

# Wesley Crain Calvert

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## Education

Ph.D. in mathematics, May 2005, University of Notre Dame  
Thesis title: Algebraic Structure and Computable Structure  
Thesis adviser: Julia F. Knight  
M.S. in mathematics, May 2002, University of Notre Dame  
B.A. *summa cum laude* in mathematics and history, May 2000, Augustana College (Illinois)  
– Phi Beta Kappa

## Positions Held

Professor, Southern Illinois University, Carbondale, 2023–Present  
Director of Undergraduate Studies, School of Mathematical and Statistical Sciences / Department of Mathematics, Southern Illinois University, Carbondale, 2016–2024  
Associate Professor, Southern Illinois University, Carbondale, 2016–2023  
Research Member, Mathematical Sciences Research Institute, Summer 2022  
Research Member, Mathematical Sciences Research Institute, and Visiting Scholar, University of California, Berkeley, 2020  
Assistant Professor, Southern Illinois University, Carbondale, 2010 – 2016  
Fulbright-Nehru Senior Research Scholar, Institute of Mathematical Sciences, Chennai, India, 2011  
Assistant Professor, Murray State University, 2005 – 2010

## Research Area

Primary interest: Mathematical logic and its applications (MSC 03), especially computability theory and model theory  
Secondary interests: Theoretical computer science (MSC 68), especially computational learning; algebraic geometry (MSC 14) and number theory (MSC 11), especially computational aspects

## External Research Funding

Fulbright-Nehru Senior Research Scholarship, *Effective Structures and Computation*, US-India Educational Foundation  
Senior Personnel, *Collaboration in Computability*, National Science Foundation award DMS 1101123, \$82,500 to fund travel for research collaboration among US, Russian, and Kazakh mathematicians  
Senior Personnel, *Collaboration in Computability*, National Science Foundation award DMS 0554841, \$75,000 to fund travel for research collaboration among US, Russian, and Kazakh mathematicians  
Senior Personnel, *Collaboration in Computability*, National Science Foundation award DMS 1600625, \$100,000 to fund travel for research collaboration among US, Bulgarian, Russian, and Kazakh mathematicians, including subaward of \$4,999 to fund summer support for an SIUC graduate student.

Research Member, “Definability, Decidability, and Computability in Number Theory, part 2,” Mathematical Sciences Research Institute, Berkeley, California, subaward of National Science Foundation Award DMS-1928930, approximately \$7,200 to fund travel and lodging in 2022.

### Book in Progress

*Mathematical Logic and Probability*, under contract with Cambridge University Press, expected in 2024.

### Refereed Publications

- “The isomorphism problem for classes of computable fields,” *Archive for Mathematical Logic* 43 (2004), 327–336.
- “Comparing classes of finite structures,” with D. Cummins, J. F. Knight, and S. Miller, *Algebra and Logic* 43 (2004) 374–392.
- “The isomorphism problem for computable Abelian  $p$ -groups of bounded length,” *Journal of Symbolic Logic* 70 (2005), 331–345.
- “Trees of Scott rank  $\omega_1^{CK}$  and computable approximability,” with J. F. Knight and J. Millar, *Journal of Symbolic Logic* 71 (2006), 283–298.
- “Classification from a computable viewpoint,” with J. F. Knight, *Bulletin of Symbolic Logic* 12 (2006), 191–218.
- “Effective categoricity of equivalence structures,” with D. Cenzer, V. S. Harizanov, and A. Morozov, *Annals of Pure and Applied Logic* 141 (2006), 61–78.
- “Index sets of computable structures,” with V. S. Harizanov, J. F. Knight, and S. Miller, *Algebra and Logic* 45 (2006), 306–325.
- “Computable structures of Scott rank  $\omega_1^{CK}$  in familiar classes,” with S. S. Goncharov and J. F. Knight, *Advances in Logic* (Proceedings of the North Texas Logic Conference, October 8–10, 2004), *Contemporary Mathematics* 425 (2007), American Mathematical Society, 49–66.
- “Turing degrees of isomorphism types of algebraic objects,” with V. S. Harizanov and A. Shlapentokh, *Journal of the London Mathematical Society*, 75 (2007), 273–286.
- “Index sets for classes of high rank structures,” with E. Fokina, S. S. Goncharov, J. F. Knight, O. Kudinov, A. S. Morozov, and V. Puzarenko, *Journal of Symbolic Logic* 72 (2007), 1418–1446.
- “Categoricity of computable infinitary theories,” with S. S. Goncharov, J. F. Knight, and J. Millar, *Archive for Mathematical Logic* 48 (2009), 25–38 (special issue for papers on Model Theory and Computable Model Theory from the Special Year in Logic, University of Florida, 2007).
- “Effective categoricity of Abelian  $p$ -groups,” with D. Cenzer, V. S. Harizanov, and A. Morozov, *Annals of Pure and Applied Logic* 159 (2009), 187–197.
- “Real computable manifolds and homotopy groups,” with R. Miller, *Unconventional Computation 2009*, *Lecture Notes in Computer Science* 5715 (2009), 98–109.
- “The cardinality of an oracle in Blum-Shub-Smale Computation,” with K. Kramer and R. Miller, *Electronic Proceedings in Theoretical Computer Science*, special issue for Computability and Complexity in Analysis 2010, 24 (2010) 56–66.
- “Metric structures and probabilistic computation,” *Theoretical Computer Science* 412 (2011), 2766–2775.
- “Noncomputable Functions in the Blum-Shub-Smale Model,” with K. Kramer and R. Miller, *Logical Methods in Computer Science* 7 (2011), 1–20.

- “Formalization of generalized constraint language: A crucial prelude to computing with words,” with E. Khorasani and S. Rahimi, *IEEE Transactions on Cybernetics* 43 (2013) 246–258.
- “Degeneration and orbits of tuples and subgroups in an Abelian group,” with K. Dutta and A. Prasad, *Journal of Group Theory* 16 (2013), 221–233.
- “Approximating functions and measuring distance on a graph,” with R. Miller and J. Chubb Reimann, *Proceedings of the 12th Asian Logic Conference, 2013*, World Scientific Publishing, 24–52.
- “Some results on  $\mathbb{R}$ -computable structures,” with J. E. Porter, *Effective Mathematics and the Uncountable* (Lecture Notes in Logic, volume 41), 2013, Cambridge University Press, 14–32.
- “Degrees of isomorphism types of geometric objects,” with V. Harizanov and A. Shlapentokh, *Computability* 3 (2014), 105–134.
- “PAC Learning, VC Dimension, and the Arithmetic Hierarchy,” *Archive for Mathematical Logic* 54 (2015) 871–883.
- “Genericity and UD-random reals,” with J. N. Y. Franklin, *Journal of Logic and Analysis*, 7:4 (2015) 1–10.
- “Strong Jump Inversion,” with A. Frolov, V. Harizanov, J. F. Knight, C. F. D. McCoy, A. Soskova, and S. Vatev, *Journal of Logic and Computation* 28 (2018) 1499–1522.
- “Densely computable structures,” with D. Cenzer and V. Harizanov, *Journal of Logic and Computation*, 32 (2022) 581–607.
- “Interpreting a field in its Heisenberg group,” with R. Alvir, G. Goodman, V. Harizanov, J. Knight, A. Morozov, R. Miller, A. Soskova, and R. Weisshaar, *Journal of Symbolic Logic* 87 (2022), pp. 1215–1230.
- “Generically and coarsely computable isomorphisms,” with D. Cenzer and V. Harizanov, *Computability* 11 (2022) 223–239.
- “Generically Computable Abelian Groups,” with D. Cenzer and V. Harizanov, *Unconventional Computation and Natural Computation*, Lecture Notes in Computer Science, volume 14003, Springer, 2023, 32–45.
- “Structural highness notions,” with J. N. Y. Franklin and D. Turetsky, *Journal of Symbolic Logic* 84 (2023) 1692–1724.
- “In memory of Martin Davis,” with V. Harizanov, E. G. Omodeo, A. Policriti, and A. Shlapentokh, accepted for publication in *Notices of the American Mathematical Society*, December 2023.
- “Computability in infinite Galois theory and algorithmically random algebraic fields,” with V. Harizanov and A. Shlapentokh, submitted to *Journal of the London Mathematical Society*, December 2023
- “Generically computable Abelian groups and isomorphisms,” with D. Cenzer and V. Harizanov, submitted to *Natural Computation*, December 2023
- “Normality, relativization, and randomness,” with E. Grunner, E. Mayordomo, D. Turetsky, and J. D. Villano, submitted to *Information and Computation*, December 2023
- “Generically computable linear orderings,” with D. Cenzer, D. Gonzalez, and V. Harizanov, submitted to *Annals of Pure and Applied Logic*, January 2024

## Conference and Seminar Lectures

Invited Talks at Conferences:

- *The isomorphism problem for computable structures*, AMS Special Session on Computability and Models, Joint Mathematics Meetings, Baltimore, Maryland, January 15, 2003

- *Description and comparison of computable structures*, Special session on Computability Theory and Applications, AMS Central Section Meeting, Northwestern University, October 23–24, 2004
- *Classification from a computable viewpoint*, Classification of Countable Models: Workshop on Work Growing Out of Vaught’s Conjecture, University of Notre Dame, May 18, 2005
- *Some results in  $\mathbb{R}$ -computable model theory*, Special Session on Advances in Algorithmic Methods for Algebraic Structures, AMS Southeastern Section Meeting, Middle Tennessee State University, November 4, 2007
- *$\mathbb{R}$ -computable structures*, Invited address, Workshop on Computability and Uncountable Structures, City University of New York Graduate Center, August 18, 2008
- *Randomized Computation and Continuous First-Order Logic*, Special Session on Computability Theory and Effective Algebra, AMS Eastern Section Fall Meeting, Middletown, Connecticut, October 12, 2008
- *Specifying Computation for a Complicated World*, invited lecture, Workshop in Computability Theory, University of San Francisco, California, March 22–23, 2011
- *Continuous First Order Logic*, Invited lecture, Annual Meeting of the Calcutta Logic Circle, Kolkata, India, September 4, 2011
- *The Distance Function on a Computable Graph*, Invited lecture, Mal’tsev Meeting, Novosibirsk, Russia, October 11–14, 2011.
- *The Most Annoying Restriction* Invited lecture, MidAtlantic Mathematical Logic Seminar (Alan Turing Centenary), Boca Raton, Florida, January 12–16, 2012.
- *Degeneration and orbits of tuples and subgroups*, Invited lecture in special session on Computable Mathematics (in honor of Alan Turing), AMS Eastern Section Meeting, March 18, 2012.
- *Algorithmic Unsolvability in Geometry*, Special Session on Computational Advances on Special Functions and Tropical Geometry, AMS Central Section Meeting, Iowa State University, April 28, 2013.
- *What Does a Random Number Look Like?*, Invited keynote address in IL-MO Regional Undergraduate Mathematics Conference, Southeast Missouri State University, November 2, 2013.
- *The Power of Uniform Distribution Randomness*, Invited talk in AMS Special Session on Computability in Geometry and Topology, Joint Mathematics Meetings, Baltimore, Maryland, January 15–18, 2014.
- *PAC learning, VC dimension, and the arithmetic hierarchy*, Invited lecture in Special Session on Computable Structure Theory, AMS Eastern Section Meeting, Georgetown University, March 8, 2015.
- *What could we be, if not rational?*, Invited lecture in Special Session on Computability Theory and Applications, AMS Central Section Meeting, Loyola University Chicago, October 4, 2015.
- *Asymptotically Computable Structures: Model Existence and Categoricity*, Invited lecture, Southeastern Logic Symposium, Gainesville, Florida, March 4, 2017.
- *Generically and Coarsely Computable Structures*, Invited lecture in special session on Computability in Algebra and Number Theory, AMS Southeastern Section Meeting, Charleston, South Carolina, March 12, 2017.
- *Computability and Continuous Logic*, Invited lecture in special session on Computability Theory: Pushing the Boundaries, AMS Eastern Section Meeting, Hunter College, New York City, May 7, 2017.

- *Random Structures*, Invited lecture in AMS Special Session on Recent Advances and Trends in Computable Structure Theory, Joint Mathematics Meetings, Baltimore, Maryland, January 16–19, 2019
- *Learning on Effective Concept Classes*, Invited lecture in Special Session on Computability, Complexity, and Learning, AMS Central and Western Joint Sectional Meeting, University of Hawaii at Manoa, March 23, 2019.
- *Probability, Density, and Structure*, Invited lecture, Midwest Computability Seminar, University of Chicago, April 18, 2019.
- *Degrees High for Isomorphism*, Invited lecture, Northeast Recursion and Definability Seminar, Hofstra University, May 30, 2020.
- *Degrees High for Isomorphism, and Related Classes of Degrees*, Invited lecture in Special Session on Computability Theory and Effective Mathematics, Joint Math Meetings, Washington, DC, January 8, 2021.
- *Logic, Analysis, and Learning*, Invited lecture, Southeastern Logic Symposium, Gainesville, Florida, March 5, 2022.
- *Densely Computable Structures II*, Program Seminar in Decidability, Definability, and Computability in Number Theory, Part 2, Mathematical Sciences Research Institute, July 20, 2022
- *Structural Highness Notions*, Invited lecture, Southeastern Logic Symposium, Gainesville, Florida, March 4–5, 2023.
- Tutorial, Computable Structure Theory, program in “A Convergence of Computable Structure Theory, Analysis, and Randomness,” Banff International Research Station, March 20, 2023.
- *Robust Normality*, Invited Lecture, 17th International Conference on Computability, Complexity, and Randomness (CCR 2024), Nagoya, Japan, March 12, 2024.
- *Random Algebraic Fields*, Invited Lecture, ICICL Summer Research Conference, Drake University, May 13, 2024.

#### Invited Seminar and Colloquium Lectures

- *Structure and non-structure via the isomorphism problem*, Mathematics Department Colloquium, Western Illinois University, March 18, 2004
- *Description and comparison of computable structures*, Southern Wisconsin Logic Colloquium, University of Wisconsin at Madison, November 2, 2004
- *Description and comparison of computable structures*, Logic Seminar, Massachusetts Institute of Technology, December 1, 2004
- *A course in mathematical logic for non-mathematical students*, Westminster College, Fulton, Missouri, December 8, 2004
- *Internal and external complexity among computable structures*, Logic Seminar, Ohio State University, January 14, 2005
- *Internal and external complexity among computable structures*, Department of Mathematics and Statistics Colloquium, Murray State University, January 31, 2005
- *Classification and computation*, Department of Mathematics, Morehouse College, March 1, 2005
- *Comparing classes of structures*, Department of Mathematics Colloquium, George Washington University, April 8, 2005
- *Internal and external complexity among computable structures*, Logic Seminar, George Washington University, April 8, 2005
- *Computation, algebra, and the uncountable*, Mathematics Department Colloquium, East Carolina University, April 11, 2008

- *Effectiveness and Computation in Algebra and Geometry*, Mathematics Department Colloquium, University of Connecticut, October 9, 2008
- *Continuity, Logic, and Computation*, Mathematical and Philosophical Logic Seminar, University of Connecticut, October 10, 2008
- *Effectiveness and Computation in Algebra and Geometry*, Mini-Symposium on Logic and Universal Algebra, University of Bern, Switzerland, November 24, 2008
- *Effectiveness and Computation in Algebra and Geometry*, Mathematics Department Colloquium, University of Louisville, February 9, 2009
- *Continuous Logic and Randomized Computation*, Logic Seminar, Indiana University, Bloomington, February 25, 2009
- *Effectiveness and Computation in Algebra and Geometry*, Mathematics Department Colloquium, University of Toledo, March 20, 2009
- *Effectiveness and Computation in Algebra and Geometry*, Mathematics Department Colloquium, University of Alaska Fairbanks, April 7, 2009
- *Computation, Decision, and Mathematical Problems*, Mathematics Department Colloquium, Southern Illinois University Carbondale, November 10, 2010
- *Randomized Computation and Continuous First-Order Logic*, Computable Structures Seminar, Novosibirsk State University, Russia, June 7, 2010
- *How is a Proof Like a Function?*, Mathematics Department Colloquium, Eastern Illinois University, April 1, 2011.
- *Degrees coded in geometry*, Logic Seminar, George Washington University, April 28, 2011
- *Diophantine Geometry of Undecidability*, Mathematics Departments, Alpha Arts and Science College and Alpha College of Engineering, Chennai, India, September 14, 2011
- *The distance function on a computable graph* Computer Science Seminar, Indian Statistical Institute, Chennai Centre, Chennai, India, October 24, 2011.
- *Strong Jump Inversion*, Logic Seminar, George Washington University, December 6, 2016
- *Logic and Probability*, Mathematics Colloquium, Western Illinois University, February 28, 2019.
- *Effective Ringed Spaces and Turing Degrees of Isomorphism Types*, Computability Seminar, Mathematical Sciences Research Institute, Berkeley, California, September 18, 2020.
- (Panelist) *Superpower Theory*, Career Development Seminar (for postdocs in two thematic programs), Mathematical Sciences Research Institute, Berkeley, California, September 30, 2020.
- *Densely Computable Structures*, Logic Seminar, Iowa State University, November 3, 2021.
- *Densely Computable Structures II*, Program Seminar in Decidability, Definability, and Computability in Number Theory, Part 2, Mathematical Sciences Research Institute, July 20, 2022
- *Random Algebraic Extensions of  $\mathbb{Q}$* , Department of Mathematics Colloquium, University of Florida, March 3, 2023.
- *Learning and Logic*, Undergraduate Mathematics Seminar, Trinity University, Texas, January 23, 2024.
- *Logic and Learning*, Mathematics Colloquium, Iowa State University, January 30, 2024.

## Contributed Talks (selected):

- *The isomorphism problem for familiar classes of computable structures*, ASL annual meeting, Las Vegas, Nevada, June 1, 2002
- *The isomorphism problem for classes of computable groups and fields*, Logic Colloquium 2003, Helsinki, Finland, August 19, 2003
- *The isomorphism problem for classes of computable structures*, ASL Winter Meeting, Joint Mathematics Meetings, Phoenix, Arizona, January 10, 2004
- *Comparing classes of finite structures*, MAA Trisection Meeting (Illinois, Indiana, and Kentucky), Evansville, Indiana, November 2004
- *Description and comparison of computable structures*, ASL Winter Meeting, Joint Mathematics Meetings, Atlanta, Georgia, January 7, 2005
- *Turing degrees of isomorphism types of algebraic objects*, ASL Winter Meeting, Joint Mathematics Meetings, San Antonio, Texas, January 15, 2006
- *Coding Turing Degrees in Geometric Objects*, Contributed talk in ASL Meeting, Joint Mathematics Meetings, Washington, DC, January 7, 2009
- *Probabilistic Computation and Stochastic Processes*, Contributed talk in ASL Meeting, Joint Mathematics Meetings, San Francisco, CA, January 15, 2010
- *Computation and logic on dynamic random graphs*, ASL Annual Meeting, Berkeley, California, March 26, 2011.
- *Geometry of Undecidability*, Knots in Washington XXXII, May 1, 2011.
- *The Distance Function on a Computable Graph*, Contributed talk in ASL Meeting, Joint Mathematics Meetings, Boston, MA, January 2012.
- *Algebra and Logic of Random Variables*, Illinois Section Meeting of the MAA, March 31, 2012.
- *Who Can See the Isomorphism?*, Contributed talk in Illinois Section Meeting of the MAA, April 6, 2013.
- *PAC Learning, VC Dimension, and the Arithmetic Hierarchy*, Association of Symbolic Logic North American Meeting, Urbana, Illinois, March 25, 2015.
- *Locating Boundaries of Machine Learning*, Knots in Washington XLIII, December 10, 2016.
- *Symmetry and Structure*, MAA Trisection Meeting (Illinois, Indiana, and Michigan), Valparaiso University, March 23, 2018.
- *Semigroups of Partial Automorphisms*, Contributed talk in ASL North American Annual Meeting, Macomb, Illinois, May 16–19, 2018.
- *The Composition Lemma*, Reading Seminar, Mathematical Sciences Research Institute, Berkeley, California, August 8, 2022.

**Internal Research Funding**

Undergraduate Assistantship, SIUC Center for Undergraduate Research and Creative Activities, 2016–2017

“Business Math in a Data Driven World,” PI, SIU Foundation Research Grant, \$4,801.38; 2019–2021

**Graduate Research Students**

As director

- Elizabeth Spector, M.S., 2013; presently Asset Manager, Ansonia Properties; formerly Vice President, Fidelity Capital management

- Vina Castelli, M.S., 2015; presently Lecturer, Mathematics, Southern Illinois University at Carbondale
- Dodamgodage Gihanee Senadheera, M.S., 2019; Ph.D., 2022; presently Assistant Professor, Wintrop University
- Seth Thomasson, M.S. in progress, expected Summer 2024
- Kathryn Wiesen, M.S. in progress, expected Fall 2024
- Sunil Karn, Ph.D. in progress, expected 2025.

#### As Committee Member

- Elham Khorasani, Ph.D. (Computer Science), 2012
- Allan Smith
- Wahidah Alsibiani, Ph.D., 2015
- Hakim Walker, Ph.D. (George Washington University), 2017
- Jeremiah Roberts, M.S., 2020, Ph.D. in progress
- Daina McKinney, M.S., 2021

### Undergraduate Research Students

Ryan Walls, 2007–2009; preliminary results presented at MAA Kentucky Section Meeting, March 2008; Senior thesis defended May 2009; currently Senior Data Scientist, Articulate.

Robert Amundson, 2007–2008; preliminary results presented at MAA Kentucky Section Meeting, March 2008; currently US Army.

Aron Huckaba, currently Assistant Professor, Chemistry, University of Kentucky, 2009–2010

Sophia Lozano, currently VP, Special Operations, Insticator, 2012

Alexandra Melton, currently Associate Business Consultant, Primera Engineers, 2012

David Foutch, 2012, currently statistical analyst, Department of Biomedical Informatics, Vanderbilt University Medical Center.

Ashley Ziegler, 2016; currently mathematics teacher, Carbondale Community High School, preliminary results presented at MAA Illinois Section Meeting, April 2016

Brianna Martin, 2016–2017; currently Claims Analyst, HFRI; preliminary results presented at MAA Illinois Section Meeting, March 2017

Industrial Mathematics Clinic course, Spring 2019, including 12 students; results presented at MathFest 2019.

Industrial Mathematics Clinic course, Spring 2021, including 7 students.

Saluki Analytics Lab, 2019–2020, including 8 students so far.

Daniel Davidson, 2020

Wyatt Powers, 2021

### Curriculum Leadership

Courses designed or redesigned

- **Finite Mathematics for Business Students:** Led group of faculty in redesign of an existing course to integrate spreadsheet use and align to needs of client programs
- **Coremediation Calculus I:** Led group of faculty in design of new course to make STEM majors more available to students with weak high school preparation
- **Honors Calculus I:** Led group of faculty in design of new course to provide additional depth in calculus to advanced students
- **Industrial Mathematics Clinic:** Individual grant-funded effort to create a new



upper-level course in which students solve a mathematical problem for a client organization (clients included an electrical utility and a US Navy research center)

- **Teaching Undergraduate Mathematics:** Individual effort to create a graduate course in pedagogy for new teaching assistants

Degree programs designed or redesigned

- **B.S. in Statistics:** Led group of faculty in design of new B.S. program. Managed proposal through campus, system, and state review process. Approved by Illinois Board of Higher Education, November 2023.
- **B.S. in Mathematics, Specialization in Actuarial Mathematics:** Led group of faculty to redesign obsolete actuarial science program, achieving SOA recognition in 2023.
- **B.S. in Mathematics, Specialization in Data Science:** Led group of faculty to design new specialization to prepare students for high-demand careers, opened in Fall 2020.

## Courses Taught

At Southern Illinois University, Carbondale:

- Service courses: College Algebra, Finite Mathematics (for business), Calculus I–III, Mathematics Content and Methods for the Elementary School; University Honors Seminar in Uncertainty; University Honors Seminar in Mathematics and Climate
- Graduate / Advanced Courses: Introduction to proofs, Discrete Mathematics, History of Mathematics, Upper-level Linear Algebra, Basic Short-Term Actuarial Mathematics (FAM-S), Classical and Modern Geometry, Abstract Algebra II (ring and field theory for undergraduate and masters' students), Industrial Mathematics Clinic, Teaching Undergraduate Mathematics, Algebraic Structures I (group and ring theory for Ph.D. students), Measure and Integration, Mathematics of Uncertainty, Machine Learning

At Institute of Mathematical Sciences, Chennai: Computable Model Theory

At Murray State University:

- Service courses: Liberal Arts Mathematics, Introductory Statistics, College Algebra, Precalculus, Business Calculus, Calculus I
- Other undergraduate courses: Introduction to Algebraic Structures
- Graduate courses: Abstract Algebra I, Linear Algebra (graduate), Computability Theory

At University of Notre Dame: (As primary instructor) Liberal Arts Mathematics, Basic Logic; (As teaching assistant) Basic Logic, Calculus II for Life Sciences, Linear Algebra and Differential Equations

At Augustana College: help session tutor for basic physics

## Teaching-Related Certifications

Youth Mental Health First Aid (National Council for Mental Wellbeing), Expires 2026  
Behavioral First Responder, Level 2 (Alpenglow Education), Expires 2026

## Conferences Organized

Co-Organizer, 5th Annual Graduate Student Conference in Logic, University of Notre Dame, May 1–2, 2004

Local organizing committee, 27th Southeastern Atlantic Regional Conference on Differential Equations, Murray State University, October 19–20, 2007 (SEARCDE 2007)

Co-Organizer, Special Session on Computability Across Mathematics, AMS Central Section Meeting, St. Louis, Missouri, October 18–20, 2013

Co-Organizer, AMS-ASL Joint Special Session on Logic and Probability, Joint Mathematics Meetings, Baltimore, Maryland, January 15–18, 2014

- Program Committee, ASL Winter Meeting (with Joint Mathematics Meetings), January 2015
- Program Committee and Organizing Committee, Langenhop Lecture and SIU Mathematics Conference, May 16–17, 2016
- Co-Organizer, Special Session on Effective Mathematics in Discrete and Continuous Worlds, AMS Central Section Meeting, Minneapolis, Minnesota, October 28–30, 2016
- Program Committee Chair and Organizing Committee, Annual Meeting of the Illinois Section of the Mathematical Association of America, March 29–30, 2019
- Program Committee and Organizing Committee, Langenhop Lecture and SIU Mathematics Conference, May 14–15, 2019
- Program Committee, ASL North American Meeting, April 2022
- Program Committee and Local Organizing Committee, Langenhop Lecture and Mathematics Conference, October 28–30, 2022
- Co-Organizer, AMS Special Session on Computable Mathematics: A Special Session Dedicated to Martin D. Davis, Joint Mathematics Meetings, San Francisco, California, January 3–6, 2024
- Online Logic Seminar, involving speakers from at least 21 countries on six continents. April 2, 2020–present

### Externally Funded Involvement in Education Reform

- Content specialist and workshop leader, *West Kentucky Partners in Math and Science Education* (Funded by US Department of Education), provided training in content knowledge and pedagogy for K-8 teachers, 2006–2007
- Content specialist and workshop leader, *West Kentucky Mathematics Partnership* (Funded by Kentucky Council on Postsecondary Education), providing training in content knowledge and pedagogy for middle school teachers, 2008–2010
- Mathematics Instructor, Monroe-Randolph-Intel Math Connections (Funded by US Department of Education via Illinois State Board of Education MSP program), 2010–2012
- Guest speaker (Lecture title: *Bayes' Rule in Artificial Intelligence*), PSBB Secondary School, Chennai, India, August 29, 2011
- Guest speaker (Lecture title: *Inquiry in Maths Education and Teacher Education*), Faculty Development Program, Alpha Arts and Science College and Alpha College of Engineering
- Internal Co-PI, *A Community of Problem Solvers: Teachers Leading Problem-Based Learning in Southern Illinois*, NSF DUE 1136414; \$1,640,821, October 1, 2011–September 30, 2017
- Organizer, high school teachers' workshop on affective content knowledge in mathematics, Chennai, India, funded by United States-India Educational Foundation.
- Co-PI, *SIUC Race to the Top (Common Core Standards Intro Secondary Mathematics Teacher Education Program)*, Illinois State Board of Education, \$4,000, October 31, 2013–June 30, 2014
- Co-PI, *SIUC Race to the Top (Common Core Standards Intro English Language Arts Teacher Education Programs)*, Illinois State Board of Education, \$4,166, October 31, 2013–June 30, 2014
- PI, *SIUC Race to the Top (Common Core Standards Intro Secondary Mathematics and English Teacher Education Program)*, Illinois State Board of Education, \$38,842, August 1, 2014–December 22, 2015
- PI, *ISTEM Network Local Area Partnerships*, US Department of Education, via Illinois State Board of Education and Regional Office of Education #30; \$23,850, July 1, 2015–September 30, 2015.
- Co-PI and Fiscal Officer, *ISTEM Network Local Area Partnerships*, US Department of Education, via Illinois State Board of Education and Regional Office of Education #30; \$23,850, July 1, 2016–August 31, 2016.

Co-PI, Southern Illinois — Making Math Connections, Regional Office of Education #45 (Funded by US Department of Education via Illinois State Board of Education), \$66,003, March 15, 2017–August 31, 2017.

Co-PI, Southern Illinois — Making Math Connections (renewal), Regional Office of Education #45 (Funded by US Department of Education via Illinois State Board of Education), \$86,456, January 1, 2018–August 31, 2018.

### Other Grants for Institutional Capacity Building

PI, Preparing for Industrial Careers in Mathematical Sciences at Southern Illinois University Carbondale, Mathematical Association of America (funded by National Science Foundation via MAA), approximate value \$6,000 May 29, 2018–August 1, 2019.

Co-PI, Building Big Data Research and Teaching Synergy at SIUC, Sigma Xi, \$2,000, March 1, 2018–May 30, 2019

### Popular Writing, Public Testimony, and Media Appearances

Keynote speaker at a luncheon hosted by Reppert Publications (local newspaper publisher) to honor top graduates of local high schools, May 2011.

Weekly columnist, *The Carterville Courier*, documenting my experiences in India, July–December 2011.

“Paradox, Truth, and Computing,” 15th Popular Lecture of the Association for Mathematics Teachers in India, December 21, 2011, published under same title in *The Mathematics Teacher* 47 (2011), 189–198.

Guest Opinion, “Not Vouching for School Choice,” *The Southern Illinoisan*, January 31, 2012  
The Saylor Foundation, free online course in mathematical logic and theory of computing, 2014

Guest Opinion, “Snake Oil School Choice,” *The Carterville Courier*, April 16, 2014

Radio Interview, “Morning Conversations,” WSIU radio, May 16, 2016

Radio Interview, “InFocus,” WSIU radio, May 15, 2017

Author of national curriculum for Boy Scouts of America program on mathematics, “Fearful Symmetry,” for children in grades 2–5, March 2018

TV Interview, KFVS News (CBS), April 18, 2018

TV Interview, WSIL News, (ABC), April 17, 2018

Testimony before Illinois General Assembly Higher Education Committee on Southern Illinois University Funding, August 20, 2018

New class described in *The Southern Illinoisan*: “SIU Students work on predicting power grid reliability with Ameren Illinois project,” February 18, 2019.

### Service

To Southern Illinois University (University-level appointments)

- Internal program review team for the SIUC English Department (representing Graduate Council), 2010–2011.
- Intercollegiate Athletics Advisory Committee, 2012–2014.
- Outstanding Dissertation Award Committee, 2016.
- Chair, Library Affairs Advisory Committee, 2015–2016.
- Search Committee, Dean of Library Affairs, 2016.
- Student Appeals Committee (for student grievance to Graduate School), Spring 2017.
- Teacher Education Program Unit Accreditation Coordinating Council, 2012–2019.
- Community of Practice on First Generation Students, 2016–2019.
- Graduate Council, 2016–2019.

- Chair of the Graduate Council, 2018–2019 (included overseeing faculty governance review of major campus reorganization).
  - Research Subcommittee, 2016–2017
  - Chair, New Programs Subcommittee, 2017–2018
  - Review Panel, PROMPT (Proactive Recruitment of Multicultural Professionals for Tomorrow) Fellowship, 2016–2019.
  - Search committee for Director, Honors Program, 2018.
  - Search Committee for Associate Dean and Director of the Graduate School, 2019.
  - Chair, Search Committee for Interim Vice Chancellor for Research, 2019.
  - SIU STEM Connection Group, coordinating outreach efforts to local high schools, 2018–2020.
  - Search Committee for Dean of the School of Education, 2020.
  - Joint Benefits Committee, 2022–present
  - Chair, Faculty Senate Ad-Hoc Committee on Addressing High DFW Rates, 2024.
- To Southern Illinois University (College-level appointments)
- Health Professions Advising Committee, 2016–2023.
  - College of Science Curriculum Committee, 2016–2020, Chair 2018–2020.
  - Interdisciplinary faculty search in Science Education (originally for one position, search resulted in two hires), 2017
  - College of Engineering, Computing, Technology, and Mathematics Curriculum Committee, 2020–present, Chair 2023–present.
- To Southern Illinois University (Department/School-level appointments)
- Math Field Day / Little Egypt Mathematics Week Committee, 2010–2014.
  - Mathematics Department Colloquium Organizer, 2012–2016.
  - Mathematics Department Graduate Program Committee, 2015–2016, 2023–present.
  - Mathematics Department / School of Mathematical and Statistical Sciences Undergraduate Program Committee, 2010–present; Chair, 2016–present.
  - Department Representative to institutional team for Illinois Board of Higher Education / Illinois Community College Board Complete College America Co-requisite Remediation Pilot Program, 2016–2019.
  - Promotion and Tenure Committee, 2016–2018, 2023–present.
  - Moderator, Formation Committee for Calculus I Enhanced (Calculus I with coremediation), Fall 2016.
  - Director, Saluki Analytics Lab, 2019–2020.
  - Operating Paper Committee, 2021–2023.
  - Search Committee, Assistant Professor and Calculus Coordinator, 2021–2022.
- To Murray State University
- Mathematics Department Scholarship Committee, 2005–2006.
  - Roads Scholars Outreach Team to Massac County, Illinois, 2005–2008.
  - Mathematics Department Graduate Program Committee, 2006–2009.
  - Mathematics Department Curriculum and Assessment Committee, 2009–2010.
  - Faculty Adviser, Lee Clark Residential College Debate Team, 2005–2010.
  - Faculty Adviser, University Academic Team (Quick Recall), 2006–2010.
  - Search committee for chair of Mathematics Department, 2008–2009.
  - Mathematics Department Study Abroad Ambassador, 2008–2010.
  - Mathematics Department Library Contact, 2009–2010.
- To the scientific community
- Co-Organizer, Graduate Student Workshop at Indiana section MAA meeting, Indiana State University, April 2–3, 2004; supported by an MAA grant for Pilot Programs to Support Graduate Student Participation
  - MAA Liaison to Murray State University, 2008–2010.
  - MAA Committee on Articulation and Placement, 2009–2015.
  - Member, India National Screening Committee, Fulbright-Nehru Doctoral and Professional Research Fellowships, 2011.

- MAA Illinois Section Two-Year College Committee, 2012–2015.
- AMS Library Committee, 2013–2016.
- MAA Illinois Section Board of Directors, 2013–2016, 2017–2020.
- MAA Illinois Section Finance Committee, 2013–2020.
- MAA Illinois Section Program Committee, 2017–2019; chair 2018–2019.
- MAA Committee on Mathematical Education of Teachers, 2017–2023.
- MAA Committee for the Mary P. Dolciani Award, 2023–present.
- Sigma Xi, President of SIUC Local Chapter, 2018–2019.
- Co-Organizer, Career Development Seminar (for postdocs in two thematic programs),  
Mathematical Sciences Research Institute, Berkeley, California, Fall 2020.
- Referee for journals, conference proceedings, and Mathematical Reviews.

To the University of Notre Dame

- Mathematics Department Graduate Student Seminar Organizer, 2001–2004
- University Committee on Libraries, 2002–2005
- Teaching, Learning, and Technology Roundtable Subcommittee on Student Computer  
Ownership, January – October 2002
- University Traffic Appeals Committee and Parking Committee, 2001–2002
- Department Graduate Student Recruiting committee, Spring 2002 – Spring 2004

## Honors

*Outstanding Graduate Student Teacher Award for Excellence in Teaching*, 2004, awarded by the Kaneb Center for Teaching and Learning.

Project NExT Fellow 2006–2007

*Lindell W. Sturgis Memorial Public Service Award*, Southern Illinois University (One award annually across all university employees), 2020.

*Cosmos Award*, Greater St. Louis Area Council of Boy Scouts of America, for activities in informal STEM education, 2021

## Memberships

American Mathematical Society, Mathematical Association of America, National Council of Teachers of Mathematics, Association for Symbolic Logic, Association for Computing Machinery, Sigma Xi