

Armin Straub

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containing preprints, slides of talks, and a current CV

Academic employment

<i>since 2015</i>	University of South Alabama Assistant Professor (tenure-track)
<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

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) (with distinction) thesis: “Local recognition of reflection graphs on Coxeter groups” supervisor: Ralf Köhl (né Gramlich)
<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

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.

Extended research visits

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

Preprints

- [4] (with Dermot McCarthy, Robert Osburn) *Sequences, modular forms and cellular integrals*
submitted, 2017
- [3] (with Robert Osburn, Wadim Zudilin) *A modular supercongruence for ${}_6F_5$: An Apéry-like story*
submitted, 2017
- [2] (with Bruce C. Berndt) *Ramanujan's formula for $\zeta(2n + 1)$*
submitted, 2016
- [1] (with Shaun Cooper, Jesús Guillera, Wadim Zudilin) *Crouching AGM, hidden modularity*
submitted, 2016

Refereed publications

- [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, 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 Richard 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 Richard 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. 155-166, 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

- 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

 2013–2014

- 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
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)
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- 2012 and earlier
- 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 talks

- 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

Teaching experience

<i>2017, Spring</i>	Instructor for Linear Algebra II & Cryptography	
<i>2016, Fall</i>	Instructor for 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 a special topics graduate course (Introduction to Special Functions and WZ Theory)	
<i>2016, Spring</i>	Instructor for Calculus III	(2 sections)
<i>2015, Fall</i>	Instructor for Calculus II & Linear Algebra	

University of Illinois at Urbana-Champaign

<i>2014, Fall</i>	Instructor for Applied Linear Algebra	(2 large sections)
	400-level introduction to linear algebra; total of 396 students from various sciences	
<i>2014, Fall</i>	IGL project: p -adic properties of sequences and finite state automata mentoring 3 undergraduate students on a first research project	
<i>2014, Spring</i>	Instructor for Introduction to Differential Equations Plus	(2 sections)
<i>2012, Fall</i>	Instructor for Introduction to Differential Equations Plus 200-level introduction to differential equations, including systems of linear equations; mostly engineering students	

Tulane University

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

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

Academic grants, honors and awards (non-teaching)

2017	Arts & Sciences Support and Development Award College of Arts & Sciences, University of South Alabama	(\$1,500)
2015 – 2018	AMS-Simons Travel Grant American Mathematical Society & Simons Foundation	(\$4,000)
2016	Arts & Sciences Summer Professional Development Award College of Arts & Sciences, University of South Alabama	(\$1,000)
2014	Co-recipient of the G. de B. Robinson Award for the paper <i>Densities of short uniform random walks (with an appendix by Don Zagier)</i> Canadian Mathematical Society	
2011, Jun	ISSAC 2011 Distinguished Student Author Award for the paper <i>Special values of generalized log-sine integrals</i> International Symposium on Symbolic and Algebraic Computation, San Jose	(\$300)
2011, May	“Excellence in Mathematics Graduate Student Award” Mathematics Department, Tulane University	(\$250)
2010, Apr	Poster <i>Random Walk Integrals</i> selected 1st place in Graduate Division School of Science and Engineering Research Day Poster Session, Tulane University	(\$250)
2009 – 2010	IBM Fellow in Computational Science Center for Computational Science, Tulane University	(\$4,000)
2007, Apr	“Outstanding First Year Graduate Student Award” Mathematics Department, Tulane University	

Academic services and memberships

since 2012	Reviewer for Mathematical Reviews	(13 reviews)
since 2014	Reviewer for the NSA Mathematical Sciences Grant Program	(2 reviews)
since 2007	Referee for the following journals and proceedings: <ul style="list-style-type: none"> • The Ramanujan Journal (12 times) • Journal of Mathematical Analysis and Applications (9 times) • International Journal of Number Theory (7 times) • The American Mathematical Monthly (5 times), Ars Combinatoria (2 times), Journal of Number Theory (2 times), Rocky Mountain Journal of Mathematics (2 times), Journal of Symbolic Computation (2 times), Integers (2 times), Bulletin of the LMS, Proceedings of the AMS, Research in Number Theory, Discrete Mathematics, Communications in Number Theory and Physics, Acta Arithmetica, Experimental Mathematics, Research in the Mathematical Sciences, Israel Journal of Mathematics, European Journal of Combinatorics, Computer Physics Communications, Applied Mathematics Letters, Artificial Intelligence and Symbolic Computation, Contemporary Mathematics 	
2017	Organized the special session <i>Arithmetic Properties of Sequences from Number Theory and Combinatorics</i> with Eric Rowland at the AMS JMM 2017	
2014 – 2015	Organizer of the Number Theory Seminar at UIUC	
2009 – 2010	Coorganizer of the Graduate Student Colloquium at Tulane University	
2008 – 2010	GSSA (Graduate Studies Student Association) representative of the Mathematics Department, Tulane University	
since 2007	Member of the American Mathematical Society (AMS)	
since 2013	Member of the Society for Industrial and Applied Mathematics (SIAM)	

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