

Klay Kruczek

Work: Mathematics Department
Western Oregon University
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Employment

2004-Present Associate Professor of Mathematics
Western Oregon University

Education

2004 Ph.D. Rutgers, The State University of New Jersey
Mathematics Department (Advisor József Beck)
Title: Tic-Tac-Toe and Tumbleweeds

1998 M.S. Virginia Polytechnic and State University
Mathematics

1996 B.S. Georgia Institute of Technology
Mathematics (High Honor)

Research Interests

Combinatorics and graph theory, in particular problems in positional game theory;
K-12 Education, in particular implementation of discrete mathematics in middle school.

Teaching Experience

2004 - Present	Associate Professor	Western Oregon University Mathematics Department
2006 - 2007	Instructor	Young Scholars Program Rutgers University
1999 - 2004	Instructor	Rutgers University
2001 - 2004	Graduate Fellow	NSF GK-12 Program Rutgers University
1998 - 2001	Teaching Assistant	Rutgers University
1996 - 1998	Instructor	Virginia Tech
1995 - 1996	Senior Teaching Assistant	Georgia Tech

Awards and Fellowships

2005 - 2006 National Project NExT Fellow
2005 Pacific Northwest MAA Section, NExT Fellow
2001 - 2004 National Science Foundation, GK-12 Fellowship
2000 Graduate Teaching Assistant Teaching Excellence Award
Rutgers University

Teaching Grants Awarded

2008 Active Learning Approaches and Visual Methods for Teaching the Foundational
Mathematics for Elementary Teachers Courses
Cheryl Beaver, Laurie Burton, Klay Kruczek: Co-Directors
Mathematical Association of America's NSF-funded Professional Enhancement Program
Western Oregon University

Courses Taught

Western Oregon University

- MTH 111 - College Algebra (2007 - 2009)
- MTH 112 - Trigonometry (2007)
- MTH 211 - Foundations of Elementary Mathematics I (2007)
- MTH 212 - Foundations of Elementary Mathematics II (2005, 2007 - 2009)
- MTH 213 - Foundations of Elementary Mathematics III (2005, 2006, 2010)
- MTH 231 - Elements of Discrete Mathematics (2008)
- MTH 251 - Calculus I (2005, 2006, 2009)
- MTH 252 - Calculus II (2005)
- MTH 355 - Discrete Mathematics (2006, 2007, 2009)
- MTH 358 - Mathematical Modeling (2011)
- MTH 365 - Mathematical Probability (2006)
- MTH 391 - Manipulatives in Mathematics (2004, 2005)
- MTH 392 - College Algebra for Elementary Teachers (2008 - 2010)
- MTH 394 - Geometry for Elementary Teachers (2007)
- MTH 396 - Elementary Problem Solving (2004 - 2011)
- MTH 398 - Discrete Mathematics for Elementary Teachers (2008 - 2011)
- MTH 420 - Game Theory (2006)
- MTH 494 - Geometry for Middle School Teachers (2005 - 2008)
- MTH 495 - Calculus for Middle School Teachers (2010, 2011)
- MTH 589 - Algebraic Structures for Middle School Teachers (2009)
- MTH 597 - Discrete Mathematics for Middle School Teachers (2005, 2008)
- MTH 599 - Integrated Methods (2006)

Young Scholars Program

Taught course on graph theory and its applications to outstanding high school students (2006, 2007)

NSF GK-12 Graduate Fellow

Worked with various middle school teachers in New Jersey to implement more discrete mathematics, technology, and activities relating mathematics and science into the curricula (2001 - 2004)

Rutgers University

Instructor

- MATH 103 - Topics in Mathematics for the Liberal Arts (2002)
- MATH 135 - Calculus I (1999)
- MATH 250 - Introductory Linear Algebra (2000, 2004)
- MATH 252 - Elementary Differential Equations (2003)
- MATH 477 - Mathematical Theory of Probability (2001)

Teaching Assistant

- MATH 151 - Calculus I for the Mathematical and Physical Sciences (1998 - 2000)
- MATH 152 - Calculus II for the Mathematical and Physical Sciences (1999, 2000)
- MATH 244 - Differential Equations for Engineering and Physics (2001)

Virginia Tech

Instructor

- MATH 1205 - Calculus I (1997)
- MATH 1206 - Calculus II (1998)
- MATH 1525 - Elementary Calculus with Matrices I (1996)
- MATH 1526 - Elementary Calculus with Matrices II (1997)

Publications

Edited Books

Beaver, C., Burton, L., Fung, M., **Kruczek, K.**, *MAA Notes Volume on Programs, Courses and Resources for Training Preservice Middle School Mathematics Teachers* (Initially accepted for publication, May 2008).

Peer-reviewed Articles in Books

Beaver, C. and **Kruczek, K.**, The Mathematics for Middle School Teachers Program at Western Oregon University, *MAA Notes Volume on Programs, Courses and Resources for Training Preservice Middle School Mathematics Teachers* (Volume in Preparation).

Burton, L. and **Kruczek, K.**, Visual College Algebra for Teachers, *MAA Notes Volume on Programs, Courses and Resources for Training Preservice Middle School Mathematics Teachers* (Volume in Preparation).

Peer-reviewed Journal Articles

Kruczek, K. and Sundberg, E., d -dimensional Integer Lattice Tic-Tac-Toe with Rational Slopes of Bounded Coordinates, *The Electronic Journal of Combinatorics*, **17**, 2010

Kruczek, K. and Sundberg, E., A Pairing Strategy for Tic-Tac-Toe on the Integer Lattice with Numerous Directions, *The Electronic Journal of Combinatorics*, **15(1)**, 2008

Journal Articles

Kruczek, K., Same Surface Area...How can that be?, *The Oregon Mathematics Teacher*, December 2008.

Kruczek, K., Math and Maps, *The Oregon Mathematics Teacher*, January/February 2008.

Kruczek, K., Pizza Delivery Problem, *The Oregon Mathematics Teacher*, May/June 2006.

Peer-Reviewed Journal Articles and Course Materials in Preparation

Kruczek, K., Pairing Strategy Draws in N^d Tic-Tac-Toe.

Kruczek, K., Discrete Mathematics for K - 8 Teachers (Course Materials).

Professional Experience

2010 - Present Reader Educational Testing Service
Reader for the Advanced Placement Calculus exam

2005 - Present Consultant The Math Forum @ Drexel
Review aspects of the Online Mentoring Guide and Program, Fundamental Problems of the Week, and the newly introduced Virtual Fieldwork Sequence

2007 - 2008 Consultant Al Bennett of fractionbars.com
Helped redesign and edit existing games on fractionbars.com

2006 - 2008 Textbook Reviewer The McGraw-Hill Companies
Reviewed and Edited College Algebra Second Edition, James Coburn

2006 - 2007 Consultant Coastline Consulting, LLC
Designed spreadsheet for computing significant wave height and period of waves. Calculated forces exerted on a pier and the attached floating dock

Research and Travel Funding

2004 - 2010 Faculty Development Award (Travel) Western Oregon University
2008 Faculty Development Award (Course Reassignment) Western Oregon University
2007 Travel fully funded to do research with Occidental College
Prof. Eric Sundberg (Occidental College)

Invited Colloquia and Local Talks

“Birds, Trees, and Tic-Tac-Toe”

47th Annual Northwest Mathematics Conference, Portland, OR, October 2008

“Discrete Mathematics in the K-8 Curriculum”

LBCC Future Teachers Conference, Linn-Benton Community College, March 2007

“Mathematics of Tic-Tac-Toe”

Mathematics Colloquium, Willamette University, April 2007

Mathematics Colloquium, Saint Martins University, September 2006

Colloquium for Undergraduates, Pacific University, October 2005

“Hands-On Fraction and Decimal Concepts: Models and Games”

Future Teachers Conference, Linn-Benton Community College, March 2006

“An Introduction to Positional Games”

Portland Area Lecture Series, Portland State University, December 2005

“The Mathematics of Doodling”

44th Annual Northwest Mathematics Conference, Portland, OR, October 2005

Presentations at Professional Conferences

“Using Facebook in a Discrete Mathematics Course”

AMS/MAA Joint Mathematics Meetings, New Orleans, LA, January 2011

“On the Use of Fractional Matchings to Find Pairing Strategy Draws in N^d Tic-Tac-Toe”

AMS/MAA Joint Mathematics Meetings, New Orleans, LA, January 2011

“Mathematics Teacher Development through Virtual Fieldwork”

Association of Mathematics Teacher Educators Conference, Irvine, CA, January 2010

“Potential-Based Strategies for Breaker for Maker-Breaker Tic-Tac-Toe on the Integer Lattice with Numerous Directions”

AMS/MAA Joint Mathematics Meetings, San Francisco, CA, January 2010

“Introduction to Proofs Class: Content and Effectiveness”

Pacific Northwest Section of MAA Regional Meeting, Ellensburg, WA, April 2009

“A Pairing Strategy for Tic-Tac-Toe on the Integer Lattice with Numerous Directions”

Pacific Northwest Section of MAA Regional Meeting, Helena, MT, June 2008

“Which Team is the Most Popular?”

Joint AMS/MAA National Meeting, San Diego, CA, January 2008

“Discrete Mathematics Materials for Middle School Mathematics Teachers”

Joint AMS/MAA National Meeting, San Diego, CA, January 2008

“The Departmental Self-Study: How to Ensure That it is Purposeful”

MathFest 2007, San Jose, CA, August 2007 (Panel Discussion)

“Western Oregon University’s Middle School Mathematics Focus”

Joint AMS/MAA National Meeting, New Orleans, LA, January 2007

“What the Hex?”

Pacific Northwest Section of MAA Regional Meeting, Ashland, OR, June 2006

“Online Mentoring Project Prepares Future Teachers to Foster Problem Solvers”

NCTM Annual Meeting, Saint Louis, MO, April 2006

“Using Math Forum to Teach an Elementary Problem Solving Course for Preservice Teachers”

Joint AMS/MAA National Meeting, San Antonio, TX, January 2006

“Tumbleweeds and the Extra Edge Paradox”

Pacific Northwest Section of MAA Regional Meeting, Tacoma, WA, April 2005

“Pairing Strategy Draws for N^d Tic-Tac-Toe”

Joint AMS/MAA National Meeting, Atlanta, GA, January 2005

Minicourse Presentations

“Active Learning Approaches for the Foundational Mathematics for Elementary Teachers Courses”
(with Cheryl Beaver and Laurie Burton, Western Oregon University)

AMS/MAA Joint Mathematics Meetings, San Francisco, CA, January 2010

Conferences and Workshops Attended

AMS-MAA National Joint Meetings, 2003 - 2008, 2010 - 2011
Association of Mathematical Teacher Educators (AMTE), 14th Annual Conference, 2010
Faculty Workshop on Discrete Mathematics for K-8 Teachers, 2005, 2006
MAA Northwest Section Meeting, 2005 - 2010
MathFest (Annual Meeting of the MAA), 2005 - 2007, 2009
NCTM Annual Meeting and Exposition, 2006
Northwest Mathematics Conference, 2005, 2008
TOTOM (Teachers of Teachers of Mathematics) Annual Meeting, 2004 - 2007, 2010
Workshop on Extremal Graph Theory, Carnegie Mellon University, 2007

Memberships

AMS (American Mathematical Society)
MAA (Mathematical Association of America)
NCTM (National Council of Teachers of Mathematics)
OCTM (Oregon Council of Teachers of Mathematics)

Professional Service

2011 Chair, Pacific Northwest Section of Mathematics Association of America
2010 - Present Reviewer, *The Electronic Journal of Combinatorics*
2010 - Present Member, MAA Committee on the Mathematical Education of Teachers (COMET)
2007 - Present Communications Officer, Pacific Northwest Section of Project NExT
2005 - Present Co-Chair of Various Sessions, Meetings of PNW Section of MAA
2004 - Present Oregon Mathematics Education Council Representative
2005 - Present Co-Chair, Steering Committee, Oregon Invitational Mathematics Tournament
2008 - 2010 President, Oregon Mathematics Education Council
2006 - 2008, 2010 Co-Chair of Various Sessions, AMS-MAA National Joint Meetings
2006 Co-Coordinator, "Sterling Dot" Project NExT Sessions, MathFest

Institutional Service (at Western Oregon University)

2010 - Present Chair, Natural Sciences and Mathematics Division Personnel Review Committee
2009 - Present Chair, Mathematics Department
2009 - Present Secretary, Academic Requirements Committee
2007 - Present Faculty Representative, Student Conduct Committee
2005 - Present Webmaster, Mathematics Department Departmental Web Pages
2004 - Present Primary Scheduler, Mathematics Department
2004 - Present Advisor, Preservice Teachers and Mathematics Majors (~20 advisees / year)
2005 - 2009 Faculty Senator
2006 - 2008 Designer, Credit Structure Change to Mathematics Program for Majors/Minors
2006 - 2007 Mathematics Department Self-Study Co-Organizer (with Prof. Michael Ward)
2004 - 2006 Faculty Advisor, Math Club

Community Service

2010 Oregon Invitational Mathematics Tournament (Proctor, Judge, Problem Co-Creator)
2006 - Present Sonia Kovalevsky Day, Western Oregon University, Session Chair
2006 Oregon Invitational Mathematics Tournament (Proctor, Judge)

References

Laurie Burton (teaching reference), Western Oregon University
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Michael Ward (teaching reference), Western Oregon University
wardm@wou.edu

Eric Sundberg, Occidental College
sundberg@oxy.edu