Paul E. Gunnells

Dept. of Mathematics and Statistics, University of Massachusetts Amherst, Amherst, MA, 01003
gunnells at math dot umass dot edu

Degrees

BS 1989, with honors, Stanford University. Honors thesis: *The topology of hypersurface singularities.* Advisor: Steven Kerckhoff.

PhD 1994, MIT. Thesis title: *The topology of Hecke correspondences.* Advisor: Robert D. MacPherson.

Experience

Tufts University. Instructor, 1994–95.

Columbia University. Ritt Assistant Professor, 1995–99.

Barnard College, Columbia University. Visiting Assistant Professor, 1999–2000.

Rutgers University (Newark). Assistant Professor, 2000–02.

Max Planck Institut für Mathematik (Bonn). Research affiliate, Spring 2001.

University of Massachusetts (Amherst), Assistant Professor, 2002–06.

University of Massachusetts (Amherst), Associate Professor, 2006–12.

University of Massachusetts (Amherst), Professor, since 2012.

ICERM, Brown University, Research Fellow for special semester *Automorphic Forms, Combinatorial Representation Theory and Multiple Dirichlet Series*, Spring 2013.

Publications

Appeared/To Appear

[1] *Modular symbols for* $\mathbf{Q}$*-rank one groups and Voronoĭ reduction,* J. of Number Theory **75** (1999), no. 2, 198–219.

[2] *Symplectic modular symbols.* Duke Math. J. **102** (2000), no. 2, 329–350.

[3] *Finiteness of minimal modular symbols for* SL_n*.* J. of Number Theory **82** (2000), no. 1, 134–139.

[4] *Computing Hecke eigenvalues below the cohomological dimension,* J. of Experiment. Math. **9** (2000), no. 3, 351–367.

[5] *Computing special values of partial zeta functions,* with Gautam Chinta and Robert Sczech, Algorithmic number theory (Leiden, 2000), 247–256, Lecture Notes in Comput. Sci., 1838, Springer, Berlin, 2000.

[6] *Modular symbols and Hecke operators,* Algorithmic number theory (Leiden, 2000), 347–358, Lecture Notes in Comput. Sci., 1838, Springer, Berlin, 2000.

[7] *Eisenstein series twisted by modular symbols for the group* SL_n*,* with Dorian Goldfeld. Math. Res. Lett. **7** (2000), 1–10.

[8] *Toric modular forms and nonvanishing of L-functions,* with Lev A. Borisov. J. Reine Angew. Math. **539** (2001), 149–165.

[9] *Toric varieties and modular forms,* with Lev A. Borisov, Invent. Math. **144** (2001), no. 2, 297–325.

[10] *Elliptic functions and equations of modular curves,* with Lev A. Borisov and Sorin Popescu, Math. Ann. **321** (2001), no. 3, 553–568.

[11] *A smooth space of tetrahedra,* with Eric Babson and Richard Scott, Adv. Math. **165** (2002), no. 2, 285–312.

[12] *Cohomology of congruence subgroups of* $SL(4, \mathbf{Z})$*,* with Avner Ash and Mark McConnell, J. of Number Theory **94** (2002), 181–212.

[13] *Wonderful blowups associated to group actions,* with Lev A. Borisov, Selecta Math. N.S. **8** (2002), no. 3, 373–379.

[14] *Evaluation of Dedekind sums, Eisenstein cocycles, and special values of L-functions,* with Robert Sczech. Duke Math. J. **118** (2003), no. 2, 229–260.

[15] *Hecke operators and* $\mathbf{Q}$*-groups associated to self-adjoint homogeneous cones,* with Mark McConnell, J. of Number Theory **100** (2003), no. 1, 46–71.

[16] *Toric modular forms of higher weight,* with Lev A. Borisov, J. Reine Angew. Math. **560** (2003), 43–64.

[17] *A characterization of Dynkin elements,* with Eric Sommers, Math. Res. Lett. **10** (2003), no. 2–3, 363–373.

[18] *Some elementary Ramanujan graphs,* Geometriæ Dedicata. **112** (2005), no. 1, 53–65.

[19] *Geometry of the tetrahedron space,* with Eric Babson and Richard Scott. Adv. Math. **204** (2006), no. 1, 176–203.

[20] *Cells in Coxeter groups,* Notices of the AMS, **53** (2006), no. 5, 528–535.

[21] *Computing in higher rank,* appendix to the book *Modular Forms, a computational approach,* by William Stein, GSM v.79, American Math. Society.

[22] *Robert MacPherson and arithmetic groups,* Pure and Appl. Math. Quarterly **2** (2006), no. 4, 1015–1052. Special volume dedicated to Robert MacPherson.

[23] *Weyl group multiple Dirichlet series constructed from quadratic twists,* with Gautam Chinta, Invent. Math. **167** (2007), no.2, 327–353.

[24] *On certain integral Schreier graphs of the symmetric group,* with Richard Scott and Byron Walden, Electronic J. of Combinatorics **14** (2007), no. 1.

[25] *Lattice polytopes, Hecke operators, and the Ehrhart polynomial,* with Fernando Rodriguez Villegas, Selecta Math. **13** (2007), 253–276.

[26] *On the p-parts of quadratic Weyl multiple Dirichlet series,* with Gautam Chinta and Solomon Friedberg, J. Reine Angew. Math. **623** (2008), 1–23. J. Reine Angew. Math.

[27] *Cohomology of congruence subgroups of* $SL(4, \mathbf{Z})$ *II,* with Avner Ash and Mark McConnell, J. of Number Theory **128** (2008), no. 8, 2263–2274.

[28] *Hecke operators and Hilbert modular forms,* with Dan Yasaki, Algorithmic number theory (Banff, 2008), 387–401, Lecture Notes in Comput. Sci., 5011, Springer, Berlin, 2008.

[29] *Constructing Weyl group multiple Dirichlet series,* with Gautam Chinta, J. Amer. Math. Soc. **23** (2010), 189–215.

[30] *Cohomology of congruence subgroups of* $SL_4(\mathbf{Z})$ *III,* with Avner Ash and Mark McConnell, Math. Comp. **79** (2010), 1811–1831.

[31] *Weyl group multiple Dirichlet series of type* A_2*,* with Gautam Chinta. *Number Theory, Analysis and Geometry: In Memory of Serge Lang,* 125–142, Springer, New York, 2012.

[32] *On the cohomology of congruence subgroups of* $SL_4(\mathbf{Z})$*,* Proceedings of the RIMS workshop *Automorphic representations, automorphic L-functions, and arithmetic,* (ed. Yoshi-Hiro Ishikawa), RIMS Kôkyûroku 2009.

[33] *Automata and cells in affine Weyl groups,* Represent. Theory **14** (2010), 627–644.

[34] *Torsion in the cohomology of congruence subgroups of* $SL(4, \mathbf{Z})$ *and Galois representations,* with Avner Ash and Mark McConnell. J. Algebra **325** (2011), 404–415.

[35] *Kazhdan–Lusztig cells in infinite Coxeter groups,* with Misha Belolipetsky, to appear in Proceedings of Belfast (UK) meeting Workshop on Algebra, Combinatorics and Dynamics, August 17–21, 2009. (Also available in Russian.)

[36] *Littelmann patterns and Weyl group multiple Dirichlet series of type D,* with Gautam Chinta, *Multiple Dirichlet Series, L-functions and Automorphic Forms,* 119–130, Birkhäuser Boston, 2012.

[37] *Modular forms and elliptic curves over the field of fifth roots of unity,* with Farshid Hajir and Dan Yasaki. Experimental Math. **22** (2013), no. 2, 203–216

[38] *Metaplectic Whittaker functions and Crystals of type B,* with Ben Brubaker, Dan Bump, and Gautam Chinta, *Multiple Dirichlet Series, L-functions and Automorphic Forms,* 93–118, Birkhäuser Boston, 2012.

[39] *Metaplectic Ice,* with Ben Brubaker, Dan Bump, Gautam Chinta, and Solomon Friedberg, *Multiple Dirichlet Series, L-functions and Automorphic Forms,* 65–92, Birkhäuser Boston, 2012.

[40] *Resolutions of the Steinberg module for $GL(n)$,* with Avner Ash and Mark McConnell. J. Algebra **349** (2012), 380–390.

[41] *Generalized Burnside rings and module categories,* with Andrew Rose and D. Rumynin. J. Algebra **358** (2012), 33–50.

[42] *Modular forms and elliptic curves over the cubic field of discriminant -23,* with Dan Yasaki. Int. J. Number Theory **9** (2013), no. 1, 53-76.

[43] *On Hilbert modular threefolds of discriminant 49,* with Lev A. Borisov. Selecta Math. (N.S.) **19** (2013), no. 4, 923-947.

[44] *Lectures on computing cohomology of arithmetic groups.* in *Computations with Modular Forms,* edited by G. Böckle and G. Wiese. Proceedings of a Summer School and Conference, Heidelberg, August/September 2011. Contributions in Mathematical and Computational Sciences (Springer-Verlag) **6** (2014), 3–45.

[45] *Cells in Coxeter Groups I,* with Misha Belolipetsky. J. Algebra **385** (2013), 134-144.

[46] *Mod 2 homology for $GL(4)$ and Galois representations,* with Avner Ash and Mark McConnell. J. Number Theory **146** (2015), 4-22 (special issue dedicated to Steve Rallis).

[47] *Kazhdan–Lusztig Cells in planar hyperbolic Coxeter groups and automata,* with Mikhail Belolipetsky and Richard Scott. International Journal of Algebra and Computation **24** (2014), no. 5, 757–772.

[48] *Crystal graphs, Tokuyama's formula, and the Gindikin–Karpelevič formula for G_2,* with Holley Friedlander and Louis Gaudet. Journal of Algebraic Combinatorics **41** (2015), no. 4, 1089–1102.

[49] *A table of elliptic curves over the cubic field of discriminant -23,* with Steve Donnelly, Ariah Klages-Mundt, and Dan Yasaki. Exp. Math. **24**, (2015), no. 4, 375–390.

[50] *On the homology of linear groups over imaginary quadratic fields,* with Mathieu Dutour Sikirić, Herbert Gangl, Jonathan Hanke, Achill Schürmann, and Dan Yasaki.J. Pure Appl. Algebra **220** (2016), no. 7, 2564–2589.

[51] *A Class of Hash Functions Based on the Algebraic Eraser,* with Iris Anshel, Derek Atkins, and Dorian Goldfeld. Groups, Complexity, and Cryptology, **8**, (2016), no. 1, 1–7.

[52] *Metaplectic Demazure operators and Whittaker functions,* with Gautam Chinta and Anna Puskás. Indiana University Mathematics Journal, **66** (2017), no. 3, 1045–1064.

[53] *Torus orbits on homogeneous varieties and Kac polynomials of quivers,* with Emmanuel Letellier and Fernando Rodriguez Villegas. Math. Z. **290** (2018), no. 1–2, 445–467.

[54] *Exotic matrix integrals: the Albert algebra and the spin factor.* Moscow Math Journal, **18**, (2018), no. 2, 321–347.

[55] *On topological computation of K_4 of the Gaussian and Eisenstein integers,* with Mathieu Dutour Sikirić, Herbert Gangl, Jonathan Hanke, Achill Schürmann, and Dan Yasaki. J. Homotopy Relat. Struct. **14** (2019), no. 1, 281–291.

[56] *Tiered trees, weights, and q-Eulerian numbers,* with William Dugan, Sam Glennon, and Einar Steingrìmsson. J. Combin. Theory Ser. A, **164** (2019), 24–49.

[57] *On the growth of torsion in the cohomology of arithmetic groups,* with Avner Ash, Mark McConnell, and Dan Yasaki. J. Inst. Math. Jussieu **19** (2020), no. 2, 537–569.

[58] *Cohomology with twisted one-dimensional coefficients for congruence subgroups of $GL(4, \mathbf{Z})$ and Galois representations,* with Avner Ash and Mark McConnell. J. Algebra **553** (2020), 211–247.

[59] *Weighted lattice point sums in lattice polytopes, unifying Dehn–Sommerville and Ehrhart–Macdonald,* with M. Beck and E. Materov. Discrete Comput. Geom. **65** (2021), no. 2, 365–384.

[60] *Ironwood Meta Key Agreement and Authentication Protocol,* with Iris Anshel, Derek Atkins, and Dorian Goldfeld. Adv. Math. Commun. **15** (2021), no. 3, 397–413.

[61] *Generalized Catalan numbers from hypergraphs.* Electron. J. Combin. **28** (2021), no. 1, Paper No. 1.52, 29 pp.

[62] *WalnutDSA: a group theoretic digital signature algorithm,* with Iris Anshel, Derek Atkins, and Dorian Goldfeld. Int. J. Comput. Math. Comput. Syst. Theory **6** (2021), no. 4,

260–284.

[63] *On the cohomology of congruence subgroups of GL_3 over the Eisenstein integers,* with Mark McConnell and Dan Yasaki. Exp. Math. **30** (2021), no. 4, 499–512.

[64] *Hypergraph matrix models,* with M. Defranco. Mosc. Math. J. **21** (2021), no. 4, 737–766.

[65] *$\aleph$–structures: One–way actions via holomorphs and split extensions with cryptographic applications,* with Iris Anshel and Dorian Goldfeld. In *Analysis, Cryptography, and Information Science,* edited by Nicholas Daras, Panos Pardalos, and Michael Rassias. Series on Computers and Operations Research **10**, 1–19. World Scientific, 2023.

[66] *Hypergraph matrix models and generating functions.* Combinatorics and Number Theory **13** (2024), no. 2, 149–178.

[67] *On the cohomology of GL_2 and SL_2 over imaginary quadratic fields,* with Herbert Gangl, Jonathan Hanke, and Dan Yasaki. Experimental Mathematics, **34** (2024), no. 3, 404–421.

[68] *Explicit sharbly cycles at the virtual cohomological dimension for $SL_n(\mathbf{Z})$,* with Avner Ash and Mark McConnell. J. Homotopy and Related Structures, **20** (2025), 391–416.

[69] *Cohomology with Sym^g coefficients for congruence subgroups of $SL_4(\mathbf{Z})$ and Galois representations,* with Avner Ash and Mark McConnell. J. Algebra, **678** (2025), 297–325.

Submitted/Preprints/Unpublished

Most preprints are available from `arXiv.org`.

[70] *Units, polyhedra, and a conjecture of Satake,* with Jacob Sturm (2002).

[71] *On toric varieties and modular forms,* MPIM preprint 2001. This is a writeup of a talk given at the Arbeitstagung, Bonn, 2001.

[72] *On the cryptanalysis of the generalized simultaneous conjugacy search problem and the security of the Algebraic Eraser* (2011).

[73] *Defeating the Kalka–Teicher–Tsaban linear algebra attack on the Algebraic Eraser,* with Dorian Goldfeld (2011).

[74] *Defeating the Ben-Zvi, Blackburn, and Tsaban Attack on the Algebraic Eraser,* with Iris Anshel, Derek Atkins, and Dorian Goldfeld (2016).

In preparation

[75] *The Atiyah-Singer theorem and elementary number theory (2nd ed.),* with Friedrich E. P. Hirzebruch and Don Zagier (approximately 250 new pages to be written, currently have 175 pp. completed)

[76] *Computing Hecke operators on the Siegel modular group $Sp_4(\mathbf{Z})$,* with Mathieu Dutour Sikirić.

[77] *Cohomology of congruence subgroups of GL_n over the rational function field,* with D. Yasaki.

[78] *Computing SLD of graph states with GF,* with E. Vallée, K. Goodenough,T. Coopmans, and J. Tura1.

Awards and Honors

Simons Fellow in Mathematics, 2012.

Research Grants

NSF Graduate Fellow, 1989–1993.

NSF Mathematical Sciences Computing Research Environments grant DMS 9627870, 1996–1999.

NSF Mathematical Sciences Grant, *Algebraic geometry and number theory,* DMS 0070747, DMS 0196109, DMS 0245580, (PI); July 1, 2000—June 30, 2004, $67,850.

Rutgers Competitive Fellowship Grant, spring 2001.

NSF Mathematical Sciences Grant, *Algebraic geometry, number theory, and representation theory* DMS 0401525, (PI); July 1, 2004—June 30, 2008, $107,000.

Five College Number Theory Seminar *Program in analysis in number theory,* 2005–2007 NSA Mathematical Sciences Program CWSS, H98230-05-1-0291, co-PI with Robert Benedetto,

Gregory Call, Giuliana Davidoff, Farshid Hajir, Leanne Robertson, Margaret Robinson, Thomas Weston, and Siman Wong.

NSF Mathematical Sciences Computing Research Environments grant DMS 0619492, 2006, $84,000. Co-PI with Hans Johnston, Markos Katsoulakis, Panayotis Kevrekidis, and Bruce Turkington.

NSF Mathematical Sciences Grant, *Problems in number theory and representation theory,* DMS 0801214, (PI); July 1, 2008—June 30, 2012, $150,001.

NSF Mathematical Sciences Grant, *Problems in arithmetic groups and multiple Dirichlet series,* DMS 1101640, (PI); July 1, 2011–June 30, 2014, $155,891.

NSF Mathematical Sciences Grant, *Multiple Dirichlet series, Whittaker functions, and the cohomology of arithmetic groups,* DMS 1501832, (PI); July 1, 2015–June 30, 2018, $218,207.

NSF Mathematical Sciences Grant, *EAGER: Braid Statistics and Hard Problems in Braid Groups with Applications to Cryptography,* DMS 1551271, (PI); July 1, 2015–June 30, 2017, $149,989.

Simons Collaboration Grant for Mathematicians, Award Number: 963025; September 1, 2022–August 31 2027, $32,000.

Meetings organized

Special session on arithmetic geometry and modular forms, AMS Eastern Section Meeting, with Farshid Hajir, Durham, NH, Spring 2006.

Special session on automorphic forms and arithmetic geometry, AMS Eastern Section Meeting, with Gautam Chinta, Hoboken, NJ, Spring 2007.

Low-dimensional topology and number theory, BIRS Workshop, Banff, Alberta, with David Boyd, Walter Neumann, and Adam Sikora, Fall 2007.

Dedekind sums in geometry, topology, and arithmetic, BIRS Workshop, Banff, Alberta, with Matthias Beck and Adam Sikora, Fall 2009.

Whittaker Functions, Crystal Bases, and Quantum Groups, BIRS Workshop, Banff, Alberta, with Ben Brubaker, Dan Bump, and Gautam Chinta, Summer 2010.

Low-dimensional topology and number theory, Oberwolfach Workshop, Germany, with Walter Neumann, Adam Sikora, and Don Zagier, Summer 2010.

Torsion and arithmetic groups: geometry, arithmetic, and computation, BIRS Workshop, Banff, Alberta, with Frank Calegari and Akshay Venkatesh. Summer 2012.

Low-dimensional topology and number theory, Oberwolfach Workshop, Germany, with Walter Neumann, Adam Sikora, and Don Zagier, Summer 2012.

Whittaker Functions: Number Theory, Geometry and Physics, BIRS Workshop, Banff, Alberta, with Ben Brubaker, Dan Bump, Solomon Friedberg, and Gautam Chinta. Fall 2013.

Curves and Automorphic forms, Arizona State University, with David Farmer, John Jones, and Holly Swisher. Spring 2014.

Low-dimensional topology and number theory, Oberwolfach Workshop, Germany, with Walter Neumann, Adam Sikora, and Don Zagier, Summer 2014.

Computational Representation Theory in Number Theory, Oregon State University, with John Cremona, David Farmer, John Jones, and Holly Swisher. Summer 2015.

Special session on automorphic forms, combinatorics and representation theory, AMS Western Section Meeting, with Dan Bump, Sol Friedberg, and Anna Puskas, Salt Lake City, UT, Spring 2016.

Whittaker Functions: Number Theory, Geometry and Physics, BIRS Workshop, Banff, Alberta, with Ben Brubaker, Dan Bump, Solomon Friedberg, and Gautam Chinta. Summer 2016.

Modularity and Bianchi groups, Université du Luxembourg, member of scientific committee along with Nicolas Bergeron and Gebhard Boeckle. Summer 2016.

Low-dimensional topology and number theory, Oberwolfach Workshop, Germany, with Walter Neumann, Adam Sikora, and Don Zagier, 2017.

Cohomology of Arithmetic Groups, Lattices and Number Theory: Geometric and Computational Viewpoints, CIRM Luminy, with Eva Bayer Fluckiger, Phillipe Elbaz-Vincent, and Graham Ellis, 2019.

Low-dimensional topology and number theory, Oberwolfach Workshop, Germany, with Adam Sikora, Le Thang, and Don Zagier, 2020.

Lattices and Cohomology of Arithmetic Groups: Geometric and Computational Viewpoints, BIRS Workshop, Banff, Alberta, with Phillipe Elbaz-Vincent and Graham Ellis, 2021.

COGENT online seminar, with Phillipe Elbaz-Vincent, Graham Ellis, and Haluk Sengun, since 2021.

Selected talks and conferences

Special addresses

Japan–U.S. Mathematical Institute (JAMI) 2001, Johns Hopkins, *Toric varieties and modular forms,* Spring 2001.

Arbeitstagung 2001, Bonn, Germany, *On toric varieties and modular forms,* Summer 2001.

MSRI Summer Graduate Program on Modular forms, Berkeley, California, Summer 2006. Gave a short course of four lectures on computing cohomology of arithmetic groups.

Southeast Regional Meeting on Numbers 2009, UNC Greensboro, plenary address, *Multiple Dirichlet Series.*

Columbia–NYU–CUNY Joint Number Theory Seminar, *Weyl group multiple Dirichlet series,* Fall 2010. Gave three separate talks (talk for graduate students, Colloquium-style talk, detailed research talk).

Summer school on Computational Modular forms, Heidelberg, Germany, Summer 2011. Gave a short course of five lectures on cohomology of arithmetic groups, automorphic forms, and computational techniques.

UNCG Summer School in Computational Number Theory 2014 on Modular Forms and Geometry. Gave a short course of three lectures on modular symbols and modular forms.

UNCG Summer School in Computational Number Theory 2017 on Modular Forms and Geometry. Gave a short course of three lectures on modular symbols and modular forms.

Research Seminars

University of North Carolina (Greensboro) Number Theory Seminar, *Automorphic forms, cohomology, and Galois representations*, Spring 2015.

Boston University Algebra Seminar, *On the growth of torsion in the cohomology of arithmetic groups,* Spring 2017.

Columbia University Analytic Number Theory Seminar, *Introduction to modular symbols,* Spring 2019.

Columbia–NYU–CUNY Joint Number Theory Seminar, *Modular symbols and function fields,* Fall 2023.

Invited talks and workshops

Explicit methods in number theory, Oberwolfach, Germany, *Computing Hecke operators on Siegel modular forms,* Summer 2018.

Patterns in cohomology of moduli spaces, Oxford (UK), Clay Research Workshop, *On the growth of torsion in the cohomology of arithmetic groups,* Fall 2019.

Simons Collaboration on Arithmetic Geometry, Number Theory and Computation Annual Meeting, New York, NY, Spring 2020.

Workshop on Cohomology of Arithmetic Groups, CRM, Montreal (QU), *Modular symbols over function fields,* Fall 2020.

Eisenstein series and equivariant cohomology, Regensburg, Germany (online), *Modular symbols over function fields,* Summer 2021.

Eastern Section of the AMS, Buffalo, NY, *Modular symbols over function fields,* Fall 2023. (cancelled due to weather.)

Simons Collaboration on Arithmetic Geometry, Number Theory and Computation Annual Meeting, New York, NY, Spring 2024.
Boston University Number Theory Seminar, *Modular symbols over function fields,* Spring 2024.
Simons Collaboration on Perfection Algebra, Geometry and Topology Annual Meeting, New York, NY, Spring 2024.
AIM Workshop on Post-Quantum Cryptography, Pasadena, CA, *Digital signatures based on Aleph-Structures,* Spring 2024.
Moduli Spaces and Modular Forms, Texel Island, The Netherlands, Spring 2024.
Arithmetic Geometry and Applications, ICTP, Trieste, Italy, Summer 2024.
Explicit methods in number theory, Oberwolfach, Germany. Fall 2024.

Graduate/Undergraduate/High school Colloquia

Center for Women in Mathematics at Smith College Lunch Talk, *Impartial Games*, Spring 2015.
PROMYS program (Boston University), *Generalized Catalan numbers*, Summer 2018.

Service

Selected Past UMass Departmental Service

Frontiers in Geometry faculty search committee, 2016–17.
VAP Search Committee, 2018–19.
Vision Committee (chair), 2013–14.
Strategic Planning Committee, 2014–20.
Course Release Committee, Chair, 2021–22.
Climate Committee, 2021–22.

Current UMass Departmental Service

Graduate Admissions Committee, Chair, since 2019.
Strategic Planning Committee, since 2022.

University Service

College of Natural Sciences and Mathematics Awards Committee, 2008–09.
College of Natural Sciences Personnel Committee, 2013–2019. Co-chair 2014–15.

Professional

Moderator for the number theory section (`math.NT`) of the preprint server `arXiv.org`, since 1999.
Member of the arXiv:math advisory committee of `arXiv.org`, 2014–2020.
Vice Chair of the arXiv:math advisory committee of `arXiv.org` 2020–2024.
ArXiv Mathematics Editor and chair of the Math Subject Editorial Committee, since 2024.
Editor of *Online Journal of Analytic Combinatorics*, since 2014.
Referee for various journals, including Journal of the AMS, Compositio, Duke Mathematical Journal, Advances in Mathematics, Annals of Mathematics, Mathematische Annallen, Journal of Number Theory, Pure and Applied Mathematics Quarterly, International Journal of Number Theory, Experimental Mathematics, Journal of Algebraic Geometry, SIDMA, SICOMP, Proceedings of the AMS, Indagationes Mathematicae, Mathematics of Computation, Comptes rendus Mathematique, Annales of the Quebec Society, Acta Arithmetica, Nagoya Math Journal, Journal of Pure and Applied Algebra, Integers, Journal of Algebraic Combinatorics.
Referee for various grant programs: National Science Foundation (NSF), National Security Agency (NSA), National Sciences and Engineering Research Council of Canada (NSERC), Austrian Science Fund (FWF), CUNY Research Award Program, FONDECYT (Chilean Science Foundation), The Danish Council for Independent Research (Natural Sciences), the Simons Foundation, AmSud.
Reviewer for Mathematical Reviews, Zentralblatt, and MIT Press.

See also **Meetings organized**.

Additional teaching service

Doctoral thesis committee member (external), Aurel Page, Bordeaux (France), 2014. *Méthodes explicites pour les groupes arithmétiques.*

Doctoral thesis committee member (external), Anna Puskás, Columbia University, 2014. *Demazure-Lusztig Operators and Metaplectic Whittaker Functions on Covers of the General Linear Group.*

Postdoctoral advisor, Jun Wen, Univ. of Mass., 2014–2017.

Thesis supervisor, Samuel Glennon, Univ. of Mass., 2017. *Coverings of graphs and tiered trees.*

Undergraduate thesis supervisor, Zachary Plummer, Univ. of Mass., 2015. *Design and Development of a Video Game with Applied Graph Theory.*

Thesis supervisor, Matthew Bates, Univ. of Mass., 2019. *Bruhat–Tits buildings and a characteristic p modular symbol algorithm.*

Undergraduate thesis supervisor , William Dugan, Univ. of Mass., 2017. *Tiered Trees, Weights, q-Eulerian Numbers, and Applications to Hyperplane Arrangements.* Results published in *Tiered trees, weights, and q-Eulerian numbers,* (see publication list)

Habilitation à Diriger des Recherches committee member for Alexander Rahm, Mathématiques de Paris Centre Campus Jussieu (France), 2017. *Torsion Subcomplex Reduction.*

Doctoral thesis committee member (external), Thomas Camus, Grenoble (France), 2017. *Méthodes algorithmiques pour les réseaux algébriques*

Postdoctoral advisor, Anna Puskás, Univ. of Mass., 2017–2018. (Currently Lecturer at University of Glasgow.)

Postdoctoral advisor, Mario DeFranco, Univ. of Mass., 2017–2020.

Postdoctoral advisor, Lubomir Chiriac, Univ. of Mass., 2017–2019. (Currently tenure-track at Portland State University.)

Masters project (in Computer Science) supervisor, Nimrod Hajaj, Univ. of Mass., 2019.

Honors thesis committee, Artem Vsygorets, Univ. of Mass., 2019.

Doctoral thesis committee member, Lian Duan, Univ. of Mass., 2019.

Doctoral thesis committee member, Vy Nguyen, Univ. of Mass., 2019.

Doctoral thesis committee member (external), Hao Zhang, Sorbonne (France), 2020. *Elliptic cocycle for $GL_n(\mathbf{Z})$ and Hecke operators*

Postdoctoral advisor, Louis Gaudet, Univ. of Mass., since 2023.