

Ryan K. Cassotto, Ph.D.

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ACADEMIC PREPARATION

Earth and Environmental Sciences (Ph.D.)	2017
University of New Hampshire, Durham, NH <i>"Unraveling short-term variations in tidewater glacier flow: Insights from terrestrial radar interferometric studies"</i>	
Earth Science: Geology (M.S.)	2011
University of New Hampshire, Durham, NH <i>"Implications of changing winter fjord ice mélanges for Greenland outlet glacier dynamics"</i>	
Electronic Engineering Technology (B.S.)	1999
University of Hartford, Hartford, CT	

RELEVANT EXPERIENCE

University of Colorado, Boulder, CO	2018 - present
<i>Cooperative Institute for Research in Environmental Sciences (CIRES)</i>	
<ul style="list-style-type: none">• Generate mosaics of very high resolution (2-m) digital elevation models (DEMs) derived from optical satellite imagery to characterize the impacts of sea level rise on coastal cities.• Investigate the impacts of a perennial firn aquifer on ice dynamics in southeast Greenland using satellite remote sensing observations.• Provide remote sensing and modeling expertise for a NASA Interdisciplinary Research in Earth Science project to evaluate how climate change facilitates cascading natural hazards (precipitation, drought, fire, landslides).• Launched and chaired new CIRES Mentorship Program that partners junior researchers and staff with senior personnel to enhance diversity and inclusion, encourage collaborations, and improve employee morale.• Authored and submitted four research proposals to external funding agencies (NASA, NSF), one pending.	
University of New Hampshire, Durham, NH	2008 - 2017
<ul style="list-style-type: none">• Applied new terrestrial radar interferometry technology to study ice dynamics along fast flowing (50 m d⁻¹) Greenland tidewater glaciers and map aseismic slip (10 mm yr⁻¹) along a California earthen dam.• Combined passive (optical, thermal microwave) and active (radar) measurements with photogrammetry observations to characterize geophysical surface deformation.• Developed a novel algorithm to use daily MODIS thermal infrared observations to assess variations in proglacial winter ice mélange in Greenland fjords.	

ACADEMIC RESEARCH POSITIONS

Post-Doctoral Research Associate, University of Colorado, Boulder, CO	2018 - Present
NASA Earth and Space Science Fellow, University of New Hampshire	2014 – 2017
New Hampshire Space Grant Fellow, University of New Hampshire	2013 – 2014
Research Assistant, University of New Hampshire	2011 – 2013

PUBLICATIONS

- Cassotto, R.K.**, J. Burton, J.M. Amundson, M. Fahnestock, & M. Truffer. Granular decoherence precedes ice mélange failure and glacier calving at Jakobshavn Isbræ. *Nature Geoscience* (in press)
- Samsonov, S., K. Tiampo, & **R. Cassotto**. Measuring the state and temporal evolution of glaciers using SAR-derived 3D time series of glacier surface flow. *The Cryosphere Discuss.*, <https://doi.org/10.5194/tc-2020-257>
- 2021 Samsonov, S., K. Tiampo, & **R. Cassotto**. SAR-derived flow velocity and its link to glacier surface elevation change and mass balance. *Remote Sensing of Environment*. (258) <https://doi.org/10.1016/j.rse.2021.112343>
- 2019 **Cassotto, R.K.**, M. Fahnestock, J.M. Amundson, M. Truffer, M. Boettcher, S. de la Pena, I. Howat. Non-linear glacier response to calving events, Jakobshavn Isbræ. *Journal of Glaciology*. 65(249), 39-54 <https://doi.org/10.1017/jog.2018.90>
- Willis, MJ; W.D. Barnhart, **R. Cassotto**, J. Klassen, J. Corcoran, T. Host, B. Huberty, K. Pelletier, & J.F. Knight. *CaliDEM: Ridgecrest, CA Region 2m Digital Surface Elevation Model*. <https://doi.org/10.5069/G998854C>
- 2018 Burton, J.C., J. Amundson, **R. Cassotto**, C.C. Kuo, M. Dennin. Quantifying flow and stress in ice mélange, the world's largest granular material, *Proceedings of the National Academy of Sciences*. 115(20), 4105-5110. <https://doi.org/10.1073/pnas.1715136115>
- 2017 Werner, C., B. Baker, **R. Cassotto**, C. Magnard, U. Wegmuller, and M. Fahnestock. Measurement of fault creep using multi-aspect terrestrial radar interferometry at Coyote Dam. *Proceedings from the 2017 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*. <https://doi.org/10.1109/IGARSS.2017.8127110>
- Voytenko, D., T. H. Dixon, D. M. Holland, **R. Cassotto**, I. M. Howat, M. Fahnestock, M. Truffer, and S. de la Peña. Acquisition of a 3 min, two-dimensional glacier velocity field with terrestrial radar interferometry, *Journal of Glaciology*, 63(240), 629–636, <https://doi.org/10.1017/jog.2017.28>
- Motyka, R.J., **R. Cassotto**, M. Truffer, K.K. Kjeldsen, D. van As, N.J. Korsgaard, M. Fahnestock, I. Howat, P.L. Langen, J. Mortensen, K. Lennert, and S. Rysgaard. Asynchronous behavior of outlet glaciers feeding Godthabsfjord (Nuup Kangerlua) and the triggering of Narsap Sermia's retreat in SW Greenland. *Journal of Glaciology*, 63(238). <https://doi.org/10.1017/jog.2016.138>
- 2015 Peters, I.R., J.M. Amundson, **R.K. Cassotto**, M. Fahnestock, K.N. Darnell, M. Truffer, and W.W. Zhang. Dynamic jamming of iceberg-choked fjords, *Geophysical Research Letters*, 42. <http://doi.org/10.1002/2014GL062715>
- Cassotto, R.K.**, M. Fahnestock, J.M. Amundson, M. Truffer, and I. Joughin. Seasonal and interannual variations in ice mélange rigidity and its impact on terminus stability, Jakobshavn Isbræ, Greenland, *Journal of Glaciology*, 61(225). <https://doi.org/10.3189/2015JoG13J235>
- 2012 Podrasky, D., M. Truffer, M. Fahnestock, J. Amundson, **R. Cassotto**, and I. Joughin. Outlet glacier response to forcing over hourly to interannual timescales, Jakobshavn Isbræ, Greenland. *Journal of Glaciology*, 58(212), 1212 - 1226. <https://doi.org/10.3189/2012JoG12J065>

MANUSCRIPTS IN PREPARATION

Cassotto, R. K., M.A. Fahnestock, S.A. O’Neel, L. Sass, and R.W. McNabb. Large response to precipitation and tidal forcing at Columbia Glacier – evidence for late summer changes in basal water system.

Cassotto, R. K., M.J. Willis, Køge Bugt: Evidence for firn aquifer impacting Greenland’s dynamic ice mass loss.

GUEST LECTURES

“Map Interpretation of the Landscape” for Mapping a Changing World, Boulder, CO. Nov 12, 2020.

“Terrestrial Radar Interferometry” for InSAR Processing and Interpretation. Boulder, CO. Oct 26, 2020.

“Remote Sensing, Satellite and Image Maps” for Mapping a Changing World, Boulder, CO. Oct 1, 2020

“Paleoclimate” for Our Deadly Planet, Boulder, CO. Dec 9, 2019

“Mass Extinctions” for Our Deadly Planet, Boulder, CO. Sep 19, 2019.

“Ice Flow and Calving Front Dynamics” for The Cryosphere: Ice and Icy Environments. Boulder, CO. Feb 14, 2019.

“The Cryosphere” for Planet Earth, Boulder, CO. Feb 26, 2019.

“Mountain Building and Geodesy” for Introduction to Geology, Boulder, CO. Mar 8, 2018.

PRESENTATIONS

Cassotto, R.K., J. Burton, J. Amundson, M. Fahnestock, M. Truffer. The influence of granular ice mélange on iceberg calving. National Snow and Ice Data Center (NSIDC), Boulder, CO. Nov 6, 2019 (Invited)

Cassotto, R.K. M.J. Willis, M. MacFerrin. C.Miège, M. Bevis. Semi-periodic Dynamic “Thickening” of a Tidewater Glacier in Køge Bugt, Greenland, National Center for Atmospheric Research, Boulder, CO. Feb 4, 2019 (Invited)

Cassotto, R.K. M.J. Willis, M. Bevis, M. MacFerrin. Semi-periodic Dynamic “Thickening” of a Tidewater Glacier in Køge Bugt, Greenland, Abstract C14A-04, AGU Fall Meeting, Washington D.C.. Dec 10, 2018

Cassotto, R.K., M.A. Fahnestock, J.M. Amundson, M. Truffer, and M.S. Boettcher. The correlation between calving size and glacier speed – or lack thereof. NASA Program for Arctic Research and Climate Assessment (PARCA), Goddard Space Flight Center, Greenbelt, MD. Jan 24, 2017

Cassotto, R.K., J. M. Amundson, M.A. Fahnestock, M. Truffer, J. Burton, C. Kuo, M. Dennin, and M.S. Boettcher. Evolution of Ice Mélange Motion During Periods of Terminus Quiescence, Abstract C51A-0650, AGU Fall Meeting, San Francisco, CA. Dec 2016

Cassotto, R.K., M.A. Fahnestock, J.M. Amundson, M. Truffer, and S. O’Neel. Variations at the ice–ocean boundary: insights from terrestrial radar interferometric studies of tidewater glaciers, Abstract 74A2110, IGS Symposium, San Diego, CA. Jul 2016

Cassotto, R.K., M.A. Fahnestock, S. O’Neel, L. Sass, R.W. McNabb, and W.T. Pfeffer. Large response to precipitation and tidal forcing at Columbia Glacier imaged with terrestrial radar interferometry, Abstract C43B-0808, AGU Fall Meeting, San Francisco, CA (Outstanding Student Presenter Award). Dec 2015

Cassotto, R.K., M. Fahnestock, J.M. Amundson, and M. Truffer. Glacier–Ocean Interactions on Short Timescales: Can observations of tidal and calving impacts on near-terminus ice flow inform us about controls on terminus stability? International Workshop on Understanding the Response of Greenland’s Marine Terminating Glaciers to Oceanic and Atmospheric Forcing. Beverly, MA. Jun 2013

Cassotto, R.K. M.A. Fahnestock, M. Truffer, R.J. Motyka, D. Podrasky, and P. Dryer. Observations of a Greenland Tidewater Outlet Glacier Behavior Using a Ground Based Radar Interferometer. International Symposium on Glaciers and Ice Sheets in a Warming Climate, University of Alaska, Fairbanks, AK. Jun 2012

Cassotto, R.K., M.A. Fahnestock, J.M. Amundson, M. Truffer, and I. Joughin. Implications of changing winter fjord ice mélanges for Greenland outlet glacier dynamics. NASA Program for Arctic Research and Climate Assessment (PARCA), Goddard Space Flight Center, Greenbelt, MD. Jan 2012

Cassotto, R.K., M.A. Fahnestock, and J.M. Amundson. Implications of Greenland Fjord Ice Stability on Terminus Retreat from the MODIS Thermal Record. International Symposium on Interactions of Ice Sheets and Glaciers with the Ocean, Scripps Institute of Oceanography, San Diego, CA. Jun 2011

AWARDS

CIRES Outstanding Performance Award	2020
University of New Hampshire Graduate Student Research/Scholarship/Creativity Award	2017
Outstanding Student Paper Award (OSPA), AGU Fall Meeting	2015

SKILLS

- Satellite (Optical, Thermal Microwave, Radar) Remote Sensing and Image Processing
- Terrestrial Radar Interferometry
- Big Data
- Photogrammetry
- Gamma Remote Sensing SAR and Interferometry
- Quantum GIS (QGIS)
- Shell scripting
- MATLAB (expert)
- Python (novice)

SYNERGISTIC ACTIVITIES

Service to CIRES / NOAA	2019 – present
<i>CIRES Members’ Council Representative, CIRES Mentoring Program Chairperson</i>	
Peer Review Panels	2019 – present
<i>NASA, NSF</i>	
Outreach Engagements	2018 – present
<i>National Ocean Sciences Bowl ‘Trout Bowl’ Keynote Speaker</i>	
<i>Guest Geologist / Glaciologist, Red Hawk Elementary Science Night</i>	
Mentorship	2014 – present
<i>CIRES PhD students, UNH Geophysics students</i>	
Manuscript Peer Reviewer	2014 – present
<i>Journal of Glaciology, Geophysical Research Letters, Remote Sensing of Environment</i>	

FIELD EXPERIENCE

<i>October 2014</i>	<i>Columbia Glacier, Valdez, Alaska</i>	Conducted terrestrial radar interferometric measurements of Columbia Glacier
<i>August 2012</i>	<i>Jakobshavn Isbræ, Ilulissat Greenland</i>	Performed terrestrial radar interferometric measurements of glacier and ice mélange, time-lapse photogrammetry, tidal measurements
<i>August 2010/11</i>	<i>Kangiata Nunaata Sermia, Nuuk Greenland</i>	Acquired terrestrial radar interferometric measurements of terminus and ice mélange, time-lapse photogrammetry, theodolite and GPS surveys

- April 2010 *Jakobshavn Isbræ, Ilulissat, Greenland*
Assisted in GPS survey of 2000-meter contour, time-lapse photogrammetry
- July-Aug 2009 *Juneau Icefield Research Program, Juneau, Alaska*
Excavated snow pits for surface mass balance estimates, Assisted GPS surveying
- July 2008 *Castner Glacier, Delta, Alaska*
Volunteer field assistant for glacial geomorphology project

PROFESSIONAL AFFILIATIONS

- American Geophysical Union (AGU)
- International Glaciological Society (IGS)
- American Association for the Advancement of Science (AAAS)

PREVIOUS WORK EXPERIENCE

- L-3 Communications Systems West, Salt Lake City, UT** *2003 - 2007*
Electromagnetic Compatibility (EMC) Engineer
- Provided inception-through-delivery systems engineering support of DoD satellite communication systems.
 - Guided projects through the EMC certification process and supported multi-agency test efforts of Unmanned Aerial Vehicles (UAV) at a government test facility.
 - Established effective working relationships across departments and liaised between engineering, manufacturing, and government contractors to resolve issues and ensure customer satisfaction.
 - Advised engineering and manufacturing personnel on proper EMC design and mitigation techniques.
 - Collaborated with RF, electrical, and mechanical engineers during instrument design.
 - Supervised the cable design engineering team to rectify EMC fabrication issues.
- Quantum Bridge Communications, Andover, MA** *2000-2001*
Compliance Engineer
- Successfully attained regulatory compliance approvals for two families of optical networking equipment, including multiple generations of hardware development.
 - Prepared test plans and component documentation for agency reviewers.
 - Advised senior management on compliance issues and certification progress.
- Curtis-Straus LLC, Littleton, MA** *1999-2003*
Electromagnetic Compatibility Test Engineer
- Performed electromagnetic emissions testing during the regulatory approvals process (FCC, CE, UL).
 - Diagnosed EMC failures and implemented solutions for telecommunication and biomedical devices.
 - Established exceptional rapport with clientele, earning preferred Engineer status for off-site testing.
 - Authored technical reports to convey test results.