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Education

Stanford University, Stanford, CA. Ph.D. in Mathematics (2002). Advisor: Yasha Eliashberg.

Cambridge University, Cambridge, England. Certificate of Advanced Studies with Distinction, Part III of the Mathematical Tripos (1997).

Harvard University, Cambridge, MA. A.B. summa cum laude in Mathematics (1996).

Professional Positions Held

Associate Professor, Haverford College (2010–)

Research Member, Mathematical Sciences Research Institute (Spring 2010).

Assistant Professor, Haverford College (2003–2010).

Lecturer, University of Pennsylvania (2002–3).

Research Interests (AMS 2000 Subject Classifications in parentheses)

Symplectic and contact topology (53D, 57M, 57R), especially Legendrian and transversal knot theory (57M) and Lagrangian submanifolds (53D)

Grants and Awards

National Grants

National Science Foundation Grant: “Knotting Phenomena in Symplectic and Contact Topology” (2009–2012). Principal Investigator (PI) in a collaborative proposal with Lisa Traynor. NSF-DMS 0909273.

National Science Foundation Grant: “Noyce Teaching Scholarship Program at Bryn Mawr and Haverford Colleges” (2009–2014). Co-PI with Victor Donnay (PI) and Robert Fairman, Alice Lesnick, and Peter Brodfuehrer (co-PIs). NSF-DUE 0934831.

American Institute of Mathematics SQuaREs Grant: “Augmentations, Rulings, and Generating Families” (2009–2010). With Lisa Traynor, Paul Melvin, Dmitry Fuchs, Daniel Rutherford, M. Bradley Henry, Victor Goryunov, and Sergei Chmutov.

ARCS Fellowship (2000–2001). For academic achievement.

National Science Foundation Graduate Research Fellowship (1997–2000).

Winston Churchill Foundation Scholarship (1996–1997).

Awards

Lindback Distinguished Teaching Award (2010).

Penn Math Department Good Teaching Award (2002).

Walter J. Gores Award, Stanford University (2001). For achievement in educational endeavors. This is Stanford's highest teaching award.

Centennial Teaching Assistant Award, Stanford University (2001). For excellence in teaching.

Phi Beta Kappa, Harvard University (1995).

Local Grants

Haverford Faculty Support Fund (for summer research assistants):

“Explorations in Legendrian Knot Theory via Generating Families” (2009)

“Explorations in Symplectic and Contact Topology via Generating Families” (2008)

“Topological Knot Invariants via Legendrian Contact Homology” (2006)

“Products in Contact Homology for Legendrian Knots” (2005)

“Computing Contact Homology for Legendrian Knots” (2004)

Mellon Tri-Co Seed Grant:

“Math and Philosophy Working Group” (2007–08 and 2008–09) with Alan Baker (SC), Mark Goodwin (SC), Tom Hunter (SC), and Danielle Macbeth (HC).

“Faculty-Student Seminar in Topology” (2004–05 and 2005–2006), with Paul Melvin (BMC), Lisa Traynor (BMC), and Janet Talvacchia (SC).

Publications

Peer-reviewed Journal Articles:

[With Gokhan Civan, John Etnyre, Paul Koprowski '07 and Alden Walker '07] “*Product Structures for Legendrian Contact Homology.*” To Appear in Math. Proc. Camb. Phil. Soc.

[With Lisa Traynor] “*Obstructions to the Existence and Squeezing of Lagrangian Cobordisms*”, J. Topol. Anal. **2** (2010), no. 2, 203–232.

[With Tobias Ekholm and John Etnyre] “*A Duality Exact Sequence for Legendrian Contact Homology*”, Duke Math. J. **150** (2009), 1–75.

“*Duality for Contact Homology of Legendrian Knots.*” Geometry and Topology **10** (2006) 2351–2381.

[With Lenhard Ng] “*The Correspondence between Augmentations and Rulings of Legendrian Knots.*” Pacific J. Math. **224** (2006), 141–150.

“*Augmentations and Rulings of Legendrian Knots.*” Int. Math. Res. Not. **2005**, 1157–1180.

“*Invariants of Legendrian Knots in Circle Bundles.*” Comm. Contemp. Math. **5** (2003), 569–628.

[With John Etnyre and Lenhard Ng] “*Invariants of Legendrian Knots and Coherent Orientations.*” *J. Symplectic Geom.* **1** (2002), 321–367.

Invited Articles:

“WHAT IS... A Legendrian Knot?” *Notices Amer. Math. Soc.* 56 (2009), 1282–1284.

[With Phil Eiseman '10, Jonathan Lima '10, and Lisa Traynor] “*A Partial Ordering on Slices of Planar Lagrangians.*” *J. Fixed Point Theory Appl.* **3** (2008), 431–447.

Educational Materials:

[With Stephen Wang] “*Cross Sections of Graphs of Functions of Two Variables*” and “*Second-Order Partial Derivatives*” from the Wolfram Demonstrations Project. Available at <http://demonstrations.wolfram.com>, 2009.

[With Jennifer Morse] “*The Community Math Teaching Project.*” In Hadlock, C. (ed.), *Mathematics in Service to the Community.* Washington, D.C.: The Mathematical Association of America, 2005.

Professional Activities

Invited Conference Talks

American Mathematical Society (AMS) Northeast Sectional Meeting, Low Dimensional Topology Session: “*Product Structures for Legendrian Contact Homology*” (October 2008)

American Institute of Mathematics (AIM) Workshop on Legendrian and Transverse Knots: “*An Introduction to Invariants of Legendrian Knots*” (Opening lectures) (September 2008)

New Perspectives and Challenges in Symplectic Field Theory (YashaFest at Stanford): “*An Introduction to Legendrian Contact Homology*” (June 2007)

AMS Northeast Sectional Meeting, Symplectic and Contact Topology Special Session: “*Duality for Legendrian Contact Homology*” (April, 2006)

AMS Western Sectional Meeting, Contact and Symplectic Geometry Session: “*Product Structures for Linearized Chekanov-Eliashberg Invariants (Preliminary Report)*” (April 2004)

Frontiers of PDEs and Dynamics Conference (Rutgers): “*Invariants of Legendrian Knots in Circle Bundles*” (May 2003)

AMS Southeast Sectional Meeting, Symplectic and Contact Topology Session: “*Invariants of Legendrian Knots in Circle Bundles*” (March 2002).

Invited Colloquia and Lecture Series

Wesleyan University Colloquium: “*Invariants of Legendrian Knots and the Legendrian Mirror Problem*” (April 2009)

Washington University in St. Louis Colloquium: “*Invariants of Legendrian Knots and the Legendrian Mirror Problem*” (February 2009)

Penn State Colloquium: “*Symplectic Rigidity for Lagrangian Cylinders*” (October 2008)

Dartmouth Colloquium: “*Symplectic Rigidity for Lagrangian Cylinders*” (April 2008)

Washington University in St. Louis Colloquium: “*Symplectic Rigidity for Lagrangian Cylinders*” (February 2008)

NYU / Courant Institute: “*Contact Homology for Legendrian Knots*” (Four-lecture mini-course, April/May 2003)

Seminars

Columbia Symplectic Geometry and Gauge Theory Seminar: “*Lagrangian Caps for Legendrian Knots via Generating Families*” (April 2010)

Research Seminar (MSRI): “*Lagrangian Caps for Legendrian Knots via Generating Families*” (March 2010)

Seminar on Quantitative Floer Theory (MSRI): “*Symplectic Rigidity for Lagrangian Cylinders*” (February 2010)

Workshop on Mirror Symmetry, Symplectic Geometry, and Related Topics (MIT): “*A-infinity Structures for Legendrian Contact Homology*” (June 2009). Contributed talk as invited participant.

University of Pennsylvania Deformation Theory Seminar: “*Products and A-infinity Structures in Contact Homology*” (February 2009)

Duke University Geometry-Topology Seminar: “*Symplectic Rigidity for Lagrangian Cylinders*” (November 2008)

Temple Geometry Seminar: “*Symplectic Rigidity for Lagrangian Cylinders*” (October 2008)

AIM Workshop on Legendrian and Transverse Knots: “*Symplectic Rigidity for Lagrangian Cylinders*” (Given jointly with Lisa Traynor) (September 2008)

Georgia Institute of Technology Geometry Seminar: “*Symplectic Rigidity for Lagrangian Cylinders*” (April 2008)

Dartmouth Geometry-Topology Seminar: “*Duality for Legendrian Submanifolds and the Arnold Conjecture*” (April 2008)

University of Pennsylvania Geometry-Topology Seminar: “*Symplectic Rigidity for Lagrangian Cylinders*” (February 2008)

Brussels–Cologne Joint Seminar (at L’Universite Libre de Bruxelles): “*Duality for Legendrian Contact Homology in Three Dimensions and Higher*” (April 2007)

University of Pennsylvania Geometry-Topology Seminar: “*Augmentations and Rulings of Legendrian Knots*” (November 2006)

Georgia Institute of Technology Geometry Seminar: “*The Structure of Legendrian Invariants*” (November, 2005)

UMass-Amherst Geometry Seminar: “*The Structure of Legendrian Invariants*” (October 2005)

The Lafayette/Lehigh Geometry and Topology Seminar: “*Invariants of Legendrian Knots*” (February 2005)

University of Pennsylvania Geometry-Topology Seminar: “*Structure Theorems for Legendrian Invariants*” (February 2005)

University of Southern California Geometry Seminar: “*The Structure of Legendrian Invariants*” (October 2004)

George Washington University Topology Seminar: “*Product Structures for Linearized Chekanov-Eliashberg Invariants (Preliminary Report)*” (March 2004)

University of Pennsylvania Geometry-Topology Seminar: “*Invariants of Legendrian Knots in Circle Bundles*” (January 2002).

Undergraduate-Oriented Colloquia and Seminars

Wesleyan University Math Club: “*How to Tie Your Unicycle in Knots*” (April 2009)

Penn State MASS Colloquium: “*How to Tie Your Unicycle in Knots*” (October 2008)

University of Pennsylvania Undergraduate Colloquium: “*How to Tie Your Unicycle in Knots*” (October 2006)

Gettysburg College Colloquium: “*How to Tie Your Unicycle in Knots*” (November 2005)

Bi-College Mathematics Colloquium: “*How Many Ways Can You Parallel Park a Unicycle?*” (February 2005)

Swarthmore College Colloquium: “*How Many Ways Can You Parallel Park a Unicycle?*” (November 2004)

Conference / Seminar Organization

Co-Organizer, Philadelphia Area Contact / Topology Seminar (Fall 2003–).

Co-Organizer, Mini-Conference on Symplectic Field Theory (Spring 2006).

Co-Organizer, MAA-Project NExT Session on “Being a Good Consumer of Mathematics Education Research” (AMS/MAA Joint Meetings, 2004).

Co-Organizer, AMS Special Session on Contact and Symplectic Geometry (AMS Sectional Meeting, April 2003).

Other

Referee for *Inventiones Mathematicae*, *J. Symplectic Geometry*, *International Mathematics Research Notices*, *Algebraic and Geometric Topology*, *Pacific J. of Math.*, *J. Topology*, *International J. Math.*, *Comm. Contemp. Math.*, *Mathematical Reviews (MathSciNet)*.

Project NExT Fellow (2003–4).

Winston Churchill Foundation Scholarship Screening Committee (2007, 2008)

Educational Activities

In the Classroom

At Haverford (2003–):

Intensive Calculus I (113 – HHMI section), Introductory Integral Calculus (114), Multivariable Calculus (121), The Community Math Teaching Project (123), Differential Equations (204), Linear Algebra (215), Multivariable Calculus (216), Analysis I (317), Analysis II (318), Topology I (335), Topology II (336), Differential Geometry (391). Developed new course with Rob Manning given in Fall 2004 and beyond (Math 299: “Bridge to Advanced Mathematics”), and created a course (Math 123: “The Community Math Teaching Project”) given in Spring 2006.

At the University of Pennsylvania (2002–2003):

The Community Math Teaching Project, Calculus I, and Advanced Linear Algebra

PhD Students

M. Brad Henry, 2009. Jointly advised with Rachel Roberts at Washington University in St. Louis. Placement as NSF VIGRE Postdoc at the University of Texas-Austin.

Undergraduate Research Students

C. Kirk Mangels '05, Paul Koprowski '07, Alden Walker '07, Sumana Shrestha BMC '07, Sam Clearman '07, Phil Eiseman '10, Jon Lima '10, Jacob Ralston '10, Stephen Sacchetti '11

Senior Thesis Students

Nick Kerr '04, Scott Sargrad '04, C. Kirk Mangels '05, Aaron Rosenberg '05, Benjamin Fineman '05, James Gallagher '05, Amanda Morris '06, Nicole Padula '06, Christina Chase '08, Alex Wein '08, Vahe Vartan '08, Katherine Clark '09, Anna Weltman '09

Talks and Panels

University of Pennsylvania Center for Teaching and Learning Workshop: “*Getting Undergraduates Involved in Research*” (February 2009)

MAA EPaDel Section Meeting Service Learning and Mathematics panel (November 2005)

MSPGP Math/Science Pedagogy Workshop: “*Theoretical Problems' in Advanced Multivariable Calculus*” (May 2005)

MAA Session on Service Learning in Mathematics at AMS/MAA Joint Meetings (Panelist, January 2004).

Consulting and Professional Development

Seminar Participant, Bi-College Teaching and Learning Initiative Faculty Seminar (Spring 2009)

Seminar Participant, Bi-College Math / Science Pedagogy Seminar (2004–06)

Script Writer for multimedia teacher education software. LearnTempo.com (Summer 2001).

Standards Writer for the Program of Teacher Preparation in Mathematics. Stanford University School of Education and Department of Mathematics (Winter 2001).

Teaching Consultant for the Center for Teaching and Learning. Stanford University (2000-2001).

Video Consultant for the Center for Teaching and Learning. Stanford University (1998-1999).

Other

Advisor for Humanities Center Student Seminar entitled “What are Poets and Polynomials For?” organized by David Henry '05 and David Alff '05 (2004–05).

Departmental supervisor for teaching certificate candidates Stephanie Rexer '04 and Ryan Chudd '09

Instructor for Haverford Summer Science Institute (HSSI) in summers of 2008 and 2009

College Service

Committees

Alternate Natural Science Representative to Academic Council (2010–11).

Committee on College Honors (2004–05 and 2008-09), including selection of Beckman Scholars in 2005, 2006, and 2008.

Faculty Admissions Committee (2007-08).

Hurford Humanities Center Steering Committee (2005–06).

Departmental Service

Math Question Center (evening help session one night per week, one semester per year) (2003– when not on leave)

Library Liaison (2003–06, 2007–2009)

Colloquium Chair (2004–05, Spring 2006, Fall 2007, Fall 2008, Spring 2011)

Computer Coordinator (for PCs, 2005–06)

Other

Informal Tri-College effort to better train our students for teaching mathematics (2004–05)

Panelist for Career Services session on how to apply to graduate school (September 2005)

Reappointment Committee for Jody Cohen (BMC) (2006)

Hiring Committee for Director of Alumni Relations (2006)

Hiring Committee for Assistant Admissions Counselor (2008)

Presenter for John Dougherty's Reappointment (2010–11)