Code Search. In *Proceedings of the 30th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pages 295–306, Lincoln, NE, USA, November 2015. Acceptance rate: $\frac{55}{289} \approx 19\%$. DOI: 10.1109/ASE.2015.60.

[C25] Jeff Rasley, Eleni Gessiou, Tony Ohmann, Yuriy Brun, Shriram Krishnamurthi, and Justin Cappos. Detecting Latent Cross-Platform API Violations. In *Proceedings of the 26th IEEE International Symposium on Software Reliability Engineering (ISSRE)*, pages 484–495, Gaithersburg, MD, USA, November 2015. Acceptance rate: $\frac{33}{151} \approx 22\%$. DOI: 10.1109/ISSRE.2015.7381841.

[C24] Robert J. Walls, Yuriy Brun, Marc Liberatore, and Brian Neil Levine. Discovering Specification Violations in Networked Software Systems. In *Proceedings of the 26th IEEE International Symposium on Software Reliability Engineering (ISSRE)*, pages 496–506, Gaithersburg, MD, USA, November 2015. Acceptance rate: $\frac{33}{151} \approx 22\%$. DOI: 10.1109/ISSRE.2015.7381842.

[C23] Edward K. Smith, Earl Barr, Claire Le Goues, and Yuriy Brun. Is the Cure Worse than the Disease? A Large-Scale Analysis of Overfitting in Automated Program Repair. In *Proceedings of the 10th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 532–543, Bergamo, Italy, September 2015. Acceptance rate: $\frac{74}{291} \approx 25\%$. Previous versions appeared as University of Massachusetts Computer Science technical report UM-CS-2015-007 and as UC Davis College of Engineering technical report `https://escholarship.org/uc/item/3z8926ks`. DOI: 10.1145/2786805.2786825

[C22] Kıvanç Muşlu, Yuriy Brun, and Alexandra Meliou. Preventing Data Errors with Continuous Testing. In *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis*

(ISSTA), pages 373–384, Baltimore, MD, USA, July 2015. Acceptance rate: $\frac{33}{119} \approx 28\%$. Extended and revised version of [H11]. DOI: 10.1145/2771783.2771792.

[C21] Seung Yeob Shin, Yuriy Brun, Leon J. Osterweil, Hari Balasubramanian, and Philip L. Henneman. Resource Specification for Prototyping Human-Intensive Systems. In *Proceedings of the 18th International Conference on Fundamental Approaches to Software Engineering (FASE)*, pages 332–346, London, England, April 2015. Acceptance rate: $\frac{23}{82} \approx 28\%$. DOI: 10.1007/978-3-662-46675-9_22.

[C20] Ivo Krka, Yuriy Brun, and Nenad Medvidovic. Automatic Mining of Specifications from Invocation Traces and Method Invariants. In *Proceedings of the 22nd ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE)*, pages 178–189, Hong Kong, China, November 2014. Acceptance rate: $\frac{61}{273} \approx 22\%$. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2013-509. DOI: 10.1145/2635868.2635890.

[C19] Earl T. Barr, Yuriy Brun, Premkumar Devanbu, Mark Harman, and Federica Sarro. The Plastic Surgery Hypothesis. In *Proceedings of the 22nd ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE)*, pages 306–317, Hong Kong, China, November 2014. Acceptance rate: $\frac{61}{273} \approx 22\%$. DOI: 10.1145/2635868.2635898.

[C18] Tony Ohmann, Michael Herzberg, Sebastian Fiss, Armand Halbert, Marc Palyart, Ivan Beschastnikh, and Yuriy Brun. Behavioral Resource-Aware Model Inference. In *Proceedings of the 29th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pages 19–30, Västerås, Sweden, September 2014. Acceptance rate: $\frac{50}{258} \approx 19\%$. DOI: 10.1145/2642937.2642988.

[C17] Ivan Beschastnikh, Yuriy Brun, Michael D. Ernst, and Arvind Krishnamurthy. Inferring Models of Concurrent Systems from Logs of their Behavior with CSight. In *Proceedings of the 36th International Conference on Software Engineering (ICSE)*, pages 468–479, Hyderabad, India, June 2014. Acceptance rate: $\frac{99}{495} = 20\%$. Previous versions appeared as University of British Columbia technical report 2429/46122 and as University of Washington technical report UW-CSE-12-10-01. DOI: 10.1145/2568225.2568246.

[C16] Kıvanç Muşlu, Yuriy Brun, Michael D. Ernst, and David Notkin. Making Offline Analyses Continuous. In *Proceedings of the 9th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 323–333, Saint Petersburg, Russia, August 2013. Acceptance rate: $\frac{51}{251} \approx 20\%$. DOI: 10.1145/2491411.2491460.

[C15] Ivan Beschastnikh, Yuriy Brun, Jenny Abrahamson, Michael D. Ernst, and Arvind Krishnamurthy. Unifying FSM-inference algorithms through declarative specification. In *Proceedings of the 35th International Conference on Software Engineering (ICSE)*, pages 252–261, San Francisco, CA, USA, May 2013. Acceptance rate: $\frac{85}{461} \approx 18\%$. A previous version appeared as University of Washington technical report UW-CSE-13-03-01. DOI: 10.1109/ICSE.2013.6606571.

[C14] Kıvanç Muşlu, Yuriy Brun, Reid Holmes, Michael D. Ernst, and David Notkin. Speculative Analysis of Integrated Development Environment Recommendations. In *Proceedings of the 27th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA)*, pages 669–682, Tucson, AZ, USA, October 2012. Acceptance rate: $\frac{57}{228} = 25\%$. DOI: 10.1145/2384616.2384665.

[C13] George Edwards, Yuriy Brun, and Nenad Medvidovic. Automated analysis and code generation for domain-specific models. In *the joint 10th Working IEEE/IFIP Conference on Software Architecture and 6th European Conference on Software Architecture (WICSA/ECSA)*, pages 161–170, Helsinki, Finland,

September 2012. Acceptance rate: $\frac{20}{96} \approx 21\%$. Extended and revised version of [H7]. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2010-517. DOI: 10.1109/WICSA-ECSA.212.24.

[C12] Yuriy Brun and Nenad Medvidovic. Keeping Data Private while Computing in the Cloud. In *Proceedings of the 5th International Conference on Cloud Computing (CLOUD)*, pages 285–294, Honolulu, HI, USA, June 2012. Acceptance rate: $\frac{48}{282} \approx 17\%$. Previous versions appeared as University of Southern California, Center for Software Engineering technical reports USC-CSSE-2007-714 and USC-CSSE-2008-819. DOI: 10.1109/CLOUD.2012.126.

[C11] Jochen Wuttke, Yuriy Brun, Alessandra Gorla, and Jonathan Ramaswamy. Traffic Routing for Evaluating Self-Adaptation. In *Proceedings of the 7th International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*, pages 27–32, Zurich, Switzerland, June 2012. Acceptance rate: $\frac{19}{50} \approx 38\%$. DOI: 10.1109/SEAMS.2012.6224388.

[C10] Yuriy Brun, Reid Holmes, Michael D. Ernst, and David Notkin. Proactive detection of collaboration conflicts. In *Proceedings of the 8th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 168–178, Szeged, Hungary, September 2011. Acceptance rate: $\frac{34}{203} \approx 17\%$. ACM SIGSOFT Distinguished Paper Award. A previous version appeared as University of Washington technical report UW-CSE-10-03-01. DOI: 10.1145/2025113.2025139.

[C9] Ivan Beschastnikh, Yuriy Brun, Sigurd Schneider, Michael Sloan, and Michael D. Ernst. Leveraging existing instrumentation to automatically infer invariant-constrained models. In *Proceedings of the 8th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 267–277, Szeged, Hungary, September 2011. Acceptance rate: $\frac{34}{203} \approx 17\%$. DOI: 10.1145/2025113.2025151.

[C8] Yuriy Brun, George Edwards, Jae young Bang, and Nenad Medvidovic. Smart redundancy for distributed computation. In *Proceedings of the 31st International Conference on Distributed Computing Systems (ICDCS)*, pages 665–676, Minneapolis, MN, USA, June 2011. Acceptance rate: $\frac{87}{565} \approx 15\%$. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2009-510. DOI: 10.1109/ICDCS.2011.25.

[C7] Yuriy Brun. Improving efficiency of 3-SAT-solving tile systems. *Lecture Notes on Computer Science*, 6518/2011:1–12, 2011. Extended and revised in [J12]. A previous version appeared in the Proceedings of the 16th International Conference on DNA Computing (DNA), pages 70–81, 2010. DOI: 10.1007/978-3-642-18305-8_1.

[C6] Ivo Krka, Yuriy Brun, George Edwards, and Nenad Medvidovic. Synthesizing partial component-level behavior models from system specifications. In *Proceedings of the 7th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 305–314, Amsterdam, The Netherlands, August 2009. Acceptance rate: $\frac{32}{217} \approx 15\%$. Extended and revised version of [H1]. DOI: 10.1145/1595696.1595756.

[C5] Yuriy Brun and Dustin Reishus. Connecting the dots: Molecular machinery for distributed robotics. *Lecture Notes on Computer Science*, 5347/2009:102–111, 2009. Extended and revised in [J8]. A previous version appeared in the Proceedings of the 14th International Meeting on DNA Computing (DNA), pages 27–35, 2008. DOI: 10.1007/978-3-642-03076-5_9.

[C4] Yuriy Brun. Constant-size tileset for solving an NP-complete problem in nondeterministic linear time. *Lecture Notes on Computer Science*, 4848/2008:26–35, 2008. Extended and revised in [J7]. A previous version appeared as "Asymptotically Optimal Program Size Complexity for Solving NP-Complete Problems in the Tile Assembly Model" in the Proceedings of the 13th International Meeting on DNA Computing (DNA), pages 231–240, 2007. DOI: 10.1007/978-3-540-77962-9_3.

[C3] Yuriy Brun. Adding and multiplying in the tile assembly model. In *Proceedings of the 4th Foundations of Nanoscience: Self-Assembled Architectures and Devices (FNANO)*, Snowbird, UT, USA, April 2007. Extended and revised in [J4].

[C2] Yuriy Brun, Manoj Gopalkrishnan, Dustin Reishus, Bilal Shaw, Nickolas Chelyapov, and Leonard Adleman. Building blocks for DNA self-assembly. In *Proceedings of the 1st Foundations of Nanoscience: Self-Assembled Architectures and Devices (FNANO)*, pages 2–15, Snowbird, UT, USA, April 2004.

[C1] Yuriy Brun and Michael D. Ernst. Finding latent code errors via machine learning over programs executions. In *Proceedings of the 26th International Conference on Software Engineering (ICSE)*, pages 480–490, Edinburgh, Scotland, May 2004. Acceptance rate: $\frac{58}{436} \approx 13\%$. DOI: 10.1109/ICSE.2004.1317470.

Refereed Short Publications

[H14] Tony Ohmann, Ryan Stanley, Ivan Beschastnikh, and Yuriy Brun. Visually Reasoning about System and Resource Behavior. In *Proceedings of the Demonstrations Track of the 38th International Conference on Software Engineering (ICSE Demo)*, pages 601–604, Austin, TX, USA, May 2016. Acceptance rate: $\frac{18}{56} \approx 32\%$. DOI: 10.1145/2889160.2889166.

[H13] Kıvanç Muşlu, Luke Swart, Yuriy Brun, and Michael D. Ernst. Simplifying Development History Information Retrieval via Multi-Grained Views. In *Proceedings of the 30th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pages 697–702, Lincoln, NE, USA, November 2015. Acceptance rate: $\frac{17}{41} \approx 41\%$. DOI: 10.1109/ASE.2015.53.

[H12] Tony Ohmann, Kevin Thai, Ivan Beschastnikh, and Yuriy Brun. Mining Precise Performance-Aware Behavioral Models from Existing Instrumentation. In *Proceedings of the New Ideas and Emerging Results Track at the International Conference on Software Engineering (ICSE)*, pages 484–487, Hyderabad, India, June 2014. Acceptance rate: $\frac{35}{146} \approx 24\%$. DOI: 10.1145/2591062.2591107.

[H11] Kıvanç Muşlu, Yuriy Brun, and Alexandra Meliou. Data Debugging with Continuous Testing. In *Proceedings of the New Ideas Track at the 9th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 631–634, Saint Petersburg, Russia, August 2013. Acceptance rate: $\frac{12}{33} \approx 36\%$. DOI: 10.1145/2491411.2494580.

[H10] Roykrong Sukkerd, Ivan Beschastnikh, Jochen Wuttke, Sai Zhang, and Yuriy Brun. Understanding Regression Failures through Test-Passing and Test-Failing Code Changes. In *Proceedings of the New Ideas and Emerging Results Track at the 35th International Conference on Software Engineering (ICSE)*, pages 1177–1180, San Francisco, CA, USA, May 2013. Acceptance rate: $\frac{31}{143} \approx 22\%$. DOI: 10.1109/ICSE.2013.6606672.

[H9] Xiang Zhao, Yuriy Brun, and Leon J. Osterweil. Supporting Process Undo and Redo in Software Engineering Decision Making. In *Proceedings of the 8th International Conference on Software and*

System Process (ICSSP), pages 56–60, San Francisco, CA, USA, May 2013. Acceptance rate: $\frac{6}{18} \approx 33\%$. A previous version appeared as University of Massachusetts, Computer Science technical report UM-CS-2013-016. DOI: 10.1145/2486046.2486057.

[H8] Kıvanç Muşlu, Yuriy Brun, Reid Holmes, Michael D. Ernst, and David Notkin. Improving IDE Recommendations by Considering Global Implications of Existing Recommendations. In *Proceedings of the New Ideas and Emerging Results Track at the 34th International Conference on Software Engineering (ICSE)*, pages 1349–1352, Zurich, Switzerland, June 2012. Acceptance rate: $\frac{26}{147} \approx 18\%$. DOI: 10.1109/ICSE.2012.6227082.

[H7] George Edwards, Yuriy Brun, and Nenad Medvidovic. Isomorphism in model tools and editors. In *Proceedings of the 26th IEEE ACM International Conference on Automated Software Engineering (ASE)*, pages 458–461, Lawrence, KS, USA, November 2011. Acceptance rate: $\frac{92}{252} \approx 37\%$. Extended and revised in [C13]. DOI:10.1109/ASE.2011.6100099.

[H6] Ivan Beschastnikh, Yuriy Brun, Michael D. Ernst, Arvind Krishnamurthy, and Thomas E. Anderson. Bandsaw: Log-powered test scenario generation for distributed systems. In *The Work In Progress track of the 23rd ACM Symposium on Operating Systems Principles (SOSP)*, Cascais, Portugal, October 2011. Acceptance rate: $\frac{17}{48} \approx 35\%$.

[H5] Yuriy Brun, Reid Holmes, Michael D. Ernst, and David Notkin. Crystal: Precise and unobtrusive conflict warnings. In *Proceedings of the 8th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering Tool Demonstration Track (ESEC/FSE)*, pages 444–447, Szeged, Hungary, September 2011. Acceptance rate: $\frac{14}{30} \approx 47\%$. DOI: 10.1145/2025113.2025187.

[H4] Ivan Beschastnikh, Jenny Abrahamson, Yuriy Brun, and Michael D. Ernst. Synoptic: Studying logged behavior with inferred models. In *Proceedings of the 8th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering Tool Demonstration Track (ESEC/FSE)*, pages 448–451, Szeged, Hungary, September 2011. Acceptance rate: $\frac{14}{30} \approx 47\%$. DOI: 10.1145/2025113.2025188.

[H3] Chloé Kiddon and Yuriy Brun. That's what she said: Double entendre identification. In *Proceedings of the 49th Annual Meeting of the Association for Computational Linguistics (ACL)*, pages 89–94, Portland, OR, USA, June 2011. ACM ID: 2002756.

[H2] Ivo Krka, Yuriy Brun, Daniel Popescu, Joshua Garcia, and Nenad Medvidovic. Using dynamic execution traces and program invariants to enhance behavioral model inference. In *Proceedings of the New Ideas and Emerging Results Track at the 32nd International Conference on Software Engineering (ICSE)*, pages 179–182, Cape Town, South Africa, May 2010. Acceptance rate: $\frac{19}{76} \approx 25\%$. DOI: 10.1145/1810295.1810324.

[H1] Ivo Krka, George Edwards, Yuriy Brun, and Nenad Medvidovic. From system specifications to component behavioral models. In *Proceedings of the New Ideas and Emerging Results Track at the 31st International Conference on Software Engineering (ICSE)*, pages 315–318, Vancouver, Canada, May 2009. Acceptance rate: $\frac{21}{119} \approx 18\%$. Extended and revised in [C6]. A previous version appeared as University of Southern California, Center for Software Engineering technical report USC-CSSE-2008-821. DOI: 10.1109/ICSE-COMPANION.2009.5071010.

Refereed Book Chapters

[B4] Yuriy Brun, Ron Desmarais, Kurt Geihs, Marin Litoiu, Antonia Lopes, Mary Shaw, and Mike Smit. A design space for adaptive systems. In Rogério de Lemos, Holger Giese, Hausi A. Müller, and Mary Shaw, editors, *Software Engineering for Self-Adaptive Systems II*, volume 7475, pages 33–50. Springer-Verlag, 2013. DOI: 10.1007/978-3-642-35813-5_2.

[B3] Rogério de Lemos, Holger Giese, Hausi A. Müller, Mary Shaw, Jesper Andersson, Luciano Baresi, Basil Becker, Nelly Bencomo, Yuriy Brun, Bojan Cukic, Ron Desmarais, Schahram Dustdar, Gregor Engels, Kurt Geihs, Karl M. Goeschka, Alessandra Gorla, Vincenzo Grassi, Paola Inverardi, Gabor Karsai, Jeff Kramer, Marin Litoiu, Antonia Lopes, Jeff Magee, Sam Malek, Serge Mankovskii, Raffaela Mirandola, John Mylopoulos, Oscar Nierstrasz, Mauro Pezzè, Christian Prehofer, Wilhelm Schäfer, Rick Schlichting, Bradley Schmerl, Dennis B. Smith, João P. Sousa, Gabriel Tamura, Ladan Tahvildari, Norha M. Villegas, Thomas Vogel, Danny Weyns, Kenny Wong, and Jochen Wuttke. Software engineering for self-adaptive systems: A second research roadmap. In Rogério de Lemos, Holger Giese, Hausi A. Müller, and Mary Shaw, editors, *Software Engineering for Self-Adaptive Systems II*, volume 7475, pages 1–32. Springer-Verlag, 2013. DOI: 10.1007/978-3-642-35813-5_1.

[B2] Yuriy Brun, Giovanna Di Marzo Serugendo, Cristina Gacek, Holger Giese, Holger Kienle, Marin Litoiu, Hausi Müller, Mauro Pezzè, and Mary Shaw. Engineering self-adaptive systems through feedback loops. In Betty H.C. Cheng, Rogério de Lemos, Holger Giese, Paola Inverardi, and Jeff Magee, editors, *Software Engineering for Self-Adaptive Systems*, volume 5525, pages 48–70. Springer-Verlag, 2009. DOI: 10.1007/978-3-642-02161-9_3.

[B1] Betty H.C. Cheng, Rogério de Lemos, Holger Giese, Paola Inverardi, Jeff Magee, Jesper Andersson, Basil Becker, Nelly Bencomo, Yuriy Brun, Bojan Cukic, Giovanna Di Marzo Serugendo, Schahram Dustdar, Anthony Finkelstein, Cristina Gacek, Kurt Geihs, Vincenzo Grassi, Gabor Karsai, Holger M. Kienle, Jeff Kramer, Marin Litoiu, Sam Malek, Raffaela Mirandola, Hausi A. Müller, Sooyong Park, Mary Shaw, Matthias Tichy, Massimo Tivoli, Danny Weyns, and Jon Whittle. Software engineering for self-adaptive systems: A research roadmap. In Betty H.C. Cheng, Rogério de Lemos, Holger Giese, Paola Inverardi, and Jeff Magee, editors, *Software Engineering for Self-Adaptive Systems*, volume 5525, pages 1–26. Springer-Verlag, 2009. DOI: 10.1007/978-3-642-02161-9_1.

Refereed Workshop Publications

[W13] Seung Yeob Shin, Yuriy Brun, and Leon J. Osterweil. Specification and Analysis of Human-Intensive System Resource-Utilization Policies. In *Proceedings of the 8th International Workshop on Software Engineering in Healthcare Systems (SEHS)*, pages 8–14, Austin, TX, USA, May 2016. Acceptance rate: $\frac{10}{16} \approx 63\%$. DOI: 10.1145/2897683.2897688.

[W12] Seung Yeob Shin, Hari Balasubramanian, Yuriy Brun, Philip L. Henneman, and Leon J. Osterweil. Resource Scheduling through Resource-Aware Simulation of Emergency Departments. In *Proceedings of the 5th International Workshop on Software Engineering in Health Care (SEHC)*, pages 64–70, San Francisco, CA, USA, May 2013. Acceptance rate: $\frac{16}{30} \approx 53\%$. DOI: 10.1109/SEHC.2013.6602480.

[W11] Xiang Zhao, Emery R. Boose, Yuriy Brun, Barbara Staudt Lerner, and Leon J. Osterweil. Supporting Undo and Redo in Scientific Data Analysis. In *Proceedings of the 5th USENIX Workshop on the Theory and Practice of Provenance (TaPP)*, Lombard, IL, USA, April 2013. Acceptance rate: $\frac{12}{19} \approx 63\%$. A

previous version appeared as University of Massachusetts, Computer Science technical report UM-CS-2013-015.

[W10] Yuriy Brun, Kıvanç Muşlu, Reid Holmes, Michael D. Ernst, and David Notkin. Predicting Development Trajectories to Prevent Collaboration Conflicts. In *the Future of Collaborative Software Development (FCSD)*, Seattle, WA, USA, February 2012.

[W9] Yuriy Brun, Reid Holmes, Michael D. Ernst, and David Notkin. Speculative analysis: Exploring future states of software. In *Proceedings of the 2010 Foundations of Software Engineering Working Conference on the Future of Software Engineering Research (FoSER)*, pages 59–63, Santa Fe, NM, USA, November 2010. Acceptance rate: $\frac{87}{139} \approx 63\%$. DOI: 10.1145/1882362.1882375.

[W8] Sigurd Schneider, Ivan Beschastnikh, Slava Chernyak, Michael D. Ernst, and Yuriy Brun. Synoptic: Summarizing system logs with refinement. In *Proceedings of the Workshop on Managing Systems via Log Analysis and Machine Learning Techniques (SLAML)*, Vancouver, Canada, October 2010. Acceptance rate: $\frac{9}{19} \approx 47\%$. DOI: 10.1145/1928991.1928995.

[W7] Yuriy Brun. Improving impact of self-adaptation and self-management research through evaluation methodology. In *Proceedings of Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*, pages 1–9, Cape Town, South Africa, May 2010. Acceptance rate: $\frac{13}{32} \approx 41\%$. DOI: 10.1145/1808984.1808985.

[W6] Yuriy Brun and Nenad Medvidovic. Crystal-growth-inspired algorithms for computational grids. In *Proceedings of the Workshop on Bio-Inspired Algorithms for Distributed Systems (BADS)*, pages 19–26, Barcelona, Spain, June 2009. DOI: 10.1145/1555284.1555288.

[W5] Yuriy Brun. Reducing tileset size: 3-SAT and beyond. In *Proceedings of the 14th International Meeting on DNA Computing (DNA)*, page 178, Prague, Czech Republic, June 2008. Extended and revised in [J7].

[W4] Yuriy Brun and Nenad Medvidovic. Fault and adversary tolerance as an emergent property of distributed systems' software architectures. In *Proceedings of the 2nd International Workshop on Engineering Fault Tolerant Systems (EFTS)*, pages 38–43, Dubrovnik, Croatia, September 2007. DOI: 10.1145/1316550.1316557.

[W3] Yuriy Brun and Nenad Medvidovic. An architectural style for solving computationally intensive problems on large networks. In *Proceedings of Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*, Minneapolis, MN, USA, May 2007. Acceptance rate: $\frac{18}{26} \approx 69\%$. DOI: 10.1109/SEAMS.2007.4.

[W2] Yuriy Brun. A discreet, fault-tolerant, and scalable software architectural style for Internet-sized networks. In *Proceedings of the Doctoral Symposium at the 29th International Conference on Software Engineering (ICSE)*, pages 83–84, Minneapolis, MN, USA, May 2007. Acceptance rate: $\frac{11}{48} \approx 23\%$. DOI: 10.1109/ICSECOMPANION.2007.12.

[W1] Yuriy Brun and Manoj Gopalkrishnan. Toward in vivo disease diagnosis and treatment using DNA. In *Proceedings of the 2006 International Conference on Bioinformatics & Computational Biology (BIOCOMP)*, pages 182–186, Las Vegas, NV, USA, June 2006.

Refereed Poster and Unconventional Publications

[U2] Jenny Abrahamson, Ivan Beschastnikh, Yuriy Brun, and Michael D. Ernst. Shedding Light on Distributed System Executions. In *Proceedings of the Poster Track at the International Conference on Software Engineering (ICSE)*, pages 598–599, Hyderabad, India, June 2014. Acceptance rate: $\frac{19}{52} \approx 37\%$. DOI: 10.1145/2591062.2591134.

[U1] Jochen Wuttke, Ivan Beschastnikh, and Yuriy Brun. Effects of Centralized and Distributed Version Control on Commit Granularity. *Tiny Transactions on Computer Science*, 1, September 2012.

Non-Refereed Publications

[N7] Yuriy Brun and Mehdi Mirakhorli. Summary of Co-located Workshops. In *Proceedings of the 24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE)*, pages vi–vii, Seattle, WA, USA, November 2016.

[N6] Yuriy Brun. *Self-assembly for discreet, fault-tolerant, and scalable computation on Internet-sized distributed networks*. PhD dissertation, University of Southern California, Los Angeles, CA, USA, May 2008. Proquest URL: http://proquest.umi.com/pqdlink?did=1564036421&Fmt=7&clientId=79356&RQT=309&VName=PQD.

[N5] Yuriy Brun. Building biologically-inspired self-adapting systems. In Betty H.C. Cheng, Rogério de Lemos, Holger Giese, Paola Inverardi, and Jeff Magee, editors, *Proceedings of the Schloss Dagstuhl seminar 08031: Software Engineering for Self-Adaptive Systems*, Dagstuhl, Germany, January 2008. Dagstuhl URL: http://drops.dagstuhl.de/opus/volltexte/2008/1499.

[N4] Yuriy Brun and Michael D. Ernst. Finding latent code errors via machine learning over program executions. MIT Computer Science and Artificial Intelligence Laboratory Abstracts, March 2004.

[N3] Yuriy Brun. Software fault identification via dynamic analysis and machine learning. Master's thesis, Massachusetts Institute of Technology, Cambridge, MA, USA, August 2003. URL: http://hdl.handle.net/1721.1/17939.

[N2] Yuriy Brun and Michael D. Ernst. Software fault identification via dynamic analysis and machine learning. MIT Laboratory for Computer Science Abstracts, March 2003.

[N1] Yuriy Brun. The four-color theorem. *Undergraduate Journal of Mathematics*, pages 21–28, May 2002.

Patents

[P1] Yuriy Brun and Nenad Medvidovic. Tile Architectural Style for Privacy-Preserved Distributed Computing. United States Patent # US 8,332,458 B2, December 11, 2012.

Software and Software Artifacts

Nearly all listed software is developed collaboratively. Linked project pages list the collaborators.

[S13] **SearchRepair**: A semantic-search-based automated program repair technique. `https://github.com/ProgramRepair/SearchRepair`.

[S12] The **ManyBugs** and **IntroClass** benchmarks for automated repair of c programs. `http://repairbenchmarks.cs.umass.edu/`.

[S11] **Perfume**: A performance-aware model inference tool that produces concise and precise time-range automate models from a system's execution log (distributed as part of Synoptic). `http://people.cs.umass.edu/ohmann/perfume/`.

[S10] **Solstice**: A code replication and synchronization framework for Eclipse. `https://bitbucket.org/kivancmuslu/solstice/`.

[S9] **CSight**: A model inference tool for concurrent systems that produces concise and precise communicating finite state machine models from a concurrent system's log (distributed as part of Synoptic). `https://github.com/ModelInference/synoptic`.

[S8] **InvariMint**: A declarative specification engine for model-inference algorithms (distributed as part of Synoptic). `https://github.com/ModelInference/synoptic`.

[S7] **Quick Fix Scout**: Compilation-error-fix explorer for Eclipse. `https://github.com/brunyuriy/quick-fix-scout/`.

[S6] **Crystal**: A proactive conflict detector for distributed version control. `https://github.com/brunyuriy/crystalvc/`.

[S5] **Synoptic**: A model inference tool that produces concise and precise finite state machine models that describe logged system executions. `https://github.com/ModelInference/synoptic`.

[S4] **Adasim**: A traffic routing exemplar for evaluating self-adaptive systems. `https://github.com/brunyuriy/adasim`.

[S3] **Iterative Redundancy**: Self-adapting reliability in distributed software systems. `http://softarch.usc.edu/~ronia/sr/`.

[S2] **Mahjong**: A sTile framework for distributing NP-complete computations onto untrusted networks in a trustworthy manner. `https://bitbucket.org/brunyuriy/privatecloud/`.

[S1] **Fault-Invariant Classifier**: An error-detection tool based on models of past errors. Distributed as part of the Daikon invariant detector. `http://pag.csail.mit.edu/daikon/`.

Teaching Activities

Instructor

University of Massachusetts, Amherst

Q11 refers to 5.0-scale, student-rated "Overall rating of the instructor's teaching."

2017

CMPSCI 520	Fall	Theory and Practice of Software Engineering	(ugrad)
CMPSCI 621	Spring	Advanced Software Engineering: Analysis and Evaluation	(grad)
CMPSCI 521	Spring	Software Engineering: Analysis and Evaluation	(ugrad)

		2015		
CMPSCI 621	Fall	Advanced Software Engineering: Analysis and Evaluation	(grad)	Q11: 4.9
CMPSCI 521	Fall	Software Engineering: Analysis and Evaluation	(ugrad)	Q11: 4.7
CMPSCI 320	Spring	Introduction to Software Engineering	(ugrad)	Q11: 4.6
CMPSCI 529	Spring	Software Engineering Project Management	(ugrad)	Q11: 4.7
CMPSCI H320	Spring	Introduction to Software Engineering Honors Colloquium	(ugrad)	Q11: 5.0
		2014		
CMPSCI 621	Fall	Advanced Software Engineering: Analysis and Evaluation	(grad)	Q11: 5.0
CMPSCI 521	Fall	Software Engineering: Analysis and Evaluation	(ugrad)	Q11: 4.8
		2013		
CMPSCI 621	Fall	Advanced Software Engineering: Analysis and Evaluation	(grad)	Q11: 4.6
CMPSCI 521	Fall	Software Engineering: Analysis and Evaluation	(ugrad)	Q11: 4.7
CMPSCI 320	Spring	Introduction to Software Engineering	(ugrad)	Q11: 4.6
CMPSCI 529	Spring	Software Engineering Project Management	(ugrad)	Q11: 5.0
CMPSCI H320	Spring	Introduction to Software Engineering Honors Colloquium	(ugrad)	Q11: 4.5
		2012		
CMPSCI 621	Fall	Advanced Software Engineering: Analysis and Evaluation	(grad)	Q11: 4.4
CMPSCI 521	Fall	Software Engineering: Analysis and Evaluation	(ugrad)	Q11: 4.5

University of Washington

Q3 refers to 5.0-scale, student-rated "The instructor's contribution to the course."

		2012		
CSE 590N	Winter, Spring	Software Engineering Seminar co-taught with Michael D. Ernst and David Notkin	(grad)	
		2011		
CSE 590N	Autumn	Software Engineering Seminar co-taught with Michael D. Ernst and David Notkin	(grad)	
CSE 403	Winter	Software Engineering	(ugrad)	Q3: 4.7

Guest Lecturer

University of Washington

		2010		
CSE 331	Autumn	Software Design and Implementation	(ugrad)	
CSE 599X	Spring	Molecular Programming	(grad)	
CSEP 504	Winter	Advanced Topics in Software Systems	(grad)	

University of Southern California

		2007		
CSCI 599	Spring	Organic Computing	(grad)	
CSCI 303	Spring	Design and Analysis of Algorithms	(ugrad)	

Teaching Assistant

University of Southern California

		2007		
CSCI 578	Spring	Software Architectures	(grad)	
CSCI 303	Spring	Design and Analysis of Algorithms	(ugrad)	
		2006		
CSCI 303	Fall	Design and Analysis of Algorithms	(ugrad)	

Massachusetts Institute of Technology

2003

6.170	Spring	Software Engineering Laboratory	(ugrad)

Teaching Grants

2016	UMass Center for Teaching & Faculty Development Flex Grant	$500
2015	Amazon Web Services in Education Coursework grant	$13,600
	UMass Center for Teaching & Faculty Development Flex Grant	$500
2014	Amazon Web Services in Education Coursework grant	$15,200
2013	Amazon Web Services in Education Coursework grant	$12,100
	UMass Center for Teaching & Faculty Development Flex Grant	$500
2012	Amazon Web Services in Education Coursework grant	$4,300
2011	Amazon Web Services teaching grant	$5,600

Student Supervision

PhD Advisor

current	Tony Ohmann (earned Masters degree in 2016)	
	Ted Smith (earned Masters degree in 2016)	
	Manish Motwani	
2016	Seung Yeob Shin (co-advised with Leon J. Osterweil)	now a Research Associate at University of Luxembourg
2015	Kıvanç Muşlu (co-advised with Michael D. Ernst)	now a software engineer at Microsoft TSE

PhD dissertation committee member

current	John Vilk	
2016	Kaituo Li	
2015	Thomas Helmuth	now an Assistant Professor at Washington and Lee University
	Charlie Curtsinger	now an Assistant Professor at Grinnell College
2014	Robert J. Walls	starting as Assistant Professor at Worcester Polytechnic Institute in Fall'16
	Tongping Liu	now an Assistant Professor at the University of Texas at San Antonio
2013	Ivan Beschastnikh	now an Assistant Professor at the University of British Columbia

Masters

current	Sainyam Galhotra (co-advised with Alexandra Meliou)	
	Natcha Simsiri	
2015	Karthik Kannappan	now a software engineer at Juniper Networks
	Armand Halbert	now a software engineer at IBM
2013	Xiang Zhao (co-advised with Leon J. Osterweil)	now a software engineer at Google, Inc.

Undergraduate

current	William Borkofsky	
	Shubham Mehta	
	Evan Reiff	
2016	Natcha Simsiri (honors thesis)	now a Masters student at UMass Amherst
	Ryan Stanley (honors thesis)	now a software engineer at Amazon.com, Inc.
2015	Chris Ciollaro (honors thesis reader)	
2014	Sebastian Fiss	while on exchange program at UMass Amherst
	Michael Herzberg	while on exchange program at UMass Amherst
	Nicholas Braga (honors thesis)	now a software engineer at BookBub
	Brian Stapleton (honors thesis reader)	now a software engineer at AdHarmonics, Inc.
2013	Brandon McNew (REU)	now software developer at CUSi
	Jeanderson Barros (REU)	now a Masters student at the Federal University of Pernambuco
	Roykrong Sukkerd	now a PhD student at Carnegie Mellon University
	Haochen Wei	now a software developer at LinkedIn
	Alice Ouyang	now an IT Analyst at Liberty Mutual Insurance
2012	Jonathan Ramaswamy	now an associate consultant at Cirrus10

Formal Presentations

[T47] Quality and applicability of automated repair.
– Dagstuhl Seminar 17022. Automated Program Repair. Wadern, Germany, January 9, 2017.

[T46] Measuring and improving quality of automated program repair.
– The 45th CREST Open Workshop, London, England, UK, January 25, 2016.

[T45] Preventing data errors with continuous testing.
– The 26th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA15), Baltimore, MD, USA, July 17, 2015.

[T44] Interactive classroom games for teaching software engineering.
– Software Engineering Educators Symposium (SEES), Hong Kong, China, November 17, 2014.

[T43] Inferring models to help developers understand behavior.
– Workshop on the State of the Art in Automated Software Engineering Research, Toronto, ON, Canada, June 25, 2014.

[T42] Secure-multiparty software systems: Privacy and security on untrusted hardware.
– The Security and Privacy Assurance Research — Multi-party Computation (SPAR-MPC) Workshop, Cambridge, MA, USA, May 29, 2014.

[T41] Factors affecting success in automatic program repair.
– Brown University, Providence, RI, USA, May 7, 2014.
– University of Washington, Seattle, WA, USA, April 21, 2014.

[T40] Inferring models for verification: Ensuring assurances.
– Dagstuhl Seminar 13511. Software Engineering for Self-Adaptive Systems: Assurances. Wadern, Germany, December 17, 2013.

[T39] What's wrong with the program I haven't written yet?
– Harvard University, Cambridge, MA, USA, September 26, 2014.
– Carnegie Mellon University, Pittsburgh, PA, USA, January 24, 2014.
– The International Software Engineering @ 45 Symposium (SE@45), Los Angeles, CA, USA, October 4, 2013.
– INRIA Paris-Rocquencourt, Paris, France, May 15, 2013.
– Massachusetts Institute of Technology, Cambridge, MA, USA, October 5, 2012.

[T38] Fortune-telling developer tools.
– University of California, Davis, CA, USA, May 21, 2013.

[T37] Privacy and reliability in an untrusted cloud.
– RiSE group at Microsoft Research, Redmond, WA, USA, March 19, 2013.

[T36] Reducing notification delays: What will happen if I change my code?
– Augmenting Software Developer Support to Improve Productivity (ASDS13), Monte Verità, Ascona, Switzerland, March 11, 2013.

[T35] Keeping data private while computing in the cloud.
– 5th IEEE International Conference on Cloud Computing (CLOUD12), Honolulu, HI, USA, June 28, 2012.

[T34] Speculative analysis: What's wrong with the program I haven't written yet?
– University of Michigan, Ann Arbor, MI, USA, April 24, 2012.
– IMDEA: Madrid Institute for Advanced Studies, Software Institute, Madrid, Spain, April 12, 2012.
– Oregon State University, Corvallis, OR, USA, April 5, 2012.
– University of Massachusetts, Amherst, MA, USA, March 29, 2012.
– Carnegie Mellon University, Silicon Valley campus, Mountain View, CA, USA, March 21, 2012.
– University of Maryland, College Park, MD, USA, March 12, 2012.
– University of Illinois, Chicago, IL, USA, March 5, 2012.
– Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA, USA, February 27, 2012.
– University of Chicago, Chicago, IL, USA, February 14, 2012.
– Purdue University, West Lafayette, IN, USA, February 9, 2012.

[T33] What does my program do today, and what will it do tomorrow?
– Keynote at the 2nd International Workshop on Regression Testing (Regression12), Montreal, QC, Canada, April 17, 2012.

[T32] Isomorphism in model tools and editors.
– 26th IEEE ACM International Conference On Automated Software Engineering (ASE11), Lawrence, KS, USA, November 9, 2011.

[T31] Speculative analysis: Exploring future states of software.
– The 15th CREST Open Workshop, London, England, UK, October 24, 2011.
– The 2010 Foundations of Software Engineering Working Conference on the Future of Software Engineering Research (FoSER10), Santa Fe, NM, USA, November 7, 2010.

[T30] Crystal: Precise and unobtrusive conflict warnings.
– The 8th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering Tool Demonstration Track (ESEC/FSE11), Szeged, Hungary, September 8, 2011.

[T29] Proactive detection of collaboration conflicts.
– The 8th Joint Meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE11), Szeged, Hungary, September 7, 2011.
– Testing Automation Group, Google Inc., Mountain View, CA, USA, December 5, 2011.

[T28] Smart redundancy for distributed computation.
– The 31st IEEE International Conference on Distributed Computing Systems (ICDCS11), Minneapolis, MN, USA, June 23, 2011.

[T27] Software self-adaptation: Automating decision making.
– Brown University, Providence, RI, USA, March 16, 2011.
– Oregon State University, Corvallis, OR, USA, February 15, 2011.
– University of Memphis, Memphis, TN, USA, February 4, 2011.

[T26] Self-assembling distributed Internet software.
– Politecnico di Milano, Milano, Italy, November 4, 2010.
– University of Lugano, Lugano, Switzerland, November 2, 2010.
– University of Zurich, Zurich, Switzerland, October 21, 2010.
– ETH Zurich, Zurich, Switzerland, October 19, 2010.
– Carnegie Mellon University, Pittsburgh, PA, USA, September 23, 2010.
– Massachusetts Institute of Technology, Cambridge, MA, USA, September 21, 2010.
– Harvard University, Cambridge, MA, USA, September 17, 2010.
– Hong Kong University of Science and Technology, Hong Kong, China, June 18, 2010.
– University of Victoria, Victoria, BC, Canada, June, 3, 2010.
– George Mason University, Fairfax, VA, USA, February 25, 2010.
– University of Maryland, College Park, MD, USA, February 24, 2010.

[T25] Improving efficiency of 3-SAT-solving tile systems.
– The 16th International Conference on DNA Computing and Molecular Programming (DNA10), Hong Kong, China, June 16, 2010.

[T24] Improving impact of self-adaptation and self-management research through evaluation methodology.
– Software Engineering for Adaptive and Self-Managing Systems (SEAMS10), Cape Town, South Africa, May 4, 2010.

[T23] Self-assembly in engineering.
– Molecular Programming Project. California Institute of Technology, Pasadena, CA, USA, July 10, 2009.

[T22] Crystal-growth-inspired algorithms for computational grids.
– Workshop on Bio-Inspired Algorithms for Distributed Systems (BADS09), Barcelona, Spain, June 19, 2009.

[T21] Improving reliability through smart redundancy.
– ISR Research Forum, University of California, Irvine, CA, USA, June 5, 2009.

[T20] How nature's self-assembly can guide computational grid design.
– Center for Systems and Software Engineering Annual Research Review, Los Angeles, CA, USA, March 17, 2009.

[T19] Mahjong.
– First Look L.A. University of California Los Angeles (UCLA), Los Angeles, CA, USA, November 12, 2008.

[T18] Tile-inspired software.
– The Winfree Group. California Institute of Technology, Pasadena, CA, USA, June 17, 2008.

[T17] Reducing tileset size: 3-SAT and beyond.
– The 14th International Meeting on DNA Computing (DNA08), Prague, Czech Republic, June 4, 2008.

[T16] Connecting the dots: Molecular machinery for distributed robotics.
– The 14th International Meeting on DNA Computing (DNA08), Prague, Czech Republic, June 3, 2008.

[T15] Harnessing biology to inspire software system design.
– Applied Computer Science Colloquium. Universität Karlsruhe, Karlsruhe, Germany, May 16, 2008.

[T14] Building biologically-inspired self-adapting systems.
– Dagstuhl Seminar 08031. Software Engineering for Self-Adaptive Systems. Wadern, Germany, January 14, 2008.

[T13] Self-assembly: Biology as a guide for system design.
– The Shakhnovich Biophysics Lab Seminar. Department of Chemistry and Chemical Biology of Harvard University, Cambridge, MA, USA, January 7, 2008.

[T12] Fault and adversary tolerance as an emergent property of distributed systems' software architectures.
– The 2nd International Workshop on Engineering Fault Tolerant Systems (EFTS07), Dubrovnik, Croatia, September 4, 2007.

[T11] Software deployment architecture and quality-of-service in pervasive environments.
– International Workshop on the Engineering of Software Services for Pervasive Environments (ESSPE07), Dubrovnik, Croatia, September 4, 2007.

[T10] Asymptotically optimal program size complexity for solving NP-complete problems in the tile assembly model.
– The 13th International Meeting on DNA Computing (DNA07), Memphis, TN, USA, June 5, 2007.

[T9] Fault-tolerant, and scalable software architectural style for Internet-sized networks.
– Institute for Software Research (ISR) Research Forum 2007, Irvine, CA, USA, June 1, 2007.

[T8] An architectural style for solving computationally intensive problems on large networks.
– Software Engineering for Adaptive and Self-Managing Systems (SEAMS07), Minneapolis, MN, USA, May 26, 2007.

[T7] Fault-tolerant, and scalable software architectural style for Internet-sized networks.
– Doctoral Symposium at the 29th International Conference on Software Engineering (ICSE07), Minneapolis, MN, USA, May 21, 2007.

[T6] Adding and multiplying in the tile assembly model.
– The 4th Foundations of Nanoscience: Self-Assembled Architectures and Devices (FNANO07), Snowbird, UT, USA, May 19, 2007.

[T5] Toward in vivo disease diagnosis and treatment using DNA.
– The 2006 International Conference on Bioinformatics & Computational Biology (BIOCOMP06), Las Vegas, NV, USA, June 29, 2006.

[T4] Building blocks for DNA self-assembly.
– USC Molecular Biology Retreat, Laguna Beach, CA, USA, November 14, 2004.

[T3] Finding latent code errors via machine learning over programs executions.
– The 26th International Conference on Software Engineering (ICSE04), Edinburgh, Scotland, UK, May 27, 2004.

[T2] Building blocks for DNA self-assembly.
– The 1st Foundations of Nanoscience: Self-Assembled Architectures and Devices (FNANO04), Snowbird, UT, USA, April 21, 2004.

[T1] Finding latent code errors via machine learning over program executions.
– EECS Masterworks Colloquium, Cambridge, MA, USA, April 30, 2003.

Professional Service

Conference Organization

2019	
ICSE	Formal Demonstrations track co-chair, 41st IEEE/ACM Intl. Conference on Software Engineering
2018	
ICSE	Poster track co-chair, 40th IEEE/ACM Intl. Conference on Software Engineering
2017	
ISSTA	Demonstration track co-chair, 25th ACM SIGSOFT Intl. Symposium on Software Testing and Analysis
2016	
ASE	Review process co-chair, 31st IEEE/ACM Intl. Conference on Automated Software Engineering
FSE	Workshop co-chair, 24th ACM SIGSOFT Intl. Symposium on the Foundations of Software Engineering
2015	
ICSE	IEEE/ACM Intl. Conference on Software Engineering Double Blind Review Task Force
NESD	Co-organizer, New England Security Day
2013	
FuSE	General co-chair, Future of Software Engineering Symposium
ICSE	Publication co-chair, 35th IEEE/ACM Intl. Conference on Software Engineering

Program Committee Membership

2018	
ICSE	40th Intl. Conference on Software Engineering
2017	
ASE	32nd IEEE/ACM Intl. Conference on Automated Software Engineering
SIGSOFT DDA	ACM SIGSOFT Distinguished Dissertation Award
ICSE	39th Intl. Conference on Software Engineering
ICSE TB	39th Intl. Conference on Software Engineering Technical Briefings Track

	2016
ICSE	38th Intl. Conference on Software Engineering
ESEC/FSE Demo	10th Joint Meeting: European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering Tool Demonstrations Track
SEAMS	11th Intl. Symposium on Software Engineering for Adaptive and Self-Managing Systems
	2015
ASE	30th IEEE/ACM Intl. Conference on Automated Software Engineering
ICSE	37th Intl. Conference on Software Engineering
SEAMS	10th Intl. Symposium on Software Engineering for Adaptive and Self-Managing Systems
SEFM	13th Intl. Conference on Software Engineering and Formal Methods
	2014
ASE	29th IEEE/ACM Intl. Conference on Automated Software Engineering
ICSE	36th Intl. Conference on Software Engineering
ICSE Demo	36th Intl. Conference on Software Engineering Formal Demonstrations Track
SEAMS	9th Intl. Symposium on Software Engineering for Adaptive and Self-Managing Systems
	2013
ASE	28th IEEE/ACM Intl. Conference on Automated Software Engineering (expert reviewer panel)
ADAPTIVE	5th Intl. Conference on Adaptive and Self-Adaptive Systems and Applications
ICSE NIER	35th Intl. Conference on Software Engineering New Ideas and Emerging Results Track
SEAMS	8th Intl. Symposium on Software Engineering for Adaptive and Self-Managing Systems
SCORE	Student Contest on Software Engineering at the 35th Intl. Conference on Software Engineering
ICSE SRC	ACM Student Research Competition at the 35th Intl. Conference on Software Engineering
SESENA	4th Intl. Workshop on Software Engineering for Sensor Network Applications
	2012
ADAPTIVE	4th Intl. Conference on Adaptive and Self-Adaptive Systems and Applications
IWSOS	6th Intl. Workshop on Self-Organizing Systems
NCA	11th IEEE Intl. Symposium on Network Computing and Applications
RACS	ACM Research in Applied Computation Symposium
SCET	Spring World Congress on Engineering and Technology
SEAMS	7th Intl. Symposium on Software Engineering for Adaptive and Self-Managing Systems
TOOLS Europe	50th Intl. Conference on Objects, Models, Components, Patterns
Regression	2nd Intl. Workshop on Regression Testing
	2011
IWSOS	5th Intl. Workshop on Self-Organizing Systems
NCA	10th IEEE Intl. Symposium on Network Computing and Applications
RACS	ACM Research in Applied Computation Symposium
SASO	5th IEEE Intl. Conference on Self-Adaptive and Self-Organizing Systems
SEAMS	6th Intl. Symposium on Software Engineering for Adaptive and Self-Managing Systems

	2010
AAMAS	9th Intl. Conference on Autonomous Agents and Multiagent Systems
AOSE	11th Intl. Workshop on Agent-Oriented Software Engineering
ICAC	7th IEEE Intl. Conference on Autonomic Computing and Communications
RACS	Intl. Conference on Reliable and Autonomous Computational Science
SOAR	2nd Intl. Workshop on Self-Organizing Architectures
SSS	12th Intl. Symposium on Stabilization, Safety, and Security of Distributed Systems, track on Self-Organizing Systems
	2009
SASO	3rd IEEE Intl. Conference on Self-Adaptive and Self-Organizing Systems
SOAR	1st Intl. Workshop on Self-Organizing Architectures
SSS	11th Intl. Symposium on Stabilization, Safety, and Security of Distributed Systems, track on Self-Organizing Systems
	2008
GSRS	Graduate Student Research Symposium, University of California, Irvine
	2007
GSRS	Graduate Student Research Symposium, University of California, Irvine

Refereeing and Reviewing

	2017
JASE	Automated Software Engineering
ACM TAAS	ACM Transactions on Autonomous and Adaptive Systems
EMSE	Empirical Software Engineering
IEEE TSE	IEEE Transactions on Software Engineering
	2016
JASE	Automated Software Engineering
ACM TAAS	ACM Transactions on Autonomous and Adaptive Systems
IEEE TSE	IEEE Transactions on Software Engineering
ACM TOSEM	ACM Transactions on Software Engineering and Methodology
	2015
ACM TAAS	ACM Transactions on Autonomous and Adaptive Systems
PLOS ONE	Public Library of Science ONE
JSERD	Journal of Software Engineering Research and Development
IEEE TSE	IEEE Transactions on Software Engineering
ACM TOSEM	ACM Transactions on Software Engineering and Methodology
	2014
ACM TAAS	ACM Transactions on Autonomous and Adaptive Systems
JCSS	Journal of Computer and System Sciences
	Computing
ICDCS	34th Intl. Conference on Distributed Computing Systems
HLPP	7th Intl. Symposium on High-level Parallel Programming and Applications
IEEE TSE	IEEE Transactions on Software Engineering
	Journal of Supercomputing

	2013
IEEE TAAS	ACM Transactions on Autonomous and Adaptive Systems
JOC	Journal of Complexity
JCSS	Journal of Computer and System Sciences
SODA	24th ACM/SIAM Symposium on Discrete Algorithms
IEEE TSE	IEEE Transactions on Software Engineering
ACM TOSEM	ACM Transactions on Software Engineering and Methodology
JSPE	Software: Practice and Experience
	2012
CHI	ACM SIGCHI Conference on Human Factors in Computing Systems
FOCS	53rd IEEE Symposium on Foundations of Computer Science
IEEE TPDS	IEEE Transactions on Parallel and Distributed Systems
	Software Engineering for Self-Adaptive Software Systems II
JSS	Journal of Systems and Software
IEEE TSE	IEEE Transactions on Software Engineering
ACM TOSEM	ACM Transactions on Software Engineering and Methodology
ACM ToC	ACM SIGACT Theory of Computing
UIST	25th ACM Symposium on User Interface Software and Technology
	2011
ASL	Advanced Science Letters
SCP	Science of Computer Programming
IEEE TC	IEEE Transactions on Computers
	Concurrency and Computation: Practice and Experience
ICSE	33rd IEEE/ACM Intl. Conference on Software Engineering
ISSRE	22nd Intl. Symposium on Software Reliability Engineering
MATCH	Communications in Mathematical and in Computer Chemistry
	Mathematical and Computer Modelling of Dynamic Systems
NaCo	Natural Computing
OOPSLA	Object-Oriented Programming, Systems, Languages and Applications
SODA	22nd ACM/SIAM Symposium on Discrete Algorithms
IEEE TSE	IEEE Transactions on Software Engineering
ACM TOSEM	ACM Transactions on Software Engineering and Methodology
STVR	Software Testing, Verification and Reliability
JSS	Journal of Systems and Software
ACM ToC	ACM SIGACT Theory of Computing
	2010
IJCM	Intl. Journal of Computer Mathematics
	Concurrency and Computation: Practice and Experience
	Discrete Applied Mathematics
ISARCS	1st Intl. Symposium on Architecting Critical Systems
	Mathematical and Computer Modelling of Dynamical Systems
TIMACS	Mathematics and Computers in Simulation
NaCo	Natural Computing
SCP	Science of Computer Programming
IEEE TSE	IEEE Transactions on Software Engineering
JSS	Journal of Systems and Software
JZUS	Journal of Zhejiang University Science C (Computers & Electronics)

	2009
ASE	24th IEEE/ACM Intl. Conference on Automated Software Engineering
	BioSystems
IJCM	Intl. Journal of Computer Mathematics
DSN WADS	8th DSN Workshop on Architecting Dependable Systems
FNCOM	Frontiers in Computational Neuroscience
ICAC	6th IEEE Intl. Conference on Autonomic Computing and Communications
IEEE TBN	IEEE Transactions on Nanobioscience
NaCo	Natural Computing
JSS	Journal of Systems and Software
	2008
ASE	23rd IEEE/ACM Intl. Conference on Automated Software Engineering
ACM TAAS	ACM Transactions on Autonomous and Adaptive Systems
	Bentham Science Publishers e-books
	Discrete Applied Mathematics
QoSA	Quality of Software-Architectures
SEAMS	3rd Intl. Workshop on Software Engineering for Adaptive and Self-Managing Systems
	Software Engineering for Self-Adaptive Software Systems
	2007
CBSE	10th Intl. ACM SIGSOFT Component-Based Software Engineering Symposium
DSN WADS	7th DSN Workshop on Architecting Dependable Systems
SASO	1st IEEE Intl. Conference on Self-Adaptive and Self-Organizing Systems
	2006
AIIM	Artificial Intelligence in Medicine

Institutional Service

2017–2018

UMass CICS executive and budget committee

2016–2017

UMass CS graduate admissions committee

2015–2016

UMass CICS executive and budget committee
UMass CICS teaching-track faculty recruiting committee
UMass CICS curriculum committee

2014–2015

UMass CS tenure-track faculty recruiting committee
UMass CS teaching-track faculty recruiting committee
UMass CS annual faculty review (AFR) personnel committee

2013–2014

UMass CS graduate admissions committee
UMass CS computing committee

2012–2013

UMass CS graduate admissions committee

2011–2012

President of the UW Computer Science & Engineering postdoctoral researchers

Other Service

Los Angeles county science fair judge 2008–09
USC graduate mentor 2007–08

Professional Associations

ACM	Association for Computing Machinery
ACM SIGSOFT	ACM Special Interest Group on Software Engineering
IEEE	The Institute of Electrical and Electronics Engineers
ISNSCE	Intl. Society For Nanoscale Science, Computation and Engineering
HKN	HKN Honor Society
UPE	ΥΠΕ Honor Society