

DANIEL S. FREED
CURRICULUM VITA

PERSONAL DATA

Born:	April 17, 1959	Address:	Harvard University
Citizenship:	U.S. Citizen		Department of Mathematics
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			1 Oxford Street
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EDUCATION

Ph.D.	University of California, Berkeley (Advisor: I. M. Singer)	1985
M.A.	Harvard University	1981
B.A.	Harvard University (summa cum laude)	1981

PROFESSIONAL EXPERIENCE

2023– Shiing-Shen Chern Professor of Mathematics, Harvard University

2023–28 Director, Center of Mathematical Sciences and Applications, Harvard University

2013–2023 Mildred Caldwell and Baine Perkins Kerr Centennial Professor, UT Austin

Fall 2022 Simons Visiting Professor, Mathematical Sciences Research Institute

2016–18, 22–24 Distinguished Visiting Research Chair, Perimeter Institute

Spring 2020 Distinguished Research Professor, Mathematical Sciences Research Institute

Fall 2017 Poincaré Distinguished Visiting Professor of Mathematics, Stanford University

Spring 2015 IBM Einstein Fellow, Institute for Advanced Study, Princeton

Fall 2014 Visiting Professor of Mathematics, Harvard University

Spring 2014 Member, Mathematical Sciences Research Institute

Spring 2012 Visitor, Simons Center for Geometry and Physics

1996–1998 Member, Institute for Advanced Study, Princeton

Eté '95, '99 Visitor, Institut des Hautes Etudes Scientifiques

1994–2013 Professor, University of Texas at Austin

Fall '92, '93 Visitor, Geometry Center, Minneapolis

1989–1994 Associate Professor, University of Texas at Austin

1987–1989 NSF Postdoctoral Fellow and Assistant Professor, University of Chicago

1985–1987 NSF Postdoctoral Fellow and Moore Instructor, MIT

HONORS AND PRIZES

2020 Clay Senior Scholar Award

2014 Senior Berwick Prize, London Mathematical Society

2014–2015 Simons Fellow in Mathematics

2012 Inaugural Fellow of the American Mathematical Society

2005–2007 Cook Professorship in Mathematics

2002–2003 Guggenheim Fellow

2002 Invited speaker, International Congress of Mathematicians

2002 College of Natural Sciences Outreach Award

1990–1996 NSF Presidential Young Investigator Award
 1988–1992 Alfred P. Sloan Research Fellowship

GRANTS

2021–2025 Simons Collaboration Grant
 1988–2023 NSF Individual Research Grant
 2007–2018 PI, NSF Research Training Grant
 2012–2017 PI, NSF Focused Research Group
 1990–1996 O’Donnell Foundation Grant
 1985–1988 NSF Postdoctoral Fellowship in Mathematics
 1981–1984 NSF Graduate Fellowship

PROFESSIONAL SERVICE

Institutes

2023–26 Trustee, Aspen Center for Physics, Aspen, Colorado
 2015–25 General Member, Aspen Center for Physics, Aspen, Colorado
 2020–24 Scientific Advisory Committee, Perimeter Institute for Theoretical Physics, Waterloo, Ontario
 2006–23 Board of Trustees, Mathematical Sciences Research Institute, Berkeley, California
 2010–22 Scientific Advisory Committee, Simons Center for Geometry and Physics, Stony Brook, New York
 2005–08 Scientific Advisory Board, Banff International Research Station, Banff, Alberta
 2002–06 Scientific Advisory Committee, Mathematical Sciences Research Institute, Berkeley, California
 1990–99 Cofounder and Steering Committee, IAS/Park City Mathematics Institute

International Committees

2010– Steering Committee, String-Math biennial conferences

National Committees

2019–2022 Council of the American Mathematical Society
 2019–2022 American Mathematical Society Committee on Publications
 2018–2021 American Mathematical Society Program Committee for National Meetings (chair, 2019–2020)
 2015–2017 American Mathematical Society Committee on Science Policy
 2014–2016 American Mathematical Society Central Section Program Committee
 2012–2014 American Mathematical Society Special Program Committee
 2012 Simons Foundation Review Advisory Panel
 2004–2006 American Mathematical Society Committee on Steele Prizes
 1998–2001 American Mathematical Society National Program Committee (chair in third year)
 1995 American Mathematical Society Task Force on Electronic Journals

Conferences Organized

Co-organizer, “Categorical Symmetries in Quantum Field Theory”, Les Diablerets, Switzerland, August, 2023.
 Co-organizer, “A Panorama of Homotopy Theory (for Mike Hopkins’ 65th birthday)”, Oxford, June, 2023.

- Co-organizer, “Karen Uhlenbeck 80th birthday conference”, Institute for Advanced Study, September, 2022.
- Co-organizer, “Chern birthday conference”, Mathematical Sciences Research Institute, November, 2021.
- Co-organizer, “The Mathematics of Topological Insulators”, American Institute of Mathematics (virtually), December, 2020.
- Co-organizer, “Generalized Symmetries, Anomalies, and Observables”, Aspen Center for Physics, August 2019.
- Co-organizer, “QFT and Invariants of Manifolds, IAS/Park City Mathematics Institute, July, 2019.
- Co-organizer, “Hecke Algebras in Geometric Representation Theory and Low-Dimensional Topology”, International Centre for Mathematical Sciences, Edinburgh, Scotland, June, 2019.
- Co-organizer, “Higher Symmetries: Theory and Applications”, Aspen Center for Physics, March 2019.
- Co-organizer, “Mathematics of Topological Phases of Matter”, Simons Center for Geometry and Physics, May–June, 2017.
- Co-organizer, “Boundaries and Defects in Quantum Field Theories”, Aspen Center for Physics, July, 2016.
- Co-organizer, “Symmetry and Topology in Quantum Matter”, Institute for Pure and Applied Mathematics, Los Angeles, Winter, 2015.
- Main scientific organizer, “West Coast Algebraic Topology Summer School”, Pacific Institute for the Mathematical Sciences, Vancouver, July, 2014.
- Co-organizer, “Mathematics of Superconformal Field Theory”, Aspen Center for Physics, July, 2013.
- Co-organizer, “Algebraic Topology, Field Theory and Strings”, Simons Center for Geometry and Physics, Stony Brook, May, 2012.
- Co-organizer, “Supersymmetric Field Theories and their Implications”, graduate student winter school, Simons Center for Geometry and Physics, Stony Brook, March, 2012.
- Co-organizer, “Workshop on Differential Cohomology”, Simons Center for Geometry and Physics, Stony Brook, January, 2011.
- Co-organizer, “New Mathematical Methods in Quantum Gauge Theories”, Aspen Center for Physics, July, 2010.
- Co-organizer, “Hodge Theoretic Reflections on the String Landscape”, International Centre for Mathematical Sciences, Edinburgh, Scotland, June, 2010.
- Co-organizer, “Geometry, Quantum Fields and Strings: Categorical Aspects”, Oberwolfach, Germany, June, 2010.
- Co-organizer, “String Theory and Quantum Geometry”, Aspen Center for Physics, July, 2007.
- Co-organizer, “Twisted K -Theory”, Arbeitsgemeinschaft, Oberwolfach, Germany, October, 2006.
- Co-organizer, Texas Geometry and Topology Conference, Austin, Texas, October, 2005.
- Co-organizer, “Strings, Branes and Superpotentials”, Aspen Center for Physics, July–August, 2004.
- Co-organizer, “Workshop on Symplectic Geometry and Mathematical Physics”, Mathematical Sciences Research Institute, March, 2004.
- Co-organizer, “Workshop on Geometry and String Theory”, Institute for Theoretical Physics, Santa Barbara, July, 2003.
- Co-organizer, “Karenfest”, Texas Geometry and Topology Conference in honor of Karen Uhlenbeck’s 60th birthday, University of Texas at Austin, October, 2002.
- Co-organizer, “Workshop on Infinite-dimensional Algebras, Conformal Field Theory and Supersymmetry”, Mathematical Sciences Research Institute, April, 2002.
- Co-organizer, Graduate Summer School and Research Program on “Quantum Field Theory, Supersymmetry, and Enumerative Geometry”, IAS/Park City Mathematics Institute, July, 2001.

- Co-organizer, Special Session on “Recent Developments in Index Theory”, Central Sectional Meeting of AMS, Austin, October, 1999.
- Organizing Committee for Summer School on Geometry and Theoretical Physics, Institute for Theoretical Physics, Santa Barbara, July, 1999.
- Co-organizer, Texas Geometry and Topology Conference, Austin, Texas, October, 1998.
- Organizing Committee for Workshop on Duality in Mathematics and Physics, Aspen Center for Physics, July, 1996.
- Co-organizer, Special Session on “Geometry, Topology, and Quantum Field Theory”, Eastern sectional meeting of AMS, Boston, October, 1995.
- Co-organizer, Texas Geometry and Topology Conference, Austin, Texas, April, 1994.
- Co-organizer, Texas Geometry and Topology Conference, Austin, Texas, October, 1991.
- Chairman, Organizing Committee for Workshop on Mathematical Ideas Arising from Conformal Field Theory, held at the Aspen Center for Physics, 1989.
- Member, Organizing Committee for AMS Joint Summer Research Conference on Elliptic Cohomology, Brunswick, Maine, 1988.
- Chairman, Organizing Committee for Workshop on Differential Geometry, held at the Aspen Center for Physics, 1987.

Editor

- Editor of *Communications of the AMS (CAMS)*, 2020–2025.
- Associate Editor for *AMS Bulletin* articles.
- Editor of *Gokova Geometry/Topology Journal*.
- Editor of *Graduate Studies in Mathematics* (American Mathematical Society), 2012–2020.
- Editor of *Advances in Mathematics*, 2000–2016.
- Editor of *Communications in Contemporary Mathematics*, 1998–2013.
- Editor of *Park City Mathematics Series*, publications of the IAS/Park City Mathematics Institute, 1993–1999.
- Associate Editor for Research Announcements in *Bulletin of American Mathematical Society*, 1992–1994.

CONFERENCE LECTURES AND LECTURE SERIES

- Invited speaker at “Interactions of Low-dimensional Topology and Quantum Field Theory”, SRS SwissMAP Research Station, Les Diablerets, Switzerland, May, 2023.
- Invited speaker at “Simons Collaboration on Global Categorical Symmetries Annual Meeting”, Simons Foundation, New York, November, 2022.
- Invited speaker at “HirosiFest”, Caltech, October, 2022.
- Invited speaker at “Physics from the Point of View of Geometry”, Oxford University, September, 2022.
- Invited speaker at “String-Math 2022”, University of Warsaw, July, 2022.
- Invited speaker (4 lectures) at “Global Categorical Symmetries”, Perimeter Institute, Waterloo, June, 2022.
- Invited speaker at “Chern-Simons and Other Topological Field Theories”, Mathematical Sciences Research Institute, November 2021.
- Invited speaker at “Generalized Cohomology and Physics”, International Centre for Theoretical Physics, Trieste (virtually), November, 2021.
- Invited speaker at “Chern: a Great Geometer of the 20th century”, Tsinghua University (virtually), October, 2021.
- Invited speaker at “Simons Collaboration on Global Categorical Symmetries kickoff meeting, Simons Center for Geometry and Physics, Stony Brook, NY, October, 2021.

- Invited speaker (5 lectures) at “Thematic Program on Arithmetic, Geometry, and Physics”, Korea Institute for Advanced Study (virtually), August, 2021.
- Invited speaker at “Math-Science Literature Lecture Series”, Center of Mathematical Sciences and Applications, Harvard University (virtually), April, 2021.
- Invited speaker at “The Mathematics of Topological Insulators”, American Institute of Mathematics (virtually), December, 2020.
- Invited speaker at “AMS Special Session on Noncommutative Geometry and Applications”, Denver, January, 2020.
- Inaugural speaker, “Peter Scherk Distinguished Lectures in Geometry”, University of Saskatchewan, Saskatoon, September, 2019.
- Invited speaker at “Topology and Dynamics in Quantum Matter”, Center of Mathematical Sciences and Applications, Harvard University, Cambridge, September, 2019.
- Invited speaker at “Shanks Workshop in Homotopy Theory”, Vanderbilt University, April, 2019.
- Plenary speaker at “String-Math 2018”, Tohoku University, Sendai, Japan, June, 2018.
- Invited speaker at “Geometric Quantization”, Banff International Research Station, Banff, April, 2018.
- Invited speaker (5 lectures) at “CMI-LMS Research School: Algebraic Topology of Manifolds”, Oxford, September, 2017.
- Principal speaker (10 lectures) at “Topological and Geometric Methods in QFT”, NSF-CBMS Conference, Montana State University, August, 2017.
- Invited speaker (3 lectures) at “Arbeitstagung” in honor of Yuri Manin, Max Planck Institute, Bonn, Germany, June, 2017.
- Invited speaker (2 lectures) at “Topology Festival”, Cornell University, Ithaca, New York, May, 2017.
- Invited speaker at “Quantum Entanglement”, Simons Symposium, Schloss Elmau, Germany, May, 2017.
- Invited speaker at “JDG 2017” Conference on Geometry and Topology, Harvard University, Cambridge, April, 2017.
- Alexander Zabrodsky Memorial Lectures (3 lectures), Hebrew University, Jerusalem, November, 2016.
- Invited speaker at “Topological quantum matter”, Kavli Institute for Theoretical Physics, Santa Barbara, October, 2016.
- Invited speaker at “Simons Summer Workshop in Mathematics and Physics”, Simons Center for Geometry and Physics, Stony Brook, July, 2016.
- Invited speaker at “Condensed Matter Physics and Topological Field Theory”, Perimeter Institute, Waterloo, October, 2015.
- Invited speaker at “Algebraic Topology: Manifolds Unlocking Higher Structures”, Clay Mathematical Institute, Oxford, September, 2015.
- Plenary speaker at “Topology and Geometry Conference in Bonn”, Hausdorff Research Institute for Mathematics, Bonn, August, 2015.
- Invited speaker at “Geometric Unification from Six-Dimensional Physics”, Banff International Research Station, Banff, May, 2015.
- Invited speaker at “Berkeley Math-Physics Meeting”, Berkeley, April, 2015.
- Invited speaker at “Stratified Spaces in Geometric and Computational Topology and Physics”, Madison, March, 2015.
- Invited speaker at “Topology and Mathematics in Condensed Matter Physics”, Harvard University, Cambridge, September, 2014.
- Invited speaker at “Analysis and Topology in Interaction”, Cortona, June, 2014.

- Invited speaker at “Noncommutative Geometry Festival (in honor of Henri Moscovici)”, Texas A&M University, April, 2014.
- Invited speaker at “Topological Materials”, Tsinghua Sanya International Mathematics Forum, December, 2013.
- Speaker at “String-Math 2013”, Simons Center for Geometry and Physics, Stony Brook, June, 2013.
- Keynote speaker at “Graduate Student Geometry and Topology Conference”, Notre Dame, April, 2013.
- Invited speaker at “Aspects of Topology in Geometry and Physics (in honor of Graeme Segal)”, Oxford, December, 2012.
- Plenary speaker at “Algebraic Topology: Applications and New Directions”, Stanford Symposium, July, 2012.
- Invited speaker at “Conference on Geometry and Quantization of Moduli Spaces”, CRM, Barcelona, June, 2012.
- Invited speaker (short course + research lecture) at “Workshop on K -Theory and Quantum Field Theory”, Erwin Schrodinger Institute, Vienna, June, 2012.
- Invited speaker at “Current Events Bulletin”, Special Session at Joint Mathematics Meeting, Boston, January, 2012.
- Invited speaker at “Shanks Workshop: Subfactors, Fusion Categories, Planar Algebras and Random Matrices”, Vanderbilt University, Nashville, October, 2011.
- Invited speaker at “String-Math 2011”, University of Pennsylvania, June, 2011.
- Invited speaker at 60th birthday conference for Michael Freedman, Station Q, Santa Barbara, April, 2011.
- Invited speaker at “Workshop on Differential Cohomology” (3 lectures), Simons Center for Geometry and Physics, Stony Brook, January, 2011.
- IGA lecturer (10 lectures), University of Adelaide, Australia, October, 2010.
- Eisenbud lecture series (3 lectures), Brandeis University, Boston, April, 2010.
- Kempf lecture series (2 lectures), Johns Hopkins University, Baltimore, March, 2010.
- Invited speaker at “Midwest conference on topology and physics”, Ann Arbor, February, 2010.
- Invited speaker at “Mathematical Methods in General Relativity and Quantum Field Theories”, Paris, November, 2009.
- Invited speaker at “Strings, Fields and Topology”, Oberwolfach, Germany, June, 2009.
- Invited speaker at “Topological Field Theory”, Northwestern University, Evanston, May, 2009.
- Invited speaker at “Topology, C^* -algebras, and String Duality”, Texas Christian University, Fort Worth, May, 2009.
- Invited speaker at “Gauge theory and Langlands duality”, Kavli Institute for Theoretical Physics, Santa Barbara, July, 2008.
- Invited speaker at “Geometry and Physics: Special Metrics and Supersymmetry”, Bilbao, Spain, May, 2008.
- Invited speaker at “Geometry and Physics”, Hausdorff Research Institute for Mathematics, Bonn, Germany, May, 2008.
- Invited speaker at “The Mathematical Sciences from the 20th to the 21st Century”, a celebration of the 25th anniversary of the Mathematical Sciences Research Institute, Berkeley, California, January, 2008.
- Invited speaker at “Texas Geometry and Topology Conference”, College Station, Texas, October, 2007.
- Invited plenary speaker at “Abel Symposium in Algebraic Topology”, Oslo, Norway, August, 2007.
- Invited speaker at “Maxwell Institute Colloquium on Conformal Field Theory and Topology,” Edinburgh, Scotland, May, 2007.

- Invited speaker at “Geometry Festival”, Maryland, April, 2007.
- Niven lecturer (2 lectures), University of Oregon, Eugene, Oregon, April, 2007.
- Invited speaker at Nigel Hitchin’s 60th birthday celebration, Madrid, Spain, September, 2006.
- Invited speaker (3 lectures) at “XVth Oporto Meeting on Geometry, Topology and Physics”, Oporto, Portugal, July, 2006.
- “Andrejewski Lecture series” (3 lectures), Max Planck Institute for Mathematics, Leipzig, Germany, April, 2006.
- Invited speaker at “Pacific Northwest Geometry Seminar”, Palo Alto, California, February, 2006.
- Invited speaker (lecture in memory of Raoul Bott) at “Black holes, topological strings, and invariants of holomorphic submanifolds”, Harvard University, Boston, Massachusetts, January, 2006.
- Invited speaker at “Stringy Topology in Morelia”, Morelia, Mexico, January, 2006.
- Invited speaker at “Simons Workshop in Mathematics and Physics”, Stony Brook, New York, August, 2005.
- Invited speaker at “Geometric Topology and Connections with Quantum Field Theory”, Oberwolfach, Germany, June, 2005.
- Plenary speaker at Canadian Mathematical Society summer meeting, Waterloo, Canada, June, 2005.
- Invited speaker at “Symposium on the First Superstring Revolution”, Aspen Center for Physics, Aspen, Colorado, August, 2004.
- Invited speaker at “AMS-SIAM Conference on String Geometry”, Snowbird, Colorado, June, 2004.
- Invited speaker at Midwest Topology Seminar, Northwestern University, Evanston, Illinois, February, 2004.
- Invited speaker at “Elliptic Cohomology and Chromatic Phenomena”, Isaac Newton Institute, Cambridge, England, December, 2002.
- Invited speaker in Mathematical Physics section, International Congress of Mathematicians, Beijing, China, August, 2002.
- Invited speaker at “Stringy Orbifolds”, Chengdu, China, August, 2002.
- Invited speaker (2 lectures) at “Current Developments in Mathematics”, Harvard University, November, 2001.
- Invited speaker (7 lectures) at Graduate Summer School “Quantum Field Theory, Supersymmetry, and Enumerative Geometry”, IAS/Park City Mathematics Institute, July, 2001.
- Invited speaker (4 lectures) at “Duality Workshop: A Math/Physics Collaboration”, Institute for Theoretical Physics, Santa Barbara, June, 2001.
- Invited speaker at “New interfaces in geometry and physics”, Miraflores de la Sierra, Spain, June, 2001.
- Invited speaker at Clifford Lectures Conference, Tulane University, November, 2000.
- Invited speaker at “International Congress of Mathematical Physics”, London, England, July, 2000.
- Invited speaker at Gokova Topology/Geometry Conference, Gokova, Turkey, May, 2000.
- Invited speaker at “Special Program on Geometry and Topology”, Feza Gursey Institute of Istanbul, Turkey, May, 2000.
- Plenary speaker at “Strings, Duality, and Geometry”, Montreal, Canada, March, 2000.
- Invited speaker at “Geometry, Duality and Hodge theory”, Irvine, March, 2000
- Invited speaker at “Texas Geometry and Topology Conference”, Texas A&M, College Station, November, 1999.
- Invited speaker at “A Fiftieth Anniversary Celebration of the Postdoctoral Instructorship in Mathematics at MIT”, Boston, October, 1999.
- Invited speaker (3 lectures) at “Mathematics from Physics”, University of Illinois, Urbana-Champaign, May, 1999.

- Invited speaker at “Southern California Geometric Analysis Seminar”, University of California at Irvine, February, 1999.
- Invited speaker at Pacific Northwest Geometry Symposium, Eugene, Oregon, November, 1998.
- Invited speaker (5 lectures) at “Geometry and Duality”, Institute for Theoretical Physics, Santa Barbara, January, 1998.
- Invited speaker at “Trimestre de Physique/Mathematique: Integrales Fonctionnelles”, Centre Emile Borel, Paris, December, 1997.
- Invited speaker at “Workshop on Higher Category Theory and Physics”, Northwestern University, March, 1997.
- Invited speaker at “Moduli Spaces in Geometry and Physics”, University of Florida, February, 1997.
- Invited speaker at Special Session on “Moduli Spaces of Vector Bundles over Riemann Surfaces”, Rider College, October, 1996.
- Invited hour address at Eastern sectional meeting of AMS, Boston, October, 1995.
- Invited speaker at “Geometry and Physics”, Aarhus, Denmark, July, 1995.
- Invited speaker at Gokova Topology/Geometry Conference, Gokova, Turkey, June, 1995.
- Invited speaker at Special Session on Topology and Geometry (AMS-IMU Conference), Jerusalem, Israel, May, 1995.
- Invited speaker at “Topological and Geometrical Problems Related to Quantum Field Theory”, Trieste, Italy, March, 1995.
- Invited speaker at “Particles and Fields, 1994”, Banff, Alberta, August, 1994.
- Invited speaker at Namboodiri Conference, University of Chicago, May, 1994.
- Invited speaker at “Mathematical Physics and Geometry”, Mathematical Sciences Research Institute, Berkeley, January, 1994.
- Invited speaker at “Spectral Geometry”, Mathematical Sciences Research Institute, Berkeley, November, 1993.
- Invited speaker at “Conformal Field Theory, Operator Algebras and Low-Dimensional Topology”, Warwick, England, August, 1993.
- Invited speaker at Geometry and Topology Conference in honor of Raoul Bott’s 70th birthday, Harvard University, April, 1993.
- Invited speaker at Special Session “Knots and Topological Quantum Field Theory” (AMS Conference), Dayton, Ohio, October, 1992.
- Invited speaker at “Symposium on Gauge Theory, Geometry, and Topology”, Warwick, England, July 1992.
- Invited speaker at “New Index Theories and Applications”, Oxford, England, July 1992.
- Plenary speaker at “XIX International Colloquium on Group Theoretical Methods in Mathematical Physics”, Salamanca, Spain, June 1992.
- Invited speaker (5 lectures) at the summer school “Recent Problems in Mathematical Physics”, Salamanca, Spain, June 1992.
- Invited speaker at Clifford Lectures Conference, Tulane University, February 1992.
- Invited speaker and participant in US/USSR Meeting “Mathematics and String Theory”, Mathematical Sciences Research Institute, Berkeley, June 1991.
- Invited speaker at “Applications of Algebraic Topology to Geometry and Analysis”, Mathematical Sciences Research Institute, Berkeley, January 1990.
- Invited speaker (5 lectures) at “College on Global Geometric and Topological Methods in Analysis”, International Centre for Theoretical Physics, Trieste, Italy, December 1988.
- Invited speaker at the AMS Joint Summer Research Conference “Geometric and Topological Invariants of Elliptic Operators”, Brunswick, Maine, July 1988.
- Invited speaker at the CBMS Conference “Gauge Theory”, St. Louis, June 1987.

Selected Colloquia and Seminars 1986–2021: Bar-Ilan University, Boston University, Brandeis, Brown, Cal Tech, City University of New York, Columbia, Concordia, ETH, Geometry Center, Harvard, Hebrew University, Institute for Advanced Study, Johns Hopkins, Kansas State University, Mathematical Sciences Research Institute, McGill, MIT, New Mexico State, Notre Dame, Northwestern, Orsay, Oxford, Perimeter Institute, Princeton, Rice, Rockefeller, Rutgers, Simons Center for Geometry and Physics, Stanford, Texas A & M, Tel Aviv University, Technion, Texas Christian University, Tulane, University of Barcelona, University of California at Berkeley, University of California at San Diego, University of California at Santa Barbara, University of Chicago, University of Colorado, University of Houston, University of Illinois, University of Kansas, University of Maryland, University of Michigan, University of Minnesota, University of North Carolina, University of Pennsylvania, University of Texas, University of Toronto, University of Toulouse, University of Utah, University of Virginia, University of Warwick, University of Wisconsin, Virginia Polytechnic Institute, Yale.

Ph.D. STUDENTS

William Stewart, current

Charles Reid, current

Richard Wedeen, current

Arun Debray, Mathematics, Ph.D., 2021

Valentin Zakharevich, Mathematics, Ph.D., 2018

Mio Alter, Mathematics, Ph.D., 2013

Braxton Collier, Mathematics, Ph.D., 2012

Orit Davidovich, Mathematics, Ph.D., 2011

Michael Ortiz, Mathematics, Ph.D., 2009

Spencer Stirling, Mathematics, Ph.D., 2008

Alexander Kahle, Mathematics, Ph.D., 2008

Kevin Klonoff, Mathematics, Ph.D., 2008

Matthew Scholl, Mathematics, Ph.D., 2006

Jerry Jenquin, Physics, Ph.D., 2004

(with Karen Uhlenbeck) Fergus O’Dea, Mathematics, Ph.D., 2000

Mihaela Manilou, Physics, Ph.D., 1997

Rob Harrington, Physics, Ph.D., 1996

PUBLICATIONS

Books

1. (with K. Uhlenbeck), “Instantons and Four-Manifolds”, MSRI Publications, Volume 1, Springer-Verlag, New York, 1984, 1991 (Second Edition).
2. “Five Lectures on Supersymmetry”, American Mathematical Society, Providence, RI, 1999.
3. “Lectures on Field Theory and Topology”, Conference Board of the Mathematical Sciences, Regional Conference Series in Mathematics, Number 133, American Mathematical Society, Providence, RI, 2019.

Books Edited

4. (edited with K. Uhlenbeck), “Geometry and Quantum Field Theory”, IAS/Park City Mathematics Series, 1. American Mathematical Society, Providence, RI; Institute for Advanced Study (IAS), Princeton, NJ, 1995.
5. (edited with P. Deligne, P. Etingof, L. Jeffrey, D. Kazhdan, J. Morgan, D. Morrison, E. Witten), “Quantum Fields and Strings: A Course for Mathematicians”, American Mathematical Society, Providence, RI, 1999.

6. (edited with D. Morrison, I. Singer), “Quantum Field Theory, Supersymmetry, and Enumerative Geometry”, IAS/Park City Mathematics Series, 11. American Mathematical Society, Providence, RI; Institute for Advanced Study (IAS), Princeton, NJ, 2006.
7. (edited with D. Ayala, R. Grady), “Topology and Quantum Theory in Interaction”, Contemporary Mathematics, Volume 718, American Mathematical Society, 2018.
8. (edited with J. Lott), “Selected Works of Isadore Singer”, 3 Volumes, International Press of Boston, Somerville, MA, 2021.
9. (edited with S. Gukov, C. Manolescu, C. Teleman, U. Tillmann), “Quantum Field Theory and Manifold Invariants”, IAS/Park City Mathematics Series, 28. American Mathematical Society, Providence, RI, to appear.

Research Articles

10. (with L. A. Shepp), *A poisson process whose rate is a hidden Markov process*, Advances in Applied Probability, **14** (1982), 21–36.
11. (with Jean-Michel Bismut) *Fibré déterminant et invariant éta*, C. R. Acad. Sci. Paris. Sér. I Math., **301** (1985), 707–710.
12. *Flag manifolds and Kahler geometry*, Infinite Dimensional Groups (ed. V. G. Kac), MSRI Publications, Volume 4, Springer-Verlag, New York, 1985.
13. (with P. C. Fishburn, P. Frankl, J. C. Lagarias, A. M. Odlyzko), *Probabilities for intersecting systems and random subsets of finite sets*, SIAM J. Alg. Disc. Meth., **7** (1986), 73–79.
14. (with Jean-Michel Bismut), *The analysis of elliptic families. I. Metrics and connections on determinant bundles*, Commun. Math. Phys., **106** (1986), 159–176.
15. (with Jean-Michel Bismut), *The analysis of elliptic families. II. Dirac operators, eta invariants, and the holonomy theorem*, Commun. Math. Phys., **107** (1986), 103–163.
16. *Determinants, Torsion, and Strings*, Commun. Math. Phys., **107** (1986), 483–513.
17. (with Cumrun Vafa), *Global anomalies on orbifolds*, Commun. Math. Phys., **110** (1987), 349–389.
18. *On determinant line bundles*, in “Mathematical Aspects of String Theory” (ed. S. T. Yau), World Scientific Publishing, 1987.
19. *Z/k -Manifolds and families of Dirac operators*, Invent. Math., **92** (1988), 243–254.
20. *The geometry of loop groups*, J. Diff. Geom., **28** (1988), 223–276.
21. *An index theorem for families of Fredholm operators parametrized by a group*, Topology, **27** (1988), 279–300.
22. (with David Groisser), *The basic geometry of the manifold of Riemannian metrics and of its quotient by the diffeomorphism group*, Mich. Math J., **36** (1989), 323–344.
23. *Anomalies and determinant line bundles*, XVIIth International Colloquium on Group Theoretical Methods in Physics (Sainte-Adele, PQ, 1988), World Scientific Publishing, Teaneck, NJ, 1989.
24. (with Robert Gompf), *Computer tests of Witten’s Chern-Simons theory against the theory of three-manifolds*, Phys. Rev. Lett., **66** (1991), 1255–1258.
25. (with Robert Gompf), *Computer calculation of Witten’s 3-manifold invariant*, Commun. Math. Phys., **141** (1991), 79–117.
26. (with Richard Melrose), *A mod k index theorem*, Invent. Math., **107** (1992), 283–299.
27. *Reidemeister torsion, spectral sequences, and Breiskorn spheres*, J. reine Math., **429** (1992), 75–89.
28. (with Frank Quinn), *Chern-Simons theory with finite gauge group*, Commun. Math. Phys., **156** (1993), 435–472, ([arXiv:hep-th/9111004](https://arxiv.org/abs/hep-th/9111004)).
29. *Extended structures in topological quantum field theory*, in “Quantum Topology” (eds. L. H. Kauffman and R. A. Baadhio), World Scientific, 1993, 162–173, ([arXiv:hep-th/9306045](https://arxiv.org/abs/hep-th/9306045)).

30. *A gluing law for the index of Dirac operators*, in “Global Analysis in Modern Mathematics (ed. K. K. Uhlenbeck), Publish or Perish, 1993, 5–14.
31. *Locality and integration in topological field theory*, in “Group Theoretical Methods in Physics, Volume 2” (eds. M. A. del Olmo, M. Santander and J. M. Guilarte), Ciemat, 1993, 35–54, ([arXiv:hep-th/9209048](#)).
32. *Lectures on topological quantum field theory*, in “Integrable Systems, Quantum Groups, and Quantum Field Theories” (eds. L. A. Ibort and M. A. Rodríguez), Kluwer Academic Publishers, 1993, 95–156.
33. *Higher algebraic structures and quantization*, Commun. Math. Phys., **159** (1994), 343–398, ([arXiv:hep-th/9212115](#)).
34. (with Xianzhe Dai) *η -Invariants and determinant lines*, J. Math. Phys., **35** (1994), 5155–5194, ([arXiv:hep-th/9405012](#)).
35. *Classical Chern-Simons theory, 1*, Adv. Math., **113** (1995), 237–303, ([arXiv:hep-th/9206021](#)).
36. *Characteristic numbers and generalized path integrals*, in “Geometry, Topology, & Physics for Raoul Bott” (ed. S.-T. Yau), International Press, 1995, 126–138, ([arXiv:dg-ga/9406002](#)).
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