CURRICULUM VITAE

MATT KERR

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Born August 5th, 1975 in Washington, D.C.
Citizenship: U.S.

Education:

Ph.D. Princeton University, January 2003
Advisor: Phillip A. Griffiths

B.A. University of Virginia, May 1997, *summa cum laude* in mathematics and physics
Undergraduate Advisor: David Brydges

Employment:

Professor, Washington University in St. Louis, July 2018 - present
Associate Professor, Washington University in St. Louis, July 2013 - June 2018
Member, Institute for Advanced Study, Princeton, NJ, Sept 2014 - July 2015
Assistant Professor, Washington University in St. Louis, Aug. 2010 - June 2013
Lecturer, Durham University, Fall 2007 - July 2010
L.E. Dickson Instructor, University of Chicago, Fall 2004 - Summer 2007
Postdoctoral Fellow, Max-Planck-Institute for Mathematics, Bonn, Germany, Jan.-Aug. 2005
Adjunct Assistant Professor, UCLA Math Department, Fall 2002 - Summer 2004

Grants and Academic Honors:

Intl. Partner, Projekt BWST-ISF2025-072 (PI: J. Walcher), July 2026 - June 2029, €375.600
NSF Standard Grant DMS-2502708 (PI), July 2025 - June 2027, $159,995
Simons Foundation Travel Grant MPS-TSM-00007677 (PI), Sep. 2024 - Aug. 2029, $42,000
Guido L. Weiss Teaching and Service Award, Washington University, 2024
NSF Standard Grant DMS-2101482 (PI), Aug. 2021 - July 2024, $164,784
Simons Foundation Collaboration Grant 634268 (PI), Sep. 2019 - Aug. 2021, $16,800
Invited (semi-plenary) speaker, 2017 Mathematical Congress of the Americas
NSF FRG Grant DMS-1361147 (PI), July 2014 - June 2019, $301,874
NSF Conference Grants DMS-1259024 (PI, $28,030), and DMS-1600159 (co-PI, $24,740)
NSF Standard Grant DMS-1068974 (PI), July 2011 - June 2014, $127,412
EPSRC First Grant EP/H021159/1 (PI), Jan. 2010 - July 2010, 102K GBP, terminated by move
National Science Foundation Graduate Fellowship, 1997-2000
E.J. McShane Prize, University of Virginia Mathematics Department, 1997
James W. Elkins Award, University of Virginia Physics Department, 1997
Barry M. Goldwater Scholarship, 1996-7

Research Interests:

Algebraic Geometry
Hodge Theory
Mathematical Physics

Memberships:

Member, Intl. GdT on Differential Equations, March 2019 - present
Member, American Mathematical Society, Aug. 2009 - present
Fellow, Higher Education Academy (UK), Nov. 2008 - present

Research Publications – Books:

1. "Hodge theory, complex geometry, and representation theory (v. 1)", joint with M. Green and P. Griffiths, CBMS Reg. Conf. Series in Math, No. **118**, AMS, 2013, 406 pp.
2. "Mumford-Tate groups and domains: their geometry and arithmetic", joint with M. Green and P. Griffiths, Annals of Math. Studies, no. **183**, Princeton Univ. Press, 2012, 289 pp.

Research Publications – Articles:

3. *Hodge theory of degenerations, (III): a vanishing-cycle calculus for non-isolated singularities*, joint with R. Laza, J. of Singularities **29** (2026), 175-198.
4. *Hodge adjacency conditions for singularities*, joint with RJ Acuña, Pure Appl. Math. Quarterly, February 2026, https://doi.org/10.4310/PAMQ.260121024216.
5. *Real regulator maps with finite 0-locus*, joint with RJ Acuña and D. Akman, Compositio Math. **162** (2026), no. 6, 1256-1273.
6. *On the torsion locus of the Ceresa normal function*, joint with S. Tayou, J. Inst. Math. Jussieu **25** (2026), no. 4, 1977-1995.
7. *Motivic irrationality proofs*, in "Regulators V", Contemp. Math. **842**, AMS, 2026, 187-212.
8. *A note on higher Green's functions*, joint with C. Doran, Res. Math. Sci. **13** (2026), no. 2, Paper No. 45, 12 pp.
9. *Hodge theory of degenerations, (II): vanishing cohomology and geometric applications*, joint with R. Laza, in "Current Developments in Hodge Theory", Springer, 2025, 299-348.
10. *Apéry extensions*, joint with V. Golyshev and T. Sasaki, J. London Math. Soc. (2) **109** (2024), no. 1, Paper No. e12825, 38.
11. *Remarks on eigenspectra of isolated singularities*, joint with B. Castor, H. Deng, G. Pearlstein, Pacific Math. J. **327** (2023), no. 1, 29-54.
12. *K_2 and quantum curves*, joint with C. Doran and S. Sinha Babu, Adv. Theor. Math. Phys. **27** (2023), no. 8, 2261-2318.
13. *Unipotent extensions and differential equations (after Bloch-Vlasenko)*, CNTP **16** (2022), no. 4, 47 pp.
14. *Algebraic and analytic compactifications of moduli spaces*, joint with P. Gallardo, AMS Notices **69** (2022), no. 9, 1476-1485.
15. *Smoothing of rational singularities and Hodge structure*, joint with R. Laza and M. Saito Algebraic Geometry **9** (2022), no. 4, 476-501.
16. *Geometric interpretation of toroidal compactifications of moduli spaces of points in the line and cubic surfaces*, joint with P. Gallardo and L. Schaffler, Adv. Math. **381** (2021), Paper No. 107632, 48 pp.
17. *Hodge theory of degenerations (I): consequences of the decomposition theorem*, joint with R. Laza, with an appendix by M. Saito, Selecta Math **27** (2021), no. 4, Paper No. 71, 48 pp.
18. *Two applications of the integral regulator*, joint with M. Li, Pacific J. Math. **306** (2020), no. 2, 539-556.
19. *Polarized relations on horizontal SL(2)s*, joint with G. Pearlstein and C. Robles, Documenta Math. **24** (2019), 1179-1249.
20. *Specialization of cycles and the K-theory elevator*, joint with J. Iyer, J. Lewis, P. del Angel, S. Müller-Stach and D. Patel, CNTP **13** (2019), 299-349.
21. *Normal functions over locally symmetric varieties*, joint with R. Keast, SIGMA **14** (2018), 116-133.
22. *An explicit basis for the rational higher Chow groups of an abelian number field*, joint with Y. Yang, Ann. K-Theory **3** (2018), no. 2, 173-191.

23. *Local mirror symmetry and the sunset Feynman integral*, joint with S. Bloch and P. Vanhove, Adv. Theor. Math. Phys. **21** (2017), no. 6, 1373-1453.
24. *Simplicial Abel-Jacobi maps and reciprocity laws*, joint with J. Lewis and P. Lopatto, with an appendix by J. Burgos Gil, J. Algebraic Geom. **27** (2018), 121-172.
25. *Variations of Hodge structure and orbits in flag varieties*, joint with C. Robles, Adv. in Math **315** (2017), 27-87.
26. *Classification of smooth horizontal Schubert varieties*, joint with C. Robles, European J. Math **3** (2017), no. 2, 289-310.
27. *Boundary components of Mumford-Tate domains*, joint with G. Pearlstein, Duke Math. J. **165** (2016), no. 4, 661-721.
28. *Arithmetic of degenerating principal variations of Hodge structure: examples arising from mirror symmetry and middle convolution*, joint with G. da Silva Jr. and G. Pearlstein, Canadian J. Math **68** (2016), v. 2, 280-308.
29. *Normal functions, Picard-Fuchs equations, and elliptic fibrations on $K3$ surfaces*, joint with X. Chen, C. Doran, and J. Lewis, J. reine angew. Math **721** (2016), 43-79.
30. *A Feynman integral via higher normal functions*, joint with S. Bloch and P. Vanhove, Compositio Math. **151** (2015), no. 12, 2329-2375.
31. *Algebraic and arithmetic properties of period maps*, in "Calabi-Yau varieties: arithmetic, geometry, and physics", 173-208, Fields Inst. Monogr. **34**, Toronto, 2015.
32. *Naive boundary strata and nilpotent orbits*, joint with G. Pearlstein, Ann. Inst. Fourier **64** (2014), no. 6, 2659-2714.
33. *Algebraic cycles and local quantum cohomology*, joint with C. Doran, CNTP **8** (2014), no. 4, 703-727.
34. Appendix to *Reciprocity laws on algebraic surfaces via iterated integrals*, joint with I. Horozov, J. K-Theory **14** (2014), no. 2, 304-310.
35. *Cup products in automorphic cohomology: the case of Sp_4*, in "Hodge theory, complex geometry, and representation theory (v. 2)", Contemp. Math. **608**, AMS, 2014, 199-234.
36. *Notes on the representation theory of $SL_2(\mathbf{R})$*, 34 pp., in "Hodge theory, complex geometry, and representation theory (v. 2)", Contemp. Math. **608**, AMS, 2014, 173-198.
37. *Special values of automorphic cohomology classes*, joint with M. Green and P. Griffiths, Memoirs of the AMS **231**, No. 1088, 2014, 145 pp.
38. *Shimura Varieties: a Hodge-theoretic perspective*, 45 pp., in "Hodge Theory",Math. Notes **49**, Princeton Univ. Press, 2014.
39. *On the isomorphism question for complete Pick multiplier algebras*, joint with J. McCarthy and O. Shalit, Integral Equations and Operator Theory **76** (2013), no. 1, 39-53.
40. *Indecomposable K_1 of elliptically fibered $K3$ surfaces: a tale of two cycles*, in "Arithmetic and geometry of $K3$ surfaces and Calabi-Yau threefolds", 387-409, Fields. Inst. Commun. 67, Springer, New York, 2013.
41. *Algebraic K-theory of toric hypersurfaces*, joint with C. Doran, CNTP **5** (2011), no.2, 397-600.
42. *Normal functions and the GHC*, joint with G. Pearlstein, RIMS Kokyuroku **1745** (2011), 71-75.
43. *Mumford-Tate domains*, joint with M. Green and P. Griffiths, Bollettino dell'Unione Math. Ital. **3** (2010), no. 2, 281-308.
44. *An exponential history of functions with logarithmic growth*, joint with G. Pearlstein, in "Topology of Stratified Spaces", MSRI Pub. **58**, Cambridge Univ. Press, 2011, 281-374.
45. *The sheaf of nonvanishing meromorphic functions in the projective algebraic case is not acyclic*, joint with X. Chen and J. Lewis, C. R. Acad. Sci. Paris, Ser. I **348** (2010), 291-293.
46. *Néron models and limits of Abel-Jacobi mappings*, joint with M. Green and P. Griffiths, Compositio Math. **146** (2010), 288-366.
47. *Some enumerative global properties of variations of Hodge structure*, joint with M. Green and P. Griffiths, Moscow Math J. **9** (2009), 469-530.
48. *Higher Abel-Jacobi Maps for 0-cycles*, J. of K-theory **1** (2008), 1-55.
49. *Neron models and boundary components for degenerations of Hodge structures of mirror quintic type*, joint with M. Green and P. Griffiths, in "Curves and Abelian Varieties

(V. Alexeev, Ed.)", Contemp. Math **465** (2007), AMS, 71-145.

50. *The Abel-Jacobi Map for Higher Chow Groups, II*, joint with J. Lewis, 67 pp., Invent. Math. **170** (2007), 355-420.
51. *A survey of transcendental methods in the study of Chow groups of 0-cycles*, in "Mirror Symmetry V (Banff, 2003)", AMS/IP Stud. Adv. Math. **38** (2006), 295-349.
52. *Exterior products of 0-cycles*, J. reine angew. Math **600** (2006), 1-23.
53. *The Abel-Jacobi Map for Higher Chow Groups*, joint with J. Lewis and Stefan Muller-Stach, Compositio Math. **142** (2006), no. 2, 374-396.
54. *An Elementary Proof of Suslin Reciprocity*, Canad. Math. Bull. **48** v.2 (2005), pp. 221-236.
55. *A Regulator Formula for Milnor K-groups*, K-Theory **29** (2003) pp. 175-210.

Research Preprints (on arXiv):

56. *The 2-part of the Bloch-Kato conjecture, and indivisibility results, for K_2 of some elliptic curves*, 2026, joint with N. Dummigan, V. Golyshev, and R. de Jeu
57. *Three vignettes on hypergeometric normal functions*, 2026, to appear in "Arithmetic, K-Theory, Algebraic Cycles."
58. *The arithmetic of Calabi-Yau motives and mobile higher regulators*, 2024, joint with V. Golyshev, submitted.
59. *Non-vanishing of Ceresa and Gross-Kudla-Schoen cycles associated to modular curves*, joint with W. Li, C. Qiu and T. Yang, 2024, to appear in Transactions of the AMS.

PhD Thesis (on webpage):

60. "Geometric Construction of Regulator Currents with Applications to Algebraic Cycles", Princeton University Ph.D. Thesis, 355 pp.

Volumes Edited:

61. "Recent advances in Hodge theory: period domains, algebraic cycles, and arithmetic", M. Kerr and G. Pearlstein, eds., Cambridge Univ. Press, 2016, 514 pp.

Expository Publications:

62. *Math as Social Endeavor: Groupwork and the Blackboard*, joint with S. Frankel, AMS Notices **67** (2020), no. 9, 1357-1358 (Early Career Section).
63. *Counting, Sums, and Series*, to appear in ASMI volume (C. Doran, Ed.).

Invited Talks:

Vanderbilt University Algebraic Geometry Seminar, Oct. 6, 2026.
SIMIS Algebraic Geometry Seminar, Shanghai, June 11, 2026.
Conference on Algebraic and Differential Geometry, Shanghai Tech/Feishu, June 1-5, 2026.
"D-modules and birational geometry", SIMIS, Shanghai, June 1-5, 2026.
Minicourse on "Algebraic Cycles and Normal Functions" (6 talks), BICMR, Peking University, Beijing, June 27-29, 2026.
Stony Brook University Algebraic Geometry Seminar, March 11, 2026. (planned)
"Geometric aspects of Hodge theory and related areas", Algebraic Geometry Summer Research Institute (SRI), Fort Collins, CO, Jul. 21-25, 2025.
Minicourse on "Algebraic Cycles and Normal Functions" (6 talks), Dartmouth University, June 9-11, 2025.
"Arithmetic, K-Theory and Algebraic Cycles", Ohio State University, May 27-31, 2025.
Bogotá Algebraic Geometry Seminar, April 4, 2025. (Zoom)
Lefschetz Centennial Conference, University of Miami, March 24-28, 2025.
"The Arithmetic of Calabi-Yau Manifolds", Mainz Institute of Theoretical Physics, Mainz, Germany, March 17-28, 2025.
Seminar on Motivic Differential Equations, Institute Henri Poincaré, Paris, March 14, 2025.

Imperial College London Geometry & Topology Seminar, Jan. 10, 2025.
Loughborough University Geometry Seminar, Jan. 8, 2025.
"Four lectures on number theory and physics", Physics LatAm and Intl. GdT on Diff. Eqns., Lecture #4, Nov. 21, 2024 (Zoom).
"Higher du Bois and higher rational singularities", AIM, Oct. 28 – Nov. 1, 2024.
CMSA Workshop on Calabi-Yau Geometry, June 25, 2024. (Zoom)
"Regulators V", Pisa, June 3-13, 2024.
"The Ceresa cycle in arithmetic and geometry", ICERM, May 13-17, 2024.
Stanford University Math Dept., May 3, 2024.
Yau Mathematical Sciences Center, May 27, 2024 (Zoom).
University of Michigan Algebraic Geometry Seminar, Nov. 15, 2023.
Rutgers University Math Department Colloquium, Oct. 27, 2023.
"Global Invariants of Arithmetic Varieties", CIRM, Luminy, Oct. 9-13, 2023.
Number Theory Lunch Seminar, Max Planck Institute for Mathematics, Bonn, July 26, 2023.
Universität Hamburg Math Department Collquium, July 11, 2023.
"Hodge Theory, Mirror Symmetry, and Physics of CY Moduli", Heidelberg, June 12-16, 2023.
"Periods of CY Varieties and GW Invariants", BIMSA, China, May 7-13, 2023 (Zoom).
Duke University Number Theory Seminar, March 8, 2023 (Zoom).
"Representation theory, CY Manifolds, and Mirror Symmetry", CMSA, Harvard, Nov. 27-30, 2022 (Zoom).
"Periods in Mirror Symmetry", ICMS (Edinburgh, UK), Sept. 19-23, 2022.
"Mathematical physics: algebraic cycles, amplitudes, and strings", Isaac Newton Institute (Cambridge, UK), 2022.
Fanosearch seminar, Imperial College London, June 29, 2022.
"Arithmetic geometry, cycles, Hodge theory, regulators, periods and heights", Isaac Newton Institute (Cambridge, UK), 2022.
"Geometrical Aspects of the Swampland" (3 talks), ICMAT (Madrid), June 8-10, 2022.
Bard College Undergraduate Math Seminar, May 9, 2022.
Joint Math Colloquium, Harvard University, Cambridge, MA, May 5, 2022.
Fields Number Theory Seminar, May 16, 2022 (Zoom).
Mittag-Leffler Institute seminar, Nov. 4, 2021 (Zoom).
CMS Special Session on "Fibrations and Degenerations in Algebraic Geometry", Dec. 4-6, 2020 (Zoom).
IMSA Workshop on "Recent Applications of the Theory of o-minimal Structures to Various Questions in Hodge Theory", U. Miami, Nov. 16-20, 2020 (Zoom).
CMSA Math-Physics Seminar, Harvard Univ., Nov. 16, 2020 (Zoom).
Universität Duisberg-Essen, Seminar für Algebraische Geometrie und Arithmetik, July 2, 2020 (Zoom).
Stockholm University Math. Dept. Seminar, June 17, 2020 (Zoom).
AMS/JMM Special Session on "Algebraic Cycles in Arithmetic and Geometry", Denver, Jan. 18, 2020.
"The Legacy of Elie Cartan", TSIMF, Sanya, China, Dec. 16-20, 2019.
"Recent Advances in Mirror Symmetry (Yau 70th)", TSIMF, Sanya, China, Dec. 18-20, 2019.
"Algebraic Geometry and Arithmetic Geometry", USTC, Hefei, China, Dec. 16-20, 2019.
Donu Arapura's 60th Birthday Conference, Madison, WI, Sept. 12-15, 2019.
"Explicit Methods for Abelian and $K3$ Varieties", Logan, UT, July 5-7, 2019.
"Beyond the Beilinson Conjectures", St. Petersburg, Russia, June 22, 2019.
Geometry & Algebra Seminar, U. Stockholm/KTH, Stockholm, Sweden, June 20, 2019.
PIMS Postdoctoral Training School on Hodge Theory and Stochastic Dynamics, Edmonton, Canada, March 11-15, 2019.
Stony Brook University Algebraic Geometry Seminar, Oct. 17, 2018.
"Periods and L-values of motives", Schloß Elmau, April 29 – May 5, 2018.
"Modern Geometry (celebrating P. Griffiths's 80th)", Miami, Feb. 28 – March 4, 2018.

"Periods and Regulators", Hausdorff Institute of Mathematics, Bonn, Jan. 15-19, 2018.
Cohomological Methods in Geometry (minicourse), Freiburg, Oct. 9-13, 2017.
Higher School of Economics and Steklov Inst. (2 talks), Moscow, July 31-Aug. 1, 2017.
Hodge Theory, Moduli, and Representation Theory, Stony Brook, Aug. 14-18, 2017.
Second Mathematical Congress of the Americas (semi-plenary talk), July 23-28, 2017.
Workshop on Flag Domains and Cycle Spaces, Korea Institute of Advanced Study, Seoul, Korea, May 22-26, 2017.
Duke University Geometry Seminar, May 1, 2017.
Purdue University Algebraic Geometry Seminar, March 22, 2017.
"Amplitudes: practical and theoretical developments", Mainz Institute of Theoretical Physics, Mainz, Germany, Feb. 6-10, 2017.
Institute Henri Poincaré (seminar talk), Paris, Jan. 17, 2017.
"Arithmetic and Algebraic Geometry", University of Tokyo, Dec. 12-15, 2016.
"Modular forms in string theory", BIRS, Banff, Canada, Sept. 25-30, 2016.
Fields Institute Workshop on "Calabi-Yau varieties: arithmetic, geometry, physics", Sussex, UK, June 20-25, 2016.
GANITA workshop, Fields Institute, June 13-17, 2016.
Conference on "Arithmetic L-functions and differential geometric methods (Regulators IV)", Paris, France, May 23-28, 2016.
Workshop on Hodge Theory, Simons Center, Stony Brook Univ., March 15-17, 2016.
Workshop on Hodge Theory, Moduli and Representation Theory, Texas A&M, Jan. 13-17, 2016.
Workshop on Algebraic Varieties, Fields Institute, Toronto, Nov. 21-22, 2015.
Algebraic Geometry Seminar, Univ. Illinois – Chicago, Oct. 21, 2015.
Group, Lie and Number Theory Seminar, University of Michigan, Ann Arbor, Sept. 28, 2015.
Workshop on Hodge Theory and H-Surfaces, IAS, Princeton, NJ, June 3-4, 2015.
Algebraic Geometry Seminar, Univ. California – San Diego, May 15, 2015.
Math Department Colloquium, Rutgers Univ. – Newark, May 6, 2015.
Workshop on Hodge Theory, Moduli, and Representation Theory, Stony Brook Univ., Jan. 4-9, 2015.
"Cohomological Realizations of Motives", BIRS, Banff, Canada, Dec. 7-12, 2014.
Valley geometry Seminar, U. Mass – Amherst, Nov. 21, 2014.
AMS meeting, special sessions on "Mirror Symmetry" and "Geometry and Combinatorics on Homogeneous Spaces", UNC-Greensboro, Nov. 8-9, 2014.
Workshop on Fundamental Groups and Periods, Institute for Advanced Study, Princeton, Oct. 13-17, 2014.
"Algebraic Varieties: Bundles, Topology, Physics", VBAC, Freie Univ. Berlin, Sept. 1-5, 2014.
Workshop on Hodge Theory, Moduli, and Representation Theory, Texas A&M, Sept. 14-19, 2014.
Univ. of Alberta Geometry Seminar, June 23, 2014.
Texas A&M Algebraic Geometry Seminar, May 29, 2014.
Oregon State Math. Deptartment Colloquium, May 12, 2014.
Workshop on "Hodge Theory in String Theory", Fields Inst. (Toronto, Canada), Nov. 18-22, 2013.
Mathematical Congress of the Americas, Special Session on "Contemporary Trends in Algebraic Geometry and K-Theory", Guanajuato, Mexico, Aug. 5-9, 2013.
"Polylogarithms as a Bridge Between Number Theory and Particle Physics", Durham, UK, July 3-12, 2013.
Summer school and conference on "Recent Advances in Hodge Theory: Period Domains, Algebraic Cycles, and Arithmetic" (3 talks), UBC (Vancouver, Canada), June 10-20, 2013.
"Moduli Spaces and their Invariants in Mathematical Physics", CRM (Montreal, Canada), June 3-14, 2013.
Univ. of Maryland Math Department Colloquium, March 13, 2013.
Workshop on "Algebraic cycles, motives, and geometry", UNAM, Mexico City, Feb 18-23, 2013.
Université Paris XIII Math Department Seminar, Jan. 9, 2013.
Southern Illinois Univ. Carbondale Math Department Seminar, Nov. 13, 2012

AMS meeting, session on "Motives, Algebraic Cycles and K-Theory", University of Arizona, October 27-28, 2012.
Canadian Number Theory Association XII Meeting, Special Session on Number Theory and Physics, University of Lethbridge, June 17-22, 2012
NSF/CBMS Conference on "Hodge Theory, Complex Geometry, and Representation Theory" (2 talks), Texas Christian University, June 18-22, 2012
Texas A&M Working Seminar in Geometry (5 talks), May 14-18, 2012
Special Number Theory Seminar, Institute for Advanced Study, Princeton, March 30, 2012
Algebra, Geometry, and Physics Seminar, Stony Brook University, March 14, 2012
"Arithmetic and Geometry of Algebraic Varieties", Fields Institute, Nov. 19-20, 2011
Conference on the Arithmetic and Geometry of K3 Surfaces and CY Threefolds, Fields Institute, Aug 16-25, 2011
"Number Theory and Physics at the Crossroads", BIRS (Banff), May 8-13
Show-me Algebraic Geometry Conf., Columbia, MO, May 7-8, 2011
Texas A&M Geometry Seminar, Feb. 7, 2011
Purdue Algebraic Geometry Seminar, Jan. 19, 2011
AMS meeting, session on "Number Theory and Physics", Notre Dame, Nov. 6, 2010
"Regulators III" Conference, Barcelona, July 12 - July 22, 2010
ICTP Summer School on Hodge Theory (7 talks), ICTP (Trieste), June 14 - July 3, 2010
University of Cambridge Geometry Seminar, May 19, 2010
Washington University Colloquium and Algebraic Geometry seminar, Jan. 25-26, 2010
University of Alberta Colloquium and Algebra Seminar, Jan. 18-19, 2010
University of Alberta Algebra Seminar, Nov. 30, 2009
Oxford University Algebraic Geometry Seminar, Oct. 13, 2009
Workshop on Homological Mirror Symmetry and Hodge Theory, Universität Wien (3 talks), Aug. 8-12, 2009
Hodge Theory and Algebraic Geometry, A Symposium in Honor of S. Usui, RIMS (Kyoto, Japan), June 23-July 3, 2009
Michigan State University Colloquium and Algebra Seminar, April 23-24, 2009
Durham Arithmetic Study Group (3 talks), Feb.-March 2009
MPIM-Bonn Number Theory Seminar, Jan. 12, 2009
Universität Wien, Jan. 7, 2009
University of Exeter Colloquium, Nov. 27, 2008
University of Bristol Colloquium, Nov. 26, 2008
Cambridge Geometry Seminar, Nov. 12, 2008
COW/Geometry-Topology Seminar, Imperial College London, Nov. 6, 2008
Algebraic and Differential Geometry, A Conference in Celebration of the 70th Birthday of Phillip Griffiths, IAS, Oct. 16-17, 2008
BIRS Workshop (Banff, AB, Canada), Number Theory and Physics at the Crossroads, Sept. 21-26, 2008
MSRI Workshop (Berkeley, CA), Topology of Stratified Spaces, Sept. 8-12, 2008
University of Washington (US), Superseminar, April 17, 2008
University of Alberta (Canada), Conference on Regulators and heights in Algebraic Geometry, April 11-16, 2008
BIRS Workshop on Hodge Theory, April 6-11, 2008
University of Chicago Algebra Seminar, April 2, 2008
University of Durham Colloquium, Jan. 2008
University of Washington conference on $K3$ surfaces and string dualities (4 talks), July 2007
University of Durham, May 18, 2007
"Moduli of Curves and Abelian Varieties", Athens, GA, April 2007
University of Wisconsin Geometry Seminar, March 2, 2007
Georgia Tech Algebra Seminar, February 5, 2007
Johns Hopkins University Colloquium, January 25, 2007

Purdue University Algebraic Geometry Seminar, January 10, 2007
CMS Conference, workshop on C-Y Varieties and Mirror Symmetry, Toronto, Dec. 7, 2006
Texas A&M University, October 13, 2006
Universität Mainz (2 talks), June-July 2006
Motives and Periods Conference, PIMS/UBC, June 7, 2006
Ohio State University Algebraic Geometry Seminar, May 18, 2006
University of Chicago Algebraic Geometry Seminar, April 26, 2006
UIC Algebraic Geometry Seminar, April 17, 2006
Fields Institute Weekend Seminar, March 5, 2006
University of Washington Special Seminar, February 23, 2006
MPIM-Bonn Number Theory Seminar, August 17, 2005
University of Durham, August 9, 2005
MPIM-Bonn IMPRS Seminar, July 22, 2005
Insitut de Jussieu, July 4, 2005
Universita di Roma ("La Sapienza"), June 21, 2005
Variations on Mahler Measure, CIRM-Luminy, May 31-June 4, 2005
Antalya Algebra Days, May 17-23, 2005
Bilkent University (3 talks), May 2005
Purdue University Algebraic Geometry Seminar, November 17th, 2004
University of Chicago Algebraic Geometry Seminar, November 10th, 2004
University of Washington Algebra Seminar, November 2nd, 2004
UCLA Perspectives in Mathematics Seminar, April 12th, 2004
Fields Institute Weekend Seminar, March 27-28, 2004
Lehigh University Math Department, February 12-13, 2004
Ohio State University Math Department, February 4, 2004
BIRS Workshop, Calabi-Yau Varieties and Mirror Symmetry, December 6-11, 2003
Summer School on the Arithmetic, Geometry, and Topology of Algebraic Cycles, UNAM-Morelia (3 hour talks), June 15-July 4, 2003
Conference on Web Theory and Differential Equations, CIRM-Luminy, March 31–April 4, 2003
University of Alberta Math Department, April 5, 2002
Brown University Math Department, January 25, 2002
Johns Hopkins Algebraic Geometry Seminar, January 24, 2002
Summer School on Transcendental Aspects of Algebraic Cycles, Université de Grenoble, June 18-July 6, 2001

Teaching:

Courses at WUSTL: Algebraic Cycles and Representation Theory, Hodge Theory, Graduate Complex Analysis I/II (4 times), Graduate Algebra I/II (3/4 times), Calculus II (2 sections), Calculus III (4 sections), Matrix Algebra (5 sections), Honors Mathematics I/II (twice), Calculus of Several Variables, Linear Algebra (twice); Undergraduate and Graduate Algebraic Geometry; Graduate Professional Development; developed and taught Number Theory and Cryptography (4 times)

Expository book projects, available on webpage:

- Advanced Linear Algebra (291 pp.), written Fall 2002 and Spring 2023
- Introductory Algebraic Geometry (450^+ pp.), written 2009-10 and 2022-26
- Graduate Algebra I and II (508 pp.), 2020-21
- Graduate Complex Analysis I and II (in progress), 2026
- Number Theory and Cryptography (250 pp.), Fall 2016
- Hodge Theory and Algebraic Cycles (handwritten), Fall 2011 and Fall 2015

Presenter at Littlebrook Elementary Science Expo, Princeton, NJ, May 21, 2015
Alberta Science and Math Initiative (5 talks to high school students), Univ. of Alberta, July 2011 and August 2014

Courses taught at Durham: Algebraic Geometry, Number Theory III/IV, Algebra and Number Theory II; ANT II and SMA (Calculus) tutorials
Supervised five Masters' theses (Project IV) at Durham (one co-supervised with H. Gangl); two were selected as best project in maths department (2008, 2009)
Courses taught at Chicago: Basic Algebra I, Complex Analysis, Honors Calculus III, Summer REU class on Algebraic Curves, Calculus II, Algebraic Curves.
Courses taught at UCLA (5/yr.): Finite Math, Calculus for Life Science, Multivariable Calculus, Honors Linear Algebra, Analysis, Differential Geometry, Game Theory; 10 lectures in graduate Hodge-theory seminar.
Teaching Assistant, Princeton University Mathematics Department, 2000-2002

Advising:

Current Ph.D. Students:
- Udit Pudipeddi (2nd year)
- Rachel Wu (5th year), co-advised with L. Escobar (UCSC)

Past Ph.D. Students:
- Ryan Keast (grad. May 2016, followed by postdoc at Univ. of Toronto)
  Thesis: "Some results in higher weight Hodge theory"
- Genival da Silva Jr. (grad. May 2016, postdoc at Imperial, now TT faculty at TAMU-SA)
  Thesis: "On the limiting behavior of variations of Hodge structure"
- Yu Yang (grad. January 2017, followed by internship at China Securities (Beijing))
  Thesis: "Explicit bases of motives over number fields with applications to Feynman integrals"
- Muxi Li (grad. May 2018, now postdoc at USTC)
  Thesis: "Regulators on higher Chow cycles"
- Tokio Sasaki (grad. May 2019, now postdoc at U. Miami)
  Thesis: "Limits and singularities of normal functions"
- Ben Castor (grad. May 2022, now postdoc at Kenyon College)
  Thesis: "Bounding projective hypersurface singularities"
- Haohua Deng (grad. May 2022, now postdoc at Duke)
  Thesis: "Hodge-theoretic compactification of period maps"
- Soumya Sinha Babu (grad. May 2022, now postdoc at U. Georgia)
  Thesis: "Quantum curves and asymptotic Hodge theory"
- Xiaojiang Cheng (grad. May 2024, now postdoc at YMSC (Beijing))
  Thesis: "Hodge classes in the cohomology of local systems"
- RJ Acuña (grad. May 2025)
  Thesis: "Studies in algebraic cycles: Hodge theory of degenerations, regulators, and cluster varieties"
- Devin Akman (grad. May 2026)
  Thesis: "Finiteness of torsion loci and normal functions arising from cycles on Hadamard products"

Postdoctoral mentees:
- Jay Yang (2022-2025; now at Vanderbilt)
- Humberto Diaz (2019-2022; now at NSA)
- Patricio Gallardo (2017-19; now TT faculty at UC-Riverside)
- Ivan Horozov (2011-15; now TT faculty at CUNY-Bronx)

Undergraduate research students: Patrick Lopatto (research project + published paper); Thomas Morrell, Ethan Farber, Joe Foster, Calvin Henaku, Andy Parks, and Yibo Wang (senior theses)
Masters' theses at Durham: Stephanie Belcher, Andrew Strangeway, Thomas Oliver, Adam Watts, Jason de Carvalho

Conferences Organized:

"Hodge theoretical and combinatorial aspects of mirror symmetry" (with L. Bossinger, A. Corti, and L. Escobar), Casa Matemática Oaxaca, Aug. 2-7, 2026.

Special Session on "Algebraic Cycles, Hodge Theory, and Arithmetic" (with D. Akman and W. Li) AMS Central Sectional Meeting, Saint Louis University, October 18-19, 2025.

"Western Algebraic Geometry Symposium" (with R. Beheshti and W. Li), St. Louis, November 4-5, 2023.

"Spectral Theory, Algebraic Geometry, and Strings" (with C. Doran, A. Grassi, H. Jockers and M. Mariño), Mainz Institute of Theoretical Physics, June 19-23, 2023.

"Algebraic Geometry and Algebraic K-Theory" (with R. Beheshti and J. Shareshian), St. Louis, May 23-25, 2022.

"I-70 Algebraic Geometry Symposium" (with R. Beheshti and M. Kumar), St. Louis, Nov. 2-3, 2019.

"Symposium on Hodge Theory, Arithmetic, and Geometry" (with C. Doran, M. Lalin, J. Lewis, and G. Pearlstein), Pacific Inst. of Mathematical Sciences, UBC, Vancouver, May 13-17, 2019.

"PIMS Postdoctoral Training School on Stochastic Dynamics and Hodge Theory" (with C. Doran and G. Pearlstein), Edmonton, March 11-15, 2019.

"Algebraic varieties, Hodge theory and motives" (with J. Lewis, G. Pearlstein and N. Yui), Fields Institute, Toronto, March 19-22, 2018.

"Hodge theory, moduli, and representation theory" (with P. Brosnan, R. Laza, G. Pearlstein, and C. Robles), Simons Center for Geometry and Physics, Stony Brook, August 14-18, 2017.

Special session on "Motives and periods" (with C. Doran and J. Lewis), 2nd Mathematical Congress of the Americas, Montreal, July 24-28, 2017.

Workshop on Algebraic Varieties (with P. Brosnan, J. Lewis, G. Pearlstein, C. Robles and N. Yui) Fields Institute, Toronto, March 9-12, 2017.

FRG Workshop on Hodge Theory and Period Integrals, Washington University in St. Louis, January 4-8, 2017.

CRM Workshop on "Algebraic cycles and moduli" (with P. Brosnan, M. Lalin, R. Laza, J. Lewis, G. Pearlstein and C. Robles), Montreal, June 2-8, 2016.

FRG Workshop on Hodge Theory and Representation Theory, Washington University in St. Louis, April 25-29, 2015.

Special session on "Algebraic Cycles and Coherent Sheaves" (with R. Beheshti and M. Kumar), AMS Central Sectional Meeting, Washington Univ., St. Louis, Nov. 18-20.

Summer School and Conference on "Recent Advances in Hodge Theory: Period Domains, Algebraic Cycles, and Arithmetic" (with J. Lewis and G. Pearlstein), Pacific Institute of Mathematical Sciences, UBC, Vancouver, June 10-20, 2013.

BIRS Workshop on "Hodge Theory and String Duality" (with A. Clingher, C. Doran, and J. Walcher), Banff, Dec. 4-9, 2011.

Academic Service:

Director of Graduate Studies, Washington University Mathematics Department, July 2026 –

Washington University Math Circle: Nov. 14, 2010; Oct. 2, 2011; Oct. 7, 2012; Feb. 9, 2014; Oct. 25, 2015; April 9, 2017 (with T. Sasaki); March 25, 2018; March 31, 2019; Nov. 1, 2020; Apr. 30, 2023; March 24, 2024; April 5, 2025; April 2, 2026.

Member, HHMI-IE Steering Committtee and Committee for Latinx Student Issues, Washington University, 2020-21.

Member, STEM-HLC Committee, Washington University, 2019-20 and 2022-23.

Organizer of WUSTL Arithmetic & Algebraic Geometry Seminar and yearly reading seminars; organized Roever Colloquium (2018) and Kirk Lecture (2011,2026); Math Club supervisor, 2012-13; Graduate Colloquium organizer, 2013-14 and 2019-20; Putnam practice supervisor, Fall 2016

Member of Math. Dept. Hiring Committee (2013-14; 2020-21 [co-chair], 2024-25), Undergraduate Committee (2023-24), Graduate Committee (2011-12; 2015-16; 2022-23; 2025-), Colloquium Committee (2025-26); and Executive Committee (2020-21; 2022-25; 2026-).

Chair, WUSTL Math. Dept. Postdoctoral Hiring Committee, 2010-11 and 2016-17.

Reviewing Editor, *Experimental Results* (Cambridge Univ. Press), 2019-2023.

Referee for papers submitted to American Journal of Mathematics, Journal of Number Theory, Mathematical Research Letters, Journal of Algebraic Geometry, Advances in Theoretical and Mathematical Physics, Nagoya Mathematical Journal, Journal of the London Math. Society, Mathematische Annalen, Mathematische Zeitschrift, Manuscripta Math., Canadian Math. Bulletin, Proceedings of the AMS, Communications in Number Theory and Physics, Duke Math. Journal, Journal of K-theory, Selecta Mathematica, Advances in Math, Bol. Soc. Mat. Mexicana, IMRN, Comptes Rendus, SIGMA, Compositio Math., Exp. Math., Inventiones Math., Algebra & Number Theory, Crelle, PNAS, Documenta Math.

NSF panelist (2012, 2015, 2026) and referee for three other funding bodies

Reviewer for AMS Mathscinet, including book review ("Mixed Hodge Theory" by C. Peters and J. Steenbrink)

Co-Organizer (with V. Kurlin): Durham Univ. Pure Maths Colloquium, Fall 2008-Spring 2010

MAGIC Coordinator, Durham University, Fall 2009 - Spring 2010

Member of 18 Ph.D. committees (14 at WUSTL, 1 each at Durham, Oxford, SISSA, Paris–Saclay)

Principal Organizer: University of Chicago Algebraic Geometry Seminar, Winter-Spring 2007

Registered as Undergraduate and Graduate Mentor, National Alliance for Doctoral Studies in the Mathematical Sciences