

# Allison Michele Pacelli

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## Education and Employment

WILLIAMS COLLEGE, Williamstown, MA

**Assistant Professor**, 2003 – 2009.

**Associate Professor**, 2009 – 2015.

**Professor**, 2015 – present.

BROWN UNIVERSITY, Providence, RI.

**Ph.D., Mathematics**, May 2003.

Advisor: Michael Rosen

Dissertation Title: The Structure of the Class Group in Global Function Fields

UNION COLLEGE, Schenectady, NY.

**B.S., Mathematics**, June 1997.

Summa Cum Laude, Departmental Honors

Phi Beta Kappa, 1996

## Research Interests

- Algebraic Number Theory
- Class Groups and Class Numbers
- Global Function Fields
- Mathematics Education

## Publications

1. *Abelian Subgroups of Any Order in Class Groups of Global Function Fields*, Journal of Number Theory, **106** (2004), 26-49.
2. *Quadratic Reciprocity via Theta Functions*, (with Ram Murty), Ramanujan Mathematical Society Lecture Notes Series, Volume 1 (2005), 107-116.
3. *Subgroups of the Class Groups of Global Function Fields: The Inert Case*, (with Y. Lee), Proceedings of the American Mathematical Society, **133** (2005), 2883-2889.
4. *The Prime at Infinity and the Rank of the Class Group in Global Function Fields*, Journal of Number Theory, **116** (2006), 311 – 323.
5. *Higher Rank Subgroups in the Class Groups of Imaginary Function Fields* (with Y. Lee), Journal of Pure and Applied Algebra, **207** (2006), 51 - 62.

Continued

6. *A Lower Bound on the Number of Cyclic Function Fields with Class Number Divisible by  $n$* , Canadian Mathematical Bulletin, **49** (2006), 448 – 463.
7. *Parameterized Families of Quadratic Fields with 3-Rank At Least 2* (with undergraduates Carl Erickson, Nathan Kaplan, Neil Mendoza '07, and Todd Shayler '06), Acta Arithmetica **130** (2007), 141 - 147.
8. *Class groups of real quadratic fields of 3-rank at least 2: Effective bounds* (with Florian Luca), Journal of Number Theory, **128** (2008), 796 - 804.
9. *Function Fields with 3-Rank at Least 2*, Acta Arith. 139 (2009), 101-110.
10. *Indivisibility of Class Numbers of Global Function Fields* (with Michael Rosen), Acta Arith. 138 (2009), 269-287.
11. *Function Fields with Class Number Indivisible by a Prime  $\ell$*  (with Michael Rosen, Michael Daub , Natee Pitiwan, Mona Merling, Jackie Lang, Acta Arith. **150** (2011), 339-359.
12. *Arithmetic Properties of Generalized Rikuna Polynomials* (with Zev Chonoles, John Cullinan, Hannah Hausman '12, Sean Pegado '11, and Fan Wei), Publications Mathematiques de Besancon Algebre et Theorie des Nombres, **1** (2014) 19 – 33.

## Books

1. *Mathematics and Politics: Strategy, Voting, Power, and Proof* (with Alan D. Taylor), second edition, Springer-Verlag, Fall 2008.
2. Contributing Author to *Thinkwell Precalculus* by Edward B. Burger, Thinkwell, Fall 2013.
3. *The Beauty of Numbers*, in preparation.

## Teaching Experience

### Williams College

- The Beauty of Numbers, Fall 2012, Fall 2013, Fall 2015
- Discrete Mathematics, Fall 2009, Spring 2015
- Social Choice and Fair Division (tutorial), Fall 2008
- Algebraic Number Theory, Spring 2008, Fall 2009, Spring 2012
- Calculus 1, Fall 2007, Spring 2009, Spring 2011
- Abstract Algebra, Spring 2006, Spring 2009, Spring 2010, Spring 2013, Fall 2013
- Number Theory, Fall 2005, Spring 2008, Fall 2012, Fall 2015
- Introduction to Mathematical Proof and Argumentation (Tutorial), Fall 2005
- Galois Theory, Spring 2005, Spring 2012 (Tutorial)
- The Art and Beauty of Mathematical Thinking, Spring 2005
- Linear Algebra, Fall 2003, Spring 2004, Fall 2004
- Polynomial Arithmetic, Spring 2004

- Mathematical Politics: Voting, Power, and Conflict, Fall 2004, Fall 2008, Spring 2011

### **Williams College Math Camp**

- Director and Instructor, Summer 2013, Summer 2014, Summer 2015

### **George Washington University Summer Program for Women in Mathematics**

- Algebraic Number Theory, Summers 2007, 2008
- Mathematics and Politics, Summer 2009

### **Brown University, Visiting Faculty**

- Number Theory and the Art of Mathematical Proof, Summers 2003, 2004

### **Brown University, Teaching Fellow**

- Number Theory and the Art of Mathematical Proof, Summers 2001, 2002
- Introductory Calculus, Part 1, Summer 2000, Summer 2001
- Introductory Calculus, Part 2, Summer 2000
- Analytic Geometry and Calculus, Spring 2000
- Linear Algebra, Spring 2001, 2003
- Advanced Placement Calculus, Fall 2000
- Introductory Calculus, Part 1, Fall 1999

### **Brown University, Teaching Assistant**

- Introductory Calculus, Part 1, 1997, 1998
- Introductory Calculus, Part 2, 1999

## **Selected Presentations**

- Albany Central School District, Math & Science Partnership Grant, *Math Content Workshops*, January 22, March 2, April 30, August 18-19, October 16, 2015.
- Albany Central School District, Math & Science Partnership Grant, *STEM Building Leaders Workshops*, March 6, May 15, October 23, 2015.
- Albany Central School District, Math & Science Partnership Grant, *Math Content Workshops*, July 17-18, September 22, October 30, 2014.
- Albany Central School District, *Bar Models and Singapore Math*, June 30, 2014.
- Union College Undergraduate Mathematics Seminar, *Primes, Primes, and More Primes*, May 19, 2014.
- Williams College Mathematics and Statistics Department Faculty Seminar, *The Kronecker-Weber Theorem in Number Fields and Function Fields*, May 9, 2014.

- Albany Central School District Professional Development, *Lesson Planning for 3-5 Mathematics*, April 5, 2014.
- Gouverneur High School Professional Development, *Common Core Algebra*, March 19 – 21, 2014.
- Albany Central School District Professional Development, *Lesson Planning for K-2 Mathematics*, March 15, 2014.
- Albany Central School District Professional Development, *Common Core: Standards for Mathematical Practice, Grades K-2*, March 8, 2014.
- Albany Central School District Professional Development, *An Introduction to Common Core Math Grades K-2*, February 8, 2014.
- Albany Central School District Professional Development, *Common Core: Standards for Mathematical Practice, Grades 3-5*, January 25, 2014.
- Albany Central School District Professional Development, *Investigating Common Core Math: Standards & Progressions*, January 18, 2014.
- Williams College Math Blast, *The Mathematics of Voting*, December 9, 2013.
- Monticello Central School District, Professional Development Series, *Thinking through the Common Core (with Ed Burger)*, July 9-12, 2012.
- Williamstown Elementary School Professional Development Series, *Mathematics & The Common Core*, October 17, 2012.
- Williams College Mathematics and Statistics Department Faculty Seminar, *Class Numbers & Class Field Towers*, April 6, 2012.
- Wellesley College Mathematics Colloquium, March 4, 2011: *Algebraic Number Theory: an "Ideal" Subject*.
- Siena College Mathematics Colloquium, November 5, 2010: *Algebraic Number Theory & Fermat's Last Theorem*.
- Brown University Algebra Seminar, November 1, 2010: *Class Number Indivisibility*
- Summer Program for Women in Mathematics, George Washington University, July 27, 2010: *Algebraic Number Theory: an "Ideal" Subject*
- Acadia University Mathematics Department Colloquium, July 13, 2010: *Math and Politics in the Undergraduate Curriculum*

- Canadian Number Theory Conference, Acadia University, July 12, 2010: *Indivisibility of Class Numbers in Global Function Fields*
- Williams College SMALL REU Mathematics Colloquium, June 16, 2010: *Algebraic Number Theory: an "Ideal" Subject*
- University of Massachusetts at Amherst, Mathematics Department, April 6, 2010: *Career Advice for Graduate Students*
- Williams College Annual Faculty Lecture Series, March 18, 2010: *"Fair is Foul, and Foul is Fair:" A Mathematical Approach to Fairness*
- Mid-Hudson Mathematics Conference for Undergraduates, Keynote Address, Bard College, October 25, 2009: *Algebraic Number Theory: From Fermat to Function Fields*
- Smith College Mathematics Department Colloquium, October 6, 2009: *Algebraic Number Theory: an "Ideal" Subject*
- Journées Arithmétiques, July 6, 2009: *Class Number Indivisibility in Global Fields*
- SAC (NYC hedge fund) Seminar, December 4, 2008: *Algebraic Number Theory: an "Ideal" Subject*
- Mathematical Association of America Eastern Section Meeting, Invited Address, November 21, 2008: *The Mathematics of Fairness,*
- Williams College Department of Mathematics Faculty Research Seminar, October 31, 2008: *Indivisibility of Class Numbers*
- Bard College Mathematics Department Colloquium, October 16, 2008: *The Mathematics of Fairness*
- Middlebury College Mathematics Department Colloquium, October 21, 2008: *Algebraic Number Theory: an "Ideal" Subject*
- AMS Fall Eastern Section Meeting, October 11, 2008: *Class Number Indivisibility in Function Fields*
- Spelman College Honors Program Talk, September 22, 2008: *Election 2008 and Beyond: Your Vote Doesn't Matter, but You can Still Get Your Way*
- Spelman College Mathematics Department Colloquium, September 23, 2008: *The Mathematics of Fairness*
- Williams College SMALL Colloquium, *Class Numbers of Global Fields*, June 11, 2008.

- Williams College Science Lunch, *A Mathematical Approach to Fairness*, February 5, 2008.
- Maine/Quebec Number Theory Conference, *The 3-Rank of the Class Group in Number Fields and Function Fields*, September 29, 2007.
- Williams College Faculty Seminar, *Indivisibility of Class Numbers*, September 28, 2007
- Five College Number Theory Seminar, *The 3-Rank of the Class Group in Number Fields and Function Fields*, March 13, 2007.
- University of Wisconsin Graduate Student Seminar, *Life at a Liberal Arts College*, November 30, 2006
- University of Wisconsin Number Theory Seminar, *High  $n$ -Rank in Class Groups of Function Fields*, November 30, 2006
- Brown University Graduate Student Seminar, *Class Numbers of Quadratic Fields*, November 15, 2006
- Fields Institute Workshop on Computational Challenges in Algorithmic Number Theory and Cryptography, *Constructing Number Fields and Function Fields with Prescribed Class Group Properties*, October 31, 2006
- George Washington University Summer Program for Women in Mathematics, *Algebraic Number Theory: An "Ideal" Subject*, July 20, 2006
- Canadian Number Theory Association Meeting IX, *High  $n$ -Rank in Class Groups of Global Fields*, July 13, 2006
- Québec-Vermont Number Theory Seminar, *Class Groups with High  $n$ -Rank*, June 14, 2006
- Front Range Number Theory Colloquium, University of Wyoming, *Unit Rank and the Rank of the Class Group of a Global Function Field*, March 9, 2006
- Williams College Mathematics Department Faculty Seminar, *Class Groups of Quadratic Fields*, March 3, 2006
- Union College Undergraduate Mathematics Seminar, *Algebraic Number Theory: My "Ideal" Summer*, January 23, 2006
- Union College Mathematics Conference, *High  $n$ -Rank in Class Groups of Global Fields*, December 3, 2005
- Colby College Undergraduate Mathematics Colloquium, *Polynomials, Primes, and Fermat's Last Theorem*, November 15, 2005

- Number Theory Inspired by Cryptography Conference, *High  $n$ -Rank in Class Groups of Global Fields*, November 7, 2005
- Williams College Mathematics Colloquium, *Algebraic Number Theory: From Fermat to Function Fields*, June 15, 2005
- Hudson River Undergraduate Mathematics Conference, *Polynomials in a Parallel Universe*, April 30, 2005
- University of Connecticut Department of Mathematics Awards Ceremony, *Democracy in Action: Your Vote Doesn't Matter, but You Can Still Get Your Way*, April 21, 2005
- Centre for Information Security and Cryptography Discrete Mathematics Seminar, *High Rank Subgroups in Class Groups of Global Function Fields*, March 23, 2005
- University of Rochester Number Theory Seminar, *High Rank Subgroups in Class Groups of Global Function Fields*, March 3, 2005
- Williams College Mathematics Department Faculty Seminar, *Class Groups of Global Function Fields*, February 11, 2005
- Association for Women in Mathematics Workshop, *Unit Rank and the Rank of the Class Group of a Global Function Field*, January 8, 2005
- Capital Region Algebra and Number Theory Seminar, *Class Groups of Global Function Fields*, December 15, 2004
- Williams College Science Lunch, *Election Day: What Does Your Vote Really Mean?*, November 2, 2004
- Williams College Special Family Weekend Mathematics Lecture, *Election 2004 and Beyond: Your Vote Doesn't Matter, but You Can Still Get Your Way*, October 23, 2004
- Brown University Undergraduate Mathematics Seminar, *Election 2004 and Beyond: Your Vote Doesn't Matter, but You Can Still Get Your Way*, October 19, 2004
- Colby Sawyer College, *Election 2004 and Beyond: Your Vote Doesn't Matter, but You Can Still Get Your Way*, October 13, 2004
- Number Theory Conference in Honor of Harold Stark, *Class Number Divisibility in Cyclic Function Fields*, August 7, 2004
- Canadian Number Theory Association Meeting VIII, *Subgroups of Any Order in Class Groups of Global Function Fields*, June 22, 2004
- Williams College Science Lunch Seminar, May 4, 2004: *The Idealization of the Prime*
- Williams College Faculty Seminar, March 5, 2004: *Class Number Divisibility in Number Fields and Function Fields*

- Holy Cross Math Colloquium, December 8, 2003: *Polynomials, Primes, and Fermat's Last Theorem*
- Queen's University, Number Theory Seminar, November 14, 2003: *Subgroups of Any Order in Class Groups of Global Function Fields*
- Queen's University, Math Department Colloquium, November 14, 2003: *Divisibility of Class Numbers*
- Five College Number Theory Seminar, October 28, 2003: *Subgroups of Any Order in Class Groups of Global Function Fields*
- Williams College Colloquium, February 12, 2003: *Polynomials, Primes, and Fermat's Last Theorem*
- Davidson College Math Coffee, February 5, 2003: *Polynomials and Primes*
- AWM Workshop, Joint Meetings 2003, Poster Presentation: *Class Groups of Global Function Fields*
- AMS Eastern Section Meeting October 5, 2002, Special session on Number Theory and Arithmetic Geometry: *Class Groups of Global Function Fields*
- Union College Undergraduate Math Seminar, October 30, 2002: *Polynomials and Primes*
- Mathfest 2002, Contributed Paper: *Divisibility of Class Numbers of Global Function Fields*
- KFS Summer@Brown, Guest Lecturer, 2002: *Number Shapes*
- Graduate Student Number Theory Seminar, Brown University: Several Talks 1999 - 2002

### **Honors and Awards**

- MAA Dolciani Mathematics Enrichment Grant (for Williams College Math Camp), 2013, 2014, 2015 (maximum number of awards).
- AMS Epsilon Award (for Williams College Math Camp), February 2014, February 2015
- Teachers' Roundtable, Williams College, Fall 2007
- Hellman Fellow Grant, Williams College, 2007-08
- Association for Women in Mathematics Mentoring Travel Grant, March 2007
- Association for Women in Mathematics Mentoring Travel Grant, March 2006
- Association for Women in Mathematics Travel Grant, November 2005
- Williams College Inter-departmental Program for Experimental & Cross-Disciplinary Studies, Summer Stipend to develop new mathematics and politics course, 2004



- Mathematics Department Outstanding Teaching Award, Brown University, October 2002
- Presidential Award for Excellence in Teaching, Brown University, May 2002
- VIGRE Graduate Trainee, Brown University, Fall 2002
- Brown University Teaching Fellowship, 1998-2001
- University Fellowship, Brown University, 1997
- Martin Terry Resch Pure Mathematics Prize, Union College, 1997
- President's Commission on the Status of Women Senior Scholarly Activity Award, Union College 1997
- Waldemar J. Trjitzinsky Memorial Fund Award, American Mathematical Society, 1996
- Goldwater Scholar in Mathematics, Science and Engineering, Barry M. Goldwater Scholarship and Excellence in Education Foundation, 1996

### **Student Research Advised**

- Honors Thesis Advisor for Sam Tripp '14: *Primes in Arithmetic Progressions of Polynomials*
- Senior Thesis Advisor for Patricia Klein '11: *Quadratic Reciprocity via Algebraic Number Theory*
- Faculty Advisor for SMALL undergraduate research in Algebraic Number Theory, Summer 2010
- Honors Thesis Advisor for Natee Pitiwan '09: *Class Number Divisibility in Quadratic Fields*
- Faculty Advisor for SMALL undergraduate research in Algebraic Number Theory Group, Summer 2008
- Honors Thesis Advisor for Michael Daub (2008): *Class Numbers and Hilbert Class Field Towers*
- Honor's Thesis Advisor for Elizabeth Adams (2006): *Class Numbers of Cubic Fields*
- Faculty Advisor for SMALL undergraduate research Algebraic Number Theory Group, 2005
- Honor's Thesis Advisor for Matthew Spencer (2005): *Class Groups of Function Fields and the Decomposition of Irreducibles*
- Intel Science Talent Search Advisor for John Sillcox (named semi-finalist): *Polygonal Numbers in the Fibonacci sequence*

### **College Service**

Chair, Department of Mathematics & Statistics Visitor Hiring Committee, 2015 – 2016.

Winter Study Committee, 2015 – 2016.

Olmsted Committee, 2012-2013

Hudson River Undergraduate Mathematics Conference, Williams College

*Chair of Steering Committee, 2004-05, 2012-13*

*Steering Committee Member, 2005-present*

Faculty Review Panel, 2009-10, 2010-11

Committee on Educational Policy, 2008-09, 2009-10

Library Committee, Williams College, 2007-08

Committee on Educational Policy, Williams College, 2005-06

Hiring Committee, Williams College Department of Mathematics & Statistics, 04-05, 05-06,  
07-08, 08-09

### **Other Service**

Member of the Education Advisory Board for the Institute of Computation and  
Experimental Research in Mathematics (ICERM), January 2014 - present

Professional Development for Monticello Elementary School Teachers, *Thinking Through  
the Common Core*, July 2012

Professional Development for Williamstown Elementary School Teachers, October 2012

MAA PREP Course on Algebraic Number Theory, Director, Summer 2010

NSF Grant Reviewer, July 2010

Association for Women in Mathematics Travel Grants Selection Committee, 2009-2010

Special Session on The Arithmetic of Function Fields, Joint Mathematics Meetings 2010

Co-organizer

MAA PREP Course on Mathematics and Politics, Director, Summer 2008

Special Session on Number Theory, AMS Eastern Section Meeting, April 2007

*Co-organizer*

Special Session on The Arithmetic of Function Fields, Joint Mathematics Meetings 2007

*Co-organizer*

Co-Instructor, Professional Seminar for Advanced Graduate Students 2006-07

*Harriet W. Sheridan Center for Teaching and Learning at Brown University*

Referee, *Proceedings of the American Mathematical Society*, *American Mathematical Monthly*, *PRIMUS*, *Mathematics Magazine*

Reviewer, Math Reviews

*Since 2004*

Undergraduate Mathematics Seminar, Brown University

*Founder and Organizer, 2002-03*

Mathematics Resource Center, Brown University

*Coordinator, 2000-02; Tutor, 1997-2000*

Graduate Student Number Theory Seminar, Brown University

*Organizer, 1999-2000*

### **Teaching - Related Activities**

Project NExT (New Experiences in Teaching) Fellow, 2003-2004

MAA Short Course, Summer 2002: *The Mathematics of Cryptology*

The Sheridan Center for Teaching and Learning in Higher Education, Brown University

- *Graduate Teaching Fellow, 2001-02*
- *Teaching Consultant, 2000-01, 2001-02, 2002-03*
- *Graduate Student Liaison from Mathematics Department, 1999-2000, 2000-01, 2001-02*
- *Sheridan Center Teaching Certificate I and II*

The Boston College Mathematics Case Studies Project

Universal Instructional Design Workshop, Brown University, June 2000

### **Other Professional Activities**

Reviewer, Prentice Hall Publishing, Summer 2001

Wrote Solution Manual to *Mathematics and Politics: Strategy, Voting, Power, and Proof*, 1995

### **Professional Memberships**

- National Council of Teachers of Mathematics

- American Mathematical Society
- Association for Women in Mathematics
- Mathematical Association of America