MacKenzie E. Jewell

College of Earth, Ocean, and Atmospheric Sciences
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EDUCATION

Ph.D., expected 2025	Ocean, Earth, and Atmospheric Sciences, College of Earth, Ocean, and Atmospheric Sciences Oregon State University (Corvallis, OR)
M.Sc., March 2022	Ocean, Earth, and Atmospheric Sciences College of Earth, Ocean, and Atmospheric Sciences Oregon State University (Corvallis, OR) "*Atmospheric and Sea Ice Circulation Patterns During Lead Formation at Point Barrow*" Advisor: Dr. Jennifer K. Hutchings
B.Sc., June 2019	Physics, College of Science and Engineering Minors in Mathematics and Spanish Western Washington University (Bellingham, WA)

RESEARCH EXPERIENCE

Graduate Fellow, Oregon State University — September 2021 - present
College of Earth, Ocean, and Atmospheric Sciences
- Analyzes how Arctic weather patterns drive sea ice drift and deformation using remotely sensed data, atmospheric reanalysis, and dynamic sea ice models

Supervisor: Dr. Jennifer K. Hutchings

Graduate Research Assistant, Oregon State University — September 2019 - September 2021
College of Earth, Ocean, and Atmospheric Sciences
- Explored the internal mechanics and external forces that cause failure of the Arctic ice pack using remote sensing and atmospheric reanalyses

Supervisor: Dr. Jennifer K. Hutchings

Undergraduate Research Assistant, Western Washington University — September 2017 - June 2019
Department of Physics and Astronomy
- Developed the theoretical framework for a surface plasmon resonance biosensor utilizing guided wave plasmon polariton modes

Supervisor: Dr. Janelle Leger

Undergraduate Research Assistant, Western Washington University — Summer 2017
Department of Physics and Astronomy
- Incorporated surface plasmon – supporting structures into organic photovoltaic devices to improve absorption efficiency.

Supervisor: Dr. Janelle Leger

TEACHING EXPERIENCE

Graduate Teaching Assistant, Oregon State University — Winter 2020
ATS 341: Climate Change in the Pacific Northwest
Instructor: Dr. Andrea Allan

- Graded student assignments, as well as formative and summative assessments
- Held office hours to support student learning outcomes on material covered in lectures

Intro to Geophysical Data Analysis in Python — Spring 2023

- Developed two online introductory lessons for skills in accessing and analyzing oceanographic and hydrographic data in Python. Lessons publicly available as online resources with browser-based Python program JupyterLite.
  https://github.com/mackenziejewell/water-analysis-python-lesson/
- Co-instructed workshop on hydrographic data analysis skills using the developed Python lessons and additional Excel-based lessons for fifteen students in the Authentic Research through Collaborative Learning (ARC-Learn) program at Oregon State University.

GRANTS AWARDED

Characterizing Arctic Sea Ice Mechanics Using MODIS Imagery and Observationally-Constrained Models. PI: J.K. Hutchings, FI: **M. E. Jewell**. Future Investigators in NASA Earth and Space Science and Technology (FINESST) Program, Oregon State University. $134,880, 2021 – 2024.

Plasmonic Enhancement of Organic Solar Cells. **M. E. Jewell**. Office of Research and Sponsored Programs, Research and Creative Opportunities for Undergraduates, Western Washington University. $300, 2017 – 2018.

HONORS AND AWARDS

NSF Graduate Research Fellowship Program Honorable Mention — 2021

Provost's Distinguished Graduate Scholarship — 2019 – 2020
Oregon State University
Award of $6000

Outstanding Graduate of the Department of Physics and Astronomy — 2019
Western Washington University

Kaiser-Borsari Women in Materials Science Scholarship — 2018 – 2019
Western Washington University, Department of Materials Science
Award of $5000

Women in Science Scholarship — 2018 –2019
Western Washington University, College of Science and Engineering
Award of $1500

Western Foundation Academic Excellence Scholarship — 2018 – 2019
Western Washington University
Award of $1400

American Association of University Women – Bellingham Scholarship 2018 – 2019
Western Washington University
Award of $1500

Eric Ryan Anderson Memorial Scholarship Endowment 2017 – 2019
Western Washington University, Department of Physics
Award of $3600 over two years

President's Scholarship 2015 – 2017
Western Washington University
Award of $13000 over two years

Computer Science Department Scholarship 2015 – 2016
Western Washington University, Department of Computer Science
Award of $1000

PUBLICATIONS

3. **Jewell, M. E.**, Hutchings, J. K., & Geiger, C. A. (2023). Atmospheric highs drive asymmetric sea ice drift during lead opening from Point Barrow. The Cryosphere Discuss. [preprint] https://doi.org/10.5194/tc-2023-9, in review.

2. **Jewell, M. E**., & Hutchings, J. K. (2023). Observational perspectives on Beaufort Sea ice breakouts. Geophysical Research Letters, 50, e2022GL101408. https://doi.org/10.1029/2022GL101408

1. **Jewell**, **M. E.,** Brunner, M., & Hutchings, J. K. (2020). Tracking Ice: Arctic Sea Ice and Mathematics Curriculum. K-12 Curriculum, Science and Math Investigative Learning Experiences, Oregon State University, *non-peer-reviewed.* https://smile.oregonstate.edu/lesson/tracking-ice-arctic-sea-ice-and-mathematics-curriculum

PRESENTATIONS

Oral Presentations

7. Atmospheric drivers of winter lead opening in the Beaufort Sea and impacts on large-scale patterns of sea ice transport, IGS Symposium on Sea Ice Across Spatial and Temporal Scales, Bremerhaven, Germany. June 2023.

6. MODIS Detection of Sea Ice Fracturing Events and Associated Atmospheric and Sea Ice Circulation, 17th Conference on Polar Meteorology and Oceanography, Collective Madison Meeting, Madison, WI. August 2022.

5. Detection of recurrent lead formation mechanisms at Point Barrow with MODIS imagery, American Geophysical Union Fall Meeting, New Orleans, LA (*virtual*). December 2021.

4. Tracking Ice: Arctic Sea Ice and Mathematics Curriculum: Part II. SMILE Workshop, Oregon State University, OR. January 2020.

3. Encouraging K-12 Math Interest through Sea Ice Dynamics. American Geophysical Union Fall Meeting, San Francisco, CA. December 2019.

2. Tracking Ice: Arctic Sea Ice and Mathematics Curriculum: Part I. SMILE Workshop, Oregon State University, OR. July 2019.

1. Dispersion Properties of Damped Surface Plasmon Polariton Modes. Physics and Astronomy Undergraduate Research Conference, Western Washington University, Bellingham, WA. May 2019.

Poster Presentations

4. Using Buoy Drift to Spark K-12 Math Interest. 2nd MOSAiC Science Conference, Boulder, CO. February 2023.

3. Investigation of Surface Plasmon Resonance Biosensor Sensitivity Using Kretschmann ATR Theory. **Poster award.** APS Northwest Section Meeting, Bellingham, WA. May 2019.

2. Experimental and Theoretical Approach Towards an SPR Biosensor Based on Guided-Wave Plasmon Polariton Modes. **Poster award.** APS Northwest Section Meeting, Tacoma, WA. May 2018.

1. Excitation and Detection of Guided-Wave Plasmon Polariton Modes in High Index Dielectric MIM Structures using Kretschmann ATR. **Poster award.** Scholars Week, Western Washington University, Bellingham, WA. May 2018.

RESEARCH SKILLS

Programming and Software:
Python, Matlab, Mathematica, C++, Fortran, GitHub, ESRI ArcGIS, VirtualBox virtual machine, macOS terminal, LabView, accessing remote desktops and servers, web development tools including HTML and CSS, LaTeX typesetting, Microsoft Office Products, Google Forms

Field and Laboratory Experience
- Oceanic sediment core collection using vibracoring sampling
- Handling and splitting sediment cores
- Glove box sample handling and preparation
- Thin film device fabrication techniques, including sputter deposition and thermal evaporation.
- Methods for characterizing thin film properties, including attenuated total reflection (ATR), x-ray reflectivity (XRR), atomic force microscopy (AFM), and scanning electron microscopy (SEM)

GRE

General	V / Q / W: 162/164/5	2018

PROFESSIONAL MEMBERSHIPS

Student Member of the International Glaciological Society	2023 – present
Student Member of the American Meteorological Society	2022 – present

Student Member of the American Geophysical Union 2019 – present
Student Member of the American Physical Society 2017 – 2019

ORGANIZATIONS AND COMMITTEES

Oregon State Student Chapter of the American Meteorological Society Fall 2022 - present
Student Chapter Secretary
Oregon State University

CEOAS Promotion & Tenure Graduate Student Evaluation Committee Fall 2022
Oregon State University

Atmospheric Sciences Discipline Representative 2020 – 2021
CEOAS Association of Graduate Students
Oregon State University

Co-President and Founding Member of Materials Science Club 2018 – 2019
Western Washington University

Vice President of Women in Physics Club 2018 – 2019
Western Washington University

PROFESSIONAL DEVELOPMENT

Inclusive Mentorship Training 2023
Authentic Research through Collaborative Learning (ARC-Learn) Program
Oregon State University
(6 hr, participant)

Social Justice Education Initiative Tier One Training 2020
Oregon State University
(5 hr, participant)

OUTREACH AND MENTORSHIP

ARC-Learn Inclusive Mentorship Fellow Fall 2022 - present
- Mentoring six undergraduate students from underrepresented groups in polar science in the ARC-Learn program over 20 months.
- Lead weekly meetings to advise students in independent polar scientific research projects using evidence-based inclusive mentoring methods.

Oregon State University Ocean Science Event Volunteer February 2023

CEOAS Graduate-Undergraduate Inclusive Development Experience Mentor Winter 2023
- Held monthly meetings with an undergraduate student to discuss methods for academic success and support them in exploring career pathways.

OSU Discovery Days November 2022

- Led hands-on learning activities for K-6 students from Oregon schools and homeschooling families in an interactive exhibit demonstrating how scientists use geologic and biologic records as proxies to reconstruct past climate.

CEOAS Academic Mentoring Program Mentor Winter 2020