Jeremy Avigad

PERSONAL DATA

Born January 9, 1968, New York, N.Y. Citizenship: USA.

ADDRESS

Department of Philosophy
Carnegie Mellon University
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RESEARCH INTERESTS

Mathematical logic, philosophy of mathematics, proof theory, formal verification, automated reasoning, history of mathematics

PROFESSIONAL EXPERIENCE

2008-present	Professor of Philosophy, Carnegie Mellon University
2007-present	Courtesy appointment, Department of Mathematical Sciences, Carnegie Mellon University
August 2016	Visiting Researcher, Microsoft Research, Redmond
August 2014	Visiting Researcher, Microsoft Research, Redmond
2009-2010	Visiting Researcher, Microsoft Research / Inria Joint Centre, Orsay
2003-2008	Associate Professor of Philosophy with tenure, Carnegie Mellon University
2002-2003	Associate Professor of Philosophy, Carnegie Mellon University
1996-2002	Assistant Professor of Philosophy, Carnegie Mellon University
Spring 1996	Special Year in Logic and Algorithms Postdoctoral Fellow, DIMACS
1995-1996	T. H. Hildebrandt Assistant Professor of Mathematics, University of Michigan

EDUCATION

1990-1995	University of California, Berkeley, Ph.D. (Mathematics)
	Dissertation: *Proof-Theoretic Investigations of Subsystems of Second-Order Arithmetic*
	Advisor: Jack Silver
1984-1989	Harvard University, B.A. magna cum laude (Mathematics)

GRANTS AND FELLOWSHIPS

2018-2020	Air Force Office of Scientific Research, "Constructive Methods and Formal Verification in Analysis" (with Steve Awodey, Stefan Mitsch, and André Platzer)
2018-2021	Alfred P. Sloan Foundation, "Formal Abstracts" (with Thomas Hales)
2016-2018	National Science Foundation Research Grant, "Verified computation and proof"
2014-2019	Air Force Office of Scientific Research, "MURI: Homotopy Type Theory: Unified Foundations of Mathematics and Computation," (co-PI; lead PI, Steve Awodey)
2012-2015	Air Force Office of Scientific Research, "Type Theory, Computation, and Interactive Theorem Proving" (co-PI Robert Harper)
2011-2014	National Science Foundation Research Grant, "Proof mining and formal verification"
2010-2011	Andrew W. Mellon Foundation, follow-up to the New Directions Fellowship
2009-2011	National Science Foundation, "Carnegie Mellon summer school in logic and formal epistemology" (co-PI David Danks)

2008-2009	Templeton Foundation, Exploring the Infinite Grant Program, "The infinite in combinatorics and number theory"
2007-2010	National Science Foundation Research Grant, "Collaborative research: Logical support for formal verification" (co-PIs Harvey Friedman, Murali Sitaraman, and Bruce Weide)
2006-2008	National Science Foundation, "Carnegie Mellon summer school in logic and formal epistemology" (co-PI Teddy Seidenfeld; renewed once)
2004-2007	National Science Foundation Research Grant, "Collaborative research: Theoretical support for mechanized proof assistants" (co-PI Harvey Friedman)
2003-2004	Andrew W. Mellon Foundation New Directions Fellowship
2000-2003	National Science Foundation Research Grant, "Constructive aspects of classical logic"
1996-1999	National Science Foundation Research Grant, "A model-theoretic approach to proof theory"

PUBLICATIONS

"The Lean mathematical library," by The mathlib Community, to appear in *Certified Proofs and Programs (CPP) 2020.*

"Reliability of mathematical inference," to appear in *Synthese*.

"Modularity in mathematics," to appear in the *Review of Symbolic Logic.*

"Learning logic and proof with an interactive theorem prover," Gila Hanna, David Reid, and Michael de Viliers, *Proof Technology in Mathematics Research and Teaching,* Springer, Cham, 277-290. 2019.

"Quotients of polynomial functors," with Mario Carneiro and Simon Hudon, in John Harrison, John O'Leary, and Andrew Tolmach, editors, *Interactive Theorem Proving (ITP) 2019,* LIPIcs, 6:1--6:19 , 2019.

"Algorithmic barriers to representing conditional independence," with Nathanael L. Ackerman, Cameron E. Freer, Daniel M. Roy, Jason M. Rute, to appear in *Logic in Computer Science (LICS) 2019*.

"Proof Theory," in *Introduction to Formal Philosophy,* edited by Vincent F. Hendricks and Sven Ove Hansson, Springer, Cham, 177-190, 2018.

"The mechanization of mathematics," *Notices of the AMS,* 65:681-690, 2018. Reprinted in Mircea Pitici editor, *The Best Writing on Mathematics 2019*, Princeton University Press, 2019, 150-170.

"Introduction to *Milestones in Interactive Theorem Proving,*" with Jasmin Christian Blanchette, Gerwin Klein, Lawrence Paulson, Andrei Popescu, and Gregor Snelting, *Journal of Automated Reasoning,* 61:1-8, 2018.

"A metaprogramming framework for formal verification," Gabriel Ebner, Sebastian Ullrich, Jared Roesch, Jeremy Avigad, and Leonardo de Moura, *Proceedings of the ACM on Programming Languages, International Conference on Functional Programming,* 1:34, 2017.

"A formally verified proof of the central limit theorem," with Johannes Hölzl and Luke Serafin, *Journal of Automated Reasoning,* 59(4):389-423, 2017.

"Character and object," with Rebecca Morris, *Review of Symbolic Logic,* 9 (3): 480-510, 2016.

"A heuristic prover for real inequalities," with Robert Y. Lewis and Cody Roux, *Journal of Automated Reasoning,* 56:367-386, 2016. Conference version in Gerwin Klein and Ruben Gamboa, eds., *Interactive Theorem Proving 2014,* Springer, Heidelberg, 61-76, 2014.

"Mathematics and language," in Ernest Davis and Philip Davis eds., *Mathematics, Substance, and Surmise: Views on the Meaning and Ontology of Mathematics*, Springer, Cham, 235-255, 2015.

"The Lean theorem prover (system description)," Leonardo de Moura, Soonho Kong, Jeremy Avigad, Floris van Doorn, and Jakob von Raumer. *25th International Conference on Automated Deduction (CADE-25),* Berlin, Germany, 2015.

"Oscillation and the mean ergodic theorem for uniformly convex Banach spaces," with Jason Rute, *Ergodic Theory and Dynamical Systems,* 35(4):1009-1027, 2015.

"Homotopy limits in type theory," with Krzysztof Kapulkin and Peter LeFanu Lumsdaine, *Mathematical Structures in Computer Science,* 25:1040-1070, 2015.

"The concept of 'character' in Dirichlet's theorem on primes in an arithmetic progression," with Rebecca Morris, *Archive for History of Exact Science,* 68: 265-326, 2014.

"Formalized mathematics," with John Harrison, *Communications of the Association for Computing Machinery ,* 57(4):66-75, 2014.

"Computability and analysis: the legacy of Alan Turing," with Vasco Brattka, in Rod Downey, editor, *Turing's Legacy: Developments from Turing's Ideas in Logic,* Cambridge University Press, 1-47, 2014.

"Ultraproducts and metastability," with José Iovino, *New York Journal of Mathematics,* 19:713-727, 2013.

"A machine-checked proof of the Odd Order Theorem," with Georges Gonthier, Andrea Asperti, Jeremy Avigad, Yves Bertot, Cyril Cohen, François Garillot, Stéphane Le Roux, Assia Mahboubi, Russell O'Connor, Sidi Ould Biha, Ioana Pasca, Laurence Rideau, Alexey Solovyev, Enrico Tassi, Laurent Théry, in Sandrine Blazy, Christine Paulin-Mohring, and David Pichardie, editors, *Interactive Theorem Proving 2013,* Springer, Berlin, pages 163-179, 2013.

"Uniform distribution and algorithmic randomness," *Journal of Symbolic Logic,* 78:334-344, 2013.

"Uncomputably noisy ergodic limits," *Notre Dame Journal of Formal Logic,* 53:347-350, 2012.

"Algorithmic randomness, reverse mathematics, and the dominated convergence theorem," with Edward Dean and Jason Rute, *Annals of Pure and Applied Logic,* 163:1854-1864, 2012.

"Inverting the Furstenberg correspondence," *Discrete and Continuous Dynamical Systems, Series A,* 32: 342-3431, 2012.

"Metastable convergence theorems," with Edward Dean and Jason Rute, *Journal of Logic and Analysis,* 4:3:1-19, 2012.

"Delta-complete decision procedures for satisfiability over the reals," Sicun Gao, Jeremy Avigad, and Edmund M. Clarke, in Bernard Gramlich et al., *Proceedings of the International Joint Conference on Automated Reasoning (IJCAR),* 286-300, 2012.

"Delta-decidability over the reals," Sicun Gao, Jeremy Avigad, and Edmund M. Clarke, *Proceedings of the 27th Annual IEEE Symposium on Logic in Computer Science (LICS),* 305-314, 2012.

"Zen and the art of formalization," with Andrea Asperti, *Mathematical Structures in Computer Science,* special issue on interactive theorem proving and the formalization of mathematics, 21: 679-682, 2011.

"Building a push-button RESOLVE verifier: Progress and challenges," Murali Sitaraman, Bruce Adcock, Jeremy Avigad, Derek Bronish, Paolo Bucci, David Frazier, Harvey M. Friedman, Heather Harton, Wayne Heym, Jason Kirschenbaum, Joan Krone, Hampton Smith, Bruce W. Weide, *Formal Aspects of Computing,* 23:607-626, 2011.

"Understanding, formal verification, and the philosophy of mathematics," special issue of on "Logic and Philosophy Today," *Journal of the Indian Council of Philosophical Research,* 27: 161-197, 2010.

"Metastability in the Furstenberg-Zimmer tower," with Henry Towsner, *Fundamenta Mathematicae,* 210:243-268, 2010.

"The computational content of classical arithmetic," in Solomon Feferman and Wilfried Sieg, eds., *Proofs, Categories, and Computations: Essays in Honor of Grigori Mints,* College Publications, 15-30, 2010.

"Gödel and the metamathematical tradition," in Charles Parsons et al. eds., *Kurt Gödel : Essays for his Centennial,* ASL Lecture Notes in Logic, Cambridge University Press, 45-60, 2010.

"Local stability of ergodic averages," with Philipp Gerhardy and Henry Towsner, *Transactions of the American Mathematical Society*, 362: 261-288, 2010.

"Functional interpretation and inductive definitions," with Henry Towsner, *Journal of Symbolic Logic,* 74:1100-1120, 2009.

"A language for mathematical knowledge management," Steven Kieffer, Jeremy Avigad, and Harvey Friedman, *Studies in Logic, Grammar and Rhetoric* (special issue on computer reconstruction of the body of mathematics), 18:51-66, 2009.

"A formal system for Euclid's *Elements,"* with Edward Dean and John Mumma, *Review of Symbolic Logic*, 2:700-768, 2009.

"The metamathematics of ergodic theory," *Annals of Pure and Applied Logic,* 157:64-76, 2009.

"Understanding proofs," in Paolo Mancosu, editor, *The Philosophy of Mathematical Practice,* Oxford University Press, 317-353, 2008.

"Computers in mathematical inquiry," in Paolo Mancosu, editor, *The Philosophy of Mathematical Practice*, Oxford University Press, 302-316, 2008.

Response to questionnaire, in Vincent F. Hendricks and Hannes Leitgeb, editors, *Philosophy of Mathematics: 5 questions,* Automatic Press / VIP, 2007.

"A formally verified proof of the prime number theorem," with Kevin Donnelly, David Gray, and Paul Raff, *ACM Transactions on Computational Logic* 9(1:2):1-23, 2007.

"Philosophy of mathematics," in Constantin Boundas, editor, *The Edinburgh Companion to Twentieth-Century Philosophies,* Edinburgh University Press, 234-251, 2007; also published as *The Columbia Companion to Twentieth-Century Philosophies*, Columbia University Press, 2007.

"A decision procedure for 'big O' equations," with Kevin Donnelly, *Journal of Automated Reasoning* 38: 353-373, 2007.

"Quantifier elimination for the reals with a predicate for the powers of two," with Yimu Yin, *Theoretical Computer Science* 370:48-59, 2007.

"Combining decision procedures for the reals," with Harvey Friedman, *Logical Methods in Computer Science* 2(4:4):1-42, 2006.

"Mathematical method and proof," *Synthese,* 153:105-159, 2006.

"Methodology and metaphysics in the development of Dedekind's theory of ideals," in José Ferreirós and Jeremy Gray, editors, *The Architecture of Modern Mathematics,* Oxford University Press, 159-286, 2006.

"Fundamental notions of analysis in subsystems of second-order arithmetic," with Ksenija Simic, *Annals of Pure and Applied Logic,* 139:138-184, 2006.

"Weak theories of nonstandard arithmetic and analysis," in Stephen Simpson, editor, *Reverse Mathematics 2001*. A K Peters, 19-46, 2005.

"Forcing in proof theory," *Bulletin of Symbolic Logic,* 10:305-333, 2004.

"Formalizing O notation in Isabelle/HOL," with Kevin Donnelly, in David Basin and Michaël Rusinowitch, editors, *Automated Reasoning: second international joint conference, IJCAR 2004,* Lecture Notes in Artificial Intelligence 3097, Springer, 357-371, 2004.

"Number theory and elementary arithmetic," *Philosophia Mathematica*, 11:257-284, 2003.

"Eliminating definitions and Skolem functions in first-order logic," *ACM Transactions on Computational Logic*, 4:402-415, 2003. (Conference version: *Proceedings of the 16th annual IEEE Symposium on Logic in Computer Science,* 139-146, 2001.)

"The epsilon calculus," with Richard Zach, in the *Stanford Encyclopedia of Philosophy*, 2002.

"Saturated models of universal theories," *Annals of Pure and Applied Logic*, 118:219-234, 2002.

"Ordinal analysis without proofs," in Wilfried Sieg et. al, eds., *Reflections on the Foundations of Mathematics: Essays in Honor of Solomon Feferman*, Association for Symbolic Logic, A K Peters, 1-36, 2002.

"Transfer principles in nonstandard intuitionistic arithmetic," with Jeffrey Helzner, *Archive for Mathematical Logic*, 41:581-602, 2002.

"An ordinal analysis of admissible set theory using recursion on ordinal notations," *Journal of Mathematical Logic*, 2:91-112, 2002.

"Update procedures and the 1-consistency of arithmetic," *Mathematical Logic Quarterly*, 48:3-13, 2002.

"Algebraic proofs of cut elimination," *Journal of Logic and Algebraic Programming*, 49:15-30, 2001.

"Interpreting classical theories in constructive ones," *Journal of Symbolic Logic*, 65:1785-1812, 2000.

"A realizability interpretation for classical arithmetic," in Buss, Hájek, and Pudlák eds., *Logic Colloquium '98*, Lecture Notes in Logic 13, AK Peters, 57-90, 2000.

"The model-theoretic ordinal analysis of predicative theories," with Richard Sommer, *Journal of Symbolic Logic*, 64:327-349, 1999.

"Gödel's functional (Dialectica) interpretation," with Solomon Feferman, in the *Handbook of Proof Theory*, Samuel Buss, ed., Elsevier 337-405, 1998.

"An effective proof that open sets are Ramsey," *Archive for Mathematical Logic*, 37:235-240, 1998.

"Predicative functionals and an interpretation of $ID^{\wedge}_{<\omega}$," *Annals of Pure and Applied Logic*, 92:1-34, 1998.

"Plausibly hard combinatorial tautologies," in Paul Beame and Samuel Buss, eds., *Proof Complexity and Feasible Arithmetics*, AMS Publications 1-12, 1997.

"A model-theoretic approach to ordinal analysis," with Richard Sommer, *Bulletin of Symbolic Logic*, 3:17-52, 1997.

"Formalizing forcing arguments in subsystems of second-order arithmetic," *Annals of Pure and Applied Logic*, 82:165-191, 1996.

"On the relationship between ATR_0 and $ID^{\wedge}_{<\omega}$," *Journal of Symbolic Logic*, 61:768-779, 1996.

TECHNICAL REPORTS AND UNPUBLISHED MANUSCRIPTS

"Elaboration in dependent type theory," with Leonardo de Moura (first author), Soonho Kong, and Cody Roux. manuscript.

"A formally verified proof of the Central Limit Theorem (preliminary announcement)," with Johannes Hölzl and Luke Serafin, presented to the Isabelle workshop , Vienna, July 2014. On arXiv.

"A variant of the double-negation translation," Carnegie Mellon Technical Report CMU-PHIL-179, 2006.

"Notes on a formalization of the prime number theorem," Carnegie Mellon Technical Report CMU-PHIL-163, 2004.

"Dedekind's 1871 version of the theory of ideals," Carnegie Mellon Technical Report CMU-PHIL-162, 2004.

"Notes on $\prod^1_1$ conservativity, ω-submodels, and the collection schema," Carnegie Mellon Technical Report CMU-PHIL-125, 2001.

"'Clarifying the nature of the infinite': the development of metamathematics and proof theory," with Erich H. Reck, Carnegie Mellon Technical Report CMU-PHIL-120, 2001.

ONLINE BOOKS

Theorem Proving in Lean, with Leonardo de Moura and Soonho Kong.
http://leanprover.github.io/theorem_proving_in_lean.

Logic and Proof, with Floris van Doorn and Robert Lewis.
http://leanprover.github.io/logic_and_proof.

The Lean Reference Manual, with Leonardo de Moura, Gabriel Ebner, and Sebastian Ullrich.
http://leanprover.github.io/reference.

REVIEWS

Review of *Logic's Lost Genius: The Life of Gerhard Gentzen,* by Eckart Menzler-Trott and *Gentzen's Centenary: The Quest for Consistency,* edited by Reinhard Kahle and Michael Rathjen, *Notices of the American Mathematical Society,* 63(11):1288-1292, 2016.

Review of *Dense Sphere Packings: A Blueprint for Formal Proofs,* by Thomas Hales, *Bulletin of Symbolic Logic,* 20(4):500-501, 2014.

Review of *Why is there Philosophy of Mathematics at All?,* by Ian Hacking, *Newsletter of the London Mathematical Society,* December, 2014.

Review of *Alan Turing: His Work and Impact,* edited by S. Barry Cooper and Jan van Leeuwen, *Notices of the American Mathematical Society,* 61(8):886-890, 2014.

Review of *Proof and Other Dilemmas: Mathematics and Philosophy*, edited by Bonnie Gold and Roger A. Simons, *Notices of the American Mathematical Society,* 58(11): 1580-1584, 2011.

Review of the *Handbook of Practical Logic and Automated Reasoning,* by John Harrison, *Theory and Practice of Logic Programming*, 10:237-241, 2010.

Review of *Plato's Ghost: The Modernist Transformation of Mathematics,* by Jeremy Gray, *Mathematical Intelligencer.* 32(2):79-81, 2010.

Review of *Visual Thinking in Mathematics: An Epistemological Study,* by Marcus Giaquinto, *Philosophia Mathematica,* 17:95-108, 2009.

Review of *The Provenance of Pure Reason: Essays in the Philosophy of Mathematics and its History,* by William Tait, *Bulletin of Symbolic Logic,* 12:608-611, 2006.

Review of *The Birth of Model Theory: Löwenheim's Theorem in the Frame of the Theory of Relatives*, by Calixto Badesa, *Mathematical Intelligencer*, 28(4):67-71, 2006.

Review of *Gnomes in the Fog: The Reception of Brouwer's Intuitionism in the 1920s,* by Dennis E. Hesseling, *Mathematical Intelligencer*, 28(4):71-74, 2006.

Review of "Explicit provability and constructive semantics," by Sergei Artemov, *Bulletin of Symbolic Logic* 8:432, 2002.

Review of *Proofs and Confirmations*, by David Bressoud, *SIGACT Newsletter*, 32:4-5, 2001.

Review of *Basic Proof Theory*, by A.S. Troelstra and Helmut Schwichtenberg, *SIGACT Newsletter*, 32, 2001.

Review of "Some results on cut-elimination, provable well-orderings, induction, and reflection," by Toshiyasu Arai, *Bulletin of Symbolic Logic*, 7:77-78, 2001

Review of *In the Light of Logic*, by Solomon Feferman, *Journal of Philosophy*, 96:638-642, 1999.

Review of *First-Order Logic*, by Raymond Smullyan, *Journal of Symbolic Logic*, 61:351, 1996.

Jeremy Avigad and Assia Mahboubi, editors, *Interactive Theorem Proving 2018,* Springer.

Jeremy Avigad and Adam Chlipala, editors, *Proceedings of the 5th ACM SIGPLAN Conference on Certified Programs and Proofs, Saint Petersburg, FL, USA, January 20-22,* ACM, 2016.

PHD STUDENTS

Seul Baek (Logic, Computation, and Methodology, current)

Mario Carneiro (Pure and Applied Logic, current)

Paula Neeley (Pure and Applied Logic, current)

Floris van Doorn (Pure and Applied Logic, 2018)

Robert Lewis (Pure and Applied Logic, 2017)

Rebecca Morris (Logic, Computation, and Methodology, 2015), *Appropriate steps: a theory of motivated proof*

Jason Rute (Mathematical Sciences, 2013), *Topics in algorithmic randomness and computable analysis.*

Sicun Gao (Logic, Computation, and Methodology, 2012, co-advised with Ed Clarke), *Computable analysis, decision procedures, and hybrid automata:a new framework for the formal verification of cyber-physical system*

Henry Towsner (PhD, Mathematical Sciences, 2008), *Some results in logic and ergodic theory*

Yimu Yin (PhD, Logic, Computation, and Methodology, 2008), *Sets, models, and valued fields*

Kerry Ojakian (PhD, Mathematical Sciences, 2004), *Combinatorics in bounded arithmetic*

Ksenija Simic (PhD, Mathematical Sciences, 2004), *Aspects of ergodic theory in subsystems of second-order arithmetic*

PhD committees I have served on (in Philosophy at Carnegie Mellon, unless otherwise noted): Marcos Mazari (Mathematics, current), Soonho Kong (Computer Science, current), Jonathan Sterling (Computer Science, current), Carlo Angiuli (Computer Science, 2019), Joseph Tassarotti (Computer Science, 2018), Nathan Fulton (Computer Science, 2018), Egbert Rijke (2018), Andrew Zucker (Mathematics, 2018), Mate Szabo (2017), Sebastian Vasey (Mathematical Sciences, 2017), Kuen-Bang Hou (Favonia) (Computer Science, 2017), Yacin Hamami (Vrije Universiteit Brussel, May, 2016), William Gunther (Mathematics, 2015), Tyke Nunez (University of Pittsburgh, 2015), Krzysztof Kapulkin (University of Pittsburgh, Mathematics, 2014), Spencer Breiner (2014), Shawn Standefer (University of Pittsburgh, 2013), Alexey Solovyev (University of Pittsburgh, Mathematics, 2012), Cyril Cohen (École Polytechnique, Computer Science, 2012), Ashwini Aroksar (Mathematical Sciences, 2012), Alexander Kreuzer (Mathematics, TU Munich, 2012), Matthew Szudzik (Mathematical Sciences, 2010), Jesse Alama (Stanford, 2009), Chetan Balwe (Mathematics, University of Pittsburgh, 2008), Amine Chaieb (Computer Science, Technische Universität München, 2008), Henrik Forsell (2007), Jeremy Heis (Philosophy, University of Pittsburgh, 2007), Kaustuv Chaudhuri (Computer Science, 2006), Jyotsna Diwadkar (Mathematics, University of Pittsburgh, 2006), John Mumma (2006), Dirk Schlimm (2005), Mark Ravaglia (2003), John Krueger (Mathematical Sciences, 2003), Jesse Hughes (2001), Barbara Kauffmann (2000), Alberto Momigliano (2000), John Byrnes (1999)

MS AND UNDERGRADUATE STUDENTS

Zhouhang Zhou (MS, Logic, Computation, and Methodology, current)

Andrew Warren (MS, Mathematical Sciences, 2019), *Fluctuation bounds for ergodic averages of amenable groups on uniformly convex Banach spaces*

Minchao Wu (MS, Logic, Computation, and Methodology, 2017)

Sebastian Ullrich (MS from Karlsruhe Institute of Technology, 2016), *Simple Verification of Rust Programs via Functional Purification*

Andrew Zipperer (MS, Logic, Computation, and Methodology, 2016), *A formalization of elementary group theory in the proof assistant Lean*

Luke Serafin (MS, Mathematical Sciences, 2015), *A formally verified proof of the central limit theorem*

Jakob von Raumer (MS from Karlsruhe Institute of Technology, summer 2015), *Formalization of non-abelian topology for homotopy type theory*

Benjamin Northrop (MS, Logic, Computation, and Methodology, 2011), *Automated diagrammatic reasoning: a proof checker for the language of E*

Spencer Breiner (MS, Logic, Computation, and Methodology, 2010), *Towards a practical understanding of mathematical structuralism*

Edward Dean (MS, Logic, Computation, and Methodology, 2008), *In defense of Euclidean proof*

Steven Kieffer (MS, Logic, Computation, and Methodology, 2007), *A language for mathematical knowledge management*

Aaron Hertz (MS, Mathematical Sciences, 2004), *A constructive version of the Hilbert basis theorem*

Doug White (MS, Logic, Computation, and Methodology, 2004), *Axiomatics, methodology, and Dedekind's theory of ideals*

Jessi Berkelhammer (MS, Logic, Computation, and Methodology, 2003), *From reducibility to extensionality: the two editions of* Principia Mathematica

Erica Lucast (MS, Logic, Computation, and Methodology, 2002), *A new case for proof in mathematics curricula*

Erin Korber (Undergraduate senior thesis, Logic and Computation major, 2005), *Implementing decision procedures for the real numbers*

MS committees I have served on (in Philosophy, unless otherwise noted): Sebastian Ullrich (2016), Evan Cavallo (Mathematical Sciences, 2015), David Carper (2011), Hans-Christoph Kotzsch (2011), Brian Leary (Mathematical Sciences, 2009), Nick Radcliffe (2008), Dave Gilbert (2008), Kohei Kishida (2007), George Schaeffer (Mathematical Sciences, 2007), Lindsay Spriggs (2007), Michael Warren (2004), Adam Kramer (2004), Keith Douglas (2003), Charlie Smart (Mathematical Sciences, 2002), John Mumma (2001), Jeffrey Helzner (2001), Johanna Franklin (Mathematical Sciences, 2001), Jay Kim (1999), Nathaniel Segerlind (Mathematical Sciences, 1998), Mark Ravaglia (1997), Chris Skalka (1997)

POSTDOCS SUPERVISED

Bruno Bentzen, 2019-present

Simon Hudon, 2019-present

Johannes Hölzl, 2017

Cody Roux, 2012-2014

Philipp Gerhardy, 2006-2007

EDITORIAL WORK

Member, editorial board, *Perspectives in Logic,* 2018-present.
Member, editorial board, *Logical Methods in Computer Science,* 2015-present.
Member, editorial board, *Journal of Automated Reasoning,* 2007-present.

Member, editorial board, *Journal of Formalized Reasoning,* 2007-present.

Member, editorial board, *Computability,* 2011-2019.

Journal manager, and member, editorial board, *Journal of Logic and Analysis,* 2008-2019.

Co-editor (with Lawrence Paulson and Gerwin Klein), special issue of the *Journal of Automated Reasoning,* "Milestones in Interactive Theorem Proving".

Member, editorial board, ASL Lecture Notes in Logic, 2006-2016.

Coordinating editor, *Review of Symbolic Logic,* 2010-2013.

Member, editorial board, *Notre Dame Journal of Formal Logic,* 2004-2011.

Member, advisory board, *Review of Symbolic Logic,* 2007-2010.

Member, editorial board, *Logic and Analysis,* 2006-2008.

Co-editor (with Andrea Asperti), special issue of the *Mathematical Structures in Computer Science,* "Advances and Perspectives in the Mechanization of Mathematics"

Co-editor (with Arnold Beckmann and Georg Moser) of a special issue of the *Annals of Pure and Applied Logic* in honor of Wolfram Pohlers' 60th birthday, October 2005.

Referee for *Journal of Symbolic Logic, Annals of Pure and Applied Logic, Journal of Mathematical Logic, Archive for Mathematical Logic, Mathematical Logic Quarterly, Notre Dame Journal of Formal Logic, Journal of Philosophical Logic, Bulletin of Symbolic Logic, Review of Symbolic Logic, Journal of Logic and Analysis, Advances in Mathematics, Monsatshefte für Mathematik, Transactions of the American Mathematical Society, Proceedings of the American Mathematical Society, Philosophical Transactions of the Royal Society, Monatshefte für Mathematik, Ergodic Theory and Dynamical Systems, American Mathematical Monthly, Discrete Mathematics, Theoretical Computer Science, Mathematical Structures in Computer Science, Journal of Logic and Computation, Information and Computation, Logical Methods in Computer Science, History and Philosophy of Logic, Synthese, Dialectica, Philosophia Mathematica, Theoria, Journal of the American Philosophical Association;* for conferences: *Logic in Computer Science, Computer Science Logic, Computability in Europe, Conference on Automated Deduction, Interactive Theorem Proving, Workshop on Logic, Language, Information and Computation, Types, Certified Proofs and Programs*; as well as for other journals and conferences, and various books and collections.

OTHER PROFESSIONAL SERVICE

Member, prizes and awards committee, Association of Symbolic Logic, 2016-present

Co-organizer, Formal Methods in Mathematics / Lean Together 2020, Carnegie Mellon, Pittsburgh, 2020

Co-organizer, Ken Manders's contributions to the History and Philosophy of Mathematics, University of Pittsburgh, November 2018

Organizer, Applications of Formal Methods to Control Theory and Dynamical Systems, Carnegie Mellon, Pittsburgh, June 2018

Co-organizer, From the Fundamental Lemma to Discrete Geometry, to Formal Verification: A conference in honor of Thomas C. Hales on the occasion of his 60th birthday, University of Pittsburgh, June 2018

Co-chair, program committee, Interactive Theorem Proving (ITP), 2018

Co-organizer, Big Proof, a six week program at the Isaac Newton Institute, Cambridge, 2017

Member, program committee, Interactive Theorem Proving (ITP), 2017

Co-organizer, Ergodic Theory Interacts with Algorithmic Randomness, BIRS worskhop Oaxaca, 2016

Member, program committee, Interactive Theorem Proving (ITP), 2016

Co-chair, program committee, Certified Proofs and Programs, 2016

Chair, program committee, Logic Colloquium, 2014.

Member, program committee, Interactive Theorem Proving (ITP), 2014.

Member, executive council, Association for Symbolic Logic, 2013-2015.

Member, program committee, Interactive Theorem Proving (ITP), 2013.

Member, program committee, Conferences on Intelligent Computer Mathematics (CICM), 2013.

Member, program committee, Computer Science Logic (CSL), 2012.

Member, program committee, Mathematical Knowledge Management (MKM), 2012.

Member, program committee, Model Theory and Proof Theory of Arithmetic, 2012.

Member, program committee, Association for Symbolic Logic annual meeting, Spring 2012.

Member, program committee, Proof Search in Axiomatic Theories and Type Theories workshop at CADE 2011.

Member, program committee, Interactive Theorem Proving (ITP), 2011.

Member, program committee, Logic Colloquium 2011.

Member, program committee, 17th Workshop on Logic, Language, Information, and Computation (WoLLIC), 2011.

Member, program committee, Mathematical Logic division of the International Congress of Logic, Methodology, and Philosophy of Science, 2011.

Organizer (with Ulrich Kohlenbach and Henry Towsner). "Logic and analysis" joint AMS/ASL special session, American Mathematical Society annual meeting, New Orleans, January 2011.

Board of jurors, Kurt Gödel Research Fellowship Prize Program, 2010-2011.

Member, program committee, Interactive Theorem Proving (ITP), 2010.

Chair, Association for Symbolic Logic Committee on Logic in North America, 2008-2009.

Member, Association for Symbolic Logic Committee on Logic in North America, 2004-2009.

Member, program committee, Reverse Mathematics: Foundations and Applications, 2009.

Member, Association for Symbolic Logic Council, 2007-2009.

Member, Association for Symbolic Logic Nominating Committee, 2009.

Member, scientific committee, Logic and Mathematics, 2009

Member, program committee, Theorem Proving in Higher-Order Logic (TPHOLs), 2009.

Member, scientific committee, 14th Latin-American Symposium on Mathematical Logic, 2008.

Organizer (with Reed Solomon), "Effective aspects of measure theory and analysis" special session, Association for Symbolic Logic annual meeting, Montreal, May 2006.

Taught (with Henry Towsner) a two week short-course in proof theory at Notre Dame, under NSF grant "Two Conferences in Logic at Notre Dame," June 6-17, 2005.

Member, program committee for the 13th Workshop on Logic, Language, Information, and Computation, 2006.

Chair, local organizing committee, Association for Symbolic Logic annual meeting, Spring 2004.

Member, program committee, joint Association for Symbolic Logic and American Philosophical Association meeting, Minneapolis, May 2001.

Organizer (with Steve Awodey), Midwest Philosophy of Mathematics Workshop, Carnegie Mellon University, December 2000.

Member, program committee for the Association for Symbolic Logic annual meeting, Urbana-Champaign, May 2000.

Organizer (with Toni Pitassi), "Proof theory and complexity" special session, Association for Symbolic Logic annual meeting, Urbana-Champaign, May 2000.

UNIVERSITY SERVICE

University Committee on Tenure Appointments, 2017-2019

Chair, Hiring Committee, Philosophy, 2013-2014

Director, Graduate Studies in Philosophy, 2005-2009, and 2011-2012

Founder and director, Carnegie Mellon Summer School in Logic and Formal Epistemology, 2005-2010

Chair, H&SS Promotion and Tenure Committee, 2008-2009

Member, Posner Intern selection committee, 2004-present

Director, Logic and Computation Major, 1998-2005

University Education Council, 2002-2005

University Committee on Non-tenure Appointments, 2002-2005

Philosophy Department webmaster, 2001-2005

Faculty Senate, 2000-2004

Organizer, Pure and Applied Logic Colloquium and Philosophy Colloquium, 1996-1998