PAUL MATTHEW NIALL FEEHAN

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Personal website:	https://sites.math.rutgers.edu/~feehan
arXiv:	https://arxiv.org/a/feehan_p_1.html
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MathSciNet:	https://mathscinet.ams.org/mathscinet/search/author.html?mrauthid=602267
Google Scholar:	https://scholar.google.com/citations?hl=en&user=mNqd7H4AAAAJ
ResearchGate:	https://www.researchgate.net/profile/Paul-Feehan

RESEARCH INTERESTS

Geometric analysis, especially: non-linear elliptic and parabolic partial differential equations; global analysis; differential geometry and mathematical physics; Yang–Mills gauge theory; applications to the topology of three and four-dimensional manifolds; algebraic, analytic, and symplectic geometry; geometric flows.

EDUCATION

- **Columbia University**, New York, New York
  Doctor of Philosophy in Mathematics   1992
  (*Advisor*: Duong Hong Phong)
- Master of Philosophy in Mathematics   1988
- **University of Southern California**, Los Angeles, California
  Master of Arts in Mathematics   1987
- **University of Missouri**, Rolla, Missouri
  Master of Science in Electrical Engineering   1984
- **University College Dublin**, Dublin, Ireland
  Bachelor of Engineering in Electronic Engineering (First class honors)   1982

ACADEMIC APPOINTMENTS

Full-Time Academic Appointments

- **Rutgers, The State University of New Jersey**, New Brunswick, New Jersey
  Distinguished Professor of Mathematics   2022–
  Professor of Mathematics   2014–2022
  Associate Professor of Mathematics   2001–2014
- **University of Dublin (Trinity College)**, Dublin, Ireland
  Professor of Mathematics (1762 Erasmus Smith Chair)   2000–2001
- **Ohio State University**, Columbus, Ohio
  Associate Professor of Mathematics   2000–2001
  Assistant Professor of Mathematics   1997–2000
- **Harvard University**, Cambridge, Massachusetts
  National Science Foundation Postdoctoral Fellow   1993–1997
  (*Mentor:* Clifford Henry Taubes)
- **Mathematical Sciences Research Institute**, Berkeley, California
  Postdoctoral Research Fellow   1992–1993

Honorary Academic Appointments

- **Dublin Institute for Advanced Study**, Ireland
  Honorary Adjunct Professor, School of Theoretical Physics   2021–
  Research Associate, School of Theoretical Physics   2016–2021

Visiting Appointments and Invited Short Research Visits

- Research Professor, Mathematical Sciences Research Institute, Berkeley
- (*Analytic and Geometric Aspects of Gauge Theory*)   Sept–Dec 2022
- Max Planck Institut für Mathematik, Bonn (postponed)   August 2021
- Mathematisches Forschungsinstitut Oberwolfach   July 2021
  (*Partial Differential Equations*)
- Simons Center for Geometry and Physics, Stony Brook   January 2021
  (*Floer homology in low-dimensional topology*)
- Eidgenössische Technische Hochschule (ETH) Zürich (postponed)   June 2020
- Max Planck Institut für Mathematik, Bonn (postponed)   May 2020
- Princeton University, Visiting Professor of Mathematics   July 2019–June 2020
- Mathematisches Forschungsinstitut Oberwolfach   July 2019
  (*Partial Differential Equations*)
- Institute for Mathematical Sciences, Chinese University of Hong Kong January 2018
- Isaac Newton Institute for Mathematical Sciences, Cambridge   August 2017
- Institute for Advanced Study, Princeton (Summer Collaborator Program) July 2017
- Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette   June 2017
- Simons Center for Geometry and Physics, Stony Brook   October 2017
  (*Geometry of Manifolds*)
- Simons Center for Geometry and Physics, Stony Brook   Jan–April, 2017
  (*Gauge Theory and Low Dimensional Topology*)
- Mathematisches Forschungsinstitut, Oberwolfach (Research in Pairs)   August 2016
- Institute for Advanced Study, Princeton (Competitive Fellowship Leave) Sept 2015–July 2016
- Mathematisches Forschungsinstitut, Oberwolfach (Partial Differential Equations) August 2015
- Isaac Newton Institute for Mathematical Sciences, Cambridge   July 2015
- Max Planck Institut für Mathematik, Bonn   June–August 2015
- Max Planck Institut für Mathematik, Bonn   January 2015
- Centre for Quantum Geometry of Moduli Spaces, Aarhus   August 2014
- Hausdorff Research Institute for Mathematics, Bonn   July 2014
- Isaac Newton Institute for Mathematical Sciences, Cambridge   June 2014
- Mittag-Leffler Institute, Stockholm   January 2014
- Max Planck Institut für Mathematik, Bonn   June–August 2013
- Columbia University, Visiting Associate Professor of Mathematics   July 2012–June 2013
- Max Planck Institut für Mathematik, Leipzig   January 2013
- Max Planck Institut für Mathematik, Leipzig   May–August 2012
- JP Morgan, New York, NSF academic-industry cooperation program   Mar 2005–2006
- Bloomberg, New York, NSF academic-industry cooperation program   Jun 2004–Feb 2005
- Max Planck Institut für Mathematik, Bonn   January 2005
- Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette   August 2004
- Max Planck Institut für Mathematik, Bonn   January 2004
- Max Planck Institut für Mathematik, Bonn   July 2003
- Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette   August 2003
- Max Planck Institut für Mathematik, Bonn   January 2003
- Max Planck Institut für Mathematik, Bonn   June–September 2001
- Max Planck Institut für Mathematik, Bonn   March–September 2000
- Max Planck Institut für Mathematik, Bonn   September 1999
- Institute for Advanced Study, Princeton   1998–1999
- Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette   July–September 1998
- Max Planck Institut für Mathematik, Bonn   April–June 1998

HONORS
- Fellow of the American Mathematical Society, 2019 – For contributions to gauge theory

EXTERNAL RESEARCH GRANTS

External Research Grants Pending

- NSF DMS-2406889, Geometric Analysis program, "Collaborative research: Analysis, gauge theory, and applications to geometry and topology", June 1, 2024 through May 31, 2027, $416,258 (principal investigator)
- Simons Foundation Collaboration Grants for Mathematicians, "Analysis, gauge theory, and applications to geometry and topology", September 1, 2024, through August 31, 2029, $35,000 (principal investigator)

External Research Grants Awarded

- NSF DMS-2154782, Geometric Analysis program, "Rutgers Geometric Analysis Conference: May 16-20, 2022", May 1, 2022 through April 30, 2023, $30,000 (principal investigator)
- NSF DMS-2154823, Geometric Analysis program, "Frontiers in Geometry Conference at ICTP in Trieste: August 1-12, 2022", July 1, 2022 through June 30, 3023, $38,400 (principal investigator)
- Simons Foundation Collaboration Grants for Mathematicians, "Instantons, monopoles, and low-dimensional topology", September 1, 2021, through August 31, 2026, $42,000 (principal investigator)
- NSF DMS-2104865, Geometric Analysis program, "Collaborative research: Geometric analysis, monopoles, and applications to low-dimensional topology", June 1, 2021 through May 31, 2024, $283,583 (principal investigator)
- NSF DMS-1713013, Probability program, "Mathematical finance, probability, and partial differential equations conference", May 1, 2017 through April 30, 2018, $20,000 (principal investigator)
- NSF DMS-1611717, Geometric Analysis program, "Geometric analysis conferences and seminars: October 27-28, 2016, 2017, and 2018", July 1, 2016 through June 30, 2022, $30,000 (principal investigator)
- Simons Foundation Collaboration Grants for Mathematicians, "Partial differential equations in geometric analysis", September 1, 2015 through August 31, 2020, $35,000 (principal investigator)
- NSF DMS-1510064, Geometric Analysis program, "Collaborative research: instantons, monopoles, and relations among their Invariants", June 1, 2015 through July 31, 2019, $211,158 (principal investigator)
- NSF DMS-1266145, Analysis program, conference grant, "Analysis, complex geometry, and mathematical physics", January 1, 2013 through December 31, 2013, $49,990 (co-principal investigator)
- NSF DMS-1237722, Applied mathematics program, conference grant, "AMC-SS: mathematical finance and partial differential equations conference", September 1, 2012 through August 31, 2013, $25,000 (principal investigator)
- NSF DMS-1059206, Applied mathematics program, conference grant, "Conference on mathematical finance and partial differential equations", December 1, 2010 through May 31, 2012, $20,000 (principal investigator)
- NSF DMS-0408269, Interdisciplinary grants in mathematical sciences program, "Mathematical finance", June 1, 2004 through May 31, 2008, $100,000 (principal investigator)
- NSF DMS 0125170, Geometric analysis program, "Gauge theory and low-dimensional topology", July 1, 2001 through June 30, 2004, $95,550000 (principal investigator)
- Enterprise Ireland basic research grant (Mathematics), 2001, €100,000 (principal investigator)
- NSF DMS 9704174, Geometric analysis program, "Gauge theory and the topology of smooth four-manifolds", June 1, 1997 through May 31, 2000, $75,000 (principal investigator)
- NSF Mathematical Sciences Postdoctoral Fellowship, July 1, 1993 through June 30, 1997

ACADEMIC SERVICE

Conferences Co-Organized

- "Geometric analysis", Rutgers University, New Brunswick, New Jersey, May 15-16, 2023
- "Frontiers in Geometry and Topology: Summer School and Research Conference", International Centre for Theoretical Physics, Trieste, Italy, August 1-12, 2022
- "Geometric analysis", Rutgers University, New Brunswick, New Jersey, May 16-19, 2022
- "Geometric analysis and low-dimensional topology", special session, AMS Spring Eastern Sectional Meeting (online), March 19-20, 2022
- "Geometric analysis and partial differential equations", mini-symposium, SIAM conference on analysis of partial differential equations, Berlin, Germany, March 14-18, 2022
- "Geometric analysis and applications to low-dimensional topology", mini-symposium, Eighth European Congress of Mathematicians, Portoroz, Slovenia, June 20-26, 2021
- "Geometric analysis", Rutgers University, New Brunswick, New Jersey, May 17-21, 2021
- "Gauge theory, geometry, and low-dimensional topology", special session, AMS Spring Eastern Sectional Meeting (formerly at Brown University), March 20-21, 2021
- "Gauge theory and partial differential equations", mini-symposium, SIAM conference on analysis of partial differential equations, La Quinta, California, December 11-15, 2019
- "Geometric analysis", Rutgers University, New Brunswick, New Jersey, November 14-16, 2018
- "Geometric analysis", Rutgers University, New Brunswick, New Jersey, November 16-17, 2017
- "Mathematical finance, probability, and partial differential equations", May 17-19, 2017
- "Geometric analysis", Rutgers University, New Brunswick, New Jersey, October 27-28, 2016
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, May 2016
- "Partial differential equations and geometric analysis", mini-symposium, SIAM conference on analysis of partial differential equations, Scottsdale, Arizona, December 2015
- "Geometric analysis", special session, AMS Fall Eastern Sectional Meeting, Rutgers University, New Brunswick, New Jersey, November 14-15, 2015
- "Geometric analysis", Rutgers University, New Brunswick, New Jersey, November 12-13, 2015
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, May 2015
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, November 2014
- "Free boundary and obstacle problems for nonlinear and non-local operators", mini-symposium, SIAM conference on analysis of partial differential equations, Lake Buena Vista, Florida, December 2013
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, November 2013
- "Partial differential equations, stochastic analysis, and applications to mathematical finance", special session, AMS Fall Eastern Sectional Meeting, Philadelphia, Pennsylvania, October 2013
- "Martingale and stochastic representation problems for degenerate differential operators", special session, 36th Conference on Stochastic Processes and their Applications, Boulder, Colorado, July 2013
- "Mathematical finance, stochastic analysis, and partial differential equations", special session, Joint International Meeting of the AMS and the Romanian Mathematical Society, Alba Iulia, Romania, June 2013
- "Analysis, complex geometry, and mathematical physics: a conference in honor of D. Phong", Columbia University, New York, May 2013
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, November 2012
- "Mathematical Finance, stochastic analysis, and degenerate partial differential equations", SIAM conference on financial mathematics and engineering, Minnesota, Minnesota, July 2012
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, November 2011
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, November 2010
- "Mathematical finance and partial differential equations", New Brunswick, New Jersey, November 2009
- SIAM conference on financial mathematics and engineering, New Brunswick, New Jersey, November 2008

Seminars Co-Organized

- **"**Applied mathematics colloquium" (with Waheed Bajwa), Rutgers University   2023–
- **"**Gauge theory learning seminar" (with Izar Alonso Lorenzo), Rutgers University   2023–

- **"Geometric analysis"** (with Natasa Sesum and Daniel Ketover), Rutgers University   2014–
- **"Mathematical finance, probability, and PDE seminar"**, Rutgers University   2007–2014
- **"Gauge theory and topology seminar"**, University of Dublin, Ireland   2000–2001
- **"Analysis and geometry seminar"**, Ohio State University, Columbus   1997–2000

Service to the Profession

- Editorial work:

  - P. M. N. Feehan, J. Song, B. Weinkove, and R. A. Wentworth (editors), *Analysis, Complex Geometry, and Mathematical Physics: A Conference in Honor of Duong H. Phong*. Contemporary Mathematics Series, volume **644**, American Mathematical Society, Providence, RI, 2015, http://dx.doi.org/10.1090/conm/644.

- Journal and book reviewing:

  - American Mathematical Society – Graduate Studies in Mathematics, Annales de l'Institut Henri Poincaré (C) Analyse Non Linéaire, Annals of Global Analysis and Geometry, Annals of Mathematical Studies, Bulletin of the Iranian Mathematical Society, Commentarii Mathematici Helvetici, Communications in Analysis and Geometry, Communications in Mathematical Physics, Comptes Rendus Mathematique , Crelle's Journal, Differential Geometry and its Applications, Forum Mathematicum, Geometria Dedicata, Geometry and Topology, Glasgow Mathematical Journal, Indiana University Journal of Mathematics, International Journal of Mathematics, Journal of Differential Geometry, Journal of Geometric Analysis, Journal of Geometry and Physics, Journal of Geometry and Topology, Journal of Nonlinear Analysis, Journal of Quantitative Finance, Journal of Statistical Physics, Mathematics Research Letters, Pacific Journal of Mathematics, SIAM Journal of Optimization and Control, Topology and its Applications.

- Grant proposal reviewing:

  - NSF Division of Mathematical Sciences
    - Panel reviewer for CAREER research proposals
    - Panel and external ad hoc reviewer for regular research and graduate program proposals
  - Simons Foundation Collaboration Grants
  - Swiss National Science Foundation

- Professional society administration:

  - SIAM Financial Mathematics Activity Group, program director   2006–2008

- External Reviewer

  - Department of Mathematics, KTH Royal Institute of Technology, Stockholm   Spring 2021
  - Department of Mathematics, Baruch College, City University of New York   Spring 2016

Membership on Doctoral Dissertation Defense Committees

- Phi Long Nguyen Thanh (Advisor: Professor Duong H. Phong, Department of Mathematics, Columbia University, New York, New York)   April 2003
- Adrian Clingher (Advisor: Professor John W. Morgan, Department of Mathematics, Columbia University, New York, New York)   April 2002

Membership on Ph.D. Oral Exam Committees

- Alexander Zarechnak (Advisor: Professor Sheldon Goldstein, Department of Mathematics, Rutgers University, New Brunswick) May 2003
- Qinian Jin (Advisor: Professor Yanyan Li, Department of Mathematics, Rutgers University, New Brunswick) February 2003

Department of Mathematics, Rutgers University

- Graduate Vice-Chair   2020–
- Diversity and Inclusion Committee   2020–
- Graduate Committee (*ex-officio*)   2020–
- Personnel Planning and Policy Committee (*ex-officio*)   2020–
- Graduate Committee (Geometry & Topology)   2018–2020
- Personnel Planning and Policy Committee (Geometry & Topology)   2017–2019
- Personnel Planning and Policy Committee (At Large)   2016–2017
- Personnel Planning and Policy Committee (Geometry & Topology)   2014–2015
- Search Committee Chair, Mathematical finance and stochastic analysis   2012–2016
- Program Director and Founder, mathematical finance master's program   2005–2019
- Computer Advisory Committee   2002–2004
- Written Qualifying Exam Committee   2001–2003
- Colloquium Committee   2001–2004

School of Graduate Studies, Rutgers University

- Executive Council, School of Graduate Studies   2020–
- Mathematics and Physical Sciences Area Committee   2007–2009

School of Arts and Sciences, Rutgers University

- Advisory Committee for Appointments and Promotions   2015–2017

Association of Members of the Institute for Advanced Study (AMIAS), Princeton

- Elected Member of the Board of Trustees (Mathematics)   2016–2019

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Mathematical Society
- Association for Women in Mathematics
- European Mathematical Society
- Mathematical Association of America
- National Association of Mathematicians
- Society for Industrial and Applied Mathematics

PUBLICATIONS

Doctoral Dissertation and Master's Thesis

1. P. M. N. Feehan, *Geometry of the moduli space of self-dual connections over the four-sphere*, Ph.D. thesis, Columbia University, New York, New York, 1992, v+86 pages. (Advisor: Duong Hong Phong.) https://www.proquest.com/docview/303986746
2. P. M. N. Feehan, *An investigation of methods of surface estimation with application to the interpolation of antenna patterns*, University of Missouri, Rolla, Missouri, 1984, xix+212 pages (Advisor: William H. Tranter), https://scholarsmine.mst.edu/masters_theses/192.

Published Authored Research Monographs (Refereed)

1. P. M. N. Feehan and T. G. Leness, *Virtual Morse–Bott index, moduli spaces of pairs, and applications to topology of four-manifolds*, Memoirs of the American Mathematical Society, xx + 366 pages, to appear, https://arxiv.org/abs/2010.15789
2. P. M. N. Feehan and T. G. Leness, *An SO(3)-monopole cobordism formula relating Donaldson and Seiberg–Witten invariants*, Memoirs of the American Mathematical Society, volume 256, number 1226, American Mathematical Society, Providence, RI, 2018, xiv+234 pages, https://doi.org/10.1090/memo/1226, https://arxiv.org/abs/math/0203047.
3. P. M. N. Feehan and M. Maridakis, *Lojasiewicz–Simon gradient inequalities for gradient inequalities for coupled Yang–Mills energy functions,* Memoirs of the American Mathematical Society, volume 267, number 1302, American Mathematical Society, Providence, RI, 2020, xvi+138 pages, https://doi.org/10.1090/memo/1302, https://arxiv.org/abs/1510.03815.

Published Edited Books

1. P. M. N. Feehan, J. Song, B. Weinkove, and R. A. Wentworth (editors), *Analysis, Complex Geometry, and Mathematical Physics: A Conference in Honor of Duong H. Phong*. Contemporary Mathematics Series, volume 644, American Mathematical Society, Providence, RI, 2015, http://dx.doi.org/10.1090/conm/644.

Submitted Authored Research Monographs

1. P. M. N. Feehan, *Global existence and convergence of solutions to gradient systems and applications to Yang-Mills gradient flow,* xx+475 pages, https://arxiv.org/abs/1409.1525. (Submitted, September 4, 2014.)
2. P. M. N. Feehan, *Bialynicki-Birula theory, Morse-Bott theory, and resolution of singularities for analytic spaces,* xii+196 pages, https://arxiv.org/abs/2206.14710. (Submitted June 29, 2022.)
3. P. M. N. Feehan, *Morse theory for the Yang-Mills energy function near flat connections*, 98 pages, https://arxiv.org/abs/1906.03954. (Submitted June 10, 2019.)

Published Journal Articles (Refereed)

1. P. M. N. Feehan, Corrigendum to "Energy gap for Yang-Mills connections, II: Arbitrary closed Riemannian manifolds", Advances in Mathematics, 14 pages, to appear, https://sites.math.rutgers.edu/~feehan.
2. P. M. N. Feehan, *Optimal Lojasiewicz–Simon inequalities and Morse–Bott Yang–Mills energy functions*, Advances in Calculations of Variations **15** (2022), no. 4, 635-671, https://doi.org/10.1515/acv-2020-0034, https://arxiv.org/abs/1706.09349.
3. P. M. N. Feehan, *Perturbations of local maxima and comparison principles for boundary-degenerate linear differential equations*, Transactions of the American Mathematical Society **373** (2020), no. 8, pp. 5275-5332, https://doi.org/10.1090/tran/7246, https://arxiv.org/abs/1305.5098.
4. P. M. N. Feehan, *On the Morse–Bott property of analytic functions on Banach spaces with Lojasiewicz exponent one half*, Calculus of Variations and Partial Differential Equations 59 (2020), no. 2, 50 pages, https://doi.org/10.1007/s00526-020-01734-4, https://arxiv.org/abs/1803.11319.
5. P. M. N. Feehan and M. Maridakis, *Lojasiewicz–Simon gradient inequalities for analytic and Morse-Bott functions on Banach spaces*, Journal für die Reine und Angewändte Mathematik **765** (2020), pp. 35-67, https://doi.org/10.1515/crelle-2019-0029, https://arxiv.org/abs/1510.03817.

6. P. M. N. Feehan, *Resolution of singularities and geometric proofs of the Lojasiewicz inequalities*, Geometry & Topology 23 (2019), no. 7, 3273-3313, http://dx.doi.org/10.2140/gt.2019.23.3273, https://arxiv.org/abs/1708.09775.

7. P. M. N. Feehan and T. G. Leness, *Superconformal simple type and Witten's conjecture*, Advances in Mathematics **356** (2019), 35 pages, https://doi.org/10.1016/j.aim.2019.106821, https://arxiv.org/abs/1408.5085.

8. P. M. N. Feehan and T. G. Leness, *The SO(3) monopole cobordism and superconformal simple type*, Advances in Mathematics **356** (2019), 38 pages, https://doi.org/10.1016/j.aim.2019.106817, https://arxiv.org/abs/1408.5307.

9. P. M. N. Feehan, *Relative energy gap for harmonic maps of Riemann surfaces into real analytic Riemannian manifolds*, Proceedings of the American Mathematical Society **146** (2018), no. 7, pp. 3179-3190, http://dx.doi.org/10.1090/proc/14013, https://arxiv.org/abs/1609.04668.

10. P. M. N. Feehan, *Energy gap for Yang–Mills connections, II: Arbitrary closed Riemannian manifolds,* Advances in Mathematics **312** (2017), 547-587, http://dx.doi.org/10.1016/j.aim.2017.03.023, https://arxiv.org/abs/1502.00668.

11. P. M. N. Feehan, *A classical Perron method for existence of smooth solutions to boundary value and obstacle problems for degenerate-elliptic operators via holomorphic maps*, Journal of Differential Equations **263** (2017), 2481-2553, http://dx.doi.org/10.1016/j.jde.2017.04.003 https://arxiv.org/abs/1302.1849.

12. P. M. N. Feehan and C. A. Pop, *Boundary-degenerate elliptic operators and Hölder continuity for solutions to variational equations and inequalities*, Annales de l'Institut Henri Poincaré (C) Analyse Non Linéaire **34** (2017), no. 5, pp. 1075–1129, http://dx.doi.org/10.1016/j.anihpc.2016.07.005, https://arxiv.org/abs/1110.5594.

13. P. M. N. Feehan, *Energy gap for Yang–Mills connections, I: Four-dimensional closed Riemannian manifolds*, Advances in Mathematics **264** (2016), 55-84, http://dx.doi.org/10.1016/j.aim.2016.03.034, https://arxiv.org/abs/1412.4114.

14. P. Daskalopoulos and P. M. N. Feehan, *C^{1,1} regularity for degenerate elliptic obstacle problems*, Journal of Differential Equations **260** (2016), 5043-5074, http://dx.doi.org/10.1016/j.jde.2015.11.037, https://arxiv.org/abs/1206.0831.

15. P. M. N. Feehan and T. G. Leness, *Witten's conjecture for many four-manifolds of simple type*, Journal of the European Mathematical Society **17** (2015), Issue 4, pp. 899-923, http://dx.doi.org/10.4171/JEMS/521, https://arxiv.org/abs/math/0609530.

16. P. M. N. Feehan and C. A. Pop, *Stochastic representation of solutions to degenerate elliptic and parabolic boundary value and obstacle problems with Dirichlet boundary conditions*, Transactions of the American Mathematical Society **367** (2015), 981-1031, http://dx.doi.org/10.1090/S0002-9947-2014-06043-1, https://arxiv.org/abs/1204.1317.

17. P. M. N. Feehan and C. A. Pop, *Degenerate-elliptic operators in mathematical finance and higher-order regularity for solutions to variational equations*, Advances in Differential Equations 20 (2015), no. 3/4, 361-432, http://projecteuclid.org/euclid.ade/1423055204, https://arxiv.org/abs/1208.2658.

18. P. M. N. Feehan and C. A. Pop, *On the martingale problem for degenerate-parabolic partial differential operators with unbounded coefficients and a mimicking theorem for Itô processes*, Transactions of the American Mathematical Society **367** (2015), 7565-7593, http://dx.doi.org/10.1090/tran/6243, https://arxiv.org/abs/1211.4636.

19. P. M. N. Feehan and C. A. Pop, *Schauder a priori estimates and regularity of solutions to degenerate-elliptic linear second-order partial differential equations*, Journal of Differential Equations **256** (2014), 895-956, http://dx.doi.org/10.1016/j.jde.2013.08.012, https://arxiv.org/abs/1210.6727.

20. P. M. N. Feehan, *Maximum principles for boundary-degenerate second-order linear elliptic differential operators*, Communications in Partial Differential Equations **38** (2013), 1863-1935, http://dx.doi.org/10.1080/03605302.2013.831446, https://arxiv.org/abs/1204.6613.

21. P. M. N. Feehan and C. A. Pop, *A Schauder approach to degenerate-parabolic partial differential equations with unbounded coefficients*, Journal of Differential Equations **254** (2013), 4401-4445, http://dx.doi.org/10.1016/j.jde.2013.03.006, https://arxiv.org/abs/1112.4824.

22. P. M. N. Feehan and T. G. Leness, *SO(3) monopoles, level-one Seiberg–Witten moduli spaces, and Witten's conjecture in low degrees*, Topology and its Applications **124** (2002), 221–326, http://dx.doi.org/10.1016/S0166-8641(01)00233-4, https://arxiv.org/abs/math/0106238.

23. P. M. N. Feehan, *Critical-exponent Sobolev norms and the slice theorem for the quotient space of connections*, Pacific Journal of Mathematics **200** (2001), 71-118, http://dx.doi.org/10.2140/pjm.2001.200.71, https://arxiv.org/abs/dg-ga/9711004.

24. P. M. N. Feehan, *A Kato–Yau inequality and decay estimate for eigenspinors*, Journal of Geometric Analysis **11** (2001), 469–489, http://dx.doi.org/10.1007/BF02922015, https://arxiv.org/abs/math/9903021.

25. P. M. N. Feehan and T. G. Leness, *PU(2) monopoles. II: Top-level Seiberg–Witten moduli spaces and Witten's conjecture in low degrees*, Journal für die Reine und Angewändte Mathematik **538** (2001), 135-212, http://dx.doi.org/10.1515/crll.2001.064, https://arxiv.org/abs/dg-ga/9712005.

26. P. M. N. Feehan and T. G. Leness, *PU(2) monopoles and links of top-level Seiberg–Witten moduli spaces*, Journal für die Reine und Angewändte Mathematik **538** (2001), 57-133, http://dx.doi.org/10.1515/crll.2001.069, https://arxiv.org/abs/math/0007190.

27. P. M. N. Feehan, *Generic metrics, irreducible rank-one PU(2) monopoles, and transversality*, Communications in Analysis & Geometry **8** (2000), 905-967, http://dx.doi.org/10.4310/CAG.2000.v8.n5.a1, https://arxiv.org/abs/math/9809001.

28. P. M. N. Feehan, P. B. Kronheimer, T. G. Leness, and T. S. Mrowka, *PU(2) monopoles and a conjecture of Mariño, Moore, and Peradze*, Mathematical Research Letters **6** (1999), 169-182, http://dx.doi.org/10.4310/MRL.1999.v6.n2.a5, https://arxiv.org/abs/math/9812125.

29. P. M. N. Feehan and T. G. Leness, *PU(2) monopoles. I: Regularity, compactness and transversality*, Journal of Differential Geometry **49** (1998), 265-410, http://projecteuclid.org/euclid.jdg/1214461020, https://arxiv.org/abs/dg-ga/9710032.

30. P. M. N. Feehan and T. G. Leness, *PU(2) monopoles and relations between four-manifold invariants*, Topology and its Applications **88** (1998), 111-145, http://dx.doi.org/10.1016/S0166-8641(97)00201-0, https://arxiv.org/abs/dg-ga/9709022.

31. P. M. N. Feehan, *Geometry of the ends of the moduli space of anti-self-dual connections*, Journal of Differential Geometry **42** (1995), 465-553, http://projecteuclid.org/euclid.jdg/1214457548, https://arxiv.org/abs/1504.05741.

Published Conference Proceedings Articles (Refereed)

1. P. M. N. Feehan and T. G. Leness，*SO(3) monopoles: the overlap problem*, Fields Institute Communications **47**, American Mathematical Society, Providence, RI, 2005, pp. 97-118, https://arxiv.org/abs/1211.0480.

2. P. M. N. Feehan and T. G. Leness，*On Donaldson and Seiberg–Witten Invariants*, in Topology and Geometry of Manifolds (Athens, GA 2001), Proceedings of Symposia in Pure Mathematics **71**, American Mathematical Society, Providence, RI, 2003, pp. 237-248, http://dx.doi.org/10.1090/pspum/071, https://arxiv.org/abs/math/0106221.

Submitted Journal Articles

1. P. M. N. Feehan and T. G. Leness, *Gluing in geometric analysis via maps of Banach manifolds with corners and applications to gauge theory*, 72 pages, https://arxiv.org/abs/1910.14580. (Submitted October 31, 2019.)

2. P. M. N. Feehan and M. Maridakis, *Lojasiewicz–Simon gradient inequalities for the harmonic map energy function,* 33 pages, https://arxiv.org/abs/1903.01953. (Submitted March 5, 2019.)

3. P. M. N. Feehan, *Corrigendum to "Energy gap for Yang–Mills connections, II: Arbitrary closed Riemannian manifolds",* https://arxiv.org/abs/1502.00668. (Submitted July 14, 2019.)

4. P. M. N. Feehan, *Maximum principles for boundary-degenerate second-order linear parabolic differential operators*, 34 pages, https://arxiv.org/abs/1306.5197. (Submitted June 20, 2013.)

Journal Articles in Preparation

1. P. M. N. Feehan, T. G. Leness, and R. A. Wentworth, *Virtual Morse–Bott index, moduli spaces of semi-stable pairs, and applications to the Bogomolov–Miyaoka–Yau inequality for complex Kähler surfaces*, in preparation.

2. P. M. N. Feehan, T. G. Leness, and R. A. Wentworth, *Complex analytic space compactification of the moduli space of stable pairs via $W^{1,2}$ projections*, in preparation.

3. P. M. N. Feehan and T. G. Leness, *Virtual Morse–Bott theory on moduli spaces of SO(3) monopoles and applications to four-manifolds*, in preparation.

4. P. M. N. Feehan, *Integrability of Jacobi vectors for analytic functions on Banach manifolds*, in preparation.

5. P. M. N. Feehan, *Bubble-tree compactification for spaces of harmonic maps*, in preparation.

6. P. M. N. Feehan, *Bubble-tree compactification for spaces of Yang–Mills connections*, in preparation.

Electronic Publications (Not Refereed)

1. P. M. N. Feehan, R. Gong, and J. Song, *Feynman–Kac formulae for solutions to degenerate elliptic and parabolic boundary value and obstacle problems with Dirichlet boundary conditions, 41 pages, https://arxiv.org/abs/1509.03864.*

2. P. M. N. Feehan, *Discreteness for energies of Yang–Mills connections over four-dimensional manifolds*, 89 pages, https://arxiv.org/abs/1505.06995.

3. P. Daskalopoulos and P. M. N. Feehan, *Existence, uniqueness, and global regularity for variational inequalities and obstacle problems for degenerate elliptic partial differential operators in mathematical finance*, 115 pages, https://arxiv.org/abs/1109.1075.

4. P. M. N. Feehan and T. G. Leness, *PU(2) monopoles. III: Existence of gluing and obstruction maps*, 91 pages, https://arxiv.org/abs/math/9907107.

5. P. M. N. Feehan and T. G. Leness, *Donaldson invariants and wall-crossing formulas. I: Continuity of gluing maps*, 86 pages, https://arxiv.org/abs/math/9812060.

6. P. M. N. Feehan and T. G. Leness, *Uhlenbeck compactness and transversality for the moduli space of PU(2) monopoles*, 15 pages, https://arxiv.org/abs/dg-ga/9710012.

TEACHING

Postgraduate Researchers Supervised

- Izar Alonso Lorenzo, Hill Assistant professor   2023–2026
- Mariano Echeverria, Hill Assistant professor   2019–2022
    - Position after leaving Rutgers: Assistant teaching professor (non-tenure track), Rutgers University, New Brunswick
- Ruoting Gong, Assistant professor (non-tenure track)   2012–2014
    - Position after leaving Rutgers: Assistant professor (tenure track), Illinois Institute of Technology, Chicago
- Manousos Maridakis, Hill Assistant professor   2014–2017
    - Position after leaving Rutgers: Army service, Greece
- Kihun Nam, Assistant professor (non-tenure track)   2014–2017
    - Position after leaving Rutgers: Assistant professor (tenure track), Monash University, Australia
- Brendan Owens, Lecturer (Trinity College, University of Dublin)   2000–2001
    - Current position: Senior Lecturer, University of Glasgow, Scotland
- Triet Pham, Assistant professor (non-tenure track)   2013–2017
    - Position after leaving Rutgers: Assistant professor (tenure track), Misercordia College, Pennsylvania
- Jesus Rodriguez, Assistant professor (non-tenure track)   2007–2010
    - Position after leaving Rutgers: Applied research mathematician, United States Federal Government
- Jian V. Song, Assistant professor (non-tenure track)   2010–2012
    - Position after leaving Rutgers: Assistant professor (tenure track), University of Hong Kong, China

Doctoral Students Supervised

- Nilava Metya (Spring 2024 to present; co-advised with Arunesh Sinha, Rutgers Business School)
- Shaozong Wang (Fall 2019 to present; co-advised with Daniel Ketover)
    - Advanced to candidacy in June 2021
- Matthew Hohertz
    - Thesis: "Extending the geometric modulus principle" (January 2022)
- Ruofan Yan
    - Thesis: "Risk filtering and risk-averse control of partially observable Markov jump processes", Rutgers University, January 2018
    - First position after graduation: Goldman Sachs, New York
- Vladimir Lubyshev
    - Thesis: "Non-linear PDEs and an application to high-frequency trading", Rutgers University, May 2015
    - First position after graduation: Hedge Fund
- Eduardo Osorio
    - Thesis: "Finite difference and finite element solution of boundary value and obstacle problems for degenerate partial differential operators in mathematical finance", Rutgers University, May 2014
    - First position after graduation: Associate, Bloomberg, New York
- Camelia Pop
    - Thesis: "Degenerate partial differential equations and applications to probability theory and foundations of mathematical finance", Rutgers University, May 2012
    - First position after graduation: Lecturer in Mathematics, University of Pennsylvania
- Jin Wang
    - Thesis: "Semimartingales, Markov processes and their applications in mathematical finance", Rutgers University, October 2010

- First position after graduation: Associate, Ernst and Young, New York
- Jawon Koo
    - Thesis: "Singular perturbation methods in credit derivative modeling", Rutgers University, January 2010
    - First position after graduation: Associate, Ernst and Young, New York
- Ming Shi
    - Thesis: "Local intensity and its dynamics in multi-name credit derivatives modeling", Rutgers University, January 2010
    - First position after graduation: Associate, Ernst and Young, New York

Master's Degree Students Supervised

- Hussein Hijazi, 2024 – present:
    - Master's Thesis: "Gauge theory and Uhlenbeck compactness"

Undergraduate Students Supervised

- Anish Suresh and Timothy Nasralla: Aresty Research Assistant Program 2022-23. *Morse theory on singular spaces*.
- Cormac Grindall, Tai Wai Hu, and Mark Vaysiberg: Aresty Research Assistant Program 2021-22. *Morse theory on singular spaces*.
- Shaozong Wang: Summer 2018. Directed reading project on Morse theory.

New Graduate Courses Developed at Rutgers University

- Math 611. Topics in applied mathematics: variational inequalities, obstacle problems, and free boundary problems in mathematical finance
- Math 621. Mathematical finance I
- Math 622. Mathematical finance II
- Math 623. Computational finance
- Math 624. Credit risk modeling
- Math 625. Portfolio theory and applications
- Math 626. Fixed income securities and derivative modeling
- Math 627. High-frequency finance and stochastic control
- Math 628. Topics in mathematical finance: quantitative risk management
- Math 628. Topics in mathematical finance: energy risk, commodities, and derivative modeling

Courses Taught

Columbia University, New York, New York
- Math G6190. Variational inequalities, obstacle problems, and free boundary problems in mathematical finance   Spring 2013
- Math G4077. Computational finance   Fall 2012

Princeton University
- Mat 320. Introduction to real analysis   Fall 2019

Rutgers University, New Brunswick, New Jersey
- Graduate Director – No teaching   Spring 2024
- Math 640:548. Differential topology   Fall 2023
- Graduate Director – No teaching   Spring 2023
- On leave   Fall 2022
- Graduate Director – No teaching   Spring 2022
- Math 640:548. Differential topology   Fall 2021

- Graduate Director – No teaching .... Spring 2021
- Math 640:548. Differential topology .... Fall 2020
- Sabbatical leave (visiting Princeton University) .... Spring 2020
- Sabbatical leave (visiting Princeton University) .... Fall 2019
- Math 643:574. Numerical analysis II .... Spring 2019
- Math 640:549. Lie groups .... Fall 2018
- Math 640:518. Partial differential equations II .... Spring 2018
- Math 642:575. Numerical solution of partial differential equations .... Spring 2018
- Mathematical Finance Director – No teaching .... Fall 2017
- Math 642:612. Topics in applied mathematics: obstacle problems .... Spring 2017
- Math 640:517. Partial differential equations I .... Fall 2016
- Competitive fellowship leave (visiting IAS) .... Spring 2016
- Competitive fellowship leave (visiting IAS) .... Fall 2015
- Math 640:519. Topics in differential equations: gradient flow .... Spring 2015
- Math 642:611. Topics in applied mathematics: obstacle problems .... Fall 2014
- Math 642:575. Numerical solution of partial differential equations .... Spring 2014
- Math 642:611. Topics in applied mathematics: obstacle problems .... Fall 2013
- Sabbatical leave (visiting Columbia University) .... Spring 2013
- Sabbatical leave (visiting Columbia University) .... Fall 2012
- Math 643:623. Computational finance .... Spring 2012
- Math 642:611. Topics in applied mathematics: obstacle problems .... Fall 2011
- Math 643:623. Computational finance .... Spring 2011
- Math 643:621. Mathematical finance I .... Fall 2010
- Math 643:623. Computational finance .... Spring 2010
- Math 643:621. Mathematical finance I .... Fall 2009
- Math 643:623. Computational finance .... Spring 2009
- Math 643:621. Mathematical finance I .... Fall 2008
- Math 643:622. Mathematical finance II .... Spring 2008
- Math 643:621. Mathematical finance I .... Fall 2007
- Math 643:622. Mathematical finance II .... Spring 2007
- Math 643:621. Mathematical finance I .... Fall 2006
- Sabbatical leave .... Spring 2006
- Sabbatical leave .... Fall 2005
- Competitive fellowship leave .... Spring 2005
- Competitive fellowship leave .... Fall 2004
- Math 642:612. Topics in applied mathematics: mathematical finance II ... Spring 2004
- Math 642:611. Topics in applied mathematics: mathematical finance I ... Fall 2003
- Math 640:244. Differential equations for engineering and physics .... Fall 2003
- Math 640:244. Differential equations for engineering and physics (section 1) ... Spring 2003
- Math 640:244. Differential equations for engineering and physics (section 2) ... Spring 2003
- Math 640:534. Topics in differential geometry .... Fall 2002
- Math 640:532. Differential geometry .... Spring 2002
- Math 640:151. Calculus I .... Fall 2001
- Math 640:250. Introduction to linear algebra .... Fall 2001

University of Dublin (Trinity College), Dublin, Ireland
- Math 131. Mathematical methods and linear algebra .... Spring 2001
- Math 421. Algebraic topology .... Spring 2001
- Math 131. Mathematical methods and linear algebra .... Fall 2000
- Math 421. Algebraic topology .... Fall 2000

Ohio State University, Columbus, Ohio
- Math 867. Differential topology II .... Winter 2000

- Math 254. Multivariable calculus   Winter 2000
- Math 866. Differential topology I   Fall 1999
- Math 151. Calculus I   Fall 1999
- Math 254. Multivariable calculus – *2 sections*   Winter 1998
- Math 254. Multivariable calculus – *2 sections*   Fall 1997

Harvard University, Cambridge, Massachusetts
- Math 21A. Multivariable calculus – *2 sections*   Fall 1993
- Math 21A. Multivariable calculus – *2 sections*   Fall 1994
- Math 21A. Multivariable calculus – *2 sections*   Fall 1995

Columbia University, New York, New York
- Math W1003. College algebra and analytic geometry   Summer 1992
- Math W1003. College algebra and analytic geometry   Spring 1992
- Math W1003. College algebra and analytic geometry   Fall 1991
- Math V1201. Calculus III   Summer 1991
- Math V1101. Calculus I   Summer 1991
- Math V1101. Calculus I   Summer 1990
- Math V1102. Calculus II   Summer 1989
- Math V1101. Calculus I   Summer 1988
- Teaching assistant for undergraduate mathematics courses   1988–1991

University of Southern California, Los Angeles
- Teaching assistant for undergraduate mathematics courses   1985–1987
- Teaching assistant for undergraduate electrical engineering courses   1984–1985

University of Missouri, Rolla, Missouri
- Electrical Engineering 243. Communication systems   Summer 1984
- Teaching assistant for undergraduate electrical engineering courses   1982–1984

PRESENTATIONS

Conferences and Workshops

Recent Invited Domestic and International Workshop Participations

- Mathematical Sciences Research Institute (MSRI / SLMath), Analytic and Geometric Aspects of Gauge Theory program, Berkeley (2022)
- Mathematisches Forschungsinstitut Oberwolfach, Partial differential equations workshop, Oberwolfach, Germany (2021)
- Floer homology in low-dimensional topology, Simons Center for Geometry and Physics, New York (2021)
- Mathematisches Forschungsinstitut Oberwolfach, Partial differential equations workshop, Oberwolfach, Germany (2019)
- Geometry of manifolds, Simons Center for Geometry and Physics, New York (2017)
- Symplectic geometry - Celebrating the work of Simon Donaldson, Newton Institute, Cambridge, England (2017)
- Workshop on metric and analytic aspects of moduli spaces, Newton Institute, Cambridge, England (2015)

Invited International Conference Presentations

- SIAM conference on analysis of partial differential equations, Berlin, Germany (2022)
- Mathematisches Forschungsinstitut Oberwolfach, Partial differential equations workshop, Oberwolfach, Germany (2021)
- Eighth European Congress of Mathematicians, Minisymposium on Low-Dimensional Topology, Portoroz, Slovenia (2021)
- Low Dimensional Topology and Gauge Theory, Banff Workshop, Oaxaca, Mexico (2017)
- Workshop on metric and analytic aspects of moduli spaces, Newton Institute, Cambridge, England (2015)
- EquaDiff, Lyons, France (2015)
- Workshop on free boundary and obstacle problems, Newton Institute, Cambridge, England (2014)
- PDE and Mathematical Finance V, Stockholm, Sweden (2013)
- Research in options, Rio de Janeiro, Brazil (2012)
- Kolmogorov equations in physics and finance, Modena, Italy (2010)
- Analysis, stochastics, and applications, Vienna, Austria (2010)
- 12th annual global derivatives and risk management conference, Paris, France (2006)
- Conference on geometry and topology of manifolds, McMaster University, Hamilton, Ontario, Canada (2004)
- Conference on topology and group actions, Centre de Recherche Mathématiques, Montréal, Canada (2001)
- Mathematisches Forschungsinstitut Oberwolfach, Four-manifolds workshop, Oberwolfach, Germany (2001)
- Mathematische Arbeitstagung, Max Planck Institut für Mathematik, Bonn, and Mathematisches Institut der Universität Bonn, Bonn, Germany (2001)
- Symposium on geometry and topology, University of Warwick, Coventry, England (2000)
- Seventh Gökova geometry/topology conference, Gökova, Turkey (2000)
- Conference on geometry, analysis, and mathematical physics, European Science Foundation, Strasbourg, France (1999)
- Mathematisches Forschungsinstitut Oberwolfach, Four-manifolds workshop, Oberwolfach, Germany (1996)

Other International Conference Presentations

- AMS and Romanian Mathematical Society Joint International Meeting, Special Session, Mathematical finance, stochastic analysis, and partial differential equations, Alba Iulia, Romania (2013)
- Frontiers in Financial Mathematics, Dublin, Ireland (2013)
- International workshop on PDEs and stochastic analysis, Yerevan, Armenia (2012)
- 12th international conference on free boundary problems, Chiemsee, Germany (2012)
- International conference on math finance and economics, Istanbul, Turkey (2011)
- 35th conference on stochastic processes and their applications, Oaxaca, Mexico (2011)
- Econometrics, numerical methods, and foundations, Guanajuato, Mexico (2011)
- Analysis, stochastics, and applications, Vienna, Austria (2010)
- First joint American Mathematical Society & Unione Matematica Italiana, Pisa, Italy (2002)
- First joint American Mathematical Society & Sociétè Mathématique de France International Meeting, Lyon, France (2001)

Invited Domestic Conference Presentations

- Lafayette-Lehigh Geometry & Topology Seminar, Lafayette College (2020)
- AMS Special Session on topics in qualitative properties of PDEs, Boston, Massachusetts (2018)
- SIAM conference on analysis of partial differential equations, Baltimore, Maryland (2017)
- Gauge Theory and Topology Workshop, Simons Center for Geometry and Physics, New York (2017)
- Winter conference on geometry, topology and applications, Florida International University, Miami (2017)
- AMS Special Session on PDE methods in geometric flows, Stony Brook University (2016)
- International workshop on advances in nonlinear analysis, Pittsburgh, Pennsylvania (2014)
- Workshop on the mathematics of financial risk management, Penn State University (2012)
- Stochastic analysis in finance and insurance conference, University of Michigan, Ann Arbor, (2011)
- Georgia international topology conference, Athens, Georgia (2001)
- Marston Morse conference on gauge theory and symplectic geometry, Institute for Advanced Study, Princeton, New Jersey (1999)
- Mathematical Sciences Research Institute, Four-manifolds workshop, Berkeley, California (1997)
- Georgia Topology Conference, Symplectic topology, Athens, Georgia (1996)

Other Domestic Conference Presentations

- SIAM conference on analysis of partial differential equations, La Quinta, California (2019)
- SIAM conference on analysis of partial differential equations, Scottsdale, Arizona (2015)
- SIAM conference on analysis of partial differential equations, Buena Vista, Florida (2013)
- AMS Special Session, Partial differential equations, stochastic analysis, and applications to mathematical finance, Philadelphia, Pennsylvania (2013)
- 36th conference on stochastic processes and their applications, Boulder, Colorado (2013)
- SIAM conference on financial mathematics and engineering, Minneapolis, Minnesota (2012)
- SIAM financial mathematics and engineering conference, San Francisco, California (2010)
- AMS Special Session, Gauge theory and low-dimensional topology, Raleigh, North Carolina (1999)
- AMS Special Session, Holomorphic vector bundles and complex geometry, Urbana-Campaign, Illinois (1999)
- AMS Special Session, Gauge theory and its interaction with holomorphic and symplectic geometry, Columbia, Missouri (1996)
- AMS Special Session, Invariants of smooth four-manifolds, Princeton, New Jersey (1996)

- AMS Special Session, Gauge field theory, New York, New York (1996)
- AMS Special Session, Partial differential equations and math physics, Boston, Massachusetts, (1995)
- AMS Special Session, Gauge theory and applications, Brooklyn, New York, (1994)
- AMS Special Session, Gauge theory and four-manifolds, Los Angeles, California (1992)

Colloquium and Seminar Presentations

International Colloquium and Seminar Presentations

- University of Oxford, Geometry and Analysis Seminar (2023)
- University College London, Geometry and Topology Seminar (2023)
- University of Regensburg, Low-Dimensional Geometry and Topology Seminar, Germany (2021)
- University of York, Geometry and Mathematical Physics Seminar, England (2020)
- Dublin Institute for Advanced Studies, School of Theoretical Physics Seminar, Ireland (2019)
- Chinese University of Hong Kong, Topology Seminar Lecture Series (2018)
- Institut de Mathématiques de Jussieu, Geometric Analysis Seminar, Paris, France (2017)
- University of Glasgow, Geometry and Topology Seminar, Glasgow, Scotland (2015)
- Aarhus University, Centre for Quantum Geometry of Moduli Spaces, Geometry Seminar, Denmark (2014)
- Hausdorff Institute, Harmonic Analysis and Partial Differential Equations Seminar, Bonn, Germany (2014)
- Newton Institute, Free Boundary Problems and Related Topics Seminar, Cambridge, England (2014)
- University of Cambridge, Geometry and Partial Differential Equations Seminar, Cambridge, England (2014)
- Imperial College London, Geometry and Analysis Seminar, London, England (2014)
- Mathematical Institute, University of Oxford, Geometry and Analysis Seminar, Oxford, England (2014)
- University of Glasgow, Geometry and Topology Seminar, Glasgow, Scotland (2014)
- Edinburgh Mathematical Physics Group Seminar, Edinburgh, Scotland (2014)
- Eidgenössische Technische Hochschule Zürich, Analysis Seminar, Zürich, Switzerland (2014)
- Mathematisches Institut, Universität Köln, Geometry Seminar, Cologne, Germany (2013)
- Max-Planck-Institut für Mathematik, Oberseminar Analysis, Leipzig, Germany (2012)
- Eidgenössische Technische Hochschule Zürich, Financial and insurance mathematics seminar, Zürich, Switzerland (2012)
- Technische Universität Berlin, Stochastic analysis and stochastic finance seminar, Berlin, Germany (2012)
- University of Göttingen, Mathematics colloquium, Göttingen, Germany (2004)
- McMaster University, Mathematics colloquium, Hamilton, Ontario, Canada (2003)
- Max Planck Institut für Mathematik, Gauge theory seminar, Bonn, Germany (2003)
- Max Planck Institut für Mathematik, Gauge theory seminar, Bonn, Germany (2002)
- Max Planck Institut für Mathematik, Gauge theory seminar, Bonn, Germany (2001)
- Imperial College, Differential geometry seminar, London, England (2001)
- University College, Differential geometry seminar, National University of Ireland, Maynooth, Ireland (2000)
- Max Planck Institut für Mathematik, Gauge theory seminar, Bonn, Germany (2000)
- Mathematisches Institut, Universität Bielefeld, Bielefeld, Germany (2000)
- University of Frankfurt, Mathematics colloquium, Frankfurt, Germany, (2000)
- McMaster University, Mathematics colloquium, Hamilton, Ontario, Canada, (1999)
- University of Dublin, Trinity College, Seminar, Dublin, Ireland (1999)
- Ecole Polytechnique, Differential geometry seminar, Paris, France (1998)

- Mathematisches Institut, Differential geometry seminar, Universität München, Munich, Germany (1998)
- Mathematisches Institut, Differential geometry seminar, Universität Osnabruck, Osnabruck Germany (1998)
- Max Planck Institut für Mathematik, Oberseminar, Bonn, Germany (1998)
- University College, Differential geometry seminar, National University of Ireland, Dublin, Ireland (1994)

Domestic Colloquium and Seminar Presentations

2024
- Harvard University, Topology seminar

2023
- University of Maryland, Colloquium
- University of Maryland, Geometry and Topology Seminar

2022
- SLMath/MSRI Berkeley, Analytic and Geometric Aspects of Gauge Theory Program, Gauge Theory seminar
- CUNY Graduate Center, New York, Differential Geometry, Topology, and Special Structures seminar

2021
- Institute for Advanced Study, Princeton, Symplectic Geometry seminar

2020
- Gauge Theory Virtual seminar (online)
- Florida International University, Geometry & Topology seminar
- University of Texas, Dallas, Geometry and Topology seminar

2019
- Boston College, Topology seminar
- Princeton University, Differential Geometry and Geometric Analysis seminar
- Princeton University, Topology seminar
- Stanford University, Geometry seminar

2018
- Harvard University, Topology seminar
- Massachusetts Institute of Technology, Geometry and Analysis seminar
- Rice University, Colloquium

2017
- Columbia University, Geometry and Analysis seminar
- Purdue University, Partial Differential Equations seminar
- Stony Brook University and Simons Center for Geometry and Physics, colloquium
- University of Maryland, Informal Geometric Analysis seminar
- University of Wisconsin, Geometric and Topology seminar

2016
- Bryn Mawr College, Colloquium
- Dublin Institute for Advanced Studies, Theoretical physics seminar
- Harvard University, Gauge theory, symplectic geometry, and topology seminar
- Institute for Advanced Study, Analysis seminar

- Massachusetts Institute of Technology, Geometry and topology seminar
- Princeton University, Topology seminar
- Princeton University, Differential geometry and geometric analysis seminar
- University of Massachusetts, Amherst, Geometry and topology seminar

2015
- University of Minnesota, Minneapolis, Differential geometry and topology seminar
- Michigan State University, East Lansing, Mathematical physics and gauge theory seminar
- University of California, Irvine, Geometry and analysis seminar
- Stanford University, Analysis seminar

2014
- Lehigh University, Geometry and analysis seminar
- Princeton University and IAS, Symplectic geometry seminar
- University of Nebraska, Lincoln, Mathematics colloquium
- Columbia University, Geometry and analysis seminar

2013
- Columbia University, Geometry and analysis seminar
- Columbia University, Mathematical finance seminar

2012
- Massachusetts Institute of Technology, Cambridge, Analysis seminar
- New York University – Courant Institute, New York, Analysis seminar
- University of Pennsylvania, Philadelphia, Applied mathematics and computer science colloquium

2011
- Brown University, Providence, Analysis and geometry seminar
- University of California, Santa Barbara, Differential geometry seminar
- University of Texas, Austin, Mathematical finance seminar

2010
- Penn State University, State College, Applied mathematics colloquium

2004
- Johns Hopkins University, Baltimore, Analysis seminar

2002
- Lafayette College, Mathematics colloquium
- Haverford College, Mathematics colloquium
- State University of New York, Stony Brook, Analysis seminar

2001
- Michigan State University, East Lansing, Gauge theory seminar
- Rutgers University, New Brunswick, Nonlinear analysis seminar
- Rutgers University, New Brunswick, Geometry and topology seminar

2000
- Brown University, Seminar
- University of Wisconsin, Madison, Mathematics colloquium
- Rutgers University, Seminar

1999

- Johns Hopkins University, Mathematical physics seminar
- University of Michigan, Ann Arbor, Mathematics colloquium
- University of Michigan, Ann Arbor, Seminar
- Harvard University, Gauge theory and topology seminar
- Yale University, Topology seminar

1998
- Boston University, Differential geometry seminar
- Brown University, Differential geometry seminar
- Princeton University, Topology seminar
- Rutgers University, Topology seminar

1997
- Columbia University, Geometry and analysis seminar
- Massachusetts Institute of Technology, Analysis seminar
- University of Wisconsin, Madison, Differential geometry seminar
- University of Wisconsin, Madison, Topology seminar
- Yale University, Topology seminar
- Ohio State University, Columbus, Seminar
- State University of New York, Stony Brook, Seminar
- Texas A & M University, Seminar
- Stanford University, Mathematics colloquium
- University of California, Los Angeles, Differential geometry seminar
- University of Washington, Seattle, Mathematics colloquium
- University of California, Santa Barbara, Differential geometry seminar

1996
- Courant Institute, Differential geometry and topology seminar
- University of Illinois, Urbana-Champaign, Differential geometry seminar
- Ohio State University, Columbus, Mathematics colloquium
- Ohio State University, Columbus, PDEs and several complex variables seminar
- Harvard University, Gauge theory and topology seminar
- Princeton University, Differential geometry and topology seminar
- Brown University, Differential geometry seminar
- Massachusetts Institute of Technology, Symplectic geometry seminar

1995
- Columbia University, Geometry and analysis seminar
- Boston University, Differential geometry seminar

1994
- Institute for Advanced Study/Park City, Mathematics colloquium

1993
- State University of New York, Buffalo, Mathematics colloquium
- Harvard University, Gauge theory and topology seminar
- Stanford University, Gauge theory seminar
- University of California, Berkeley, Differential geometry seminar
- Mathematical Sciences Research Institute, Area II seminar
- Columbia University, Geometry and analysis seminar

1992
- Columbia University, Geometry and analysis seminar