

James M. Belk

Curriculum Vitae

Department of Mathematics
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EDUCATION

Cornell University, Ph.D., Mathematics, August 2004
Ph.D. Thesis: *Thompson's Group F*
Advisor: Kenneth S. Brown

Cornell University, M.S., Mathematics May 2002

Binghamton University, M.A., Mathematics, May 1999

Binghamton University, B.S., Mathematics and Physics May 1998

ACADEMIC POSITIONS

Texas A&M University
NSF Postdoctoral Fellow, Department of Mathematics August 2005 – Present

Cornell University
Visiting Assistant Professor, Department of Mathematics August 2004 – May 2005

FELLOWSHIPS AND AWARDS

NSF Postdoctoral Research Fellowship August 2005 – Present

Nominated for Cornell Math Department Teaching Award December 2004

Battig Prize for Excellence and Promise in Mathematics December 2003

Cornell Graduate Fellowship September 1999 – May 2003

NSF Graduate Research Fellowship September 1999 – May 2002

RESEARCH INTERESTS

Main Research Area

Combinatorial and Geometric Group Theory

Other Research Interests

Geometric topology, dynamical systems, discrete and computational geometry, random walks and Brownian motion, computational topology, graph theory and combinatorics, differential geometry, and mathematical physics.

Research

PUBLICATIONS AND PREPRINTS

Dynamics in Thompson's Group F (with Francesco Matucci)

Preprint (2007), arXiv:0710.3633v1.

Conjugacy in Thompson's Groups (with Francesco Matucci)

Preprint (2007), arXiv:0708.4250v1.

Forest Diagrams for Elements of Thompson's Group F (with Kenneth Brown)

Internat. J. Algebra Comput. **15** (2005), no. 5-6, 815–850.

Thompson's Group F is Maximally Nonconvex (with Kai-Uwe Bux)

Geometric methods in group theory, 131–146, *Contemp. Math.*, 372, AMS 2005.

RESEARCH TALKS

“Braids Without Twists”

- AMS Session on Algebra and Group Theory, January 2008
2008 Joint Mathematics Meetings in San Diego, California.

“Conjugacy and Dynamics in Thompson's Groups”

- University of Virginia Topology Seminar April 2007
- Cornell University Topology Seminar April 2007
- Texas A&M University Groups and Dynamics Seminar November 2006

“Conjugacy in Thompson's Group F”

- Texas A&M University Mathematics Postdoc Colloquium November 2006

“Strand Diagrams, Configuration Spaces, and Associahedra”

- Texas A&M University Groups and Dynamics Seminar March 2006

“Forest Diagrams for Thompson's Group F”

- Texas A&M University Groups and Dynamics Seminar September 2005
- Binghamton University Topology Seminar October 2004
- Cornell University Topology Seminar October 2003
- AMS Sectional Meeting. Binghamton, NY. October 2003
- International Conference on Group Theory. Gaeta, Italy. June 2003

REU EXPERIENCE

- Participant in the 1997 Rose-Hulman Institute of Technology REU.
- Graduate student leader for the 1999 SUNY Potsdam/Clarkson University REU.
- Visiting speaker for the 2001 and 2003 SUNY Potsdam/Clarkson University REU's.
- Gave five lectures on conjugacy and dynamics in Thompson's groups for the 2007 Cornell University REU.

Teaching

TEACHING EXPERIENCE

Texas A&M University

- Instructor for Graduate Engineering Mathematics (MATH 601, linear algebra and vector calculus for engineering students) Fall 2007
- Instructor for Engineering Calculus II (large lecture hall, 90 students, supervised a teaching assistant) Fall 2006

Cornell University

- Instructor for Calculus I Spring 2005
- Instructor for The Art of Secret Writing (MATH 135, computer-based cryptology course for a general audience) Spring 2005
- Instructor for The Art of Secret Writing Fall 2004
- Instructor for Calculus I (6-week summer session for high-school students) Summer 2004
- Instructor for Calculus I Spring 2004
- Instructor for Calculus I Fall 2003
- Teaching Assistant for Graduate Algebraic Topology Spring 2002
- Teaching Assistant for Linear Algebra Spring 2001

Binghamton University

- Instructor for Calculus I Spring 1999
- Teaching Assistant for Calculus I Fall 1998

Other Teaching Activities

- Designed an online MapleTA mathematics diagnostic test for the Cornell Pre-Freshman Summer Program. Spring 2004
- Instructor for the Ithaca High School Senior Mathematics Seminar (Graphs, Surfaces, and Topology) October – December 2003

TEACHING TALKS

- **“Cryptology with Spreadsheets: A Computer Course for Everyone”**
MAA Session on Cryptology for Undergraduates January 2008
2008 Joint Mathematics Meetings in San Diego, California
- **“I Gave an Exam in a Computer Lab!”** April 2005
Cornell Mathematics Teaching Seminar
- **“What is e ?”** March 2005
Cornell Professional Development Day for High-School Teachers
- **“Big O and Little o in Calculus Courses”** April 2004
Cornell Mathematics Teaching Seminar

Expository Work

EXPOSITORY TALKS

“Thompson’s Group F” Texas A&M University Mathematics Postdoc Colloquium	November 2005
“Geometry and Curvature” Binghamton University Undergraduate Math Club	October 2004
“Groups Acting on Trees” Olivetti Club (Cornell Mathematics Graduate Student Seminar)	October 2004
“Surfaces, Curvature, and Vector Fields” SUNY Potsdam/Clarkson University REU	July 2003
“Almost Convex Groups” Cornell University Topology Seminar	April 2003
“Amenability and the Banach-Tarski Paradox” Olivetti Club (Cornell Mathematics Graduate Student Seminar)	February 2002
“Topology” SUNY Potsdam/Clarkson University REU	June 2001
“Algebraic Graph Theory” Olivetti Club (Cornell Mathematics Graduate Student Seminar)	October 2000

INFORMAL EXPOSITORY TALKS

On five separate occasions I have been asked by colleagues to give a series of expository talks on some topic of interest. These were:

Weekly lectures on Riemannian Geometry Texas A&M University 3 postdocs and 1 graduate student attending	February – May 2006
Weekly lectures on Differentiable Manifolds Cornell University Approximately 5 graduate students attending	September - November 2003
Weekly lectures on Thompson’s Group F Cornell University Approximately 3 postdocs and 4 graduate students attending	March – April 2003
Weekly lectures on Category Theory Cornell University Approximately 7 graduate students attending	September - November 2002
Weekly lectures on Algebraic Topology Cornell University Approximately 4 graduate students attending	July - November 2001

In addition, as a graduate student I was twice asked by Dr. Kai-Uwe Bux to lecture for two weeks in his graduate topology classes: once on Thompson’s Group F , and once on a paper by Dehn on the topology of surfaces.

OTHER EXPOSITORY WORK

- One of three principal authors for “The Everything Seminar”, a blog about mathematics. (Website: <http://cornellmath.wordpress.org>)
- Frequent contributor to Wikipedia articles on mathematics. (See <http://en.wikipedia.org/wiki/User:Jim.belk> for a list of contributions.)

REFERENCES

- Dr. Kenneth Brown, Cornell University (thesis advisor).
- Dr. Maria Terrell, Cornell University.
- Dr. Donald Allen, Texas A&M University.
- Dr. Kai-Uwe Bux, University of Virginia.