Thomas Trantow

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EDUCATION

UNIVERSITY OF COLORADO | Boulder, CO
PhD in Geophysics | Advisor: Dr. Ute Herzfeld
May 2020 | Department of Electrical, Computer and Energy Engineering | Cum. GPA: 3.97 / 4.0

MS in Applied Mathematics with an Emphasis in Computational Physics
August 2014 | College of Arts and Sciences | Cum. GPA: 3.88/4.0

BS in Applied Mathematical Engineering | Minors: Physics, Economics
August 2014 | College of Engineering | Cum. GPA: 3.76 / 4.0

AWARDS

- ECEE Silver Award for Outstanding Graduate Research (2020)
- 35th IGC Geohost Award (2016)
- Computers and Geosciences Research Scholarship (2016)
- Colorado Diversity Initiative Fellowship (2015)
- 2014 Applied Mathematics nominee for Outstanding Graduate in Service

EXPERIENCE

GEOMATHEMATICS, REMOTE SENSING AND CRYOSPHERIC SCIENCES LAB | Research Associate
July 2023 - Present | Boulder, CO

- **Publishing original research** in remote sensing, machine learning, algorithm development, numerical modeling and model-data synthesis in high-impact journals
- **Mentoring and teaching** undergraduate and graduate students interested in scientific research

UNIVERSITY OF COLORADO | Lead Research Assistant
Undergraduate 2012-2014, Professional 2014-2015, Graduate 2015-2020, Postdoctoral 2020-2022 | Boulder, CO

- **Led a diverse research group** of students working on projects ranging from image classification using **machine learning** to processing and analyzing **big data sets** of the cryosphere, atmosphere and water bodies
- Self-taught expertise with the finite element software Elmer/Ice (FORTRAN, MATLAB, C), **creating a realistic model** of Bering Glacier to better understand dynamic instability within a complex glacier system
- **Lead developer** of the python-based Density Dimension Algorithm, an auto-adaptive height-finding algorithm used by NASA to identify environmental signals in the new photon-counting technology provided by the ICESat-2 mission
- Extensive experience analyzing **satellite imagery and altimetry** from missions such as ICESat-2, ICESat, CryoSat-2, Sentinel 1 and 2, Landsat, Worldview and CALIPSO

SELECTED PUBLICATIONS

- Trantow, Thomas, and Ute C. Herzfeld, *Evolution of a Surge Cycle of the Bering-Bagley Glacier System from Observations and Numerical Modeling*, Journal of Geophysical Research: Earth Surfaces, January 2024, doi:10.1029/2023JF007306
- Trantow, Thomas, *Surging in the Bering-Bagley Glacier System, Alaska – Understanding Glacial Acceleration through New Methods in Remote Sensing, Numerical Modeling and Model-Data Comparison.* Ph.D. Dissertation, University of Colorado, ProQuest/UMI, May 2020
- Trantow, Thomas, and Ute C. Herzfeld, *Crevasses as indicators of surge dynamics in the Bering Bagley Glacier System, Alaska: Numerical experiments and comparison to image data analysis*, Journal of Geophysical Research: Earth Surfaces, May 2018, doi:10.1029/2017JF004341

- Trantow, Thomas, and Ute C. Herzfeld, *Spatiotemporal mapping of a large mountain glacier from CryoSat-2 altimeter data: surface elevation and elevation change of Bering Glacier during surge (2011-2014)*, International Journal of Remote Sensing, March 2016, doi:10.1080/01431161.2016.1187318
- Trantow Thomas, Ute C. Herzfeld, Veit Helm and Johan Nilsson, *Sensitivity of glacier elevation analysis and numerical modeling to CryoSat-2 SIRAL retracking techniques*, Computers & Geosciences, January 2021, doi:10.1016/j.cageo.2020.104610
- Trantow, Thomas, *Numerical experiments of dynamical processes during the 2011-2013 surge of the Bering-Bagley Glacier System, using a full-Stokes, finite element model*, Master's Thesis, University of Colorado, ProQuest/UMI, 2014

SYNERGISTIC ACTIVITIES

- **DDA-ice development.** I have been working to advance the DDA-ice algorithm for detection of ice-surface heights in ICESat-2 data since 2014. Before the launch of ICESat-2 in 2018, I helped write the DDA-ice algorithm in several coding languages when only airborne simulator data were available. More recently, I have applied the algorithm to study the surge in Negribreen and am currently using it to create Greenland-wide maps of surface height and roughness. The high-resolution product provided by the DDA-ice is of significant interest to the scientific community and to help share our code I have written a DDA-ice tutorial in a Jupyter notebook which is currently being tested and improved within our lab.

- **International Field Work.** I co-organized and participated in three successful Arctic airborne-campaigns to Negribreen, Svalbard, that investigated surge-glacier properties using laser altimetry synced with kinematic GPS measurements. In preparation for each campaign, I prepared our survey setup by engineering cables, writing instrument interface and data analysis code, and stress-testing the equipment. In addition, I helped with travel logistics and prepared new team members for the campaigns. During each campaign abroad, we collaborated with local researchers and technicians to execute our surveys, and we shared our findings by giving presentations at the local universities and schools.

- **Broadening Opportunity through Leadership and Diversity.** Since 2008 I have been part of the Multicultural Engineering Program (MEP), which transformed into the Broadening Opportunity through Leadership and Diversity (BOLD) Center, at the University of Colorado Boulder. In 2014 I was the Applied Mathematics nominee for Outstanding Graduate in Service for my work with the BOLD Center that included volunteer work and the provision of free tutoring to underrepresented students for courses in mathematics, physics and engineering.

- **Participant in Elmer/Ice Modeling Community.** All the modeling code I developed since I started using Elmer/Ice in 2012 has been made available to the Elmer/Ice open source community (github.com/trantow/bbgs_elmer). I participated in one of the first Elmer/Ice workshops at the University of Washington in 2013 where I not only learned how to use the software, but made important connections in the community. As lab leader in the Geomathematics Research Group, I am continually teaching eager students numerical modeling using Elmer/Ice and how to contribute to the community.

- **Engagement with CESM Community.** I have continually attended Community Earth System Model (CESM) meetings since 2012 when I gave my first talk as an undergraduate. At these meetings, I shared and presented research results, made professional and personal connections, and learned from diverse perspectives on a variety of scientific and policy topics.