

Chris Cornwell

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Research Interests

Topology, symplectic geometry, knot theory, topological data analysis.

Positions

- Fall 2016 – **Assistant Professor**, Department of Mathematics, Towson University.
Fall 2015 **Semester Fellowship**, Institut Mittag-Leffler.
2014 – 2016 **CIRGET Postdoctoral Fellow**, Université du Québec à Montréal.
2011 – 2014 **Visiting Assistant Professor**, Mathematics Department, Duke University.

Education

- 2011 **Ph.D. Mathematics**, Michigan State University.
Thesis Title: Invariants of topological and Legendrian links in lens spaces with a universally tight contact structure.
Thesis Advisor: Efstratia Kalfagianni.
- 2006 **M.S. Mathematics**, Brigham Young University.
Advisor: Stephen Humphries.
- 2004 **B.S. Mathematics**, Brigham Young University.

Publications

- KCH representations, augmentations, and A -polynomials.**
J. Symplect. Geom., to appear.
- Augmentation rank of satellites with braid pattern (with D. Hemminger).**
Commun. Anal. Geom., to appear.
- Obstructions to Lagrangian concordance (with L. Ng and S. Sivek).**
Algebr. Geom. Topol. 16 (2016), 797 – 824.

Knot contact homology and representations of knot groups.

J. Topology 7 (2014), 1221 – 1242.

A polynomial invariant for links in lens spaces.

J. Knot Theory and its Ramifications 21 (2012), #1250060 (31 pages).

Bennequin type inequalities in lens spaces.

Int. Math. Res. Notices 2012, 1890 – 1916.

Counting fundamental paths in certain Garside semigroups (with S. Humphries).

J. Knot Theory and its Ramifications 17 (2008), 191 – 211.

Preprints

Character varieties of knot complements and branched double-covers via the cord ring.

(submitted)

Berge duals and universally tight contact structures.

(submitted).

A strong correspondence principle for smooth, monotone environments (with F. Christensen).

(in preparation).

Awards

2017	MAA Project NExT Fellow.
2015	Institut Mittag-Leffler Fellowship.
2012	AMS Simons Travel Grant Recipient.
2006–2008	NSF RTG Graduate Fellowship, DMS-0353717.

Teaching

At Towson University

Calculus I	Fall 2016
Calculus II	Spring 2017
Introduction to Abstract Mathematics	Spring 2017
Introduction to Abstract Algebra	Fall 2016

At McGill University

Applied Linear Algebra	Winter 2016
Linear Algebra	Fall 2014

At Duke University

Calculus III	Fall 2011, Spring 2012, Fall 2012, Spring 2013
Contact geometry	(mini course) Spring 2013
Differential Geometry	Spring 2012
Linear Algebra	Spring 2013
Multivariable Calculus for Economists	Fall 2013, Spring 2014
Research independent study	Fall 2012, Fall 2013
Topology	Fall 2013

Selected Conference & Colloquium Talks

- Nov. 2016 *KCH representations: A new point of view*, AMS Sectional Meeting, North Carolina State University.
- June 2016 *Augmentations in knot contact homology and $SL(2, \mathbb{C})$ character varieties*, Perspectives in topology and geometry of 4-manifolds, Dubrovnik, Croatia.
- Apr. 2016 *Augmentation varieties*, Spring Lecture Series, University of Arkansas.
- Mar. 2016 *Character varieties of branched double covers via knot contact homology*, AMS Sectional Meeting, University of Georgia.
- Dec. 2014 *Conormal tori and knot contact homology*, CMS Winter Meeting, Session "Geometry and topology of manifolds in low dimensions."
- Apr. 2014 *Knot contact homology and group representations in knot theory*, Department Colloquium, Western Illinois University.
- Jan. 2014 *Knot contact homology and a question of Cappell and Shaneson*, Knots in Washington, George Washington University.
- Dec. 2013 *Knots and homological invariants from contact structures*, Department Colloquium, University of Iowa.
- Oct. 2013 *The augmentation polynomial of knot contact homology and knot group representations*, AMS special session "Geometric Topology of Knots and 3-manifolds," Temple University.
- July 2013 *Knot contact homology and representations of knot groups*, Workshop "Low-dimensional Topology after Floer," University of Montreal.

Selected Seminar Talks

- Oct. 2016 *KCH representations: A new point of view.*, Geometry Seminar, University of Virginia.
- Sep. 2015 *Understanding character varieties of knot complements and 2-fold branched covers through the cord ring*, Geometry & Topology Seminar, McMaster University.

- April 2015 *Knot theory through contact homology and the braid group*, Geometry, Topology, Dynamical Systems Seminar, University of Texas at Dallas.
- Feb. 2015 *Knot contact homology*, Algebra & Geometry Seminar, Australia National University, Canberra.
- Feb. 2015 *Knot contact homology*, Pure Mathematics Seminar, Monash University, Melbourne.
- Oct. 2014 *Berge duals and universally tight contact structures*, Geometry/Topology Seminar, Boston College.
- Mar. 2014 *Knot contact homology, knot group representations, and the A-polynomial*, Virtual Seminar, LSU.
- Mar. 2014 *Knot contact homology and the classical A-polynomial*, Symplectic Geometry, Gauge Theory, and Categorification Seminar, Columbia University.
- Jan. 2013 *Knot contact homology and representations of knot groups*, Symplectic Geometry, Gauge Theory, and Categorification Seminar, Columbia University.
- Nov. 2012 *Skein polynomials and the classical contact invariants in lens spaces*, Geometry and Topology Seminar, Caltech.
- Mar. 2011 *Legendrian and transverse knots in lens spaces with a universally tight contact structure.*, Virtual Seminar, Louisiana State University.

Advising

- 2016 – Nestor Ashbery, APIM Masters program, Towson University.
- 2013 – 2014 David Hemminger, Duke PRUV program, Undergraduate research for senior thesis.
Supervised and guided David in summer research and independent study
Research in: augmentation rank and cables of knots, see joint paper
- 2012 – 2014 Daniel Vitek, Duke PRUV program, Undergraduate research for senior thesis.
Supervised, guided Daniel in summer research, independent study, and writing senior thesis
Research in: augmentation polynomials and use of resultants

Service

- Mar 2015 Co-organizer AMS special session “Knot theory and Floer-type invariants,” AMS Central Spring Sectional Meeting
- Apr 2012 Co-organizer of 27th Annual Geometry Festival, Duke University.
<http://www.math.duke.edu/conferences/geomfest12/>.
- Apr 2011 Co-organizer of 9th Annual Graduate Student Topology and Geometry Conference, Michigan State University, April 2 –3, 2011.