

Mark E. Walker

January 6, 2006

Education:

B.S (Mathematics, with Honors)	1990	New Mexico State University
M.S. (Mathematics)	1992	University of Illinois
Ph.D. (Mathematics)	1996	University of Illinois

Professional Experience:

Visiting Assistant Professor	1996 – 1998	University of Nebraska–Lincoln
Visiting Scholar	Jan. – Mar. 1997	Northwestern University
Visiting Scholar	Sep. – Dec. 1997	Northwestern University
Visiting Scholar	Jan. – April 1999	Rutgers University
Assistant Professor	1998 – Aug. 2002	University of Nebraska–Lincoln
Graduate Faculty Fellow	since Dec. 1999	
Associate Professor	Aug. 2002 – present	University of Nebraska–Lincoln

Research Interests:

Algebraic K -theory, motivic cohomology, algebraic geometry, commutative algebra

Funded Grants:

1. NSF Postdoctoral Fellowship, “Algebraic K -theory and Motivic Cohomology”, August 1996 – August 1999; \$66,000.
2. NSF Grant, “Topics in Commutative Algebra and Algebraic Geometry”, (I was one of six faculty on this grant), June 1997 – May 2000; \$30,030.
3. NSA Grant, “Algebraic K -theory and Motivic Cohomology”, January 2000 – December 2001; \$26,000.
4. NSF Grant, “Topics in Commutative Algebra and Algebraic Geometry”, (I was one of six faculty on this grant), July 2000 – June 2004; \$45,936.
5. NSA Grant, “Semi-topological K -theory”, January 2002 – December 2003, \$26,000.
6. DoE GAANN Grant. August 2003 – August 2006. \$595,008. I am a co-PI on this grant, but Roger Wiegand is the lead PI and Judy Walker did the vast majority of the writing of this proposal. They (and maybe others) deserve the credit for this grant, not I.
7. NSA Grant, “ K -theory, Lawson Homology, and Hodge Theory”, January 2005 – December 2006, \$26,000.

Pending Grant Proposals:

1. NSF Grant, “Algebraic cycles, motives, and K -theory”, July 2006 – June 2009, \$164,173.
2. NSA Grant, “Algebraic cycles, motives, and K -theory”, January 2007 – December 2008, \$57,928.
3. NSF Research Training Group in Commutative Algebra, August 2006 – August 2011, \$2,021,414. This NSF grant would support graduate students, post-docs, and other visitors for our research group in commutative algebra.
4. DoE GAANN Grant (Planned), August 2006 – August 2009, \$498,000. I will be co-PI on this grant proposal, but Roger Wiegand will be the lead PI and he will do the vast majority of the writing of this proposal.

Publications:

Note: All publications below have appeared in or have been submitted to refereed journals or refereed conference proceedings. Authors are listed in alphabetical order.

- [1] *How Hamiltonian can a finite group be?* (with Gary J. Sherman and Thomas J. Tucker) **Archiv der Mathematik**, **57** (1991), 1-5.
- [2] *Rewriteability in finite groups*; (with Gary J. Sherman and Judy L. Leavitt) **American Mathematical Monthly**, **99** (1992) No. 5, 446-452.
- [3] *The primitive topology of a scheme*; **Journal of Algebra**, **201** (1998), 656–685.
- [4] *Adams operations for bivariant K -theory and a filtration using projective lines*; **K-theory**, **21**, No. 2 (2000), 101–140.
- [5] *Weight zero motivic cohomology and the general linear group of a simplicial ring*; **Journal of Pure and Applied Algebra**, **147** (2000), 311–319.
- [6] *Weight one motivic cohomology and K -theory*; **American Journal of Mathematics**, **123** (2001), 1–35.
- [7] *Function spaces and continuous algebraic pairings for varieties* (with Eric Friedlander); **Compositio Mathematica**, **125** (2001), 69–110.
- [8] *Geometric models for algebraic K -theory* (with Dan Grayson); **K-theory**, **20**, No. 4 (2000), 311–330.
- [9] *Semi-topological K -theory using function complexes* (with Eric Friedlander); **Topology**; **41**, Issue 3 (2002) 591–644.
- [10] *Comparing K -theories for complex varieties* (with Eric Friedlander); **American Journal of Mathematics**, **123** (2001), 779–810.

- [11] *Some remarks concerning mod- n K -theory* (with Eric Friedlander); **Inventiones Mathematicae**, **145** (2001), 545–555.
- [12] *Semi-topological K -theory of real varieties* (with Eric Friedlander); **Proceedings of the International Colloquium on Algebra, Arithmetic and Geometry, Mumbai 2000, Part I** (2002); pp. 219–326.
- [13] *Semi-topological K -homology and Thomason’s theorem*; **K-theory**, **26** (2002), 207–286.
- [14] *Rational isomorphisms between K -theories and cohomology theories*; (with Eric Friedlander); **Inventiones Mathematicae**, **154** (2003) 1–61.
- [15] *Thomason’s Theorem for varieties over algebraically closed fields*; **Trans. Amer. Math. Soc.**, **356** (2004) 2569–2648 (electronic).
- [16] *Techniques, computations, and conjectures for semi-topological K -theory* (with Eric Friedlander and Christian Haesemeyer); **Math. Ann.**, **330** (2004) 759–807.
- [17] *Semi-topological K -theory* (with Eric Friedlander), pp. 877–924 in **Handbook of K -theory** (2005), E. M. Friedlander and D. R. Grayson editors. This is a chapter in a refereed collection on topics pertaining to K -theory and motivic cohomology.
- [18] *Homology of linear groups via cycles in $BG \times X$* (with Kevin Knudson); **The Journal of Pure and Applied Algebra**, **192** (2004), 187–202.
- [19] *Chern classes for twisted K -theory*; in press, **The Journal of Pure and Applied Algebra**. Accepted for publication in June 2005.
- [20] *The morphic Abel-Jacobi map*; submitted for publication in August 2005. Available at <http://www.math.uiuc.edu/K-theory/740/>.

Current Ph.D. students:

- Mu-wan Huang
- Xuyen (Suanne) Au

Talks:

Talks Presented at Conferences:

- “The weight one motivic complex arising from the K -theory of automorphisms”; Workshop on Algebraic K -theory and Arithmetic held at the Fields Institute for Research in Mathematical Sciences, Waterloo, Ontario; March 1994.
- “Motivic complexes and the K -theory of automorphisms”; Algebraic K -theory and Homotopy Theory conference, Oberwolfach, Germany; November 1995.

- “Adams operations on a weight filtration of K -theory”; Special Session on K -theory at the American Mathematical Society Eastern Sectional Meeting, Lawrenceville, New Jersey; October 1996.
- “A filtration of K -theory and rational motivic complexes”; 3rd Annual Great Lakes K -Theory Conference, Evanston, Illinois; April 1997.
- “ K -theory and weight one motivic cohomology”; Joint Summer Research Conference on Algebraic K -theory, Seattle, Washington; July 1997.
- “The primitive topology”; Special Session on K -theory and Motives at the American Mathematical Society Central Sectional Meeting, Milwaukee, Wisconsin; October 1997.
- “Interpolating algebraic and topological K -theory”; First Annual MUNUKU conference, University of Kansas, Lawrence, Kansas; September 1999.
- “Semi-topological K -theory”; Algebraic K -theory conference, Oberwolfach, Germany; September 1999.
- “Semi-topological K -theory and K -homology”; Sixth Annual Great Lakes K -Theory Conference, Toronto, Canada; March 2000.
- “Semi-topological and topological K -theory”; Special Session on Algebraic Geometry at the Fifth Joint AMS-SMM Meeting, Morelia, Mexico; May 2001.
- “Interpolating algebraic and topological K -theory”; Northwestern University Algebraic Topology Conference; Plenary Speaker; March 2002.
- “Semi-topological theories and weight filtrations”; Midwest Topology Conference in Urbana, Illinois; Plenary Speaker; April 2003.
- “On semi-topological K -theory and Lawson homology”; Conference on The Arithmetic, Geometry and Topology on Algebraic Cycles in Morelia, Mexico; Plenary Speaker; July 2003
- “The twisted total Chern class map”; Eric Friedlander’s 60th Birthday Conference in Evanston, Illinois; Invited Speaker; September 2004.
- “The morphic Abel-Jacobi map”; Algebraic K -theory Conference in Montreal, Canada; October 2004.
- “The morphic Abel-Jacobi map”; Topology Workshop, SUNY-Buffalo; September 2005.

Seminar Talks at Other Institutions:

- “A filtration of K -Theory using projective lines”; Algebra Seminar, Northwestern University; January 1997.
- “ K -theory and the primitive topology”; Algebra Seminar, Northwestern University; October 1997.

- “A weight filtration of algebraic K -theory”; Topology Seminar, University of Chicago; October 1997.
- “Is there an Atiyah-Hirzebruch Spectral Sequence?”; Motivic Cohomology Seminar, University of Illinois; November, 1997.
- No official title; Motivic Cohomology Seminar, University of Illinois; July, 1998.
- “On the total Chern class map”; Algebra Seminar, Rutgers University; February 1999.
- “Semi-topological K -theory of real varieties”; Algebra Seminar, Northwestern University; October 2000.
- “Semi-topological K -theory”; Algebra Seminar, Wayne State University in Detroit, Michigan; November 2000.

Other Talks:

- “Fermat’s Last Theorem”; delivered as part of *It’s a Math Thing...* in August 1998. *It’s a Math Thing...* is a weekend math camp held at UNL for high-school girls. In 1998, about thirty students attended.
- “Fermat’s Last Theorem”; delivered to approximately 80 high school calculus students at Southeast High School, Lincoln, Nebraska; December, 1998.
- “On primitive rings”; UNL Regional Workshop in the Mathematical Sciences; November, 2001.

Teaching matters:

Teaching and Advising Honors:

- College of Arts and Sciences Distinguished Teaching Award; Spring 2003.
- UNL Parents Association and the Teaching Council; 2000 and 2004.
Certificate of Recognition for Contributions to Students
- Roger Wiegand Faculty Award; 2004. This award is presented by the graduate students of the department to one faculty member each year. (The year 2004 was the first year the award was given.)

Courses Taught at UNL:

List of courses taught along with score on teaching evaluation question “What is your overall impression of the quality of instruction in this course” (Question #8). This question is the primary one used by the department to evaluate teaching effectiveness. The scale is 0 – 4, with 3.0 or higher considered to be very good.

Math 106 (Calculus I, large lecture format). Score = 2.45.

Math 107 (Calculus II, large lecture format), two times, including currently. Score = 2.52.

Math 107H (Honors Calculus II). Score = 3.37.

Math 203 (Mathematics for Liberal Arts Majors). Score = 2.59.

Math 208H (Honors Calculus III), two times. Scores = 3.24, 3.15.

Math 221 (Differential Equations). Score = 2.83.

Math 310 (Introduction to Modern Algebra), two times. Scores = 2.93, 3.33.

Math 314 (Matrix Analysis), four times. Scores = 3.06, 3.31, 3.00, 3.62.

Math 417 (Introduction to Modern Algebra I). Score = 3.89.

Math 817 (Graduate Level Introduction to Modern Algebra I). Score = 3.68.

Math 818 (Graduate Level Introduction to Modern Algebra II). Score = 3.86.

Math 901 (Second Year Graduate Algebra I), two times, including currently. Score = 3.86.

Math 902 (Second Year Graduate Algebra II). Score = 4.00

Math 918 (Graduate level topics course: Algebraic K -theory). Score = 3.71.

Math 953 (Graduate level Algebraic Geometry). Score = 3.78.

Cumulative Average on Question #8: 3.31

Other Educational Activities:

1. Directed two-year-long undergraduate research project of Gerard Gjonej as part UNL's UCARE program, from Fall 2000 through Spring 2002.
2. *Project NExT* Fellow. Project NExT is an organization for recent Ph.D. recipients in mathematics which facilitates the communication of teaching innovations and ideas.

Service Activities:

Departmental Service:

1. Acting Graduate Co-Chair (with M. Rammaha); Spring 2003.
2. Co-chair for Department Recognition Dinner; Spring 2000, 2001, 2002, 2003, and 2004.
3. Graduate Recruiting Chair; Fall 2001–Spring 2004 and Fall 2005–present.
4. Co-organizer of the Putnam Competition team for UNL; 1998–2004.
5. Member of Graduate Advisory Committee; Fall 2001–Spring 2004 and Fall 2005–present.

6. Moderated panel discussion on “Choosing a Graduate School” for Regional Workshop: November 2001, November 2002, and November 2003.
7. Wrote PROBE I exam for Math Day; Fall 2000, Fall 2001, Fall 2002, and Fall 2003.
8. Coordinator for our department for the Preparing Future Faculty program; 1999–2002. This program involved graduate students in various departments across the campus, exposing them to life as a faculty member, primarily by having the students visit neighboring institutions. Alas, the program was terminated in Summer 2002.
9. Moderated panel discussion on “Choosing a Graduate School” for NCUWM, February 2002 and February 2004.
10. Assisted in the preparation of the Academic Program Review document; Fall 2000.
11. Helped organize True/False Math Mayhem Challenge; Fall 2000, Spring 2002, and March 2004. These were popular and successful mathematics competitions in which about 20 UNL undergraduate students participated.
12. Member of Technical Advisory Committee; 2000.
13. Served on organizational committee for Regional Workshop; Fall 2000.
14. Wrote four major articles for the departmental newsletter; Fall 2000.
15. Graduate Exams: I have written and graded three qualifying exams over the material of 905 and 953 since 1999; I wrote and graded the 901–902 comprehensive exam in June 2001, in June 2002, in January 2003, and in June 2003; I helped grade the 817–818 qualifying exams in June 2001; I helped grade the 901–902 comprehensive exam in January 2001; and I wrote and helped grade the qualifying exam for 817-818 in June of 2003, January of 2004, and June of 2005.

University Service:

Served on UNL Graduate Council for 2002–2003 academic year.

Editorial, Refereeing, and Reviewing Activities:

Referee for *The Journal of Algebra*, *The Journal of Pure and Applied Algebra*, *K-theory*, *Mathematische Zeitschrift*, *The Proceedings of Seattle K-theory Conference of 1997*, and the *Handbook of K-theory*.

Conference Organization:

1. Co-organizer of an American Mathematical Society, Central Section, Special Session on *K-theory and Motivic Cohomology*, at DePaul University, Chicago, Illinois; September, 1998.
2. Co-organizer of an American Mathematical Society, Central Section, Special Session on *K-theory and Algebraic Cycles*, at University of Nebraska–Lincoln; October, 2005.

Other Honors:

Irving Reiner Memorial Award; 1995.

Outstanding Student in Algebra at the University of Illinois

NSF Graduate Research Fellowship; 1990–1993.