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Curriculum Vitae

(May 25, 2024)

Principal employment:

2007–	Professor of Mathematics, MIT; in 2014–24: Norman Levinson Professor
2003–07	Professor of Mathematics, University of Chicago
2002–03	Professor of Mathematics, Imperial College London
1999–2002	Chargé de recherche CNRS, Ecole Polytechnique, Paris

Visiting or temporary positions:

Spring 2018	Minerva Visiting Professor, Princeton University
Fall 2017	Eilenberg Visiting Professor, Columbia University
2017–18	Member, IAS, Princeton
2016–17	Distinguished Visiting Professor, IAS, Princeton
2014–15	Fellow of the Radcliffe Institute for Advanced Study
Spring 2011	Visiting Faculty Member, Simons Center for Geometry and Physics
2006–07	Visiting Professor, MIT
Spring 2003	Visiting Professor, ETH Zürich
2001–02	Member, Institute for Advanced Study
2000–01	Maître de conférences en charge partielle, Ecole Polytechnique, Paris
1998–99	Visitor, Max Planck Institut, Bonn
1997–98	Member, IAS, Princeton

Education:

1994–97	Graduate student, Oxford University (D. Phil. obtained 1998, advisor: S. Donaldson)
1990–94	Undergraduate student, Heidelberg University (Diploma in Mathematics obtained 1994, advisor: A. Dold)

Distinctions:

Member of the American Academy of Arts and Sciences (class of 2014)
Fellow of the American Mathematical Society (class of 2012)
Veblen Prize of the American Mathematical Society (2010)
Junior Faculty Mentoring Award (for graduate student mentoring),
University of Chicago (2006)
Invited speaker, Differential Geometry section,
International Congress of Mathematics, Beijing (2002)
European Mathematical Society Prize,
Awarded at the European Congress of Mathematics, Barcelona (2000)

Named lectures/Distinguished lectures:

2019 Zabrodsky Lectures, Jerusalem
2018 Floer Lecture, Stanford
2018 Artin Lecture, Heidelberg
2018 Floer Memorial Lectures, Bochum
2017 Eilenberg Lectures, Columbia University
2015 Jankowski Memorial Lecture, Gdansk
2014 Invited (Plenary) Lecture, AMS/MAA Joint Annual Meeting
2012 Adem Lecture, Mexico City
2012 Mordell Lecture, Cambridge University
2012 Distinguished Lecture Series, UCLA
2010 Marston Morse Lectures, IAS, Princeton
2010 Evans Lecture, Berkeley
2007 William Spencer Lecture, Kansas State University
2006 Walter Feit Memorial Lecture, Yale

Grants awarded:

As the only Principal Investigator:

2019–22	NSF	Lefschetz Fibrations, their noncommutative counterparts, and Formal Groups
2017	NSF	Symplectic geometry - celebrating the work of Simon Donaldson
2015–18	NSF	Lefschetz fibrations, mapping tori, and dynamics on moduli spaces of objects
2012–23	Simons Foundation	Simons Investigator Fellowship
2010–15	NSF	Cohomological methods in symplectic topology
2004–07	NSF	Fukaya categories and applications

As co-PI or part of a group application:

2019–23	Simons Foundation	Simons Collaboration in Homological Mirror Symmetry
2013–16	NSF	FRG: Collaborative research: Wall-crossings in Geometry and Physics
2010–15	NSF	EMSW-21-RTG: Geometry and Topology
2007–10	NSF	FRG: Collaborative research: Homological mirror symmetry and its applications

Service teaching: (only courses with enrolment > 100)

MIT (2006–) 18.01 (Calculus) Fall 2010/11/15/18/24

Other teaching: ($ = newly created undergraduate; * = graduate)

MIT (2018–)	Algebraic topology I
	Geometry and topology in the plane$
	Introduction to mathematical reasoning$
	Real analysis
	Lefschetz fibrations in symplectic geometry*
	Algebraic topology II*
Princeton (2017–18)	Lefschetz fibrations in symplectic geometry*
MIT (2006–)	Real analysis
	Riemann surfaces*
	Project laboratory in Mathematics
	Symplectic homology*
	Differential geometry
	Geometry of manifolds*
	Gromov-Witten theory*
	Categorical dynamics and symplectic topology*
	Geometry of manifolds*
Univ. of Chicago (2003–06)	Honors Calculus
	Differential geometry*
	Fukaya categories*
	Symplectic geometry of algebraic varieties*
Imperial College (2002–03)	Complex analysis II
	Introduction to quantization*

Undergraduate research projects:

(This excludes a number of projects where I was only involved as senior advisor, and did not design the project myself.)

Name	Year	School
Dain Kim	2022	MIT (with Nicholas Wilkins)
Zhuofan Xie	2020	MIT
Qiuyu Ren	2020	MIT
Nonnegatively curved connections on surfaces		
Aknazar Kazhymurat	2018	NIS Almaty (high school)
Topological uniqueness for Lefschetz fibrations over the disc		
Yuchen Fu	2016	MIT
Random walks and Conley-Zehnder index		
Umut Varolgünes	2012	MIT
Homological mirror symmetry for singularities		
Alejandro Ginory	2011	Florida International Univ.
Quantitative aspects of Hurwitz' theorem		
Andrew Geng	2009–10	MIT
Knotted symplectic surfaces		

PhD students:

Name	Graduation	School	Subsequent position
Kenneth Blakey	2028 exp.	MIT	
Yonghwan Kim	2028 exp.	MIT	
Zihong Chen	2025 exp.	MIT	
Jae Hee Lee	2024	MIT	Stanford
Tim Large	2021	MIT	Columbia/Simons Fellow
Yusuf Baris Kartal	2019	MIT	Princeton
Umut Varolgunes	2018	MIT	Stanford
Netanel Rubin-Blaier (or Blaier)	2016	MIT	Harvard/Brandeis
Ailsa Keating	2014	MIT	Columbia/Cambridge
David Jackson-Hanen	2014	MIT	(sports industry)
Nick Sheridan	2012	MIT	Princeton/IAS
Emma Smith Zbarsky (or Smith)	2009	Chicago	Wentworth Tech.
Alexander Ritter	2009	MIT	Cambridge University
Masuo Yanagisawa	2007	Chicago	(financial industry)
Mohammed Abouzaid	2007	Chicago	Clay Fellow/MIT
Gabriel Kerr	2007	Chicago	Northwestern University
Joseph Jones	2006	Chicago	New York University

Junior researchers mentored:

Name	Period	Institution	Subsequent position
Alex Pieloch	2022-	MIT	
Charlotte Kirchhof-Lukat	2021-23	MIT	KU Leuwen
Li Yang	2020-24	MIT	Cambridge
Daniel Alvarez-Gavela	2020-24	MIT	Brandeis
Abigail Ward	2020-23	MIT	Cambridge
Nicholas Wilkins	2019, 21-23	MIT	MPI Bonn
Hülya Argüz	2016	IAS	Imperial College
Sheel Ganatra	2016	IAS	USC
Heather Lee	2016-17	IAS	Univ. of Washington
Amitai Zernik	2016-17	IAS	(IT industry)
Zachary Sylvan	2016-17	IAS	Columbia
Cheuk Yu Mak	2016-17	IAS	Cambridge
Jingyu Zhao	2016-17	IAS	Harvard/Brandeis
Luis Haug	2016	MIT	ETH (computer science)
Sobhan Seyfaddini	2014-16	MIT	IAS/CNRS
Michael McBreen	2013-14, 15-16	MIT	Toronto
Emmy Murphy	2012-16	MIT	Northwestern
Vivek Shende	2011-13	MIT	Berkeley
Jason McGibbon	2011-14	MIT	Univ. of Mass. Amherst
Mark McLean	2009-12	MIT	IAS/Aberdeen
Kevin Costello	2006-7	Chicago	Northwestern

Major departmental service (internal service):

2020–	teaching coordinator ("area captain") for topology
2015–16	chair of the Pure Mathematics (senior hiring) committee
2014–15	chair of the Moore (postdoc hiring) committee
2012–14	co-chair of the graduate program

Service to the community (external service):

2021–24	AMS Steele Prizes, committee member (and for 2022-23, chair)
2020–21	MSRI Director Search, committee member
2019–20	Northwestern University Nemmers Prize, committee member
2018–20	Shaw Prize, committee member
2019	MSRI Summer Research in Mathematics, selection committee member
2017–21	MSRI Scientific Advisory Committee, member
2014–17	Elector for the Lowndean and Herchel-Smith Chairs, Cambridge University
2013–15	AMS Centennial Prize, committee member
2012–16	Scientific Advisory Committee Member, Simons Center for Geometry and Physics

Editorial activities:

2019–22	Editorial board member, Geometry and Topology
2016–	Editorial board member, Monographs of the European Math. Soc.
2014–19	Editorial board member, J. of the European Math. Soc.
2016–18	Editorial board member, Selecta Mathematica
2007–15	(with P. Etingof and D. Kazhdan) Editor-in-Chief, Selecta Mathematica
2006–13	Associate editor, Journal of Symplectic Geometry
2008–12	Associate editor, Duke Mathematics Journal
2004–08	Associate editor, Geometriae Dedicata
2006–08	Editorial board member, ERA of the Amer. Math. Soc.

Activities as conference and program organizer:

2022	(organizing committee member) Frontiers in Geometry and Topology, Trieste
2017	(organizing committee member) String-Math, Hamburg
2017	(with D. McDuff, D. Salamon and R. Thomas) Symplectic geometry, Newton Institute
2016–17	Special Year on Homological Mirror Symmetry, IAS (includes two workshops)
2015	Fukaya categories of Lefschetz fibration, MIT
2014–	Current developments in Mathematics, Harvard (yearly)
2011	Equivariant quantum cohomology and mirror symmetry, Simons Center
2011	(with D. Auroux and L. Katzarkov) Mirror symmetry, Miami
2010	(with D. Auroux and L. Katzarkov) Mirror symmetry, MIT
2009	(with M. Abouzaid, K. Fukaya, E. Ionel) Algebraic structures in SFT, MSRI
2009	(with M. Abouzaid, K. Fukaya, E. Ionel) Cyclic homology and symplectic topology, AIM
2009–10	(with J. Etnyre, Ya. Eliashberg, E. Ionel, D. McDuff) Special Year in symplectic and contact geometry, MSRI
2009	(with D. Auroux and L. Katzarkov) Mirror symmetry, MIT
2009	(with S. Ganatra and J. Francis) Talbot workshop, South Carolina
2009	(with D. Auroux and L. Katzarkov) Mirror symmetry, Miami
2008	(with D. Auroux and L. Katzarkov) Mirror symmetry, MIT
2008	(with D. Auroux and L. Katzarkov) Mirror symmetry, Miami
2005	(with B. Leeb and G. Tian) Global differential geometry, Oberwolfach
2002	(with K. Fukaya) Workshop on A_∞-structures and mirror symmetry, Oberwolfach
2000	(with D. Auroux and C. Viterbo) Workshop on symplectic four-manifolds, Paris

Publications: (Those in italics are ones that, retrospectively, I am particularly proud of. Your mileage may vary.)

Books and book-length papers:

[1] Homological mirror symmetry for the quartic surface. Memoirs of the Amer. Math. Soc., vol. 1116, 2015.

[2] Abstract analogues of flux as symplectic invariants. Mémoires de la Soc. Math. France, vol. 137, 2014.

[3] Fukaya categories and Picard-Lefschetz theory. ETH Lecture Notes Series vol. 8, European Math. Soc., 2008.

Papers:

[4] Formal groups and quantum cohomology. Geom. Topol. 27 (2023), 2937–3060.

[5] (with N. Wilkins) Covariant constancy of quantum Steenrod operations. J. Fixed Point Theory Appl. 24 (2022), Paper No. 52. (Part of a special collection in honor of Claude Viterbo).

[6] Fukaya A_∞-categories associated to Lefschetz fibrations. VI. Memoirs of the Amer. Math. Soc., to appear.

[7] Fukaya A_∞-categories associated to Lefschetz fibrations. V. J. Topol. Analysis 15 (2023), 865–934.

[8] Fukaya A_∞-structures associated to Lefschetz fibrations. IV 1/2. J. Symplectic Geom. 18 (2020), 291–332.

[9] Fukaya A_∞-structures associated to Lefschetz fibrations. IV. In: Breadth in Contemporary Topology, Proc. Sympos. Pure Math. vol. 102, 195–276. Amer. Math. Soc., 2019.

[10] Fukaya A_∞-structures associated to Lefschetz fibrations. III. J. Differential Geom. 117 (2021), 485–589.

[11] Connections on equivariant Hamiltonian Floer cohomology. Comm. Math. Helv. 93 (2018), 587–644.

[12] Fukaya A_∞-structures associated to Lefschetz fibrations. II 1/2. Adv. Theor. Math. Phys. 20 (2016), 883–944.

[13] Fukaya A_∞-structures associated to Lefschetz fibrations. II. In: Algebra, Geometry and Physics in the 21st Century (Kontsevich Festschrift), Progress in Math. vol. 324, Birkhäuser, 2017, 295–364.

[14] Picard-Lefschetz theory and dilating $\mathbb{C}^*$-actions. J. Topology 8 (2015), 1167–1201.

[15] Exotic iterated Dehn twists. Algebraic and Geometric Topol. 14 (2014), 3305–3324.

[16] The equivariant pair-of-pants product in fixed point Floer cohomology. Geom. Funct. Anal. 25 (2015), 942–1007.

[17] Disjoinable Lagrangian spheres and dilations. Invent. Math. 197 (2014), 299–359.

[18] Lagrangian homology spheres in (A_m) Milnor fibres via $\mathbb{C}^*$-equivariant A_∞-modules. Geom. Topol. 16 (2012), 2343–2389.

[19] (with J. Solomon) Symplectic cohomology and q-intersection numbers. Geom. Funct. Anal. 22 (2012), 443–477.

[20] Fukaya A_∞-structures associated to Lefschetz fibrations. I. J. Symplectic Geom. 10 (2012), 325–388.

[21] Some speculations on Fukaya categories and pair-of-pants decompositions. In: Surveys in Diff. Geometry vol. XVII, Intl. Press, 2012, 411–425.

[22] Simple examples of distinct Liouville type symplectic structures. J. Topol. Anal. 3 (2011), 1–5.

[23] (with I. Smith) Localization for involutions in Floer cohomology. Geom. Funct. Anal. 20 (2010), 1464–1501.

[24] (with M. Maydanskiy) Lefschetz fibrations and exotic symplectic structures on cotangent bundles of spheres. J. Topology 3 (2010), 157–180. See also: Corrigendum, J. Topology 8 (2015), 884–886..

[25] Homological mirror symmetry for the genus two curve. J. Algebraic Geom. 20 (2011), 727–769.

[26] (with M. Abouzaid) An open string analogue of Viterbo functoriality. Geometry and Topology 14 (2010), 627–718.

[27] Suspending Lefschetz fibrations, with an application to local mirror symmetry. Commun. Math. Phys. 297 (2010), 515–528.

[28] (with K. Fukaya and I. Smith) The symplectic geometry of cotangent bundles from a categorical viewpoint. In: Homological Mirror Symmetry: New Developments and Perspectives, Springer Lect. Notes in Physics vol. 757, 2008, 1–26.

[29] A_∞-subalgebras and natural transformations. Homotopy Homology Appl. 10 (2008), 83–114.

[30] (with K. Fukaya and I. Smith) Exact Lagrangian submanifolds in simply-connected cotangent bundles. Invent. Math. 172 (2008), 1–27.

[31] A biased view of symplectic cohomology. In: Current Developments in Mathematics 2006. International Press, 2008, 211–253.

[32] Symplectic homology as Hochschild homology. In: Algebraic Geometry:

Seattle 2005. Amer. Math. Soc., 2008, part 1, 415–434.

[33] (with I. Smith) A link invariant from the symplectic geometry of nilpotent slices. Duke Math. J. 134 (2006), 453–514.

[34] (with I. Smith) The symplectic topology of Ramanujam's surface. Comment. Math. Helv. 80 (2005), 859–881.

[35] Exact Lagrangian submanifolds in T^*S^n and the graded Kronecker quiver. In: Different faces of geometry, Kluwer, 2004, 349–364..

[36] Lectures on four-dimensional Dehn twists. In: Symplectic four-manifolds and algebraic surfaces, Cetraro (2004), LNM vol. 1938, Springer, 2008, 231–268.

[37] Braids and symplectic four-manifolds with abelian fundamental group. Turkish J. Math. 26 (2002), 93–100.

[38] Symplectic Floer homology and the mapping class group. Pacific Math. J. 206 (2002), 219–229.

[39] Fukaya categories and deformations. In: Proceedings of the ICM (Beijing), Higher Ed. Press, 2002, 351–360.

[40] A long exact sequence for symplectic Floer cohomology. Topology 42 (2003), 1003–1063.

[41] More about vanishing cycles and mutation. In: Symplectic Geometry and Mirror Symmetry, World Scientific, 2001, 429–465.

[42] Vanishing cycles and mutation. In: European Congress of Mathematics (Barcelona), Birkhäuser, 2002, 65–85.

[43] (with M. Khovanov) Quivers, Floer cohomology, and braid group actions. J. Amer. Math. Soc. 15 (2002), 203–271.

[44] (with R. Thomas) Braid group actions on derived categories of coherent sheaves. Duke Math. J. 108 (2001), 37–108.

[45] Graded Lagrangian submanifolds. Bull. Soc. Math. France 128 (2000), 103–146.

[46] Lagrangian two-spheres can be symplectically knotted. J. Differential Geom. 52 (1999), 145–171.

[47] On the symplectic automorphism groups of $\mathbb{C}P^m \times \mathbb{C}P^n$. In: Northern California Symplectic Geometry Seminar, Amer. Math. Society, 1999, 237–250.

[48] π_1 of symplectic automorphism groups and invertibles in quantum homology rings. Geom. Funct. Anal. 7 (1997), 1046–1095.

[49] The symplectic Floer homology of a Dehn twist. Math. Research Lett. 3 (1996), 829–834.

Unpublished (available on the arXiv or the author's homepage):

[50] (with D. Pomerleano) The quantum connection, Fourier-Laplace transform, and families of A-infinity-categories. Preprint, 2023.

[51] Fukaya A_∞-categories associated to Lefschetz fibrations. VIII. Preprint, 2021.

[52] (with M. Abouzaid) Altering symplectic manifolds by homologous recombination. Preprint, 2010.

[53] Symplectic automorphisms of T^*S^2. Preprint, 1998; this has been subsumed into the paper [14].

[54] Floer homology and the symplectic isotopy problem. DPhil thesis, 1997; most of this has been subsumed into the paper [14].