

Ursula Whitcher

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Education

Ph.D. Mathematics, University of Washington, 2009.
M.S. Mathematics, University of Washington, 2006.
B.A. Mathematics, Swarthmore College, 2003. Graduated with High Honors.

Employment

Teaching and Research Postdoctoral Fellow, Harvey Mudd College. 2009-Present.
Member, Extended Graduate Faculty, Claremont Graduate University. 2009-Present.

Research Interests

Algebraic geometry: the moduli and mirror symmetry of K3 surfaces.

Publications and Preprints

Research Papers

Adrian Clingher, Charles Doran, Jacob Lewis, and Ursula Whitcher. “Normal forms, K3 surface moduli, and modular parametrizations”. *Groups and Symmetries: Proceedings of the CRM Conference in Honor of John McKay*, edited by John Harnad and Pavel Winternitz, American Mathematical Society, 2009.

Ursula Whitcher. “Symplectic automorphisms and the Picard group of a K3 surface”. To appear in *Communications in Algebra*.
[arXiv:0902.0601v3 \[math.AG\]](https://arxiv.org/abs/0902.0601v3)

Dagan Karp, Jacob Lewis, Daniel Moore, Dmitri Skjorshammer, and Ursula Whitcher. “On a family of K3 surfaces with S_4 symmetry”.
<http://www.math.hmc.edu/~ursula/research/S4symmetry.pdf>

Exposition and Outreach

Ursula Whitcher. “Boundary conditions: a poem”. To appear in *The College Mathematics Journal*, January 2011.

Ursula Whitcher and Charles Doran. “From polygons to string theory.” Submitted to *Mathematics Magazine*.

Ursula Whitcher. “Math anxiety and gym class, or how teaching math led me to scale high walls”. Submitted to *The Chronicle of Higher Education*.

Students Advised

Dmitri Skjorshammer. Undergraduate thesis, 2010-2011.

Daniel Moore and Dmitri Skjorshammer. “Reflexive polytopes and differential equations”. Summer 2010.

Conference and Seminar Presentations

Talks for Undergraduates

“Mirror symmetry through polytopes”, Bard College Mathematics Colloquium, October 2010.

“Reflexive polytopes and mirror universes”, SACNAS National Conference, September 2010.

“Mirror symmetry through reflexive polytopes”, Claremont Colleges Colloquium, April 2010.

“Imaginary worlds and reflexive polytopes: becoming a woman in math”, Women in Mathematics guest speaker, Occidental College, March 2010.

“Reflexive polytopes and mirror symmetry”, Mathematics Colloquium, Oberlin College, January 2010.

“Introduction to toric varieties” and “Projective space”, PIMS Undergraduate Summer School in Algebra, University of Alberta, June 2009.

“Reflexive polytopes and mirror symmetry”, Undergraduate Colloquium, Seattle University, January 2009.

Research Presentations

“K3 surfaces with \mathcal{S}_4 symmetry”, Valley Geometry Seminar, University of Massachusetts-Amherst, November 2010.

“Computing Picard-Fuchs equations for hypersurfaces in toric varieties”, Special Session on Number Theory and Physics, AMS Fall Central Section Meeting, University of Notre Dame, November 2010.

“Picard-Fuchs equations for K3 hypersurfaces” (poster), Algebraic Geometry Northeastern Series, University of Connecticut, September 2010.

“Polytopes, polynomials, and string theory”, Open and Accessible Problems in Number Theory and Algebra, Mathfest, August 2010.

“Classifying symplectic actions on K3 surfaces”, Show-Me Algebraic Geometry Symposium, University of Missouri-Saint Louis, May 2010.

“Periods, Picard-Fuchs equations, and elliptic curves”, Southern California Women in Mathematics Symposium, University of Southern California, February 2010.

“K3 surfaces with discrete symmetry groups,” Association for Women in Mathematics Workshop, Joint Mathematics Meetings, January 2010.

“Classifying symplectic actions on K3 surfaces”, Algebra Seminar, University of Southern California, November 2009.

“Mirror manifolds and discrete symmetry groups”, Arithmetic and Geometry of Algebraic Varieties Workshop, Fields Institute, October 2009.

“Classifying symplectic actions on K3 surfaces”, Algebra Seminar, University of Washington, May 2009.

“K3 surfaces and modular parametrizations”, AMS Session on Algebraic Geometry and K-Theory, Joint Mathematics Meetings, January 2009.

“Residues and the Griffiths-Dwork technique”, Current Topics Seminar, University of Washington, April 2008.

“Lattice computations and K3 automorphisms”, K3 Surfaces and String Duality, University of Washington, August 2007.

“Moduli spaces of K3 surfaces with symplectic automorphisms”, Géométrie Algébrique en Liberté, Sabanci University (Istanbul), June 2007.

Teaching Experience

Harvey Mudd

Algebraic Geometry, Fall 2010.

Calculus Workshop, Fall 2010.

Differential Equations I, Spring 2010.

Multivariable Calculus II, Fall 2009.

University of Washington

Math Department Lead Teaching Assistant, Spring 2007–Summer 2008.

Instructor

Differential Equations I, Winter 2009.

Linear Algebra (substitute), Summer 2008.

Calculus II, Summer 2005.

Teaching Assistant

Mentor for new Teaching Assistants, Fall 2005, Fall 2006, Winter and Fall 2008.

Teaching Assistant and grader, Introduction to Modern Algebra for Teachers, Winter 2007.

Calculus I, II, III, and I (Honors). Fall 2004; Fall, Winter and Spring 2005; Fall 2006; Fall 2008.

SIMUW strings workshop, Summer 2005.

Tutor

Math Study Center, Summer and Fall 2004.

Professional Service

Co-organizer for Harvey Mudd Mathematics Conference, Broadening Participation in the Mathematical Sciences, 2010.

Life After Harvey Mudd panel, October 2010.

Member of graduate school panel, Claremont Colleges REU, July 2010.

Interlocutor, Undergraduate Poster Session, MAA Southern California-Nevada Section Meeting, April 2010.

Organized Math Club field trip to Honnold-Mudd Library Special Collections, February 2010.

Graduate Student Representative to the University of Washington Mathematics Department, 2008–2009.

Mathematics Graduate Program Committee member, 2008–2009.
Mathematics Colloquium Committee member, 2008–2009.
Organized Current Topics Seminar, 2008–2009.
Mentor, Association for Women in Mathematics mentorship program, 2007–2008.
Organized Modular Forms Problem Session, 2007–2008.
Planned and led Mathematics Department Teaching Assistant Training, Fall 2007.
Led small group discussions on teaching at TA Orientation, Fall 2006 and Fall 2008.
Co-organized mathematics and physics seminar (Superseminar), 2005–2006.
VIGRE Website Committee member, 2005–2006.

Awards and Fellowships

University of Washington VIGRE fellow, 2005–06.
McKibben and Merner Fellowship, 2005–08.
Academic Excellence Award, 2004.
Graduate Opportunity Research Assistantship, 2003–2004.
Joshua Lippincott Fellowship, 2003–2004.
Phi Beta Kappa member, elected 2003.

Professional Organizations

American Mathematical Society.
Association for Women in Mathematics.
Mathematical Association of America.
Society for Advancement of Chicanos and Native Americans in Science.

Other Professional Activities

Intern. The Math Forum. <http://www.mathforum.org> 1999–2003.
Summer REU. Advisor: Rebecca Wright. DIMACS, Rutgers University, 2002.
Summer Research Assistant. Soft Condensed Matter Theory Group, Case Western Reserve University, 2001.