Nash Ward

4182 E Stevens Way NE
Seatlle, WA, 98105, USA

Nashw1@uw.edu
https://nashserver.tail138bbc.ts.net/

Education

University of Utah 08/2020 – 05/2024
Mathematics B.S., Summa Cum Laude *Salt Lake City, UT, USA*
University of Washington 09/2024 – PRESENT
Applied Mathematics PhD *Seattle, WA, USA*

Research Experience

Mathematics of sea ice 09/2020 – 07/2024
University of Utah *Salt Lake City, UT, USA*
- Explored fractal properties of the brine phase of sea ice
- Discovered dependence of fractal characteristics upon porosity within brine phase
- Created the first fractal model of the microstructure of the brine phase of sea ice

Investigation on the fractal geometry of the ice pack 01/2023 – 06/2024
Wilkes Center for Climate Science and Policy, University of Utah *Salt Lake City, UT, USA*
- Provided first rigorous verification of widespread approximations of fractal properties for marginal ice zone
- Utilized cutting edge software to experimentally test how different floe distributions and fractal structures affect surface wave propagation properties

Exploration of nitrogen bonding geometries 01/2021 – 08/2021
University of Utah *Salt Lake City, UT, USA*
- Synthesized previously undocumented nitrogen bonds in organic compounds

Neutrino detection 10/2021 – 03/2022
University of Utah *Salt Lake City, UT, USA*
- Generated code to simulate neutrino refraction through polar ice
- Developed software to identify origin of detected neutrinos

Exploration of singularity in Navier-Stokes equation 02/2021 – 07/2021
University of Utah *Salt Lake City, UT, USA*
- Mentored reading pertaining to the singularity in the Navier-Stokes equation of fluid dynamics

Topological Data Analysis (TDA) focused research group 10/2022 – 05/2023
University of Utah *Salt Lake City, UT, USA*
- An NSF funded research group looking into applications of TDA in mathematical climate research

Affects of sediment bands on iceberg deterioration and stability 05/2023 – 08/2023
Woods Hole Oceanography Institution *Woods Hole, MA, USA*
- Discovered a new mechanism through which icebergs can deteriorate and break along sediment bands using theory and laboratory experiments
- Developed and experimentally verified theory on how sediment distribution throughout a free floating iceberg can alter its stability

NSF RTG funded Arctic research expedition 05/2024
University of Utah *Utqiagvik, Alaska*
- Will be collecting sea ice samples and conducting experiments on percolation and fluid flow through the ice pack

Invited Student Researcher 07/2024
Woods Hole Oceanographic Institution *Woods Hole, MA, USA*
- Conducted water tank experiments to further understanding of iceberg breaking mechanism discovered prior year

Other Experience

Teaching Assistant 08/2021 – 01/2023
University of Utah *Salt Lake City, UT, USA*
- Math 2210, Multivariable Calculus, Fall 2021 and Fall 2022

Learning Assistant 08/2021 – 1/2023
University of Utah *Salt Lake City, UT, USA*
- Math 1210, Differential Calculus, Fall 2021
- Phys 2710, Modern Physics, Fall 2022
- Math 2270, Linear Algebra, Spring 2023

Mathematics Tutor 08/2021 – 05/2024
University of Utah *Salt Lake City, UT, USA*
- Tutored students in all undergraduate math courses through the University's math center
- Privately tutored high level math courses such as real analysis

Guest Student Summer 2023
WHOI geophysical fluid dynamics program *Woods Hole, MA, USA*
- Invited to attend graduate GFD program lectures while working on undergraduate summer fellowship

Publications

[1] N. Ward, C. Cenedese, J. McElwaine, and A. Condron, "Watching ice melt: A laboratory investigation into the effects of sediment on iceberg melt rate," *In Preparation*, 2023.

[2] N. Ward, A. Dorsky, and K. Golden, "Modelling fractal seas," *In Preparation*, 2023.

[3] N. Ward, D. Hallman, B. Murphy, J. Reimer, M. Oggier, M. O'Sadnick, E. Cherkaev, and K. Golden, "Thermal evolution of brine fractal geometry in sea ice," *In Preparation*, 2023.

Presentations

Ward, et al. (2022, September 10). *Thermal Evolution of Brine Fractal Geometry in Sea Ice* [Talk]. 2022 Wasatch SIAM Student Conference – Nash Ward, Daniel Hallman, Benjamin Murphy, Jody Reimer, Marc Oggier, Megan O'Sadnick, Elena Cherkaev and Kenneth Golden

Ward, et al. (2023, February 17). *Thermal Evolution of Brine Fractal Geometry in Sea Ice* [Talk]. 2023 Utah Conference on Undergraduate Research – Nash Ward, Daniel Hallman, Benjamin Murphy, Jody Reimer, Marc Oggier, Megan O'Sadnick, Elena Cherkaev and Kenneth Golden

Ward, et al. (2023, May 17). *Sea Ice Fractals: Measuring sea ice geometry from millimeters to kilometers* [Poster]. 2023 Annual Wilkes Climate Summit – Nash Ward, Daniel Hallman, Adam Dorsky, Benjamin Murphy, Jody Reimer, Marc Oggier, Megan O'Sadnick, Elena Cherkaev and Kenneth Golden

Ward, Condron, Cenedese; (2023, July 13). *Splitting Icebergs: How sediment affects iceberg melt* [Talk]. 2023 WHOI midsummer progress report – Nash Ward, Alan Condron and Claudia Cenedese

Ward, Cenedese, McElwaine, Condron; (2023, August 10). *SIS; A new iceberg deterioration mechanism* [Poster]. 2023 WHOI Summer Student Fellowship final presentations – Nash Ward, Claudia Cenedese, Jim McElwaine, Alan Condron

Ward; (2023, November 04). *Ice Structures* [Talk]. Applied Math RTG Workshop – Nash Ward

Ward, Cenedese, McElwaine, Condron; (2023, November 19). *Watching Ice Melt: How sediment affects iceberg melt* [Talk]. APS Division of Fluid Dynamics 2023 – Nash Ward, Claudia Cenedese, Jim McElwaine, Alan Condron

Ward, Dorsky, Hallman, Golden; (2024, January 4). *Fractal Seas; Measuring sea ice geometry from millimeters to kilometers* [Talk]. Joint Math Meeting, Pi Mu Epsilon Contributed session on Research by Undergraduates, IV – Nash Ward, Adam Dorsky, Daniel Hallman, Kenneth Golden

Ward, Cenedese, McElwaine, Condron; (2024, November 26). *Deposition patterns of ice rafted debris* [Talk]. APS Division of Fluid Dynamics 2024 – Nash Ward, Claudia Cenedese, Jim McElwaine, Alan Condron

Awards & Honors

Utah Flagship Scholarship
University of Utah — *2020 – 2024*

Crocker Science Scholar
University of Utah and Gary and Ann Crocker — *2020 – 2022*

Science Research Initiative Scholarship
University of Utah, College of Science — *2020 – 2021*

Undergraduate Mathematics Research Fellowship
University of Utah, Department of Mathematics — *2021 – 2024*

University of Utah Dean's List
University of Utah — *2020/21, 2021/22, 2022/23, 2023/24*

Junius John Hayes Endowed Scholarship
University of Utah, Department of Mathematics — *2022*

Wilkes Center for Climate Science and Policy Scholar
University of Utah — *2023*

Tom and Cathy Saxton Scholarship
University of Utah — *2023*

Summer Student Fellow
Woods Hole Oceanographic Institution — *2023*

JMM 2024 PME Speaker Award
Joint Math Meeting — *January, 2024*

J.L. Gibson Senior Award
University of Utah, Department of Mathematics — *2024*

Frederick Wan Fellowship
University of Washington, Department of Applied Mathematics — *2024 – 2027*

Grants

Wilkes Climate Grant
Wilkes Center for Climate Science and Policy — *2022-2023*

WHOI APO Travel Grant
Woods Hole Oceanography Institution — *November, 2023*

PME Travel Grant
American Mathematical Society — *January, 2024*

Specialized Skills

MATLAB: Fluent
PYTHON: Fluent
Mathematica: Fluent
LaTeX: Fluent
Adobe Suit: Proficient
Microsoft Suit: Proficient