

## Thomas W. Roby

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### EDUCATION

**Massachusetts Institute of Technology** Ph.D. in Mathematics, September 1991.

**Swarthmore College** BA, June 1985.

External Examination Program: graduated with High Honors in Mathematics with a minor in Greek.  
Phi Beta Kappa

### EXPERIENCE

#### University of Connecticut

Associate Professor

Director, Quantitative Learning Center

Storrs, CT

2005–present

2005–present

Taught courses in linear algebra, combinatorics, and graduate representation theory; continued research in algebraic combinatorics and math education.

Director of the **rapidly growing** *Quantitative Learning Center*, which supports students in lower division courses considered quantitative within the framework of UConn's new general education requirements. Oversee associate director,  $\frac{3}{5}$ -time administrator, 17 Graduate Assistants, and about 70 tutors.

#### California State University

Associate Professor

Assistant Professor

Hayward, CA

2002–present

1997–2002

Taught a variety of undergraduate and masters level math courses, and continued research in algebraic combinatorics.

PI and director of ACCLAIM professional development institutes, overseeing a budget of over \$4 million (including stipends) in FY 2001–04.

Served on statewide educational committees: STAR Test Content Review Panel and California Mathematics Project Advisory Board. Chaired the latter since 9/2000.

Founding Mathlets Editor of new MAA *Journal of Online Mathematics and its Applications*, 7/2000–8/2002.

#### University of Wisconsin

Research Associate

Madison, WI

1995–97

Conducted research in algebraic combinatorics and collaborated on curriculum for preservice elementary teachers, developing a mathematical modeling course.

#### Reed College

Assistant Professor of Mathematics

Portland, OR

1993–95

Taught a variety of undergraduate math courses. Supervised senior theses. Supplemented calculus classes with labs using Mathematica and Maple. Chosen as a fellow in the MAA's Project NExT (New Experiences in Teaching) for 1994–95; supervised NExT mailing lists, 1995–2000.

#### Center for Communications Research

Consultant

San Diego, CA

Summer 1994

Researched combinatorial aspects of practical communications problems; programmed in C.

**University of Tokyo** Tokyo, JAPAN  
Japan Society for the Promotion of Science Fellow 1991–93  
Researched problems in combinatorics and representation theory.  
Achieved fluency in Japanese.

**Harvard University** Cambridge, MA  
Lecturer Fall 1990  
Taught the core course in quantitative reasoning and computer programming (QRA).

**Massachusetts Institute of Technology** Cambridge, MA  
User Consultant, Project Athena 1989–91  
Aided users of MIT’s main academic computing system; fielded questions on system problems and a wide variety of software, including typesetting and numerical analysis packages.

**Tufts University** Medford, MA  
Instructor 1989–90  
Taught several-variable calculus. Gave lectures and graded examinations.

**Boston University Program in Mathematics for Young Scientists** Boston, MA  
Recitation Leader, Head Counselor Summers 1989–91, 2000  
Tutored talented high-school students in number theory and abstract algebra. Oversaw the similar tutoring of 24–60 students by 9–15 other counselors. Reviewed applications and evaluated the work of counselors and students. Supervised participants’ living in dormitories.

**Massachusetts Institute of Technology** Cambridge, MA  
Research Assistant 1988–89  
Teaching Assistant 1985–88  
Researched problems in algebraic combinatorics under Richard Stanley.  
Taught recitation sections in calculus and complex analysis; graded homework and exams.

**Hampshire College Summer Studies in Mathematics** Amherst, MA  
Senior Staff Summers 1987–88  
Organized and taught courses in combinatorics, number theory, and graph theory to talented high-school students. Supervised teaching assistants.

**Northfield Mount Hermon** Northfield, MA  
Teaching Fellow Summer 1985

**Ross Summer Program in Mathematics at Ohio State University** Columbus, OH  
Counselor Summers 1981–83  
Tutored talented high-school students in number theory and abstract algebra.

## PUBLICATIONS

1. *Applications and Extensions of Fomin's Generalization of the Robinson-Schensted Correspondence to Differential Posets*, Ph.D. Thesis, Massachusetts Institute of Technology, 1991.
2. "The connection between the Robinson-Schensted correspondence for skew oscillating tableaux and graded graphs," *Discrete Math.* **139** (1995) 481–485.
3. (With G. Benkart) "Down-Up algebras," *Journal of Algebra* **209**, 305–344 (1998).
4. (With F. Sottile, J. Stroomer, J. West) "Jeux de tableaux" *Formal Power Series and Algebraic Combinatorics: Twelfth International Conference, FPSAC'00, Moscow, Russia, June 2000, Proceedings*, pp. 332–343.
5. (With F. Sottile, J. Stroomer, J. West) "Complementary algorithms for tableaux." *Journal of Combinatorial Theory A* **96**, 127–161 (2001).
6. "The JOMA mathlets project" *Journal of Online Mathematics and its Applications* **1** (Jan, 2001) <http://joma.org>.
7. "Models for fractions" in *Harcourt Math Professional Handbook* (Orlando, 2002), pp. PH24–25.
8. (with Maletsky, E. and seven other authors) *Harcourt Math (Grades K–6)* Harcourt, Inc., Orlando, 2004.
9. (With R. Merris) "The lattice of threshold graphs," *Journal of Inequalities in Pure and Applied Math*, **6**, #1 (2005).
10. (With I. Terada) "A two-dimensional pictorial presentation of Berele's insertion algorithm for symplectic tableaux," *The Electronic Journal of Combinatorics*, **12**(1), 2005, R4.
11. (with Maletsky, E. and seven other authors) *California HSP Math (Grades K–6)* Harcourt, Inc., Orlando, 2007.
12. (with Burger, E. and seven other authors) *Holt Mathematics Course 1–2 (Grades 6–7)* Holt, Rinehart and Winston, Austin, 2007.
13. (with Burger, E. and seven other authors) *Holt California Algebra 1* Holt, Rinehart and Winston, Austin, 2007.
14. (with Burger, E. and seven other authors) *Holt California Geometry* Holt, Rinehart and Winston, Austin, 2007.
15. (with Maletsky, E. and seven other authors) *HSP Math (Grades K–6)* Harcourt, Inc., Orlando, 2009.

## PREPRINTS

16. "Schensted correspondences for differential posets," *Journal of Combinatorial Theory A*, accepted subject to revisions.
17. "A Schensted insertion for an infinite dimensional representation." Submitted to *Discrete Mathematics*

## IN PREPARATION

18. (with Burger, E. and seven other authors) *Holt Mathematics Course 1–3 (Grades 6–8)* Holt, Rinehart and Winston, Austin, 2008.
19. “Constructing a unicycle of permutations (a problem from Knuth’s *The Art of Computer Programming*).”
20. “Mathematicians working with teachers in California: The Alameda County Collaborative for Learning and Instruction in Mathematics (ACCLAIM).”
21. “The UConn Q-center: An analogue of a university writing center to support students in quantitative-intensive courses.”

## INVITED TALKS (SELECTED)

- California State University, Hayward*, “Counting on Noncommutative Algebra,” 14 March 1997.
- University of Victoria, BC, Canada*, “Pictorial Presentations of Schensted’s Algorithm,” 20 November 1998.
- Malaspina University College, Nanaimo, BC, Canada*, “Knuth-Robinson-Schensted Correspondences for the Symmetric Group of Permutations,” 23 November 1998.
- California State University, Hayward*, “Slide, Slide: The combinatorics of Young Tableaux,” 16 January 1998.
- Sonoma State University*, “Enumeracy: The Art of Literate Counting,” 17 March 1999.
- San Jose State University*, “The Lattice of Threshold Graphs,” 25 March 1999.
- Boston University PROgram in Mathematics for Young Scientists (ProMYS)*, “Enumeracy: The Art of Literate Counting,” 7 July 1999.
- University of California, Berkeley*, “Jeux de Tableaux,” 8 November 1999.
- Santa Clara University Colloquium*, “Ups and Downs in Posets and Algebras,” 2 February 2000.
- MIT (Cambridge, MA)*, “Jeux de Tableaux,” 12 April 2000.
- University of Washington (Seattle)*, “Jeux de Tableaux,” 26 April 2000.
- University of Tokyo (Japan)*, “Complementary Algorithms for Tableaux,” 29 May 2000.
- UC, Davis Colloquium*, “Differential Posets, Down-up Algebras, and the Robinson-Schensted-Fomin Machine,” 20 November 2000.
- Malaspina University College, Nanaimo, BC, Canada Science & Technology Lecutre Series*, “Teaching Cultures in California, China, and Japan,” 4 April 2001.
- University of California, Berkeley*, “Ups & Downs in Posets & Algebras,” 23 April 2001.
- Ohio State University, Arnold Ross Reunion Conference*, “Teaching cultures in the US, China, & Japan,” 27 July 2001.
- Kyoto University, Research Institute for Mathematical Sciences (RIMS)*, “Complementation and Tableaux Games,” 7 November 2001.
- California Mathematics Council Annual Meeting (Asilomar, CA)* “Using Free Web-based Technology in the Classroom,” 1 December 2001.
- Presentation High School (San Jose)*, “Enumeracy: The Art of Literate Counting” 12 March 2003.
- Hosei University (Tokyo, Japan)*, “K-12 Math & Science Education near Silicon Valley,” 28 March 2003.
- American Mathematical Society National Meeting Special Session on the Many Lives of Lattice Theory*, “Differential Posets and Down Up Algebras,” 8 January 2004.
- MIT Richard Stanley 60th Birthday Conference (Cambridge, MA)*, “The Lattice of Threshold Graphs and Split Graphs,” 22 June 2004.

*Park City Mathematics Institute (sponsored by the Institute for Advanced Study)*, “Mathematicians working with teachers in California: The ACCLAIM Experience,” 13 July 2004.

*Park City Mathematics Institute (sponsored by the Institute for Advanced Study)*, “Japanese Lesson Study: Teaching cultures in Japan and California,” 15 July 2004.

*California State University Hayward Colloquium*, “Proving Primes in Polynomial Time,” 12 November 2004.

*Mathematical Sciences Research Institute (Berkeley) Conference on Mathematical Circles, Contests, and Summer Programs*, “The Ross Program, HCSSiM, and ProMYS,” 18 December 2004.

*University of Connecticut Colloquium*, “The Lattice of Threshold Graphs, ” and “Mathematicians working with teachers in California: The ACCLAIM Experience,” 18 January 2005.

*Sonoma State University (CA) M\*A\*T\*H\* Colloquium*, “Graphical Degree Sequences,” 16 March 2005.

*California State University, East Bay*, “Mathematicians working with teachers in California: The ACCLAIM Experience,” 22 April 2005.

*UC Davis Combinatorics Seminar*, “A pictorial presentation of Berele’s insertion algorithm for symplectic tableaux via local rules,” 16 May 2005.

*Harvard University Seminar*, “Inquiry-Based Learning and the Arnold Ross Program,” 9 March 2007.

*UConn Early College Experience*, “Euler & Infinite Series,” 20 August 2007.

*Mathematical Sciences Research Institute (Berkeley)*, “Supporting students Struggling with Algebra: Lessons from UConn’s Q Center,” at workshop on *Critical Issues in Education: Teaching and Learning Algebra* 16 May 2008.

## SERVICE

Founding Mathlets Editor for the Mathematical Association of America’s *Journal of Online Mathematics and its Applications*, 2001–2003. Served on JOMA advisory board, 2001–present.

Member of the California Mathematics Project Advisory Board 1998–2005. Chair of this advisory board, a position of considerable statewide leadership in mathematics education in California, 2000–2005.

Founded, directed and taught in ACCLAIM (Alameda County Collaborative for Learning and Instruction in Mathematics), a large, successful professional development program for K–12 teachers, in cooperation with Alameda County Office of Education and local school districts. ACCLAIM has served over 2000 teachers over the past six years, providing in-depth content-based training in mathematics and how to teach it.

Founding member of organizing committee for a highly successful semiannual series of local one-day research conferences, the *Bay Area Discrete Mathematics Days*, which rotate among universities in the Bay Area, 2000–2005.

One of 7 main organizers of the 16th Annual International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC), held 28 June–2 July 2004 at the University of British Columbia (Vancouver B.C., Canada). Coordinated travel support for invited speakers and young participants.

With Matt Hubbard, created a comprehensive website, *Pascal’s Triangle from Top to Bottom*, on binomial coefficients that has received national recognition from the Math Forum (June 2004–present): <http://binomial.csueastbay.edu/>

Served on the following university-wide committees at Cal State Hayward: Committee on Research (3 years), the Library Advisory Committee (2 years), the Faculty Diversity and Equity Committee (2 years), and the Committee to Review the University Librarian and Associate University Librarian (2004).

*University-wide service*

General Education Oversight Committee (GEOC), 2005–present;

GEOC Q subcommittee (co-chair), 2005–present;

Gateway Course Committee, 2006–07;

Gateway subcommittee on preparation and advising (chair);  
Taught two sections of INTD 182 course *Jane Austen Dances* for First Year Programs, Spring 2006–present

*Departmental service*

Hiring Screening Committee;  
Undergraduate Program Committee;  
Information Technology Committee (chair from May 2008);  
Search committee for Q Center Associate Director (chair);  
Search committee for Q Center Program Assistant (chair);

## MEMBERSHIPS

American Mathematical Society (AMS)  
Mathematical Association of America (MAA)  
National Council of Teachers of Mathematics (NCTM)  
Associate for Women in Mathematics (AWM)

## GRANTS

Received a grant of \$110,000 for 2006–07 (joint with Fabiana Cardetti) from the Connecticut Department of Higher Education’s “Teacher Quality Partnership Grant Program” to work with teachers in the New Britain and Hartford school districts on algebra knowledge and pedagogy.

Received state grants of \$168,000 for FY 2000, \$518,000 for FY 2001, and \$980,000 for FY 2002–04 to develop and run ACCLAIM professional development institutes for K–12 teachers with school year follow up, in cooperation with Alameda County Office of Education and local districts. Oversaw \$2.4 million in teacher stipends paid separately.

Received grants of \$80,000 for summer 2004, \$25,000 for AY 2004–05, and \$40,000 for Summer 2005 from the Alameda County Office of Education for ACCLAIM institutes and follow up work.

ACCLAIM received a grant for \$993,247 (to the Alameda County Office of Education, not CSUH) from the California Math and Science Partnership Program to support institutes and coaching work with K–12 teachers in the Hayward and Alameda school districts. Tom Roby is co-PI on this grant.

Received grants of \$15,400 from the National Science Foundation and \$15,200 from the National Security Agency to support the 16th Annual International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC), held June 28 - July 2, 2004 at the University of British Columbia (Vancouver B.C., Canada).