

Armin Straub

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<http://arminstraub.com>

containing preprints, slides of talks, and a current CV

Academic employment

<i>since 2021</i>	University of South Alabama Associate Professor
<i>2015 – 2021</i>	University of South Alabama Assistant Professor
<i>2012 – 2015</i> <i>(on leave during 2013)</i>	University of Illinois at Urbana-Champaign J. L. Doob Research Assistant Professor
<i>2013</i>	Max-Planck-Institut für Mathematik, Bonn (DE) Postdoctoral fellow

Research Interests

My research lies at the interface of number theory, combinatorics and special functions.
 Common threads are connections with modular forms and symbolic computation.

Academic education

<i>2008 – 2012</i>	Ph.D. in Mathematics from Tulane University thesis: “Arithmetic aspects of random walks and methods in definite integration” advisor: Victor H. Moll co-advisor: Jonathan M. Borwein, University of Newcastle (AU)	
<i>2007 – 2008</i>	Diplom in Mathematics from TU Darmstadt (DE) thesis: “Local recognition of reflection graphs on Coxeter groups” supervisor: Ralf Köhl (né Gramlich)	(with distinction)
<i>2006 – 2007</i>	M.S. in Mathematics from Tulane University	
<i>2003 – 2006</i>	Student of Mathematics at TU Darmstadt (DE) minor in Computer Science	

Extended research visits for collaboration

<i>2022, Jun–Jul</i>	Inria Saclay (FR) hosted by Alin Bostan	(1 week)
<i>2022, Jun</i>	University of Vienna (AT) hosted by Michael Schlosser	(1 week)
<i>2022, Apr</i>	Research Institute for Symbolic Computation (AT) invited by Veronika Pillwein	(3 weeks)
<i>2022, Jan</i>	Mathematisches Forschungsinstitut Oberwolfach (DE) Research in Pairs program with Jehanne Dousse, Jeremy Lovejoy, Robert Osburn	(2 weeks)

2019, Jul	Research Institute for Symbolic Computation (AT) invited by Veronika Pillwein	(3 weeks)
2017, Nov	Erwin Schroedinger Institute (AT) invited participant and speaker at the program <i>Algorithmic and Enumerative Combinatorics</i>	(2 weeks)
2015, Mar–Apr	Max-Planck-Institut für Mathematik, Bonn (DE) visiting researcher	(8 weeks)
2014, Aug	Singapore University of Technology and Design (SG) invited by James G. Wan	(2 weeks)
2013, Oct	Research Institute for Symbolic Computation (AT) invited by Veronika Pillwein and Peter Paule	(1 week)
2009, 2010, 2011	University of Newcastle (AU) invited by Jonathan M. Borwein	(4+12+4 weeks)
2009, Jun	Grinnell College invited by Marc Chamberland	(4 weeks)

Preprints

- [3] *Gessel–Lucas congruences for sporadic sequences*
submitted, 2023, [arXiv:2301.12248](https://arxiv.org/abs/2301.12248)
- [2] (with Alin Bostan, Sergey Yurkevich) *On the representability of sequences as constant terms*
submitted, 2022, [arXiv:2212.10116](https://arxiv.org/abs/2212.10116)
- [1] (with John Pomerat) *On the integrality of powers of power series*
submitted, 2022

Refereed publications

- [55] (with Wadim Zudilin) *Sums of powers of binomials, their Apéry limits, and Franel’s suspicions*
accepted for publication in **International Mathematics Research Notices**, 2022, [DOI](#)
- [54] (with Joel A. Henningsen) *Generalized Lucas congruences and linear p -schemes*
Advances in Applied Mathematics, Vol. 141, 2022, #102409, p. 1-20, [DOI](#)
- [53] *On congruence schemes for constant terms and their applications*
Research in Number Theory, Vol. 8, Nr. 3, 2022, #42, p. 1-21, [DOI](#)
- [52] (with Marc Chamberland) *Apéry limits: Experiments and proofs*
American Mathematical Monthly (special issue in memory of Jonathan Borwein), Vol. 128, Nr. 9, 2021,
p. 811-824, [DOI](#)
- [51] (with Tewodros Amdeberhan, Victor H. Moll, Christophe Vignat)
A triple integral analog of a multiple zeta value
International Journal of Number Theory, Vol. 17, Nr. 2, 2021, p. 223-237, [DOI](#)
- [50] (with Hannah E. Burson, Simone Sisneros-Thiry) *Refined counting of core partitions into d -distinct parts*
Electronic Journal of Combinatorics, Vol. 28, Nr. 1, 2021, #P1.37, p. 1-21, [DOI](#)
- [49] *Trigonometric Dirichlet series and Eichler integrals*
accepted for publication in **Encyclopedia of Srinivasa Ramanujan and His Mathematics**; Editors:
K. Alladi, G. E. Andrews, B. C. Berndt and K. Ono; Springer, 2021
- [48] (with Karl Dilcher, Christophe Vignat)
Identities for Bernoulli polynomials related to multiple Tornheim zeta functions
Journal of Mathematical Analysis and Applications, Vol. 476, Nr. 2, 2019, p. 569-584, [DOI](#)

- [47] (with Sam Formichella) *Gaussian binomial coefficients with negative arguments*
Annals of Combinatorics (special issue dedicated to George E. Andrews), Vol. 23, Nr. 3, 2019, p. 725-748, DOI
- [46] (with Drew Lewis, Kaitlyn Perry)
An algorithmic approach to the Polydegree Conjecture for plane polynomial automorphisms
Journal of Pure and Applied Algebra, Vol. 223, Nr. 12, 2019, p. 5346-5359, DOI
- [45] (with Robert Osburn) *Interpolated sequences and critical L-values of modular forms*
Chapter 14 of the book: **Elliptic Integrals, Elliptic Functions and Modular Forms in Quantum Field Theory**; Editors: J. Blümlein, P. Paule and C. Schneider; Springer, 2019, p. 327-349, DOI
- [44] *Supercongruences for polynomial analogs of the Apéry numbers*
Proceedings of the American Mathematical Society, Vol. 147, 2019, p. 1023-1036, DOI
- [43] (with Dermot McCarthy, Robert Osburn) *Sequences, modular forms and cellular integrals*
Mathematical Proceedings of the Cambridge Philosophical Society, Vol. 168, Nr. 2, 2020, p. 379-404, DOI
- [42] (with Frits Beukers, Marc Houben) *Gauss congruences for rational functions in several variables*
Acta Arithmetica, Vol. 184, 2018, p. 341-362, DOI
- [41] (with Yuliy Baryshnikov, Stephen Melczer, Robin Pemantle)
Diagonal asymptotics for symmetric rational functions via ACSV
Leibniz International Proceedings in Informatics (Analysis of Algorithms 2018), Vol. 110, 2018, p. 12:1–12:15, DOI
- [40] (with Wadim Zudilin) *Short walk adventures (in memory of Jon Borwein)*
Springer Proceedings in Mathematics & Statistics (From Analysis to Visualization: JBCC 2017), Vol. 313, 2020, p. 423–439, DOI
- [39] (with Robert Osburn, Wadim Zudilin) *A modular supercongruence for ${}_6F_5$: An Apéry-like story*
Annales de l'Institut Fourier, Vol. 68, Nr. 5, 2018, p. 1987-2004, DOI
- [38] (with Shaun Cooper, Jesús Guillera, Wadim Zudilin) *Crouching AGM, hidden modularity*
Chapter 9 of the book: **Frontiers in Orthogonal Polynomials and q-Series**; Editors: Z. Nashed and X. Li; World Scientific, 2018, p. 169-187, DOI
- [37] (with Bruce C. Berndt) *Ramanujan's formula for $\zeta(2n + 1)$*
Chapter 2 of the book: **Exploring the Riemann Zeta Function**; Editors: H. Montgomery, A. Nikeghbali, and M. Rassias; Springer, 2017, p. 13-34, DOI
- [36] *Core partitions into distinct parts and an analog of Euler's theorem*
European Journal of Combinatorics, Vol. 57, 2016, p. 40-49, DOI
- [35] (with Bruce C. Berndt) *On a secant Dirichlet series and Eichler integrals of Eisenstein series*
Mathematische Zeitschrift, Vol. 284, Nr. 3, 2016, p. 827-852, DOI
- [34] (with Amita Malik) *Divisibility properties of sporadic Apéry-like numbers*
Research in Number Theory, Vol. 2, Nr. 1, 2016, #5, p. 1-26, DOI
- [33] (with Jonathan M. Borwein, Christophe Vignat)
Densities of short uniform random walks in higher dimensions
Journal of Mathematical Analysis and Applications, Vol. 437, Nr. 1, 2016, p. 668-707, DOI
- [32] (with Bruce C. Berndt) *Certain integrals arising from Ramanujan's notebooks*
SIGMA (special issue on Orthogonal Polynomials, Special Functions and Applications), Vol. 11, Nr. 083, 2015, 11 p., DOI

- [31] (with Harold G. Diamond) *Bounds for the logarithm of the Euler gamma function and its derivatives*
Journal of Mathematical Analysis and Applications, Vol. 433, Nr. 2, 2016, p. 1072-1083, DOI
- [30] *Special values of trigonometric Dirichlet series and Eichler integrals*
The Ramanujan Journal (special issue dedicated to Marvin Knopp), Vol. 41, Nr. 1, 2016, p. 269-285, DOI
- [29] *Congruences for Fishburn numbers modulo prime powers*
International Journal of Number Theory, Vol. 11, Nr. 5, 2015, p. 1679-1690, DOI
- [28] *Multivariate Apéry numbers and supercongruences of rational functions*
Algebra & Number Theory, Vol. 8, Nr. 8, 2014, p. 1985-2008, DOI
- [27] (with Robert Osburn, Brundaban Sahu) *Supercongruences for sporadic sequences*
Proceedings of the Edinburgh Mathematical Society, Vol. 59, Nr. 2, 2016, p. 503-518, DOI
- [26] (with Wadim Zudilin) *Positivity of rational functions and their diagonals*
Journal of Approximation Theory (special issue dedicated to R. Askey), Vol. 195, 2015, p. 57-69, DOI
- [25] (with Luis A. Medina) *On multiple and infinite log-concavity*
Annals of Combinatorics, Vol. 20, Nr. 1, 2016, p. 125-138, DOI
- [24] (with David Borwein, Jonathan M. Borwein) *On lattice sums and Wigner limits*
Journal of Mathematical Analysis and Applications, Vol. 414, Nr. 2, 2014, p. 489-513, DOI
- [23] (with Marc Chamberland) *On gamma quotients and infinite products*
Advances in Applied Mathematics, Vol. 51, Nr. 5, 2013, p. 546-562, DOI
- [22] (with Jonathan M. Borwein) *Relations for Nielsen polylogarithms*
Journal of Approximation Theory (special issue dedicated to R. Askey), Vol. 193, 2015, p. 74-88, DOI
- [21] (with Mark W. Coffey, Valerio De Angelis, Atul Dixit, Victor H. Moll, Christophe Vignat)
The Zagier polynomials. Part II: Arithmetic properties of coefficients
The Ramanujan Journal, Vol. 35, Nr. 3, 2014, p. 361-390, DOI
- [20] (with Mathew Rogers) *A solution of Sun's \$520 challenge concerning $\frac{520}{\pi}$*
International Journal of Number Theory, Vol. 9, Nr. 5, 2013, p. 1273-1288, DOI
- [19] (with Tewodros Amdeberhan, David Borwein, Jonathan M. Borwein)
On formulas for π experimentally conjectured by Jauregui-Tsallis
Journal of Mathematical Physics, Vol. 53, Nr. 7, 2012, p. 073708:1-15, DOI
- [18] (with Jonathan M. Borwein) *Mahler measures, short walks and log-sine integrals*
Theoretical Computer Science (special issue on Symbolic and Numeric Computation), Vol. 479, Nr. 1, 2013, p. 4-21, DOI
- [17] (with David Borwein, Jonathan M. Borwein, James Wan) *Log-sine evaluations of Mahler measures, II*
Integers (Selfridge memorial volume), Vol. 12, Nr. 6, 2012, p. 1179-1212, DOI
- [16] (with David Borwein, Jonathan M. Borwein) *A sinc that sank*
American Mathematical Monthly, Vol. 119, Nr. 7, Aug-Sep 2012, p. 535-549, DOI
- [15] (with Jonathan M. Borwein) *Special values of generalized log-sine integrals*
Proceedings of ISSAC 2011 (36th International Symposium on Symbolic and Algebraic Computation), ACM Press, Jun 2011, p. 43-50, DOI
- [14] (with Jonathan M. Borwein, James Wan, Wadim Zudilin)
Densities of short uniform random walks (with an appendix by Don Zagier)
Canadian Journal of Mathematics, Vol. 64, Nr. 5, 2012, p. 961-990, DOI

- [13] (with Tewodros Amdeberhan, Ivan Gonzalez, Marshall Harrison, Victor H. Moll)
Ramanujan's Master Theorem
The Ramanujan Journal, Vol. 29, Nr. 1, 2012, p. 103-120, DOI
- [12] (with Jonathan M. Borwein) *Log-sine evaluations of Mahler measures*
Journal of the Australian Mathematical Society (special issue dedicated to Alf van der Poorten), Vol. 92, Nr. 1, 2012, p. 15-36, DOI
- [11] *A q -analog of Ljunggren's binomial congruence*
DMTCS Proceedings: 23rd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC), Jun 2011, p. 897-902, DOI
- [10] (with Ivan Gonzalez, Victor H. Moll) *The method of brackets. Part 2: Examples and applications*
"Gems in Experimental Mathematics", **Contemporary Mathematics**, Vol. 517, 2010, p. 157-171, DOI
- [9] (with Jonathan M. Borwein, James Wan) *Three-step and four-step random walk integrals*
Experimental Mathematics, Vol. 22, Nr. 1, 2013, p. 1-14, DOI
- [8] (with Jonathan M. Borwein, Dirk Nuyens, James Wan)
Some arithmetic properties of short random walk integrals
The Ramanujan Journal, Vol. 26, Nr. 1, 2011, p. 109-132, DOI
- [7] (with Jonathan M. Borwein, Dirk Nuyens, James Wan) *Random walks in the plane*
DMTCS Proceedings: 22nd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC), Jul 2010, p. 191-202, DOI
- [6] (with Tewodros Amdeberhan, Olivier Espinosa, Victor H. Moll) *Wallis-Ramanujan-Schur-Feynman*
American Mathematical Monthly, Vol. 117, Nr. 15, Aug 2010, p. 618-632, DOI
- [5] (with Tewodros Amdeberhan, Victor H. Moll)
Closed-form evaluation of integrals appearing in positronium decay
Journal of Mathematical Physics, Vol. 50, Nr. 10, Oct 2009, p. 103528:1-6, DOI
- [4] (with Dante Manna, Luis Medina, Victor H. Moll)
A fast numerical algorithm for the integration of rational functions
Numerische Mathematik, Vol. 115, Nr. 2, Apr 2010, p. 289-307, DOI
- [3] (with Tewodros Amdeberhan, Victor H. Moll) *The p -adic valuation of k -central binomial coefficients*
Acta Arithmetica, Vol. 140, Nr. 1, 2009, p. 31-42, DOI
- [2] (with Ralf Gramlich, Jonathan I. Hall)
The local recognition of reflection graphs of spherical Coxeter groups
Journal of Algebraic Combinatorics, Vol. 32, Nr. 1, Aug 2010, p. 1-14, DOI
- [1] *Positivity of Szegő's rational function*
Advances in Applied Mathematics, Vol. 41, Nr. 2, Aug 2008, p. 255-264, DOI

Research talks

- 2022, Oct 6 Sums of powers of binomials, their Apéry limits, and Franel's suspicions
Colloquium, Dalhousie University
- 2022, Sept 29 Gaussian binomial coefficients with negative arguments
Colloquium, University of South Alabama
- 2022, Sept 18 Sums of powers of binomials, their Apéry limits, and Franel's suspicions
AMS Fall Central Sectional Meeting, Special Session on The Intersection of Number Theory and Combinatorics, University of Texas at El Paso

- 2022, Jul 1 Sums of powers of binomials, their Apéry limits, and Franel's suspicions
Joint Seminar: MATHEXP-PolSys & Transcendence and Combinatorics, Inria Saclay & Sorbonne University (FR)
- 2022, Jun 10 Lucas congruences and congruence schemes
Combinatorics Seminar, University of Vienna (AT)
- 2022, Apr 27 Sums of powers of binomials, their Apéry limits, and Franel's suspicions
Algorithmic Combinatorics Seminar, RISC, Johannes Kepler University (AT)
- 2022, Apr 25 Lucas congruences and congruence schemes
RISC Colloquium, RISC, Johannes Kepler University (AT)
- 2022, Mar 12 Sums of powers of binomials, their Apéry limits, and Franel's suspicions
(invited plenary lecture) Southern Regional Number Theory Conference, Louisiana State University
- 2021, Dec 8 Algebraic relations between modular functions
Modular Forms Seminar, Tulane University
- 2021, Nov 17 Modular functions and the inevitable j -function
Modular Forms Seminar, Tulane University
- 2020, Nov 2
(virtual) Gaussian binomial coefficients with negative arguments
(invited plenary lecture) International Conference on Mathematical Analysis and Applications (MAA 2020), National Institute of Technology Jamshedpur (IND)
- 2020, Mar 22
(canceled due to covid) Gaussian binomial coefficients with negative arguments
Southern Regional Number Theory Conference, Louisiana State University
- 2019, Nov 3 Interpolated sequences and critical L -values of modular forms
AMS Fall Southeastern Sectional Meeting, Special Session on Partition Theory and Related Topics, University of Florida
- 2019, Jul 26 Negative thinking and polynomial analogs
(invited plenary lecture) 15th International Symposium on Orthogonal Polynomials, Special Functions and Applications, RISC, Johannes Kepler University (AT)
- 2019, Jul 25 Interpolated sequences and critical L -values of modular forms
15th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Minisymposium on Computer Algebra and Special Functions, RISC, Johannes Kepler University (AT)
- 2019, Jun 7 On the Gaussian binomial coefficients, the simplest of q -series
(invited plenary lecture) Analytic and Combinatorial Number Theory: The Legacy of Ramanujan (in honor of Bruce Berndt's 80th birthday), UIUC
- 2019, Apr 14 Interpolated sequences and critical L -values of modular forms
(invited plenary lecture) Southern Regional Number Theory Conference: Modular Curves, Modular Forms, and Hypergeometric Functions, Louisiana State University
- 2018, Oct 22 The congruences of Fermat, Euler, Gauss and stronger versions thereof
Algebra and Number Theory Seminar, Louisiana State University
- 2018, Oct 5 Supercongruences for polynomial analogs of the Apéry numbers
Integers Conference, Augusta University
- 2018, Jun 21 Gauss congruences
Combinatory Analysis 2018 (in honor of George Andrews' 80th birthday), Penn State University
- 2018, May 8 Gauss congruences
International Conference on Mathematics and Statistics (ICOMAS 2018), Special Session on Analytic Number Theory, University of Memphis
- 2017, Nov 14 Properties of Laurent coefficients of multivariate rational functions
Workshop on Computer Algebra in Combinatorics, Erwin Schroedinger Institute (AT)
- 2017, Sept 17 A modular supercongruence for ${}_6F_5$: An Apéry-like story
Palmetto Number Theory Series (PANTS XXVIII), University of Tennessee

- 2017, Jul 31 Congruences connecting modular forms and truncated hypergeometric series
AG17—SIAM Conference on Applied Algebraic Geometry, Minisymposium on Symbolic Combinatorics, Georgia Tech
- 2017, Mar 16 A gumbo with hints of partitions, modular forms, special integer sequences and supercongruences
Number Theory Seminar, University of Illinois at Urbana-Champaign
- 2017, Jan 6 Core partitions into distinct parts and an analog of Euler's theorem
AMS Joint Mathematics Meetings 2017, Special Session on Partition Theory and Related Topics, Atlanta
- 2016, Oct 6 Core partitions into distinct parts and an analog of Euler's theorem
Integers Conference, University of West Georgia
- 2016, Sept 15 An analog of Euler's theorem on integer partitions
Colloquium, University of South Alabama
- 2016, Mar 19 Core partitions into distinct parts and an analog of Euler's theorem
International Conference on Number Theory in honor of Krishna Alladi's 60th birthday, University of Florida
- 2016, Mar 6 Divisibility properties of sporadic Apéry-like numbers
AMS Spring Southeastern Sectional Meeting, Special Session on Experimental Mathematics, University of Georgia
- 2016, Jan 7 Divisibility properties of sporadic Apéry-like numbers
AMS Joint Mathematics Meetings 2016, Session on Number Theory, Seattle
- 2015, Jun 3 Special values of trigonometric Dirichlet series
13th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Minisymposium on the Legacy of Ramanujan, NIST
- 2015, Jun 2 Divisibility properties of sporadic Apéry-like numbers
13th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Minisymposium on Symbolic Computation and Special Functions, NIST
- 2015, May 12 On a q -analog of the Apéry numbers
International conference on orthogonal polynomials and q -series (celebrating Mourad E.H. Ismail), University of Central Florida
- 2015, Mar 11 Supercongruences for Apéry-like numbers
Seminar Aachen-Köln-Lille-Siegen on Automorphic Forms, University of Cologne (DE)
- 2015, Feb 26 Properties and applications of Apéry-like numbers
Colloquium, University of South Alabama
- 2015, Jan 11 Congruences for Fishburn numbers modulo prime powers
AMS Joint Mathematics Meetings 2015, Special Session on Partitions, q -Series, and Modular Forms, San Antonio
- 2014, Oct 20 Trigonometric Dirichlet series and Eichler integrals
Number Theory and Experimental Mathematics Day, Dalhousie University
- 2014, Oct 18 On a q -analog of the Apéry numbers
AMS Fall Eastern Sectional Meeting 2014, Special Session on Experimental Mathematics in Number Theory, Analysis, and Combinatorics, Dalhousie University
- 2014, Oct 18 Positivity of rational functions and their diagonals
AMS Fall Eastern Sectional Meeting 2014, Special Session on Special Functions and Their Applications, Dalhousie University
- 2014, Sept 18 Properties and applications of Apéry-like numbers
Colloquium, Tulane University
- 2014, Aug 14 Supercongruences for Apéry-like numbers
Number Theory Seminar, National University of Singapore (SG)
- 2014, Aug 13 Supercongruences for Apéry-like numbers
Number Theory Seminar, National Institute of Education (SG)

- 2014, Aug 8 Properties and applications of Apéry-like numbers
(**invited plenary lecture**) International Conference on Algebra and Number Theory, Samsun (TR)
- 2014, Jul 22 Apéry numbers and their experimental siblings
Challenges in 21st Century Experimental Mathematical Computation, ICERM
- 2014, Jul 9 Supercongruences for Apéry-like numbers
Building Bridges: 2nd EU-US Workshop on Automorphic Forms and Related Topics, University of Bristol (GB)
- 2014, Jun 3 Multivariate Apéry numbers
Midwest Number Theory Conference for Graduate Students and Recent PhDs XI, University of Illinois at Urbana-Champaign
- 2014, May 12 On a secant Dirichlet series and Eichler integrals of Eisenstein series
28th Automorphic Forms Workshop, Moab
- 2014, Apr 13 Multivariate Apéry numbers and supercongruences of rational functions
AMS Spring Central Sectional Meeting 2014, Special Session on Recent Developments in Number Theory, Texas Tech University
- 2014, Apr 3 Properties and applications of Apéry-like numbers
Number Theory Seminar, University of Illinois at Urbana-Champaign
- 2013, Nov 18 On the ubiquity of modular forms and Apéry-like numbers
Algebra and Number Theory Seminar, University College Dublin (IE)
- 2013, Nov 12 On a secant Dirichlet series and Eichler integrals of Eisenstein series
Number Theory Seminar, University of Cologne (DE)
- 2013, Oct 17 On the ubiquity of modular forms and Apéry-like numbers
Algebra and Combinatorics Seminar, Tulane University
- 2013, Oct 12 On a secant Dirichlet series and Eichler integrals of Eisenstein series
AMS Fall Eastern Sectional Meeting 2013, Special Session on Modular Forms and Modular Integrals in Memory of Marvin Knopp, Temple University
- 2013, Oct 9 On the ubiquity of modular forms and Apéry-like numbers
Algorithmic Combinatorics Seminar, RISC, Johannes Kepler University (AT)
- 2013, Jul 10 A solution of Sun's \$520 challenge concerning $520/\pi$
SIAM Annual Meeting, Minisymposium on Symbolic Computation and Special Functions, San Diego
- 2013, Mar 14 A solution of Sun's \$520 challenge concerning $520/\pi$
27th Automorphic Forms Workshop, University College Dublin (IE)
- 2013, Feb 13 Arithmetic aspects of short random walks
Number Theory Lunch Seminar, Max-Planck-Institut für Mathematik, Bonn (DE)
- 2013, Jan 29 Arithmetic aspects of short random walks
Number Theory Seminar, University of Cologne (DE)
- 2012, Nov 15 On the q -binomial coefficients and binomial congruences
 q -Series Seminar, University of Illinois at Urbana-Champaign
- 2012, Oct 28 An application of modular forms to short random walks
AMS Fall Western Sectional Meeting 2012, Special Session on Harmonic Maass Forms and q -Series, University of Arizona
- 2012, Oct 13 A q -analog of Ljunggren's binomial congruence
Midwest Number Theory Conference for Graduate Students and Recent PhDs IX, University of Illinois at Urbana-Champaign
- 2012, Sept 27 Arithmetic aspects of short random walks
Number Theory Seminar, University of Illinois at Urbana-Champaign
- 2012, Aug 10 An application of modular forms to short random walks
Building Bridges: 1st EU-US Conference on Automorphic Forms and Related Topics, RWTH Aachen (DE)

- 2012, Jan 7 Symbolic evaluation of log-sine integrals in polylogarithmic terms
AMS Joint Mathematics Meetings 2012, Boston
- 2011, Oct 6 Hypergeometric evaluations of the densities of short random walks
AG11—SIAM Conference on Applied Algebraic Geometry, Minisymposium on Symbolic Combinatorics, North Carolina State University
- 2011, Aug 24 q -binomial coefficient congruences
CARMA Analysis and Number Theory Seminar, University of Newcastle (AU)
- 2011, Jun 9 Special values of generalized log-sine integrals
ISSAC 2011—International Symposium on Symbolic and Algebraic Computation, San Jose
- 2011, May 19 Applications and evaluations of log-sine integrals
JonFest 2011—Workshop on Computational and Analytical Mathematics in honour of Jonathan Borwein's 60th birthday, The IRMACS Centre, Simon Fraser University (CA)
- 2011, Jan 9 On the method of brackets
AMS Joint Mathematics Meetings 2011, Special Session on Mathematics Related to Feynman Diagrams, New Orleans
- 2010, Oct 14 On infinite logconcavity
Colloquium, University of Newcastle (AU)
- 2010, Aug 2 Random walks in the plane
FPSAC 2010—Formal Power Series & Algebraic Combinatorics, SFSU
- 2009, Aug 18 Random walk integrals
CARMA Workshop on Multidimensional Numerical Integration and Special Function Evaluation, University of Newcastle (AU)

Educational and outreach talks

- 2018, Apr 11 Special numbers and how to recognize them numerically
Association for Computing Machinery (ACM) Student Seminar, University of South Alabama
- 2014, Feb 20 An introduction to infinite log-concavity
Graduate Student Number Theory Seminar, University of Illinois at Urbana-Champaign
- 2013, Oct 15 Tools for special functions and special numbers
Graduate Student Colloquium of the Mathematics Department, Tulane University
- 2012, Apr 26 On the distance traveled in a few random steps
GSSA Interdisciplinary Colloquium Series, Tulane University
- 2012, Mar 7 Pre π fest: A short portrayal of random facts
Pi Day Pre-Game by Science and Engineering Honor Society (SEHS), Tulane University
- 2011, Oct 27 Random walks and where to find a drunkard
Science and Engineering Honor Society (SEHS) Student Seminar, Tulane University
- 2011, Apr 12 How far does a drunkard get?
Graduate Student Colloquium of the Mathematics Department, Tulane University
- 2007, Dec 10 Nonstandard analysis
Student Colloquium (StuVo) of the Mathematics Department, TU Darmstadt (DE)

Teaching experience

<i>2023, Spring</i>	Differential Equations II, Linear Algebra II & Cryptography	
<i>2022, Fall</i>	Differential Equations I & Numerical Analysis	
<i>2021, Spring</i>	Linear Algebra II & Cryptography	
<i>2020, Fall</i>	Differential Equations II, Intro to Number Theory & Precalculus Algebra	
<i>2020, Spring</i>	Linear Algebra II & Cryptography	
<i>2019, Fall</i>	Differential Equations II, Intro to Number Theory & Calculus and its Applications	
<i>2019, Spring</i>	Calculus I, Linear Algebra II & Cryptography	
<i>2018, Fall</i>	Intro to Number Theory & Precalculus Algebra	
<i>2018, Spring</i>	Linear Algebra II & Cryptography	
<i>2017, Fall</i>	Calculus and its Applications	(3 sections)
<i>2017, Spring</i>	Linear Algebra II & Cryptography	
<i>2016, Fall</i>	Linear Algebra & Intro to Number Theory	(2+1 sections)
<i>2016, Summer</i>	Invited lecturer for the 2016 AARMS Summer School at Dalhousie University designed and taught the graduate course <i>Introduction to Special Functions and WZ Theory</i>	
<i>2016, Spring</i>	Calculus III	(2 sections)
<i>2015, Fall</i>	Calculus II & Linear Algebra	

University of Illinois at Urbana-Champaign

<i>2014, Fall</i>	Applied Linear Algebra 400-level introduction to linear algebra; total of 396 students from various sciences	(2 large sections)
<i>2014, Spring</i>	Introduction to Differential Equations Plus	(2 sections)
<i>2012, Fall</i>	Introduction to Differential Equations Plus 200-level introduction to differential equations; mostly engineering students	

Tulane University

<i>2012, Spring</i>	Real Analysis 300-level proof-based introduction to analysis for math majors	
<i>2011, Fall</i>	Calculus I	
<i>2011, Spring</i>	Statistics for Business	
<i>2010, Spring</i>	Statistics for Scientists	
<i>2009, Fall</i>	Calculus II	

Early work as teaching assistant

<i>2007, Summer</i>	Supervised undergraduate students on the research project “Experimental Mathematics” lead by Victor H. Moll, Tulane University	
<i>2006 – 2008</i>	Course Assistant at Tulane University for <ul style="list-style-type: none"> • Calculus I, • Calculus II, • Linear Algebra, • Experimental Mathematics. 	
<i>2004 – 2008</i>	Course Assistant at TU Darmstadt for <ul style="list-style-type: none"> • Numerical Analysis, • Linear Algebra, • Statistics, • Stochastic Analysis, • Algebra. 	

Teaching awards

- 2015 “Distinguished Teaching Award in Mathematics for Non-Tenure-Track Faculty”
University of Illinois at Urbana-Champaign
- 2012, 2014 Appeared on the [List of Teachers Ranked as Excellent by their Students](#) for each class taught at the University of Illinois at Urbana-Champaign
- 2012 “Excellent Graduate Student Teacher Award”
Mathematics Department, Tulane University

Academic grants, honors and awards (non-teaching)

- 2017 – 2024 [Simons Collaboration Grant](#) (\$42,000)
Simons Foundation
- 2021/2022 Sabbatical leave granted for Fall 2021 and Spring 2022
College of Arts & Sciences, University of South Alabama
- 2019 Junior Faculty Award for Scholarship and Academic Achievement (\$1,500)
College of Arts & Sciences, University of South Alabama
- 2019 Invited plenary speaker at [OPSFA15](#) (travel funded)
International Symposium on Orthogonal Polynomials, Special Functions and Applications
(1 of 9 plenary speakers, 150+ parallel talks)
- 2017 Arts & Sciences Support and Development Award (\$1,500)
College of Arts & Sciences, University of South Alabama
- 2015 – 2017 [AMS-Simons Travel Grant](#) (\$4,800)
American Mathematical Society & Simons Foundation
- 2016 Arts & Sciences Summer Professional Development Award (\$1,000)
College of Arts & Sciences, University of South Alabama
- 2015 SIAM Early Career Travel Award to attend [OPSFA13](#) (\$650)
International Symposium on Orthogonal Polynomials, Special Functions and Applications
- 2014 Co-recipient of the [G. de B. Robinson Award](#) for the paper *Densities of short uniform random walks (with an appendix by Don Zagier)*
Canadian Mathematical Society
- 2014 Invited plenary speaker at [ICA2014](#) (travel support)
International Conference on Algebra and Number Theory, Samsun (TR)
- 2011, Jun [ISSAC 2011 Distinguished Student Author Award](#) for the paper *Special values of generalized log-sine integrals* (\$300)
International Symposium on Symbolic and Algebraic Computation, San Jose
- 2011, May “Excellence in Mathematics Graduate Student Award” (\$250)
Mathematics Department, Tulane University
- 2010, Apr Poster *Random Walk Integrals* selected 1st place in Graduate Division (\$250)
School of Science and Engineering Research Day Poster Session, Tulane University
- 2009 – 2010 IBM Fellow in Computational Science (\$4,000)
Center for Computational Science, Tulane University
- 2007, Apr “Outstanding First Year Graduate Student Award” (fine dinner)
Mathematics Department, Tulane University

Student mentoring

Graduate students who wrote a Master's thesis under my direction:

- 2018 – 2019* Joel Henningsen — *Sequences modulo primes and finite state automata*
awarded a Ph.D. position at Baylor University, including teaching assistantship; joint follow-up paper on generalized Lucas congruences published in *Advances in Applied Mathematics*
- 2017 – 2018* Emily L. Grinstead — *Multiple log-concavity of finite sequences*
awarded a Ph.D. position at UTK, including teaching assistantship and graduate fellowship

Undergraduate students mentored:

- 2019 – 2022* John Pomerat
directed studies in Fall 2019 (Gröbner bases and their applications) and Spring 2020 (Number theoretic aspects of differential equations); awarded Goldwater scholarship; selected for 2020 REU Program at Maryland; joint paper on the integrality of powers of power series submitted for publication
- 2019 – 2020* Preston Stanfield (graduate student)
introduced to a project on computer algebraic approaches to continued fractions; created poster for Annual Graduate Research Forum
- 2020* Jahdia Feurtado
introduced to a project on integer partitions with a negative number of parts
- 2016 – 2019* Sam Formichella
introduced to a project on q -binomial coefficients; awarded Summer Undergraduate Fellowship (SURF) 2017; published a first paper in *JOURACA* on a q -analog of Legendre's formula; second joint paper on q -binomials with negative arguments published in *Annals of Combinatorics*; awarded SURF 2018 (turned down); selected for 2018 REU Program at Auburn; several oral conference and poster presentations
- 2017, Spring* Kevin McKeown
introduced to a project on periods of C -finite sequences; applied to SURF (unsuccessfully)
- 2014, Fall* IGL project: p -adic properties of sequences and finite state automata
mentored Amita Malik (graduate student team leader) and Arian Daneshvar, Pujan Dave, Zhefan Wang (undergraduate students) on a semester-long research project

Ph.D. Thesis Committee Member for the following students:

- since 2022* Reeve Cabral (advisor: Jeffrey T. McDonald, Computer Science)
- 2020 – 2022* Matthew Peterson (advisor: Todd R. Andel, Computer Science)
- 2019 – 2022* Colby B. Parker (advisor: Jeffrey T. McDonald, Computer Science)
- 2020* Edward Harshany (advisor: Ryan Benton, Computer Science)
- 2019 – 2020* Thomas H. Watts (advisor: Ryan Benton, Computer Science)

Master's Thesis Committee Member for the following students:

- 2021* Robert C. Cox (advisor: Ryan Benton, Computer Science)
- 2020* A. Austin Chandler (advisor: Ryan Benton, Computer Science)
- 2019 – 2020* James Bell (advisor: Jeffrey T. McDonald, Computer Science)
- 2019 – 2020* Joseph A. Mullins (advisor: Jeffrey T. McDonald, Computer Science)
- 2019 – 2020* Nathan B. Herron (advisor: Jeffrey T. McDonald, Computer Science)
- 2017 – 2018* Colby B. Parker (advisor: Jeffrey T. McDonald, Computer Science)
- 2017 – 2018* Thanh Nguyen (advisor: Jeffrey T. McDonald, Computer Science)
- 2016 – 2017* Rafi Qumsieh (advisor: Maria Byrne, Mathematics)

Academic services and memberships

<i>since 2017</i>	Editor for The Ramanujan Journal (Springer)	(90+ papers handled)
<i>since 2012</i>	Reviewer for Mathematical Reviews	(29 reviews)
<i>since 2014</i>	Reviewer for the NSA Mathematical Sciences Grant Program	(2 reviews)
<i>since 2007</i>	Referee for the following journals and proceedings:	
	<ul style="list-style-type: none"> • The Ramanujan Journal (10+ times) • International Journal of Number Theory (10+ times) • Journal of Mathematical Analysis and Applications (10+ times) • The American Mathematical Monthly (14 times), Acta Arithmetica (7 times), Proceedings of the AMS (6 times), Journal of Symbolic Computation (6 times), Research in Number Theory (6 times), Discrete Mathematics (4 times), Journal of Combinatorial Theory Series A (4 times), Monatshefte für Mathematik (4 times), Advances in Applied Mathematics (3 times), Annals of Combinatorics (3 times), Integers (3 times), Journal of Difference Equations and Applications (3 times), Journal of Number Theory (3 times), Advances in Mathematics (2 times), Ars Combinatoria (2 times), Bulletin of the LMS (2 times), Electronic Journal of Combinatorics (2 times), European Journal of Combinatorics (2 times), Research in the Mathematical Sciences (2 times), Rocky Mountain Journal of Mathematics (2 times), Alabama Journal of Mathematics, Applied Mathematics Letters, Arnold Mathematical Journal, Artificial Intelligence and Symbolic Computation, Bulletin of the London Mathematical Society, Canadian Journal of Mathematics, Communications in Number Theory and Physics, Compositio Mathematica, Comptes-Rendus de l'Académie des Sciences, Computer Physics Communications, Contemporary Mathematics, Experimental Mathematics, Israel Journal of Mathematics, Journal of the London Mathematical Society, Journal of Integer Sequences, Pacific Journal of Mathematics, Proceedings of the Edinburgh Mathematical Society, Results in Mathematics, Séminaire Lotharingien de Combinatoire 	
<i>2021 – 2022</i>	Program committee member for FPSAC 2022	
<i>2021</i>	Organized the special session Experimental Mathematics in Number Theory and Combinatorics with Luis Medina & Eric Rowland at the 2021 AMS Fall Southeastern Sectional Meeting	
<i>2019</i>	Organized the special session Experimental Mathematics in Number Theory and Combinatorics with Hannah Burson & Tim Huber at the 2019 AMS Fall Southeastern Sectional Meeting	
<i>2019</i>	Organized the special session Experimental Mathematics in Number Theory, Analysis, and Combinatorics with Amita Malik at the 2019 AMS Spring Southeastern Sectional Meeting	
<i>2018 – 2019</i>	Program committee member for FPSAC 2019	
<i>2018</i>	Co-organized the USA/USM/SELU Mini-Conference on Undergraduate Research in Science and Mathematics held April 26 at the University of South Alabama	
<i>2017</i>	Organized the special session Arithmetic Properties of Sequences from Number Theory and Combinatorics with Eric Rowland at the AMS JMM 2017	
<i>2017</i>	Reviewer for Banff International Research Station (BIRS) workshop proposal	
<i>since 2007</i>	Member of the American Mathematical Society (AMS)	
<i>since 2013</i>	Member of the Society for Industrial and Applied Mathematics (SIAM)	
<i>since 2021</i>	Member of the Mathematical Association of America (MAA)	

Departmental and university service

<i>2023</i>	Hiring Committee for a tenure-track position (chair)
<i>2022 – 2023</i>	Scholarship Committee (chair)
<i>2022</i>	Arts & Sciences Sabbatical Committee
<i>2017 – 2021</i>	Scholarship Committee (chair)
<i>2021</i>	Hiring Committee for three tenure-track positions
<i>2020, 2021</i>	Joe & Audrey Shewmake Computing and Math Scholarship Committee
<i>2019, 2020</i>	Arts & Sciences Faculty Awards Committee
<i>2016, 2018, 2020</i>	Judge for the Mobile Regional Science & Engineering Fair
<i>2017 – 2018</i>	Arts & Sciences Support and Development Awards Committee
<i>2016 – 2017</i>	Hiring Committee for two tenure-track positions
<i>2016 – 2017</i>	Scholarship Committee
<i>2016 – 2017</i>	Arts & Sciences Summer Professional Development Committee
<i>2015 – 2016</i>	Library Committee (chair)

———— before University of South Alabama —————

<i>2014 – 2015</i>	Organizer of the Number Theory Seminar at UIUC
<i>2009 – 2010</i>	Coorganizer of the Graduate Student Colloquium at Tulane University
<i>2008 – 2010</i>	GSSA (Graduate Studies Student Association) representative of the Mathematics Department, Tulane University

Other qualifications

<i>Languages</i>	German (native), English (fluent)
<i>Computer algebra</i>	Experience in several computer algebra systems including Mathematica and SAGE
<i>Programming</i>	Experience in various programming environments including Python, PHP, SQL, HTML