

Shane Grigsby, Ph.D.

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Full legal name: Erik Shane Philbert Grigsby
Citizenship: United States Citizen
Federal Experience: Yes, Exempted Service (DCIPS Payband 4 / GS14 Equivalent)
Security Clearance: Active TS/SCI with CI Polygraph (Tier 5 background check)

Registered for Selective Service: Yes

Veterans Preference: No

Objective: To enable, enhance, and support current and future science missions & efforts. I am deeply committed to fostering open and reproducible science across the scientific community, and am motivated to engage with roles that promote and lead large collaborative science efforts with significant impact.

Skills Summary:

Highly motivated and collaborative scientist with 12 years of experience planning, implementing, and leading applied science projects and programs. Effective program manager with experience developing program metrics and policies to guide and monitor program implementation.

Possess deep technical and scientific specializations in optical remote sensing (passive and active), machine learning and distributed cloud computing, and multiple earth science domains connected to the cryosphere. Consistent and passionate advocate for cultivating open and reproducible science, open source software, and open and inclusive scientific communities. Extensive experience with the scientific review process, which includes both serving and leading review panels, as well as creating program solicitations. Holistic view of agency and community objectives, with a consistent practice of envisioning programmatic strategy that is broad and synergistic across additional sections & divisions, other federal agencies, and community stakeholders and partners.

- Program Manager for the Adversarial MOBility (AMOB) program at the National Geospatial-Intelligence Agency (NGA)--responsible for programmatics, budget, and planning. Supervised and tasked multiple teams in support of the program.
- Led source selection from review to contract awards as the Topic Manager for the Detecting Known Trajectory Manipulations (DKTM) call of NGA's Boosting Innovative GEOINT Research Broad Agency Announcement (NGA BIG-R BAA). Additionally defined metrics for this BAA prior to proposal solicitation.

- Authored multiyear Test and Evaluation and Independent Validation & Verification (IV&V) strategy for AMOB program, identified and selected the appropriate Federally Funded Research and Development Center (FFRDC) to assist in implementing this strategy.
- Developed open source software contribution policy for NGA, implemented agency wide.
- Initiated a new cloud computing initiative for NGA to modernize the research and development environment for both the AMOB program & NGA Research more broadly.
- While at NASA Goddard, fostered ongoing multi year collaboration with Dr. Fernando Perez and the NSF funded 'Jupyter meets the Earth' project to develop cloud computing technologies with NASA ICESat-2 and MODIS datasets.
- Taught computing and machine learning for the NASA ICESat-2 Hackweek.
- Served as an external reviewer while at the Colorado School of Mines for the ICESat-2 ATL11 Algorithm Theoretical Basis Document (ATBD).
- Served as a reviewer for multiple NASA panels; ad hoc reviewer for multiple journals
- Implemented major new feature for the sklearn machine learning software library (lead author for the OPTICS clustering module). Contributed to multiple other open source community libraries, taught computation for scientists through Software Carpentry.
- Promoted diversity and inclusiveness in NASA Earth Sciences by serving multiple years as a research mentor for the NASA Student Airborne Research Program (NASA SARP).

Professional experience:

R&D Scientist, Job Code 23AT84
 DCIPS Pay Band 4 (IA 04, GS14 equivalent)
 National Geospatial Intelligence Agency (NGA)
 7500 GEOINT Drive
 Springfield, VA 22150

11/08/2021 – 01/10/2023
 Salary: \$174,084
 Hours per week: 40
 Office Director: Phil.A.Sage@nga.mil
 Ok to Contact: Yes

Program manager for the AMOB program in charge of programmatics, scientific robustness, and software implementation & strategy. Duties included leading the BAA source selection and review process as the DKTM (Detecting Known Trajectory Manipulations) Topic Manager, as well as designing and authoring the Test and Evaluation and IV&V strategy strategy for the program. Supervised and tasked multiple teams in support of the program, including a cloud infrastructure team, internal integration team, and the FFRDC external evaluation team. Obligated program funds in advance of expiration, and additionally developed program policies related to program implementation, classification levels, and open source software use; the latter two policies were also implemented at the agency level for broad use across directorates. Served as subject matter expert in machine learning and remote sensing for support of other projects and review panels. Assisted the NGA SCuBA program, which utilizes ICESat-2 observations for an unclassified NGA bathymetry product; provided the agency with additional context and information for ICESat-2 mission operational constraints and decisions made by the science team and NASA ICESat-2 project science office. Developed new program ideas and pitches for future solicitations, wrote task orders, mentored junior scientists. Completed a full year of federal service at the Payband 4 (GS14 equivalent) level with a fully successful and higher performance evaluations, and received a performance based salary increase (see SF50).

Assistant Scientist, ICESat-2 Project Science Office
Federal Contractor (University of Maryland)
Earth System Science Interdisciplinary Center
NASA Goddard, Greenbelt MD
Section 615, Cryospheric Sciences Laboratory

01/19/2021 – 11/05/2021
Hours per week: 40
Salary: \$85,000
GPOC: thomas.neumann@nasa.gov
Ok to Contact: Yes

Worked in support of the ICESat-2 Project Science Office to develop new tools and data products from ICESat-2 data. Developed cloud native workflows for ICESat-2 data query and analysis in collaboration with Dr. Fernando Perez and the 'Jupyter meets the Earth' NSF project. Additionally created tools for cloud native access and processing of MODIS data, beginning a high temporal resolution snow grain size retrieval project (ongoing, expected to submit for publication later this year). Created data fusion techniques to combine ICESat-2 data with additional raster datasets in the cloud, extending the NASA HEALPIX project for astronomy data to work with ICESat-2 point data. The driving science use case for the HEALPIX work was tracking ice divide boundaries in Antarctica through time, an active area of research that is continuing.

Postdoctoral Researcher
Colorado School of Mines
Department of Geophysics
924 16th Street
Golden, CO 80401

08/26/2019 – 01/15/2021
Hours per week: 40
Salary: \$60,000
Supervisor: siegfried@mines.edu
Ok to Contact: Yes

Developed proposals for both unsolicited and competitive program solicitations, with successful selection and funding for each as a Co-Investigator. Supported the NASA airborne sciences Operation IceBridge (OIB) mission by investigating timing errors in the Airborne Topographic Mapper (ATM) instrument, which were communicated to the instrument team at NASA Goddard. Invited to be an external reviewer for the ICESat-2 ATL11 Algorithm Theoretical Basis Document (ATBD); invited to support reproducible science by teaching machine learning and python programming at the NASA ICESat-2 Hackweek (both invitations accepted). Contributed to open source machine learning libraries by enhancing and improving the CuPy library in support of stochastic simulations that were being run on GPUs for error analysis of the OIB ATM data. Mentored an undergraduate student at the lab, and made contributions to the scientific community through conference presentations, paper submissions, and review service for both panels and journals.

Funded External Proposals:

(\$1,166,497) (09/2020 - 05/2023)

"Observationally constrained simulations of the evolution of polar snow using a multi-sensor approach" Solicitation (NASA): Interdisciplinary Research in Earth Science PI: Brooke Medley (NASA Goddard); Co-Is: Jan Lenarts (University of Colorado), **Shane Grigsby** (NASA Goddard), James Carton (University of Maryland), Matthew Siegfried (Mines), Thomas Overly (NASA Goddard), Jonathan Ryan (Brown), Tyler Sutterley (University of Washington)

(\$149,917) (06/2020 - 06/2022)

"Long-term validation of ICESat-2 range measurements with ground, air, and satellite surveys of salar de Uyuni, Bolivia" NASA Unsolicited Proposals PI: Matthew Siegfried (Mines); Co-Is: **Shane Grigsby** (Mines), Gabriel Walton (Mines), Mike Willis (University of Colorado, Boulder)

Education:

Ph.D. – University of Colorado at Boulder, 2019, GPA 3.92

Geography

Advisor: Dr. Waleed Abdalati

Dissertation: *Greenland Surface Roughness Retrieval and Status*

M.A. – University of California, Santa Barbara, 2014, GPA 3.8

Geography

Advisor: Dr. Dar Roberts

Thesis: *Improved Surface Temperature Estimates with MASTER/AVIRIS sensor fusion*

B.A. – University of Colorado at Boulder, 2011, Magna Cum Laude

Geography, Philosophy

Senior Thesis for High Honors: *Derivation of Solar Insolation Estimates from LiDAR*

Additional notable professional experience during graduate studies:

Research Associate

06/2014 – 08/2019

Cooperative Institute for Research in Environmental Sciences
Boulder, CO

Hours per week: 20–30
Salary: Graduate Stipend

Developed a novel processing pipeline and "roughness" data product for the NASA ICESat satellite. Our project used millions of laser waveforms collected over multiple years to map the location and character of crevasses on the Greenland ice sheet. Developed novel unsupervised method of classifying hundreds of thousands of unlabeled raster tiles from compressed data. Specified high performance computing hardware requirements, and developed algorithmic capabilities for the project.

Team Lead & Data Architect

07/2018 - 02/2019

Orbital Micro Systems
Boulder, CO

Hours per week: 20–30
Salary: Graduate Stipend

Led the data ingest team (8 to 10 members) through the design phase of a satellite startup that aims to provide low latency operational weather data. Provided leadership porting scientific MATLAB radiative transfer code to production python for deployment to the AWS cloud. Architected spatial indexing schema for petabyte scale rasters

Research Analyst
'BigData' Intel Science and Technology Center
Santa Barbara, CA

09/2013 - 08/2014
Hours per week: 20-30
Salary: Graduate Stipend

Developed driving remote sensing applications and science use cases for SciDB, an array-database for distributed storage and high performance linear algebra operations on sparse multidimensional arrays. Our science dataset was one year of raw MODIS data. Created data ingest scripts and schema for preprocessing and importing MODIS data granules. Prototyped spatio-temporal indexing for fast lookup and retrieval of image subsets.

Instructor and Research Mentor
NASA Student Airborne Research Program
NASA Dryden/Armstrong

05/2012 - 08/2015 (Summer only)
Hours per week: 40 (Summer only)
Salary: Stipend

Supervised and led teams of 8 to 10 STEM college upperclassmen through acquisition, validation, and processing of data collected by NASA Airborne assets. Planned flight lines, vicarious calibration campaigns, and science objectives. Deployed a novel photon-counting LiDAR system for its maiden airborne flight. Instructed proper use of both field equipment and atmospheric correction techniques. Mentorship years were 2012, 2013, and 2015.

Publications:

(As of June 2023: 400+ citations, h-index=5)

Snow, Tasha, Fiamma Straneo, James Holte, **Shane Grigsby**, Waleed Abdalati, and Ted Scambos. "More than skin deep: Sea surface temperature as a means of inferring Atlantic Water variability on the southeast Greenland continental shelf near Helheim Glacier." *Journal of Geophysical Research: Oceans* 126, no. 4 (2021): e2020JC016509
<https://doi.org/10.1029/2020JC016509>

Christoffersen, Poul, Marion Bougamont, Alun Hubbard, Samuel H. Doyle, **Shane Grigsby**, and Rickard Pettersson. "Cascading lake drainage on the Greenland Ice Sheet triggered by tensile shock and fracture." *Nature Communications* 9, no. 1 (2018): 1064.
<https://doi.org/10.1038/s41467-018-03420-8>

Moussavi, Mahsa S., Waleed Abdalati, Allen Pope, Ted Scambos, Marco Tedesco, Michael MacFerrin, and **Shane Grigsby**. "Derivation and validation of supraglacial lake volumes on the Greenland Ice Sheet from high-resolution satellite imagery." *Remote sensing of environment* 183 (2016): 294-303. <https://doi.org/10.1016/j.rse.2016.05.024>

Colgan, William, Harihar Rajaram, Waleed Abdalati, Cheryl McCutchan, Ruth Mottram, Mahsa S. Moussavi, and **Shane Grigsby**. "Glacier crevasses: Observations, models, and mass balance implications." *Reviews of Geophysics* 54, no. 1 (2016): 119-161.
<https://doi.org/10.1002/2015RG000504>

Pope, Allen, Ted A. Scambos, M. Moussavi, Marco Tedesco, M. Willis, D. Shean, and **S. Grigsby**. "Estimating supraglacial lake depth in West Greenland using Landsat 8 and comparison with other multispectral methods." *The Cryosphere* 10, no. 1 (2016): 15-27.
<https://doi.org/10.5194/tc-10-15-2016>

Grigsby, Shane P., Glynn C. Hulley, Dar A. Roberts, Christopher Scheele, Susan L. Ustin, and Maria Mar Alsina. "Improved surface temperature estimates with MASTER/AVIRIS sensor fusion." *Remote Sensing of Environment* 167 (2015): 53-63.
<https://doi.org/10.1016/j.rse.2015.05.019>

Journal Review Service:

- Remote Sensing of Environment
- IEEE Transactions on Geoscience and Remote Sensing
- IEEE Journal of Selected Topics in Applied Earth Observation
- Earth and Space Science
- Remote Sensing
- Ecological Processes
- The Cryosphere

Invited Talks:

- NASA Goddard (2020)
- US Army Corps (CRREL, 2019)
- ISAR5 (Tokyo, 2018)
- AGU (New Orleans, 2017)
- Scipy (Austin, 2017)
- NASA Goddard (2017)
- AGU (San Francisco, 2015)
- NASA Ames (2014)
- FOSS4G (Denver, 2011)
- Google (Boulder, 2010)

Notable Open source contributions:

- Sklearn, primary author of the OPTICS clustering algorithm (PR 1984)
- CuPy, Multivariate Normal Speed Enhancements (PR 3018)
- Mortie and GeoStacks libraries, Maintainer and Core Contributor

Merit Scholarships, Fellowships, and Competitive Scholastic Grants:

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| • TGIF Green Grow Lights Project | Funded Amount: \$38,785 |
| • Solar Mapping Project (Sustainable CU Grant) | Funded Amount: \$20,000 |

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| • USGIF Geospatial Intelligence Scholarship | Funded Amount: \$5,000 |
| • GeoEye Fellowship | Funded Amount: \$5,000 |
| • Gilman Scholarship | Funded Amount: \$4,500 |
| • Undergraduate Research Opportunities Program | Funded Amount: \$2,400 |
| • CU Study Abroad Scholarship | Funded Amount: \$1,700 |
| • Dangermond Travel Scholarship | Funded Amount: \$1,700 |

Languages:

Spanish (conversational)

References:

Dr. Waleed Abdalati

Organization: Cooperative Institute for Research in Environmental Sciences

Title: Director

Contact email : waleed.abdalati@colorado.edu

Cell: 240.481.1259

Phil Sage

Organization: National Geospatial-Intelligence Agency (NGA), Research Directorate

Title: Office Director, Analytic Technologies Office (ATO)

Contact email: Philip.A.Sage@nga.mil

Cell: 703.597.7743

Dr. Fernando Pérez

Organization(s):Jupyter Project, NumFocus, 2i2c

Title: Open Source Community Leader

Contact email: fernando.perez@berkeley.edu

Cell: 303.642.5486

Dr. Matthew Siegfried

Organization: Department of Geophysics, Colorado School of Mines

Title: Assistant Professor, Head of Mines Glaciology Laboratory

Contact email: siegfried@mines.edu

Cell: 847.525.8487