W.R. Casper

Mathematics Ph.D. Candidate

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About me

W.R. Casper is a highly motivated, computer savvy researcher with diverse interests and a can-do attitude.

Skills

Programming Languages:
C,Fortran 90, C++, Python, Ruby
Other Computing Experience:
10+ years Linux experience
Some Java, Objective C
Numerical methods
Technical computing

education

2011 - Present	Ph.D. Mathematics (expected June 2017)	University of Washington
2006-2010	M.S. Mathematics (4.0 GPA)	North Dakota State University
2006-2010	B.S. Physics (3.96 GPA)	North Dakota State University
2006-2010	B.S. Mathematics (3.96 GPA)	North Dakota State University

publications

2016 Casper, W.R. Elementary Examples of Solutions to Bochner's Problem for Matrix Differential Operators, Journal of Approximation Theory (submitted). arXiv:1509.03674v3

2013 Nadiga, Balasubramanya T., W. Riley Casper, and Philip W. Jones. "Ensemble-based global ocean data assimilation." Ocean Modelling 72 (2013): 210-230.

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

experience

2011 - Present — Graduate Student Instructor — University of Washington

- Taught classes in differential equations, linear algebra, proof-writing and advanced calculus. Responsible for writing and delivering lectures, quizzes, and exams.
- Tutored students at many levels of mathematical proficiency.

Summers of 2014-2016 — Graduate Research Assistant — Los Alamos National Laboratory

- Worked with the performance prediction team developing models for simulating and predicting performance of production codes on novel architectures.
- Developed high-performance massively parallel pseudospectral codes for solving the Boussinesq and shallow water equations.
- Performed linear stability analysis of shear instabilities for the shallow water and quasi-geostrophic equations.
- Mentored graduate students participating in the 2016 Computational Physics Summer School.
- Explored alternative methods to sweep-based algorithms for the SNAP discrete ordinates neutron transport proxy code.

2010-2011 & Summer 2012 — Post-Bachelor Research Assistant — Los Alamos National Laboratory

- Used the Data Assimilation Research Testbed (DART) and the Parallel Ocean Program (POP) to run ensemble-based data assimilation in a global ocean model.

Summer 2009 — Research Intern — LANL Physics Summer School

- Studied fluid dynamics in the context of rotating, stratified flows with emphasis on flows with geophysical length scales.
- Experimented with scaling behavior and vortex cell formation for a bouyantly forced rotating body of water, using a simple experimental setup.
- Wrote scripts in Ruby, Python and TCSH for running simulations on supercomputers at LANL and Oak Ridge National Lab (ORNL)