

# Mackenzie Jewell

College of Earth, Ocean, and Atmospheric Sciences  
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## EDUCATION

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<b>Ph.D. Ocean, Earth, and Atmospheric Sciences</b> Oregon State University (Corvallis, OR) <i>Thesis Advisor:</i> Dr. Jennifer K. Hutchings	<b>Expected Spring 2025</b>
<b>M.Sc. Ocean, Earth, and Atmospheric Sciences</b> Oregon State University (Corvallis, OR) <i>Thesis title:</i> "Atmospheric and Sea Ice Circulation Patterns During Lead Formation at Point Barrow" <i>Thesis Advisor:</i> Dr. Jennifer K. Hutchings	<b>March 2022</b>
<b>B.Sc. Physics</b> Western Washington University (Bellingham, WA) Minors in Mathematics and Spanish	<b>June 2019</b>

## RESEARCH EXPERIENCE

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<b>Graduate Fellow, Oregon State University</b> College of Earth, Ocean, and Atmospheric Sciences <i>Advisor:</i> Dr. Jennifer K. Hutchings <ul style="list-style-type: none"><li>Analyzes how Arctic weather patterns drive sea ice drift and deformation using remotely sensed data, atmospheric reanalysis, and dynamic sea ice models</li></ul>	<b>Sep 2021 - present</b>
<b>Graduate Research Assistant, Oregon State University</b> College of Earth, Ocean, and Atmospheric Sciences <i>Advisor:</i> Dr. Jennifer K. Hutchings <ul style="list-style-type: none"><li>Explored the internal mechanics and external forces that cause failure of the Arctic ice pack using remote sensing and atmospheric reanalyses</li></ul>	<b>Sept 2019 - Sept 2021</b>
<b>Undergraduate Research Assistant, Western Washington University</b> Department of Physics and Astronomy <i>Advisor:</i> Dr. Janelle Leger <ul style="list-style-type: none"><li>Developed the theoretical framework for a surface plasmon resonance biosensor utilizing guided wave plasmon polariton modes</li></ul>	<b>Sept 2017 - June 2019</b>
<b>Undergraduate Research Assistant, Western Washington University</b> Department of Physics and Astronomy <i>Advisor:</i> Dr. Janelle Leger <ul style="list-style-type: none"><li>Incorporated surface plasmon – supporting structures into organic photovoltaic devices to improve absorption efficiency.</li></ul>	<b>Summer 2017</b>

## RESEARCH GRANTS

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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

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2024 Wayne V. Burt Award <i>Oregon State University, College of Earth, Ocean, and Atmospheric Sciences</i> <ul style="list-style-type: none"><li>In recognition of outstanding achievement in physical oceanography or atmospheric sciences Award of \$500</li></ul>	<b>2024</b>
CEOAS Outreach Accomplishment Award <i>Oregon State University, CEOAS</i> <ul style="list-style-type: none"><li>In recognition of significant contribution toward CEOAS outreach goals through the creation of Build-a-Cloud educational activity and original artwork on the handout</li></ul>	<b>2023</b>
NSF Graduate Research Fellowship Program Honorable Mention	<b>2021</b>
Provost's Distinguished Graduate Scholarship <i>Oregon State University</i> Award of \$6000	<b>2019 – 2020</b>
Outstanding Graduate of the Department of Physics and Astronomy <i>Western Washington University</i>	<b>2019</b>
Kaiser-Borsari Women in Materials Science Scholarship <i>Western Washington University, Department of Materials Science</i> Award of \$5000	<b>2018 – 2019</b>
Women in Science Scholarship <i>Western Washington University, College of Science and Engineering</i> Award of \$1500	<b>2018 – 2019</b>
Western Foundation Academic Excellence Scholarship <i>Western Washington University</i> Award of \$1400	<b>2018 – 2019</b>
American Association of University Women – Bellingham Scholarship <i>Western Washington University</i> Award of \$1500	<b>2018 – 2019</b>
Eric Ryan Anderson Memorial Scholarship Endowment <i>Western Washington University, Department of Physics</i> Award of \$3600 over two years	<b>2017 – 2019</b>

## HONORS AND AWARDS CONTINUED

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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

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1. **Jewell, M.**, Hutchings, J., & Bliss, A. (2024). Spring 2021 sea ice transport in the southern Beaufort Sea occurred during coastal ice opening events. *The Cryosphere*, *preprint April 2024*, *egusphere-2024-1097*
2. **Jewell, M.**, Hutchings, J., & Geiger, C. (2023). Atmospheric highs drive asymmetric sea ice drift during lead opening from Point Barrow. *The Cryosphere*, 17, 3229-3250.  
<https://doi.org/10.5194/tc-17-3229-2023>
3. **Jewell, M.**, & Hutchings, J. (2023). Observational perspectives on Beaufort Sea ice breakouts. *Geophysical Research Letters*, 50, e2022GL101408. <https://doi.org/10.1029/2022GL101408>

## PRESENTATIONS

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### *Oral Presentations*

1. **Jewell, M.** and Hutchings, J. "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.
2. **Jewell, M.**, Hutchings, J., Erlingsson, B., and Geiger, C. "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.
3. **Jewell, M.**, Hutchings, J., Geiger, C., and Erlingsson, B. "Detection of recurrent lead formation mechanisms at Point Barrow with MODIS imagery," American Geophysical Union Fall Meeting, New Orleans, LA (*virtual*). December 2021.
4. **Jewell, M.**, Hutchings, J., Brunner, M., and Well, J. "Tracking Ice: Arctic Sea Ice and Mathematics Curriculum: Part II," SMILE Workshop, Oregon State University, OR. January 2020.
5. **Jewell, M.**, Hutchings, J., and Well, J. "Encouraging K-12 Math Interest through Sea Ice Dynamics," American Geophysical Union Fall Meeting, San Francisco, CA. December 2019.
6. **Jewell, M.**, Hutchings, J., Brunner, M., and Well, J. "Tracking Ice: Arctic Sea Ice and Mathematics Curriculum: Part I," SMILE Workshop, Oregon State University, OR. July 2019.

## PRESENTATIONS CONTINUED

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7. **Jewell, M.**, Clark, S., Beale, V., Langevin, K., Johnson, B., and Leger, J. "Dispersion Properties of Damped Surface Plasmon Polariton Modes," Physics and Astronomy Undergraduate Research Conference, Western Washington University, Bellingham, WA. May 2019.

### **Poster Presentations**

1. **Jewell, M.**, Hutchings, J., Rigor, I., and Watkins, D. "Using Buoy Drift to Spark K-12 Math Interest," 2nd MOSAiC Science Conference, Boulder, CO. February 2023.
2. **Jewell, M.**, Clark, S., Beale, V., Langevin, K., Johnson, B., and Leger, J. "Investigation of Surface Plasmon Resonance Biosensor Sensitivity Using Kretschmann ATR Theory," APS Northwest Section Meeting, Bellingham, WA. May 2019. **Poster award.**
3. Clark, S., **Jewell, M.**, Beale, V., Johnson, B., and Leger, J. "Experimental and Theoretical Approach Towards an SPR Biosensor Based on Guided-Wave Plasmon Polariton Modes," APS Northwest Section Meeting, Tacoma, WA. May 2018. **Poster award.**
4. **Jewell, M.**, Clark, S., Beale, V., Johnson, B., and Leger, J. "Excitation and Detection of Guided-Wave Plasmon Polariton Modes in High Index Dielectric MIM Structures using Kretschmann ATR," Scholars Week, Western Washington University, Bellingham, WA. May 2018. **Poster award.**

## TEACHING AND MENTORING EXPERIENCE

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### **Graduate Mentor, Oregon State University** **Summer 2024**

- Mentored Noel Wang, undergraduate summer research intern from Carleton College
- Designed their research project and trained them in methods of geophysical data analysis
- Guided them in presenting findings, and co-authored presentation for a national conference

### **ARC-Learn Inclusive Mentorship Fellow, Oregon State University** **Fall 2022 - Spring 2024**

- Mentored undergraduates from underrepresented groups in polar science
- Established and maintained relationships with 16 students over 20 months
- Led three weekly meetings to directly advised 5 students in independent research projects
- Employed evidence-based inclusive mentoring practices from Inclusive Mentorship Training

### **Graduate Teaching Assistant, Oregon State University** **Winter 2024**

ATS 420/520: Climate Physics

*Instructor: Dr. Justin Wettstein*

- Instructed weekly recitations for 20 graduate and undergraduate students
- Graded student assignments and exams

### **Undergraduate Python Workshop Co-Lead, Oregon State University** **Spring 2023**

- Developed two open access introductory lessons for analyzing geophysical data in Python
- Disseminated lessons online, guiding access to public data and browser-based Python practice <https://github.com/mackenziejewell/water-analysis-python-lesson/>
- Co-instructed workshop for 16 undergraduate students in the Authentic Research through Collaborative Learning (ARC-Learn) program

## TEACHING AND MENTORING EXPERIENCE CONTINUED

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**CEOAS Graduate-Undergraduate Inclusive Development Experience Mentor** Winter 2023

- Held monthly meetings with an undergraduate student in oceanography
- Shared methods for academic success and explored career pathways

**Co-creator of K-12 Polar Science and Math Curriculum** Winter 2020

- Developed open access K-12 lesson “Tracking Ice: Arctic Sea Ice and Mathematics Curriculum
- Collaborated with Drs. Megan Brunner and Jenny Hutchings and the OSU SMILE program
- Featured in educational resources for the international MOSAiC Expedition  
<https://smile.oregonstate.edu/lesson/tracking-ice-arctic-sea-ice-and-mathematics-curriculum>

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

- Graded student assignments, formative and summative assessments
- Held office hours to support student learning outcomes on course content

**CEOAS Academic Mentoring Program Mentor** Winter 2020

## RESEARCH SKILLS

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### *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
- 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)

## PROFESSIONAL MEMBERSHIPS

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Student Member of the International Glaciological Society	<b>2023–present</b>
Student Member of the American Meteorological Society	<b>2022–present</b>
Student Member of the American Geophysical Union	<b>2019–present</b>
Student Member of the American Physical Society	<b>2017 – 2019</b>

## ORGANIZATIONS AND COMMITTEES

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Oregon State Student Chapter of the American Meteorological Society Student Chapter Secretary <i>Oregon State University</i>	<b>Fall 2022 – Spring 2024</b>
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Atmospheric Sciences Discipline Representative CEOAS Association of Graduate Students <i>Oregon State University</i>	<b>2020 – 2021</b>
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## ORGANIZATIONS AND COMMITTEES CONTINUED

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

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

## PROFESSIONAL DEVELOPMENT

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Inclusive Mentorship Training  
Authentic Research through Collaborative Learning (ARC-Learn) Program  
*Oregon State University*  
(10 hr, participant) **2023 - 2024**

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

## SERVICE AND OUTREACH

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**Ad Hoc Reviewer** **2023 - 2024**  
*Geophysical Research Letters*

**CEOAS Community Outreach Activity on Weather** **Summer 2023**

- Developed hands-on K-12 tabling activity about cloud formation
- Created water cycle infographic with original artwork

**Interview with CEOAS Strata Magazine** **Spring 2023**

- Interviewed for “Women in Polar Science: Navigating the Ice Maze”
- Discussed expanding opportunities and the changing culture of polar science

**Oregon State University Ocean Science Event Volunteer** **February 2023**

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

**OSU Discovery Days Volunteer** **Nov. 2022**

- Led hands-on learning activities for K-6 school and home-schooled students
- Let interactive exhibit demonstrating use of proxies to reconstruct past climate