

Katrina M. Hay, Assistant Professor

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Education

2002-2008 Oregon State University Corvallis, Oregon

Physics Doctorate, Emphasis in Fluid Physics

- Pore-scale Fluid Physics, Fluid Instabilities, Quantum Physics, Electromagnetism, Dynamics, Thermodynamics, Statistical Mechanics, Solid State Physics, Atomic Molecular Optics, Quantum Field Theory, Computational Physics, Geodynamics, Crustal Seismology, Physics and Chemistry of the Earth, Teaching Seminar

1998-2002 Linfield College McMinnville, Oregon

Bachelor of Science in Physics and Mathematics 2002

- Deans List 2001-2002

Experience

Assistant Professor of Physics, Pacific Lutheran University, Fall 2008-present

- Focus on effective undergraduate education, through interactive teaching
- Involvement in school community through volunteer opportunities and committees
- Conduct Fluid Physics research independently and with undergraduate students

Mentor Teaching, Oregon State University Physics Department, 2007

- Worked closely with physics instructor learning to organize a course and plan lectures, demonstrations and tests for Introductory Physics course and Astronomy course

Research Mentor, Oregon State University Soil Science Program, Summer 2007

- Designed project and guided an undergraduate through an experimental research experience involving rock fracture flow
- Evaluated student's work for submission as a senior thesis and conference presentation

Science Intern, NASA Jet Propulsion Laboratory, Summer 2005

- Assisted in timeline development for the "Dawn" spacecraft in its orbit around the asteroid Vesta, using a spacecraft-specific computer program
- Presented suggestions for improvement to the Dawn Spacecraft Science Team

Teaching Assistantship, Oregon State University Physics Department, 2002-2005

- Recitation and Lab for Introductory Physics with Calculus, Astronomy, Paradigms of Physics (year-long junior level)

Soil Physics Research, Oregon State University Crop and Soil Science Department, 2005-2008

- Experimental investigation of fluid transport in fractures to develop a theoretical transport equation

Geophysics Cruise Data Research, Oregon State University Geophysics Department, Summer 2004

- Calibrated raw data from the MBARI (Monterey Bay Aquarium Research Institute) June 2000 cruise, developed and analyzed thermal profiles of Southern Hydrate Ridge (off the Oregon coast)

Laser Optics Lab Research, Oregon State University Physics Department, Winter 2004

- Investigated instrumentation to repair hardware malfunction in an Argon Ion Laser

Nuclear Physics Research, Linfield College Physics Department, 2001-2002, Senior Thesis

- Revised and wrote FORTRAN programs to simulate Heavy Ion collisions, and compare to Au-Au collisions at RHIC (Relativistic Heavy Ion Collider) in Brookhaven, New York.
- Oral Presentation of Senior Thesis at 2001 Murdock Science Conference

Astronomy Intern, Pacific Northwest National Laboratory, Summer 2000

- Worked with the Rattlesnake Mountain Observatory telescope instrumentation to improve the tracking and begin telescope automation for educational purposes
- Captured astrophotographs and created an educational web page on sun spots for Rattlesnake Mountain Observatory, toured students through observatory

Camp Program Director (Summer 2003) and Counselor (Summer 2002), Camp Lutherwood Oregon

- Directed and created summer camp programs, counseled and directed staff
- Counselor for campers ages 7-17, responded to emergencies
- Held weekly “Star Talks” throughout summer for staff and campers to discuss mysteries of the universe and inspire children to pursue science. (Still give occasional guest lectures for various camp science activities)
- Designed program and instructed “model rocket” camp

Adventures in Learning Teacher, Oregon State University, Summer 2004

- Taught Rollercoaster Physics and Astronomy courses (daily, two weeks each) to middle school students

Teaching Assistant, Linfield College Physics Department, 2000-2002

- Bi-weekly tutor for students in the Introductory Physics with Calculus classes
- Graded Introductory Physics with Calculus assignments

Academic Physics Peer Advisor, Linfield College Office of Academic Advising, 2000-2002

- Worked closely with a physics Faculty Advisor to co-teach an academic orientation semester class to freshmen interested in physics
- Guided 20 students each year through a college orientation and advised them individually throughout their freshman year to help them adapt to college life

Resident/Suburb Advisor, Linfield College Housing Office, 1999-2001

- Created academic, social and spiritual programs for residence hall students
- Responded to incidents and emergencies, filed reports

Science Community Volunteer, 1999-2002

- Presented physics concepts in theatre productions to elementary school students and community members
- Judged middle school science fair projects
- Presented the physics portion of Association of Women in Science for female middle school students

Assistant Director for *Godspell*, Klamath Falls, OR. 1998

- Casting, choreography, blocking, lighting and fund raising for a musical organized and performed completely by teens

Pelican Cinemas Employee, Klamath Falls, OR. 1996-2000

- Managed box office ticket sales and supervised concessions

Publications, Awards

- Poster Presentation at American Geophysical Union, “A high-speed video analysis of advancing and receding droplet interfaces in simulated rock fractures” December 2009
- 2 Oral Presentations on Physics Education Research at American Physical Society, March 2010

- New Physics Faculty Workshop, hosted by American Center for Physics, June 2009
- PhD Thesis "Physical processes that control droplet transport in rock fracture systems" Oregon State University, April 29, 2008
- Katrina M. Hay, Maria I. Dragila, James Liburdy; "A Theoretical Model for the Wetting of a Rough Surface" Journal of Colloid and Interface Science Volume 325, Issue 2, 15 September 2008, Pages 472-477.
- Conference Proceedings: Special Issue on Modeling, Analysis and Simulations of Multiscale Nonlinear Systems, Oregon State University 2007 Katrina M. Hay, Maria I. Dragila; "Physics of Fluid Spreading on Roughness", International Journal of Numerical Analysis and Modeling; Vol. 5 (2008).
- Presentation: "A Theoretical Model for the Wetting of a Rough Surface" American Geophysical Union Conference, 2007, San Francisco
- Guest Presenter for Paradigms (Junior physics class), Oregon State University, 2007
- *Outstanding Student Paper* in Hydrology for Presentation: "Physics of two-phase flow on rough surfaces" at American Geophysical Union Conference 2006, San Francisco
- *Certificate of Appreciation* for JPL internship and presentation awarded by the Oregon Space Consortium (2005 Annual Affiliate Meeting)
- Physics Department and Water Resources Department poster sessions, 2006, 2007
- Presentation: "Droplet Speed in Unsaturated Rock Fractures" American Geophysical Union Conference, 2005, San Francisco
- Teaching Fellowship, Oregon State University 2002-2008
- Linfield College Dean's List 4.0, Fall 2001
- Linfield College Dean's List 4.0, Spring 2002
- Sigma Pi Sigma (physics honor society), inducted 2002
- 2001 Murdock Science Conference research grant
- ERULF (Energy Research Undergraduate Laboratory Fellowship), 2000
- Linfield College Scholarships (4 private, 1 2nd place competitive, 1 faculty scholarship), 1998

Activities

Choir, Agnus Dei Lutheran Church, Gig Harbor, WA 2009-present
 Lutherhouse (Lutheran Campus Ministry), 2002-2008
 Association of Women in Science, 2002-2008
 Heartland Humane Society Volunteer
 Art: Watercolor, Photography (painting auctioned for \$300, 2006)
 Ballroom Dance participation and teaching, 1998-2008
 Musical theatre acting, many shows 1990-2006
Double Vision Jazz Choir, 1999- 2002
 Acapella and Concert Choirs, 1995-1999
 Guitar and Piano, varies
 Modern Dance/Dance Ensemble, 1998-2002
 Cooperative Outdoor Recreation Club, 1998-2002 (executive position, 2001)
 Life Guard, Certification 1999