Thomas Shemanske

Curriculum Vitae

Dartmouth College
Dept of Mathematics
6188 Kemeny Hall
27 N. Main Street
Hanover, NH 03755
☎ *(603) 646 3179* FAX *(603) 646 1312*
✉ *thomas.r.shemanske@dartmouth.edu*
www.math.dartmouth.edu/∼trs

Education

1976–1979 **Ph.D.**, *University of Rochester*, Rochester, NY.

1974–1976 **M.A.**, *University of Rochester*, Rochester, NY.

1970–1974 **A.B.**, *Cornell University*, Ithaca, NY.

Grants/Recognition

AT&T: (co-PI, funded) "Development and Dissemination of a Free, Online Calculus Course for College and High School Students" (DC 5-38132), $50k, July 1, 2003 – June 30, 2006.

NSF: CCEN grant: Open Calculus [1 month support, summer 2005]

A. W. Mellon: "A Better Calculus for Less" (Dwight Lahr, PI), ($224K approx) July 1, 2000 – June 30, 2003. [1 month of support, Summer 2003]

A. W. Mellon: "A Better Calculus for Less" (Dwight Lahr, PI), ($224K approx) July 1, 2000 – June 30, 2003. [1 month of support, Summer 2000]

NSF: Grant USE 8953908:(Co-Principal Investigator 1990–1991) "Calculus: Restructuring and Integration with Computing" (3-year grant to carry out calculus reform), ($300K approx) 1989 – 1992.

Sloan: Grant: 89–10–1: "Computers and the teaching of Mathematics", ($80K approx) November, 1989 – November 1990.

NSF: Grant USE 8814009: "Calculus: Restructuring and Integration with Computing" (planning grant for revision of calculus curriculum), ($50K approx) 1988 – 1989.

Teaching and Professional Experience

2004–2007 **Department Chair**, *Dartmouth College*, Hanover.

1994 fall **Member**, *Mathematical Sciences Research Institute*, Berkeley.

1993–present **Professor**, *Dartmouth College*, Hanover.

1987–1993 **Associate Professor**, *Dartmouth College*, Hanover.

1981–1987 **Assistant Professor**, *Dartmouth College*, Hanover.

1979–1981 **Lawton Lecturer**, *Temple University*, Philadelphia.

Supervised Ph.D. students

2019 **Angelica Babei**, *Dartmouth College*, Graduate Student.
Dissertation Title: TBD

2015 **Michael Wijaya**, *Bard High School Early College Queens*, faculty.
Dissertation Title: A function-field analogue of Conway's Topograph.

2012 **Benjamin Linowitz**, *Oberlin College*, Assistant Professor.
Dissertation Title: Selectivity in Central Simple Algebras and Isospectrality.

2007 **Alison Setyadi**, *Department of Defense*, Researcher.
Dissertation Title: The Affine Buildings of SL_n and Sp_n: a combinatorial perspective.

2005 **Nathan Ryan**, *Bucknell University*, Associate Professor.
Dissertation Title: Satake Parameters for Siegel Modular Forms.

2003 **Susan D'Agostino**, *Southern NH University*, Associate Professor.
Dissertation Title: Classifying Additive Codes.

2000 **Holly Rosson**, *Warren Wilson College*, Permanent Faculty.
Dissertation Title: Theta functions over function fields.

1997 **Sharon Frechette**, *College of the Holy Cross*, Associate Professor.
Dissertation Title: Decomposition of Spaces of Half-Integral Weight Cusp Forms.

1997 **Tamara Veenstra**, *University of Redlands*, Professor.
Dissertation Title: Characterizing Siegel Modular Forms.

1993 **Timothy Atwill**, *Parametric Corporation*, Director of Research: Alternative Strategies.
Dissertation Title: Diagonalizing Spaces of Hilbert Cusp Forms.

1987 **Lynne Walling**, *University of Bristol, UK*, Reader/Head of Pure Maths.
Dissertation Title: Theta series attached to lattices of arbitrary rank.

Sponsored Postdoctoral Fellows

2002-2004 **Ozlëm Imamoglu**, *ETH - Zürich*, Professor.

2000-2002 **Cristina Ballantine**, *College of the Holy Cross*, MA, Professor.

1989-1991 **Anne Schwartz**, *Mt. Holyoke College*, MA, Visiting Lecturer.

1985-1987 **Jacob Nemchenok**, *Private Industry*, MA.

1982-1984 **John Cremona**, *University of Warwick*, UK, Professor.

Research

My research is in algebraic number theory with a particular interest in the theory of modular forms, central simple algebras, and the theory of buildings and their applications. I have done extensive work on questions of the representability of modular forms by theta series attached to quadratic forms, and have used the arithmetic of quaternion algebras to answer questions regarding the representation numbers of ternary and quaternary quadratic forms. Other work has included aspects of the theory of newforms for integral and half-integral weight modular forms of elliptic and Hilbert type as well as the study of higher rank Hecke operators and their relation to Bruhat-Tits buildings for $GL_n(K)$ and $Sp_n(K)$, K a local field. Recent work has focused on the geometric and combinatorial aspects of affine buildings, as well as their application to the study of arithmetic in central simple algebras.

Recent Invited Talks and Panels

Panel Moderator (Panels part of NSF grant support for conference)
Topic: Preparing for the academic job marker
Automorphic Forms Workshop (31th annual)
Eastern Tennessee State University
March 6 – 9, 2017

Panelist (Panels part of NSF grant support for conference)
Topic: Navigating career transitions for young mathematicians
Automorphic Forms Workshop (29th annual)
University of Michigan, Ann Arbor
March 2 – 6, 2015

Panelist (Panels part of NSF grant support for conference)
Automorphic Forms Workshop (28th annual)
Brigham Young University
May 12 – 16, 2014

Referee/Reviewer

Mathematical Reviews, National Science Foundation, Zentralblatt für Mathematik, Ars Combinatoria, Acta Arithmetica, Glasgow Mathematical Journal, Journal of Number Theory, London Math Society Proceedings, Manuscripta Mathematica, Mathematische Annalen, Nagoya Math. Journal, Pacific Journal of Mathematics, Ramanujan Journal, Rocky Mountain Journal, Transactions of the American Mathematical Society.

Professional Societies

- American Mathematical Society
- Mathematical Association of America

Publications

(See attached list)

Books and Monographs

[1] (with H. Hijikata and A. Pizer), The Basis Problem for Modular Forms on $\Gamma_0(N)$, *Memoirs of the AMS*, **418** (1989), 159 pages.

[*2] *Modern Cryptography and Elliptic Curves: A Beginner's Guide*, American Mathematical Society, Student Mathematical Library **83**, (2017), 252 pages.

Research Articles

[1] (with H. Hijikata and A. Pizer), The Basis Problem for Modular Forms on $\Gamma_0(N)$, *Proc. Japan Acad.*, **56** (1980), pp. 280–284.

[2] Cuspidal Newforms and Character Twists, *J. reine angew. Math.*, **328** (1981), pp. 58–71.

[3] Primitive Newforms of Weight $3/2$, *Acta Arith.*, **43** (1984), pp. 97–104.

[4] Ternary Quadratic Forms and the Arithmetic of Quaternion Algebras, preprint.

[5] Representations of Ternary Quadratic Forms and the Class Number of Imaginary Quadratic Fields, *Pacific J. of Math.*, **122** (1986), pp. 223–250.

[6] Ternary Quadratic Forms and Quaternion Algebras, *Journal of Number Theory* **23** (1986), pp. 203–209.

[7] (with H. Hijikata and A. Pizer), Orders in Quaternion Algebras, *J. reine angew. Math.* **394** (1989), pp. 59–106.

[8] (with H. Hijikata and A. Pizer), Twists of Newforms, *Journal of Number Theory* **35** (1990), pp 287 – 324.

[9] (with L. Walling) On the Shimura Lift for Hilbert Modular Forms, in *A Tribute to Emil Grosswald: Number Theory and Related Analysis*, Contemporary Mathematics, Volume **143**, Knopp and Sheingorn Editors, American Mathematical Society, March 1993, pp 561 – 569.

[10] (with L. Walling), Twists of Hilbert Modular Forms, *Transactions of the AMS*, **338**, (1993), 375 – 403.

[11] (with L. Walling), Determining Multiplicities of Half-Integral Weight Newforms, *Pacific Journal of Math.*, **167**, (1995), 345 – 383.

[12] (with L. Walling), A Characterization of Simultaneous Hecke Eigenforms, preprint

[13] (with A. Schwartz), Maximal Orders in Central Simple Algebras and Bruhat–Tits Buildings, *Journal of Number Theory*, **56**, (1996), 115 – 138.

[14] Newforms of Half-Integral Weight, *Nagoya Math J.* **143**, (1996), 147 – 169.

[15] (with C. Ballantine) Rolle's Theorem over Local Fields (preprint)

[16] (with J. Rhodes), Rationality Theorems for Hecke Operators on GL_n, *J. of Number Theory* **102**, (2003), 278 – 297.

[17] (with C. Ballantine and J. Rhodes), Hecke Operators for GL_n and Buildings, *Acta Arithmetica* **112**, (2004), 131 – 140.

[18] The Arithmetic and Combinatorics of Buildings for Sp_n, *Transactions of the AMS* **359**, (2007), 3409-3423.

[19] Hecke Operators, Zeta Functions, and the Satake Map (preprint)

[20] (with N. Ryan) Inverting the Satake map for Sp_n, and applications to Hecke Operators, *Ramanujan J.*, **17** (2), 2008, 219 – 244.

[21] (with S. Treneer, L. Walling) Constructing Simultaneous Hecke Eigenforms, *International J. of Number Theory*, **6** (5), 2010, 1117 – 1137.

[22] Split Orders and Convex Polytopes in Buildings, *Journal of Number Theory*, **130** (1), 2010, 101 – 115.

[23] (with B. Linowitz) Embedding Orders into Central Simple Algebras, *Journal de théorie des nombres de Bordeaux*, 24 no. 2 (2012), 405 – 424.

[*24] (with B. Linowitz) Local Selectivity of Orders in Central Simple Algebras, *International Journal Number Theory*, **13** (4) (2017), 853–884.

[*25] Normalizers of graduated orders; preprint 2016.

[*26] (with A. Babei) Normalizers of graduated orders of higher rank.

Other Published Articles

[1] (with J. Baumgartner, et al.) Teaching Calculus with True BASIC, in *Priming the Calculus Pump: Innovations and Resources*, MAA Notes **17** (1990), pp 33 – 50.

Other Manuscripts

[1] The Basis Problem for Modular Forms on $\Gamma_0(2^{2r}M)$, Ph.D. dissertation, University of Rochester (1979).

[2] Notes on the Shimura-Shintani Correspondence, preprint.

[3] WeBWorK Newbie Guide, (2000), 41 pages
http://math.dartmouth.edu/∼trs/WeBWorK/newbie/WeBWorK_newbie.pdf

[4] WeBWorK Installation and Course Setup Guide (local notes version 1.6), (2001), 11 pages http://math.dartmouth.edu/ trs/WeBWorK/webwork_installation_setup_1.6.pdf

[5] WeBWorK Installation and Course Setup Guide (local notes version 1.7), (2002), 13 pages http://math.dartmouth.edu/∼trs/WeBWorK/webwork_installation_setup_1.7.pdf

[6] WeBWorK Newbie Guide — version 1.7, (2002), 68 pages http://math.dartmouth.edu/∼trs/WeBWorK/newbie-1.7/WeBWorK_newbie.pdf

[7] A Note on Multivariate Limits (2005), preprint. http://math.dartmouth.edu/∼trs/expository-papers/tex/multivariate-limits.pdf

Other Materials

[1] WeBWorK problem database for Math 8, (28 assignments) Summer, 2000.

[2] WeBWorK problem database for Math 13, (28 assignments) Summer, 2001.