

Sheel Ganatra

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Personal

Born in November 1984, United States Citizen.

Appointments

2016-: **Assistant Professor**, University of Southern California.

Fall 2016: **Member**, Institute for Advanced Study.

2013-2016: **NSF Postdoctoral Fellow**, Stanford University.

2012-2013: **Szëgo Assistant Professor**, Stanford University.

Education

2007-2012, **Massachusetts Institute of Technology**, Cambridge MA.

Ph.D. in Mathematics, June 2012. Advisor: Denis Auroux.

Thesis title: *Symplectic Cohomology and Duality for the Wrapped Fukaya Category*.

Exchange Scholar at UC Berkeley, 2009-2010, 2011-2012.

2002-2006, **Harvard University**, Cambridge MA.

S.M. in Computer Science, June 2006.

A.B. Magna Cum Laude with Highest Honors in Mathematics, June 2006.

Honors thesis title: *Seiberg-Witten theory and Einstein Metrics on Four-Manifolds*.

Research

I'm interested in symplectic topology. Much of my recent work concerns structural aspects of *Fukaya categories*, using methods of homological algebra and non-commutative geometry, with applications to *mirror symmetry* and *string topology*.

Awards and Honors

2012: **NSF Postdoctoral Research Fellowship**

2012: **Housman Award for Excellence in Teaching**, MIT Mathematics Department

2008-2011: **NSF Graduate Research Fellowship**

2007-2008: **Norman Levinson Fellowship** and **MIT Presidential Fellowship**

2006: **Herb Alexander Prize**, Harvard Mathematics Department

2005: **Phi Beta Kappa**, Harvard University

2003-2005: Three time *Outstanding* Designation in the **Mathematics Contest in Modeling**

2001: **Davidson Fellowship**

2001: **Regional Finalist, Siemens-Westinghouse Competition in Math, Science, and Technology**

Papers

0. (*My thesis, essentially subsumed by papers 2 and 3 below*): S. Ganatra, *Symplectic Cohomology and Duality for the Wrapped Fukaya Category*, available at <http://arXiv.org/abs/1304.7312>.
1. S. Ganatra, M. Maydanskiy, *Legendrian surgery formula and P. Seidel's conjecture*, published as appendix to: F. Bourgeois, T. Ekholm, and Y. Eliashberg *Effect of Legendrian Surgery*, *Geom. Topol.* **16** (2012), no. 1, 301-389. Available at <http://arxiv.org/abs/0911.0026>.
2. S. Ganatra, *Symplectic integral transforms from open-closed string maps*, available at <http://math.stanford.edu/~ganatra/materials/wrapcy1.pdf>.
3. S. Ganatra, *Symplectic cohomology from Hochschild (co)homology*, available at <http://math.stanford.edu/~ganatra/materials/wrapcy2.pdf>.
4. S. Ganatra, *Cyclic homology, S^1 -equivariant Floer cohomology, and Calabi-Yau structures*, in preparation.
5. M. Abouzaid, S. Ganatra, *Generating Fukaya Categories of Landau-Ginzburg Models*, in preparation.
6. M. Abouzaid, S. Ganatra, *Exact triangles and Fukaya categories of LG Models*, in preparation.
7. R. Cohen, S. Ganatra, *Calabi-Yau categories, the Floer field theory of a cotangent bundle, and the string topology of its base*, in preparation.
8. S. Ganatra, T. Perutz, N. Sheridan, *Mirror symmetry: from categories to curve counts*, available at <http://arXiv.org/abs/1510.03839>.
9. S. Ganatra, T. Perutz, N. Sheridan, *The cyclic open-closed map and non-commutative Hodge structures*, in preparation.
10. Y. Eliashberg, S. Ganatra, and O. Lazarev, *Flexible Lagrangians*, available at <http://arXiv.org/abs/1510.01287>.
11. S. Ganatra, D. Pomerleano, *A Log PSS morphism with applications to Lagrangian embeddings*, in preparation.
12. S. Ganatra, *Automatically generating Fukaya categories and computing quantum cohomology*, available at <http://arxiv.org/abs/1605.07702>.

Invited Talks

(upcoming) Nov. 7-11, 2016, **Workshop on Homological Mirror Symmetry**, (Institute for Advanced Study, Princeton), *TBD*.

July 25-29, 2016, **Conference on Symplectic geometry and topology** (International Centre for Mathematical Sciences, Edinburgh), *Automatically generating Fukaya categories*.

June 27-July 8, 2016, **Jussieu 2016 Summer School on Symplectic topology, sheaves, and mirror symmetry** (Institut de Mathématiques de Jussieu-Paris Rive Gauche, Paris), 2 supplementary lectures on *Homological Mirror Symmetry*.

April 20, 2016, **Special Seminar** (Columbia University), *Automatically generating Fukaya categories and computing quantum cohomology*.

Feb. 29, 2016, **LA-Top** (Los Angeles area topology seminar, UCLA), *Automatically generating Fukaya categories and computing quantum cohomology*.

Feb. 22, 2016, **MIT Geometry and Topology Seminar**, *Automatically generating Fukaya categories and computing quantum cohomology*.

- Feb. 1, 2016, **Northern California Symplectic Geometry Seminar** (Berkeley), *Automatically generating Fukaya categories and computing quantum cohomology*.
- December 10-12, 2015, **Workshop on Mirror Symmetry** (Kyoto University), 2 lecture series.
- January 11, 2016, **Colloquium** (USC), *Mirror symmetry: from categories to curve counts*.
- December 1, 2015, **Colloquium** (Boston College), *Mirror symmetry: from categories to curve counts*.
- November 12, 2015, **Geometry and physics seminar** (University of Texas at Austin), *Calabi-Yau categories in Floer theory and string topology*.
- November 7-8, 2015, **Cascade Topology Seminar** (Bi-annual Pacific Northwest topologists gathering in Portland, Oregon) *Calabi-Yau categories in Floer theory and string topology*.
- November 5-8, 2015, **Conference on Homological Mirror Symmetry** (University of Pennsylvania), *From categories to curve counts* (two part lecture series, with N. Sheridan).
- October 30, 2015, **Columbia-Princeton-IAS joint Symplectic Geometry seminar** (Columbia University), *Functors and relations from Fukaya categories of Landau-Ginzburg models*.
- September 21-25, 2015, **Symplectic Geometry and Topology Workshop** (conference in Uppsala), *Generating Fukaya categories of Landau-Ginzburg Models*.
- June 1-5, 2015, **Conference on Moduli Spaces in Symplectic Topology and in Gauge Theory** (CIRM, Marseille, France) *The Floer theory of a cotangent bundle, the string topology of the base, and Calabi-Yau categories*.
- March 26-27, 2015, **MIT Workshop on Lefschetz Fibrations**, *Generating Fukaya categories of LG models* (two part lecture and discussion session, joint with M. Abouzaid).
- March 14-15, 2015 **AMS Sectional Meeting at Michigan State University**, “Floer homology, gauge theory, and symplectic geometry” session, *Symplectic cohomology relative normal crossings divisors in the topological limit*.
- January 26-31, 2015, **Miami conference on Homological Mirror Symmetry**, *Generating Fukaya categories of LG models*.
- December 15-22, 2014, **Advanced workshop and discussion on Symplectic Geometry and Contact Topology** (Workshop at Tata Institute for Fundamental Research, Mumbai) *An introduction to homological mirror symmetry* (3 lectures).
- November 21, 2014, **Princeton/IAS Symplectic Geometry Seminar**, *Cyclic homology and S^1 -equivariant symplectic cohomology*.
- October 27, 2014, **Geometry, Topology, and Dynamics Seminar** (UIC), *Open-closed string maps and circle actions in symplectic topology*.
- September 29, 2014 **Stanford Symplectic Geometry Seminar**, *The long exact sequence for a (fibered) Dehn twist, revisited*.
- June 23, 2014 **Mirror Symmetry Week** (conference at Hebrew University of Jerusalem), *Open-closed string maps and circle actions*.
- June 16-19, 2014, **International Meeting of the American Mathematical Society and Israeli Mathematical Union** (Tel Aviv), Geometry and Dynamics session, *S^1 -equivariant symplectic homology and cyclic homology*.
- June 10, 2014, **Moduli Spaces Program Seminar** (Simons Center for Geometry and Physics), *Cyclic homology and S^1 -equivariant symplectic cohomology*.
- May 5, 2014, **Northern California Symplectic Geometry Seminar** (Stanford University), *Cyclic homology and S^1 -equivariant symplectic cohomology*.
- April 30, 2014, **Hebrew University topology and geometry seminar** (Hebrew University of Jerusalem), *Fukaya categories and Hochschild (co)homology*.
- February 21, 2014, **Princeton/IAS Symplectic Geometry Seminar**, *A criterion for generating Fukaya categories of fibrations*

January 24, 2014, **Columbia Symplectic Geometry, Gauge Theory, and Categorification Seminar**, *Cyclic homology and S^1 -equivariant symplectic cohomology*

October 7-11, 2013, **University of Hamburg**, *Fukaya categories, Hochschild homology, and topology field theory* (4 lectures).

July 23, 2013, **Kavli IPMU Mirror Symmetry Seminar** (University of Tokyo), *Symplectic cohomology and duality for the wrapped Fukaya category*

July 18, 2013, **Seminar on Geometry and Related topics** (RIMS, Kyoto University), *Symplectic cohomology and duality for the wrapped Fukaya category*.

July 8-12, 2013, **Seoul National University**, *Wrapped Floer theoretic invariants of Liouville manifolds* (3 lectures)

July 4-5, 2013, **Pacific RIM Conference in Mathematics 2013** (Sapporo, Japan), Symplectic topology session, *Symplectic cohomology and duality for the wrapped Fukaya category*

May 1, 2013, **Workshop on J-holomorphic Curves in Symplectic Geometry, Topology and Dynamics** (Centre de recherches mathématique, University of Montreal), *Symplectic cohomology and duality for the wrapped Fukaya category*

January 2013, **Miami conference on Homological Mirror Symmetry**, *Symplectic cohomology and duality for the wrapped Fukaya category*

September 11, 2012, **Simons Center for Geometry and Physics**, *On the Hochschild (co)homology of the Fukaya category*

March 31, 2012, **AMS Special Session on Mirror Symmetry** (University of Kansas), *Symplectic cohomology and the Hochschild (co)homology of the Fukaya category*

November 7, 2011, **Northern California Symplectic Geometry Seminar**, *On the Hochschild (co)homology of the Fukaya category*

October 27, 2011, **Northwestern Geometry and Physics Seminar**, *On the Hochschild (co)homology of the Fukaya category*

April 12, 2011, **Stanford Topology Seminar**, *Towards a Calabi-Yau structure for the wrapped Fukaya category*

October 11, 2010, **Stanford Symplectic Geometry Seminar**, *Symplectic cohomology, Hochschild homology, and Hochschild cohomology*

November 2009, **AIM Workshop on Cyclic Homology and Symplectic Topology**, *Legendrian Surgery Formula and Seidel's Conjecture*

Teaching

Stanford University

Summer 2016, **Instructor** for Math 51, *Linear Algebra and Differential Calculus of Several Variables* (two classes).

Spring 2016, **Instructor** for Math 257b, *Topics in symplectic geometry: Aspects of Fukaya categories* (graduate topics course).

Spring 2016, **Instructor** for Math 171, *Fundamental Concepts of Analysis*.

Summer 2015, **Instructor/Supervisor** for Math 360, *Advanced Reading and Research* (reading course for two graduate students each on different topics in symplectic topology: (a) *Floer homology* and (b) *Fukaya categories*).

Winter 2015, **Instructor** for Math 51, *Linear Algebra and Differential Calculus of Several Variables* (two classes).

Spring 2013, **Instructor** for Math 113, *Linear Algebra and Matrix theory* (undergraduate theoretical linear algebra with proofs).

Winter 2013, **Instructor** for Math 215b, *Complex Analysis and Geometry II: Algebraic Topology* (first year graduate course).

Fall 2012, **Instructor** for Math 51, *Linear Algebra and Differential Calculus of Several Variables* (two classes):

Massachusetts Institute of Technology

Summer 2011, **Co-Instructor** for 18.089, *Review of Mathematics (Single and Multivariable Calculus)*.

Winter 2012, **Teaching Assistant** for 18.095, *Mathematics Lecture Series*.

Spring 2011, **Teaching Assistant** for 18.03, *Differential Equations*.

Harvard University

Fall 2005, **Course Assistant** for Math 272a, *Algebraic Topology I*.

Spring 2004, **Course Assistant** for Math 113, *Complex Analysis*.

Service Activities

Workshops/Conference Organization

January 2016: Resident Scientific Committee, **Lefschetz fibrations: rigidity and flexibility** (graduate student training workshop), New Orleans, LA.

January 2016: Co-organizer of special session on **Moduli Spaces in Symplectic Geometry** at 2016 AMS Joint Mathematical Meetings, Seattle, Washington

2008-2013: Co-organizer of the **Talbot workshops**, weeklong training workshops in Topology and Geometry. Including:

April 2013 *Chromatic Homotopy Theory* (South Lake Tahoe, CA)

May 2012 *Calculus of Functors* (Garden City, UT)

May 2011 *Non-abelian Hodge theory* (Draper, UT)

May 2010 *Twisted K theory and Loop groups* (Breckenridge, CO)

March 2009 *Fukaya categories* (Nags Head, NC)

2010-2011: Co-organizer of the **MIT-RTG Geometry Workshops**, weeklong training workshops in Geometry. Including:

June 2011 *Fukaya categories via Microlocal Sheaf Theory* (Breckenridge, CO), and

August 2010 *Symplectic Field Theory* (Raymond, ME).

Seminar (co-)Organization

Symplectic Geometry seminar at Stanford, 2014-2016.

Student Symplectic Geometry seminar ($S^2 \times S^2$) at Stanford, 2012-2014.

Graduate student seminars at MIT 2009-2011: *Juvitop on Non-abelian Hodge theory* (2011), *Graduate student seminar on Fukaya categories* (2009), Pure Math Graduate Student Seminar (PuMaGraSs) (2009).

Seminars/working groups at MSRI/Berkeley 2009-2010: *Working group on Algebraic structures of holomorphic curves* (Fall 2009, MSRI), *Graduate student seminar on Twisted K theory and Loop group representations* (Fall 2009, UC Berkeley).

Professional Activities

Referee for *Journal of the American Mathematical Society (JAMS)*, *Duke Mathematical Journal*, *Journal of the European Mathematical Society (JEMS)*, *Geometry and Topology*, *Quantum Topology*, *Algebraic and Geometric Topology*, *Journal of Symplectic Geometry (JSG)*, *Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)*,

Miscellaneous

Programming Languages: Python, VIM, MySQL, C++, former familiar with Java, Perl, R.

Last updated: August 25, 2016