

Robert Schneider, Ph.D.
Lecturer in Mathematics at University of Georgia
Curriculum Vitae

Contact

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Education

- Emory University, Atlanta, Georgia – Ph.D. in Mathematics (2018)
- Emory University, Atlanta, Georgia – M.S. in Mathematics (2016)
- University of Kentucky, Lexington, Kentucky – B.S. in Mathematics (2012)

Research interests

- Number theory and combinatorics; in particular, the theory of integer partitions, special functions in the orbit of modular forms (q -series, mock theta functions, quantum modular forms), and analytic number theory (zeta functions and other L-functions, prime distribution).
- Active secondary interests include statistical physics, mathematical music theory, history of mathematics, computational chemistry (in work with Emory Working Group on Number Theory and Molecular Simulation), knot theory, and intersections of mathematics and the arts.

Employment

- University of Georgia, Lecturer (2018 –) and Undergraduate Research Coordinator (2019 –)
- Emory University, Visiting Assistant Professor (Summer 2019, Summer 2018)
- Emory QTM Math Circle (Math Camp for High School Students), Instructor: Number Theory II and History of Mathematics (Summer 2019)
- Emory University, Dean's Teaching Fellow at Arrendale Women's Prison: History of Mathematics–Ancient Arithmetic and the Birth of Mathematics (Spring 2018), Writing Workshop (Fall 2017)
- Emory University, Graduate Student Instructor: Math 111–Calculus 1 (2013–2016)
- Emory University, Teaching Assistant: Calculus Help Session (2012–2013)

Other educational experience

- Decatur High School, Decatur, Georgia, Math Team coach (2016–2019)
- Glendover Elementary School, Lexington, Kentucky, Weekly math tutor (2006–2012)

Non-academic professional experience

- Musician, songwriter, record producer, composer for film/stage/television/installation, band-leader of The Apples in stereo (and member of other groups), co-founder of The Elephant 6 Recording Co. collective of musicians and artists, recording/mixing/mastering engineer, recording studio manager, record label manager, comic artist, sound sculpture artist (1993 –)

Fellowships, awards and residencies

- 2018 Marshall Hall, Jr., Graduate Teaching Award, Department of Mathematics and Computer Science, Emory University (2017-2018)
- Dean's Teaching Fellowship, Emory University (2017–2018)
- Residency at Banff International Research Station jointly with Banff Centre for Arts and Creativity, Banff, Alberta, Canada, "*MSI: Music, Film and Mathematics Together*" (inter-disciplinary collaboration with number theorist Andrew Granville, screenwriter Jennifer Granville, filmmaker Thomas Britt, and musicians from Banff Centre) (Aug. 10–17, 2013)
- Woodruff Fellowship, Emory University (2012–2017)
- The Independent Music Awards (IMAs): Best Pop/Rock Song (2008)

Referee experience

- Journals: *American Mathematical Monthly*, *Annals of Combinatorics*, *Electronic Journal of Combinatorics*, *Journal of Integer Sequences*, *Journal of the Ramanujan Mathematical Society*, *Mathematics Magazine*, *Minnesota Journal of Undergraduate Mathematics*, *Ramanujan Journal*, *Research in Number Theory*, *Research in the Mathematical Sciences*
- Book publishers: CRC Press, Princeton University Press, Springer Books

Publications

1. A non-Pythagorean musical scale based on logarithms, *Proceedings of Bridges: Mathematics, Music, Art, Architecture, Culture Conference* (June, 2012)
2. Uncovering Ramanujan's "lost" notebook: An oral history, *Ramanujan Journal* (Dec., 2012)
3. A "strange" vector-valued quantum modular form (co-author Larry Rolen), *Archiv der Mathematik* (July, 2013)
4. A golden product identity for e , *Mathematics Magazine* (April, 2014)
5. A golden connection (short expository article), *Mathematics Magazine* (April, 2014)
6. Combinatorial applications of Moebius inversion (co-author Marie Jameson), *Proc. of the Am. Math. Soc.* (Sept., 2014)
7. Encounter with the infinite (co-author Benjamin Phelan), *The Believer* (January-February, 2015), reprinted in *Namarupa: Categories of Indian Thought* (Spring, 2015)
8. Why Ramanujan Matters (co-author Ken Ono), *Sloan Science & Film* (May, 2016), reprinted in *Ramanujan Mathematical Society Newsletter* (March-June, 2016), reprinted in *Asia Pacific Mathematics News* (November, 2016)
9. Partition zeta functions, *Research in Number Theory* (Dec., 2016)
10. Fibonacci numbers and the golden ratio, *Parabola* (Dec., 2016)
11. Arithmetic of partitions and the q -bracket operator, *Proc. of the Am. Math. Soc.* (May, 2017)
12. Explorations in the theory of partition zeta functions (co-authors Ken Ono and Larry Rolen), *Exploring the Riemann Zeta Function, 190 years from Riemann's Birth*, editors: H. Montgomery, A. Nikeghbali, M. Rassias, Springer Books (2017)
13. Extracting aggregation free energies of mixed clusters from simulations of small systems: application to ionic surfactant micelles (co-authors Xiaokun Zhang, Lara Patel, Olivia Beckwith, Christopher Weeden, James Kindt), *Journal of Chemical Theory and Computation* (Sept., 2017)
14. Partition-theoretic formulas for arithmetic densities (co-authors Ken Ono and Ian Wagner), *Proceedings of Number Theory in Honor of Krishna Alladi's 60th Birthday*, Springer Books (2018)

15. Jacobi's triple product, mock theta functions, unimodal sequences and the q -bracket, *International Journal of Number Theory* (Aug., 2018)
16. Alternating "strange" functions, *Ramanujan Journal* (Feb., 2019)
17. The music of *Prime Suspects* (article and musical score), *Prime Suspects: The Anatomy of Integers and Permutations*, authors: A. Granville, J. Granville, R. J. Lewis, Princeton University Press (2019).
18. Sequentially congruent partitions and related bijections (co-author Maxwell Schneider), *Annals of Combinatorics, Special Issue in Honor of George E. Andrews' 80th Birthday* (Nov., 2019).
19. Digit sums and generating functions (co-author Maxwell Schneider), *Ramanujan Journal* (Jan., 2020).
20. Journal refereeing: Merge with the collective mind (co-author Ken Ono), *Notices of the American Mathematical Society* (Feb., 2020).
21. The product of parts or "norm" of a partition (co-author Andrew V. Sills), *Proceedings of the Integers Conference 2018*, To Appear.
22. Analysis and combinatorics of partition zeta functions (co-author Andrew V. Sills), *International Journal of Number Theory, Special Issue in Honor of Bruce C. Berndt's 80th Birthday*, To Appear.
23. Sequentially congruent partitions and partitions into squares (co-authors James A. Sellers and Ian Wagner – Submitted for publication Nov., 2019).
24. Nuclear partitions and a formula for $p(n)$ (Submitted for publication Dec., 2019).

Invited talks and contributed papers

- AMS/MAA Joint Mathematics Meetings (JMM), Denver, Colorado, AMS Special Session on Partition Theory and q -Series, "*Analysis and combinatorics of partition zeta functions*" (joint work with A. V. Sills – Jan. 18, 2020)
- Modular Forms, Arithmetic and Women in Mathematics (MAAIM) 2019, Emory University, Atlanta, Georgia, contributed talk, "*Sequentially congruent partitions and related bijections*" (joint work with Maxwell Schneider – Nov. 3, 2019)
- TATT 600: Emory Teaching Assistant Training and Teaching Opportunity (TATTO) Introductory Workshop 2019, Emory University, Atlanta, Georgia, invited lecture, "*You are the face of your subject*" (Aug. 20, 2019)
- Emory University, Atlanta, Georgia, Chalk Talk Physics Seminar, "*Partitions, statistical physics and the universe*" (June 27, 2019)
- Analytic and Combinatorial Number Theory: The Legacy of Ramanujan – A Conference in Honor of Bruce C. Berndt's 80th Birthday, University of Illinois, Urbana-Champaign, Illinois, contributed talk, "*Eulerian series and the algebra of partitions*" (June 8, 2019)
- AMS Spring Southeastern Sectional Meeting, University of Alabama, Auburn, Alabama, Special Session on Experimental Mathematics, invited lecture, "*Sequentially congruent partitions and related bijections*" (joint work with Maxwell Schneider – March 16, 2019)
- Palmetto Number Theory Series (PANTS) XXXI, University of South Carolina, Columbia, South Carolina, "*Multiplicative theory of (additive) partitions*" (Dec. 8, 2018)
- Integers Conference 2018, Augusta, Georgia, invited lecture, "*Multiplicative theory of (additive) partitions*" (Oct. 6, 2018)
- Focus on Math Colloquium, Brigham Young University, Provo, Utah, invited lecture, "*Music of the primes (literally)*" (Sept. 20, 2018)

- Number Theory Seminar, Brigham Young University, Provo, Utah, invited lecture, "*Multiplicative theory of (additive) partitions*" (Sept. 20, 2018)
- Combinatory Analysis 2018: A Conference in Honor of George Andrews' 80th Birthday, Pennsylvania State University, State College, Pennsylvania, contributed paper, "*Toward an algebra of partitions*" (June 23, 2018)
- AMS Western Sectional Meeting, Portland State University, Portland, Oregon, Special Session on Mock Modular and Quantum Modular Forms, invited lecture, "*Jacobi's triple product, mock theta functions, unimodal sequences and the q -bracket*" (April 14, 2018)
- University of Georgia, Athens, Georgia, job talk, "*Music of the primes (literally)*" (Feb. 27, 2018)
- AMS/MAA Joint Mathematics Meetings (JMM), San Diego, California, AMS Contributed Papers Session on Partitions, Paths and Permutations, "*Toward an algebra of partitions*" (Jan. 12, 2018)
- Number Theory Seminar, Georgia Southern University, Statesboro, Georgia, invited lecture, "*Partition zeta functions*" (Nov. 9, 2017)
- Computational Sciences Seminar, Georgia Southern University, Statesboro, Georgia, invited lecture, "*Number theory in statistical physics: using integer partitions to compute expected values*" (Nov. 8, 2017)
- Algebra Seminar, University of Tennessee, Knoxville, Tennessee, invited lecture, "*Partition zeta functions*" (May 2, 2017)
- AMS/MAA Joint Mathematics Meetings (JMM), Atlanta, Georgia, invited panel, "*MAA Panel: Outside the Equation – Exploring Alternative Forms of Mathematics Communication*" (Jan. 7, 2017)
- AMS/MAA Joint Mathematics Meetings (JMM), Atlanta, Georgia, invited talk, "*MAA Special Presentation: Relatively Prime – Live Podcast*" (Jan. 6, 2017)
- AMS/MAA Joint Mathematics Meetings (JMM), Atlanta, Georgia, AMS Contributed Papers Session on Number Theory, "*Jacobi's triple product, mock theta functions and the q -bracket*" (Jan. 4, 2017)
- Emory University, invited lectures to undergraduate Probability and Statistics class, "*Partitions, statistical physics and the universe*" (Nov. 29 - 30, 2016)
- International Conference on Number Theory in Honor of Krishna Alladi for His 60th Birthday, University of Florida, Gainesville, Florida, invited lecture, "*Arithmetic of partitions*" (Mar. 20, 2016)
- AMS Spring Southeast Sectional Meeting, University of Georgia, Athens, Georgia, Special Session on Experimental Mathematics, invited lecture, "*Arithmetic of partitions*" (Mar. 5, 2016)
- International Conference on Number Theory, SASTRA University, Kumbakonam, India, invited lecture, "*Partition zeta functions*" (Dec. 21, 2015)
- Combinatorics Seminar, Pennsylvania State University, State College, Pennsylvania, invited lecture, "*Partition zeta functions*" (Oct. 23, 2015)
- Maker Faire Atlanta 2015, Decatur, Georgia, electronics build demonstrations sponsored by Acorn Amplifiers, "*How to make a mind-controlled synthesizer*" (Oct. 3–4, 2015)
- Palmetto Number Theory Series (PANTS) XXIV, Emory University, Atlanta, Georgia, "*Partition-theoretic zeta functions*" (Sept. 12, 2015)
- TEDx Emory 2014 Conference, Emory University, Atlanta, Georgia, invited lecture, "[*Patterns etched in sound*](#)" (Apr. 12, 2014)
- The Legacy of Ramanujan, SASTRA University, Kumbakonam, India, invited lecture, "*A new 'strange' quantum modular form*" (joint work with Larry Rolen – Dec. 14, 2012)
- International Conference on the Works of Srinivasa Ramanujan and Related Topics, University of Mysore, Mysore, India, invited lecture, "*A new 'strange' quantum modular form*" (joint work with Larry Rolen – Dec. 12, 2012)

- Berry College, Floyd, Georgia, invited lecture, “*Proofs without lyrics: Mathematical ideas in musical form*” (Nov. 26, 2012)
- Kentucky Section MAA Annual Meeting, Bellarmine University, Louisville, Kentucky, Contributed Paper Session, “*Al-Jabar: A mathematical game of strategy*” (joint work with Cyrus Hettle – Mar. 31, 2012)
- Banff International Research Station for Mathematical Innovation and Discovery, Banff, Alberta, Canada, Mathematics: Muse, Maker, and Measure of the Arts Workshop, “*Proofs without lyrics: Mathematical ideas in musical form*” (Dec. 6, 2011)
- Spelman College, Atlanta, Georgia, invited lecture, “*Proofs without lyrics: Mathematical ideas in musical form*” (Sept. 22, 2011)
- University of Georgia, invited lecture to undergraduate Mathematics and Music class, “*Proofs without lyrics: Mathematical ideas in musical form*” (Sept. 21, 2011)
- Centre College, Danville, Kentucky, Bluegrass Undergraduate Mathematics Symposium, “*A golden pair of identities in the theory of numbers*” (Sept. 17, 2011)
- MAA MathFest, Lexington, Kentucky, Pure Mathematics Contributed Paper Session, “*A golden pair of identities in the theory of numbers*” (Aug. 6, 2011)
- Duke University, Durham, North Carolina, invited lecture to undergraduate neuroscience class, “*The Teletron mind-control interface for analog synthesizers,*” with ensemble performance of experimental score “*Eclipses of the Sun and Moon*” composed by J. Mangum (Apr. 20, 2011)
- MAA MathFest, Portland, Oregon, Undergraduate Student Paper Session, “*On a fruitful identity in the theory of numbers*” (Aug. 7, 2009)
- Clemson University, Clemson, South Carolina, invited lecture to REU class, “*On a fruitful identity in the theory of numbers*” (June 6, 2009)
- MAA MathFest, San Jose, California, “*Public interview with Robert Schneider by MAA President Joe Gallian*” (Aug. 3, 2007)

Selected other public works

- *Parabola* mathematics journal for secondary school students, “*2Z Or Not 2Z: An odd comic about even numbers*”, ongoing comic series beginning Vol. 53, Issue 2 (Nov. 2017 – present); and “*Square root of negative pun*”, ongoing comic series beginning Vol. 54, Issue 3 (Dec. 2018 – present)
- *Advice from the Oceans* art installation, Athens Institute of Contemporary Art (ATHICA), Athens, Georgia, “*Ocean Telephone No. 3*”, “*Ocean Telephone No. 6*” and “*Synthesizer for the Wind*” (collaborations with Max Schneider), electronic sound sculptures (Sept. 13 – Nov. 16, 2014)
- Canadian Mathematical Society Meeting, Montreal, Quebec, Canada, musical score “*Reverie in Prime Time Signatures*” for play *MSI (Mathematical Sciences Investigation): The Anatomy of Integers and Permutations* by Andrew Granville and Jennifer Granville (two performances), electronic recording (Dec. 7 – 8, 2012)
- Gathering for Gardner – Celebration of Mind 2011, rules for original board game *Al-Jabar: A Mathematical Game of Strategy* based on abstract algebra (co-author Cyrus Hettle), published online to commemorate Martin Gardner’s birthday (Oct. 21, 2011)
- AUX Experimental Arts Festival, Ciné Theater, Athens, Georgia, musical score “*Composition for Two Hemispheres*” for Teletron mind-controlled synthesizer, ensemble performance with 3-D projections (May 7, 2011)
- Mathematical Sciences Research Institute (MSRI), Berkeley, California, musical score “*Reverie in Prime Time Signatures*” for play *MSI (Mathematical Sciences Investigation): The Anatomy of Integers and Permutations* by Andrew Granville and Jennifer Granville, electronic recording (Apr. 29, 2011)

- *The QR Code Show* art installation, Pink Hobo Gallery, Minneapolis, Minnesota, musical score “*Non-Pythagorean Composition No. 6*” based on logarithms, electronic recording (June 16 – Jul. 29, 2010)
- Institute for Advanced Study, Princeton, New Jersey, musical score “*Reverie in Prime Time Signatures*” for play *MSI (Mathematical Sciences Investigation): The Anatomy of Integers and Permutations* by Andrew Granville and Jennifer Granville, ensemble performance (Dec. 12, 2009)

Selected press

- David Peisner, “[True Harmony](#),” *Atlanta Magazine*, Feb. 2018.
- Carol Clark, “[New method calculates equilibrium constant at the small scale](#),” *Phys.org*, 29 Jan. 2018.
- Joel Werner, “[The Infinite God](#),” *Sum of All Parts*, Australian Broadcasting System, 29 Sept. 2017.
- Caitie Kealy, “[Apples in Stereo frontman Robert Schneider releases nerdy new math strategy game](#),” *AVClub.com*, 17 July 2012.
- Scott Thill, “[MindFlex Hack Turn Brain Waves Into Music](#),” *Wired.com*, 21 Oct. 2010.
- Evie Nagy, “6 Questions with Robert Schneider,” *Billboard*, Vol. 122 No. 14, 10 April 2010: 35.
- Mick Hamer, “[Flexible Scales and Immutable Octaves](#),” *New Scientist*, 23 Feb. 2008: 32 – 34.
- Michael Molenda, “Producer’s Desk: Robert Schneider,” *Guitar Player*, Vol. 36 No. 12, Dec. 2002: 30.

Memberships in professional organizations

- American Mathematical Society (AMS)
- American Society of Composers, Authors and Publishers (ASCAP)
- Euler Society
- Mathematical Association of America (MAA)