William Riley Casper

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Personal

Born on July 10, 1988.

United States Citizen.

Education

Ph.D. Mathematics, University of Washington, 2017 (expected)

M.S. Mathematics, North Dakota State University, 2010

B.S. Physics, North Dakota State University, 2010

B.S. Mathematics, North Dakota State University, 2010

Employment

University of Washington, Seattle 2011-Present.

Los Alamos National Lab, 2009-Present.

North Dakota State University 2006-2010.

Publications

Journal Articles

Ensemble-based Global Ocean Data Assimilation, 2013, *Journal of Ocean Modelling* 72, 210–230.

Elementary Examples of Solutions to Bochner's Problem for Matrix Differential Operators, 2015, *Journal of Approximation Theory* Submitted. arXiv preprint arXiv:1509.03674.

An Interaction Between Orthogonal Polynomials and Shear Instabilities in the Quasi-Geostrophic Shallow Water Equations, 2016, *Journal of Fluid Mechanics* Soon to be Submitted.

Research Experience

Los Alamos National Lab Research Summer 2016 Graduate Research Assistant. Worked with performance prediction team to develop codes to predict the runtime and energy use of programs such as CloverLeaf (a compressible fluid simulation) and the Polybench test suite. Also continued work on a high-performance spectral code, and developed incompressible and shallow water spectral simulations. Studied the dynamics and linear stability of the shallow water equations over a range of Rossby

numbers. Helped mentor a group of graduate students attending the 2016 Computational Physics Summer School.

Los Alamos National Lab Research Summer 2015 Graduate Research Assistant. Wrote a high-performance spectral code to study the Boussinesq equations with simple boundary conditions. Also worked on neutron transport methods to develop alternatives to "sweeping" in discrete ordinates simulations. Developed a proxy model based on SNAP.

Los Alamos National Lab Research Summer 2014 Graduate Research Assistant. Conducted research on several projects involving ocean modeling, turbulence, and the closure problem.

Los Alamos National Lab Research Summer 2012 Graduate Research Assistant. Continued data assimilation and reanalysis from work of previous summer, resulting in paper.

Los Alamos National Lab Postbac Research Summer 2010-Fall 2011. Performed data assimilation using data from the World Ocean Database (WOD) and ARGO floats, combined iwth the Parallel Ocean Program (POP) and the Data Assimilation Research Testbed (DART).

Los Alamos Physics Summer School 2009. Undergraduate research intership studing the mechanics of rotating fluids with a simple experimental setup.

University of Minnesota Summer 2008. Undergraduate research internship with the Dept. of Materials Science on the tensile strenght of epoxy with "soft inclusions".

Talks and Presentations

Spring 2016 123 Seminar. "Giant Fiery Laser Beams and Commuting Operators"

Spring 2016 Algebra and Algebraic Geometry Seminar. "Algebras Arising from Bispectral Problems"

Invitations and Visits

In the spring of 2016 I visited Sasha Polishchuk at the University of Oregon to discuss orders on singular curves and their links to centrilizers of matrix differential operators

In the winter of 2015 I attended the Arizona Winter School to participate in a workshop on the local-global principle, rational points on surfaces, and the Brauer group.

I have attended the Western Algebraic Geometry Symposium (WAGS) during 2014, 2015, and 2016

I attended the American Mathematical Society (AMS) Joint meetings in Seattle during 2016

I attended the annual American Meteorological Society (the other AMS) during Winter 2010.

Honors and Awards

2015 Winner in Mathematics, Los Alamos National Lab Student Symposium

2013 Academic Achievement Award, University of Washington

2011 Winner in Physics, Los Alamos National Lab Student Symposium

2011 Top Scholar Award, University of Washington

2009 NDSU Math Dept. Teaching Award

2008 Goldwater Scholarship Nominee

Teaching Experience

I have been teaching, tutoring, and grading for **more than** 10 **years**, including

I have taught my own course for one or more quarters for each of the following classes at the University of Washington (UW):

Advanced Multivariate Calculus II (1 quarter)

Differential Equations (5 quarters)

Linear Algebra (1 quarter)

Linear Analysis (2 quarters)

Introduction to Abstract Mathematics (1 quarter)

I have taught several quiz sections of calculus I,II, and III at UW

I have taught several quiz sections of calculus I,II, and III at North Dakota State University (NDSU)

I have been employed as a tutor and grader at NDSU

I have taught intro to physics labs at NDSU

Other Professional Experience and Skills

I have been a volunteer math instructor for the Freedom Education Project Puget Sound (FEPPS) at the Washington Corrections Center for Women (WCCW) during Winter 2015 and Fall 2016.

I have been a volunteer judge at the UW Math Olympiad

I am the graduate student mentor for a group of undergraduates in the Washington Experimental Mathematics Lab (WXML) studying machine learning.

I co-hosted a seminar on algebraic geometry at Los Alamos National Lab during the summer of 2015.

Last updated: October 2, 2016