William L. Harrison, Ph.D

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Education

2001	PhD in Computer Science	**University of Illinois at Urbana-Champaign**
1992	MS in Computer Science	**University of California, Davis**
1986	BA in Mathematics	**University of California, Berkeley**

Research Interests

Reconfigurable computing and high-level synthesis from functional languages. Computer security and, in particular, language-based methods in security; Trustworthy computing for cyber physical systems. All aspects of programming language design and implementation; Software Formal Methods for Zero-Trust Computing.

Academic and Professional Appointments

4/25-	Principal Scientist, Galois, Inc. Fully remote.
9/24-4/25	Senior Formal Methods Scientist/Directorate Fellow, Idaho National Laboratory, Idaho Falls, Idaho. Fully remote.
7/21-8/24	Senior Principal Research Scientist, High Assurance Systems Group, Two Six Technologies, Inc., Arlington VA
9/23-8/24	Critical Infrastructure Faculty Researcher, Idaho National Laboratory (DOE), Idaho Falls, ID
8/19-6/21	Senior Cybersecurity Scientist, Cyber Security Research Group (CYR), Oak Ridge National Laboratory, Oak Ridge TN
9/03-7/19	Associate Professor, Department of Computer Science, University of Missouri at Columbia. Promotion and tenure 5/26/2009
9/17-12/17	Visiting Scientist, Oak Ridge National Laboratory
8/13-7/14	Visiting Scientist, National Security Agency
4/11-7/19	Director, The Center for High Assurance Computing at the University of Missouri
6/00-8/03	Senior Research Associate & Adjunct Professor, Computer Science Dept., Oregon Graduate Institute, Beaverton OR
2000	Senior Compiler Engineer (consultant), Reservoir Laboratories, Portland, Oregon.
8/99-5/00	Visiting Lecturer, Department of Computer Science, Indiana University
Spr 1999	Visiting Lecturer, Department of Computer Science, UIUC

Funding History

This section summarizes my experience obtaining funding and performing on funded research project. In 2008, I received a CAREER award from the National Science Foundation.

DARPA Proposals & Experience at Two Six Technologies

While at Two Six Technologies, I wrote successful Defense Advanced Research Projects Agency (DARPA) proposals as part of a team, and performed in the roles of Principal Investigator and Research Scientist. This list only includes unclassified roles. I have also not included the numerous DARPA proposals I contributed to significantly while at Two Six.

Program: HARDEN: Hardening Development Toolchains against Emergent Execution.
Start Date: October 2022.
Role: Proposal writer and Principal Investigator.

Program: DPRIVE: Data Protection In Virtual Environments.
Roles: Research Scientist (7/21-7/23) and Principal Investigator (8/23-8/24). My functional hardware language ReWire is a central, critical technology in Two Six's DPRIVE research.

Laboratory Directed Research and Development (LDRD) Projects

Agency: US Department of Energy/Idaho National Laboratory.
Title: Physical Modeling for Assured Cyber Resilience (LDRD).
Amount: $1,510,000.
Period: October 2024 – September 2027.
Role: Principal investigator.

Agency: US Department of Energy/Oak Ridge National Laboratory.
Title: Expanding the High-Level Synthesis Trust Zone (LDRD SEED).
Amount: $190,000.
Period: October 2020 – September 2021.
Role: Sole Principal investigator (until 7/21 when I joined Two Six Technologies).

Funded Research at the University of Missouri

Total funding during this period is $4,718,292.
Agency: US Naval Research Laboratory.
Title: Mechanizing the Metatheory of the ReWire Language with Applications.
Amount: $720,000.
Period: May 2016 – August 2019.
Role: Sole Principal investigator.

Agency: US Naval Research Laboratory.
Title: Integrated Formal Methods for Secure FPGA Development.
Amount: $300,000.
Period: January 2019 – December 2021.
Role: Sole Principal investigator.

Agency: US Naval Research Laboratory.
Title: Type-Based Analysis of Security Flows in ReWire Circuit Specifications.
Amount: $99,999.
Period: October 2014 – October 2015.
Role: Sole Principal investigator.

Agency: National Security Agency.
Title: Inter-agency Personnel Agreement.
Amount: $144,190.00
Period: August 2013 – August 2014.

Agency: Department of Defense, Federal Voting Assistance Program (FVAP).
Title: Secure Ballot Delivery to UOCAVA Voters (Uniformed, Overseas, Citizens Absentee Voters).
Amount: $550,000.
Period: May 1, 2012 – April 30, 2015.
Role: Collaborative research with Dr. Dale Musser of MU's Information Technology Program and Dr. Keith Politte of MU's Reynolds School of Journalism.

Agency: Department of Education.
Title: Graduate Assistance in Areas of National Need (GAANN) Fellowships.
Amount: $240,000.
Period: September 1, 2011 – May 15, 2015.
Role: Co-Investigator. Two of my Ph.D students (Adam Procter and Christopher Hathhorn) were GAANN fellows.

Agency: National Science Foundation.
Title: CAREER: Automated Synthesis of High Assurance Security Kernels.
Amount: $450,000.
Period: June 1, 2008 – May 31, 2013.
Role: Sole Principal Investigator.

Agency: Office of the Asst. Secretary of Defense for Research and Development (ASD(R&E)).
Title: Understanding Security Flows in the Many Core Era.

Amount: $1,370,000.
Period: January 2012 – July 2015.
Role: Principal Investigator. Collaborative Research with Dr. David Andrews (University of Arkansas) and Dr. Gerard Allwein (NRL).

Agency: US Naval Research Laboratory.
Title: MILS Hardware and Its Formal Methods-based Security.
Amount: $810,000.
Period: April 2008 – April 2011.
Role: Principal Investigator. Collaborative Research with Dr. David Andrews (University of Arkansas) and Dr. Gerard Allwein (NRL).

Agency: Department of Defense through OHSU/OGI.
Title: System Information Assurance II
Amount: $31,703
Period: July 1, 2004 – July 31, 2006
Role: Principal Investigator
Agency: University of Missouri-Columbia Research Council.
Title: Big Twelve Faculty Fellowship
Amount: $2,400
Period: June 1, 2005 – August 31, 2005
Role: Sole Principal Investigator

Peer-reviewed Publications

Book Chapters

Gerard Allwein and William L. Harrison. Distributed Relation Algebra. *Relevance Logics and other Tools for Reasoning. Essays in Honor of J. Michael Dunn, Book Chapter, pages 1-30, Springer Verlag, 2022.*

Gerard Allwein and William L. Harrison. Distributed Modal Logic. *J. Michael Dunn on Information Based Logics, Book Chapter, pages 331-362, Springer Verlag, 2016.*

Journal Publications

Thomas Reynolds, Adam Procter, William L. Harrison, and Gerard Allwein. The Mechanized Marriage of Effects and Monads with Applications to High Assurance Hardware. *ACM Transactions on Embedded Computing Systems*, 2019, vol. 18, pages 1-26.

Gerard Allwein, William L. Harrison, and Thomas Reynolds. Distributed Relation Logic. *Logic and Logical Philosophy*, volume 26, number 1, March 2017, pages 19-61.

Adam Procter, William L. Harrison, Ian Graves, Michela Becchi, and Gerard Allwein. A Principled Approach to Secure Multi-Core Processor Design with ReWire *ACM Transactions on Embedded Computing Systems*, volume 16, number 2, Article 33 (January 2017).

Gerard Allwein, William Harrison and David Andrews. Simulation logic. *Logic and Logical Philosophy, vol. 26, no. 3,* 2014.

G. Allwein, Y. Yang, and W. L. Harrison. Qualitative decision theory via channel theory. *Logic and Logical Philosophy*, Volume 20, Number 1-2 (2011), pages 81–110.

W. L. Harrison and J. Hook. Achieving information flow security through monadic control of effects. *Journal of Computer Security*, 17:599–653, October 2009.

X. Z. Fu, H. Wang, W. L. Harrison, and R. Harrison. RNA pseudoknot prediction using term rewriting. *International Journal of Data Mining and Bioinformatics*, 2(1):78-93, February 2008.

W. L. Harrison and R. B. Kieburtz. The logic of demand in Haskell. *Journal of Functional Programming*, 15(6):837–891, 2005.

W. L. Harrison. Cheap (but functional) threads. 44 pages. Accepted for publication in: *Higher-Order Symbolic Computation*.

CONFERENCE PUBLICATIONS

1. Arthur Amorim, Max Taylor, Gary T. Leavens, William Harrison, Lance Joneckis, and Trevor Kann. Enforcing MAVLink Safety & Security Properties via Refined Multiparty Session Types. To appear: *Proceedings of the 2025 NASA Formal Methods Symposium (NFM25).*

2. Yakir Forman and William L. Harrison. Temporal Staging for Correct-by-Construction Cryptographic Hardware. *Proceedings of the 2024 Rapid Systems Prototyping Symposium (RSP24).*

3. William L. Harrison, Ian Blumenfeld, Eric Bond, Chris Hathhorn, Paul Li, May Torrence, and Jared Ziegler. Formalized High Level Synthesis with Applications to Cryptographic Hardware. *Proceedings of the 2023 NASA Formal Methods Symposium (NFM23).*

4. William L. Harrison, Chris Hathhorn, and Gerard Allwein. A Mechanized Semantic Metalanguage for High Level Synthesis. *Proceedings of 23rd International Symposium on Principles*

and Practice of Declarative Programming (PPDP 2021).

5. Thomas Reynolds, William L. Harrison, Rohit Chadha, and Gerard Allwein. Strongly Bounded Termination with Applications to Security and Hardware Synthesis. *Proceedings of ACM Workshop on Type Driven Development (TyDe 2020).*

6. William L. Harrison and Gerard Allwein. Verifiable Security Templates for Hardware. *Proceedings of Design, Automation, and Test in Europe (DATE 20).*

7. William L. Harrison and Gerard Allwein. Language Abstractions for Hardware-based Control-Flow Integrity Monitoring. *Proceedings of the International Conference on Reconfigurable Computing and FPGAs (ReConFig18).*

8. William L. Harrison and Gerard Allwein. Semantics-directed Prototyping of Hardware Runtime Monitors. *Proceedings of the 29th International Symposium on Rapid System Prototyping (RSP) (RSP18).*

9. Thomas N. Reynolds, Adam Procter, William L. Harrison, and Gerard Allwein. A Core Calculus for Secure Hardware: Its Formal Semantics and Proof System. *Proceedings of the 15th ACM-IEEE International Conference on Formal Methods and Models for System Design (MEMOCODE17)*, 2017.

10. William L. Harrison, Adam Procter, and Gerard Allwein. Model-driven Design & Synthesis of the SHA-256 Cryptographic Hash Function in ReWire. *Proceedings of the 27th International Symposium on Rapid System Prototyping (RSP), 2016.*

11. William L. Harrison, Adam Procter, Ian Graves, Michela Becchi, and Gerard Allwein. A Programming Model for Reconfigurable Computing Based in Functional Concurrency. *Proceedings of the 11th International Symposium on Reconfigurable Communication-centric Systems-on-Chip (ReCoSoC 2016).*

12. Ian Graves, Adam Procter, William L. Harrison, and Gerard Allwein. Provably Correct Development of reconfigurable hardware designs via equational reasoning. *Proceedings of the 2015 International Conference on Field-Programmable Technology (FPT '15).*

13. Adam Procter, William L. Harrison, Ian Graves, Michela Becchi, and Gerard Allwein. Semantics driven hardware design, implementation, and verification with ReWire. *ACM SIGPLAN/SIGBED Conf. on Languages, Compilers, Tools and Theory for Embedded Systems (LCTES), 2015.*

14. Ian Graves, Adam Procter, William L. Harrison, Michela Becchi and Gerard Allwein. Hardware Synthesis from Functional Embedded Domain-Specific Languages. *Proceedings of the 2015 11th International Symposium on Applied Reconfigurable Computing.*

15. Adam Procter, William L. Harrison, Ian Graves, Michela Becchi and Gerard Allwein. Semantics-directed Machine Architecture in ReWire. *Proceedings of the 2013 International Conference on Field Programmable Technology.*

16. Robert Harrison and William L. Harrison. Quantitative Analysis of Error Injection Covert Channels. *Proceedings of the International Workshop on Quantitative Aspects in Security Assurance (QASA 2013).*

17. William L. Harrison, Adam Procter and Gerard Allwein. The Confinement Problem in the Presence of Faults. *Proceedings of the 2012 International Conference on Formal Engineering Methods.*

18. Chris Hathhorn, Michela Becchi, William L. Harrison and Adam Procter Formal Semantics of Heterogeneous CUDA-C: A Modular Approach with Applications. *Proceedings of the 2012 Systems Software Verification Conference.*

19. Gerard Allwein, William L. Harrison and David Andrews. Simulation Logic. *Proceedings of the 2012 Conference on Non-Classical Logics.*

20. Adam Procter, William L. Harrison and Aaron Stump. The Design of a Practical Proof Checker for a Lazy Functional Language. *Proceedings of the 2012 Trends in Functional Programming Conference.*

21. W. L. Harrison, B. Schulz, A. Procter, A. Lukefahr, and G. Allwein. Towards semantics-directed system design and synthesis. In *Proceedings of the 2011 International Conference on Engineering Reconfigurable Systems and Algorithms (ERSA11)*, 2011.

22. G. Allwein and W. L. Harrison. A channel theoretic account of separation security. In *Proceedings of the 2011 International Conference on Engineering Reconfigurable Systems and Algorithms (ERSA11)*, 2011.

23. G. Allwein, Y. Yang, and W. L. Harrison. Decision theory via channel theory. In *Proceedings of the Logic in Cognitive Science Conference*. The Nicolaus Copernicus University Press, 2010.

24. G. Allwein and W. L. Harrison. Partially-ordered modalities. In *Proceedings of the Advances in Modal Logic (AiML) Conference*, pages 1–21, 2010.

25. W. L. Harrison, A. Procter, J. Agron, G. Kimmel, and G. Allwein. Model-driven engineering from modular monadic semantics: Implementation techniques targeting hardware and software. In *DSL '09: Proc. of the IFIP TC 2 Working Conference on Domain-Specific Languages*, pages 20–44, 2009.

26. W. L. Harrison, G. Allwein, A. Gill, and A. Procter. Asynchronous exceptions as an effect. In *Proceedings of the Mathematics of Program Construction (MPC08)*, pages 153–176, 2008.

27. P. S. Kariotis, A. M. Procter, and W. L. Harrison. Making monads first-class with template haskell. In *Proceedings of the first ACM SIGPLAN Symposium on Haskell*, Haskell '08, pages 99–110, New York, NY, USA, 2008. ACM.

28. W. L. Harrison. The essence of multitasking. In *11th International Conference on Algebraic Methodology and Software Technology (AMAST 2006)*, pages 158–172, July 2006.

29. W. L. Harrison. Proof abstraction for imperative languages. In *Proceedings of the 4th Asian Symposium on Programming Languages and Systems (APLAS06)*, pages 97–113, 2006.

30. W. L. Harrison and J. Hook. Achieving information flow security through precise control of effects. In *18th IEEE Computer Security Foundations Workshop (CSFW05)*, pages 16–30, Aix-en-Provence, France, June 2005.

31. W. L. Harrison. A simple semantics for polymorphic recursion. In *Proceedings of the 3rd Asian Symposium on Programming Languages and Systems (APLAS05)*, pages 37–51, Tsukuba, Japan, November 2005.

32. X. Z. Fu, H. Wang, W. L. Harrison, and R. Harrison. RNA pseudoknot prediction using term rewriting. In *Proceedings of IEEE Fifth Symposium on Bioinformatics and Bioengineering (BIBE05)*, pages 169–176, Minneapolis, MN, October 2005.

33. W. L. Harrison and R. W. Harrison. Domain specific languages for cellular interactions. In *Proceedings of the 26th Annual IEEE International Conference on Engineering in Medicine and Biology (EMBC04)*, September 2004.

34. W. L. Harrison, M. Tullsen, and J. Hook. Domain separation by construction. In *LICS03 Satellite Workshop on Foundations of Computer Security (FCS03)*, June 2003. 21 pages.

35. W. L. Harrison, T. Sheard, and J. Hook. Fine control of demand in Haskell. In *6th International Conference on the Mathematics of Program Construction (MPC02), Dagstuhl, Germany*, volume 2386 of *Lecture Notes in Computer Science*, pages 68–93. 2002.

36. W. L. Harrison and R. Kieburtz. Pattern-driven reduction in haskell. In *2nd International Workshop on Reduction Strategies in Rewriting and Programming (WRS02)*, Copenhagen, Denmark, 2002.

37. W. L. Harrison and T. Sheard. Dynamically adaptable software with metacomputations in a staged language. In *Proceedings of the Second International Workshop on Semantics, Applications, and Implementation of Program Generation (SAIG)*, volume 2196 of *Lecture Notes in Computer Science*, pages 163–182, Florence, Italy, 2001. Springer-Verlag.

38. W. L. Harrison and S. Kamin. Metacomputation-based compiler architecture. In *5th International Conference on the Mathematics of Program Construction, Ponte de Lima, Portugal*, volume 1837 of *Lecture Notes in Computer Science*, pages 213–229. Springer-Verlag, 2000.

39. W. L. Harrison and S. N. Kamin. Modular compilers based on monad transformers. In *Proceedings of the 1998 International Conference on Computer Languages*, pages 122–131. IEEE Computer Society Press, 1998.

40. W. L. Harrison, K. Levitt, and M. Archer. An HOL mechanization of the axiomatic semantics of a simple distributed programming language. In *Proceedings of the International Workshop on Higher-Order Logic Theorem Proving and Its Applications*, pages 347–358, Leuven, Belgium, September 1992.

41. W. L. Harrison and K. Levitt. Mechanizing security in HOL. In *Proceedings of the 1991 International Workshop on the HOL Theorem Proving System and its Applications*, pages 63–66, Davis, California, 1991. IEEE Computer Society Press.

Dissertation and Master's Thesis

1. W. L. Harrison. *Modular Compilers and Their Correctness Proofs*. PhD thesis, University of Illinois at Urbana-Champaign, 2001.

2. W. L. Harrison. *Mechanizing the axiomatic semantics for a programming language with asynchronous send and receive in HOL.* Master's thesis, University of California, Davis, 1992.

Technical Reports

1. Gerard Allwein and William L. Harrison. Distributed Logics. Technical Report NRL/MR/5540-14-9565, US Naval Research Laboratory, 2014.

2. W. L. Harrison. Mechanizing the Axiomatic Semantics for a Programming Language with Asynchronous Send and Receive in HOL. Technical Report CSE-92-20, University of California at Davis, 1992.

3. W. Harrison, K. Levitt, and M. Archer. Towards a Verified Code Basis for a Secure Distributed Operating System. Technical Report CSE-92-19, University of California at Davis, 1992.

Selected Honors, Memberships, and Service

1. Program Committee member, Formal Methods in Computer-Aided Design (FMCAD) in 2023 and 2024.

2. Founder, Cyber Security Center @ Mizzou (weblink).

3. Lead successful effort to earn the University of Missouri accreditation as a National Security Agency Center of Research Excellence in 2019.

4. Program Committee member, 2019 International Conference on Reconfigurable Computing and FPGAs (ReConFig), 2019.

5. Program Committee member, 13th International Conference on Mathematics of Program Construction (MPC), 2019.

6. Program Committee member, 2018 International Conference on Reconfigurable Computing and FPGAs (ReConFig), 2018.

7. Program Committee member, 30th International Conference on Computer Aided Verification (CAV), 2018.

8. Selected for Intel Corporation's 2017 Hardware Accelerator Research Program.

9. Program Chair for Seventh Workshop on Design, Modeling and Evaluation of Cyber Physical Systems (CyPhy'17).

10. Organized special session entitled *The Confluence of Secure Hardware and Programming Languages* for the International Conference on Engineering of Reconfigurable Systems and Algorithms (ERSA 11).

11. Recipient, National Science Foundation CAREER award (CyberTrust program) in 2008.

12. Received *Certificate of Appreciation* from the University of Missouri College of Engineering Graduating Seniors on December 11, 2009 for teaching excellence.

13. Member of ACM and IEEE.

14. Lead successful effort to earn the University of Missouri accreditation as a National Security Agency Center of Academic Excellence in 2007.

15. Invited participant to the NSF High-Confidence Software Platforms for Cyber-Physical Systems (HCSP-CPS) Workshop, November 30-December 1, 2006 in Alexandria, Virginia.

16. Summer Faculty Fellow to the 2006 Office of Naval Research/ASEE Summer Faculty Research Program. Research performed in the Software Engineering Section of the Naval Research Laboratory's Center for High Assurance Computer Systems in Washington, DC.

17. Member of the program committees for the *Colloquium for Information Systems Security Education* (CISSE 2011, 2012), *ACM Symposium on the Implementation of Functional Languages* (IFL11), *ACM SIGPLAN 2008 Haskell Symposium* (Haskell08), the *7th International Conference on the Mathematics of Program Construction* (MPC06).

18. Reviewer for the *Journal of Computer Security* (JCS), the *Journal of Functional Programming* (JFP), the *ACM Transactions on Programming Languages and Systems* (TOPLAS), the *Theoretical Computer Science* (TCS), the *Journal of Software Testing, Verification and Reliability*, the *ACM Journal of Experimental Algorithmics* (JEA), and the *American Medical Informatics Association Symposium 2005* (AMIA 2005).

19. Received *Big Twelve Faculty Fellowship*, University of Missouri, Columbia; visited University of Kansas System Level Design (SLDG) and Hybrid Threads groups.

20. University of Missouri nominee for 2005 *Microsoft New Faculty Fellowship* for Bioinformatics research.

21. Frequent invitations to serve and participation (usually once or twice per year) on National Science Foundation review panels.

22. Chaired recruiting committee that ultimately resulted in the hiring of Drs. Rohit Chadha and Prasad Calyam in the MU Computer Science department.

Invited Talks and Conference Presentations

1. *Why Functional Hardware Description Matters*. Sandia Laboratory, Ratish Punnoose (host). 12/20/24.

2. *Why Functional Hardware Description Matters*. SRI International. 11/30/24.

3. *Why Functional Hardware Description Matters*. Galois. 7/5/23.

4. *A Mechanized Semantic Metalanguage for High Level Synthesis*. 23rd International Symposium on Principles and Practice of Declarative Programming (PPDP 2021), September 8, 2021. Video.

5. *Strongly Bounded Termination with Applications to Security and Hardware Synthesis*. ACM Workshop on Type Driven Development (TyDe 2020), August 22, 2020. Video.

6. *Verifiable Security Templates for Hardware*. 2020 Design, Automation, and Test Europe Conference, March 11, 2020. Video.

7. *Language Abstractions for Hardware-based Control-Flow Integrity Monitoring*. International Conference on Reconfigurable Computing and FPGAs (ReConFig), December 2018.

8. *Semantics-directed Prototyping of Hardware Runtime Monitors*. The 29th International Symposium on Rapid System Prototyping (RSP), October 2018.

9. *Why Functional Hardware Description Matters.* Oak Ridge National Laboratory, Oak Ridge TN, 3/13/2017.

10. *Model-driven Design & Synthesis of the SHA-256 Cryptographic Hash Function in ReWire.* The 27th International Symposium on Rapid System Prototyping (RSP), 2016.

11. *A Programming Model for Reconfigurable Computing Based in Functional Concurrency.* The 11th International Symposium on Reconfigurable Communication-centric Systems-on-Chip (ReCoSoC 2016).

12. *Provably Correct Development of reconfigurable hardware designs via equational reasoning.* The 2015 International Conference on Field-Programmable Technology (FPT 2015).

13. *High Assurance Hardware with ReWire: Just Say No! to Semantic Archaeology.* The Technical Cooperation Program (TTCP) workshop, Defence Science & Technology Organization (DSTO), Adelaide Australia, 5/18/2015.

14. *High Assurance Hardware with ReWire: Just Say No! to Semantic Archaeology.* High Confidence Software and Systems (HCSS) NSA workshop, Annapolis MD, 5/6/2015.

15. *High Assurance Hardware with ReWire: Just Say No! to Semantic Archaeology.* Oak Ridge National Laboratory, Oak Ridge TN, 3/3/2015.

16. *The Confinement Problem in the Presence of Faults.* Proceedings of the 2012 International Conference on Formal Engineering Methods.

17. *Towards semantics-directed system design and synthesis.* International Conference on Engineering Reconfigurable Systems and Algorithms (ERSA), 7/19/2011.

18. *Understanding Security Flows in the Many Core Era.* National Security Agency, Information Assurance Directorate, 10/14/2010, Sponsor: Brad Martin.

19. *An Academic Response to National Science and Technology Challenges.* Department of Defense Intelligence Information Systems (DoDIIS) Worldwide Conference, 5/26/2010.

20. *Model-driven Synthesis of High Assurance Secure Systems.* University of Iowa, 10/23/09, Sponsor: Professor Aaron Stump.

21. *Model-driven Synthesis of High Assurance Secure Systems.* Galois, Inc., 5/20/08, Sponsor: John Launchbury.

22. *Compiling for Security.* Missouri Institute of Technology (formerly University of Missouri, Rolla), 4/28/08, Sponsor: Professor Bruce McMillen.

23. *Proof Abstraction for Imperative Languages.* The 4th Asian Symposium on Programming Languages and Systems (APLAS06), Sydney, Australia, 11/8/2006.

24. *The Essence of Multitasking.* The 11th International Conference on Algebraic Methodology and Software Technology (AMAST06), Kuuresaare, Estonia, 7/5/06.

25. *Domain-specific Languages for Cellular Interactions.* University of Kansas, 4/29/05, Sponsor: Professor Perry Alexander.

26. *A Simple Semantics for Polymorphic Recursion.*, Proceedings of the 3rd Asian Symposium on Programming Languages and Systems (APLAS05), Tsukuba, Japan, 11/3/2005.

27. *Achieving Information Flow Security Through Precise Control of Effects.* The 18th IEEE Computer Security Foundations Workshop (CSFW05), Aix-en-Provence, France, 7/20/05.

28. *Information-flow Security & Monadic Effects.* University of Illinois at Urbana-Champaign, 4/18/2005, Sponsor: Professor José Meseguer.

29. *Domain-specific Languages for Cellular Interactions.* The 26th Annual IEEE International Conference on Engineering in Medicine and Biology, San Francisco, California, 9/3/04.

30. *Domain-specific Languages for Biology.* Georgia State University, 5/26/2004, Sponsor: Professor Yi Pan.

31. *Domain Separation by Construction.* LICS03 Satellite Workshop on Foundations of Computer Security (FCS03), Ottawa, Canada, 6/26/03.

32. *Prospects for Modular Compilation.* Rice University, 12/11/2002, Sponsor: Professor Walid Taha.

33. *Domain-specific Languages for Compilation.* University of Alabama, 11/22/2002, Sponsor: Professor Joel Jones.

34. *Pattern-driven Reduction in Haskell.* Second International Workshop on Reduction Strategies in Rewriting and Programming, Copenhagen, Denmark, 7/21/02.

35. *Fine Control of Demand in Haskell.* The Sixth International Conference on the Mathematics of Program Construction (MPC02), Dagstuhl, Germany, 7/8/02.

36. *Dynamically Adaptable Software with Metacomputations in a Staged Language.* The Second Workshop on the Semantics, Applications and Implementation of Program Generation (SAIG01), Florence, Italy, 9/6/01.

37. *Metacomputation-based Compiler Architecture.* The Fifth International Conference on the Mathematics of Program Construction (MPC00), Ponte de Lima, Portugal. 7/5/00.

38. *Modular Compilers Based on Monad Transformers.* The IEEE International Conference on Computer Languages (ICCL98), Chicago, Illinois. 5/16/98.

Students & Postdocs Supervised

Postdoctoral Researchers Supervised

1. Adam Procter. 1/2015-5/2016.

2. Soumya Sanyal. 9/2013-9/2015.

Graduated Ph.D Students

1. Adam Procter. GAANN fellow. Graduated: 12/2014.
   Dissertation: *Semantics-directed Design and Implementation of High Assurance Hardware*.

2. Ian Graves. Graduated: 12/2015.
   Dissertation: *Device-level Composition in ReWire*.

3. Christopher Hathhorn. GAANN Fellow. Graduated: 12/2017.
   Dissertation: *Defining the Undefinedness of C11: Practical Semantics-based Program Analysis*.

4. Thomas Reynolds. Graduating 12/13/2019.
   Dissertation: *Mechanizing the Metatheory of ReWire*.

Graduated MS Students

1. Daniel Dunn. Thesis: Penetration Testing FOSCAM IP Cameras. Graduated: 5/2018.

2. Zolbayar Magsar. Graduated: 5/2016.

3. Richard Wallen. Graduated: 12/2015.

4. Mohammed Alharbi. Graduated: 5/2013.

5. Jared Kvanvig. Thesis: Compiler Infrastructure for the Cheap Threads Compiler. Graduated: 12/2009.

6. Ajay Nagar. Non-thesis. Graduated: 5/2009.

7. Megha Rao. Thesis: Physical Security in a Nuclear Environment. Graduated: 12/2008.

8. Pericles S. Kariotis. Thesis: Making Monads First-class Using Template Haskell. Graduated: 12/2008.

References

Available by request.