

# Curriculum Vitae

## Kathryn Lesh

Department of Mathematics  
Union College  
Schenectady, NY 12308  
(518) 388-8063

1524 Baker Ave  
Niskayuna, NY 12309  
leshk@union.edu

### Education:

*Massachusetts Institute of Technology, 1984-88:* Ph.D., May 88, Pure Mathematics. Advisor: Prof. F. P. Peterson. Thesis: “Extensions of Maps from Suspensions of Finite Projective Spaces”  
*Churchill College, Cambridge University, 1983-84:* Churchill Scholarship for one-year graduate program in mathematics (Part III of Tripos Exams).  
*Swarthmore College, 1979-83:* B.A. with Highest Honors, Mathematics and English Literature. Phi Beta Kappa, Sigma Xi, Brinkmann Mathematics Prize.

### Research Interests:

Algebraic topology: unstable homotopy theory, unstable Adams spectral sequence, unstable modules over the Steenrod algebra, the Sullivan conjecture, classifying spaces, generalized homology theories, cohomology of groups, calculus of functors.

### Experience:

*Union College, 2005- :* Professor of Mathematics.  
*MIT, 2004-05:* Research Affiliate, on sabbatical from Union College.  
*Union College, 2002-2005:* Associate Professor of Mathematics.  
*Union College, 2001-2002:* Assistant Professor of Mathematics.  
*University of Toledo, 1996-2003:* Associate Professor of Mathematics (with tenure). From Jan 2000 - Aug 2001, undergraduate academic advisor and coordinator of Math Learning Center.  
*MIT, 1997-98:* Visiting Scholar, on sabbatical from the University of Toledo.  
*University of Toledo, 1991-96:* Assistant Professor of Mathematics.  
*Brandeis University, 1988-1991:* Assistant Professor of Mathematics.  
*Mathematical Sciences Research Institute, Fall, 1989 :* Postdoctoral Fellow.  
*Massachusetts Institute of Technology, 1984-1988:* Lecturer and recitation instructor.

### Courses Taught:

*Lower division:* developmental algebra, problem solving for liberal arts, mathematics for elementary education, precalculus, trigonometry, business calculus, orientation for freshmen, cryptography.  
*Calculus:* all levels of calculus and linear algebra.  
*Upper division:* abstract algebra (both junior level and senior level), topology, geometry, transition to higher math (“how-to-prove-it”), cryptography, senior thesis.  
*Graduate courses:* real analysis, applied linear algebra, topology, pedagogy seminar for TAs.  
*Methodologies used:* lecture, seminar, lecture/seminar hybrid, project-based, historical sources, technology, student presentations, Geometer’s Sketchpad software, online homework (WeB-WorK).

### Refereed Publications:

- (1) “Augmented  $\Gamma$ -spaces, the stable rank filtration, and a *bu* analogue of the Whitehead conjecture,” with Gregory Arone, *Fundamenta Mathematicae*, 207 (2010), no. 1, 29–70.
- (2) “Loop structures in Taylor towers,” with Gregory Arone and William Dwyer *Algebraic and Geometric Topology*, 8, 173-210 (2008).
- (3) “Filtered spectra arising from permutative categories,” with Gregory Arone *Journal für die reine und angewandte Mathematik (Crelle’s Journal)*, 604, 73-136 (2007).
- (4) “Cohomology of symmetric groups and the Quillen map at odd primes,” with Le Minh Ha *Journal of Pure and Applied Algebra*, 190, 137-153 (2004).
- (5) “A conjecture on the unstable Adams spectral sequences for *SO* and *U*” *Fundamenta Mathematicae*, 174, 49-78 (2002).
- (6) “The unstable Adams spectral sequence for two-stage towers” *Topology Appl.*, 101, 161-180 (2000).
- (7) “A filtration of spectra arising from families of subgroups of symmetric groups” *Trans. Amer. Math. Soc.*, 352, 3211-3237 (2000).
- (8) “Infinite loop spaces from group theory” *Mathematische Zeitschrift*, 225, 467-483 (1997).
- (9) “Hybrid spaces with interesting cohomology” *Trans. Amer. Math. Soc.*, 347, 3247-3262 (1995).
- (10) “Extensions of maps from suspensions of finite projective spaces” *Mathematische Zeitschrift*, 205, 437-450 (1990).

### Other Publications:

- (11) “Mathematical Problem Solving and Heuristics” *NLA News*, March, 1990.

### Grants and Awards since 2000:

- (1) National Science Foundation, spring 2010:  
\$159,714 three-year grant for “FRG: Collaborative Research: The Calculus of Functors and the Theory of Operads: Interactions and Applications”
- (2) National Science Foundation, spring 2009:  
\$22,500 grant for “Conference Travel Funding: Algebraic Topology, Group Theory, and Representation Theory (Isle of Skye),” to support participants at an international conference for which I was a co-organizer.
- (3) National Science Foundation, spring 2005:  
\$19,000 Research Opportunity Award to support joint research with Gregory Arone at the University of Virginia.
- (4) National Science Foundation, spring 2004:  
\$15,900 Research Opportunity Award to support joint research with Gregory Arone at the University of Virginia.
- (5) National Science Foundation, spring 2003:  
\$9,000 grant for “Invariant Theory and its Applications to Other Fields,” to support participants at an international conference for which I was a co-organizer.
- (6) University of Toledo, spring 2000:  
Co-PI on a \$20,000 grant from UT’s Program for Academic Excellence to improve undergraduate instruction. Four-week grant to visit during topology emphasis year.

### Conference organizing:

- (1) Skye 2009: International conference on algebraic topology, group theory, and representation theory (Organizing committee)
- (2) AMS Special Session 2008: Fall AMS Sectional Meeting on algebraic topology, in honor of Bill Singer (Co-organizer)
- (3) INGO 2003: International conference on invariant theory. (Scientific committee)
- (4)–(6) Co-organizer of Union College Mathematics Conference 2001, 2003, 2005.

### Invited talks since 2001:

(expenses and/or honorarium provided where indicated)

- (1) *Kalamazoo College, Feb 2001*: Colloquium.
- (2) *University of Chicago, May 2001*: Research seminar. Supported
- (3) *Isle of Skye, Scotland, July 2001*: International conference. Supported
- (4) *Northwestern University, November 2001*: Research seminar.
- (5) *University of Virginia, November 2001*: Research seminar. Supported
- (6) *Northwestern University, March 2002*: International conference. Supported
- (7) *University of Chicago, May 2002*: Research seminar. Supported
- (8) *Mt. Holyoke College, June 2002*: AMS Joint Summer Research Conference. Supported
- (9) *Massachusetts Institute of Technology, May 2003*: Research seminar. Supported
- (10) *Swarthmore College, November 2003*: Colloquium. Supported
- (11) *Rider University, April 2004*: AMS regional meeting special session.
- (12) *Massachusetts Institute of Technology, July 2004*: Summer research seminar.
- (13) *University of Illinois at Urbana-Champaign, November 2004*: Research seminar. Supported
- (14) *Massachusetts Institute of Technology, March, 2005*: Research seminar. Supported
- (15) *University of Delaware, April 2-3, 2005*: AMS regional meeting special session.
- (16) *Northwestern University, April 11, 2005*: Research seminar. Supported
- (17) *University of Chicago, April 12, 2005*: Research seminar. Supported
- (18) *Vassar College, 2006*: Research seminar.
- (19) *University of Chicago, 2007*: Research seminar. Supported
- (20) *University of Paris 13, Villeneuve, France, October 2007*: Research seminar.
- (21) *University of Virginia, April, 2008*: Undergraduate Math Seminar Supported
- (22) *Lisbon Technical Institute, July, 2008*: Topology Seminar.
- (23) *University of Oregon, December 2008*: Research seminar. Supported

### Supported workshop attendance

- Clay Mathematics Institute, March 11-13, 2005. Supported
- Mittag-Leffler Institute, Stockholm, Winter 2006. One month research fellowship. Supported
- University of Copenhagen, June 15-20, 2008 Supported