

**ELLYN M. ENDERLIN, PhD**

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**EDUCATION**

**The Ohio State University**

Columbus, OH

**Ph.D. Earth Sciences**

August 2013

Advisor: Dr. Ian Howat

Dissertation: Observations and modeling of Greenland outlet glacier dynamics

**The Ohio State University**

Columbus, OH

**M.S. Geological Sciences**

March 2010

Advisor: Dr. Ian Howat

Thesis: Controls on west Greenland outlet glacier sensitivity to climate forcing

**Lehigh University**

Bethlehem, PA

**B.S. Environmental Science**

January 2008

Advisor: Dr. Joan Ramage Macdonald

Honors Thesis: Landsat TM and ETM+ derived snowline altitudes in the Cordillera Huayhuash and Cordillera Raura, Peru, 1986-2005

**AT A GLANCE**

- Research Assistant Professor at the University of Maine
- Studies marine-terminating glacier dynamics and ice-ocean interactions using a suite of remotely sensed data, in situ observations, and numerical ice flow models
- 19 peer-reviewed publications (10 as first-author) & 2 publications in review
- Grants awarded as PI: 3 NASA grants totaling \$646,233 & 2 NSF grants totaling \$539,505
- Grants awarded as Co-PI: 1 NSF grant totaling \$159,670 & 1 NSF/NASA grant for a polar science communication workshop
- Experience teaching Glaciology, Geomorphology, and introductory Earth Science
- Actively involved in mentoring and outreach activities:
  - research (co-)advisor for 4 graduate students & several undergraduate students
  - Early-career representative: American Geophysical Union Cryosphere Section
  - Secondary school guest speaker: annual presentations on glaciers, climate change, and/or remote sensing with local area schools

## RESEARCH INTERESTS

- Understanding variability in the response of glaciers to climate change
- Ice-ocean interactions & how changes in the interactions can trigger glacier change
- Glacier crevassing & implications for dynamic change
- Predicting glacier behavior using numerical ice flow modeling & remote sensing techniques
- Relative influence of internal and external controls of tidewater glacier behavior

## GRANTS

### Awarded

- PI: NASA Earth and Space Sciences Fellowship (2010-2013), *Observations and modeling of Greenland outlet glacier dynamics*, \$90,000, 3 years, Co-PI: Ian Howat (OSU/BPRC)
- PI: NASA ROSES Cryospheric Science (4/23/14-10/31/17), *Intra-annual Force Balance Analysis of Tidewater Glaciers*, \$259,654, 3 years, Co-PI: Shad O'Neel (USGS)
- PI: NSF Arctic Research Opportunities (8/15/14 – 7/31/17), *Quantifying Greenland Iceberg Melt Rates using Remotely-sensed Data*, \$172,372, 3 years
- PI: US Army Corps of Engineers (9/30/16-2/28/17), *Glaciological Analysis of Greenland Ice Sheet in Support of Defense POW/MIA Accounting Agency (DPAA)*, \$25,000, 1 year
- PI: NSF Antarctic Research (6/1/17-5/31/20), *Antarctic Submarine Melt Variability from Remote Sensing of Icebergs*, \$367,133, 3-years
- Co-PI: NSF & NASA (4/1/17-3/31/18), *Workshop on Communicating Science for Early Career Polar Scientists*, \$99,474, 2 years, PI: Mahsa Moussavi (UColorado)
- Co-PI: NSF Arctic Natural Sciences (9/1/17 - 8/31/2020), *Collaborative Research: What controls calving? A Greenland-wide test of terminus change mechanisms*, \$159,670, 3 years, Co-PI: Tim Bartholomaus (UIdaho)
- PI: NASA ROSES Cryospheric Science (6/1/18 - 5/31/21), *Quantification and Analysis of Greenland Glacier and Ice Cap Discharge using Automated Landsat Terminus Change Time Series and NASA Data Products*, \$296,579, 3 years, Co-I: Andre Khalil (UMaine)

### In Preparation

- PI: NSF Arctic Natural Sciences (9/1/19 - 8/31/22), *Collaborative Research: Greenland Seasonal Ice Discharge, Freshwater Flux Distribution, and Impacts on Ocean Circulation*, \$408,135, 3 years, Co-PIs: Twila Moon (NSIDC) and Patrick Heimbach (UTexas-Austin)

**PUBLICATIONS (\*née E. M. McFadden)**

- Scheick, J., **E. M. Enderlin**, & G. Hamilton, in review. Automated iceberg detection using Landsat: method and example application in Disko Bay, west Greenland. *The Cryosphere*.
- Ran, J., M. Vizcaino, P. Ditmar, M. R. van den Broeke, T. Moon, C. Steger, **E. M. Enderlin**, B. Wouters, B. Noël, C. Reijmer, R. Klees, & M. Zhong, in review. Seasonal mass variations show timing and magnitude of meltwater storage in the Greenland ice sheet. *The Cryosphere*.
- Enderlin, E. M.**, S. O’Neel, T. Bartholomäus, & I. Joughin, in review. Evolving environmental and geometric controls on Columbia Glacier’s continued retreat. *J. Geophys. Res.: Earth Surface*.
- Bamber, J., A. Tedstone, M. King, I. Howat, M. van den Broeke, B. Noël, and **E. Enderlin**, 2018. Land ice freshwater budget of the Arctic and North Atlantic Oceans: 1. Data, methods and results. *J. Geophys. Res.: Oceans, The Arctic: An AGU Joint Special Collection*, 123, 1827-1837, doi:10.1002/2017JC013605.
- Kochtitzky, W. H., B. R. Edwards, **E. M. Enderlin**, J. Marino, & N. Marinque, 2018. Improved estimates of glacier change rates at the Nevado Coropuna Ice Cap, Peru. *J. Glaciol.*, 64(244), 175-184, doi:10.1017/jog.2018.2.
- Enderlin, E. M.**, C. J. Carrigan, W. H. Kochtitzky, A. Cuadros, T. Moon, & G. S. Hamilton, 2018. Greenland iceberg melt variability from high-resolution satellite observations. *Cryosphere*, 12, 565-575, doi:10.5194/tc-12-565-2018.
- Sulak, D. J., D. A. Sutherland, **E. M. Enderlin**, L. A. Stearns, & G. S. Hamilton, 2017. Iceberg properties and distributions in three Greenlandic fjords using satellite imagery. *Ann. Glaciol.*, 58(74), 92-106, doi:10.1017/aog.2017.5.
- Talpe, M. J., R. S. Nerem, E. Forootan, M. Schmidt, F. G. Lemoine, **E. M. Enderlin**, & F. W. Landerer, 2017. Ice mass change in Greenland and Antarctica between 1993 and 2013 from satellite gravity measurements. *J. Geod.*, 91(11), 1283-1298, doi:10.1007/s00190-017-1025-y.
- Enderlin, E. M.**, G. S. Hamilton, S. O’Neel, T. Bartholomäus, M. Morlighem, & J. W. Holt, 2016. An empirical approach for estimating stress-coupling lengths for marine-terminating glaciers. *Frontiers in Cryo. Sci.*, 4(104), doi:10.3389/feart.2016.00104.
- Enderlin, E. M.**, G. S. Hamilton, F. Straneo, & D. A. Sutherland, 2016. Iceberg meltwater fluxes dominate the freshwater budget in Greenland’s glacial fjords. *Geophys. Res. Lett.*, 43, 11287-11294, doi:10.1002/2016GL070718.
- Van den Broeke, M., **E. M. Enderlin**, I. Howat, P. K. Munneke, B. Noël, W. van de Berg, E. van Meijgaard, & B. Wouters, 2016. On the recent contribution of the Greenland ice sheet to sea level change. *Cryosphere Special Issue: Mass balance of the Greenland Ice Sheet*, 10, 1-14, doi:10.5194/tc-10-1-2016.

- Xu, Z., E. Schrama, W. van de Wal, M. van den Broeke, & **E. M. Enderlin**, 2016. Improved GRACE regional mass balance estimates of the Greenland Ice Sheet cross-validated with the input-output method. *Cryosphere*, 10, 895-912, doi: 10.5194/tc-10-895-2016.
- Lenaerts, J. T. M., D. Le Bars, L. van Kampenhout, M. Vizcaino, **E. M. Enderlin**, & M. R. van den Broeke, 2015. Representing Greenland ice sheet freshwater fluxes in climate models. *Geophys. Res. Lett.*, 42, doi:10.1002/2015GL064738.
- Enderlin, E. M.** & G. S. Hamilton, 2014. Estimates of iceberg submarine melting from high-resolution digital elevation models: Applications to Sermilik Fjord, East Greenland. *J. Glaciol.*, 60(224), doi:10.3189/2014JoG14J085.
- Enderlin, E. M.**, I. M. Howat, S. Jeong, M.-J., Noh, J. H. van Angelen, & M. R. van den Broeke, 2014. An improved mass budget for the Greenland ice sheet. *Geophys. Res. Lett.*, 41, 866-872, doi: 10.1002/2013GL059010.
- Enderlin, E. M.**, I. M. Howat, & A. Vieli, 2013. The sensitivity of tidewater glacier flowline models to parameter uncertainty. *Cryosphere*, 7, 1579-1590, doi:10.5194/tc-7-1579-2013.
- Enderlin, E.M.**, I.M. Howat, & A. Vieli, 2013. High sensitivity of tidewater glacier dynamics to shape. *Cryosphere*, 7, 1007-1015, doi:10.5194/tc-7-1007-2013.
- Enderlin, E. M.** & I. M. Howat, 2013. Submarine Melt Rate Estimates for Floating Termini of Greenland Outlet Glaciers (2000-2010). *J. Glaciol.*, 59(213), 67-75, doi:10.3189/2013JoG12J049.
- Walsh, K. M., I. M. Howat, Y. Ahn, & **E. M. Enderlin**, 2012. Changes in the marine-terminating glaciers of central east Greenland, 2000-2010. *Cryosphere*, 6, 211-220, doi:10.5194/tc-6-211-2012.
- \***McFadden, E. M.**, I. M. Howat, I. Joughin, B. E. Smith, & Y. Ahn, 2011. Changes in the dynamics of marine-terminating outlet glaciers in west Greenland (2000-2009). *J. Geophys. Res.*, 116(F2), F02022, doi:10.1029/2010JF001757.
- \***McFadden, E. M.**, J. Ramage, & D. T. Rodbell, 2011. Landsat TM and ETM+ derived snowline altitudes in the Cordillera Huayhuash and Cordillera Raura, Peru, 1986-2005. *Cryosphere*, 5, 419-430, doi:10.5194/tc-5-419-2011.
- Howat, I. M., J. E. Box, Y. Ahn, A. Herrington, & \***E. M. McFadden**, 2010. Seasonal variability in the dynamics of marine-terminating outlet glaciers in Greenland. *J. Glaciol.*, 56(198), 601-613.

## RESEARCH EXPERIENCE

**University of Maine**

Orono, ME

**Research Assistant Professor**

November 2014 – present

- Compiling observations of glacier thickness, velocity, and terminus position for ~20 marine-terminating outlet glaciers across Greenland and using the observations to validate the calving parameterizations that are used by numerical ice flow models to drive glacier change
- Constructing time series of ice shelf and iceberg melt around Antarctica to quantify iceberg freshwater fluxes and assess whether variations in iceberg melt rates can be used to infer changes in ocean forcing and/or submarine melting of ice shelves
- Supervising graduate research projects that investigate:
  - the use of mapped icebergs to infer changes in glacier discharge and spatial variations in fjord bathymetry
  - if changes in snow accumulation influence the timing of glacier surges
  - buried crevasse detection using satellite remote sensing datasets and ground-penetrating radar
- Developed an empirical approach to estimate the distance over which stresses are longitudinally transferred within glaciers to ensure that glacier force balance estimates are computed at the appropriate spatial scales
- Constructed glacier force balance time series from high-resolution digital elevation models (DEMs) and synthetic aperture radar (SAR)-derived surface flow speeds to examine controls of short-term variations in glacier dynamics at Columbia Glacier in Alaska
- Compared force balance, terminus position, and air temperature time series for Columbia Glacier to assess the relative importance of seasonal terminus retreat and meltwater-driven changes in subglacial hydrology on ice discharge from retreating tidewater glaciers
- Developed a novel method to extract iceberg size distributions and estimate iceberg freshwater fluxes in glacial fjords using high-resolution digital elevation models
- Estimated iceberg freshwater fluxes and size distributions for icebergs calved from two of Greenland's largest glaciers in collaboration with oceanographer colleagues at Woods Hole Oceanographic Institution and the University of Oregon
- Constructed time series of area-averaged iceberg melt rates for ~7 of Greenland's large glacial fjords using high-resolution DEMs and compared melt rate patterns to ocean temperature observations
- Constructed high-resolution DEMs of the Koge Bugt region, SE Greenland, and analyzed the DEMs and surface velocity data to assist with repatriation of WWII military remains
- Generated high-resolution DEMs and assisted with analysis of ice shelf stability in the McMurdo Shear Zone, West Antarctica

**University of Maine**

Orono, ME

**Postdoctoral Research Associate**

August 2013 – October 2014

- Developed a remote sensing method to estimate iceberg submarine freshwater fluxes and area-averaged melt rates using high-resolution DEMs
- Compared remote sensing-derived iceberg melt estimates for Sermilik Fjord, East Greenland and Ilulissat Fjord, West Greenland to assess the controls of iceberg melting
- Constructed high-resolution DEMs for Columbia Glacier, Alaska and Helheim Glacier, East Greenland for use in a comparative force balance analysis

**The Ohio State University**

Columbus, OH

**NASA Earth and Space Science Fellow**

September 2010 - August 2013

- Used satellite-derived digital elevation models and surface speeds to construct annual grounding line discharge time series for 178 tidewater glaciers in Greenland for 2000-2012
- Quantified Greenland ice sheet mass loss using glacier discharge and surface mass balance time series and the assessed the changes in mass loss partitioning since 2000
- Estimated average melt season submarine melt rates beneath the floating termini of 13 tidewater glaciers in Greenland to quantify mass loss from submarine melting
- Developed a one-dimensional numerical ice flow (i.e., flowline) model for analysis of tidewater glacier behavior: the Matlab model code is free to download from my website with a user guide describing model details and recommended sensitivity tests
- Assessed the influence of fjord geometry on glacier behavior in response to an environmental perturbation using a flowline model
- Investigated glacier sensitivity to variations in effective viscosity using a numerical ice flow model to improve the validity of prognostic models of glacier dynamics

**The Ohio State University**

Columbus, OH

**Graduate Research Assistant**

June 2008 - September 2010

- Analyzed changes in terminus positions and surface elevations for 59 tidewater outlet glaciers in west Greenland using satellite imagery obtained from 2000-2009
- Examined West Greenland tidewater glacier terminus position, speed, and elevation changes from 2000-2009 to determine the magnitude and timing of changes in glacier dynamics
- Compared West Greenland glacier behavior, air temperature, and ocean temperature records from 2000-2009 to assess the influence of climate forcing on glacier behavior
- Assisted a Masters student with analyzing terminus positions, surface elevations, and speeds for tidewater glaciers in east Greenland

**Lehigh University**

Bethlehem, PA

**Undergraduate Research Assistant**

June 2005 - May 2008

- Quantified modern snowline elevation change in the Cordillera Huayhuash and Cordillera Raura, Peru using satellite imagery from the mid-1980s to early 2000s and used snowline change to infer regional atmospheric warming

**FIELD EXPERIENCE**

**McMurdo Shear Zone, Antarctica**

October 2014

**PI: Dr. Gordon Hamilton (UMaine)**

- Installed and repeatedly surveyed a stake network with high-precision GPS units in order to construct strain rate grids for stability analysis of the McMurdo Shear Zone

**Helheim Glacier-Sermilik Fjord, Greenland**

July 2014

**PI: Dr. Gordon Hamilton (UMaine)**

- Deployed and retrieved high-precision GPS units on the highly-crevassed Helheim Glacier terminus with Gordon Hamilton (UMaine) and an undergraduate assistant via helicopter to provide precisely-located reference points for scanning lidar observations of ice motion
- Conducted expendable conductivity, temperature, and depth (XCTD) surveys in open-ocean leads in the Sermilik Fjord ice mélange via helicopter for oceanographer colleagues
- Worked with helicopter pilots to select icebergs for ‘iceberg tracker’ GPS unit deployment for physical oceanographer collaborator Dave Sutherland (UOregon)
- Installed an automated weather station near the Helheim terminus with colleagues from the US Army Cold Regions Research and Engineering Laboratory

**Jokulsarlon Lagoon, Iceland**

April 2012

**PI: Dr. Ian Howat (OSU)**

- Supervised field program preparation and provided logistical support for a Masters student in the OSU Glaciology group
- Collected conductivity, temperature, and depth (CTD) surveys in Jokulsarlon lagoon (adjacent to Breiðamerkurjökull Glacier) for estimates of glacier submarine melting
- Serviced a tide gauge & added a wind turbine to a time-lapse camera unit positioned in close proximity to the actively calving portion of the Breiðamerkurjökull terminus

**Russell Glacier and Jakobshavn Isbræ, Greenland**

July 2010

**Co-I: Dr. Ian Howat (OSU), Dr. Paul Morin (University of Minnesota)**

- Collected high-precision on- and off-ice static GPS points with colleagues from the U. Minnesota Polar Geospatial Center and post-processed data for DEM coregistration
- Assessed safety conditions while collecting GPS data on a highly-crevassed glacier terminus

**Breiðamerkurjökull Glacier, Iceland**

March 2008, June 2008, April 2009

**PI: Dr. Ian Howat (OSU)**

- Installed & serviced 12 high-precision GPS stations on the glacier terminus and an off-ice GPS base station used for surface velocity and strain rate calculations during the melt season
- Assisted in the acquisition of ice-penetrating radar observations used to estimate ice thickness and ice-bed interface properties within the GPS grid

**Quelccaya Ice Cap and Hualcan Glacier, Peru**

June 2008

**PI: Dr. Lonnie Thompson (OSU)**

- Collected paleo plant samples that emerged from the retreating Quelccaya Ice Cap, which provided a minimum date for the last period of reduced ice extent
- Assisted in snowpit sampling and shallow ice core collection on Hualcan Glacier

**Cordillera Huayhuash, Peru**

June 2005

**PI: Dr. Joan Ramage Macdonald (Lehigh)**

- Collected quartzite samples for cosmogenic isotope analysis for constraining regional Last Glacial Maximum deglaciation dates

**ABSTRACTS (\*née E. M. McFadden)**

**Talks**

**Enderlin, E. M.**, G. S. Hamilton, S. O'Neel, & T. Bartholomaeus, 2016. The Continued Demise of Columbia Glacier: Insights On Dynamic Change. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C12B-03.

**Enderlin, E. M.** (invited), 2016. Remote sensing of Arctic Calving Glaciers. *IASC Workshop on the Importance of Calving for the Mass Budget of Arctic Glaciers*.

**Enderlin, E. M.** (invited), 2016. Investigating Variations in Glacier Sensitivity to Climate Change Using Remotely-Sensed Data. *Department of Earth and Environmental Sciences, Michigan State University*.

**Enderlin, E. M.**, G. S. Hamilton, & F. Straneo, 2016. Large Freshwater Fluxes from Melting Ice Mélange in Greenland Glacial Fjords. *International Symposium on Interactions of Ice Sheets and Glaciers with the Ocean, Int. Glac. Soc.* Abstract 74A2009.

**Enderlin, E. M.**, G. S. Hamilton, & F. Straneo, 2015. Submarine Melting of Icebergs in Sermilik Fjord, Southeast Greenland, Based on Satellite Remote Sensing and Hydrographic Observations. *International Symposium on Contemporary Ice-Sheet Dynamics, Int. Glac. Soc.* Abstract 73A1878.

**Enderlin, E. M.**, G. S. Hamilton, F. Straneo, & C. Cenedese, 2014. Submarine Melting of Icebergs from Repeat High-Resolution Digital Elevation Models. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C32B-03.



- Enderlin, E. M.**, I. M. Howat, M.-J. Noh, M. R. van den Broeke, & J. van Angelen, 2014. An Improved Mass Budget for the Greenland Ice Sheet. *IASC Workshop on the Dynamics and Mass Budget of Arctic Glaciers & Network on Arctic Glaciology Annual Meeting*.
- Enderlin, E. M.**, I. M. Howat, M.-J. Noh, M. R. van den Broeke, & J. van Angelen, 2013. An Improved Mass Budget for the Greenland Ice Sheet. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C31C-01.
- Enderlin, E. M.**, 2013. Submarine melt rates for Greenland outlet glaciers. *Program for Regional Climate Assessment (PARCA)*, NASA Polar Initiative Meeting.
- Enderlin, E. M.**, 2012. Do Variations in Outlet Width Influence Dynamic Sensitivity? *Tidewater Glaciers Workshop, Svalbard, Norway*.
- Enderlin, E. M.**, 2012. Observations and Modeling of Greenland Outlet Glacier Dynamics. *Program for Regional Climate Assessment (PARCA)*, NASA Polar Initiative Meeting.
- \***McFadden, E. M.**, I. M. Howat, & A. Vieli, 2011. Assessing How Marine-Terminating Glacier Geometry Controls Dynamic Sensitivity to Calving Using a Numerical Ice Flow Model. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C31C-06.
- \***McFadden, E. M.**, I. M. Howat, Y. Ahn, I. R. Joughin, & W. Maslowski, 2009. West Greenland Outlet Glacier Sensitivity (2000-2009). *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C11A-06.
- \***McFadden, E. M.**, I. M. Howat, Y. Ahn, & I. Joughin, 2008. Controls on Greenland Outlet Glacier Sensitivity to Climate Forcing: A Comparative Approach. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C32B-05.
- Posters**
- Enderlin, E. M.**, G. S. Hamilton, & S. O'Neel, 2015. High-resolution force balance analyses of tidewater glacier dynamics, *Eos Transactions AGU*, Fall Meet. Suppl., C25C-0798.
- Enderlin, E. M.** & I. M. Howat, 2013. Re-examining the timing and magnitude of recent dynamic changes in NW Greenland, *U.S. CLIVAR Workshop: Understanding the response of Greenland's marine-terminating glaciers to oceanic and atmospheric forcing*.
- Enderlin, E. M.**, I. M. Howat, & A. Vieli, 2012. High sensitivity of tidewater glacier dynamics to shape, *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C23C-0662.
- Enderlin, E. M.**, I. M. Howat, & A. Vieli, 2012. Assessing Glacier Sensitivity to Differences in Outlet Width Using a Numerical Ice Flow Model. *Glaciers and Ice Sheets in a Warming Climate, Int. Glac. Soc.* Abstract 63A253.
- \***McFadden, E. M.** & I. M. Howat, 2011. Assessing Geometric Controls on Tidewater Glacier Dynamics Using a Numerical Ice Flow Model. *International Symposium on Interactions of Ice Sheets and Glaciers with the Ocean, Int. Glac. Soc.* Abstract 60A011.

- \***McFadden, E. M.** & I. M. Howat, 2010. Assessing Geometric Controls on Tidewater Glacier Sensitivity to Frontal Perturbations Using a Numerical Ice Flow Model. *Eos Transactions AGU*, Fall Meet. Suppl. Abstract C23B-0616.

### TEACHING INTERESTS

- Glaciology & Cryosphere-Climate Interactions
- Remote Sensing
- Geomorphology & Paleoclimatology
- Introductory Earth Science, Environmental Science, & Physical Geography

### TEACHING EXPERIENCE

#### **Substitute Lecturer ERS230**

November-December 2016

#### **Geomatics**

- Lectured on applications for optical, thermal, and microwave remote sensing observations & assisted junior-level students with their course projects

#### **Instructor ERS602**

Spring 2015

#### **Glaciology Seminar**

- Developed a graduate-level Glaciology seminar for students conducting glacier research
- Introductory lectures on the major principles of glaciology (mass balance, ice flow, hydrology, dynamics, etc.) and their research applications tailored to meet student needs
- Student seminars:
  - 2-3 student-selected assigned readings per week
  - reading guides designed by student presenter to highlight discussion points
  - 30 minute student presentation of journal articles & associated background information
  - mediated discussion on assigned readings

#### **Substitute Lecturer ES121**

September 2012

#### **The Dynamic Earth**

- Lectured on mineral identification, silicate structure, magma, and igneous rocks to ~150 students enrolled in an introductory Earth Sciences course at The Ohio State University

#### **Lab Instructor ES550**

Spring 2011, Spring 2012

#### **Geomorphology**

- Developed 9 new 2-hour laboratory exercises designed for a class of ~25 undergraduate Earth Science majors and non-majors at The Ohio State University
- Revised laboratory exercises annually to improve the quality of student learning
- Taught introductory material for laboratory exercises using illustrations, demonstrations, and examples to ensure students were prepared with the appropriate background knowledge

- Assisted students with questions throughout laboratory exercises by providing one-on-one instruction on difficult concepts or exercises
- Encouraged student participation in laboratory exercises by varying the type of activity (computer-based vs. hands-on) and by developing a good rapport with students
- Conducted surveys regarding course content and the effectiveness of my teaching

**Student EduPL 894.32**

Winter 2012

**Higher Education Group Study: Course Design**

- Attended weekly 3-hour lectures on course design using the backwards design principle
- Applied backwards design to the development of an undergraduate Geomorphology course open to Earth Sciences majors and students from other disciplines
- Developed a Geomorphology course description and course syllabus used to convey the course goals and objectives to administrators and students, respectively
- Created a major scaffolded assignment and grading rubric for the Geomorphology course

**HONORS/AWARDS**

- **International Arctic Science Committee Early-Career Travel Award**, IASC Seminar on “Importance of calving for mass budget of Arctic glaciers”, 2016
- **Maine Space Grant Consortium Director’s Fund Award**, University of Maine, 2016
- **Bangor Savings Bank Faculty Development Award**, University of Maine, 2016
- **NASA Early-Career Travel Award**, International Glaciological Society Symposium on Interactions of Ice Sheets and Glaciers with the Ocean, 2016
- **Distinguished Senior Ph.D. Student Award**, The Ohio State University, 2013
- **Michael Johnson Graduate Scholarship**, The Ohio State University, 2012
- **NASA Earth and Space Sciences Fellowship**, The Ohio State University, 2010-2013
- **Rick Toracinta Graduate Scholarship**, The Ohio State University, 2010
- **University Fellowship**, The Ohio State University, 2008-2009
- **Foster Hewett Senior Undergraduate Award**, Lehigh University, 2008
- **Rhodes Scholarship Nominee**, Lehigh University, 2008
- **Presidential Scholar**, Lehigh University, 2008
- **Class of 1904 Scholarship**, Lehigh University, 2007-2008
- **Eckardt College Scholar**, Lehigh University, 2004-2008

**PROFESSIONAL SERVICE AND OUTREACH**

- **Peer-reviewer**: Geophysical Research Letters; Journal of Geophysical Research-Earth Surface and -Atmospheres; Geology; Inverse Problems; Journal of Glaciology; Annals of Glaciology; The Cryosphere; Arctic, Antarctic, and Alpine Research; Earth and Planetary Science Letters; Cold Regions Science and Technology; Remote Sensing
- **Review Editor**: Frontiers in Cryospheric Sciences

- **Co-Convener:** Polar Science Communication Workshop, University of Colorado Boulder, August 2017
- **Early Career Representative:** American Geophysical Union Cryosphere Section Executive Committee, Summer 2017-present
- **US Representative:** International Arctic Science Committee (IASC) Network on Arctic Glaciology, January 2017-present
- **Undergraduate Research Supervisor:** University of Maine, 2014-present
  - Caroline Carrigan, Environmental Sciences Major (graduated winter 2017)
  - Alex Cuadros, Marine Sciences Major (graduated spring 2017)
  - Michael Driscoll, Earth Sciences Major
  - Emily Miller, Marine Science Major
  - Andrew Nolan, Earth Sciences Major
- **Graduate Supervisor/Committee Member:** University of Maine, 2015-present
  - Mariama Dryak, Earth Sciences MS student
  - Lynn Kaluziński, Earth Sciences PhD student
  - Will Kochtitzky, Earth Sciences MS student
  - Ben Partan, Earth Sciences MS student (graduated winter 2017)
  - Jessica Scheick, Earth Sciences PhD student
- **Early Career Representative:** Ice Sheet Mass Balance and Sea Level (ISMSS) Steering Committee, July 2015-present
- **Co-chair:** Association of Polar Early Career Scientists United States National Committee (USAPECS), January 2015-January 2018
- **Local Organizing Committee Chair & Early Career Activity Coordinator:** IASC Network on Arctic Glaciology Annual Meeting, January 2017
- **Co-opted Council Member:** International Glaciological Society, 2016
- **Co-convener:** Association of Polar Early Career Scientists Cryosphere Career Development Panel, American Geophysical Union Fall Meeting, 2013-2016
- **Outstanding Student Presentation Award Coordinator:** Cryosphere Focus Group, American Geophysical Union Fall Meeting, 2015-2016
- **High School Guest speaker:**
  - STEM Academy, Bangor High School, 2016
  - 12<sup>th</sup>-grade Physics & 9<sup>th</sup>-grade Physical Science (climate science/glaciology/remote sensing), Ellsworth High School, 2014-2016
  - 9<sup>th</sup> grade Physical Science, London High School, 2011-2013
  - Columbus Ohio Center of Science and Industry, December 2011
- **8<sup>th</sup>-Grade Science Fair Judge:** Etna-Dixmont School, 2015-2016
- **Panelist:** Bowdoin College Coalition for Expanding Reach of Earth Sciences (CERES) Women in Science panel, 2016
- **Scientific Session Convener:** American Geophysical Union Fall Meeting, 2014 & 2015

- **Council Member:** Association of Polar Early Career Scientists (APECS), 2013-2015
- **Co-convener:** Getting out in the Field as a Skill Workshop, American Geophysical Union Fall Meeting, 2013
- **OSU Glaciology Group Outreach Coordinator/Chair:** 2011- 2013
- **Prospective Graduate Student Coordinator:** School of Earth Sciences, The Ohio State University, 2013
- **Graduate Student Representative:** School of Earth Sciences Activity Committee & School of Earth Sciences Diversity Committee, The Ohio State University, 2012 - 2013
- **School of Earth Sciences Graduate Student Representative:** The Ohio State University Council of Graduate Students, 2011 - 2012
- **Climate Change Interviewee:** NBC4 Columbus, April 2010

#### INVITED PRESENTATIONS

- **College of the Atlantic Seminar on Climate Change Speaker Series (May 2017: Bar Harbor, Maine, USA):** “Understanding Modern Ice Loss from the Greenland Ice Sheet”
- **University of Alberta Grace Anne Stewart Speaker Series (March 2017: Edmonton, Alberta, Canada):** “Understanding Variability in Glacier Behavior in a Changing Climate”
- **International Arctic Science Committee Symposium on the Importance of calving for mass budget of Arctic Glaciers (October 2016: Sopot, Poland):** “Greenland Dynamic Discharge Review & Updates” & “Remote Sensing Methods for Studies of Arctic Calving Glaciers”
- **Lehigh University Earth and Environmental Science Department (April 2014: Bethlehem, Pennsylvania, USA):** “Glaciers Gone Wild: Rapid Changes in Greenland Glacier Behavior Initiated at the Ocean’s Edge”
- **International Arctic Science Committee Field Workshop on Studies of Tidewater Glaciers (August 2012: Svalbard, Norway):** “Do Variations in Outlet Width Influence Dynamic Sensitivity?”

#### PROFESSIONAL SHORT-COURSES

- **New Generation of Polar Researchers Leadership Symposium,** USC Wrigley/Boone Center for Environmental Research, CA, USA, May 2015
- **Karthaus Summer School on Ice Sheets and Glaciers in the Climate System,** Karthaus, Italy, September 2009

#### PROFESSIONAL AFFILIATIONS

- American Geophysical Union
- European Geosciences Union
- International Glaciological Society
- Association of Polar Early Career Scientists