

# Stephanie Weirich

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## Positions

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<b>University of Pennsylvania</b> <i>ENIAC President's Distinguished Professor</i>	<b>Philadelphia, Pennsylvania</b> <i>September 2019-present</i>
<b>Galois, Inc</b> <i>Visiting Scientist</i>	<b>Portland, Oregon</b> <i>June 2018-August 2019</i>
<b>University of Pennsylvania</b> <i>Professor</i>	<b>Philadelphia, Pennsylvania</b> <i>July 2015-August 2019</i>
<b>University of Pennsylvania</b> <i>Associate Professor</i>	<b>Philadelphia, Pennsylvania</b> <i>July 2008-June 2015</i>
<b>University of Cambridge</b> <i>Visitor</i>	<b>Cambridge, UK</b> <i>August 2009-July 2010</i>
<b>Microsoft Research</b> <i>Visiting Researcher</i>	<b>Cambridge, UK</b> <i>September-November 2009</i>
<b>University of Pennsylvania</b> <i>Assistant Professor</i>	<b>Philadelphia, Pennsylvania</b> <i>July 2002-July 2008</i>
<b>Cornell University</b> <i>Instructor, Research Assistant and Teaching Assistant</i>	<b>Ithaca, New York</b> <i>August 1996-July 2002</i>
<b>Lucent Technologies</b> <i>Intern</i>	<b>Murray Hill, New Jersey</b> <i>June-July 1999</i>

## Education

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<b>Cornell University</b> <i>Ph.D., Computer Science</i>	<b>Ithaca, NY</b> <i>2002</i>
<b>Cornell University</b> <i>M.S., Computer Science</i>	<b>Ithaca, NY</b> <i>2000</i>

**Rice University**

*B.A., Computer Science, magnum cum laude*

**Houston, TX**

*1996*

## Honors

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- SIGPLAN Robin Milner Young Researcher award, 2016
- Most Influential ICFP 2006 Paper, awarded in 2016
- Microsoft Outstanding Collaborator, 2016
- Penn Engineering Fellow, University of Pennsylvania, 2014
- Institute for Defense Analyses Computer Science Study Panel, 2007
- National Science Foundation CAREER Award, 2003
- Intel Graduate Student Fellowship, 2000–2001
- National Science Foundation Graduate Research Fellowship, 1996–1999
- CRA-W Distributed Mentorship Project Award, 1996
- Microsoft Technical Scholar, 1995–1996

## Teaching Experience

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### University of Pennsylvania.....

- CIS 120 - Programming Languages and Techniques I  
Spring 2022, Spring 2021, Spring 2020, Spring 2018, Spring 2016, Spring 2015, Spring 2014, Spring 2013, Spring 2012, Spring 2011, Fall 2008, Spring 2008, Spring 2007
- CIS 552 - Advanced Programming  
Fall 2022, Fall 2021, Fall 2020, Fall 2019, Fall 2017, Spring 2017, Fall 2015, Fall 2013, Fall 2012, Fall 2011
- CIS 670/700 - Advanced topics in Programming Languages  
Fall 2016, Fall 2010, Spring 2009, Fall 2006, Spring 2006, Fall 2002
- CIS 500 - Software Foundations  
Fall 2014, Fall 2005, Fall 2004
- CIS 340 - Principles of Programming Languages  
Spring 2004, Spring 2003

### Cornell University.....

- CS 212 - Java Practicum
- CS 213 - C++ Programming
- CS 214 - A Taste of UNIX and C

## Students

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### Dissertation supervision (current students).....

- Yao Li, expected graduation summer 2022
- Pritam Chaudhury, expected graduation autumn 2022
- Yiyun, Liu.

### Postdoc supervision.....

- Joachim Breitner, Aug 2016-2018.

### Dissertation supervision (graduated students).....

- Antal Spector-Zabusky, May 2021. *Don't mind the formalization gap: The Design and Usage of hs-to-coq*. Current position: Jane Street.
- Richard Eisenberg, December 2016. *Dependently-Typed Haskell*. Current position: Assistant professor, Bryn Mawr College. *Co-winner of Morris and Dorothy Rubinoff award*.
- Vilhelm Sjöberg, May 2015. *A Dependently Typed Language with Non-termination*. Current position: Postdoc, Yale University. *Co-winner of SIGPLAN 2016 John C. Reynolds Doctoral Dissertation award*.
- Brent Yorgey, December 2014. *Combinatorial Species and Labelled Structures*. Current position: Assistant Professor, Hendrix College.
- Chris Casinghino, December 2014. *Combining Proofs and Programs*. Current position: Draper Laboratory.
- Dimitrios Vytiniotis, August 2008. *Practical type inference for first-class polymorphism*. Current position: Google DeepMind, London, UK.
- Geoffrey Washburn, December 2007. *Principia Narcissus: How to avoid being caught by your reflection*. Current position: Logicblox.

### Dissertation committee member.....

- Nicholas Rioux, Penn.
- Paul He, Penn.
- Li-Yao Xia, Penn. June 2022.
- Teng Zheng, Penn. October 2021.
- Robert Rand, Penn. November 2018.
- William Bowman, Northeastern University, November 2018.
- Steven Keuchel, University of Ghent, June 2018.
- Jennifer Paykin, Penn, May 2018.
- Leonidas Lampropoulos, Penn, May 2018.
- Arthur Azevedo de Amorim, Penn, September 2017.
- Peter Michael Osera, Penn, July 2015.
- Daniel Wagner, Penn, June 2014.

- Harley Eades III, University of Iowa, May 2014.
- Julien Cretin, INRIA / University Paris 7, January 2014.
- Michael Greenberg, Penn (chair), December 2013.
- Hongbo Zhang, Penn, Master's thesis, December 2013.
- Klara Mazurak, Penn (chair), May 2013.
- Jianzhao Zhao, Penn, April 2013.
- Aaron Bohannon, Penn, February 2012.
- Jean-Philippe Bernardy, Chalmers ("Faculty Opponent"), Gothenburg, Sweden, June 2011.
- Jeffrey Vaughan, Penn, December 2009.
- Boris Yakobowski, INRIA / University Paris 7, December 2008.
- Dan Dantas, Princeton University, August 2007.
- Stephen Tse, Penn, August 2007.
- Wahnghong Nam, Penn, December 2006.
- Joeseeph Vanderwaart, Carnegie Mellon University, August 2006.
- Vladimir Gapayev, Penn, January 2006.

#### **Visiting PhD student supervision.....**

- Pedro Henrique Azevedo de Amorim, Mar-Aug 2016.
- Antoine Voizard, École Normale Supérieure, Paris. Mar-Aug 2014.
- Steven Keuchel, University of Ghent, Sep 2013-Mar 2014.
- Arthur Charguéraud (co-supervised with Benjamin Pierce), INRIA, 2007.

#### **Independent study.....**

- Doctoral: Yiyun Liu (Fall 2021, Spring 2022). Jessica Shi, Fall 2021. Irene Yoon, Spring 2020. Hengchu Zhang, Yao Li, Spring 2017. Antoine Voizard, Kenny Foner, Fall 2015. Antal Spector-Zabusky, Spring 2016, Spring 2013. Jennifer Paykin, Fall 2012. Richard Eisenberg, Justin Hsu, Spring 2012. Richard Eisenberg, Hongbo Zhang. Fall 2011. Brent Yorgey, Peter-Michael Osera, Vilhelm Sjöberg. Fall 2008-Spring 2009. Chris Casinghino, Spring 2008. Andrew Hilton (co-advised), Karl Mazurak, Jeff Vaughan, Fall 2004. Liang Huang, Spring 2004.
- Masters: Eric Giovanni, Spring 2020. Dominik Bollman, Spring 2016. Simon Wimmer, Summer 2015.
- Undergraduate Senior Design Project: Memoria Matters and Lauren Leung, 2016-2017 (Honoable Mention). Charles Du 2017, Max McCarthy 2016. Lewis Ellis, Max Scheiber, Ashutosh Goel, and Jeff Grimes (Honorable Mention). Tiernan Garsys, Taylor Mandel, Lucas Peña, and Noam Zilberstein (Third place). 2014-2015. Kaycee Anderson, Juan Jose Lopez, Caroline Ho, and Johanna Martens (Honorable Mention), 2013-2014.

- Undergraduate Research: Daniel Lee, 2021. Joshua Cohen, 2018. Emmanuel Suarez, 2017-2018. Anastasiya Kravchuk-Kirilyuk, 2017. Matthew Weaver 2015-2016. Leondra Morse, Summer 2015 (CRA-DREU). Mitchell Stern, Spring 2014. Hamidhasan Ahmed, Spring 2014, Summer 2013. Sneha Popley, Summer 2008 (CRA-DREU). Stephanie Simon, Summer 2008. David Gorski, Fall 2006. Parshant Mittal, Atish Davda, Fall 2005. Neal Parikh, Summer 2004.

## Research Community Service

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### Conference and Symposium Leadership.....

- International Conference on Functional Programming (ICFP) 2020, general chair.
- Principles of Programming Languages (POPL) 2019, program chair.
- International Conference on Functional Programming (ICFP) 2010, program chair.
- Haskell Symposium 2009, program chair.

### Journal Leadership.....

- Associate Editor of ACM TOPLAS, 2019-present.
- Editorial Board of Logical Methods in Computer Science, 2016-present.
- Editorial Board of TheoreTICs, 2021-present.
- Editor of Journal of Functional Programming, 2011-2017.
- Guest Editor (with Zhenjiang Hu, Shin-Cheng Mu), Progress in Informatics. Special Issue on Advanced Programming Techniques for Construction of Robust, General and Evolutionary Programs, March 2013.
- Guest Editor (with Benjamin Pierce), Journal of Automated Reasoning. Special Issue on the POPLmark Challenge. October 2012.
- Editorial Board, Foundations and Trends in Programming Languages, 2012-present.
- Nomination committee, SIGPLAN CACM Research Highlights, 2009-2011.

### Workshop Leadership.....

- DeepSpec Workshop, 2018. Co-located with PLDI, co-organizer.
- Dagstuhl seminar “Language Based Verification Tools for Functional Programs” (16131), April 2016, co-organizer.
- Dependently-Typed Programming Workshop (DTP) 2013, program chair and organizer.
- Shonan Village Dependently-Typed Programming, 2011, co-organizer.
- Types in Language Design and Implementation Workshop, 2011, general

chair.

- Workshop on Mechanizing Metatheory, 2006-2009, co-organizer.
- Workshop on Mechanizing Metatheory, 2006, program chair.

**Program Committee Membership (conference/symposium).....**

- International Conference on Functional Programming (ICFP) 2022.
- Formal Structures for Computation and Deduction (FSCD) 2022.
- History of Programming Languages (HOPL IV) 2020.
- Symposium on Trends in Functional Programming (TFP) 2020.
- Principles of Programming Languages (POPL) 2018.
- Certified Proofs and Programs (CPP) 2018.
- European Symposium on Programming (ESOP) 2017.
- Principles and Practice of Declarative Programming (PPDP) 2016.
- Symposium on Trends in Functional Programming (TFP) 2016.
- International Conference on Functional Programming (ICFP) 2015.
- Certified Proofs and Programs (CPP) 2015.
- Principles of Programming Languages (POPL) 2014.
- Functional and Logic Programming (FLOPS) 2014.
- Typed Lambda Calculi and Applications (TLCA) 2013.
- Asian Symposium on Programming Languages and Systems (APLAS) 2012.
- International Symp. on Principles and Practice of Declarative Programming (PPDP) 2012.
- Certified Proofs and Programs (CPP) 2011.
- European Symposium on Programming (ESOP) 2011.
- Verified Software, Tools, Theory and Experiments (VSTTE) 2010.
- International Conference on Functional Programming (ICFP) 2007.
- International Conference on Aspect-Oriented Software Development (AOSD) 2007.
- Principles of Programming Languages (POPL) 2006.
- European Symposium on Programming (ESOP) 2006.
- Programming Language Design and Implementation (PLDI) 2004.
- International Conference on Functional Programming (ICFP) 2002.

**Program Committee Membership (workshop).....**

- TYPES 2021.
- TyDe 2021.
- CoqPL Workshop 2020.
- Coq Workshop 2018.
- Haskell Implementor's Workshop (HiW) 2016.

- Higher-Order Programming with Effects (HOPE) 2016.
- Implementation of Functional Languages (IFL) 2015.
- Coq Workshop 2015.
- Logical Frameworks and Meta Languages Theory and Practice (LFMTP) 2013.
- Trends in Functional Programming in Education (TFPIE) 2013.
- Grace Hopper Conference, Panels, Workshops, and Presentations 2012.
- Programming Languages meets Program Verification Workshop (PLPV) 2010.
- IFIP TC2 Working Conference Domain Specific Languages 2009.
- Proof Carrying Code Workshop 2008.
- Haskell Workshop 2007.
- Workshop on Types in Language Design and Implementation (TLDI) 2007.
- ML Workshop 2006.
- MetaOCaml Workshop, 2005.
- Foundations of Object-Oriented Languages Workshop (FOOL) 2005.
- MetaOCaml Workshop, 2004.
- Foundations of Global Ubiquitous Computing Workshop (FGUC) 2004.
- IFIP TC2 Working Conference on Generic Programming 2002.
- Haskell Workshop 2001.

#### **Steering Committee Membership**.....

- ICFP, 2009-2012, 2017-2022. SC Chair, 2021-2022
- POPL, 2017-2021
- PLMW, 2012
- Haskell Symposium, 2008-2012, 2018-2021
- TLDI, 2010-2011
- PLPV, 2012-2014
- WGP, 2012-2015

#### **Technical Society Membership**.....

- Association for Computing Machinery, 1998-present
- ACM SIGPLAN, 1998-present
- ACM SIGLOG, 2014-present
- IFIP Working Group 2.8 (Functional Programming), 2003-present
- IFIP Working Group 2.11 (Program Generation), 2007-2012

#### **Other**.....

- SIGPLAN Reynold's dissertation award committee, 2021.
- NSF panel: March 2019, March 2018, February 2016, June 2014, October

2012, December 2011, March 2008, December 2004.

- Haskell' language standard committee, 2005-2010.
- TYPES forum moderator: 2003-2009.
- PLDI External Review Committee: 2013, 2011, 2009
- POPL External Review Committee: 2015, 2012.
- Ad hoc reviews: ACM Computing Surveys, JFP, HOSC, Acta Informatica, TOPLAS, SCP, ICFP, POPL, PLDI, ECOOP, LCTES, ICALP, FOOL, ML, Haskell, PEPM, NSF

## Department, School and University Service

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- CIS Faculty Hiring committee, 2021-2022, 2019-2020 (chair), 2012-2013.
- Provost's Faculty Advisory Committee on Online Learning, 2020.
- Penn Engineering COVID-19 oversight committee, 2020.
- Faculty Council on Access and Academic Support, 2019-present.
- SEAS Undergraduate Curriculum Committee, 2017-2018.
- Undergraduate Chair, CIS, Sep 2014-Dec 2017.
- SEAS Diversity Committee, 2015-2016.
- Penn Forum for Women Faculty, 2015-2016.
- Faculty advisor to CommuniTech (Penn undergraduate service organization). 2012-present.
- Faculty advisor to  $\Omega$ E International Engineering and Technical Science Sorority. 2012-present.
- University committee on the Facilities, 2011-2014. Chair 2013-2014, 2012-2013.
- Graduate student admissions chair, 2013-2014, 2012-2013.
- CIS seminar series coordinator, 2011-2012.
- Faculty Council, 2010-2012.
- Academic Performance Committee, 2004-2017.
- CIS seminar organizer, 2011-2012.
- CIS 120 reform, 2009-2010.
- Back-up Care Committee, 2009.
- Senior Design Project Judge, 2006.
- Freshman Advisor, 2003.
- Graduate Admissions Committee, 2003-2004.
- Curriculum Committee, 2002-2003.



## Outreach

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- Workshop organizer: (with Ron Garcia) ICFP Programming Languages Mentoring Workshop (ICFP-PLMW 2015) Vancouver, BC, September, 2015
- Workshop co-founder: (with Kathleen Fisher and Ron Garcia) Programming Language Mentoring Workshop (PLMW 2012) Philadelphia, PA, January 24, 2012
- SIGPLAN CARES member, January 2020-present
- SRC@ICFP student research competition, selection committee. 2015, 2014.
- Haskell Foundation, Interim Board member, 2020-2021
- Programming Contest co-organizer:
  - 2004, Seventh Annual ICFP programming contest
  - 2000, Third Annual ICFP Programming Contest
- Panelist/Speaker (External events):
  - Researcher Panel, PLMW @POPL, January 18, 2022
  - Panel on Advising and Research. PLMW @PLDI, June 22, 2021
  - “Dependent types—salvation or plague?”, panel discussion at Lambda-Days, Feb 4th, 2021
  - CS Curriculum Panel, 35th anniversary of the Computer Science Department at Rice, Houston, TX, October 11-13, 2019
  - Programming Languages Panel, Computer Science 50th Anniversary Symposium, Cornell University, Ithaca, NY, October 2, 2014
  - Teaching Haskell in Academia and Industry (panel). Haskell Symposium, September 2013
  - CRA-W/CDC Programming Languages Summer School, UT Austin, May 2007
  - Women in Science and Engineering Conference, Princeton, February 2006
- Panelist/Speaker (Penn events):
  - SWE Ted Talks Event for high school students: Feb 2022, Dec 2020
  - AWE Faculty Panel: Feb 2022, Oct 2021
  - Panel Moderator/Member at FemmeHacks: Feb 2018, Feb 2017, Feb 2016
  - The “Computers”: Apr 2015
  - WICS high school day for girls: Apr 2017, Apr 2015, Apr 2014, Apr 2013, Apr 2012
  - Graduate Student Professional Seminars: Mar 2013, Mar 2012
  - SWE Graduate Section Inspiration Lunch Talk: April 20, 2012

- Philadelphia Area Aspirations in Computing Award presentation: March 21, 2012
- Penn AWE Pre-Orientation: Aug 2021, Aug 2017, Aug 2016, Aug 2011
- o Podcast interviews:
  - CoRecursive w/ Adam Bell, June 2018.
  - Type Theory Podcast, “Episode 4: Stephanie Weirich on Zombie and Dependent Haskell”, April 2015.

## Funding

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### Current.....

1. *SHF: Small: Mechanized reasoning for functional programs.* Weirich, NSF 2006535. \$450,000, 10/2020-09/2023.
2. *SHF: Medium: Collaborative Research: The Theory and Practice of Dependent Types in Haskell.* Weirich, Eisenberg (Bryn Mawr), NSF 1703835, \$814,453 (Penn), 7/2017-6/2022.
3. *Collaborative Research: Expeditions in Computing: The Science of Deep Specification.* Weirich (PI), Pierce, Zdancewic (Penn), Appel (Princeton), Shao (Yale), Chlipala (MIT). NSF 1521539, \$10 million total, 1/2016-10/2021.
4. *Collaborative Research: Expeditions in Computing: The Science of Deep Specification: REU Supplement.* Weirich, Pierce, Zdancewic (Penn). \$24,000, 1/2017-10/2021.

### Completed.....

2. *CIF: Small: Rich-Type Inference for Functional Programming.* Weirich (PI). NSF 1319880, \$450,000, 9/2013-8/2018.
3. *SPARCS: Synthesis of Platform-aware Attack-Resilient Control Systems* Lee (PI), Sokolsky, Pappas, Michael, Mangharam, Weirich, Alur, Tabuada. DARPA, \$5.5 million total, 8/2012-8/2017.
4. *CCF-SHF Small: Beyond Algebraic Data Types: Combinatorial Species and Mathematically-Structured Programming* Weirich (PI). NSF 1218002, \$325,840, 8/2012-8/2017.
5. *SHF: Small: Dependently-Typed Haskell* Weirich (PI). NSF 1116620, \$496,785, 8/2011-8/2016.

6. *Student travel support for ICFP 2015*. Weirich. NSF \$20,000.
7. *CIF: Small: Rich-Type Inference for Functional Programming REU* Weirich. NSF, \$7,000.
8. *SHF: Small: Dependently-Typed Haskell REU* Weirich (PI). NSF 1116620, \$6,000.
9. *SHF: Large: Collaborative Research: TRELLYS:Community-Based Design and Implementation of a Dependently Typed Programming Language* Weirich (Penn), Stump (University of Iowa), Sheard (Portland State University). NSF 0910786, \$2.1 million total. 2009-2014.
10. *Student Travel Support for Programming languages Mentoring Workshop (PLMW 2012)* Weirich (PI). NSF \$15,900, 11/2011.
11. *Networks Opposing Botnets* Smith (PI), Pierce, Zdancewic, Loo, Weirich, Felton, Rexford, Walker, Morrisett, Welsh. ONR, \$400,000 (Penn), 2009-2012.
12. *Computer Science Study Panel, Phase II* Weirich (PI), Zdancewic. DARPA, \$500,000, 2008-2010.
13. *Collaborative Research: CT-T: Manifest Security* University of Pennsylvania. Pierce (PI), Weirich, Zdancewic. Carnegie Mellon University. Pfening (PI), Harper, Crary. NSF \$1 million total, 2007-2011.
14. *A Practical Dependently-Typed Functional Programming Language* Weirich (PI). NSF, \$200,000. 2007-2009.
15. *Computer Science Study Panel, Phase I* Weirich. DARPA, \$99,411. 2007-2008.
16. *CRI: Machine Assistance for Programming Languages Research* Weirich (PI), Pierce, Zdancewic. NSF \$200,000, 2006-2008.
17. *CAREER: Type-Directed Programming in Object-Oriented Languages* Weirich (PI), NSF CCF-0347289: \$400,000, 2003-2008.

## Refereed Publications

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- [1] Pritam Choudhury, Harley Eades III, and Stephanie Weirich. A dependent dependency calculus. In Ilya Sergey, editor, *Programming Languages and Systems, ESOP 2022*, volume 13240 of *Lecture Notes in*

*Computer Science*, pages 403–430, Cham, 2022. Springer International Publishing. ISBN 978-3-030-99336-8. doi: 10.1007/978-3-030-99336-8\_15.

- [2] Richard A. Eisenberg, Guillaume Duboc, Stephanie Weirich, and Daniel Lee. An existential crisis resolved: Type inference for first-class existential types. *Proc. ACM Program. Lang.*, 5(ICFP), August 2021. doi: 10.1145/3473569. Distinguished Paper Award.
- [3] Yao Li, Li yao Xia, and Stephanie Weirich. Reasoning about the garden of forking paths. *Proc. ACM Program. Lang.*, 5(ICFP), August 2021.
- [4] Joachim Breitner, Antal Spector-Zabusky, Yao Li, Christine Rizkallah, John Wiegley, Joshua Cohen, and Stephanie Weirich. Ready, set, verify! Applying hs-to-coq to real-world Haskell code. *Journal of Functional Programming*, 31:1–40, February 2021. doi: 10.1017/S0956796820000283.
- [5] Pritam Choudhury, Harley D. Eades III, Richard A. Eisenberg, and Stephanie Weirich. A graded dependent type system with a usage-aware semantics. *Proc. ACM Program. Lang.*, 5(POPL), January 2021.
- [6] Anastasiya Kravchuk-Kirilyuk, Antoine Voizard, and Stephanie Weirich. Eta-equivalence in core dependent haskell. In Marc Bezem and Assia Mahboubi, editors, *Post-proceedings of the 25th International Conference on Types for Proofs and Programs (TYPES 2019)*, volume 175 of *Leibniz International Proceedings in Informatics*, pages 7:1–7:32, Dagstuhl, Germany, September 2020. Schloss Dagstuhl - Leibniz-Zentrum für Informatik.
- [7] Stephanie Weirich, Pritam Choudhury, Antoine Voizard, and Richard Eisenberg. A role for dependent types in Haskell. *Proc. ACM Program. Lang.*, 3(ICFP), 2019. doi: 10.1145/3341705.
- [8] Joachim Breitner, Antal Spector-Zabusky, Yao Li, Christine Rizkallah, John Wiegley, and Stephanie Weirich. Ready, set, verify! Applying hs-to-coq to real-world Haskell code (Experience report). *Proc. ACM Program. Lang.*, 2(ICFP):89:1–89:16, July 2018. ISSN 2475-1421. doi: 10.1145/3236784.
- [9] Antal Spector-Zabusky, Joachim Breitner, Christine Rizkallah, and Stephanie Weirich. Total Haskell is reasonable Coq. In *Proceedings of 7th ACM SIGPLAN International Conference on Certified Programs*

*and Proofs (CPP'18)*. ACM, 2018. doi: 10.1145/3167092. New York, NY, USA.

- [10] Stephanie Weirich, Antoine Voizard, Pedro Henrique Avezedo de Amorim, and Richard A. Eisenberg. A specification for dependent types in Haskell. *Proc. ACM Program. Lang.*, 1(ICFP):31:1–31:29, August 2017. ISSN 2475-1421. doi: 10.1145/3110275.
- [11] Andrew W. Appel, Lennart Beringer, Adam Chlipala, Benjamin C. Pierce, Zhong Shao, Stephanie Weirich, and Steve Zdancewic. Position paper: the science of deep specification. *Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*, 375(2104), 2017. ISSN 1364-503X. doi: 10.1098/rsta.2016.0331.
- [12] Steven Keuchel, Stephanie Weirich, and Thomas Tom Schrijvers. Infra-gen: Binder boilerplate at scale. In *European Symposium on Programming (ESOP)*, pages 419–445, April 2016.
- [13] Richard A. Eisenberg, Stephanie Weirich, and Hamidhasan G. Ahmed. Visible type application. In *European Symposium on Programming (ESOP)*, pages 229–254, April 2016.
- [14] Joachim Breitner, Richard A. Eisenberg, Simon Peyton Jones, and Stephanie Weirich. Safe zero-cost coercions for Haskell. *Journal of Functional Programming*, 26, 2016. doi: 10.1017/S0956796816000150.
- [15] Wenrui Meng, Junkil Park, Oleg Sokolsky, Stephanie Weirich, and Insup Lee. Verified ros-based deployment of platform-independent control systems. In *Seventh NASA Formal Methods Symposium*, pages 248–262, Pasadena, CA, 2015.
- [16] Vilhelm Sjöberg and Stephanie Weirich. Programming up to congruence. In *POPL 2015: 42nd ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages*, pages 369–382, Mumbai, India, January 2015.
- [17] Joachim Breitner, Richard A. Eisenberg, Simon Peyton Jones, and Stephanie Weirich. Safe zero-cost coercions for Haskell. In *The 19th ACM SIGPLAN International Conference on Functional Programming, ICFP '14*, pages 189–202, September 2014.
- [18] Richard A. Eisenberg, Dimitrios Vytiniotis, Simon Peyton Jones, and Stephanie Weirich. Closed type families with overlapping equations.

In *POPL 2014: 41st ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages*, pages 671–683, San Diego, CA, USA, January 2014.

- [19] Chris Casinghino, Vilhelm Sjöberg, and Stephanie Weirich. Combining proofs and programs in a dependently typed language. In *POPL 2014: 41st ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages*, pages 33–45, San Diego, CA, USA, 2014.
- [20] Stephanie Weirich, Justin Hsu, and Richard A. Eisenberg. System FC with explicit kind equality. In *Proceedings of The 18th ACM SIGPLAN International Conference on Functional Programming, ICFP '13*, pages 275–286, Boston, MA, September 2013.
- [21] Garrin Kimmel, Aaron Stump, Harley D. Eades, Peng Fu, Tim Sheard, Stephanie Weirich, Chris Casinghino, Vilhelm Sjöberg, Nathin Collins, and Ki Yunh Anh. Equational reasoning about programs with general recursion and call-by-value semantics. *Progress in Informatics*, (10): 19–48, March 2013.
- [22] Miroslav Pajic, Nicola Bezzo, James Weimer, Rajeev Alur, Rahul Mangharam, Nathan Michael, George J. Pappas, Oleg Sokolsky, Paulo Tabuada, Stephanie Weirich, and Insup Lee. Towards synthesis of platform-aware attack-resilient control systems: extended abstract. In *HiCoNS '13: Proceedings of the 2nd ACM international conference on High confidence networked systems*, pages 75–76, New York, NY, USA, 2013. ISBN 978-1-4503-1961-4.
- [23] Richard A. Eisenberg and Stephanie Weirich. Dependently typed programming with singletons. In *Haskell Symposium*, pages 117–130, Copenhagen, Denmark, September 2012.
- [24] Michael Greenberg, Benjamin C. Pierce, and Stephanie Weirich. Contracts made manifest. *Journal of Functional Programming*, 22(3):225–274, May 2012.
- [25] Chris Casinghino, Vilhelm Sjöberg, and Stephanie Weirich. Step-indexed normalization for a language with general recursion. In *Fourth workshop on Mathematically Structured Functional Programming (MSFP '12)*, pages 25–39, 2012.
- [26] Vilhelm Sjöberg, Chris Casinghino, Ki Yung Ahn, Nathan Collins, Harley D. Eades III, Peng Fu, Garrin Kimmell, Tim Sheard, Aaron

- Stump, and Stephanie Weirich. Irrelevance, heterogeneous equality, and call-by-value dependent type systems. In *Fourth workshop on Mathematically Structured Functional Programming (MSFP '12)*, pages 112–162, 2012.
- [27] Garrin Kimmell, Aaron Stump, Harley D. Eades III, Peng Fu, Tim Sheard, Stephanie Weirich, Chris Casinghino, Vilhelm Sjöberg, Nathan Collins, and Ki Yung Ahn. Equational reasoning about programs with general recursion and call-by-value semantics. In *Sixth ACM SIGPLAN Workshop Programming Languages meets Program Verification (PLPV '12)*, pages 15–26, 2012.
  - [28] Brent A. Yorgey, Stephanie Weirich, Julien Cretin, Simon Peyton Jones, Dimitrios Vytiniotis, and José Pedro Magalhães. Giving Haskell a promotion. In *Seventh ACM SIGPLAN Workshop on Types in Language Design and Implementation (TLDI '12)*, pages 53–66, 2012.
  - [29] Stephanie Weirich, Brent A. Yorgey, and Tim Sheard. Binders unbound. In *Proceeding of the 16th ACM SIGPLAN International Conference on Functional Programming, ICFP '11*, pages 333–345, New York, NY, USA, 2011. ISBN 978-1-4503-0865-6.
  - [30] Stephanie Weirich, Dimitrios Vytiniotis, Simon Peyton Jones, and Steve Zdancewic. Generative type abstraction and type-level computation. In *POPL 11: 38th ACM SIGACT-SIGPLAN Symposium on Principles of Programming Languages, January 26–28, 2011. Austin, TX, USA.*, pages 227–240, January 2011.
  - [31] Tim Sheard, Aaron Stump, and Stephanie Weirich. Language-based verification will change the world. In *2010 FSE/SDP Workshop on the Future of Software Engineering Research*, pages 343–348, November 2010. Position paper.
  - [32] Aaron Stump, Vilhelm Sjöberg, and Stephanie Weirich. Termination casts: A flexible approach to termination with general recursion. In *Workshop on Partiality and Recursion in Interactive Theorem Provers*, pages 76–93, Edinburgh, Scotland, July 2010.
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## Chapters in Books

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## Thesis

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## Technical Reports

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- [74] Stephanie Weirich and Benjamin Pierce. Icfp 2020 post-conference report. Technical report, 2021. URL <https://arxiv.org/abs/2104.01239>.
- [75] Pritam Choudhury, Harley D. Eades III, Richard A. Eisenberg, and Stephanie Weirich. A graded dependent type system with a usage-aware semantics (extended version). Technical report, 2020. URL <https://arxiv.org/abs/2011.04070>.
- [76] Antal Spector-Zabusky, Joachim Breitner, Yao Li, and Stephanie Weirich. Embracing a mechanized formalization gap. Technical report, October 2019.
- [77] Stephanie Weirich, Pritam Choudhury, Antoine Voizard, and Richard Eisenberg. A role for dependent types in Haskell (extended version). Technical report, 2019. URL <https://arxiv.org/abs/1905.13706>.
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- [81] Richard A. Eisenberg, Dimitrios Vytiniotis, Simon Peyton Jones, and Stephanie Weirich. Closed type families with overlapping equations (extended version). Technical Report MS-CIS-13-10, University of Pennsylvania, November 2013.
- [82] Stephanie Weirich, Dimitrios Vytiniotis, Simon Peyton Jones, and Steve Zdancewic. Generative type abstraction and type-level computation (extended version). Technical report, November 2010.
- [83] Brian Aydemir and Stephanie Weirich. Lngen: Tool support for locally nameless representations. Technical Report MS-CIS-10-24, Computer and Information Science, University of Pennsylvania, June 2010.
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pendix. Technical Report MS-CIS-05-22, University of Pennsylvania, April 2006.

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- [90] Geoffrey Washburn and Stephanie Weirich. Generalizing parametricity using information flow (extended version). Technical Report MS-CIS-05-04, Computer and Information Science, University of Pennsylvania, July 2005.
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- [95] Simon L. Peyton Jones, Geoffrey Washburn, and Stephanie Weirich. Wobbly types: Practical type inference for generalised algebraic datatypes. Technical Report MS-CIS-05-26, University of Pennsylvania, Computer and Information Science Department, Levine Hall, 3330 Walnut Street, Philadelphia, Pennsylvania, 19104-6389, July 2004.
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## Invited Talks and Technical Presentations

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1. TBA. Milner lecture, Laboratory for Computer Science, Edinburgh. June 15, 2022.
2. *How to implement the Lambda Calculus, Quickly*. Haskell Love, virtual developer conference. September 10, 2021.
3. *How to implement the Lambda Calculus, Quickly*. Invited talk at IFL. The 33rd Symposium on Implementation and Application of Functional Languages. September 3, 2021.
4. *Programming Language Design: From Grace Hopper to Today*. ENIAC Day: 75th anniversary of ENIAC mini-symposium. February 15, 2021.
5. *Strongly-Typed System F in GHC*. YOW! Lambda Jam Online 2020. July 2020.
6. *Strongly-Typed System F in GHC*. Chalmers Functional Programming Seminar Series. June 2020.
7. *Adventures in Quantitative Type Theory*. IFIP WG 2.8 Meeting, Zion National Park. March 2020.
8. *A Dependently-Typed Core Calculus for GHC*. PurPL Fest invited speaker. Purdue University. West Lafayette, IN. September 23, 2019.
9. *Dependent Types in Haskell*. BOBkonf invited speaker (research track). Berlin, Germany. August 21, 2019.
10. *A Dependently-Typed Core Calculus for GHC*. TYPES 2019 Conference Invited talk. Oslo, Norway. June 2019.
11. *Strongly-typed System F in GHC*. IFIP WG 2.8, Bordeaux, Fr. May 2019.

12. *Dependent Types in Haskell*. Cornell CS Colloquium, Ithaca, NY. November 2018.
13. *Dependent Types in Haskell*. Haskell eXchange keynote, London, October 2018.
14. *Work-in-progress: Verifying the Glasgow Haskell Compiler Core language using the Coq proof assistant*. Intel Labs, Hillsboro, OR. August 2018.
15. *Work-in-progress: Towards a formal semantics for GHC Core*. DeepSpec 2018 Workshop, Philadelphia, PA. June 2018.
16. *Work-in-progress: Verifying the Glasgow Haskell Compiler Core language*. IFIP WG 2.8, Asilomar, CA. June 2018.
17. *Work-in-progress: Verifying the Glasgow Haskell Compiler Core language*. Dagstuhl Seminar 18201, “Secure Compilation” Wadern, Germany, May, 2018.
18. *Dependent Types in Haskell*. Invited speaker, Comcast Labs Connect: Functional Programming. March 9, 2018.
19. *Locally Nameless at Scale*. Joint presentation with Anastasiya Kravchuck-Kirilyuk. CoqPL workshop, Los Angeles, CA. January 2018.
20. *Dependent Types in Haskell*. University of Washington, PLSE Seminar Series, Seattle, WA, December 2017.
21. *Dependent Types in Haskell*. McMaster University Departmental Seminar, Hamilton Ontario, November 2017.
22. *Dependent Types in Haskell*. StrangeLoop 2017, St. Louis, MO, September 2017.
23. *Eta-equivalence in Core Dependent Haskell*. WG 2.8, Edinburgh, UK. June 2017.
24. *The Influence of Dependent Types*. Keynote address, ACM Symposium on Principles of Programming Languages (POPL ’17) Paris, France, January 2017.
25. *A Foundation for Dependently Typed Haskell*. WG 2.8, Lake Placid, NY, July 19, 2016.



26. *Depending on Types*. Typelevel Summit, Philadelphia, PA, March 2-3, 2016.
27. *Dynamic Typing in GHC*. Compose :: Conference, Brooklyn, NY, February 4-5, 2016.
28. *Visible Type Application*. Microsoft Research, Cambridge, UK, November 6, 2015.
29. *Visible Type Application*. University of Kent, November 5, 2015.
30. *Depending on Types*. Code Mesh 2015, London, November 4, 2015.
31. *From System F to Typed Assembly Language*, by Morrisett, Walker, Crary, Glew. Papers We Love, Philadelphia. Philadelphia, PA, October 6, 2015
32. *Towards Dependently Typed Haskell*. WG 2.8, Kefalonia, Greece, May 24, 2015
33. *Pi-Forall: How to use and implement a dependently-typed language*. Technical Keynote, Compose Conference. New York, January 30, 2015
34. *Programming up-to Congruence*. ACM Symposium on Principles of Programming Languages (POPL '15). Mumbai, India, January 16, 2015
35. *Depending on Types*. Computer Science Colloquium Series, Indiana University. Bloomington, Indiana, October 17, 2014
36. *Programming Languages Panel*. Cornell CS 50th Anniversary Symposium. Ithaca, New York, October 2, 2014
37. *Depending on Types*. Keynote address, International Conference on Functional Programming (ICFP). Gothenburg, Sweden, September 3, 2014
38. *Programming Up-to Congruence, Again*. WG 2.8, Estes Park, Colorado, August 12, 2014
39. *Combining Proofs and Programs*. Certification of High-level and Low-level programs. Paris, France, July 7, 2014
40. *Why You Should Care About Dependent Types*. Programming Languages Mentoring Workshop. San Diego, CA, January 21, 2014
41. *Programming Up-to Congruence*. WG 2.8, Aussios, France, October 14, 2013

42. *The Pleasure and Pain of Advanced Type Systems*. Invited speaker, Facebook Faculty Summit. Menlo Park, CA, August 6, 2013
43. *Paradoxical Typecase*. WG 2.8, Annapolis, MD, November 7, 2012
44. *A POPLmark Retrospective: Using Proof Assistants in Programming Language Research*. Invited speaker, LFMTTP 2012: 7th International Workshop on Logical Frameworks and Meta-languages: Theory and Practice, Copenhagen, Denmark, September 9, 2012
45. *Dependently-typed programming in GHC*. Invited speaker, FLOPS 2012: Eleventh International Symposium on Functional and Logic Programming, Kobe, Japan, May 25, 2012
46. *Binders Unbound*. The 16th ACM SIGPLAN International Conference on Functional Programming, ICFP 2012 Tokyo Japan, September 21, 2011
47. *Combining Proofs and Programs*. Dependently Typed Programming, Shonan Seminar 007, Shonan Village, Japan, September 16, 2011
48. *Combining Proofs and Programs*. Joint invited speaker for Rewriting Techniques and Applications (RTA 2011) and Typed Lambda Calculi and Applications (TLCA 2011) Novi Sad, Serbia, June 1, 2011
49. *Combining Proofs and Programs in Trellys*. Plenary Address, MFPS 27. Pittsburgh, PA. May 26, 2011
50. *Generic Binding and Telescopes*. WG 2.8, Marble Falls, TX. March 11, 2011
51. *Generative Type Abstraction and Type-level Computation*. ACM Symposium on Principles of Programming Languages (POPL '11). Austin, TX, January 2011
52. *ICFP 2010 Program Chair's Report*. Baltimore, MD. September 27, 2010
53. *Dependent Types and Program Equivalence*. University of Strathclyde. Glasgow, Scotland. April 30, 2010
54. *Generic Programming with Dependent Types*. IFIP 2.11, St. Andrews, Scotland. March 1-3, 2010
55. *Dependent Types and Program Equivalence*. University of Nottingham. Nottingham, England. February 5, 2010

56. *Trellys Status Report*. PLPV Discussion. Madrid, Spain. January 19, 2010
57. *A POPLmark Retrospective: Using Proof Assistants in Programming Language Research*. University of Cambridge Computer Laboratory Wednesday Seminars. Cambridge, England. December 2, 2009
58. *Dependent Types and Program Equivalence*. Semantics Lunch, University of Cambridge Computer Laboratory. Cambridge, England. November 2, 2009
59. *Haskell Symposium 2009 Program Chair's report*. Edinburgh, Scotland. September 3, 2009
60. *Doing Dependent Types Wrong Without Going Wrong*. IFIP WG 2.8, Frauenchiemsee, Germany, June 2009
61. *Adventures in Dependently-Typed Metatheory*. IFIP WG 2.11, Mountain View CA. April 15, 2009
62. *Engineering Formal Metatheory* Computer Science Colloquium, City University of New York Graduate Center. New York, NY. February 2, 2009
63. *First-class Polymorphism for Haskell*. IFIP WG 2.8, Park City, UT. June 19, 2008
64. *Engineering Formal Metatheory*. Princeton University, Princeton NJ, USA. November 19, 2007
65. *Machine Assistance for Programming Language Research*. Cornell University, Ithaca, NY, USA. October 12, 2007
66. *Formal Reasoning About Programs and Programming Languages*. National Security Agency. Fort Meade, MD, USA. July 20, 2007
67. *Engineering Aspects of Formal Metatheory*. Harvard University, Boston MA, USA. June 1, 2007
68. *Dependently-Typed Languages*. Working session summary. IFIP WG 2.11, Portland, OR, October 2006
69. *Simple Unification-Based Type Inference for GADTs*. International Conference on Functional Programming (ICFP). Portland, OR. September 2006

70. *RepLib: A Library for Derivable Type Classes*. Haskell Workshop. Portland, OR. September 2006
71. *Parametricity and GADTs*. IFIP Working Group 2.8 (Functional Programming). Boston, MA. July 2006
72. *Practical Type Inference for Advanced Type Systems*. International Federation for Information Processing (IFIP) Working Group 2.11, Dagstuhl, Wadern, Germany. January 2006
73. *Boxy Types: Inference for Higher-rank Types and Impredicativity*. International Federation for Information Processing (IFIP) Working Group 2.8, Kalvi Manor, Estonia. October 2005
74. *A Core Language for Generalised Algebraic Datatypes*. International Federation for Information Processing (IFIP) Working Group 2.8, West Point, USA. November 2004
75. *A Design for Type-directed Java*. Programming Languages Seminar, Yale University, New Haven, CT. October 1, 2004
76. *2004 ICFP Programming Contest Results*. (Presented jointly with Benjamin Pierce and Steve Zdancewic) International Conference on Functional Programming, Snowbird, UT. September 20, 2004
77. *A Core Language for Generalised Algebraic Datatypes*. Dagstuhl Seminar 04381: Dependently Typed Programming, Wadern, Germany. September 12, 2004
78. *A Design for Type-Directed Java*. Microsoft Research Lab, Cambridge, UK. August 31, 2004
79. *A Design for Type-Directed Java*. Workshop on Object-Oriented Developments (WOOD '04). London, UK, August 2004
80. *Unifying Nominal and Structural Ad-hoc Polymorphism*. International Federation for Information Processing (IFIP) Working Group 2.8, Coffs Harbour, Australia. January 2003
81. *Unifying Nominal and Structural Ad-hoc Polymorphism*. Computer Science Colloquium, City University of New York Graduate Center. New York, NY. October 30, 2003

82. *Boxes Go Bananas: Parametric Higher-Order Abstract Syntax in System F*. Laboratory for Secure Systems Seminar, Stevens Institute of Technology. Hoboken, NJ. May 5, 2003
83. *Run-time type analysis in Haskell with an Awful Lot of Newtypes*. International Federation for Information Processing (IFIP) Working Group 2.8, Crans-Montana, Switzerland. January 2003
84. *Polytypic Programming and Intensional Type Analysis*. New Jersey Programming Languages Seminar. University of Pennsylvania, Philadelphia, PA. September 20, 2002
85. *Programming with Types*. OHSU/Oregon Graduate Institute, Beaverton, OR. February 11, 2002
86. *Programming with Types*. University of Oregon, Eugene, OR. February 15, 2002
87. *Programming with Types*. University of Pennsylvania, Philadelphia, PA. February 19, 2002
88. *Programming with Types*. University of Virginia, Charlottesville, VA. February 28, 2002
89. *Programming with Types*. University of Maryland, College Park, MD. March 4, 2002
90. *Programming with Types*. Northeastern University, Boston, MA. March 13, 2002
91. *Programming with Types*. University of California, San Diego, CA. March 15, 2002
92. *Programming with Types*. Purdue University, West Lafayette, IN. March 25, 2002
93. *Programming with Types*. University of Michigan, Ann Arbor, MI. March 27, 2002
94. *Programming with Types*. University of Texas, Austin, TX. April 2, 2002
95. *Higher-order Intensional Type Analysis*. European Symposium on Programming (ESOP '02). Grenoble, France, April 2002

96. *Programming with Types*. University of Colorado at Boulder, CO. April 16, 2002
97. *Programming with Types*. Pennsylvania State University, State College, PA. April 19, 2002
98. *Programming with Types*. Massachusetts Institute of Technology, Boston, MA. April 25, 2002
99. *Programming with Types*. Rice University, Houston TX. April 29, 2002
100. *Run-Time Type Analysis and Program Verification*. Research, Careers and Computer Science: A Maryland Symposium. University of Maryland, College Park, MD. November 2001
101. *Polytypic Programming and Intensional Type Constructor Analysis*. International Federation for Information Processing (IFIP) Working Group 2.8, Are, Sweden. April 2001
102. *Encoding Intensional Type Analysis*. European Symposium on Programming (ESOP '01). Genova, Italy. April 2001
103. *Resource Bound Certification*. Harvard University, Boston, MA. February 2001
104. *Functional Pearl: Type-Safe Cast*. International Conference on Functional Programming. Montreal, Canada. September 2000
105. *Resource Bound Certification*. IBM Research, Hawthorne, NY. June 2000
106. *Resource Bound Certification*. ACM Symposium on Principles of Programming Languages (POPL '00). Boston, MA, USA. January 2000
107. *Flexible Type Analysis*. International Conference on Functional Programming (ICFP '99). Paris, France, September 1999
108. *Type Analysis and Typed Compilation*. Princeton University, Princeton, NJ. June 1999
109. *Intensional Polymorphism in Type-Erasure Semantics*. International conference on Functional Programming (ICFP '98). Baltimore, MD, USA, September 1998

## Tutorials

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- *Implementing Dependent Types in pi-forall* Oregon Programming Languages Summer School: Types, Logic, and Verification. Eugene OR, USA. June 2022
- *Dependent Types*. Programming Languages Mentoring Workshop. St. Louis, MO. September 2018.
- *Formal Logic and Software Verification using Interactive Theorem Provers*. ACM Philadelphia Region Celebration of Women in Computing, April 21, 2018
- *Language Specification and Variable Binding*. The Science of Deep Specifications Summer School, July 2017
- *How to write a great research paper: Simon's seven easy steps*. Programming Languages Mentoring Workshop. Mumbai, India, 2015
- *How to give a good research talk*. Programming Languages Mentoring Workshop. Mumbai, India, 2015
- *Designing Dependently-Typed Programming Languages*. Oregon Programming Languages Summer School: Types, Logic, and Verification. Eugene OR, USA. June 2014
- *Designing Dependently-Typed Programming Languages*. Oregon Programming Languages Summer School: Types, Logic, and Verification. Eugene OR, USA. July 2013
- *Computational Flags*. Swarthmore CATALYST Conference for 7th/8th graders, April 2015, March 2012
- *Generic Programming with Dependent Types*. Spring School on Generic and Indexed Programming. Oxford, England. March 2010
- *Coq for Programming Language Metatheory*. Oregon Programming Languages Summer School on Logic and Theorem Proving in Programming Languages. University of Oregon, July 2008
- *Using Proof Assistants for Programming Language Research or, How to write your next POPL paper in Coq*. POPL Tutorial, Jan 2008
- *Getting started in PL design research*. CRA-W/CDC Programming Languages Summer School. UT Austin, May 2007
- *Career paths: How to get started in academia or industry*. CRA-W/CDC Programming Languages Summer School. UT Austin, May 2007