

Dr. Joseph H. Kennedy



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publications



@jhkenedy

STAFF SCIENTIST I am a Scientist and Software Engineer with extensive multi-institutional project leadership and management experience. I specialize in bridging the gap between scientists and software engineers, building ground-up Cloud and HPC data processing/analysis platforms for users, managing global-scale processing campaigns, working with PB-scale Big Data, and generating analysis-ready Earth Observing/Modeling data. I have expertise in open-source development, packaging, and distribution of scientific software, especially within the scientific Python ecosystem.

HIGHLIGHTS Lead the transformation of internally and externally developed science (algorithm and processing) prototypes into Cloud and HPC production services, and effectively managed \$1.5M (2022-2023) to execute multiple global-scale processing campaigns.

- ◇ Executed the [ITS_LIVE](#) global glacier velocity campaign, processing ≈ 25 million scene-pairs in two months, covering every available ice-intersecting Landsat 4-9, Sentinel-2, and Sentinel-1 scene.
- ◇ Productionized the HydroSAR flood monitoring service for the Hindu Kush Himalayas (HKH) region and successfully transitioned the service to [ICIMOD](#), our local partners in Nepal.
- ◇ Transitioned the [JPL ARIA processing system](#) to an open-source, serverless framework resulting in 10x reduction in cost per product, significantly growing the ARIA-S1-GUNW archive.

Lead the ground-up redesign and development of ASF's [HyP3](#), an on-demand SAR data processing system making analysis-ready RTC and InSAR data products. *Anyone* may request HyP3 products for free. HyP3 is deployed in NASA's Earthdata Cloud environment and integrated directly into ASF's main data search portal [Vertex](#).

Created LIVVkit, an ice-sheet model verification and validation toolkit, to provide a wide range of validation analysis covering atmosphere-ice and land-ice interactions as well as ice sheet dynamics. These analysis exercise the entire data science pipeline, from data wrangling and cleaning to reporting, and incorporate everything from point measurements (e.g., weather stations and ablation stakes) to airborne radar altimetry (e.g., NASA IceBridge) and satellite observations (e.g., RADARSAT, NASA GRACE).

PROFESSIONAL EXPERIENCE

Alaska Satellite Facility, Fairbanks, Alaska, USA
Geophysical Institute, University of Alaska Fairbanks

September 2019 – present

Staff Scientist

January 2024 – present

As a Staff Scientist, I guide strategic research and engineering endeavors that leverage ASF's unique capabilities and resources to meet ASF's mission of "Making Remote-Sensing Data Accessible". My research interests are broadly focused on the computational aspects of remote sensing, ice sheet modeling, and Earth system modeling. I specialize in developing scientific workflows and transforming science (algorithm and processing) prototypes into Cloud and HPC production services. I manage multiple global-scale processing campaigns of Earth observing data, curate "Big" datasets from inception to dissemination, and contribute to and maintain open-source scientific tools and services. This includes Custom HyP3 deployments for grant projects and external customers, STAC Catalogs, and data processing tools. I excel at project management, leading both internal strategic projects and multi-institutional research projects. I serve as a liaison between the scientific community, ASF, and funding agencies, ensuring effective representation and coordination, and advising on research priorities and resource enhancement. I lead science communication efforts, contribute to education and outreach initiatives, and provide mentorship in computational and data science to foster professional growth within ASF and the wider scientific community.

Engineering Supervisor

March 2023 – present

As an Engineering Supervisor, I currently manage 5 engineers across all levels and am involved in recruiting candidates across the organization. I am responsible for setting performance targets, developing and implementing strategies to achieve them, and monitoring progress to make sure that they are meeting or exceeding expectations. I communicate regularly with employees to provide feedback, guidance, and support as needed, and work to create a positive and productive work environment. I ensure that my employees are properly trained and equipped with the necessary tools to perform their jobs effectively.

Senior Research Software Engineer

July 2021 – December 2023

Research Software Engineer

September 2019 – July 2021

As a Senior RSE, I specialize in transforming internally and externally developed science (algorithm and processing) prototypes into Cloud and HPC production services, and manage \$800K to execute multiple global-scale processing campaigns. I lead the ground-up redesign and development of ASF's [HyP3](#), an on-demand, Analysis-Ready SAR data processing system freely available to *anyone*. I Build and maintain open-source scientific tools and services to meet ASF's mission of "Making Remote-Sensing Data Accessible" including Custom HyP3 deployments for customers, STAC Catalogs, Esri Image Services, and [SAR toolboxes](#). I curate global datasets, from inception to dissemination, such as the ARIA-S1-GUNW archive and the GLO-30 HAND dataset. I also contribute to and maintain community open-source SAR processing tools, including MintPy, ISCE2, RAiDER, autoRIFT, and more.

Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA

Climate Change Science Institute

January 2015 – September 2019

Computational Scientist in Glaciology

December 2016 – September 2019

Perform research tasks using DOE's Earth system model E3SM and ice sheet models (e.g., MPAS-LI, BISICLES, PISM, CISM); coordinate the verification and validation of E3SM, MPAS-LI, and BISICLES simulations; development of the Land Ice Verification and Validation toolkit (LIVVkit), a Python-based toolkit for robust evaluation of ice-sheet models; and develop an extended V&V evaluation tool (EVE) for statistical climate reproducibility testing of ESMs.

Postdoctoral Research Associate

January 2015 – December 2016

Perform research tasks using the Community Ice Sheet Model (CISM) and coordinate the development of the Land Ice Verification and Validation toolkit (LIVVkit) — a Python-based toolkit for robust evaluation of ice-sheet models.

Advisor: Dr. Katherine J. Evans

EDUCATION

University of Alaska Fairbanks, Department of Physics, Fairbanks, Alaska, USA

Ph.D., 2015, Dissertation Topic:

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

Advisor: Dr. Erin C. Pettit

Western Washington University, Department of Physics, Bellingham, Washington, USA

B.S., 2008, Physics

Minors: Astronomy, The Study of Religion

SELECTED PUBLICATIONS

Meyer, F.J., *J.H. Kennedy*, K. Hogenson, A. Lewandowski, R.W. Albright, G. Short, A.I. Flores-Anderson (In Press). Facilitating the Golden Age of SAR: New Tools, Services, and Trainings to make SAR Data More Accessible. *IEEE Geoscience and Remote Sensing Magazine*.

Meyer, F.J., L.A. Schultz, B. Osmanoglu, *J.H. Kennedy*, M. Jo, R.B. Thapa, J.R. Bell, S. Pradhan, M. Shrestha, J. Smale, H. Kristenson, B. Kubby, and T.J. Meyer (2024). HydroSAR: A cloud-based Service for the monitoring of inundation events in the Hindu Kush Himalaya. *Remote Sensing*, 16, 3244.

[DOI: 10.3390/rs16173244](https://doi.org/10.3390/rs16173244)

López, L.A., A.S. Gardner, C.A. Greene, M. Fahnestock, *J.H. Kennedy*, M. Liukis, T.A. Scambos, J.R. Fahnestock (2023). ITS.LIVE: A Cloud-Native Approach to Monitoring Glaciers from Space. *IEEE Computing in Science & Engineering*, vol. 25, no. 6, pp. 49–56, Nov.-Dec. 2023. [DOI: 10.1109/MCSE.2023.3341335](https://doi.org/10.1109/MCSE.2023.3341335)

Wang, J., Z. Lu, D. Bekaert, C. Marshak, Marin Govorcin, S. Sangha, *J.H. Kennedy*, P. Gregg (2023). Along-arc volcanism in the western and central Aleutian from 2015 to 2021 revealed by cloud-based InSAR processing. *Geophysical Research Letters*, 50, e2023GL106323.

DOI: [10.1029/2023GL106323](https://doi.org/10.1029/2023GL106323)

Bekaert, D., N. Arena, M. Grace Bato, M. Govorcin, E. Havazli, K. Hogenson, H. Hua, A. Johnston, M. Karim, *J.H. Kennedy*, Z. Lu, C.Z. Marshak, F.J. Meyer, S. Owen, S. Sangha, G. Short, J. Wang, R. Zinke (2023). The ARIA S1 GUNW: the ARIA Sentinel-1 geocoded unwrapped phase product for open InSAR science and disaster response IGARSS 2023 – 2023 IEEE International Geoscience and Remote Sensing Symposium, Pasadena, CA, USA, 2023, pp. 2850-2853.

DOI: [10.1109/IGARSS52108.2023.10282671](https://doi.org/10.1109/IGARSS52108.2023.10282671)

Evans, K.J., *J.H. Kennedy*, D. Lu, M.M. Forrester, S. Price, J. Fyke, A.R. Bennett, M. Hoffman, I. Tezaur, C.S. Zender, and M. Vizcaino. (2019). LIVVkit 2.1: Automated and extensible ice sheet model validation. *Geoscientific Model Development*, 12, 1067–1086.

DOI: [10.5194/gmd-12-1067-2019](https://doi.org/10.5194/gmd-12-1067-2019)

Mahajan, S., K.J. Evans, *J.H. Kennedy*, M. Xu, M.R. Norman, M.L. Branstetter (2019) Ongoing solution reproducibility of Earth system models as they progress towards exascale computing. Special Issue for Computational Reproducibility at Exascale Workshop 2017, Super Computing 2017, Int. J. High Perf. Comp. Apps..

DOI: [10.1177/1094342019837341](https://doi.org/10.1177/1094342019837341)

Lipscomb, W.H., S.F. Price, M.J. Hoffman, G.R. Leguy, A.R. Bennett, S.L. Bradley, K.J. Evans, J.G. Fyke, *J.H. Kennedy*, M. Perego, D.M. Ranken, W.J. Sacks, A.G. Salinger, L.J. Vargo, and Patrick H. Worley. (2019). Description and evaluation of the community ice sheet model (CISM) v2.1. *Geoscientific Model Development*, 12, 387–424.

DOI: [10.5194/gmd-12-387-2019](https://doi.org/10.5194/gmd-12-387-2019)

Goelzer, H., S. Nowicki, T. Edwards, M. Beckley, A. Abe-Ouchi, A. Aschwanden, R. Calov, O. Gagliardini, F. Gillet-Chaulet, N. Golledge, J. Gregory, R. Greve, A. Humbert, P. Huybrechts, *J.H. Kennedy*, E. Larour, W. Lipscomb, S. Le clec'h, V. Lee, M. Morlighem, F. Pattyn, T. Payne, C. Rodehacke, M. Ruckamp, F. Saito, N. Schlegel, H. Seroussi, A. Shepherd, S. Sun, R. van de Wal, F. Ziemen. (2018). Design and results of the ice sheet model initialization experiments initMIP-Greenland: An ISMIP6 intercomparison. *The Cryosphere*, 12, 1433–1460.

DOI: [10.5194/tc-12-1433-2018](https://doi.org/10.5194/tc-12-1433-2018)

Kennedy, J.H., A.R. Bennett, Evans, K.J., S. Price, M. Hoffman, W.H. Lipscomb, J. Fyke, L. Vargo, A. Boghazian, M. Norman, P.H. Worley. (2017). LIVVkit: An extensible, Python-based, land ice verification and validation toolkit for ice sheet models. *Journal of Advances in Modeling Earth Systems*, 9(2), 854–869.

DOI: [10.1002/2017MS000916](https://doi.org/10.1002/2017MS000916)

Price, S., M. Hoffman, J. Bonin, T. Neumann, I. Howat, J. Saba, J. Guerber, D. Chambers, K.J. Evans, *J.H. Kennedy*, J. Lenaerts, W.H. Lipscomb, M. Perego, A. Salinger, R. Tuminaro, M. van den Broeke, and S.M.J. Nowicki. (2017). An ice sheet model validation framework for the Greenland ice sheet. *Geoscientific Model Development*, 10, 255–270.

DOI: [10.5194/gmd-10-255-2017](https://doi.org/10.5194/gmd-10-255-2017)

Kennedy, J.H., and E.C. Pettit (2015). The response of climate induced fabric variations to simple shear and migration recrystallization. *Journal of Glaciology*, 61(227), 537–550.

DOI: [10.3189/2015JoG14J156](https://doi.org/10.3189/2015JoG14J156)

Kennedy, J.H., E.C. Pettit, and C.L. Di Prinzio (2013). The evolution of crystal fabric in ice sheets and its link to climate history. *Journal of Glaciology*, 59(214), 357–373.

DOI: [10.3189/2013JoG12J159](https://doi.org/10.3189/2013JoG12J159)

Gusmeroli, A., E.C. Pettit, *J.H. 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)

FUNDED GRANT PROPOSALS	NASA ROSES: A.41 SERVIR Applied Sciences Team (2024) Co-I; pending: <i>Enhanced Virtual River Gauge Network (EVeRGreeN) in South East Asia</i> \$150K over 3 years to UAF
	NASA ROSES: F.7 Support for Open-Source Tools, Frameworks, and Libraries (2024) Co-PI; pending: <i>Elevating earthaccess: Cultivating an ecosystem of people and tools to streamline NASA Earthdata workflows</i> \$934K total; \$243K over 3 years to UAF
	NASA ROSES: F.7 Support for Open-Source Tools, Frameworks, and Libraries (2024) Co-PI; pending: <i>Facilitating Containerized Software for On-the-Fly Data Reduction</i> \$272K over 3 years to UAF
	NASA Earth Surface and Interior (ESI) Program (2023) Co-PI: <i>A one-stop shop of analysis-ready coseismic displacement products to advance the understanding of fault rupture processes and improve downstream rapid response products</i> \$755K total; \$147K over 3 years to UAF
	NSF Geosciences Open Science Ecosystem (GEO OSE) Program (2023) Co-PI: <i>Enhancing usability of the Parallel Ice Sheet Model (PISM) to accelerate innovative sea-level research</i> \$638K over 3 years to UAF
	NASA Making Earth System Data Records for Use in Research Environments (MEaSUREs) Program (2022) Co-I: <i>Next Generation - Inter-mission Time Series of Land Ice Velocity and Elevation (ITS-LIVE-NG)</i> \$2.5M total; \$869K over 5 years to UAF
	NASA Advancing Collaborative Connections for Earth System Science (ACCESS) Program (2020) Co-I: <i>Training Data for Stream Flow Estimation</i> \$447K total; \$273K over 3 years to UAF
	NASA Advancing Collaborative Connections for Earth System Science (ACCESS) Program (2020) Co-I: <i>Enabling Cloud-based InSAR Science for an exploding NASA InSAR data archive</i> \$1.02M total; \$316K over 2 years to UAF
	DOE E3SM phase II project (2018) Co-I: <i>The energy exascale Earth system modeling project scientific focus area renewal</i> \$4.5M over 5 years to ORNL
	DOE BER next-gen development project (2018) Co-I: <i>Climate reproducibility tests for E3SM model components and stand-alone kernels</i> \$1.44M over 3 years to ORNL
	DOE BER/ASCR sea-level projections (2017) Co-I and V&V task lead: <i>Probabilistic sea-level projections from ice sheet and Earth system models</i> \$1.33M over 5 years to ORNL
	DOE BER ACME-SM project (2016) Co-I: <i>A Global climate model software modernization surge</i> \$1.35M over 3 years to ORNL
SIGNIFICANT REPORTS AND WHITE PAPERS	ORNL/NOAA performance project (2016) Co-I: <i>Performance analysis of climate workflows</i> \$336K over 1 year to ORNL
	<i>Kennedy, J.H., B.W. Mayer, K.J. Evans, J. Durachta (2017). Performance analysis of large scale HPC workflows for Earth system models. ORNL Technical Memo, ORNL/TM-2017/540. DOI: 10.2172/1439154</i> <i>Allen, M.R., H.M.A. Aziz, M.A. Coletti, J.H. Kennedy, S.S. Nair, and O.A. Omitaomu (2017). Workshop on human activity at scale in Earth system models. ORNL Technical Memo, ORNL/TM-2017/24. DOI: 10.2172/1343540</i>

Kennedy, J.H., B. Debusschere, K. Sargsyan, F.M. Hoffman, K.J. Evans (2016). Full-system evaluation of Earth system models. Ideas paper 51 in E. Ng, K.J. Evans, et al. (Authors), Advancing Cross-Cutting Ideas for Computational Climate Science, Workshop Report, Rockville, MD, September 12-13, 2016. ORNL/TM-2016/717. DOI: [10.2172/1341564](https://doi.org/10.2172/1341564).

Law, K., R. Archibald, *J.H. Kennedy* (2016). Data assimilation for ice-sheet models. Ideas paper 22 in E. Ng, K.J. Evans, et al. (Authors), Advancing Cross-Cutting Ideas for Computational Climate Science, Workshop Report, Rockville, MD, September 12-13, 2016. ORNL/TM-2016/717. DOI: [10.2172/1341564](https://doi.org/10.2172/1341564).

SOFTWARE

Lead the ground-up redesign and development of the Alaska Satellite Facility's Hybrid Pluggable Processing Pipeline (HyP3; pronounced "hype"). HyP3 consists of:

- ◇ *The platform*: A cloud-native, serverless job orchestration engine in AWS with a friendly, OpenAPI and Swagger-based API.
- ◇ *Science plugins*: Container-based science algorithms and processing software. When invoked, they marshal input data, generate an output product, and upload the product to the cloud. Plugins are self-contained and independent of the platform so they can be used anywhere.
- ◇ *Science products*: The data our users are after – typically GeoTIFF and netCDF based data, with associated metadata, documentation, and usage guides.
- ◇ *Tools*: ArcGIS plugins, Python packages for working with the HyP3 API and HyP3 products, and other packages useful for HyP3 development.
- ◇ *Documentation*: How we help our users, and ourselves. This includes product/software/tool documentation, examples and guides, and everything that goes into making documentation usable and look great.

The entire HyP3 ecosystem is open-source and openly-developed within the [ASFHyP3 organization](#) on GitHub.

Contributor to open-source software projects:

- ◇ [autoRIFT](#) ◇ [MintPy](#) ◇ [PyAPS](#) ◇ [PySolid](#)
- ◇ [RAIDER](#) ◇ [dem-sticher](#) ◇ [ISCE2](#) ◇ [EarthAccess](#)

Conda-forge recipe maintainer for:

- ◇ [ASF Tools](#) ◇ [EVV](#) ◇ [HyP3lib](#) ◇ [HyP3 Metadata](#)
- ◇ [HyP3 SDK](#) ◇ [ILAMB](#) ◇ [JSON tricks](#) ◇ [LIVVkit](#)
- ◇ [MPAS-Analysis](#) ◇ [MPAS-Tools](#) ◇ [TempestRemap](#)

Past:

Technical and visionary lead of the Land Ice Verification and Validation toolkit (LIVVkit); a Python-based, extensible verification and validation suite for land-ice models.

<https://github.com/LIVVkit/LIVVkit>

Creator of the ISMIP6 Atlas submission validation tool; an extension to LIVVkit which checks submissions to ISMIP6 experiments for correct file names, paths, metadata, etc. and produces a large variety of diagnostic plot. <https://github.com/LIVVkit/Atlas>

E3SM (Energy Exascale Earth System Model) core developer (infrastructure group) for phase 2; DOE's E3SM is a state-of-the-science Earth system model development and simulation project to investigate energy-relevant science using code optimized for DOE's advanced computers.

<https://e3sm.org/>

Developer on DOE's E3SM ecosystem projects

- ◇ MPAS-Analysis: Analysis for simulations produced with Model for Prediction Across Scales (MPAS) components and DOE's E3SM.
<https://github.com/MPAS-Dev/MPAS-Analysis>
- ◇ A-Prime: Python based scripts to generate coupled priority metrics for DOE's E3SM.
<https://github.com/ACME-Climate/a-prime>
- ◇ EVV: Extended verification and validation for Earth system models.
<https://github.com/LIVVkit/evv4esm>

Developer and integrator for the joint DOE/NSF Community Ice Sheet Model (CISM); an open-source, next-generation ice sheet model used for predicting ice sheet evolution and sea level rise in a changing climate. <https://github.com/ESCOMP/cism>

ALLOCATION PROPOSALS	<p>Energy Research Computing Allocations Process (ERCAP) for NERSC (2016) Co-I, accepted, <i>Predicting ice sheet and climate evolution at extreme scales</i>, 10M hours on Edison</p> <p>OLCF Director's Discretion Allocation (2015) Co-I, accepted, <i>Earth system modeling collaborative</i>, 10M hours on Titan</p>	
AWARDS	<p>2022 Richardson Medal by the International Glaciology Society Contributing member of the ISMIP6 Team which was ecognized for its academic and leadership activities in the design and production of future sea-level projections. https://www.igsoc.org/about/awards/richardson-medal/the-ismip6-team-2022</p> <p>2016 CCSI Professional Development Award, \$100,000 Co-I: <i>Understanding the links between neighbourhood level human activity and global climate change by developing an integrative methodology using data analytics, agent-based modelling and Earth system modelling</i>. Project PI: Dr. Melissa R. Allen. Climate Change Science Institute, Oak Ridge National Laboratory</p> <p>2013–2014 Thesis Completion Fellowship, \$15,000 + tuition University of Alaska Fairbanks Graduate School</p> <p>2011–2012 CASE GK-12 Fellow, \$45,000 NSF Graduate STEM Fellow in K-12 Education, Changing Alaska Science Education</p>	
CERTIFICATIONS	<ul style="list-style-type: none"> ◇ Certified Scrum Product Owner[®] <i>Scrum Alliance</i>, 09/30/2022. Expires 9/30/2024. ◇ Certified ScrumMaster[®], <i>Scrum Alliance</i>, 9/28/2022. Expires 9/28/2024. 	
SYNERGISTIC ACTIVITIES	2024	Participated in NSF's National Discovery Cloud for Climate Workshop.
	2022–2023	Serve on the NASA's ESDS Community Development Best Practices Working Group.
	2018	Organized a minisymposium on computational methodologies for next-generation climate models at the European Seminar on Computing (ESCO) 2018 conference in Pilzen, Czech Republic.
	2017	Organized an international workshop on human activity at scale in Earth system models at Oak Ridge National Laboratory.
TEACHING EXPERIENCE	<p>International Geoscience and Remote Sensing Symposium 2024, Athens, Greece <i>Co-instructor with Dr. Franz J. Meyer (UAF), Heidi Kristenson (ASF), Gregory Short (ASF), and Dr. Alexander Handwerker (JPL)</i> A day at the OPERA: Discover how analysis-ready OPERA data can accelerate your science 3-hour course that provided an overview of using the new analysis-ready Radiometric Terrain Corrected (RTC) and Coregistered Geocoded Single Look Complex (CSLC) products produced by the Observational Products for End-Users from Remote Sensing Analysis OPERA project. Attendees learned how to discover and access OPERA products as well as use services at the Alaska Satellite Facility to analyze a large volume of data at scale.</p> <p>European Conference on Synthetic Aperture Radar 2024, Munich, Germany <i>Co-instructor with Dr. Forrest F. Williams (ASF), and Dr. Franz J. Meyer (UAF)</i> SAR at Scale: Working with Large Volumes of Synthetic Aperture Radar Data (Condensed) 1.5-hour course that provided an overview of using advanced SAR remote sensing data and methods within a cloud-computing ecosystem to advance the community's capacity to process large volume SAR data at scale. We explored an interferometric SAR use case in depth, using freely-available open SAR data, services, and tools.</p> <p>International Geoscience and Remote Sensing Symposium 2023, Pasadena, CA, USA <i>Co-instructor with Dr. Forrest F. Williams (ASF), Alex Lewandowski (ASF), and Dr. Franz J. Meyer (UAF)</i> SAR at Scale: Working with Large Volumes of Synthetic Aperture Radar Data 4-hour course that provided an overview of using advanced SAR remote sensing data and methods within a cloud-computing ecosystem to advance the community's capacity to process large volume SAR data at scale. We explored two scientific use cases in depth, using freely-available open SAR data, services, and tools.</p>	

Oak Ridge Institute for Continued Learning at Roane State Community College, Oak Ridge, Tennessee, USA Climate Change Science **June 2016**
Co-lecturer with Dr. Melissa R. Allen (ORNL)

We presented four lectures, one and a quarter hours in length, on the topics: 1) global warming and the carbon cycle, 2) indicators of climate change, 3) impacts of climate change on human life and 4) global and regional climate modeling and uncertainty.

University of Alaska Fairbanks, Fairbanks, Alaska, USA **August 2014 – December 2014**
Geology & Geophysics Department
Graduate Teaching Assistant

GEOS 631/431 — 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.

Geology & Geophysics Department **August 2012 – December 2012**
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^AT_EX document and introduced tools such as a distributed version control system to keep track of changes and share work with collaborators.

Graduate Teaching Assistant
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 **May 2011 – May 2012**
Classroom Scientist

I taught 4 science lessons a week in two first grade classrooms of 30 students at Denali Elementary School (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.

Physics Department **August 2008 – May 2009**
Graduate Teaching Assistant

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

Physics Department

September 2006 – June 2008

Undergraduate Teaching Assistant

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
(LAST 5 YRS)

Kennedy, J.H., The ASF DAAC and The NISAR Mission Team.
NASA Distributed Active Archiving Centers and Cloud Computing
Tools and services for working with “big” NASA data like Sentinel-1 and NISAR
NASA Community Snow Meeting, Boulder, CO, August 15, 2024

Kennedy, J.H.

OSL and HyP3 synergies: How they can be used across multiple sensors and disciplines
NASA ESDS Working Group Meeting, Baltimore, MD, March 23, 2023

Kennedy, J.H., T. Logan, A. Johnston, H. Kristenson, F.F. Williams, J. Zhu, J. Smale, J. Herrmann
ASF HyP3: Cloud-native SAR Processing for everyone
NASA ESDIS Technology Spotlight, Online, July 25, 2022

Kennedy, J.H., R. Grapenthin, Y. Cheng, M. Angarita, D. Tan, F.J. Meyer, D. Fee
Volcano Surprise: Rapid discovery thorough analysis in the cloud
NASA Hyperwall Exhibit, Living Planet Symposium, Bonn, Germany, May 26, 2022

Kennedy, J.H.

Accelerate Your Science With On Demand InSAR Processing From ASF
NASA EOSDIS Webinar, Online, July 28, 2021

Kennedy, J.H.

ASF HyP3 for SAR Data Processing
Mini-Workshop for Community Capabilities and Best Practices on Large-scale and Automated
Processing of SAR and Optical Data Products, Online, August 27, 2020

(*Plenary*) Mahajan, S., K.J. Evans, *J.H. Kennedy*, M. Norman, M. Xu
A Multivariate Approach to Ensure Statistical Reproducibility of Climate Model Simulations
Platform for Advanced Scientific Computing (PASC) Conference, ETH Zurich, Switzerland,
June 13, 2019

CONFERENCE
PRESENTATIONS
(LAST 5 YRS)

Kennedy, J.H., et al.

A new Global 30m HAND dataset to support hydrological services and applications
AGU Fall Meeting, Abstract 1657429, December 9-13, 2024

A. Steiker, M. Fisher, *J.H. Kennedy*, D. Kaufman, L.A. López, and the Earthaccess Community
How to accelerate user value through open, collaborative development
Sharing earthaccess community success stories and challenges
NASA ESDIS System Engineering Technical Interchange Meeting (SE-TIM), August 22, 2024

F.J. Meyer, *J.H. Kennedy*, H.J. Kristenson, G.L. Short, A. Handwerker
A day at the OPERA: Discover how analysis-ready OPERA data can accelerate your science
International Geoscience and Remote Sensing Symposium (IGARSS), HD-10, July 7, 2024

F.J. Meyer, *J.H. Kennedy*, H.J. Kristenson, G.L. Short, A. Handwerker
SAR at Scale: Working with Large Volumes of Synthetic Aperture Radar Data
European Conference on Synthetic Aperture Radar (EUSAR), T1, April 23, 2024

J.H. Kennedy, F.F. Williams, F.J. Meyer

SAR at Scale: Working with Large Volumes of Synthetic Aperture Radar Data
International Geoscience and Remote Sensing Symposium (IGARSS), HD-07, July 16, 2023

Kennedy, J.H., et al.

A new Global 30m HAND dataset to support hydrological services and applications
AGU Fall Meeting, Abstract H42F-1362, December 15, 2022

Kennedy, J.H., F.J. Meyer
Cloud-native SAR Processing for everyone
CEOS Working Group on Calibration and Validation, Synthetic Aperture Radar Subgroup meeting,
October 19, 2022

Kennedy, J.H., et al.
ASF's Custom Cloud Processing Services
NISAR Community Workshop, August 31, 2022

Kennedy, J.H., et al.
Get HyP3! Cloud-native SAR processing for everyone
NISAR Community Workshop, August 31, 2022

Kennedy, J.H., et al.
Search and On Demand Processing in Python
NISAR Community Workshop, August 30, 2022

A. Gardner, M. Fahnestock, C. Greene, A. Johnston, *J.H. Kennedy*, et al.
The NASA MEaSUREs ITS-LIVE project: Accelerating glacier science through satellite data synthesis
Living Planet Symposium, May 20, 2022

Kennedy, J.H., et al.
Get HyP3! Cloud-native SAR processing for everyone
Living Planet Symposium, May 20, 2022

Kennedy, J.H., et al.
Get HyP3! SAR processing for everyone
AGU Fall Meeting, Abstract G45B-0395, December 16, 2021

Kennedy, J.H., et al.
Get HyP3! SAR processing for everyone
EGU Fall Meeting, Abstract EGU21-8973, April 28, 2021

Kennedy, J.H., et al.
Science Support: From Prototype to Production
NASA ESDS Working Group Meeting, February, 2021

Kennedy, J.H., et al.
Get HyP3! SAR processing for everyone
AGU Fall Meeting, Abstract IN001-0003, December 7, 2020

Kennedy, J.H., et al.
Automated verification of Earth system models with EVV
SIAM conference on Mathematical and Computational Issues in the Geosciences, March 14, 2019

Kennedy, J.H., et al.
LIVVkit: Now and into the future
CESM land-Ice working Group Meeting, February 4, 2019

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.

AFFILIATIONS AGU American Geophysical Union
 APS American Physical Society
 IGS International Glaciological Society
 SIAM Society for Industrial and Applied Mathematics

TECHNICAL SKILLS	Languages:	Python, Julia, R, C++, FORTRAN, Matlab, SQL, Bash, L ^A T _E X
	Operating Systems:	Unix/Linux (desktops to HPCs), Windows, OSX
	DevOps:	GitHub Actions, GitLab CI/CD, Docker, Git
	Data formats:	Zarr, Cloud Optimized GeoTIFFs, HDF5, NetCDF4, CF-conventions, Parquet
	SAR processing:	ISCE2/3, RAI ² DER, MintPy, PyAPS, GAMMA, Xarray-Sentinel
	Math/Science Packages:	conda/mamba, Scikit-learn, Pandas, Xarray, Numpy, Scipy
	Climate/GIS Tools:	GDAL, QGIS, NCO, PyNIO/PyNGL, NCL, GMT
	Data Science:	PCA, multivariate testing, regression analysis
	Frameworks/Skills:	Agile software development, test-driven development, verification and validation, unit and integration testing, continuous integration, containerization
OTHER SKILLS AND ACTIVITIES	◇ Wilderness experience including a continuous 700 mile, 33 day, canoe trip down the Yukon River	
	◇ Enjoy outdoor recreation: canoeing, biking, hiking, camping, etc.	
	◇ Trained in bear safety	