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RESEARCH INTERESTS

DIFFERENTIAL GEOMETRY: contact and symplectic geometry, Riemannian geometry

GEOMETRIC TOPOLOGY: low-dimensional topology, knot theory

ACADEMIC APPOINTMENTS

LOUISIANA STATE UNIVERSITY
Assistant Professor
Baton Rouge, LA
2012-

COLUMBIA UNIVERSITY
NSF Postdoctoral Fellow
Sponsoring Scientist: Peter Ozsváth
New York, NY
2009-2012

MATHEMATICAL SCIENCE RESEARCH INSTITUTE
Research Member
Berkeley, CA
2009-2010

GEORGIA INSTITUTE OF TECHNOLOGY
Visiting Scholar
Atlanta, GA
Fall 2007

EDUCATION

UNIVERSITY OF PENNSYLVANIA
Ph.D. in Mathematics, May 2009
Advisor: John B. Etnyre
Philadelphia, PA

RICE UNIVERSITY
B.A. in Mathematics *magna cum laude*, May 2004
Houston, TX

HONORS AND AWARDS

NATIONAL SCIENCE FOUNDATION GRANT (\$131,615)
Title: "Contact geometry, Heegaard Floer homology and open book decompositions"
2012-2015

NATIONAL SCIENCE FOUNDATION MATHEMATICAL SCIENCES POST-
DOCTORAL RESEARCH FELLOWSHIP (\$135,000)
Columbia University
2009-2012

AMERICAN INSTITUTE OF MATHEMATICS SQUARE GRANT
Joint with Ken Baker, Jeremy Van Horn-Morris and Vera Vértési
Title: "The Giroux correspondence"
2014-2017

CHAUVENET PRIZE FOR EXPOSITORY MATHEMATICAL WRITING
Awarded by the Mathematical Association of America for *The Four Vertex Theorem and its Converse*, published in the Notices of the AMS.
2012

DEAN'S AWARD FOR DISTINGUISHED TEACHING BY A GRADUATE STUDENT University of Pennsylvania	Spring 2009
PENN PRIZE FOR EXCELLENCE IN TEACHING Honorable Mention: University of Pennsylvania	Fall 2005
DEPARTMENTAL GOOD TEACHING AWARD University of Pennsylvania	2005, 2006, 2008
BENJAMIN FRANKLIN FELLOWSHIP University of Pennsylvania	2004-2009
FRANK JONES SCHOLARSHIP Rice University	Summer 2003

PUBLICATIONS

GENERALIZED GAUSS MAPS AND INTEGRALS FOR THREE-COMPONENT LINKS: TOWARD HIGHER HELICITIES FOR MAGNETIC FIELDS AND FLUID FLOWS, PART 2

Joint with Dennis DeTurck, Herman Gluck, Rafal Komendarczyk, Paul Melvin, Haggai Nuchi, and Clayton Shonkwiler: *Algebr. Geom. Topol.* **13** (2013), no. 5, 2897-2923, [arXiv:1207.1793\[math.GT\]](#).

ON THE EQUIVALENCE OF LEGENDRIAN AND TRANSVERSE INVARIANTS IN KNOT FLOER HOMOLOGY

Joint with John A. Baldwin and Vera Vértési: *Geom. Topol.* **17** (2013), 925-974, [arXiv:1112.5970\[math.SG\]](#).

GENERALIZED GAUSS MAPS AND INTEGRALS FOR THREE-COMPONENT LINKS: TOWARD HIGHER HELICITIES FOR MAGNETIC FIELDS AND FLUID FLOWS

Joint with Dennis DeTurck, Herman Gluck, Rafal Komendarczyk, Paul Melvin, and Clayton Shonkwiler: *J. Math. Phys.* **54**, 013515 (2013) [arXiv:1101.3374\[math.GT\]](#).

ON THE TRANSVERSE INVARIANT FOR BINDINGS OF OPEN BOOKS

J. Differential Geom. **88** (2011), no. 3, 533-552, [arXiv:0806.1729\[math.SG\]](#).

LEGENDRIAN CONTACT HOMOLOGY AND NONDESTABILIZABILITY

Joint with Clayton Shonkwiler: *J. Symplectic Geom.* **9** (2011), no. 1, 33-44, [arXiv:0910.3914\[math.GT\]](#).

HIGHER-DIMENSIONAL LINKING INTEGRALS

Joint with Clayton Shonkwiler: *Proc. Amer. Math. Soc.* **139** (2011), no. 4, 1511-1519, [arXiv:0801.4022\[math.GT\]](#).

TORSION AND OPEN BOOK DECOMPOSITIONS

Joint with John B. Etnyre: *Int. Math. Res. Not.* (2010), no. 2, 4385-4398, [arXiv:0909.3465\[math.SG\]](#).

TRIPLE LINKING NUMBERS, HOPF INVARIANTS AND INTEGRAL FORMULAS FOR THREE-COMPONENT LINKS

Joint with Dennis DeTurck, Herman Gluck, Rafal Komendarczyk, Paul Melvin, and Clayton Shonkwiler: *Mat. Contemp.* **34** (2008), 251-283, [arXiv:0901.1612\[math.GT\]](#).

THE FOUR VERTEX THEOREM AND ITS CONVERSE

Joint with Dennis DeTurck, Herman Gluck, and Daniel Pomerleano: *Notices Amer. Math. Soc.* **54** (2007), no. 2, 192-207, [arXiv:0609268\[math.DG\]](#).

PREPRINTS

SUTURED FLOER HOMOLOGY AND INVARIANTS OF LEGENDRIAN AND TRANSVERSE KNOTS

Joint with John B. Etnyre and Rumen Zarev: Under revision at *Geom. Topol.* 2015, [arXiv:1408.5858\[math.GT\]](#).

BRAIDS AND COMBINATORIAL KNOT FLOER HOMOLOGY

Joint with Peter Lambert-Cole and Michaela Stone: Submitted 2013, [arXiv:1312.5586\[math.GT\]](https://arxiv.org/abs/1312.5586).

A REFINEMENT OF THE HEEGAARD FLOER CONTACT INVARIANT I

Joint with John A. Baldwin: In Preparation – Draft available.

A REFINEMENT OF THE HEEGAARD FLOER CONTACT INVARIANT II

Joint with John A. Baldwin: In Preparation – Draft available.

CONTACT GEOMETRY AND HEEGAARD FLOER INVARIANTS OF NONCOMPACT 3-MANIFOLDS

Joint with John B. Etnyre: In Preparation.

RULING INVARIANTS AND AUGMENTATIONS OF BORDERED LEGENDRIAN KNOTS

Joint with Joshua Sabloff and Clayton Shonkwiler: In Preparation – Draft Available.

THE GEOMETRY OF TRIPLE LINKING: A SURVEY

Joint with Dennis DeTurck, Herman Gluck, Rafal Komendarczyk, Paul Melvin, Haggai Nuchi, and Clayton Shonkwiler: In Preparation.

 CONFERENCE, COLLOQUIUM AND SERIES TALKS

A REFINEMENT OF THE OZSVÁTH-SZABÓ CONTACT INVARIANT

Spring 2015

Joint Meetings: San Antonio, TX

BRAIDS AND COMBINATORIAL KNOT FLOER HOMOLOGY

Summer 2014

Combinatorial Link Homology Theories, Braids, and Contact Geometry: ICERM

CONTACT STRUCTURES AND KNOT FLOER HOMOLOGY

Spring 2014

AMS Sectional Meeting: University of Maryland, Baltimore County

TRANSVERSE KNOTS, INFINITE CYCLIC COVERS AND HEEGAARD FLOER HOMOLOGY

Spring 2013

Topology and Dynamics Conference: Central Connecticut State University

TRANSVERSE KNOTS, INFINITE CYCLIC COVERS AND HEEGAARD FLOER HOMOLOGY

Spring 2013

Redbud Topology Conference: University of Arkansas

ON THE EQUIVALENCE OF LEGENDRIAN AND TRANSVERSE KNOT INVARIANTS IN HEEGAARD FLOER HOMOLOGY

Fall 2012

AMS Sectional Meeting: Tulane University

CONTACT STRUCTURES, LEGENDRIAN AND TRANSVERSE KNOTS, AND HEEGAARD FLOER HOMOLOGY

Spring 2012

Colloquium: University of New Mexico

CONTACT STRUCTURES, LEGENDRIAN AND TRANSVERSE KNOTS, AND HEEGAARD FLOER HOMOLOGY

Spring 2012

Colloquium: Louisiana State University

ON THE EQUIVALENCE OF LEGENDRIAN AND TRANSVERSE KNOT INVARIANTS IN HEEGAARD FLOER HOMOLOGY

Spring 2012

Joint Meetings: Boston, MA

RECOVERING $\text{HFK}^-(Y, K)$ FROM SUTURED FLOER HOMOLOGY AND CONTACT INVARIANTS FOR OPEN 3-MANIFOLDS

Spring 2011

BIRS Workshop: Banff, Canada

RECOVERING $\text{HFK}^-(Y, K)$ FROM SUTURED FLOER HOMOLOGY AND CONTACT INVARIANTS FOR OPEN 3-MANIFOLDS

Spring 2011

AMS Sectional Meeting: Georgia Southern University

RECOVERING $\text{HFK}^-(Y, K)$ FROM SUTURED FLOER HOMOLOGY AND CONTACT INVARIANTS FOR OPEN 3-MANIFOLDS Joint Meetings: New Orleans, LA	Spring 2011
ARNOLD'S DREAM: A SEARCH FOR HIGHER ORDER HELICITY INVARIANTS Colloquium: Rice University	Fall 2010
RECOVERING $\text{HFK}^-(Y, K)$ FROM SUTURED FLOER HOMOLOGY AND CONTACT INVARIANTS FOR OPEN 3-MANIFOLDS PATCH Seminar: Temple University	Fall 2010
PONTRYAGIN INVARIANTS AND INTEGRAL FORMULAS FOR MILNOR'S TRIPLE LINKING NUMBER Knot Concordance and Homology Cobordism Workshop: Wesleyan University	Summer 2010
LEGENDRIAN CONTACT HOMOLOGY AND NONDESTABILIZABILITY Istanbul Contact Geometry and Topology Workshop: Bogazici University	Summer 2010
LECTURES ON BORDERED FLOER HOMOLOGY Geometry-Topology Reading Seminar: Georgia Tech	Fall 2009
TRANSVERSE INVARIANTS AND BINDINGS OF OPEN BOOKS AMS Sectional Meeting: North Carolina State University	Spring 2009
TRIPLE LINKING NUMBERS, AMBIGUOUS HOPF INVARIANTS AND INTEGRAL FORMULAS FOR THREE-COMPONENT LINKS Colloquium: Haverford College	Spring 2009
ON THE TRANSVERSE INVARIANT FOR BINDINGS OF OPEN BOOKS AMS Sectional Meeting: Wesleyan University	Fall 2008
LEGENDRIAN AND TRANSVERSE LINK INVARIANTS AIM Workshop: Palo Alto, CA	Fall 2008

SEMINAR TALKS

2015

• University of Georgia; Athens, GA • American Institute of Mathematics; San Jose, CA • Colorado State University; Fort Collins, CO

2014

• American Institute of Mathematics; Palo Alto, CA • SUNY at Stony Brook; Stony Brook, NY • Columbia University; New York, NY

2013

• Rice University; Houston, TX • University of Virginia; Charlottesville, VA • Tulane University; New Orleans, LA

2012

• Simons Center; Stony Brook, NY • Purdue University; West Lafayette, IN • Louisiana State University; Baton Rouge, LA • Georgia Institute of Technology; Atlanta, GA • Duke University; Durham, NC • University of California, Berkeley; Berkeley, CA • City University of New York; New York, NY

2011

• Georgia Institute of Technology; Atlanta, GA • Harvard University; Cambridge, MA • SUNY at Stony Brook; Stony Brook, NY • University of Georgia; Athens, GA • Columbia University; New York, NY • SUNY at Stony Brook; Stony Brook, NY

2010

• University of Pennsylvania; Philadelphia, PA • Columbia University; New York, NY • Rice University; Houston, TX • Tulane University; New Orleans, LA

2009

• University of Massachusetts; Amherst, MA • Rice University; Houston, TX • Rochester University; Rochester, NY • Duke University; Durham, NC • Georgia Institute of Technology; Atlanta, GA • Wesleyan University; Middletown, CT • Texas Christian University; Fort Worth, TX (two talks) • Eidgenössische Technische Hochschule; Zürich, Switzerland • University of Pennsylvania; Philadelphia, PA

2008

• Temple University; Philadelphia, PA • University of Southern California; Los Angeles, CA • University of Georgia; Athens, GA • University of Pennsylvania; Philadelphia, PA

2006

• Georgia Institute of Technology; Atlanta, GA • University of Georgia; Athens, GA • University of Pennsylvania; Philadelphia, PA • PACT Seminar; Philadelphia, PA

TEACHING EXPERIENCE

REU SUPERVISOR

2013 • Computing Transverse Invariants – Louisiana State University
2012 • Braids and Knot Floer Homology – Louisiana State University
2011 • Noncommutative Knot Invariants – Columbia University
2010 • Abelianized Characterized of Legendrian Knots – Columbia University

COURSE INSTRUCTOR

2015 • Multidimensional Calculus – Louisiana State University
2014 • Topology I – Louisiana State University • Complex Analysis – Louisiana State University
2013 • Contact Geometry – Louisiana State University • Integral Transforms and Their Applications – Louisiana State University • Differential Geometry – Louisiana State University
2012 • Integral Transforms and Their Applications • Multidimensional Calculus – Louisiana State University
2011 • Linear Algebra • Calculus I • Independent Study in Noncommutative Knot Theory (two students) – Columbia University
2010 • Calculus II (two sections) – Columbia University
2007 • Calculus III – University of Pennsylvania
2006 • Calculus I – University of Pennsylvania

COURSE TEACHING ASSISTANT

• Contact Geometry in Low-Dimensions – Park City Mathematics Institute
• Algebraic Topology • Honors Calculus • Calculus III • Calculus II • Ideas in Mathematics – University of Pennsylvania

PROFESSIONAL SERVICE

GRADUATE RESEARCH AND MENTORSHIP

• Advisor to Jose Cenicerros and Federico Salmoiraghi
• Comprehensive Exam committee member for Andrew Holmes
• Dissertation committee member for Peter Lambert-Cole

UNDERGRADUATE RESEARCH AND MENTORSHIP

- Research supervisor for Shawn Williams – Louisiana State University, Spring 2015
- Research supervisor for Bao Pham and Sarah Schott – Louisiana State University, Summer 2013
- REU supervisor for Samuel Connolly, Michaela Stone, and Ellen Weld – Louisiana State University, Summer 2012
- Research supervisor for Eden Prywes, John Schultz, and Josh Tobin – Columbia University, Fall 2011
- REU supervisor for Rankeya Datta, Stephen Fitz, Eden Prywes, John Schultz, Josh Tobin, and Kitty Yang – Columbia University, Summer 2011
- REU supervisor for Atanas Atanasov, Jeffery Irwin, Daniel Kotzen, Christopher Lopez, and Eliot Wycoff – Columbia University, Summer 2010
- Mentor to Dimitri Dziabenko and Nick Watson as part of the Undergraduate Seminar – University of Pennsylvania, Spring 2009

CONFERENCES, SEMINARS AND PANELS CO-ORGANIZED

- Smooth Topology Research Seminar; Louisiana State University
- 2011 Geometry Festival; University of Pennsylvania
- Undergraduate Seminar; University of Pennsylvania
- Low-Dimensional Topology Seminar; University of Pennsylvania
- Graduate Student General Seminar; University of Pennsylvania
- Landing a Job: A panel discussion on the application process; University of Pennsylvania

CURRICULUM DEVELOPMENT

- Together with Asher Auel and Andrew Obus, spearheaded the development of the University of Pennsylvania's Math 116/260, a rigorous introduction to calculus.

ADMINISTRATION

- Executive committee member – Louisiana State University, 2014 - present
- Treasurer of the Louisiana State University chapter of Phi Beta Kappa, 2015
- Former contributor and founding editorial board member: AMS Graduate Student Blog
- Former representative: Graduate Student Associations Council; University of Pennsylvania

REFEREE

- Geometry & Topology
- Selecta Mathematica
- Forum of Mathematics, Sigma
- Quantum Topology
- Journal of Symplectic Geometry
- Journal of Topology
- Pacific Journal of Mathematics
- Algebraic & Geometric Topology
- Topology and its Applications

REVIEWER

- Math Reviews
- Zentralblatt MATH

VOLUNTEER

- Rice Alumni Volunteer for Admission

PROFESSIONAL MEMBERSHIPS

AMERICAN MATHEMATICAL SOCIETY	2003-
ASSOCIATION FOR WOMEN IN MATHEMATICS	2005-
MATHEMATICAL ASSOCIATION OF AMERICA	2008-
PHI BETA KAPPA	2004-

REFERENCES

John B. Etnyre Georgia Institute of Technology	Thesis Advisor
Herman Gluck University of Pennsylvania	Research Reference
Ko Honda University of Southern California	Research Reference
Peter Ozsváth Princeton University	Research Reference

Paul Melvin
Bryn Mawr College

Research Reference

Michael Thaddeus
Columbia University

Teaching Reference
