

# Joseph Huston Kennedy

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## CONTACT INFORMATION

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## RESEARCH INTERESTS

- Applying computational physics methods to novel and unique problems.
- Validation and verification of global climate models and their constituents.
- Developing cross-disciplinary tools to facilitate collaboration, sharing, and reproducibility.
- Investigating the link between climate history and ice crystalline fabric.
- Glacier dynamics and the effects of anisotropic ice on bulk properties.

## EDUCATION

**University of Alaska Fairbanks**, Fairbanks, Alaska USA

*Department of Physics*

Ph.D., 2015, Dissertation Topic:

“Linking climate history and ice crystalline fabric evolution in polar ice sheets.”

**Western Washington University**, Bellingham, Washington USA

*Department of Physics*

B.S., Physics, June, 2008

Minors: Astronomy, The Study of Religion

## PROFESSIONAL EXPERIENCE

**Oak Ridge National Laboratory**, Oak Ridge, Tennessee, USA

*Postdoctoral Research Associate*

Climate Change Science Institute

**January, 2015 - present**

Developer for the Land Ice Validation & Verification (LIVV) toolkit, which is a python-based toolkit to perform a suite of validation and verification tests on the Community Ice Sheet Model (CISM).

- Latest LIVV release: <https://github.com/LIVVkit>
- Latest CISM release: <https://github.com/CISM>

## PUBLICATIONS

Evans, KJ, PH Worley, A Boghoozian, AR Bennett, *JH Kennedy*, M Norman, S Price, M Hoffman. (In Prep). A python-based, extensible toolkit for a robust verification and validation of continental-scale land ice models.

*Kennedy, JH*, C Khroulev, and EC Pettit. (In Prep). PISM-FEvoR: a multi-scale ice flow model incorporating fabric evolution with recrystallization. *Journal of Glaciology*.

*Kennedy, JH*, and EC Pettit (2015). The response of climate induced fabric variations to simple shear and migration recrystallization. *Journal of Glaciology*, 61(227), 118.  
[doi:10.3189/2015JoG14J156](https://doi.org/10.3189/2015JoG14J156).

*Kennedy, JH*, EC Pettit, and CL Di Prinzio (2013). The evolution of crystal fabric in ice sheets and its link to climate history. *Journal of Glaciology*, 59(214), 118.  
[doi:10.3189/2013JoG12J159](https://doi.org/10.3189/2013JoG12J159).

Gusmeroli, A, EC Pettit, *JH Kennedy*, and C Ritz (2012). The crystal fabric of ice from full-waveform borehole sonic logging. *J. Geophys. Res.*, 117, F03021.  
[doi:10.1029/2012JF002343](https://doi.org/10.1029/2012JF002343).

**University of Alaska Fairbanks, Fairbanks, Alaska USA**

*Graduate Teaching Assistant*

Geology & Geophysics Department

**August, 2014 - December, 2014**

I taught the computational portion of the graduate level geophysics course Foundations of Geophysics and was responsible for lectures, homework assignments, and grades. Further duties included holding weekly office hours.

- GEOS 631/431 – Foundations of Geophysics, Fall 2014.

*Guest Lecturer*

GEOS 631/431 – Foundations of Geophysics (Oct. 25 and Oct. 30, 2012): I gave two lectures, one and a half hours in length, on general conservation laws, conservation of energy, and heat transfer. The first lecture started with the general form of the conservation laws, derived the conservation of momentum equation the students were familiar with, and then discussed the definition and forms of energy. The lecture concluded with a discussion on the first law of thermodynamics as well as a derivation of the conservation of energy equation. The second lecture discussed Fourier's law and solved practical heat flow problems; some of which were taken from Chapter 4 of Turcotte and Schubert's Geodynamics textbook.

*Guest Lecturer*

GEOS 636/436 – Beyond the Mouse: Computer Programming and Automation for Geosciences (Sept. 11 and Nov. 15, 2012): The September lecture was 1 hour in length and focused on an introduction to variables and data types. We discussed what a computer is, how a computer thinks, what a program is, and what a programming language is. The students were then taught how to create variables and store different types of data. The November lecture was a demonstration of live programming and was 2 hours in length. I demonstrated how to use common command line tools, a scripting language, and good file structure to create a manuscript preparation work-flow. I developed scripts to help create a L<sup>A</sup>T<sub>E</sub>X document and introduced tools such as a distributed version control system to keep track of changes and share work with collaborators.

*Graduate Teaching Assistant*

Geology & Geophysics Department

**August, 2012 - December, 2012**

I taught the computational portion of graduate level geophysics courses and was responsible for lectures, homework assignments, and grades. Further duties included holding weekly office hours.

- GEOS 631/431 – Foundations of Geophysics, Fall 2012.
- GEOS 636/436 – Beyond the Mouse: Computer Programming and Automation for Geosciences, Fall 2012.

*NSF GK-12 Fellow*

Denali Elementary School

**May, 2011 - May, 2012**

I taught 4 science lessons a week in two first grade classrooms of 30 students (10 contact hours per week). We covered a variety of subjects, including: the scientific method, the five senses, plants, birds of prey, migratory birds, caribou, weather, glaciers, heat transfer, food science, rockets, pressure-volume-temperature, volcanoes and how to design a testable question. I primarily designed the lesson plans, homework, and experiments for the students. At the end of the year, the classes worked on a joint science fair project in which the students designed and conducted the entire experiment. The classes won a first place ribbon and a \$50.00 prize for *Exceptional Women in Science* at the Fairbanks Northstar Borough School District Science Fair.

*Graduate Teaching Assistant*

Physics Department

**August, 2008 - May, 2009**

I taught the laboratory portion of introductory physics courses and was responsible for lectures, homework assignments, and grades. Further duties included holding weekly office hours and staffing the homework help office.

- PHYS 103 – College Physics I, Fall 2008, 2 sections.
- PHYS 104 – College Physics II, Spring 2009.
- PHYS 115 – Physical Science I, Spring 2009.

Western Washington University, Bellingham, Washington USA

*Undergraduate Teaching Assistant*

September, 2006 - June, 2008

I taught the laboratory portion of the introductory physics courses and was responsible for lectures, homework assignments and grades.

- PHYS 131 – Physics with Calculus I Lab, Fall 2006, 2007
- PHYS 132 – Physics with Calculus II Lab, Winter 2007, 2008
- PHYS 133 – Electricity and Magnetism Lab, Spring 2007, 2008

INVITED TALKS

*Kennedy, Joseph H*

A closer look at the link between climate history and fabric evolution in ice sheets  
MicroDice Ice Flow Workshop, Nuuk, Greenland, 22 August, 2011

Pettit, Erin, Gusmeroli, Alessio, *Kennedy, Joseph H*

Exploring the link between climate history and fabric evolution in ice sheets  
Laboratoire de Glaciologie et Gophysique de l'Environnement, Grenoble, France, 12 April, 2011

*Kennedy, Joseph H*

Climate signal evolution in crystal orientation fabric  
Physics Department Colloquium, Western Washington University, Bellingham, WA, 21 Oct., 2010

CONFERENCE  
PRESENTATIONS

*Kennedy, Joseph H, et al*

The record may be in the fabric: Preservation of climate history in polar ice sheets.  
AGU Fall Meeting, Abstract C25B-08, 13 December, 2013

*Kennedy, Joseph H, et al*

Evaluating the parameterization of polygonization in a fabric evolution model.  
IGS Symposium, Poster ID 63A500, 28 June, 2012

*Kennedy, Joseph H, et al*

Evaluating the parameterization of polygonization in a fabric evolution model.  
MicroDice Conference, Ice deformation; from the model material to ice in natural environments,  
Grenoble, France, 9 November, 2011.

*Kennedy, Joseph H, et al*

Modeling the evolution of crystal fabric and its link to climate and ice sheet history  
EGU Spring Meeting, Abstract EGU2011-2343, 7 April, 2011

*Kennedy, Joseph H, et al*

Exploring the relation between crystal fabric and climate history in an ice-core  
AGU Fall Meeting, Abstract C13B-0546, 12 December, 2010

*Kennedy, Joseph H, et al*

Climate histories and crystal orientation fabric evolution in Antarctic Ice Cores  
Graduate Climate Conference, University of Washington, Pack Forest, WA, 16 October, 2010

*Kennedy, Joseph H, Pettit, Erin*

Climate signal evolution in crystal orientation fabric  
Northwest Glaciologists' Meeting, University of Alaska Fairbanks, Fairbanks, AK, 9 October, 2010

*Kennedy, Joseph H, Pettit, Erin*

Evolution of crystal fabric: Ice-Age ice versus Holocene ice  
AGU Fall Meeting, Abstract C23A-0478, 15 December, 2009

*Kennedy, Joseph H, Pettit, Erin*

Building fabric evolution into a finite-element ice-sheet flow model  
Northwest Glaciologists' Meeting, University of British Columbia, Vancouver, BC, 23 October, 2009

SERVICE

*Volunteer website creator and administrator – <http://glaciers.gi.alaska.edu>  
Glaciers Group, University of Alaska Fairbanks Geophysical Institute*

**FIELD WORK**

**Dome C, East Antarctica.** Deploying a sonic probe down the Dome C ice core borehole and prepping ice core samples. 3 weeks.

**Valdez, AK, USA.** Deploying sea temperature moorings. 3 days.

**Yakutat Glacier, AK, USA.** Taking GPS measurements, ablation stake measurements, and deploying time laps cameras. 5 days.

**Icy Bay, AK, USA.** Deploying hydro-acoustic mooring, taking CDT casts, and hydro-acoustic recordings. 5 days.

**AWARDS**

**2013-2014 Thesis Completion Fellowship**, \$15,000 + tuition  
University of Alaska Fairbanks Graduate School

**2011-2012 CASE GK-12 Fellow**, \$45,000  
NSF Graduate STEM Fellow in K-12 Education, Changing Alaska Science Education

**Travel Grant** of \$3,000 to attend  
MicroDice Ice Flow Workshop, Nuuk, Greenland, August 2011

**COMAP, the Consortium for Mathematics and Its Applications**  
Mathematical Contest in Modeling (MCM), Problem A, Honorable Mention, 2008

**AFFILIATIONS**

APS      American Physical Society  
IGS      International Glaciological Society  
AGU      American Geophysical Union

**COMPUTER SKILLS**

Mathematics Packages:    MATLAB, Mathematica, Octave, Gnuplot  
Instrumentation:        Vernier Logger Pro, LabVIEW, Gamit/Globk – Track  
Languages:                C/C++, Python, FORTRAN, Bash, L<sup>A</sup>T<sub>E</sub>X  
Web:                        Apache, PHP, HTML, CSS, Drupal  
Applications:            Mendeley, Catia, ProE, Adobe Creative Suite, Microsoft Office  
Operating Systems:      Unix/Linux, Windows, OSX

**OTHER SKILLS AND ACTIVITIES**

- Wilderness experience including a continuous 700 mile, 33 day, canoe trip down the Yukon River.
- Skilled with soldering, hand and power tools, and simple electrical systems.
- Extensive boat experience: Sailing, Canoing, Power-boating, etc.
- Enjoy outdoor recreation: biking, hiking, backpacking, camping, etc.
- Trained in bear safety.