Justin Sawon

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Web: sawon.web.unc.edu   University of North Carolina   Fax: 919-962 2568
Chapel Hill NC 27599-3250

Education

2000   PhD, Mathematics, University of Cambridge, UK
Dissertation: *Rozansky-Witten invariants of hyperkähler manifolds*
Advisor: *Prof Nigel Hitchin*

1996   MSc, Mathematics, University of Adelaide, Australia
Dissertation: *Homomorphisms of semi-holonomic Verma modules: an exceptional case*
Advisor: *Prof Michael Eastwood*

1994   BSc, 1st class honours, Mathematics, University of Adelaide, Australia
Honours thesis: *The Borel-Weil theorem for projective space*

Employment

2023–   Professor in the Department of Mathematics, University of North Carolina
2016–2022   Associate Professor in the Department of Mathematics, University of North Carolina
2010–2015   Assistant Professor in the Department of Mathematics, University of North Carolina
2006–2009   Assistant Professor in the Department of Mathematics, Colorado State University
2002–2006   Simons Instructor in the Department of Mathematics, SUNY at Stony Brook
1999–2002   Esmee Fairbairn Junior Research Fellow at New College, University of Oxford

Visiting positions

Jan–Jun 2023   Visiting researcher at the Max-Planck-Institut für Mathematik, Bonn
May–Jul 2013   Visiting researcher at the Erwin Schrödinger Institute, Vienna
Sep–Dec 2011   Participant in the Junior Trimester Program on Differential Geometry at the Hausdorff Research Institute for Mathematics, Bonn
Jul–Dec 2011   Visiting researcher at the Max-Planck-Institut für Mathematik, Bonn
May–Jun 2006   Visiting researcher at the Max-Planck-Institut für Mathematik, Bonn
Jun–Aug 2005   Visiting researcher at Johannes Gutenberg Universität, Mainz
Jun–Aug 2004   Visiting researcher at the Research Institute for Mathematical Sciences, Kyoto
Jun–Aug 2003   Visiting researcher at the Institut des Hautes Études Scientifiques, Bures-sur-Yvette
Mar–May 2002   Visiting researcher at the Isaac Newton Institute, Cambridge
Dec 2001–Mar 2002   European Differential Geometry Endeavour postdoctoral fellow, Università di Roma 1

Awards and scholarships

2007+2008+2009   Colorado Mathematics Awards for outstanding service to students
1999–2000   Trinity College (Cambridge) Senior Rouse Ball Studentship
1996–1999   Trinity College (Cambridge) External Research Studentship, Overseas Research Student Award, Honorary Packer Scholar
1998   J.T. Knight Prize for mathematical essay, awarded by University of Cambridge
1995–1996   Australian Postgraduate Award for MSc research at University of Adelaide
1994   Amar Hasan Abdi Prize for top honours mathematics student, University of Adelaide

1992+1993	Best entries in the Sydney University Mathematics Society national competition
1993	David Murray Scholarship, J.R. Wilton and E.S. Barnes Prizes for top 3rd year mathematics student, University of Adelaide
1992	J.H. Michael Prize for top 2nd year mathematics student, University of Adelaide
1991	Honourable mention at the International Mathematics Olympiad in Sweden

Articles in preparation

1. Xuqiang Qin and Justin Sawon[1], *Toward a classification of $(1,2)$-polarized Lagrangian fibrations*, in preparation, 9 pages.

2. Justin Sawon, *Mirror symmetry for generalized Kummer varieties*, in preparation, 7 pages.

3. Justin Sawon and Chen Shen, *A singular Lagrangian fibration by Prym varieties, I. construction*, in preparation, 15 pages.

4. Justin Sawon and Chen Shen, *A singular Lagrangian fibration by Prym varieties, II. dual fibrations*, in preparation, 10 pages.

5. Paul Kruse and Justin Sawon, *Moduli spaces of Bridgeland stable objects on K3 surfaces and their $\mathbb{P}^3$ relatives*, in preparation, 25 pages.

Preprints (available online at **sawon.web.unc.edu**)

1. Xuqiang Qin and Justin Sawon, *Birational geometry of Beauville-Mukai systems III: asymptotic behavior*, preprint **arXiv:2210.03095**, 9 pages, October 2022, submitted to the Bulletin of the London Mathematical Society.

2. Justin Sawon, *Isotrivial elliptic K3 surfaces and Lagrangian fibrations*, preprint **arXiv:1406.1233**, 17 pages, December 2014, under review for Mathematische Nachrichten.

3. Justin Sawon, *Fourier-Mukai transforms, mirror symmetry, and generalized K3 surfaces*, preprint **arXiv:1209.3202**, 26 pages, September 2012.

Refereed publications (available online at **sawon.web.unc.edu**)

1. Xuqiang Qin and Justin Sawon, *Birational geometry of Beauville-Mukai systems II: general theory in low ranks*, accepted by Mathematical Research Letters, October 2023, 33 pages, preprint **arXiv:2207.12608**.

2. Xuqiang Qin and Justin Sawon, *Birational geometry of Beauville-Mukai systems I: the rank three and genus two case*, Mathematische Zeitschrift (2023), 305:32, 35 pages. DOI: 10.1007/s00209-023-03353-z

3. Justin Sawon, *Topological bounds on hyperkähler manifolds*, Experimental Mathematics (2023), 17 pages. DOI: 10.1080/10586458.2023.2172630

4. Justin Sawon and Chen Shen, *Deformations of compact Prym fibrations to Hitchin systems*, Bulletin of the London Mathematical Society **54** (2022), no. 5, 1568–1583. DOI: 10.1112/blms.12643

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[1]In pure mathematics journals all authors are regarded as equal contributors; accordingly, authors' names are always listed alphabetically.

5. Justin Sawon, *A bound on the second Betti number of hyperkähler manifolds of complex dimension six*, European Journal of Mathematics **8** (2022), 1196–1212. DOI: 10.1007/s40879-021-00526-0

6. Justin Sawon, *Singular fibres of very general Lagrangian fibrations*, Communications in Contemporary Mathematics **24** (2022), no. 9, 19 pages. DOI: 10.1142/S021919972150070X

7. Justin Sawon, *Lagrangian fibrations by Prym varieties*, Matemática Contemporânea, Vol. **47** (2020), 182–227. DOI: 10.21711/231766362020/rmc479

8. Kelly McKinnie, Justin Sawon, Sho Tanimoto, and Anthony Várilly-Alvarado, *Brauer groups on K3 surfaces and arithmetic applications*, Brauer groups and obstruction problems, 177–218, Progress in Mathematics **320**, Birkhäuser/Springer, Cham, 2017. DOI: 10.1007/978-3-319-46852-5_9

9. Justin Sawon, *Moduli spaces of sheaves on K3 surfaces*, Journal of Geometry and Physics **109** (2016), 68–82. DOI: 10.1016/j.geomphys.2016.02.017

10. Justin Sawon, *A finiteness theorem for Lagrangian fibrations*, Journal of Algebraic Geometry **25** (2016), no. 3, 431–459. DOI: 10.1090/jag/673

11. Rebecca Glover and Justin Sawon, *Generalized twistor spaces for hyperkähler manifolds*, Journal of the London Mathematical Society (2) **91** (2015), no. 2, 321–342. DOI: 10.1112/jlms/jdu074

12. Justin Sawon, *On Lagrangian fibrations by Jacobians I*, Journal für die reine und angewandte Mathematik **701** (2015), 127–151. DOI: 10.1515/crelle-2013-0023

13. Justin Sawon, *On Lagrangian fibrations by Jacobians II*, Communications in Contemporary Mathematics, Vol. 17, No. 5 (2015), 1450046, 23 pages. DOI: 10.1142/S0219199714500461

14. Justin Sawon, *Fibrations on four-folds with trivial canonical bundles*, Geometriae Dedicata **171** (2014), 93–117. DOI: 10.1007/s10711-013-9890-x

15. Justin Sawon, *Foliations on hypersurfaces in holomorphic symplectic manifolds*, International Mathematics Research Notices (2009), no. **23**, 4496–4545.

16. Justin Sawon, *Deformations of holomorphic Lagrangian fibrations*, Proceedings of the American Mathematical Society **137** (2009), 279–285.

17. Justin Sawon, *Twisted Fourier-Mukai transforms for holomorphic symplectic four-folds*, Advances in Mathematics **218** (2008), no. 3, 828–864.

18. Justin Sawon, *On the discriminant locus of a Lagrangian fibration*, Mathematische Annalen **341** (2008), no. 1, 201–221.

19. Justin Sawon, *Lagrangian fibrations on Hilbert schemes of points on K3 surfaces*, Journal of Algebraic Geometry **16** (2007), no. 3, 477–497.

20. Justin Sawon, *Perturbative expansion of Chern-Simons theory*, in Interaction of finite-type and Gromov-Witten invariants, Banff 2003, Geometry and Topology Monographs **8** (2006), 145–166. DOI: 10.2140/gtm.2006.8.145

21. Justin Sawon, *Derived equivalence of holomorphic symplectic manifolds*, in Algebraic structures and moduli spaces: CRM Workshop, Montreal, July 2003, CRM Proceedings & Lecture Notes Series **38** (2004), 193–211.

22. Justin Sawon, *Abelian fibred holomorphic symplectic manifolds*, Turkish Jour. Math. **27** (2003), no. 1, 197–230. (Proceedings of the Ninth Gökova Geometry-Topology Conference, May 2002.)

23. Justin Roberts and Justin Sawon, *Generalizations of Rozansky-Witten invariants*, in Invariants of knots and 3-manifolds, Kyoto 2001, Geometry and Topology Monographs **4** (2002), 263–279.

24. Michael Eastwood and Justin Sawon, *The Borel-Weil theorem for complex projective space*, in Invitations to geometry and topology, Oxford Graduate Texts in Mathematics (2002), 126–145.

25. Justin Sawon, *Topological quantum field theory and hyperkähler geometry*, Turkish Jour. Math. **25** (2001), no. 1, 169–194. (Proceedings of the Seventh Gökova Geometry-Topology Conference, June 2000.)

26. Justin Sawon, *A new weight system on chord diagrams via hyperkähler geometry*, in Quaternionic structures in mathematics and physics, Rome, September 1999, World Scientific (2001), 349–363.

27. Nigel Hitchin and Justin Sawon, *Curvature and characteristic numbers of hyperkähler manifolds*, Duke Mathematical Journal **106** (2001), no. 3, 599–615.

28. Justin Sawon, *When is a Lie algebra not a Lie algebra?*, in Proceedings of the IXth Oporto Meeting on Geometry, Topology and Physics, September 2000 (available at **www.math.ist.utl.pt/~jmourao/om/omix/proc.html**).

29. Justin Sawon, *The Rozansky-Witten invariants of hyperkähler manifolds*, Proceedings of the 7th International Conference on Differential Geometry and Applications (Satellite Conference of the Berlin ICM), Brno, August 1998, (1999), 429–436.

30. Justin Sawon, *Homomorphisms of semiholonomic Verma modules: an exceptional case*, Acta Mathematica Universitatis Comenianae **68** (1999), no. 2, 257–269.

Dissertations (available online at **sawon.web.unc.edu**)

1. Justin Sawon, *Rozansky-Witten invariants of hyperkähler manifolds*, PhD thesis, University of Cambridge (2000), 130 pages.

2. Justin Sawon, *Homomorphisms of semiholonomic Verma modules: an exceptional case*, MSc thesis, University of Adelaide (1996), 96 pages.

Other publications

1. Justin Sawon, 116 reviews for Mathematical Reviews (MathSciNet), from 2000 to the present time.

2. Jon Aycock (honors advisee of Justin Sawon), *Galois cohomology and the Brauer group of a field*, Rose-Hulman Undergraduate Mathematics Journal **18** (2017), no. 2, 26pp.

3. Graham Hawkes (honors advisee of Justin Sawon), *Simple surfaces singularities, their resolutions, and construction of K3 surfaces*, Rose-Hulman Undergraduate Mathematics Journal **15** (2014), no. 1, 31–61.

4. Justin Sawon, main article on *Hyperkähler manifolds*, plus five brief articles on *The ADHM construction, Higgs bundles, The Hitchin system, Instanton moduli spaces*, and *Rozansky-Witten invariants* for the Modern Encyclopedia of Mathematical Physics, editors Irina Aref-eva and Daniel Sternheimer, Springer 2014, 5 pages and 1 page each, respectively.

5. Nigel Hitchin (notes by Justin Sawon), *Riemann surfaces and integrable systems*, in Integrable systems: twistors, loop groups, and Riemann surfaces, Oxford Graduate Texts in Mathematics, Clarendon Press (1999), 11–52.

Invited conference talks

- *Complex Lagrangians, Mirror Symmetry, and Quantization*, Banff, Canada, October 2023
- *Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics*, Simons Center for Geometry and Physics, Stony Brook, New York, USA, September 2023
- *Workshop on Hyperkähler Geometry*, Paris, France, June 2023
- *Complex Lagrangians, Integrable Systems, and Quantization*, University of Oxford, UK, June 2023 (four talks)
- *New perspectives on hyperkähler manifolds*, Levico Terme, Italy, June 2022
- *AMS Fall Southeastern Sectional Meeting*, virtual meeting online, October 2020
- *Moduli of special holonomy metrics and their periods*, Simons collaboration virtual meeting online, June 2020
- *Algebraic Geometry in Auckland*, University of Auckland, New Zealand, December 2019
- *Algebraic Geometry Workshop*, KIAS, Seoul, Korea, November 2019
- *Joint Mathematics Meetings of the AMS and MAA 2019*, Baltimore, USA, January 2019
- *Geometry and physics of quantum curves*, Banff, Canada, September 2018
- *Moduli spaces in algebraic geometry and applications*, Campinas, Brazil, July 2018
- *Joint Mathematics Meetings of the AMS and MAA 2018*, San Diego, USA, January 2018
- *Georgia Algebraic Geometry Symposium*, University of Georgia at Athens, USA, March 2017
- *Generalised Geometry and Noncommutative Algebra*, University of Oxford, UK, December 2016
- *AMS Fall Southeastern Sectional Meeting*, North Carolina State University, USA, November 2016
- *Complex Algebraic Geometry*, UC San Diego, California, USA, January 2016
- *Workshop on Spectral Data for Higgs Bundles*, American Institute of Mathematics, San Jose, California, USA, September/October 2015
- *AMS Summer Institute on Algebraic Geometry*, University of Utah, Salt Lake City, USA, July 2015
- *Hyperkähler Saturday*, Higher School of Economics, Moscow, Russia, May 2015
- *Workshop on Hyperkähler Geometry*, KIAS, Seoul, Korea (two lectures), March 2015
- *AMS Fall Southeastern Sectional Meeting*, University of North Carolina at Greensboro, USA, November 2014 (two talks)
- *9th Pacific Rim Conference on Complex Geometry (Seoul ICM 2014 Satellite Conference)*, Gunsan, Korea, July/August 2014
- *Instanton counting : moduli spaces, integrable systems, and representation theory*, Lorentz Center, Leiden, Netherlands, June 2014 (one research and one expository talk)
- *Brill-Noether methods in the study of Calabi-Yau and hyperkähler manifolds*, Hausdorff Research Institute for Mathematics, Bonn, Germany, March 2014
- *Quiver varieties workshop*, Simons Center for Geometry and Physics, Stony Brook, New York, USA, October 2013
- *Workshop on Brauer groups and obstruction problems : moduli spaces and arithmetic*, American Institute of Mathematics, Palo Alto, California, USA, February 2013
- *The Interaction of Geometry and Representation Theory : Exploring new frontiers*, Erwin Schrödinger Institute, Vienna, Austria, September 2012
- *Workshop on algebraic geometry*, Università degli Studi di Milano, Milan, Italy, December 2011
- *International conference on moduli spaces and modular forms*, CIRM, Luminy, France, October 2011
- *Workshop on holomorphic symplectic varieties*, Courant Institute, NYU, New York, USA, June 2011
- *Shanks Workshop*, Vanderbilt University, Nashville, Tennessee, USA, September 2010
- *Generalized complex and holomorphic Poisson geometry*, Banff, Canada, April 2010
- *UM/UIC/OSU Weekend Algebraic Geometry Workshop*, Columbus, Ohio, USA, March 2010
- *AMS Fall Western Sectional Meeting*, University of New Mexico, USA, October 2007
- *Workshop on Fourier-Mukai and Nahm Transforms*, CRM, Université de Montréal, Canada, August 2007

- *Western Algebraic Geometry Seminar*, University of Washington, Seattle, USA, April 2007
- *Workshop on Holomorphic Symplectic Geometry*, KIAS, Seoul, Korea (four lectures), March 2007
- *Workshop on Geometry*, Chinese University of Hong Kong, December 2006
- *Workshop on Holomorphic Symplectic Varieties*, MPIM Bonn, Germany, May 2006
- *Mathematical Aspects of String Theory*, Kyoto, Japan, July 2004
- *Hyperkähler, Holomorphic Symplectic Manifolds, and Related Topics*, Gero, Japan, January 2004
- *The Interaction of Finite Type and Gromov-Witten Invariants*, Banff, Canada, November 2003
- *Complex Geometry*, Oberwolfach, Germany, August 2003
- *Workshop on Algebraic Structures and Moduli Spaces*, CRM, Université de Montréal, Canada, July 2003
- *Integrable Systems and Spectral Curves*, Université de Lille, France, June 2003
- *AMS Spring Eastern Sectional Meeting*, Courant Institute, NYU, New York, USA, April 2003
- *XVIIIth Annual Geometry Festival*, Duke University, USA, March 2003
- *Geometric Topology* (satellite conference of ICM 2002), Xi'an, China, August 2002
- *Ninth Gökova Geometry and Topology Conference*, Turkey, May/June 2002
- *Clay Spring School on Geometry and String Theory*, Isaac Newton Institute, Cambridge, UK, April 2002
- *Workshop on Quantum Topology*, Warwick, UK, March 2002
- *Invariants of Knots and 3-manifolds*, Kyoto, Japan, September 2001
- *Complex Geometry*, Oberwolfach, Germany, September 2001
- *New Interfaces between Geometry and Physics*, Miraflores, Madrid, Spain, May/June 2001
- *IXth Oporto Meeting on Geometry, Topology, and Physics*, Portugal, September/October 2000
- *Seventh Gökova Geometry and Topology Conference*, Turkey, May/June 2000
- *2nd Meeting on Quaternionic Structures in Mathematics and Physics*, Rome, September 1999
- *4th International Conference on Geometry and Applications*, Varna, Bulgaria, August 1999
- *Summer School on Invariants of Links and 3-manifolds*, Grenoble, France, June/July 1999
- *Differential Geometry and its Applications* (satellite of ICM 1998), Brno, Czech Republic, August 1998

Other conference presentations

- *International Congress of Mathematicians 2018*, Rio de Janeiro, Brazil, August 2018 (short communication)
- *Joint Mathematics Meetings of the AMS and MAA 2017*, Atlanta, USA, January 2017
- *International Congress of Mathematicians 2014*, Seoul, Korea, August 2014 (short communication)
- *1st Pacific Rim Mathematical Association (PRIMA) Congress*, University of NSW, Australia, July 2009
- *Conference on Algebraic Geometry*, Kinosaki, Japan, October 2008 (poster)
- *Vector Bundles on Algebraic Curves*, Bad Honnef, Germany, June 2007 (poster)
- *International Congress of Mathematicians 2002*, Beijing, China, August 2002 (short communication)
- *Géométrie Algébraique en Liberté VII*, Marseille, France, March 1999
- *International Congress of Mathematicians 1998*, Berlin, Germany, August 1998 (poster)

Invited lectures, seminars, and colloquia

- Università degli Studi di Milano, Milan, Italy, July 2023
- Johannes Gutenberg Universität, Mainz, Germany, June 2023
- University College London, UK, June 2023
- Max Planck Institute for Mathematics, Bonn, Germany, May 2023
- Institute for Science and Technology (two lectures), Austria, March 2023
- University of Pennsylvania, November 2022

- University of Pisa, Italy, June 2022
- University of Bologna (two lectures), Italy, June 2022
- Scuola Internazionale Superiore di Studi Avanzati, Trieste, Italy, June 2022
- University of Illinois Chicago, USA, online seminar, February 2021
- Tecnico Lisboa, Lisbon, Portugal, online seminar, January 2021
- University of Massachusetts, Boston, USA, March 2019
- Northeastern University, Boston, USA, March 2018
- Duke University, Durham, USA, January 2017
- University of South Carolina (two lectures), Columbia, USA, February 2016
- Faculty of Mathematics (two lectures), Higher School of Economics, Moscow, Russia, May 2015
- University of Waterloo, Canada, July 2014
- University of Utrecht, Netherlands, June 2014
- University of Hannover, Germany, July 2013
- Faculty of Mathematics (three lectures), Higher School of Economics, Moscow, Russia, June 2013
- Erwin Schrödinger Institute, Vienna, Austria, May 2013
- Korea Institute for Advanced Studies (two lectures), Seoul, Korea, March 2013
- Penn State University, USA, January 2013
- University of Toronto (three lectures), Canada, May 2012
- Duke University, Durham, USA, January 2012
- Hausdorff Research Institute for Mathematics, Bonn, Germany, November 2011
- University of Utrecht, Netherlands, November 2011
- University of Oxford, UK, October 2011
- Università di Roma 1, Italy, October 2011
- University of California San Diego, USA, May 2011
- University of California Riverside, USA, May 2011
- Korea Institute for Advanced Studies, Seoul, Korea, May 2010
- Korea Advanced Institute of Science and Technology, Daejeon, Korea, May 2010
- University of Utah, USA, March 2010
- University of Georgia, Athens, USA, February 2010
- Duke University, Durham, USA, February 2010
- University of Sydney (colloquium and seminar), Australia, July 2009
- University of Adelaide (three lectures), Australia, June 2009
- State University of New York at Stony Brook, USA, March 2009
- University of North Carolina, Chapel Hill, USA, February 2009
- Duke University, Durham, USA, February 2009
- University of North Carolina, Chapel Hill, USA, April 2008
- Yonsei University, Seoul, Korea, April 2008
- Korea Institute for Advanced Studies, Seoul, Korea, March 2008
- University of Colorado (two lectures), Boulder, USA, May 2007
- University of Wisconsin, Madison, USA, May 2007
- Rice University, USA, February 2007
- University of Utah, USA, February 2007
- Chinese University of Hong Kong (five lectures), January 2007
- Humboldt University, Berlin, Germany, July 2006
- Köln University, Germany, June 2006
- Université Pierre-et-Marie-Curie, Paris 6, France, June 2006
- Texas A&M University, USA, March 2006
- Kansas State University, USA, February 2006
- Colorado State University, USA, February 2006
- Tokyo University, Japan, January 2006

- University of Illinois at Urbana-Champaign, USA, October 2005
- Johannes Gutenberg Universität, Mainz, Germany, June 2005
- Adelaide University, Australia, May 2005
- Louisiana State University, USA, February 2005
- Boston University, USA, February 2005
- University of California, Davis, USA, February 2005
- Kyushu University, Japan, July 2004
- Brown University, Providence, USA, March 2004
- University of Pennsylvania, USA, November 2003
- Université Paris 7, Jussieu, France, June 2003
- École Polytechnique (Besse seminar), France, June 2003
- Columbia University, New York, USA, February 2003
- Kyoto University, Japan, January 2003
- Köln University, Germany, May 2002
- Cambridge University, UK, May 2002
- Cardiff University, UK, March 2002
- University of California San Diego, USA, November 2001
- University of California Berkeley, USA, November 2001
- University of Birmingham (colloquium), May 2001
- Università di Roma 1, Italy, April 2001
- International Centre for Theoretical Physics, Trieste, Italy, April 2001
- Cambridge University, UK, March 2001
- Trinity College Dublin, Ireland, January 2001
- Edinburgh University, UK, February 2000
- University of Århus, Denmark, April 1999

Other seminars and talks

- two Graduate Mathematics Association talks and two undergraduate Math Club talks at UNC
- numerous internal seminars while employed at UNC, Colorado State University, Stony Brook University, and the University of Oxford
- regular participant at the UNC Mathematics Colloquium, Physically Inspired Mathematics Seminar, and Geometric Methods in Representation Theory Seminar

Teaching record

University of North Carolina (600-level and above are graduate courses)

Fall 2023	MATH294 Problem solving seminar, 14 students
	MATH551 Euclidean and non-Euclidean geometries, 13 students
	MATH891 Symplectic geometry and topology, 8 students (+12 auditors)
Summer 2023	MATH381 Discrete mathematics ("Math in Florence" study abroad), 10 students
Fall 2022	MATH210 Mathematical tools for data science, 30 students
	MATH294 Problem solving seminar, 8 students
	MATH681 Introductory topology, 12 students
Summer 2022	MATH521 Advanced calculus I, 13 students
Fall 2021	MATH231 Calculus of functions of one variable I, 138 students
	MATH294 Problem solving seminar, 8 students (+24 auditors)
	MATH551 Euclidean and non-Euclidean geometries, 19 students
Summer 2021	MATH521 Advanced calculus I, 25 students

Spring 2021	MATH521 Advanced calculus I, 42 students
	MATH296 Directed exploration in mathematics - hyperbolic geometry, 1 student (Xiangyu Zeng)
	MATH920 Reading course in complex geometry, 1 student (Laney Bowden)
Fall 2020	MATH771 Commutative algebra, 7 students
	MATH294 Problem solving seminar, 12 students (+20 auditors)
	MATH296 Directed exploration in mathematics - soliton theory, 1 student (Calum O'Mara)
Summer 2020	MATH296 Directed exploration in mathematics - hyperbolic geometry, 1 student (Xiangyu Zeng)
Spring 2020	MATH578 Algebraic structures, 58 students
Fall 2019	MATH381 Discrete mathematics, 40 students
	MATH771 Commutative algebra, 5 students
	MATH294 Problem solving seminar, 20 students (+20 auditors)
Summer 2019	MATH381 Discrete mathematics ("Math in Costa Rica" study abroad), 5 students
Fall 2018	MATH680 Geometry of curves and surfaces, 18 students
	MATH294 Problem solving seminar, 19 students (+20 auditors)
Spring 2018	MATH681 Introductory topology, 13 students
	MATH692H Honors thesis in derived categories, 1 student (Sam DeHority)
Fall 2017	MATH231 Calculus of functions of one variable I, 148 students
	MATH294 Problem solving seminar, 21 students (+20 auditors)
	MATH691H Honors research in derived categories, 1 student (Sam DeHority)
	MATH692H Honors thesis in noncommutative geometry, 1 student (Shengding Sun)
Spring 2017	MATH296 Undergraduate reading in derived categories, 1 student (Sam DeHority)
	MATH691H Honors research in noncommutative geometry, 1 student (Shengding Sun)
Fall 2016	MATH676 Modules, linear algebra, and groups, 17 students
	MATH294 Problem solving seminar, 17 students (+30 auditors)
Spring 2016	MATH782 Differential geometry, 12 students
	MATH692H Honors thesis in Brauer groups, 1 student (Jon Aycock)
Fall 2015	MATH231 Calculus of functions of one variable I, 130 students
	MATH294 Problem solving seminar, 11 students (+17 auditors)
	MATH691H Honors research in quadratic forms, 1 student (Jon Aycock)
Spring 2015	MATH681 Introductory topology, 9 students
Fall 2014	MATH548 Combinatorial mathematics, 40 students
	MATH676 Modules, linear algebra, and groups, 11 students
	MATH294 Problem solving seminar, 13 students (+10 auditors)
	MATH692H Honors thesis in algebraic topology, 1 student (Marshall Lochbaum)
	MATH920 Graduate reading course in geometry, 1 student (Tim Adler)
Spring 2014	MATH381 Discrete mathematics, 42 students
	MATH578 Algebraic structures, 26 students
Fall 2013	MATH680 Geometry of curves and surfaces, 16 students
	MATH294 Problem solving seminar, 10 students (+10 auditors)
Spring 2013	MATH681 Introductory topology, 13 students
	MATH290 Undergraduate independent study in algebraic geometry, 1 student (Graham Hawkes)
	MATH994 Graduate reading course in complex geometry, 1 student (Sam Miller)
Fall 2012	MATH233 Calculus of functions of several variables (section 6), 41 students
	MATH381 Discrete mathematics (section 3), 35 students
	MATH295 Problem solving in mathematics, 7 students (+8 auditors)

	MATH296 Undergraduate reading course in algebraic geometry, 1 student (Graham Hawkes)
	MATH994 Graduate reading course in complex geometry, 1 student (Sam Miller)
Summer 2012	Undergraduate reading course in algebraic geometry, 1 student (Graham Hawkes)
	Graduate reading course in complex geometry, 1 student (Sam Miller)
Spring 2012	MATH381 Discrete mathematics (section 2), 37 students
	MATH578 Algebraic structures, 18 students
	MATH699 Reading course in Riemannian geometry, 2 students
Spring 2011	MATH782 Differential geometry, 12 students
Fall 2010	MATH381 Discrete mathematics (section 2), 30 students
	MATH920 Reading course in complex geometry, 1 student (Rebecca Glover)
	MATH920 Reading course in moduli of vector bundles, 1 student (Ryan Kaliszewski)
Spring 2010	MATH681 Introductory topology, 10 students
	MATH920 Reading course in symplectic geometry, 3 students

Colorado State University (500-level and above are graduate courses)

Fall 2009	MATH369 Linear algebra (section 3)
	MATH676 Topics in Riemannian geometry
Spring 2009	MATH670 Introduction to differentiable manifolds
	Independent study in moduli spaces (Olivia Dumitrescu)
Fall 2008	MATH161 Calculus II (sections 4, 5, and 7)
Spring 2008	MATH567 Abstract algebra II
Fall 2007	MATH495 GRE preparation
	MATH566 Abstract algebra I
Spring 2007	MATH369 Linear algebra (section 3)
Fall 2006	MATH369 Linear algebra (section 1)
	MATH400D Topology
	Independent study in differential geometry (Byungsoo Kim)

SUNY at Stony Brook (500-level and above are graduate courses)

Spring 2006	MAT 542 Complex analysis I
Fall 2005	MAT 125 Calculus A (sections LEC1 and LEC5)
	Independent study in differential geometry (Greg Grinberg)
Fall 2004	MAT 260 Problem solving in mathematics
	MAT 590 Problem seminar (comprehensive exam preparation)
	Independent study in twistor spaces (Mustafa Kalafat)
Spring 2004	MAT 645 Topics in differential geometry (hyperkähler manifolds)
	Independent study in geometry of Lagrangian submanifolds (Ibrahim Unal)
	Independent study in ALE manifolds and singularities (Yu-Jen Shu)
Fall 2003	MAT 123 Introduction to calculus
	MAT 590 Problem seminar (comprehensive exam preparation)
	Independent study in G_2-manifolds (Ibrahim Unal)
	Independent study in self-dual 4–manifolds (Mustafa Kalafat)
Spring 2003	MAT 305 Calculus IV (differential equations)
	MAT 569 Differential geometry II
Fall 2002	MAT 566 Differential topology

Junior faculty mentored

2023–present   Caroline Moosmueller (assistant professor)
2020–present   Olivia Dumitrescu (assistant and then associate professor)

Postdoctoral researchers supervised

2020–present   Xuqiang Qin (departmental postdoc)

PhD students supervised

2023–present   Andrew Paul (expected graduation in 2028)
2022–present   Xiangjia Kong (expected graduation in 2026)
2021–present   Aubrey Leary (expected graduation in 2026)
2021–present   Paul Teszler (expected graduation in 2024)
2016–2020   Paul Kruse, "Moduli spaces of Bridgeland stable objects on K3 surfaces and their $\mathbb{P}^3$ relatives" (defended July 2020, currently an EPA fellowship recipient)
               Chen Shen, "Lagrangian fibrations by Prym varieties" (defended March 2020, currently a data scientist at Microsoft, Seattle, WA)
2013–2017   Sam Miller, "A Kobayashi-Hitchin-like correspondence for $\widehat{\mathbb{C}^2/\pm 1}$" (graduated December 2017, instructor at Trinity University, San Antonio, TX, currently an actuary at Milliman)
2011–2013   Rebecca Glover, "Generalized twistor spaces for hyperkähler and quaternionic Kähler manifolds" (graduated May 2013, currently an associate professor at the University of St Thomas, St Paul, MN)

Master's students supervised

2021–2022   Laney Bowden, "Abelian surfaces and linear systems" (graduated May 2022, currently a PhD student at UT Austin)
2014–2017   Yang Sun (left UNC after graduating with a PhD in physics, worked at IBM and Citi, currently at Bytedance)
2014   Cole Arendt, "Hyperbolic geometry and Mostow's rigidity" (graduated December 2014, currently a solutions engineer at RStudio Inc.)

Undergraduate honors projects supervised

2017–2018   Sam DeHority, "Bridgeland stability and non-commutative tori" (currently a PhD student at Columbia University)
2017   Shengding Sun, "Non-commutative quiver algebras and their geometric realizations" (currently a PhD student at Georgia Tech)
2015–2016   Jon Aycock, "The Brauer group of a field" (currently a PhD student at the University of Oregon)
2013–2014   Marshall Lochbaum, "A lower bound for immersions of real Grassmannians" (Dyalog Ltd. software developer)
2012–2013   Graham Hawkes, "Simple surface singularities, their resolutions, and construction of some K3 surfaces" (elected to Sigma Xi, PhD from UC Davis, postdoc at the Max Planck Institute, currently a postdoc at Ben-Gurion University of the Negev, Israel)

Other students mentored

2023	Japheth Varlack (Wake Forest University), as part of the Math Alliance program "Facilitated Graduate Applications Process (F-GAP)"
2022	Javier Loya (Kansas State University), as part of the Math Alliance program "Facilitated Graduate Applications Process (F-GAP)"
2021	Meagan Hodge (Spelman College), as part of the Math Alliance program "Facilitated Graduate Applications Process (F-GAP)"
2020	Juan Valencia (California State University, Stanislaus), as part of the Math Alliance program "Facilitated Graduate Applications Process (F-GAP)"
2020	Xiangyu Zeng, recipient of a Summer Award for Research-Intensive Courses, research led to a poster presentation at the Undergraduate Mathematics Symposium, University of Illinois Chicago, November 2020
2019	Rose Lopez (Arizona State University), as part of the Math Alliance program "Facilitated Graduate Applications Process (F-GAP)" (currently a PhD student at UC Berkeley)
2016	Calum O'Mara and Ami Zou, undergraduate participants in the Science and Math Achievement and Resourcefulness Track (SMART) summer program for underrepresented minority students in STEM disciplines

Grants

National Science Foundation *FRG Collaborative Research: Complex Lagrangians, Integrable Systems, and Quantization*, $740,299 (direct costs: $502,967), lead P.I. (co-P.I. Olivia Dumitrescu), 16.7% effort, June 2022–May 2025

American Mathematical Society travel grant, $3500 (direct costs: $3500), to attend ICM in St Petersburg, Russia, sole P.I., 0% effort, July 2022 (program cancelled)

National Science Foundation AGEP-GRS supplemental funding for a minority student (supplement to award DMS-1555206), $59,122+$59,297+$60,681 (direct costs: $42,350+$42,477+$43,367), sole P.I., 0% effort, June 2021–May 2024

National Science Foundation CAREER award DMS-1555206 *Finiteness for hyperkähler manifolds*, $450,003 (direct costs: $304,706), sole P.I., 16.7% effort, June 2016–May 2021 (extended to May 2022)

National Science Foundation conference grant DMS-1547117 *Workshops on algebraic geometry and representation theory*, $30,000 (direct costs: $30,000), P.I.s Prakash Belkale and Justin Sawon, 0% effort, November 2015–October 2018

Simons Foundation collaboration grant *Topics in holomorphic symplectic and hyperkähler geometry*, $35,000 (direct costs: $30,000), sole P.I., 0% effort, September 2015–August 2020

National Science Foundation supplemental funding for a graduate student (supplement to award DMS-1206309), $8259 (direct cost $5580), sole P.I., 0% effort, July 2015–June 2016

National Science Foundation conference grant DMS-1446356 *Workshop on moduli spaces, derived geometry, and representation theory*, $15,000 (direct costs: $15,000), P.I.s Prakash Belkale, Shrawan Kumar, Justin Sawon, 0% effort, November 2014–October 2015

UNC Junior Faculty Development Award, *Derived categories*, $7500 (direct costs: $7,500), sole P.I., 0% effort, January–December 2013

National Science Foundation grant DMS-1206309 *Classification of Lagrangian fibrations*, $150,629 (direct costs: $103,584), sole P.I., 16.7% effort, July 2012–June 2015

UNC University Research Council small grant program, *Hyperkähler metrics and Lagrangian fibrations*, recipient of $1000 grant (direct costs: $1000), sole P.I., 0% effort, May 2012–April 2014

UNC University Research Council small grant program, *Mirror symmetry and deformations of generalized K3 surfaces*, recipient of $2500 grant (direct costs: $2500), sole P.I., 0% effort, May 2011–April 2013

Travel support from an NSF grant, $1200 (direct costs: $1200), to attend PRIMA2009 in Sydney, Australia, sole P.I., 0% effort, July 2009

American Mathematical Society travel grant, $2000 (direct costs: $2000), to attend ICM in Madrid, Spain, sole P.I., 0% effort, August 2006

National Science Foundation grant DMS-0305865 *Studies in Riemannian and complex geometry*, $477,300 (direct costs: $322,500), P.I.s: Mike Anderson and Claude LeBrun, postdoctoral associate: Justin Sawon, 16.7% effort, June 2003–May 2006

Professional service to discipline

Reviewing and refereeing

Referee for Advances in Mathematics, Algebraic and Geometric Topology, Algebraic Geometry, AMS books (the Student Mathematical Library series), Annales de l'Institut Fourier, Annales scientifiques de l'École normale supérieure, Annales Polonici Mathematici, Annals of Global Analysis and Geometry, Bulletin of the London Mathematical Society, Central European Journal of Mathematics, Commentarii Mathematici Helvetici, Communications in Analysis and Geometry, Communications in Contemporary Mathematics, Communications in Mathematical Physics, Compositio Mathematica, Comptes Rendus Mathématique, Documenta Mathematica, Duke Mathematical Journal, Épijournal de Géométrie Algébrique, Geometric and Functional Analysis, Geometry and Topology, International Journal of Mathematics, International Mathematics Research Notices, Israel Journal of Mathematics, Journal of Algebraic Geometry, Journal of the American Mathematical Society, Journal für die reine und angewandte Mathematik, Journal of Differential Geometry, Journal of the European Mathematical Society, Journal of Geometric Analysis, Journal of Geometry and Physics, Journal of the London Mathematical Society, Journal of Symplectic Geometry, Kyoto Journal of Mathematics, Letters in Mathematical Physics, Manuscripta Mathematica, Matemática Contemporânea, Mathematical Proceedings of the Cambridge Philosophical Society, Mathematical Research Letters, Mathematische Zeitschrift, Monatshefte Mathematik, Punjab University Journal of Mathematics, Quantum Topology, Topology, Transformation Groups, Turkish Journal of Mathematics, and for various conference proceedings

Reviewer of a proposal for the KAW Program in Mathematics (postdoctoral researcher program), Royal Swedish Academy of Sciences, 2022

Reviewer and panel member for the National Science Foundation, 2013, 2014, twice in 2016, 2019, 2023

External examiner for University of Adelaide PhD thesis defense (Zhenxi Huang), 2018

Reviewer of a proposal for the BASIS Foundation grant competition "Junior Leader (Math)", 2018

Reviewer of a proposal for the contest "Young Russian Mathematics", 2015

External examiner for University of Waterloo PhD thesis defense (Jordan Hamilton), 2014

External reviewer for the Istituto Nazionale di Alta Matematica (INdAM) in Italy (of two applications for INdAM/Marie-Curie fellowships in mathematics), 2012

Reviewer for the Natural Sciences and Engineering Research Council of Canada (of two Discovery Grant proposals), 2011 and 2012

Conferences organized

Mini-school on moduli of sheaves on three- and four-folds virtual meeting online (December 2020), see math.unc.edu/event/mini-school-on-moduli-of-sheaves-on-three-and-four-folds

Mini-school on geometry at UNC, Chapel Hill, USA (April 2019)

Mini-school on compactified Jacobians and applications at UNC, Chapel Hill, USA (May 2018), see www.unc.edu/~sawon/mini-school_sp18.html

Workshop on topics in algebraic geometry at UNC, Chapel Hill, USA (November 2017), see www.unc.edu/~sawon/UNCworkshop17.html

Mini-school on abelian and symplectic varieties at UNC, Chapel Hill, USA (April 2017), see www.unc.edu/~sawon/mini-school_sp17.html

Workshop on symplectic varieties and geometric representation theory at UNC, Chapel Hill, USA (October 2016), see www.unc.edu/~sawon/UNCworkshop16.html

Workshop on new developments in moduli and Geometric Invariant Theory at UNC, Chapel Hill, USA (November 2015), see www.unc.edu/~sawon/UNCworkshop15.html

Workshop on moduli spaces, derived geometry, and geometric representation theory at UNC, Chapel Hill, USA (October-November 2014), see www.unc.edu/~sawon/UNCworkshop14.html

Workshop on hyperkähler geometry at the Simons Center for Geometry and Physics, Stony Brook, USA (October-November 2012), see scgp.stonybrook.edu/archives/3434

Advances in hyperkähler and holomorphic symplectic geometry at the Banff International Research Station, Alberta, Canada (March 2012), see www.birs.ca/events/2012/5-day-workshops/12w5126

Hyperkähler geometry and related topics at the Hausdorff Research Institute for Mathematics, Bonn, Germany (November–December 2011), see www.him.uni-bonn.de/programs/past-programs/past-junior-trimester-programs/differential-geometry/workshop-on-hyperkahler-geometry/

Western Algebraic Geometry Seminar (two day conference with approximately 60 participants) at Colorado State University, Fort Collins, USA (October 2007), see math.colorado.edu/~casa/seminars/WAGS/WAGSpages/fall2007wags.html

Professional service to department/university

University of North Carolina

2023–2024	Teaching faculty search committee chair
	Faculty search committee member
2023–present	UNC Marshall Scholarship internal selection committee chair
2023–present	Department of Mathematics undergraduate advising committee member
2013–present	UNC Science/Study Abroad Working Group member
2012–present	Faculty adviser for the UNC Math Club and Putnam competition team
2010–present	Committee chair/member/reader for the Geometry and Topology comprehensive exam
2022–2023	Faculty search committee chair
2015–2022	UNC Marshall Scholarship internal selection committee member
2019–2021	Department of Mathematics Graduate Committee member
2015–2019	Director of Graduate Studies, Department of Mathematics
2017–2018	Committee member for the Algebra comprehensive exam
	UNC Goldwater Scholarship internal selection committee chair
2016	Judge for UNC Academic Research Conference graduate student research talks
2015	Internal reviewer and member of the UNC Internal Selection Committee for the Packard Fellowships in Science and Engineering
2012–2015	Department of Mathematics Graduate Committee member
2012	Grader for the Algebra comprehensive exam
2010–2012	Judge for UNC's 6th, 7th, and 8th Annual Research Days

PhD, master's, and honors committees

2023	Committee member for oral examination (Will Davis)
2023	Committee member for undergraduate honors dissertation defense (Anand Hande)
2022–2023	Committee member for oral examination and PhD thesis defense (Aidan Young)
2022	Committee member for master's thesis defense (Reed Hubbard)
2021–2022	Committee member for oral examination and PhD thesis defense (Samantha Moore)
2020–2022	Committee member for oral examination and PhD thesis defense (Avery Wilson)
2021	Committee member for oral examination (Sarah Carpenter)
	Committee member for undergraduate honors dissertation defense (Abigail Watkins)
2020	Committee member for master's thesis defense (Raymond Park)
	Committee member for undergraduate honors dissertation defense (Mingming Lang)
2017–2018	Committee member for oral examination and PhD thesis defense (Paul Cornwell)
2017	Committee member for master's thesis defense (Michelle Randolph)
2016	Committee member for master's thesis defense (David Mason)
2015–2016	Committee member for oral examinations and PhD thesis defenses (Ryo Moore, Cass Sherman)
2015	Committee member for master's thesis defense (Taylor Allison)
2013–2014	Committee member for oral examinations and PhD thesis defenses (Michael Abel, Merrick Brown, Alexander Soibelman)
2012–13	Committee member for oral examinations and PhD thesis defenses (Ryan Kaliszewski, Andrea Overbay)
2012	Committee member for master's thesis defense (Mayukh Mukherjee)
2010	Committee member for undergraduate honors dissertation defense (Greg Howard)

Colorado State University

2007–2009	Department of Mathematics Undergraduate Committee member
	Faculty adviser for the CSU Math Club
2006–2009	Coach for the CSU Putnam Competition team

SUNY at Stony Brook

2002–2006	Coorganizer of the Geometry and Topology Seminar
	Organizer of the Mathematical Physics Learning Seminar
	Departmental committee member for the Carnegie Initiative on the Doctorate program
	Oral examination committee member (for five different graduate students)
2004	Coach for the Stony Brook Putnam Competition team

Outreach activities

2023	Panelist and faculty mentor for Graduate Research Opportunities for Women at Bonn (GROW@Bonn)
2019–present	Faculty facilitator (doctoral mentor) for the Math Alliance program "Facilitated Graduate Applications Process (F-GAP)" for students from underrepresented groups, in 2019 the student I mentored was admitted to UCLA, UC Berkeley, UC San Diego, UC Santa Barbara, U Oregon, and U Washington
2020–2023	Judge for SIMIODE Challenge Using Differential Equations Modeling (SCUDEM) V 2020, VI 2021, VII 2022, and VIII 2023 undergraduate mathematical modeling competition
2016–2019	Judge for MAA Undergraduate Student Poster Sessions at the Joint Mathematics Meetings 2016–2019, Seattle, WA, Atlanta, GA, and San Diego, CA, Baltimore, MD
2017	Judge for poster session at 3rd Annual Summer Undergraduate Pipeline Symposium
	Judge for student poster session at 2nd Annual UNC Diversity in STEM Conference
2016	Judge for UNC Women in Science Symposium poster session
2015	Volunteer leading experiential learning experiences (three classes) for Project Uplift, an overnight experiential program for academically gifted rising high school seniors from diverse populations
2013–2015	Volunteer at UNC Science Expo, for school students
2014	Faculty adviser for ADMIRES: Assisting in Development and Mentoring an Innovative Research Experience in Science, an NSF program for 9th graders targeting first generation college-going, economically disadvantaged, and minorities in STEM fields
	Faculty mentor for ARTS490 Visualizing science and DIY : The Magic of Making, a science and art collaboration
2013	Judge for THInC: Tar Heel Innovation Challenge, a high school science competition held at UNC-Chapel Hill
2012	Mentor for middle school student MarcAndrew Laurenvil
	Local organizer for American Mathematics Contest 8 for middle school students
2007+2009	Judge for Mathcounts Middle School Mathematics Competition, northern Colorado chapter
2004	Mentor for high school student Neal Wadhwa
2000	Tutor at Sutton Trust Summer School, Oxford, a one-week programme, designed to encourage school students from disadvantaged backgrounds to apply to study at Oxford