

# Jeremy Lovejoy

## Curriculum Vitae

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### Personal

Date of birth March 7, 1972  
Place of birth Escanaba, Michigan, USA  
Citizenship American

### Education

May 1994 **B.S.**, Mathematics, Virginia Tech.  
August 2000 **PhD**, Mathematics, The Pennsylvania State University.  
Advisors: George E. Andrews and Ken Ono

### Professional Positions

2000–2003 **VIGRE/Van Vleck Assistant Professor**, *Department of Mathematics*, University of Wisconsin.  
2003–2006 **Researcher**, *Centre National de Recherche Scientifique (CNRS)*, Université Bordeaux 1.  
2006–current **Researcher**, *CNRS*, Université Paris Diderot - Paris 7.  
2017–2018 **Lecturer**, *Department of Mathematics*, University of California, Berkeley.

### Research interests

- Partitions and  $q$ -series
- Modular forms and number theory
- Combinatorics
- Quantum knot theory

### Publications

1. Ramanujan Type Congruences for Three-Colored Frobenius Partitions, *J. Number Theory* 86 (2000), 283-290.
2. The Divisibility and Distribution of Partitions into Distinct Parts, *Adv. Math.* 158 (2001), 253-263.
3. 3-regular Partitions and a Modular K3 Surface (with David Penniston), *Contemp. Math.* 291 (2001), 177-182.
4. The Arithmetic of the Number of Partitions into Distinct Parts (with Scott Ahlgren), *Mathematika* 48 (2001) 203-211.

5. Frobenius Partitions and the Combinatorics of Ramanujan's  ${}_1\psi_1$  summation (with Sylvie Corteel), *J. Combin. Theory Ser. A* 97 (2002), 177-183.
6. Extension of Ramanujan's Congruences for the Partition Function Modulo Powers of 5 (with Ken Ono), *J. reine angew. math.* 542 (2002), 123-132.
7. Lacunary Partition Functions, *Math. Res. Lett.* 9 (2002), 191-198.
8. Partitions with Designated Summands (with George Andrews and Richard Lewis), *Acta Arithmetica* 105 (2002), 51-66.
9. The Number of Partitions into Distinct Parts Modulo Powers of 5, *Bull. London Math. Soc.* 35 (2003), 41-46.
10. Hypergeometric Generating Functions for Dirichlet and Other L-Functions (with Ken Ono), *Proc. Nat. Acad. Sci. USA* vol. 100 no. 12 (2003), 6904-6909.
11. Gordon's Theorem for Overpartitions, *J. Combin. Theory Ser. A* 103 (2003), 393-401.
12. More Lacunary Partition Functions, *Illinois J. Math.* 47 (2003), 769-773.
13. Overpartitions (with Sylvie Corteel), *Trans. Amer. Math. Soc.* 356 (2004), 1623-1635.
14. A Bailey Lattice *Proc. Amer. Math. Soc.* 132 (2004), 1507-1516.
15. Overpartitions and Real Quadratic Fields, *J. Number Theory* 106 (2004), 178-186.
16. Overpartition Theorems of the Rogers-Ramanujan Type *J. London Math. Soc.* 69 (2004), 562-574.
17. Overpartitions and Generating Functions for Generalized Frobenius Partitions (with Sylvie Corteel and Ae Ja Yee), *Trends in Mathematics, Mathematics and Computer Science III: Algorithms, Trees, Combinatorics, and Probabilities (Birkhauser)* (2004) 15-24.
18. Rank and Conjugation for the Frobenius Representation of an Overpartition, *Ann. Comb.* 9 (2005), 321-334.
19. A Theorem on Seven-Colored Overpartitions and its Applications, *Int. J. Number Theory.* 1 (2005), 215-224.
20. An Iterative-Bijective Approach to Generalizations of Schur's Theorem (with Sylvie Corteel), *Europ. J. Comb.* 27 (2006), 496-512.
21. Overpartition Pairs, *Ann. Inst. Fourier* 56 (2006), 781-794.
22. Constant Terms, Jagged Partitions, and Partitions with Difference Two at Distance Two, *Aequationes Math.* 72 (2006), 299-312.
23. Partitions and overpartitions with attached parts, *Arch. Math.* 88 (2007), 316-322.
24. Dyson's rank, overpartitions, and Maass forms (with Kathrin Bringmann), *Int. Math. Res. Not.* (2007), rnm063.
25. Overpartition pairs and two classes of basic hypergeometric series (with Olivier Mallet), *Adv. Math.* 217 (2008), 386-418.
26. Rank and conjugation for a second Frobenius representation of an overpartition, *Ann. Comb.* 12 (2008), 101-113.
27. Rank and congruences for overpartition pairs (with Kathrin Bringmann), *Int. J. Number Theory* 4 (2008), 303-322.

28. An extension to overpartitions of the Rogers-Ramanujan identities for even moduli (with Sylvie Corteel and Olivier Mallet), *J. Number Theory* 128 (2008), 1602-1621.
29. Rank differences for overpartitions (with Robert Osburn), *Quart. J. Math. (Oxford)* 59 (2008) 257-273.
30.  $n$ -color overpartitions, twisted divisor functions, and Rogers-Ramanujan identities (with Olivier Mallet) (G.E. Andrews' 70th birthday issue) 6 (2008), 23-36.
31. Overpartitions and class numbers of binary quadratic forms (with Kathrin Bringmann), *Proc. Nat. Acad. Sci. USA* 106 no. 14 (2009), 5513-5516.
32. Rank and crank moments for overpartitions (with Kathrin Bringmann and Robert Osburn), *J. Number Theory* 129 no. 7 (2009), 1758-1772.
33. Overpartitions and the  $q$ -Bailey identity (with Sylvie Corteel), *Proc. Edinburgh Math. Soc.* 52 (2009), 297-306 .
34. Partitions weighted by the parity of the crank (with Dohoon Choi and Soon-Yi Kang), *J. Combin. Theory Ser. A* 116 (2009), 1034-1046 .
35.  $M_2$ -rank differences for partitions without repeated odd parts (with Robert Osburn), *J. Théor. Nombres Bordeaux* 21 no. 2 (2009), 313-334.
36. Automorphic properties of generating functions for generalized rank moments and Durfee symbols (with Kathrin Bringmann and Robert Osburn), *Int. Math. Res. Not.* (2010), rnp131.
37. On identities involving sixth order mock theta functions, *Proc. Amer. Math. Soc.* 138 (2010), 2547-2552.
38.  $M_2$ -rank differences for overpartitions (with Robert Osburn), *Acta Arithmetica* 144 (2010), 193-212.
39. Partitions with rounded occurrences and attached parts, *Ramanujan J.* 23 (2010), 307-313.
40. Quadratic forms and four partition functions modulo 3 (with Robert Osburn), *Integers* 11 (2011), 47-53.
41. On the modularity of the unified WRT invariants of certain Seifert manifolds (with Kathrin Bringmann and Kazuhiro Hikami), *Adv. Appl. Math.* 46 (2011), 86-93.
42. Automorphic properties of generating functions for generalized odd rank moments and odd Durfee symbols (with Claudia Alfes and Kathrin Bringmann), *Math. Proc. Cambridge Phil. Soc* 151 (2011), 385-406.
43.  $\ell$ -adic properties of smallest parts functions (with Scott Ahlgren and Kathrin Bringmann), *Adv. Math.* 228 (2011), 629-645.
44. Ramanujan-type partial theta functions and conjugate Bailey pairs, *Ramanujan J.* 29 (2012), 51-67.
45. The Bailey chain and mock theta functions, *Adv. Math.* 238 (2013), 442-458.
46.  $q$ -hypergeometric double sums as mock theta functions (with Robert Osburn), *Pacific J. Math.* 264 (2013), 151-162 .

47. On  $q$ -difference equations for partitions without  $k$ -sequences (with Kathrin Bringmann and Karl Mahlburg), *Legacy Of Ramanujan, Ramanujan Mathematical Society Lecture Notes* 20 (2013), 129–137.
48. Mixed mock modular  $q$ -series (with Robert Osburn), *J. Indian Math. Soc.*, Special Volume to commemorate the 125th Birth Anniversary of Srinivasa Ramanujan and the National Mathematics Year - 2012 (2013), 45–61.
49. Bailey pairs and indefinite quadratic forms, *J. Math. Anal. Appl.* 410 (2014), 1002–1013.
50. The rank of a unimodal sequence and a partial theta identity of Ramanujan (with Byungchan Kim), *Int J. Number Theory* 10 (2014), 1081–1098.
51. Torus knots and quantum modular forms (with Kazuhiro Hikami), *Res. Math. Sci.* 2:2, 2014.
52. On two tenth order mock theta identities, *Ramanujan J.* 36 (2015), 117–121.
53. Anti-lecture hall compositions and Andrews' generalization of the Watson-Whipple transformation (with Sylvie Corteel and Carla Savage), *J. Combin. Theory Ser. A* 134 (2015), 188–195.
54. Overpartitions with restricted odd differences (with Kathrin Bringmann, Jehanne Dousse, and Karl Mahlburg), *Electron. J. Combin* 22 (2015), no.3, paper 3.17.
55. Real quadratic double sums (with Robert Osburn), *Indag. Math.* 26 (2015), 697–712.
56. Ramanujan-type partial theta identities and rank differences for special unimodal sequences (with Byungchan Kim), *Ann. Comb.* 19 (2015), 705–733.
57. A partition identity and the universal mock theta function  $g_2(x; q)$  (with Kathrin Bringmann and Karl Mahlburg), *Math. Res. Lett.* 23 (2016), 67–80.
58. Odd-balanced unimodal sequences and related functions: parity and quantum modularity (with Byungchan Kim and Subong Lim), *Proc. Amer. Math. Soc.* 144 (2016), 3687–3700.
59. Overpartitions into distinct parts without short sequences (with Youn-Seo Choi and Byungchan Kim), *J. Number Theory* 175 (2017), 117–133.
60. Partial indefinite theta identities (with Byungchan Kim), *J. Aust. Math. Soc.* 102 (2017), 255–289.
61. Mock theta double sums (with Robert Osburn), *Glasgow Math. J.* 59 (2017), 323–348.
62. Hecke-type formulas for families of unified Witten-Reshetikhin-Turaev invariants (with Kazuhiro Hikami), *Commun. Number Theory Phys.* 11 (2017), 249–272.
63. On a Rogers-Ramanujan type identity from crystal base theory (with Jehanne Dousse), *Proc. Amer. Math. Soc.* 146 (2018), 55–67.
64. Asymmetric generalizations of Schur's theorem, Proceedings of the 2016 Gainesville International Conference on Number Theory in honor of Krishna Alladi's 60th birthday, to appear.
65. On some special families of  $q$ -hypergeometric Maass forms (with Kathrin Bringmann and Larry Rolen), *Int. Math. Res. Not. IMRN*, to appear.
66. Ramanujan-type partial theta identities and conjugate Bailey pairs, II. Multisums (with Byungchan Kim), *Ramanujan J.*, to appear.

67. Generalizations of Capparelli's identity (with Jehanne Dousse), submitted.
68. Identities for overpartitions with smallest parts odd (with Min-Joo Jang), submitted.
69. The colored Jones polynomial and Kontsevich-Zagier functions for double twist knots (with Robert Osburn), preprint.

## Talks

### Conferences - Invited talks

- October 2000 *The Combinatorics of Ramanujan's  ${}_1\psi_1$  and the  $q$ -Gauss  ${}_2\phi_1$  summation,  $q$ -series with Applications to Combinatorics, Number Theory, and Physics, University of Illinois, Urbana, IL.*
- March 2001 *The Arithmetic of the Number of Partitions into Distinct Parts, AMS Spring Southeastern Section Meeting, University of South Carolina, Columbia, SC.*
- August 2001  *$q$ -series Identities, The Life and Legacy of Ramanujan, MAA MathFest Short Course, University of Wisconsin, Madison, WI.*
- May 2003 *Gordon's Theorem for Overpartitions, AMS Spring Sectional Meeting, San Francisco State University, San Francisco, CA.*
- February 2004 *Overpartition Analogues of Classical Families of Partition Theorems, Conference on Paths, Permutations, and Trees, Nankai University, Tianjin, China.*
- November 2004 *Extending Partition Theorems of Schur and Göllnitz to Overpartitions, Additive Number Theory, Gainesville, FL.*
- January 2006 *Constant terms, jagged partitions, and partitions with distance two at distance two, Workshop of Combinatorics on  $q$ -series and Partitions, Lyon, France.*
- June 2006 *Overpartition pairs, lattice paths, and Andrews' well-poised basic hypergeometric series, International conference on number theory, KIAS, Seoul, Korea.*
- December 2008 *Andrews' generalization of Selberg's  $q$ -difference equations, Combinatory Analysis 2008: Partitions,  $q$ -series, and Applications.*
- May 2009  *$q$ -series and class numbers, Mock theta functions and applications in combinatorics, algebraic geometry, and mathematical physics, Max Planck Institute, Bonn, Germany.*
- March 2011 *Congruences for smallest parts functions, Modular Forms and Mock Modular Forms and their Applications in Arithmetic, Geometry and Physics, Trieste, Italy.*
- March 2012 *Ramanujan's identities for the sixth order mock theta functions, Symposium on Modular Forms, Mock Theta Functions, and Applications, Cologne, Germany.*
- August 2013 *The Bailey chain and mock theta functions, The Combinatorics of  $q$ -Series and Partitions in honor of Professor George Andrews' 75th birthday, Tianjin, China.*
- February 2015 *Torus knots and quantum modular forms, Functional equations and special functions: from combinatorics to model theory, Grenoble, France.*
- December 2017 *TBD, Trends in Modular Forms, Daejon, South Korea.*
- April 2018 *TBD, AMS Spring Western Sectional Meeting, Portland State University.*
- June 2018 *TBD, Combinatory Analysis 2018 - A conference in honor of George Andrews' 80th birthday, Penn State University*

### Conferences - Contributed talks

- November 1999 *Divisibility and Distribution of Partitions into Distinct Parts*, Conference on  $q$ -series, symbolic computation, number theory, special functions, physics and combinatorics, University of Florida, Gainesville, FL.
- April 2000 *Extension of Ramanujan's Congruences for the Partition Function Modulo Powers of 5*, SERMON (Southeast Regional Meeting on Numbers) 2000, Virginia Tech, Blacksburg, VA.
- May 2000 *Extension of Ramanujan's Congruences for the Partition Function Modulo Powers of 5*, Millennial Conference on Number Theory, University of Illinois, Urbana, IL.
- June 2000 *Extension of Ramanujan's Congruences for the Partition Function Modulo Powers of 5*, NATO Advanced Study Institute: Special Functions 2000, Arizona State University, Tempe, AZ.
- December 2000 *The Divisibility of the Number of Partitions into Distinct Parts*, Western Number Theory Conference, University of San Diego, San Diego, CA.
- May 2001 *Summing the Tails of Modular Forms,  $q$ -series, and the Arithmetic of Quadratic Number Fields*, Fifth International Joint Meeting of the AMS and the Sociedad Matematica Mexicana (SMM), UNAM, Morelia, Mexico.
- May 2002 *Lacunary Partition Functions*, CNTA, Université de Montreal, Montreal, Quebec.
- July 2005 *A Theorem on Seven-colored Overpartitions and its Applications*, XXIVèmes Journées Arithmétiques, Marseille, France.
- July 2007 *Rank differences for overpartitions*, XXVèmes Journées Arithmétiques, Edinburgh, Scotland.
- August 2012 *The Bailey chain and mock theta functions*, Building Bridges: 1st EU-US conference on Automorphic Forms and related topics, Aachen, Germany.
- July 2014 *Rank differences for unimodal sequences*, Building Bridges: 2nd EU-US workshop on Automorphic Forms and related topics, Bristol, United Kingdom.

### Conferences - Competitive submissions

- November 2001 *Frobenius Partitions and Basic Hypergeometric Series*, GasCOM 2001, University of Siena, Siena, Italy.
- June 2003 *Overpartitions (with Sylvie Corteel)*, FPSAC, Sweden.
- September 2004 *Overpartitions and Generating Functions for Generalized Frobenius Partitions*, Third Colloquium on Mathematics and Computer Science, Vienna, Austria.
- September 2006 *An extension to overpartitions of the Rogers-Ramanujan identities for even moduli (with Sylvie Corteel and Olivier Mallet)*, Fourth Colloquium on Mathematics and Computer Science, Nancy, France.

### Seminars

- October 1999 Pennsylvania State University (USA).
- October 2000 University of Wisconsin (USA) (3 seminars).
- November 2000 Institut Girard Desargues, Université Lyon I (France).

March 2001 University of Wisconsin (USA).  
 April 2001 University of Illinois (USA).  
 March 2002 Institut Henri Poincaré (France).  
 April 2002 Institut Girard Desargues, Université Lyon I (France).  
 April 2002 Sussex University (UK).  
 June 2002 LaBRI, Université Bordeaux I (France).  
 November 2002 University of Illinois (USA).  
 March 2003 University of Wisconsin (USA) (2 seminars)  
 December 2003 Max Planck Institute (Germany).  
 April 2004 University of Melbourne (Australia).  
 November 2004 University of Wisconsin (USA).  
 March 2005 Institut Camille Jordan, Université Lyon I (France).  
 April 2005 LIAFA, Université Paris 7 (France).  
 March 2006 University College, Dublin (Ireland).  
 February 2007 Institut Camille Jordan, Université Lyon I (France).  
 April 2007 Pohang University of Science and Technology (Korea) (3 seminars).  
 April 2007 Korea Institute for Advanced Study (Korea) (2 seminars).  
 April 2007 Korea Advanced Institut of Science and Technology (Korea).  
 June 2007 Institut Henri Poincaré (France).  
 March 2008 IECN, Université Nancy (France).  
 November 2009 University of Cologne (Germany).  
 October 2011 University College Dublin (Ireland).  
 December 2012 Institut Joseph Fourier, Grenoble (France).  
 December 2012 Institut Camille Jordan, Lyon (France).  
 October 2013 CALIN, Université Paris XIII (France).  
 February 2014 University College Dublin (Ireland).  
 October 2015 Korea Institute for Advanced Study (Korea).  
 October 2016 University of Zurich (Switzerland).  
 November 2016 University College Dublin (Ireland).  
 April 2017 Nanyang Technological University (Singapore).

December 2017 BAANTAG 15, University of California, Berkeley.

## Professional Awards and Grants

- 2001–2002 Chateaubriand Fellowship.
- 2004–2007 Principal Investigator (PI), *Partitions d'entiers à l'interface de la combinatoire, des  $q$ -séries, et de la théorie des nombres*, ACI Jeunes Chercheuses et Jeunes Chercheurs, 40.000 Euros.
- 2007–2010 Member, *GAMMA*, ANR Projet Blanc.
- 2008–2009 Co-PI, *Ramanujan-type congruences for overpartitions and overpartition pairs*, Ulysses - PHC Franco-Irlandais, 5.000 Euros.
- 2008–2011 Member, *Arithmetic Properties of Coefficients of Modular Forms*, Science Foundation Ireland Research Frontiers Programme, 117.000 euros.
- 2008–2013 Member, *IComb*, ANR Jeunes Chercheuses et Jeunes Chercheurs, 340.000 euros
- 2014–2015 Co-PI, *Partial theta functions in Ramanujan's lost notebook and beyond*, STAR - PHC Franco-Coréen, 10.880 euros.

## Organizing and Program Committees

- July 2008 Program Committee, *Formal Power Series and Algebraic Combinatorics*, Talca University, Chile.
- July 2010 Co-organizer, *Prospects in  $q$ -series and modular forms* University College Dublin, Ireland.
- May 2012 Co-organizer, *Hypergeometric series and their generalizations in algebra, geometry, number theory and physics*, Institut Henri Poincaré, Paris, France.
- March 2013 Co-organizer, *Automorphic forms workshop*, University College Dublin, Ireland.
- June 2013 Organizing Committee, *Formal Power Series and Algebraic Combinatorics*, Paris, France.
- May 2015 Co-organizer, *Automorphic forms: advances and applications*, CIRM Luminy, France.
- March 2018 Co-organizer, *Modular forms and quantum knot invariants*, BIRS, Banff, Canada.

## Teaching

### Graduate courses

- Master Parisien de Recherche en Informatique (MPRI)
- The Theory of Partitions

### Undergraduate courses

- College Algebra
- Quantitative Reasoning
- Calculus I, Calculus II
- Differential Equations
- Linear Algebra, Advanced Linear Algebra



- Combinatorics
- Introduction to Analysis
- Introduction to Abstract Algebra

## Advising

### Undergraduate

2003 Team leader, Research Experience for Undergraduates, University of Wisconsin.

### Master

2011 M1 research advisor, Jehanne Dousse, ENS Lyon

2016 M2 research advisor, Isaac Konan, Université Paris Sud

### PhD

2006–2008 Olivier Mallet, Université Paris Diderot. Current position: Maître de conférences, Université de Rouen.

2012–2015 Jehanne Dousse, Université Paris Diderot. Current position: Postdoc, University of Zurich.

2017– Isaac Konan, Université Paris Diderot.

## Thesis evaluation

### Thesis examiner

- University of Mysore (India)
- Nanyang Technological University (Singapore)
- Thapar University (India)

### Habilitation Commitee

- Frédéric Jouhet, Université Lyon I, 2010

## Refereeing

### Journals

- Acta Arithmetica
- Acta Mathematica Sinica
- Acta Mathematica Scientia
- Advances in Applied Mathematics
- Advances in Difference Equations
- Advances in Mathematics
- American Journal of Mathematics
- American Mathematical Monthly
- Annali dell'Università di Ferrara
- Annals of Combinatorics
- Applicable Analysis and Discrete Mathematics

- Arabian Journal of Mathematics
- Arkiv för Matematik
- Ars Combinatoria
- Bulletin of the Australian Mathematical Society
- Bulletin of the Brazilian Mathematical Society
- Bulletin of the London Mathematical Society
- Bulletin of the Polish Academy of Sciences, Mathematics
- Canadian Journal of Mathematics
- Canadian Mathematical Bulletin
- Central European Journal of Mathematics
- Colloquium Mathematicum
- Compositio Mathematica
- Comptes Rendus Mathématiques
- Constructive Approximation
- Discrete Mathematics
- Discrete Mathematics and Theoretical Computer Science
- Duke Mathematical Journal
- Electronic Journal of Combinatorics
- European Journal of Combinatorics
- Formal Power Series and Algebraic Combinatorics
- Functional Analysis, Approximation, and Computation
- Functiones et Approximatio, Commentarii Mathematici
- Graphs and Combinatorics
- Houston Journal of Mathematics
- Integers
- International Journal of Mathematics and Mathematical Sciences
- International Journal of Number Theory
- International Mathematical Research Notices
- JP Journal of Algebra, Number Theory and Applications
- Journal de Théorie de Nombres de Bordeaux
- Journal of Analysis and Number Theory
- Journal of Combinatorial Theory Series A
- Journal of Combinatorics and Number Theory
- Journal of Integer Sequences
- Journal of the London Mathematical Society
- Journal of Mathematical Analysis and Applications
- Journal of Number Theory
- Journal of the Ramanujan Mathematical Society
- Kragujevac Journal of Mathematics

- Mathematica Bohemica
- Mathematica Slovaca
- Mathematical Communications
- Mathematics of Computation
- Mathematika
- Mediterranean Journal of Mathematics
- Miskolc Mathematical Notes
- Monatshefte für Mathematik
- New Zealand Journal of Mathematics
- Pacific Journal of Mathematics
- Proceedings of the American Mathematical Society
- Proceedings of the Edinburgh Mathematical Society
- Proceedings of the Estonian Academy of Sciences
- Proceedings of the Indian Academy of Sciences - Mathematical Sciences
- Proceedings of the London Mathematical Society
- Proceedings of the National Academy of Sciences (USA)
- Publicationes Mathematicae Debrecen
- Quarterly Journal of Mathematics
- Ramanujan Journal
- Research in the Mathematical Sciences
- Rocky Mountain Journal of Mathematics
- SIAM Journal on Discrete Mathematics
- Tamsui Oxford Journal of Information and Mathematical Sciences
- Turkish Journal of Mathematics

#### Funding agencies

- National Science Foundation
- National Security Agency

#### Reviewing

- AMS Mathematical Reviews (200 reviews)
- Zentralblatt MATH (155 reviews)
- Book reviewer for Prentice-Hall
- Book reviewer for Cambridge University Press

#### Languages

English	Native speaker
French	Fluent
Dutch	Intermediate

## References

George Andrews, Pennsylvania State University

Ken Ono, Emory University

Bruce Berndt, University of Illinois at Urbana-Champaign