

Nancy C. Wrinkle

Associate Professor of Mathematics
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Education

Columbia University: Ph.D., Mathematics, May 2002.
Thesis advisor: Joan S. Birman.
Dissertation title: *The Markov theorem for transverse knots*.
M. Phil., Mathematics, 2002.
M. A., Mathematics, 1996.
Barnard College: B. A., Mathematics, 1995.
Graduated with departmental honors.

Research Interests

Low-dimensional geometric topology: knot theory, braid theory, contact geometry, tight knots, applications of knot theory to molecular biology.

Publications and Preprints

Parametrizations of holonomic and Legendrian knots. with Joan S. Birman, *Journal of Knot Theory and its Ramifications* **9** No. 3 (2000), p. 293-309.

On transversally simple knots. with Joan S. Birman, *Journal of Differential Geometry*, **55** (2000), pp 325-354.

Some ropelength critical clasps, with John M. Sullivan, *Physical and Numerical Models in Knot Theory and Their Application to the Life Sciences*, (J. Calvo, K. Millett, E. Rawdon, and A. Stasiak, editors). Series on Knots and Everything, World Scientific, Volume 36, 2005.

Criticality for the Gehring link problem, with Joseph H.G. Fu, Jason Cantarella, Rob Kusner, and John M. Sullivan. *Geometry & Topology*, **10** (2006), pp 1-61.

Flat ribbon-links in \mathbb{R}^2 , with Elizabeth Denne and John Sullivan, *in preparation*.

Grants

United States Department of Agriculture National Institute on Food and Agriculture Hispanic Serving Institutes (USDA-NIFA HSI) Education grant, Project Director, 2010-2012, \$290,000.

Hispanic Serving Institute (HSI) Initiative, (internal), *Expanding Peer-Led Team Learning Seminars at NEIU*, Spring 2009, \$3,600.

National Science Foundation Grant for Scholarships in Science, Technology, Engineering, and Mathematics (NSF S-STEM), co-Principal Investigator, 2008-2013, \$598,000.

Dr. Ferydoon Firoozi Memorial Conference Travel Fund, for travel to Banff International Research Station, May 2007

Association for Women in Mathematics (AWM) Travel Grant, for travel to various conferences, Spring 2005.

AWM Traveling Mentor Grant, for travel to Berlin, Germany, May-June, 2005.

Selected Talks/ Workshop participation

June 2010, AAC&U *Institute on General Education*, University of Vermont.

January 2010, AAC&U *Annual Meeting, THE WIT, THE WILL ... AND THE WALLET: Supporting Educational Innovation, Shaping Our Global Futures*, Washington, D.C.

November 2009, *Ribbons and Ropes in R^2 and R^3* . Math Lunch talk, Smith College.

July 2009, *Ribbons and Ropes in R^2 and R^3* . The Unknot Conference, Denison University.

February 2009, *An Introduction to the Theory of Knots, Links, and Braids*. Mathematical Sciences Seminar, Northeastern Illinois University.

May 2007, *The Mathematics of Knotting and Linking in Polymer Physics and Molecular Biology*, workshop at Banff International Research Station, Banff Canada. Invited participant.

August 2006, *The Teacher's Circle*, workshop at the American Institute of Mathematics (AIM), Palo Alto, California. Invited Participant.

April 2005, "*Criticality for the Gehring ropelength problem*", Columbia University Geometric Topology seminar, New York City.

March 2005, "*Introduction to contact structures*" and "*Introduction to knots and contact structures*", pre-conference workshop for graduate students and new researchers, Braids, Links, and Mapping Class Groups: a conference in honor of Joan Birman, Columbia University, New York City.

May 2004, "*Team Teaching and Peer Learning in Mathematics Theory Courses: Experiments in Student-Centered Learning*", Excellence in Teaching Mathematics and Science: Research and Practice, 7th annual symposium series break-out session, University of Illinois (Chicago).

April 2004, "*DNA and Knot Theory*", Northeastern Illinois University, Mathematical Sciences Seminar.

November 2004, "*On the Gehring ropelength problem*", University of Illinois (Chicago), Geometry, Topology, and Dynamics seminar.

October 2003, "*An introduction to the theory of knots*" Northeastern Illinois University, undergraduate math club.

April 2003, "*The simple clasp*", University of Illinois, Champaign-Urbana, Topology Potpourri (seminar).

March 2003, "*Ropelength-critical clasp configurations.*" Texas Tech University, Spring Topology and Dynamical Systems Conference.

Fall 2002, "*An introduction to Ozsvath-Szabo invariants of 3-manifolds*". University of Georgia, Topology Seminar, 5 week lecture series.

October 2002, "*The ropelength of the simple clasp.*" AMS central sectional meeting, Madison, Wisconsin, special session: Optimal Geometry of Curves and Surfaces.

October 2001, "*Arc presentations of knots and braids.*" Emory University, Topology Seminar.

December 2000, "*Transverse knot theory.*" University of Pennsylvania, Topology Seminar.

September 2000, "*On transversally simple knots.*" State University of New York, Buffalo, Topology Seminar.

October 1998, "*Holonomic parametrizations of knots.*" Columbia University, Geometric Topology Seminar. Also gave an undergraduate level version of the same talk to the Barnard/Columbia math club.

Teaching Experience

- 2009-present **Associate Professor (Northeastern Illinois University):** Undergraduate: History of Mathematics.
- 2004-2009 **Assistant Professor (Northeastern Illinois University).** Undergraduate: Quantitative Reasoning, Discrete Mathematics, Calculus I, and Foundations of Geometry. Graduate: Modern Geometry
- 2003-2004 **Visiting Lecturer: (Northeastern Illinois University)** Undergraduate: Intermediate Algebra, Calculus II, Calculus III, Linear Algebra, and Mathematics for Elementary School Teachers. Graduate: Mathematical Structures II for Elementary Teachers, Probability and Statistics for Elementary Teachers .
- 2001-2003 **VIGRE Postdoctoral Instructor: (University of Georgia)** Calculus I, Calculus III, Geometry for Middle School Teachers and Algebra for Middle School Teachers (content courses for Mathematics Education majors). Graduate: Reading course on Hatcher's Algebraic Topology.
- Summer 1999 **VIGRE Mentor: (Columbia University)** Developed and led a six week undergraduate summer research program in knot theory, funded by an NSF Vertical Integration in Research and Education grant. This project was based on the paper *Parametrizations of holonomic and Legendrian knots*. Responsibilities included delivering daily lectures, leading seminars, and designing and advising undergraduate research projects with the goal of systematically parametrizing knots using the computer algebra system *Mathematica* .
- 1997-2001 **Instructor: (Columbia University)** Calculus I and II, Intermediate Algebra.
- 1996-1999 **Teaching Assistant: (Columbia University)** Assisted with Calculus I, II and III. Taught recitation sections for Calculus I and II using the computer algebra system *Mathematica*. Graded exams and homeworks.

Administrative Experience

- 2009-2010** **Special Assistant to the President (Northeastern Illinois University).** One year position in the President's office. Served as a member of the President's Council in a senior administrative role, observed and participated in day-to-day operations of the Office of the President, and participated in numerous administrative leadership initiatives, including assistance with Strategic Planning implementation, development of programming for the Presidential Scholars Program, and assisting University advocacy efforts during the spring legislative session.
- My projects:
- Led a working group from Academic Affairs, Institutional Research, and the departments of Mathematics and Mathematics Development to study, develop, and implement changes to improve student success in our remedial mathematics program;
 - Authored the University's progress report on accreditation for the Higher Learning Commission of the North Central Association of Colleges and Schools, detailing the development of the University's Strategic Plan and its integration into all aspects of the University's processes;
 - Took a leadership role in the creation and implementation of the University's Policy Working Group, which now develops and approves University (Administrative) policies;
 - Represented the President's Office in the planning and organization of NEIU's University Day, a symposium built around the theme of free speech on Northeastern's campus;
 - Authored the program statement and helped to develop the floor plan for the newly founded Angelina Pedroso Center for Diversity and Inter-Cultural Affairs;
 - Organized and hosted the annual meeting for the Illinois Board of Higher Education's Student Advisory Council (IBHE-SAC).

Service

NEIU hiring committees: took part in searches for the Dean of the College of Arts and Sciences, Coordinator of the Student Center for Science Engagement, Assistant Professor of Mathematics.

Co-chair, General Education Task Force, 80 person University-wide multi-year project to review and revise NEIU's program for General Education.

Planning board member, Chicago Symposium for Excellence in Teaching Science and Mathematics: Research and Practice. <http://www.math.uic.edu/chicagosymposia/> (**Organized** symposium to be held at NEIU May 1st, 2009.)

Director of PLTL (Peer Led Team Learning) program in the Mathematics department at NEIU, starting Fall 2007, an enrichment seminar program linked to several mathematics courses, involving five faculty, nine undergraduate peer leaders, and fifty mathematics students <http://www.ptl.org>

Advisor for the undergraduate mathematics majors at NEIU, starting Fall 2007.

Master's Project Advisor for students in MS in Mathematics (Secondary Education Track).

Developed a general education mathematics course for undergraduates at NEIU: Quantitative Reasoning, Math in Daily Life (Math 113), to satisfy the quantitative reasoning requirement at NEIU. Course was approved by NEIU in the spring of 2004 and piloted in the Fall semester of 2004.

Examination committee member for the MS in mathematics (applied and secondary tracks)

Faculty mentor at the University of Georgia for EDGE (Enhancing Diversity in Graduate Education), a joint program of Bryn Mawr College (PA) and Spelman College (GA) whose explicit purpose is to increase the number of women minority students who successfully complete graduate programs in the mathematical sciences. <http://www.edgeforwomen.org>

Organized 2003 Georgia Topology Conference at the University of Georgia. <http://www.math.uga.edu/~topology/2003>

Referee for *Journal of Knot Theory and its Ramifications*, *Algebraic and Geometric Topology*, and *Pacific Journal of Mathematics*.

Professional Memberships

American Mathematical Society
Mathematical Association of America
Association for Women in Mathematics