

Nash Ward

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

Nashw1@uw.edu
Nashdoesmath.com

Education

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

Research Experience

Mathematics of sea ice <i>University of Utah</i> <ul style="list-style-type: none">• 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	09/2020 – 07/2024 <i>Salt Lake City, UT, USA</i>
Investigation on the fractal geometry of the ice pack <i>Wilkes Center for Climate Science and Policy, University of Utah</i> <ul style="list-style-type: none">• 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	01/2023 – 06/2024 <i>Salt Lake City, UT, USA</i>
Exploration of nitrogen bonding geometries <i>University of Utah</i> <ul style="list-style-type: none">• Synthesized previously undocumented nitrogen bonds in organic compounds	01/2021 – 08/2021 <i>Salt Lake City, UT, USA</i>
Neutrino detection <i>University of Utah</i> <ul style="list-style-type: none">• Generated code to simulate neutrino refraction through polar ice• Developed software to identify origin of detected neutrinos	10/2021 – 03/2022 <i>Salt Lake City, UT, USA</i>
Exploration of singularity in Navier-Stokes equation <i>University of Utah</i> <ul style="list-style-type: none">• Mentored reading pertaining to the singularity in the Navier-Stokes equation of fluid dynamics	02/2021 – 07/2021 <i>Salt Lake City, UT, USA</i>
Topological Data Analysis (TDA) focused research group <i>University of Utah</i> <ul style="list-style-type: none">• An NSF funded research group looking into applications of TDA in mathematical climate research	10/2022 – 05/2023 <i>Salt Lake City, UT, USA</i>
Affects of sediment bands on iceberg deterioration and stability <i>Woods Hole Oceanography Institution</i> <ul style="list-style-type: none">• 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	05/2023 – 08/2023 <i>Woods Hole, MA, USA</i>
NSF RTG funded Arctic research expedition <i>University of Utah</i> <ul style="list-style-type: none">• Will be collecting sea ice samples and conducting experiments on percolation and fluid flow through the ice pack	05/2024 <i>Utqiagvik, Alaska</i>
Invited Student Researcher <i>Woods Hole Oceanographic Institution</i> <ul style="list-style-type: none">• Conducted water tank experiments to further understanding of iceberg breaking mechanism discovered prior year	07/2024 <i>Woods Hole, MA, USA</i>

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. Cherkashev, 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 Cherkashev 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 Cherkashev 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 Cherkashev 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, Condrón; (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 Condrón

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

Awards & Honors

Utah Flagship Scholarship	
<i>University of Utah</i>	2020 – 2024
Crocker Science Scholar	
<i>University of Utah and Gary and Ann Crocker</i>	2020 – 2022
Science Research Initiative Scholarship	
<i>University of Utah, College of Science</i>	2020 – 2021
Undergraduate Mathematics Research Fellowship	
<i>University of Utah, Department of Mathematics</i>	2021 – 2024
University of Utah Dean's List	
<i>University of Utah</i>	2020/21, 2021/22, 2022/23, 2023/24
Junius John Hayes Endowed Scholarship	
<i>University of Utah, Department of Mathematics</i>	2022
Wilkes Center for Climate Science and Policy Scholar	
<i>University of Utah</i>	2023
Tom and Cathy Saxton Scholarship	
<i>University of Utah</i>	2023
Summer Student Fellow	
<i>Woods Hole Oceanographic Institution</i>	2023
JMM 2024 PME Speaker Award	
<i>Joint Math Meeting</i>	January, 2024
J.L. Gibson Senior Award	
<i>University of Utah, Department of Mathematics</i>	2024
Frederick Wan Fellowship	
<i>University of Washington, Department of Applied Mathematics</i>	2024 – 2027

Grants

Wilkes Climate Grant	
<i>Wilkes Center for Climate Science and Policy</i>	2022-2023
WHOI APO Travel Grant	
<i>Woods Hole Oceanography Institution</i>	November, 2023
PME Travel Grant	
<i>American Mathematical Society</i>	January, 2024

Specialized Skills

MATLAB: Fluent

PYTHON: Fluent

Mathematica: Fluent

L^AT_EX: Fluent

Adobe Suit: Proficient

Microsoft Suit: Proficient