

# Ryleigh Moore

PhD Student in Applied Mathematics  
University of Utah  
Phone: 208-859-8883  
E-Mail: rmoore@math.utah.edu

## Education

- PhD Student in Applied Mathematics Aug 2017 – Present  
**University of Utah**  
All 3 qualifying exams passed (August 2018)  
Applied Math, Differential Equations, Numerical Analysis
- Bachelor of Science in Applied Mathematics (Summa Cum Laude) Aug 2014 – June 2017  
Bachelor of Science in Mathematics (Summa Cum Laude)  
Minor in Computer Science  
**Boise State University – 3.985 GPA – Advisor: Dr. Jens Harlander**
- Valedictorian - Class of 2014 Aug 2010 – June 2014  
**Rocky Mountain High School**

## Research Experience

### PhD Research

#### Advisor – Dr. Akil Narayan

*Department of Mathematics, Scientific Computing and Imaging (SCI) Institute, University of Utah*

Nov 2018 – Present

- My current research goal is to solve high dimensional stochastic differential equations of the form  $dX_t = f(X_t)dt + g(X_t)dW_t$  with initial condition  $X_0 = C$  where  $W_t$  is a Brownian motion and  $X_t$  is an Itô diffusion. The method discretizes in time, interprets the time-discretized equation as a discrete-time Markov chain, and then uses quadrature to solve the Chapman-Kolmogorov equation.
- The method is up to 100 times faster than Fokker-Planck solvers with the same order of error. There are many modeling and inference applications for a variety of physical and biological processes.

### PhD Research

#### Dr. Ken Golden

*Department of Mathematics, University of Utah*

Sept 2017 – Dec 2019

- My research focused on melt ponds and sea ice floes in the Arctic. I utilized tools from statistical mechanics, probability, geometry, stochastic differential equations, and mathematical physics in order to rigorously explore, classify, and model Arctic melt pond evolution and sea ice dynamics.
- I mentored one undergraduate students and one high school student in sea ice research. Students: Dane Gollero, and Jeremiah Chapman

### Association of Polar Early Career Scientists MOSAiC School Participant

*Arctic Expedition - Multidisciplinary drifting Observatory for the Study of Arctic Climate*

Sept 2019 – Nov 2019

- I travelled to Tromsø, Norway and then to the Central Arctic (85-86 degrees north) to study sea ice with leading scientists from around the world.
- I led the successful deployment of 3 seasonal ice mass balance buoys in the Central Arctic.
- I am 1 of only 20 students from around the world and 1 of only 3 students from the United States selected to participate out of 250 applicants.

### 2019 Industrial Math/Stat Modeling Workshop for Graduate Students Participant

July 2019

- I worked on a team with 6 other graduate students to study ocean wave breaker types using coastal imagery analysis, wave dynamics, and machine learning with the United States Army Corps of Engineers.

**Undergraduate Thesis Research****Dr. Jens Harlander***Department of Mathematics, Boise State University*

Jan 2017 – June 2017

- I studied quadratic forms and answered the following question posed in John Conway's paper *A Sensual Quadratic Form*: For any integers  $a, b, h, n$ , is there is an algorithmic way to decide whether the Diophantine equation  $ax^2 + hxy + by^2 = n$  is solvable in integers  $(x, y)$ , and to find such integers in the case when it is solvable?

**Undergraduate Research Assistant****Dr. Kris Campbell***Department of Electrical and Computer Engineering, Boise State University*

May 2015 – Oct 2015

- I conducted research on reconfigurable electronics and new electronic memory technologies. The group's main goal was to help study memristors, which are electrical components that have a memory of the last charge experienced.
- I wrote code for graphing data collected by the group and worked with others to understand what functionality was needed. I also designed the main program used for an Agilent B1500 (Semiconductor Device Parameter Analyzer) in order to test the memristor devices.

**Undergraduate Research Assistant****Dr. Henry Charlier***Department of Biochemistry, Boise State University*

May 2013 – Sept 2013

- I studied Carbonyl Reductase (CR) for the use of cancer treatment. The major emphasis of the work was to better understand how CR recognizes the molecules that it binds with and to determine if they are substrates or inhibitors. Equipped with this information, drugs may be designed to control CR in order to reduce the risk of cardiotoxicity during anthracycline cancer treatment.

**Teaching****Graduate Student Instructor***Department of Mathematics, University of Utah*

Aug 2017 – Current

- Fall 2019 – MATH 2210 Calculus 3 teaching assistant
- Summer 2019 – MATH 1080 Pre-calculus lecture course instructor
- Spring 2019 – MATH 1060 Trigonometry lecture course instructor
- Fall 2018 – MATH 1090 Business Algebra lecture course instructor
- Spring 2018 – MATH 1090 Business Algebra lecture course instructor
- Fall 2017 – MATH 2250 ODEs for Engineers lab instructor

**Mathematics ACCESS Program Instructor***University of Utah*

Summers of 2018 and 2019

- I helped plan, write course materials for, and teach the mathematics week of a summer-long ACCESS program for women interested in STEM. The program is primarily to help first generation college students transition smoothly from high school to the University of Utah.

**Other Selected Work Experience****Math Learning Center Secretary***Department of Mathematics, Boise State University*

Sept 2016 – May 2017

- During my undergraduate education, I worked at the front desk and helped students that had questions about the Math Learning Center classes. I managed the test scheduling, proctored exams, and kept documentation sorted. Furthermore, I provided a friendly and helpful environment for the community at Boise State.

**Workers' Compensation Analyst***Underwriting Services of America, LLC*

May 2016 – Sept 2016

- I assisted in creating the WorkSmart IQ plan used in the writing of workers' compensation insurance in Idaho and across the United States. I also helped with technology-based needs of the company and learned how the insurance industry use risk levels to develop rates for different types of businesses.

**Software Engineer***Zenware*

Sept 2013 – May 2015

- I wrote, tested, and worked to improve RoadFS technician scheduling software. I also implemented a website examination platform for the International Detailing Association.

**Service and Memberships**

- Ambassador for the MOSAiC Arctic expedition Sept 2019 – Oct 2020
- Association for Women in Mathematics Member (AWM) Sept 2017 – Current
  - Treasurer (2018-2019)
- Co-Created Utah Undergraduate mentoring network April 2018 – Current
  - A program which currently has ~25 pairs of mentors and mentees
  - I helped create the program and I currently co-manage the network
  - I personally have mentored 2 students
- Society for Industrial and Applied Mathematics Member (SIAM) Sept 2018 – Current
- Emergency Safety Floor Captain for University of Utah Math Department Feb 2018 – May 2019
- National Honor Society – Rocky Mountain High School Aug 2013 – May 2014
  - President (Fall 2013/ Spring 2014)
  - Vice President (Fall 2012/ Spring 2013)

**Honors and Awards**

- Association of Polar Early Career Scientists MOSAiC School Arctic Expedition Participant (1 of 20 students from around the world and 1 of only three students from the United States)
- 2019 Industrial Math/Stat Modeling Workshop for Graduate Students Participant – North Carolina State University
- Boise State University Presidential Scholarship Recipient
- Society of Women in Engineering (SWE) Scholarship Recipient
- Idaho Governor's Cup Scholarship Recipient
- United States Army Reserve National Scholar/Athlete Award
- Interscholastic Star Scholarship Finalist
- 8 Varsity Letters: 4 Golf, 3 Band, 1 National Honor Society
- Led Rocky Mountain Girls' Varsity Golf team to 2 State Championship titles
- 2-Time Idaho Junior Golf Association State Individual Champion
- National U.S. Jr. PGA Championship competitor
- European Jr. PGA Championship competitor

**Featured Skills and Certifications**

- Microsoft Office Certified – Access, Excel, Word, PowerPoint
- Advanced in Python, LaTeX, MATLAB, Git. Knowledge of Java, JavaScript, PHP, MySQL, IGOR, C++, Sage
- Knowledge of Adobe Fireworks and Flash
- SCUBA Certified Diver

**Recent Talks and Presentations Given**

- Adventures in the Arctic MOSAiC Presentation – Given 5 times so far to various audiences Nov – Dec 2019
- Seasonal Ice Mass Balance Buoy Deployment Presentation – Research Vessel Akademik Fedorov Nov 2019
- Beginning Python Introduction – Research Vessel Akademik Fedorov Nov 2019
- ACCESS Math Week – University of Utah July 2019
  - Evolution of Arctic Melt Pond Geometry and the Role of Saddle Points
- The Second SIAM Wasatch Student Chapters Conference April 2019
  - Arctic Melt Pond Geometry and Numerical Solvers for Stochastic Differential Equations
- Applied Math Colloquium – University of Utah March 2019
  - An Introduction to Numerical Simulation of Stochastic Differential Equations
- Applied Math Colloquium – University of Utah Nov 2018

- Percolation Theory, Fractal Dimension, and Applications to Melt Pond Geometry
- ACCESS Math Week – University of Utah July 2018
  - Percolation Introduction and Calculating the Fractal Dimension

#### Conferences Attended

- 2019 Industrial Math/Stat Modeling Workshop for Graduate Students – North Carolina State University July 2019
- The Second SIAM Wasatch Student Chapters Conference – Utah State April 2019
- Seminar on Stochastic Processes – University of Utah March 2019

#### Publications / Technical Reports

- Sea Ice Topography and Saddle Points of Melt Pond Surfaces (upcoming submission)
- Seasonal Ice Mass Balance Buoys
  - Chapter of MOSAiC RV Akademik Fedorov Cruise Report 2019 (submitted - pending publication)
- Coastal Imagery Analysis and Breaking Wave Type Estimation with Machine Learning
  - Chapter of SAMSI IMSM 2019 Technical Report (submitted - pending publication)

#### Selected Media Coverage

Articles with quotes from me

- E&E News article Oct 2019
  - *Eyes overboard to gauge crunching ice for data set*
- Science Magazine article Aug 2019
  - *Arctic researchers will lock this ship in ice for a year to study the changing polar region*