CURRICULUM VITAE——————————ANNE DEIRDRE COLLINS

Mathematics
Centre College
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EMPLOYMENT

Assistant Professor of Mathematics, Centre College	2004-present
Postdoctoral Scholar, Stanford University	2002-2004

EDUCATION

Duke University	Mathematics	Ph.D. 2002
Duke University	Mathematics	M.A. 1999
Northwestern University	Physics and Astronomy	M.S. 1996
Bowling Green State University	Mathematics and Physics	B.S. 1994

TEACHING

Centre College, *Assistant Professor of Mathematics*

MAT 110: Mathematics in Our Society	Fall 2004
MAT 130: Introduction to Statistics	Spring 2006, 2008, Fall 2007
MAT 140: Differential Calculus with Review	Fall 2005, 2006
MAT 141: Integral Calculus with Review	Spring 2007
MAT 171: Calculus II	Spring 2005, Fall 2007
MAT 330: Abstract Algebra	Fall 2005, 2006
MAT 331: Abstract Algebra II	Spring 2007
MAT 360: Differential Equations	Spring 2005, 2006, 2008
MAT 400: Directed Study	Fall 2006, 2007
MAT 404: Introduction to Topology	Fall 2004
MAT 408: Computational Geometry	Spring 2008
MAT 420: Putnam Exam Seminar	Fall 2006, 2007

RESEARCH SUPERVISED

Mandy Smith (Centre College '08)

John C. Young Scholar under my supervision	2007-2008
Faculty/Student Collaborative Research	Sumer 2006

Mandy's research so far has eared her an award at the 2008 Undergraduate Poster Session at the National Jount Mathematics Meetings. She has also given conference presentations at WKU and JMU, and has several talks pending this spring, both at Centre and beyond.

ADVISING

Mathematics Majors:

Class of 2007: Danielle Patterson, Joe Yeager
Class of 2008: Kelly Bickel, Mandy Smith, Maggie Vo
Class of 2009: Leah Campbell, Joseph Griggs, Sara Haque, Molly Lindle, Lisa Notier

Freshmen Advisees:

Class of 2009: Eric Brown, Leah Campbell, Joseph Griggs, Lynne Harris, Sam Lewis, Lisa Notier, Allison Perkins, Chris Williamson
Class of 2011: Derek Bryant, Clinton Cahall, Ryan Curry, Lauren Gates, Amna Ijaz, Katherine Tahamtan, Jimmie Warren

COMMITTEES & SERVICE

Faculty Advisor to the Theta Theta Chapter of the service fraternity Alpha Phi Omega	2007-present
Honors and Prizes Committee	2007-present
John C. Young Scholars Committee	2007-present
Faculty Advisor to the Centre Chapter of the Association for Women in Mathematics	2006-present
Faculty Advisor to the Centre College Putnam Mathematics Competition Team	2006-present
Student Life Committee	2006-2007
Centre College Council, Division III Representative	2005-present
Instructional Technology Advisory Committee	2005-2007
Instructional and Technology Resources Committee	2005-2006
Mathematics Program Committee	2004-present
Computer Science Program Committee	2004-present
Mathematics Search Committee	2005, 2006, 2007
Physics Search Committee	2004 & 2005
Computer Science Search Committee	2004

PROFESSIONAL ACTIVITIES

Coordinator of the Kentucky Section Project NExT, 2006-present
A local version of Project NExT (below) specifically for pre-tenure Kentucky mathematics faculty

Organized a National Project NExT Panel Session at MathFest, Knoxville TN, August, 2006
Getting Tenure Without Going Insane: Advice From Those That Have Gone Before

National Science Foundation Grant Review Panel, Arlington VA, June 2006
Assessed grant proposals for the NSF IGMS: Interdisciplinary Grants in the Mathematical Sciences

Local Organizer for the first Kentucky Section NExT meeting, held at Centre College, March 31, 2006
A satellite workshop to the 2006 KYMAA Section Meeting hosted by Centre

Judge for Joint Mathematics Meetings Undergraduate Poster Session, 2006

2005-2006 National Project NExT Fellow ("Sterling Dot")

New Experiences in Teaching – a selective professional development program for new faculty in the mathematical sciences, organized by the the Mathematical Association of America. Provides a network of mentors and peers, and addresses all aspects of an academic career: the teaching and learning of mathematics, research and scholarship, and other professional activities and services.

RESEARCH

Centre College — Summer 2007

Shape Classification via Persistent Homology, supported by the Centre FDC.

Centre College — Summer 2006

Collaborative Research with Centre student Mandy Smith, investigating persistence barcodes and classification of handwritten digits from a standard database provided by the National Institute of Standards and Technology.

Stanford University — Summer 2006

Collaboration on 3-dimensional shape classification, grant support through DARPA.

Stanford University — Summer 2005

Collaboration to extend previous work to 3-dimensional shape classification.
Grant support from Defense Advanced Research Projects Agency (DARPA),
the central research and development organization of the Department of Defense

Centre College — Summer 2005

Visit research group at Stanford University to continue collaboration.
Shape classification via persistent homology.

Centre College — Centre Term 2005

Centre Term visit to Stanford University to continue collaboration.
Shape classification via persistent homology.

Stanford University — 2002-2004

Postdoctoral Advisor: Gunnar Carlsson
Shape classification via persistent homology.
Computational Topology.

Duke University — 1998-2002

Graduate Advisors: John L. Harer and Pankaj K. Agarwal
Ph.D. Thesis: Configuration Spaces in Robotic Manipulation and Motion Planning.
Robot motion planning via the probabilistic roadmap method.
Automated design of part feeders for industrial assembly.
Computational Geometry.

Northwestern University — 1995-1997

Graduate Advisor: Lee Samuel Finn
Modeled gravitational signature of a pulsar for use with LIGO.

Bowling Green State University

Summer REU, Undergraduate Advisor: John B. Laird — Summer 1994
Studied metallicity of stars in globular clusters from observational data.

Senior Honors Project, Undergraduate Advisors: G. Comer Duncan and J. Gordon Wade — 1993-1994
Characteristic Eigenvalues and Eigenvectors for Three Dimensional Relativistic Fluid Dynamics.

PUBLICATIONS

Recognition, Redistribution, and Liberty with Jamus J. Lim. Accepted in 2007 to the 66th Midwest Political Science Association Annual National Conference. To appear, 2008.

Persistence Barcodes for Shapes with Gunnar Carlsson, Afra Zomorodian, and Leo Guibas. International Journal of Shape Modeling, 11(2):149-187, June, 2005.

A Near-Quadratic Algorithm for Fence Design, with Pankaj K. Agarwal and Robert-Paul Berretty. Discrete and Computational Geometry, 33(3):463-481, March 2005.

A Barcode Shape Descriptor for Curve Point Cloud Data with Afra Zomorodian, Gunnar Carlsson, and Leo Guibas. Computers and Graphics, 28(6):881-894, Special issue on Point Based Graphics, December 2004.

A Barcode Shape Descriptor for Curve Point Cloud Data with Afra Zomorodian, Gunnar Carlsson, and Leo Guibas. Proceedings of the Symposium on Point-Based Graphics, ETH Zurich, Switzerland, June 2004.

Persistence Barcodes for Shapes with Gunnar Carlsson, Afra Zomorodian, and Leo Guibas. Proceedings of the Second Symposium on Geometry Processing, Nice, France, June 2004.

HPRM: A Hierarchical PRM, with Pankaj K. Agarwal and John L. Harer. Proceedings of the 2003 IEEE International Conference on Robotics and Automation (ICRA), Taipei, Taiwan, September 2003.

A Near-Quadratic Algorithm for Fence Design, with Pankaj K. Agarwal and Robert-Paul Berretty. Proceedings of the Fifth International Workshop on Algorithmic Foundations of Robotics, Nice, France, December 2002. Also appeared as a chapter in *Algorithmic Foundations of Robotics V*, Springer Tracts in Advanced Robotics Vol.7, 2003.

Configuration Spaces in Robotic Manipulation and Motion Planning, Ph.D. Thesis, Duke University, 2002.

Minimal Trap Design, with Pankaj K. Agarwal and John L. Harer. Proceedings of the 2001 IEEE International Conference on Robotics and Automation (ICRA), Seoul, Korea, May 2001.

CONFERENCES & WORKSHOPS

27^{th} Annual Symposium in Mathematics at Western Kentucky University, October 12-13, 2007
Three Centre students presented research from summer REUs:
Leah Campbell ('09), Mandy Smith ('08), Yanni Yang ('09)

KYMAA & KYNExT Meetings at Northern Kentucky University, Spring 2007
Organizer of KYNExT

Shenandoah Undergraduate Mathematics and Statistics Conference, James Madison University, Oct.28, 2006
Student Mandy Smith ('09) presented summer research

Workshop on Applications of Topology in Science and Engineering. MSRI, Berkeley, CA, Sept 21–22, 2006.
Part of the semester-long Program on Computational Applications of Algebraic Topology,
at the Mathematical Sciences Research Institute (MSRI), Berkeley, CA.

Connections for Women: Computational Applications of Algebraic Topology. MSRI, Aug.31 - Sept.1, 2006

Invited talk: "Computing with Persistent Homology," an introductory lecture for women graduate and postdococtoral students interested in Computational Algebraic Topology and Persistent Homology.

MathFest, Knoxville, TN, August, 2006.
Participated as a 2005-2006 Project NExT Fellow

MAA-PREP Workshop: Incorporating the Software GAP into Teaching Abstract Algebra, July 10-14, 2006.

KY-NExT Workshop, first meeting of the Kentucky Section Project NExT. Centre College, March 31, 2006.
Coordinator and Local Organizer.

Annual Meeting of the Kentucky Section of the Mathematical Association of America (KYMAA).
Hosted by Centre College, March 31 & April 1, 2006.

Joint Mathematics Meetings, San Antonio, Texas, January 2006.
Participated as a 2005-2006 Project NExT Fellow

AMS-MER Workshop on Excellence in Undergraduate Mathematics: Mobilizing for the Future, Dec.2005
Half of team representing Centre College, with Alex McAllister
MathFest, Albuquerque, New Mexico, August 2005.
Participated as a 2005-2006 Project NExT Fellow

Mathematical Association of America Kentucky Section meeting, Morehead State, Kentucky, April 2005.
Contributed talk: "Shape Classification via Persistent Homology"

American Mathematical Society Southeast Sectional meeting, Western Kentucky University, March 2005.
Invited talk: "A Topological Approach to Shape Classification"

Algebraic Topological Methods in Computer Science II, University of Western Ontario, Canada, July 2004.
Contributed talk: "A Barcode Shape Descriptor for Curve Point Cloud Data"

Joint Mathematics Meetings, Phoenix, January 2004.

2003 IEEE International Conference on Robotics and Automation (ICRA), Taipei, Taiwan, September 2003.
Contributed paper: "HPRM: A Hierarchical PRM"

International Workshop on Algorithmic Foundations of Robotics (WAFR), Nice, France, December 2002.
Contributed paper: "A Near-Quadratic Algorithm for Fence Design"

Joint Mathematics Meetings, San Diego, January 2002.

ACM Symposium on Computational Geometry (SoCG), Tufts University, Boston, June 2001.

2001 IEEE International Conference on Robotics and Automation (ICRA), Seoul, Korea, May 2001.
Contributed paper: "Minimal Trap Design"

IMA Career Workshop: Connecting Women in Mathematical Sciences to Industry, Institute for Mathematics and its Applications, Minneapolis, September 2000.

International Workshop on Algorithmic Foundations of Robotics (WAFR), Dartmouth College, March 2000.

Joint Mtg. of the Am. Physical Society and the Am. Assoc. of Physics Teachers, Indianapolis, May 1996.

TALKS

Why π?
Guest Lecturer for MAT 499, Spring '07

Computing with Persistent Homology
MSRI Workshop on Connections for Women: Computational Applications of Algebraic Topology.
Mathematical Sciences Research Institute, Berkeley, CA, August 31 - September 1, 2006

Shape Classification via Persistent Homology
Mathematical Association of America Kentucky Section meeting, Morehead State, Kentucky, March 2005.

A Topological Approach to Shape Classification
American Mathematical Society Southeast Sectional Meeting, Western Kentucky University, March 2005.

A Barcode Shape Descriptor for Curve Point Cloud Data
Algebraic Topological Methods in Computer Science II, University of Western Ontario, July 2004.

Robot Motion Planning
Centre College, Mathematics Program, March 2004.

Shape Description via Persistent Homology
Western Illinois University, Department of Mathematics, February 2004.

Geometric Querying and Kinetic Data Structures
Information Processing for Sensor Networks Seminar, Dept. of Computer Science, Stanford, May 2003.

HPRM: A Hierarchical PRM
Motion Algorithms Seminar, Robotics Lab, Stanford University, January 2003.
Topology-Statistics Seminar, Department of Mathematics, Stanford University, October 2002.

A Near-Quadratic Algorithm for Fence Design
International Workshop on Algorithmic Foundations of Robotics (WAFR), Nice, France, December 2002.

Configuration Spaces in Robotic Manipulation and Motion Planning
Dissertation defense, Department of Mathematics, Duke University, June 2002.

Minimal Trap Design
IEEE International Conference on Robotics and Automation, Seoul, Korea, May 2001.
Algorithms Seminar, Department of Computer Science, Duke University, April 2001.
Graduate/Faculty Seminar, Department of Mathematics, Duke University, April 2001.

Voronoi Diagrams and Methods for Computing Them
Graduate/Faculty Seminar, Department of Mathematics, Duke University, October 1999.

Riemann-Roch, Part 1 : Laurent Approximation Theorem
Complex Analysis Seminar, Department of Mathematics, Duke University, July 1999.

An Introduction to Hyperbolic Geometry
Complex Analysis Seminar, Department of Mathematics, Duke University, June 1999.

GRANTS

Awarded Faculty Development Committee Faculty Research Grant, Centre College, Summer 2007

Supported by DARPA grant to continue work with research group at Stanford University, Summer 2006

Awarded Faculty Development Committee Collaborative Research Grant, Centre College, Summer 2006
with student Mandy Smith, investigating persistence barcodes for MNIST database of handwritten digits

Awarded Faculty Development Committee Faculty Research Grant, Centre College, Summer 2006

Supported by DARPA grant to continue work with research group at Stanford University, Summer 2005

Awarded Faculty Development Committee Faculty Research Grant, Centre College, Summer 2005

Awarded Faculty Development Committee Faculty Research Grant, Centre College, Fall 2004

Graduate and PostDoctoral grant support:
2002-2004 NSF FOCUS and CARGO grant support at Stanford University
1997-2002 NSF VIGRE, FOCUS, and ITR grant support at Duke University
1994-1997 University Fellow and DoE GAANN Fellowship from Northwestern University

MEMBERSHIPS

American Mathematical Society

Association for Women in Mathematics

Mathematical Association of America

Phi Beta Kappa

Young Mathematicians' Network

COMPUTER SKILLS

Geometer's Sketchpad, Maple, Matlab, LaTeX, Office Suite, C/C++, Unix/Linux, html

COLLABORATORS

Pankaj Agarwal (Ph.D. Thesis co-advisor), Computer Science, Duke University

Robert-Paul Berretty, Philips Research

Gunnar Carlsson (Postdoctoral advisor), Mathematics, Stanford University

Leonidas Guibas, Computer Science, Stanford University

John Harer (Ph.D. Thesis co-advisor), Mathematics, Duke University

Jamus Lim, Human Development Network of the World Bank, Washington D.C.

Vin de Silva, Mathematics, Pomona College

Mandy Smith, Mathematics, Centre College

Afra Zomorodian, Computer Science, Dartmouth College