CURRICULUM VITA

LAWRENCE ROBERTS

Contact Information:

Department of Mathematics
The University of Alabama
Tuscaloosa, Al 35487

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Professional Preparation:

May 1997	B.A. Summa Cum Laude	Washington University in St. Louis
Dec 2004	Ph.D. Mathematics	University of California, Berkeley

Appointments:

Associate Professor, The University of Alabama, Aug. 2015 –
Assistant Professor, The University of Alabama, Aug. 2009 – 2015
Research Member, Homology theory of knots and links program, MSRI Jan 2010 – May 2010
Visiting Assistant Professor, Michigan State University, Aug. 2008 – Aug. 2009
Visiting Research Instructor, RTG program in Geometry/Topology
Michigan State University, Aug. 2005 - Aug. 2008

Awards and Honors:

National Science Foundation, Graduate Research Fellowship, 1998 - 2001
Outstanding Graduate Student Instructor, University of California, Berkeley, 2003
Arthur Holly Compton Fellowship, Washington University, St. Louis, 1993-1997

Research Interests: Differential topology, low dimensional topology, knot theory, gauge theory, Heegaard-Floer homology, Khovanov homology

Dissertation: "Heegaard-Floer homology and based links in three manifolds", written under Robion Kirby, University of California, Berkeley

Papers published and accepted:

"Graphical discovery of a new identity for Jacobi polynomials" w. Brian Gerard, *American Mathematical Monthly*, vol. 105, no. 2. Feb 1998, p. 163-166.

"Rational blow downs in Heegaard-Floer homology", *Communications in Contemporary Mathematics*. Vol 10, No. 4, (2008) 491-522. [32 pgs]
DOI: 10.1142/S0219199708002880

"Heegaard-Floer homology and string links", *Algebraic & Geometric Topology* 9 (2009) 29-102. [74 pgs] DOI: 10.2140/agt.2009.9.29

"Extending Van Cott's bounds for the τ-invariant of satellite knots", *Journal of Knot Theory and its Ramifications.* Vol. 20, No. 9 (2011) 1237-1245. [9 pgs] DOI: 10.1142/S0218216511009200

"Some bounds for the knot-Floer τ-invariant of satellite knots", *Algebraic & Geometric Topology* 12 (2012) 449-467. [19 pgs] DOI: 10.2140/agt.2012.12.449

"On knot Floer homology for some fibered knots", *Communications in Contemporary Mathematics.* Vol. 15, No. 1, January 2013 [38 pages] DOI: 10.1142/S0219199712500538

"On knot Floer homology in double branched covers", *Geometry & Topology* 17 (2013) 413-467 [55 pgs] DOI: 10.2140/gt.2013.17.413

"On non-isotopic spanning surfaces for a class of arborescent knots", *Journal of Knot Theory and its Ramifications.* Vol. 22, No. 13 (2013) 1350075 [16 pages] DOI: 10.1142/S0218216513500752

"Totally twisted Khovanov homology", *Geometry & Topology* 19 (2015) 1-59 [59 pgs] DOI: 10.2140/gt.2015.19.1

"Twisted Skein Homology", w/ N. Duong, *Journal of Knot Theory and its Ramifications.* Vol. 23, 1450027 (2014) [43 pages] DOI:10.1142/S0218216514500278

"The decategorification of bordered Khovanov homology", *Journal of Knot Theory and its Ramifications.* 1450078 (2014) [33 pgs] DOI: 10.1142/S0218216514500783

"A type D structure in Khovanov Homology", *Advances in Mathematics* 293 (2016) 81-145 [64 pages] DOI: 10.1016/j.aim.2016.02.007

"A type A structure in Khovanov Homology", *Algebraic & Geometric Topology* 16-6 (2016), 3653-3719. [50 pages] DOI: 10.2140/agt.2016.16.3653

"Planar algebras and the decategorification of bordered Khovanov homology", *Journal of Knot Theory and its Ramifications.* 1750023 (2017) [23 pages] DOI: 10.1142/S0218216517500237

Papers submitted:

'Planar compositions in bordered Khovanov Homology," submitted *Algebraic & Geometric Topology*

Pre-prints and papers in preparation:

"Notes on the Heegaard-Floer link surgery spectral sequence", math.GT/0808.2817, [53 pages]

"Planar compositions in totally twisted Khovanov Homology," w/ N. Duong, in preparation

Invited Talks:

Several talks in the topology/geometry seminar at Michigan State University, 2005-2008

Georgia Topology Conference, May 2008

Rice University Topology Seminar, October 2008

Gauge Theory and Topology Seminar, Harvard University, November 2008

Louisiana State University Topology Seminar, November 2008

University of Virginia Topology Seminar, November 2009

Special Session on Gauge Theory, Eastern Sectional Meeting of the American Mathematical Society, September 2011

Low Dimensional Topology, Simons Center for Geometry and Physics, May 2013
Georgia Institute of Technology, Topology Seminar, September 2013
CalTech-UCLA-USC Joint topology seminar, October 2013

Advising:

Graduate (Ph.D.):
- Dissertation advisor for Nguyen Duong, Fall 2011 – Spring 2015
- Dissertation advisor for Timothy Homan, Fall 2016 –
- Dissertation committee for Anne Duffee, Spring 2016

Graduate (M.A.):
- Masters thesis advisor:
  - Jake Sundberg, "Khovanov homology of knots and links", Spring 2014
  - Jeff Davis, "Persistent homology and data analysis", Spring 2015
- Masters thesis committee:
  - Jason Duke, "The Weierstrass Approximation Theorem", Spring 2012
  - LaBeausha Holt, "Probability generating functions for random walks on graphs and digraphs", Spring 2014

Undergraduate Research:
- Yifan Liu, Readings on Knots and Braids, Fall 2011
- Trent Faris, Visual Cryptography and Captchas, Emerging Scholars Program, Spring 2011 – Fall 2012
- Harrison Brown, Khovanov Homology and Category Theory, Aug 2012 – Dec 2012
- Chris Popovich, Alexander invariants of links, Emerging Scholars Program, Nov 2012 – Spring 2015.
- David Mildebrath, Quantum Computing, Spring 2015 – Spring 2016
- Alex Mathers, Khovanov homology and tangles, Fall 2015 –
- Aaron Tharsius, Algorithms and Khovanov Homology, Sp 2017 –

Referee for:

Geometry & Topology, Journal of Differential Geometry, Compositio Mathematica, Algebraic & Geometric Topology, Mathematics Research Letters, Journal of Knot Theory and its Ramifications

Teaching at the University of Alabama:

Math 125 Calculus I	Fl 2009, Fl 2010, Fl 2011, Fl 2013, Sp 2014, Fl 2015
Math 126: Calculus II	Sp 2011, Sp 2012, Sp 2013, Sp 2015
Math 145: Honors Calculus I	Fl 2012, Fl 2014
Math 146: Honors Calculus II	Sp 2016, Sp 2017
Math 227: Calculus III	Fl 2016
Math 237: Intro. to Linear Algebra	Fl 2014
Math 238: Applied Differential Equations	Sp 2013
Math 460/560: Intro. to Differential Geometry	Sp 2017
Math 465/565: Intro. to General Topology	Fl 2009, Fl 2010, Fl 2012, Fl 2015

Math 466/566: Intro to Algebraic Topology	Sp 2011, Sp 2012, Sp 2014, Sp 2016
Math 474/574: Cryptography	Fl 2011
Math 486/586: Real Analysis I	Fl 2013, Fl 2014
Math 499: Undergraduate Rsch experience	Sp 2016
Math 537: Reading course on knot theory	Fl 2012
Math 598: Non Thesis Rsch	Sp 2014, Sp 2015
Math 661: Algebraic Topology I	Fl 2016
Math 669: Topics in topology	Sp 2013
Math 698: Non-dissertation research	Sp 2016, Fl 2016
Math 699: Dissertation research	Fl 2012, Sp 2013, Fl 2013, Sp, 2014, Fl 2014, Sp 2015

Teaching at Michigan State University:

Spring 2009	Math 320: Analysis I
Fall 2008	Math 254H: Honors Multi-Variable Calculus
Spring 2008	Math 864: Geometric Topology (graduate)
Fall 2007	Math 461: Metric and Topological Spaces
Spring 2007	Math 153H: Honors Calculus II
Fall 2007	Math 152H: Honors Calculus I
Spring 2006	Math 234: Multi-Variable Calculus
Fall 2005	Math 132: Calculus I

Teaching at the University of California, Berkeley:

Summer 2002	Math 16B: Applied Calculus II

Service:

Tenure and Promotion Committee
College of Arts and Sciences, Fall 2015 –
Arts and Sciences Curriculum Committee
College of Arts and Sciences, Fall 2014 –
Member, Graduate Admissions and Scholarship Committee
UA Dept. of Mathematics, Fall 2015–
Member, Honors Calculus Committee,
UA Dept. of Mathematics, Fall 2016–
Member, search committee for tenure track position in topology
UA Dept. of Mathematics, Fall 2015–Spring 2016
Member, Ainsworth Memorial Scholarship committee
UA Dept. of Mathematics, Summer 2014, 2015
Member, search committee for tenure track positions in computational
mathematics and statistics, UA Dept. of Mathematics, Fall 2013–Spring 2014
Member, CLTF Search committee, Dept. of Mathematics, Spring 2013
Graduate Course Committee, Fall-Spring 2013
Teaching Instructor retention committee, Dept. of Mathematics, Spring 2012
Member, search committee for tenure track position in computational

mathematics, UA Dept. of Mathematics, Fall 2010–Spring 2011

Other:

Judge for the University of Alabama undergraduate research conference, Spring 2014, 2015, 2016, 2017
Gave survey talks to Pi Mu Epsilon math honors society, Spring 2013
Judge and emcee for ciphering round of state mathematics competition, Spring 2011
NSF Grant Review Panel member