

Jake P. Solomon

Curriculum Vitae

Contact Information

Einstein Institute of Mathematics
Edmond J. Safra Campus, Givat Ram
The Hebrew University of Jerusalem
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Education

2000 B.A. *Summa cum laude*, Mathematics and Physics, Yeshiva College.

2006 Ph.D., Mathematics, Massachusetts Institute of Technology.
Thesis Advisor: Gang Tian.
Thesis title: *Intersection theory on the moduli space of holomorphic curves with Lagrangian boundary conditions.*

Research Interests

Differential geometry, symplectic geometry, algebraic geometry and related aspects of physics.

Appointments

Professor	Hebrew University	2019 - present
Associate Professor	Hebrew University	2014 - 2019
Senior Lecturer	Hebrew University	2008 - 2014

Visiting Positions

Visitor/Member	Institute for Advanced Study	2016 - 2017
Visiting Assoc. Prof.	Princeton University	2016 - 2017
Instructor	Princeton University	2007 - 2008
Member	Institute for Advanced Study	2006 - 2007

Academic Service

Editor, International Mathematical Research Notices, 2020 – present.

Editor in Chief (with P. Etingof and D. Kazhdan), *Selecta Mathematica*, 2016 - present.

Organizer of the Zabrodsky Lecture Series, Hebrew University, spring 2014 - present.

Co-organizer of the Hebrew University Topology and Geometry Seminar, 2008 - present.

Organizer of the Landau Lecture Series, Hebrew University, 2011 and 2014.

Organizer of the Jerusalem Mathematics Colloquium, 2009 - 2010.

Awards

ISF Grant 569/18, *Lagrangian submanifolds, J-holomorphic curves and mirror symmetry*, 2018-2022.

BSF Grant 2016173, *Analysis of Monge-Ampere equations with applications to Convex Geometry, Differential Geometry and Several Complex Variables*, with S. Arstein-Avidan, B. Klartag and Y. Rubinstein, 2017-2021.

Rector's prize, Hebrew University, 2015.

ERC Starting Grant 337560, *Three ideas in open Gromov-Witten theory*, 2013-2018.

BSF Grant 2012236, *Applications of Monge-Ampere type equations*, with S. Arstein-Avidan, B. Klartag and Y. Rubinstein, 2013-2017.

ISF Grant 1747/13, *Foundations of open Gromov-Witten theory*, 2013-2017.

BSF Grant 2008314, *Algebraic aspects of open Gromov-Witten theory*, with R. Pandharipande, 2009-2013.

ISF Grant 1321/09, *Open Gromov-Witten theory and mirror symmetry*, 2009-2013.

Marie Curie International Reintegration Grant No. 239381, *Open Gromov Witten theory, real symplectic geometry and mirror symmetry*, 2009-2013.

Alon Fellowship, 2009-2012.

NSF Mathematical Sciences Postdoctoral Research Fellowship DMS 0703722, 2007-2010.

Publications

A partial differential equation for the open Gromov-Witten potential, in preparation.

The Witten complex for non-Morse functions, in preparation.

Differential forms on orbifolds with corners (with S. Tukachinsky), [arXiv:2011.10030](#).

Special Lagrangian webbing (with A. Yuval), [arXiv:2010.12293](#).

Geodesics of positive Lagrangians from special Lagrangians with boundary (with A. Yuval), [arXiv:2006.06058](#).

Relative quantum cohomology (with S. Tukachinsky), [arXiv:1906.04795](#).

Involutions, obstructions and mirror symmetry, Adv. Math. **367** (2020), 107107, [arXiv:1810.07027](#).

Locality in the Fukaya category of a hyperkähler manifold (with M. Verbitsky), Compos. Math. **155** (2019), no. 10, 1924-1958, [arXiv:1805.00102](#).

Point-like bounding chains in open Gromov-Witten theory (with S. Tukachinsky), [arXiv:1608.02495](#).

Differential forms, Fukaya A-infinity algebras, and Gromov-Witten axioms (with S. Tukachinsky), [arXiv:1608.01304](#).

The degenerate special Lagrangian equation (with Y. Rubinstein), Adv. Math. **310** (2017), 889-939, [arXiv:1506.08077](#).

Geodesics of positive Lagrangians in Milnor fibers (with A. Yuval), Int. Math. Res. Notices **2017** (2017), no. 3, 830-868, [arXiv:1501.00972](#).

Intersection theory on moduli of disks, open KdV and Virasoro (with R. Pandharipande and R. J. Tessler), [arXiv:1409.2191](#).

J-holomorphic curves with boundary in bounded geometry (with Y. Groman), J. Symplectic Geom. **14** (2016), no. 3, 767-809, [arXiv:1311.7484](#).

Metric description of defects in amorphous materials (with R. Kupferman and M. Moshe), Arch. Ration. Mech. Anal. **216** (2015), no. 3, 1009-1047, [arXiv:1306.1624](#).

Curvature of the space of positive Lagrangians, Geom. Funct. Anal. **24** (2014), no. 2, 670-689, [arXiv:1301.6660](#).

The open Gromov-Witten-Welschinger theory of blowups of the projective plane (with A. Horev), [arXiv:1210.4034](#).

A reverse isoperimetric inequality for J-holomorphic curves (with Y. Groman), Geom. Funct. Anal. **24** (2014), no. 5, 1448-1515, [arXiv:1210.4001](#).

The Calabi homomorphism, Lagrangian paths and special Lagrangians, Math. Ann. **357** (2013), no. 4, 1389-1424, [arXiv:1209.4737](https://arxiv.org/abs/1209.4737).

A Γ -structure on Lagrangian Grassmannians (with P. Albers and U. Frauenfelder), Comment. Math. Helv. **89** (2014), no. 4, 929-936, [arXiv:1209.4505](https://arxiv.org/abs/1209.4505).

Can mean-curvature flow be made non-singular? (with M. Kazhdan and M. Ben-Chen), Comput. Graph. Forum **31** (2012), no. 5, 1745-1754, [arXiv:1203.6819](https://arxiv.org/abs/1203.6819).

A Riemannian approach to reduced plate, shell, and rod theories (with R. Kupferman), J. Funct. Anal. **266** (2014), no. 5, 2989-3039, [arXiv:1201.3565](https://arxiv.org/abs/1201.3565).

Symplectic cohomology and q -intersection numbers (with P. Seidel), Geom. Funct. Anal. **22** (2012), no. 2, 443-477, [arXiv:1005.5156](https://arxiv.org/abs/1005.5156).

Symmetries of Lagrangian fibrations (with R. Castano-Bernard and D. Matessi), Adv. Math. **225** (2010), no. 3, 1341-1386, [arXiv:0908.0966](https://arxiv.org/abs/0908.0966).

Disk enumeration on the quintic 3-fold (with R. Pandharipande and J. Walcher), J. Amer. Math. Soc. **21** (2008), no. 4, 1169-1209, [arXiv:math/0610901](https://arxiv.org/abs/math/0610901).

Intersection theory on the moduli space of holomorphic curves with Lagrangian boundary conditions, MIT Thesis, [arXiv:math/0606429](https://arxiv.org/abs/math/0606429).

Surjectivity of the period map for blow-ups of P^2 , appendix in *Systolic geometry and topology*, by M. Katz, Mathematical Surveys and Monographs, 137, American Mathematical Society, Providence, RI, 2007.

Research Students

Pavel Giterman, MSc 2012, PhD student.

Yoel Groman, MSc 2011, PhD 2015, postdoc ETH Zurich and Columbia University, Senior Lecturer Hebrew University.

Asaf Horev, MSc 2011, continued to PhD with E. Farjoun and Y. Varshavsky.

Elad Kosloff, MSc 2020, PhD student.

Amit Solomon, MSc 2014, PhD student.

Ran Tessler, PhD 2015, ETH-ITS Junior Fellow, Senior Researcher Weizmann Institute.

Sara Tukachinsky, MSc 2011, PhD 2017, postdoc Université de Montréal, member IAS Princeton, postdoc MSRI.

Amitai Yuval, MSc 2014, PhD student.

Amitai Zernik, PhD 2018, member IAS Princeton.

Invited Talks at International Conferences

September 2020, Motivic Geometry, CAS, Oslo.

August 2020, Real Symplectic Topology 2020, Universität Augsburg.

June 2019, Topological String Theory and Related Topics, CERN, Geneva.

June 2019, Special Holonomy and Calibrated Geometry, Imperial College, London.

May 2019, C^0 aspects of symplectic geometry and Hamiltonian dynamics, Technion, Haifa.

February 2019, Workshop on Geometric Analysis, Algebraic Geometry and Symplectic Geometry, Chinese University of Hong Kong.

December 2018, Geometry and its applications, ORT Braude College, Karmiel.

October 2018, Wall-crossing formula, open Gromov-Witten invariants, and related areas, IBS Center for Geometry and Physics, Pohang.

August 2018, Workshop on Symplectic Field Theory IX: Polyfolds for SFT, Universität Augsburg.

June 2018, 6th Workshop on Combinatorics of Moduli Spaces, Cluster Algebras, and Topological Recursion, Moscow.

January 2018, Lie Theory without Groups: Enumerative Geometry and Quantization of Symplectic Resolutions, Israel Institute for Advanced Studies, Jerusalem.

October 2017, Open Gromov-Witten theory, integrable hierarchies and mirror symmetry, Eidgenössische Technische Hochschule, Zürich.

October 2017, Singularities, Real and Tropical Geometry and beyond, On the occasion of Eugenio Shustin's 60th birthday, Eilat.

September 2017, Second BICMR & IBS-CGP Joint Symplectic Geometry Workshop, Beijing International Center for Mathematical Research.

March 2017, Workshop on Homological Mirror Symmetry: Emerging Developments and Applications, Institute for Advanced Study, Princeton.

July 2016, Trends in Modern Geometry 2016, University of Tokyo.

April 2016, The 31st Annual Geometry Festival, Princeton University.

January 2016, German-Israeli Workshop in Algebraic and Tropical Geometry, Bar-Ilan University, Ramat Gan.

December 2015, String Math 2015, Tsinghua Sanya International Mathematics Forum, Sanya.

July 2015, Summer School on Moduli Problems in Symplectic Geometry, Institut des Hautes Études Scientifiques, Bures-sur-Yvette.

June 2015, Moduli spaces in Symplectic Topology and in Gauge Theory, Centre International de Recontres Mathématiques, Marseille.

December 2014, Lagrangian submanifolds and related topics, Università degli Studi di Milano.

September 2014, G2 Manifolds Workshop, Simons Center for Geometry and Physics, Stony Brook.

June 2014, Tropical geometry in its complex and symplectic aspects, Centre Interfacultaire Bernoulli, École Polytechnique Fédérale de Lausanne.

June 2014, Second Joint International Meeting of the IMU and the AMS, Bar-Ilan and Tel Aviv Universities, Tel Aviv.

May 2014, Workshop on Symplectic Dynamics and Hamiltonian Systems, Nankai University, Tianjin.

March 2014, Symplectic and Contact Dynamics Workshop, Tel Aviv University.

May 2013, Complex Analysis and Dynamical Systems VI, Nahariya.

April 2013, Workshop J-holomorphic Curves in Symplectic Geometry, Topology and Dynamics, Centre de Recherches Mathématiques, Montreal.

July 2011, Mirror Symmetry and Tropical Geometry, Cetraro.

July 2011, A conference on Gromov-Witten theory, Institute Fourier, Grenoble.

May 2011, Symplectic Geometry and Related Topics, Sichuan University, Chengdu.

May 2011, Equivariant Quantum Cohomology, Mirror Symmetry, and Symplectic Geometry Workshop, Simons Center for Geometry and Physics, Stony Brook.

June 2010, Real structures on complex manifolds: achievements and perspectives, Centre International de Recontres Mathématiques, Marseille.

January 2010, International Conference on Mirror Symmetry and Gromov-Witten theory, Seoul National University, Seoul.

July 2009, two lecture mini-course, Workshop on Symplectic Field Theory IV, Ludwig-Maximilians-Universität, Munich.

May 2009, Symplectic Geometry and Physics, Beijing International Center for Mathematical Research, Beijing.

January 2009, Workshop on Symplectic Geometry, Contact Geometry and Interactions, Strasbourg.

July 2008, four lecture series at summer school on Real and Symplectic geometry, Institut Henri Poincaré, Paris.

June 2008, Concluding Conference of the programme Real and Tropical Algebraic geometry, Centre Interfacultaire Bernoulli, École Polytechnique Fédérale de Lausanne.

January 2008, Workshop on homological mirror symmetry and related topics, University of Miami.

June 2007, Workshop: Real, tropical and complex enumerative geometry, Centre de Recherches Mathématiques, Montreal.

April 2006, Workshop on Extreme Forms of Real Algebraic Varieties, American Institute of Mathematics, Palo Alto.

Selected Invited Talks

April 2018, Mathematics Colloquium, Tel Aviv University.

March 2018, Symplectix Seminar, Institut Henri Poincaré, Paris.

March 2018, Mathematics Colloquium, Bar Ilan University.

October 2017, Symplectic Geometry Seminar, ETH Zurich.

December 2016, mini-course on Numerical invariants from bounding chains, Institute for Advanced Study.

December 2016, Baltimore-Washington Metro Area Differential Geometry Seminar, University of Maryland, College Park.

November 2016, Columbia Symplectic Geometry, Gauge Theory, and Categorification Seminar, Columbia University.

October 2016, Geometry and Physics Seminar, University of Michigan.

September 2016, Differential Geometry and Geometric Analysis Seminar, Princeton.

July 2016, Seminar on Geometry and related topics, RIMS, Kyoto University.

May 2016, The Sixth Advanced Seminar in Symplectic Geometry and Topological Field Theory, 6 hour lecture series, BICMR, Beijing.

December 2014, Symplectic Geometry Seminar, ETH Zurich.

September 2014, JHU-UMD Complex Geometry Seminar, University of Maryland.

September 2014, Informal Mathematical Physics Seminar, Columbia University.

March 2014, Symplectic Geometry Seminar, Princeton University and Institute for Advanced Study.

March 2014, Algebraic Geometry Seminar, Courant Institute.

January 2014, Geometry and Dynamics Seminar, Tel Aviv University.

January 2014, Algebraic Geometry and Number Theory Seminar, Ben-Gurion University.

February 2013, Geometry and Analysis Seminar, Imperial College London.

February 2013, Algebraic and Symplectic Geometry Seminar, University of Oxford.

November-December 2012, 4 hour lecture series, Symplectic Geometry Seminar, Princeton University.

December 2011, Mathematics Colloquium, University of Haifa.

June 2011, Topology and geometry session of the Israel Mathematics Union meeting, Bar-Ilan University.

October 2010, Mathematics Colloquium, Technion.

October 2009, Symplectic Geometry Seminar, ETH Zurich.

June 2009, Mathematics Colloquium, Ben Gurion University.

March 2009, 9 hour lecture series, Kyoto University.

May 2008, Geometry and Topology Seminar, University of Wisconsin Madison.

May 2008, Geometry/Physics Seminar, Northwestern University.

December 2007, Math Colloquium, Tel Aviv University.

May 2007, New York Area Symplectic Seminar, Stony Brook University.

April 2007, Homological Mirror Symmetry Seminar, Institute for Advanced Study.

March 2007, Symplectic Geometry Seminar, University of Toronto.

January 2007, Geometry and Physics Seminar, University of Michigan.

January 2007, Jerusalem Mathematics Colloquium, Hebrew University of Jerusalem.

January 2007, Geometry and Dynamics Seminar, Tel Aviv University.
December 2006, Bar-Ilan Mathematics Colloquium, Bar-Ilan University.
November 2006, Geometry, Representation Theory and Moduli Seminar, Princeton U.
November 2006, Topology/Geometry Seminar, Rutgers University.
October 2006, Members Seminar, Institute for Advanced Study.
March 2006, Gauge Theory/Symplectic Geometry Seminar, Columbia University.
January 2006, Geometry and Topology seminar, Hebrew University of Jerusalem.
January 2006, Special Seminar, Tel Aviv University.
December 2005, Differential Geometry Seminar, Harvard University.

Teaching Experience

Spring 2020, Advanced calculus 2, Hebrew University.
Fall 2019, Quantum field theory, Hebrew University.
Spring 2019, Singularities of mean curvature flow, Hebrew University.
Fall 2018, Differential geometry, Hebrew University.
Spring 2018, Mirror symmetry, Hebrew University.
Fall 2017, Differential geometry, Hebrew University.
Fall 2016, Multivariable calculus (MAT 201), Princeton.
Spring 2016, Mean curvature flow, Hebrew University.
Fall 2015, Differential geometry, Hebrew University.
Spring 2015, Kähler-Einstein metrics, Hebrew University.
Fall 2014, Differential geometry, Hebrew University.
Spring 2014, Advanced calculus 2, Hebrew University.
Fall 2013, Differential geometry, Hebrew University.
Spring 2013, Differential geometry, Hebrew University.

Spring 2013, Seminar on mirror symmetry and Berkovich spaces, Hebrew University.

Fall 2012, The Atiyah-Singer index theorem, Hebrew University.

Fall 2012, Seminar on perturbative quantum field theory, Hebrew University.

Spring 2012, Differential geometry, Hebrew University.

Spring 2011, Curvature and topology, Hebrew University.

Fall 2010, Differential geometry, Hebrew University.

Spring 2010, Differential geometry, Hebrew University.

Fall 2009, Seminar on Gromov compactness, Hebrew University.

Fall 2009, Topics in geometry and topology, Hebrew University.

Spring 2009, Introduction to differential geometry, Hebrew University.

Fall 2008, Algebraic topology, Hebrew University.

Fall 2007, supervised Junior Thesis of an undergraduate student at Princeton.

Spring 2006, Differential equations recitation (18.03), MIT.

Fall 2005, Differential equations recitation (18.03), MIT.

Fall 2002, Multivariable calculus recitation (18.02), MIT.