

KEVIN P. KNUDSON

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Administrative Experience

Acting Director, Shackouls Honors College, Mississippi State University, August 2008–present
Associate Director, Shackouls Honors College, Mississippi State Univ., August 2007–present
Director, Honors Undergraduate Research Program, Mississippi State Univ., August 2007–present
Director, Distinguished Scholars Program, Mississippi State University, August 2007–August 2008

Employment History

Associate Professor (with tenure), Mississippi State University, August 2005–present
Assistant Professor, Mississippi State University, August 2002–July 2005
Assistant Professor, Wayne State University, September 1999–August 2002
NSF Postdoctoral Fellow and Visiting Assistant Professor, Northwestern University, September 1996–August 1999

Visiting Positions

Member, Mathematical Sciences Research Institute, Berkeley, CA, Fall 2006
Visiting Associate Professor, University of Chicago, October 2005

Education

Duke University, Durham, NC
Ph.D., Mathematics, May 1996
Advisor: Richard M. Hain
Dissertation: *The homology of special linear groups over Laurent polynomial rings*
Virginia Polytechnic Institute and State University, Blacksburg, VA
M.S., Mathematics, May 1991
B.S., Mathematics, June 1990, magna cum laude, Phi Beta Kappa

Research Interests

computational topology, discrete Morse theory, homology of linear groups, algebraic K -theory, equivariant topology

Grants

Subcontract on DARPA grant on Topological Data Analysis (\$28,000), May–August 2007
Young Investigator Grant, National Security Agency (\$26,000), January 2005–December 2006
Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities (\$10,000), June 2003–July 2004
NSF grant no. DMS-0070119 (\$74,400), July 15, 2000–June 30, 2004
Wayne State University Summer Research Grant (\$7000), 2000
NSF Mathematical Sciences Postdoctoral Fellowship (\$66,000), 1996-9
Alfred P. Sloan Foundation Doctoral Dissertation Fellowship, 1995-6

Awards

Mississippi State University College of Arts and Sciences Faculty Research Award, 2005
Wayne State University Board of Governors Faculty Recognition Award, 2002
L. P. and Barbara Smith Teaching Award, Duke University, 1994

Conferences Organized

Organizer, Institute for Mathematics and its Applications Summer School for Graduate Students, *Topology and its Applications*, July 2006, Mississippi State University

Co-organizer, AMS Special Session on Group Cohomology, Chapel Hill, NC, October 2003

Co-organizer, AMS Special Session on K -theory and Motivic Cohomology, Chicago, October 1998

Publications

Book: *Homology of linear groups*, Progress in Mathematics **193**, Birkhäuser Verlag, 2000.

Journal Articles:

1. *The homology of $SL_2(F[t, t^{-1}])$* , J. Algebra **180** (1996), 87–101.
2. *The homology of special linear groups over polynomial rings*, Ann. Sci. École Norm. Sup. (4) **30** (1997), 385–416.
3. *Congruence subgroups and twisted cohomology of $SL_n(F[t])$* , J. Algebra **207** (1998), 695–721.
4. *Integral homology of PGL_2 over elliptic curves*, in *Algebraic K-theory, Seattle, WA, 1997*, W. Raskind and C. Weibel, eds., Proc. Symp. Pure Math. **67** (1999), 175–180.
5. *On the K-theory of elliptic curves*, J. reine angew. Math. **507** (1999), 81–91.
6. *Relative completions of linear groups over $\mathbb{Z}[t]$ and $\mathbb{Z}[t, t^{-1}]$* , Trans. Amer. Math. Soc. **352** (2000), 2205–2216.
7. *Unstable homotopy invariance and the homology of $SL_2(\mathbb{Z}[t])$* , J. Pure Appl. Algebra **148** (2000), 255–266.
8. *Congruence subgroups and twisted cohomology of $SL_n(F[t])$ II. Finite fields and number fields*, Comm. Alg. **29** (2001), 5465–5475.
9. *Relative completions and the cohomology of linear groups over local rings*, J. London Math. Soc. (2) **65** (2002), 183–203.
10. *Unstable homotopy invariance for finite fields*, Fund. Math. **175** (2002), 155–162.
11. (with M. Walker) *Homology of linear groups via cycles in $BG \times X$* , J. Pure Appl. Algebra **192** (2004), 187–202.
12. *On the kernel of the Gassner representation*, Arch. Math. (Basel) **85** (2005), 108–117.
13. (with H. King and N. Mramor) *Generating discrete Morse functions from point data*, Experimental Math. **14** (2005), 441–450.
14. *The homology of invariant group chains*, J. Algebra **298** (2006), 15–33.
15. *Relative completions of linear groups over coordinate rings of curves*, Comm. Alg. **35** (2007), 3904–3908.
16. *Relative completions of linear groups*, L'Enseign. Math. **54** (2008), 119–121.
17. *A refinement of multi-dimensional persistence*, Homology, Homotopy Appl. **10** (2008), 259–281.

Submitted Articles:

18. (with H. King and N. Mramor) *Birth and death in discrete Morse theory* (2008).
19. (with K. Brown) *Nonlinear statistics of human speech data* (2008).
20. (with K. Brown) *Persistent homology for speech recognition* (2008).
21. *Homology and finiteness properties of $SL_2(\mathbb{Z}[t, t^{-1}])$* (2008).

Recent Invited Talks

Oberwolfach Conference on Computational Algebraic Topology, July, 2008

Colloquium, Western Carolina University, March, 2008

Colloquium, University of North Carolina at Greensboro, February, 2008

Colloquium, Rhodes College, Memphis, TN, February, 2008

DARPA Topological Data Analysis Annual Meeting, San Diego, CA, December 2007

Special Session on Computational Methods in Topology, Albuquerque, NM, October 2007

Colloquium, Louisiana State University, April 2007

Colloquium, University of Louisiana–Lafayette, February 2007

Colloquium, Central Michigan University, January 2007
 Special Session on Cohomology and Representation Theory, New Orleans, LA, January 2007
 Algebra Seminar, University of Washington, November 2006
 Topology Seminar, University of Washington, November 2006
 Algebra Seminar, University of Nebraska, November 2006
 Workshop on Topological Methods in Combinatorics and Computational Geometry, MSRI,
 October 2006
 Colloquium, Texas A&M University, February 2006
 Algebra Seminar, Northwestern University, October 2005
 Topology Seminar, University of Chicago, October 2005
 Workshop in Computational Topology, Denison University, Granville, OH, July 2005
 New Directions Short Course in Computational Topology, IMA, University of Minnesota,
 July 2004
 Special Session on Topology, Sixth Joint Meeting of the AMS and SMM, Houston, TX, May 2004

Teaching and Instruction

Assistant/Associate Professor, Mississippi State University, Fall 2002–present
 Assistant Professor, Wayne State University, Fall 1999–Spring 2002
 Assistant Professor, Northwestern University, Fall 1996–Spring 1999
 Instructor, Talent Identification Program, Duke University, Summer 1996
 Instructor, Graduate Record Examination Preparatory Course, Spring 1996

Courses taught: Calculus I, II, III, linear algebra, differential equations, number theory, abstract algebra (graduate and undergraduate), group cohomology, representation theory, complex variables, topology, advanced calculus, probability

Student Research

Kenny Brown, Mississippi State University, *Topology of human speech data*, 2007
 Spencer Arnault, Mississippi State University, *Realizability in matrix groups*, 2006
 Andy Eadon, Mississippi State University, *A probable primality test for Mersenne numbers*, 2004
 Brett Burns and Jon Corring, Mississippi School for Mathematics and Science, 2004

Service

Professional:

Refereed papers for *J. Pure Appl. Algebra*; *Canad. J. Math.*; *K-Theory*; *Proc. AMS*; *Homology, Homotopy and Applications*, *J. Number Theory*, *J. Algebra*, *Foundations of Computational Math.*

Reviewer for *Mathematical Reviews*

Proposal review for National Science Foundation and ORAU Ralph Powe Awards

Departmental:

Student Recruiting Committee Chair 2003–2006
 Department Scholarship Committee 2003–2006
 Faculty advisor to KME/Math Club 2003–present
 Evaluation of Classroom Teaching Committee 2004–2006
 Coordinator of Discovery Day Mathematics Contest
 Speaker at Sonya Kovalevsky Day 2003, 2004, 2005
 Interim Undergraduate Coordinator, Spring 2004

University:

Faculty Research Advisory Committee, 2008–11

University Athletic Council, 2008–9

MSU Office of Research Strategic Planning Committee, 2007

Mentor to the MSU Distinguished Scholars, 2007–8

College of Arts and Science Promotion and Tenure Committee, 2005, 2007

Phi Beta Kappa application committee, 2003

Society of Scholars, 2002–present