

Peter D. Horn

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Appointments

- National Science Foundation Postdoctoral Research Fellow 2009 - 2012
Columbia University
Scientific sponsor: Peter Ozsváth
- Mathematical Sciences Research Institute, Postdoctoral Member Spring 2010
Homology Theories of Knots and Links

Education

- Rice University May 2009
Ph.D. in Mathematics
Thesis title: *Higher-order analogues of genus and slice genus of classical knots*
Thesis advisor: Tim Cochran
- Hendrix College May 2004
B.A in Mathematics

Research Interests

Low-dimensional topology, particularly the theory of knots and links, and non-commutative group theory.

Publications and Preprints

1. Filtering smooth concordance classes of topologically slice knots
with Tim Cochran and Shelly Harvey
at [arXiv:1201.6283](https://arxiv.org/abs/1201.6283)
2. Knot concordance and homology cobordism
with Tim Cochran, Bridget Franklin, and Matthew Hedden
to appear in *Proceedings of the American Mathematical Society*
at [arXiv:1102.5730](https://arxiv.org/abs/1102.5730)
3. Higher-order signature cocycles for subgroups of mapping class groups and homology cylinders
with Tim Cochran and Shelly Harvey
International Mathematics Research Notices, 2011, doi:10.1093/imrn/rnr149
at [IMRN's website](#) or [arXiv:1003.4977](https://arxiv.org/abs/1003.4977)
4. A higher-order genus invariant and knot Floer homology
Proceedings of the American Mathematical Society, 138 (2010), 2209–2215
at [PAMS's website](#) or [arXiv:0901.2095](https://arxiv.org/abs/0901.2095)
5. Higher-order analogues of the slice genus of a knot
International Mathematics Research Notices, 2011, no. 5, 1091–1106
at [IMRN's website](#) or [arXiv:0807.0434](https://arxiv.org/abs/0807.0434)

Peter D. Horn

6. The non-triviality of the Grope filtrations of the knot and link concordance groups
Commentarii Mathematici Helvetici, **85** (2010), no. 4, 751-773
at [CMH's website](#) or [arXiv:0804.2661](#)
7. The first-order genus of a knot
Mathematical Proceedings of the Cambridge Philosophical Society, **146** (2009), 135-149
at [Cambridge's website](#) or [arXiv:0712.1010](#)
8. Modeling the impact of forest fragmentation on predator-prey systems
with Ryan Westbrook
Pi Mu Epsilon Journal, **12** (2004), no. 1

Fellowships and Awards

NSF Mathematical Sciences Postdoctoral Research Fellowship Columbia University	2009 - 2012
Lodieska Stockbridge Vaughn Fellowship Rice University	2008 - 2009
NSF Vertical Integration of Research and Education Fellowship Rice University	2006 - 2008
Graduate Fellowship Rice University	2004 - 2006
Richard V. Andree Award <i>Pi Mu Epsilon Journal</i>	2004
Walter E. Hogan Award Hendrix College	2004
Phillip E. Parker Undergraduate Research Award Hendrix College	2004
Barry M. Goldwater Scholarship	2003
Elizabeth McHenry and Harry I. Lane Award Hendrix College	2002

Conference and Colloquium Talks

Four-dimensional equivalence relations on knots Colloquium Syracuse University	January 2012
Knot concordance and homology cobordism AMS Special Session on <i>Knot Theory</i> Joint Mathematics Meetings, Boston	January 2012
Filtering topologically slice knots AMS Special Session on <i>Knot Theory</i> Joint Mathematics Meetings, New Orleans	January 2011
Higher-order signature cocycles for the mapping class group Knot Concordance and Homology Cobordism Workshop Wesleyan University	July 2010

Peter D. Horn

Higher-order signature cocycles for the mapping class group AMS Eastern Sectional Meeting New Jersey Institute of Technology	May 2010
Generalizing the genus of a knot Bi-college Mathematics Colloquium Haverford College	April 2010
Higher-order genera of knots AMS Eastern Sectional Meeting Wesleyan University	Oct 2008
The Grope filtration and higher-order genera of knots Fifty Years Since Fox and Milnor, a Conference in Honor of Jerry Levine Brandeis University	June 2008
Higher-order genera of knots AMS Southeastern Sectional Meeting Louisiana State University	March 2008
Non-triviality in the Grope filtration of the knot concordance group Third Annual Louisiana-Texas Topology Retreat Rice University	Feb 2008
Bipolar plots MAA MathFest University of Colorado at Boulder	July 2003
Modeling the impact of forest fragmentation on predator-prey populations REU-VIGRE Conference Texas A&M University	July 2003

Seminar Talks

2011

- Wesleyan University • SUNY Stony Brook • Louisiana State University • Princeton University
- Columbia University

2010

- Columbia University (two talks) • Brandeis University • Rutgers University • City University of New York • University of Virginia • Wesleyan University • Rice University

2009

- Columbia University (two talks) • Louisiana State University

2007

- Trinity University

Teaching

REU Co-organizer

- Summer 2011 - Columbia University
- “Non-commutative Knot Invariants”

Instructor

- Fall 2011 - Columbia University
- Independent Study/Research Course (three students) • Calculus II • Calculus III
- Fall 2009 - Columbia University
- Calculus I • Calculus II

Peter D. Horn

Summer 2007 - Rice University

- Linear Algebra

Summer 2006 - Rice University

- Ordinary Differential Equations and Linear Algebra

Spring 2006 - Rice University

- Multivariable Calculus

Summer 2005 - Rice University

- Multivariable Calculus

Teaching Assistant

2004 to 2009 - Rice University

- General topology • Differential Geometry • Algebraic Topology • Honors Linear Algebra • Ordinary Differential Equations and Linear Algebra • Multivariable Calculus • Single Variable Calculus

Service and Professional Activities

Co-organizer of the Special Session in “Low-dimensional Topology”

AMS Southeastern Section Spring Meeting

University of South Florida, March 2012

Referee

International Mathematics Research Notices

Graduate Teaching Seminar Participant

Rice University, 2004 - 2006

Logistics Coordinator

Rice University Mathematical Institute for Young Women, 2008

Graduate Student Liaison to the Graduate Committee

Rice University Department of Mathematics, 2005 - 2009

Peer Academic Mentor

Hendrix College, 2002 - 2003

Mentored a dozen freshman students regarding their personal and academic endeavors

References

Tim Cochran

Rice University

Research reference

Kent Orr

Indiana University

Research reference

Peter Ozsváth

Princeton University

Research reference

Daniel Ruberman

Brandeis University

Research reference

Peter Teichner

Max-Planck-Institut für Mathematik and University of California, Berkeley

Research reference

Patrick Gallagher

Columbia University

Teaching reference