
# Colin J. Gleason

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## EDUCATION

**Ph.D. (2016)** Geography, University of California Los Angeles (2011-2016)

**M.S. (2011)** Environmental Resources Engineering, State University of New York College of Environmental Science and Forestry (2009-2011)

**B.S. (2009)** Forest Engineering, State University of New York College of Environmental Science and Forestry *Magna Cum Laude* (2005-2009)

## EMPLOYMENT

**Assistant Professor (2016-present)** University of Massachusetts, Amherst Department of Civil and Environmental Engineering

## PEER-REVIEWED JOURNAL PUBLICATIONS

***** denotes advisee. I do not use the convention where the lab manager who conceives of and funds research is listed last, rather, I list authors by their contributions when my lab's work is published.
** denotes undergraduate advisee

Allen, G.H., Pavelsky, T.M., Barefoot, E.A., Lamb, M.P., Butman, D., Tashie, A., **& C.J. Gleason** (2018). Similarity of stream width distributions across headwater systems. *Nature Communications* 610 doi:10.1038/s41467-018-02991-w

**Barber, C.A. **& C.J. Gleason** (2017). Verifying the prevalence, properties, and congruent hydraulics of at-many-stations hydraulic geometry (AMHG) for rivers in the continental United States. *Journal of Hydrology* doi.org/10.1016/j.jhydrol.2017.11.038

Smith, L.C., Yang ,K, Pitcher, LH, Overstreet, BT, Chu, VW, Rennermalm, AK, Ryan, J, Cooper, MG, **Gleason, CJ** and 13 others (2017). Direct measurements of meltwater

runoff on the Greenland Ice Sheet surface. *Proceedings of the National Academy of Sciences*. doi.org/10.1073/pnas.1707743114

**Gleason, C.J.,** Wada, Y., & J. Wang (2017)**.** A hybrid of optical remote sensing and hydrological modelling improves water balance estimation. *Journal of Advances in Modelling of Earth Systems* doi.org/10.1002/2017MS000986

*Hagemann, M.W.**, C.J. Gleason,** & M.T. Durand (2017). BAM: Bayesian AMHG-Manning inference of discharge using remotely sensed stream width, slope, and height. *Water Resources Research* doi.org/10.1002/2017WR021626

**Gleason, C.J.,** Durand, M.T., & P-A Garambois (2017). Water, satellites, and mass conservation: Tracking river flows from space. *EOS: Transactions of the American Geophysical Union* doi.org/10.1029/2017EO078085.

Alvarez-Leon, L.F., & **C.J. Gleason** (2017). Production, property, and the construction of remotely sensed data. *The Annals of the American Association of Geographers*. 10.1080/24694452.2017.1293498

Pitcher, L.H, Smith, L.C., & **C.J. Gleason** (2016). CryoSheds: a GIS Modeling Framework for Generating Hydrologic Watersheds for land-terminating glaciers and ice sheets using Digital Elevation Models and Remote Sensing Observations. *GIScience and Remote Sensing*. 10.1080/15481603.2016.1230084

**Gleason, C.J.,** Smith, L.C., Chu, V.W., Legleiter, C.J., Pitcher, L.H., Overstreet, B.T., Rennermalm, A.K., & R.R. Forster (2016) Characterizing supraglacial meltwater channel hydraulics on the Greenland Ice Sheet from in situ observations. *Earth Surface Processes and Landforms*. 10.1002/esp.3977

Durand M., **Gleason, C.J.,** Garambois, P.A., Bjerklie, D., Smith, L.C., Roux, H., Rodriguez, E., Bates, P., Frasson, R., et al (2016) Intercomparison of remote sensing river discharge estimation algorithms from measurements of river height, width, and slope. *Water Resources Research*. 10.1002/2015WR018434

Bonnema, M., Sikder, S., Hossain, F., Durand, M.A., **Gleason, C.J.,** & D. Bjerklie (2016). Benchmarking wide swath altimetry-based river discharge estimation algorithms for the Ganges river system. *Water Resources Research* 10.1002/2015WR017830

Yang, K., Smith, L.C., Chu, V.W., Pitcher, L.H., **Gleason, C.J.,** Rennermalm, A.K., & M. Li (2016). Fluvial morphometry of supraglacial river networks on the southwest Greenland Ice Sheet, *GIScience & Remote Sensing*, 10.1080/15481603.2016.1162345

Yang, K., Smith, L.C., Chu, V.W., **Gleason, C.J.,** & M. Li (2015). A caution on the use of digital elevation models to simulate supraglacial hydrology of the Greenland Ice Sheet. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 10.1109/JSTARS.2015.2483483

**Gleason, C.J.,** & J. Wang (2015). Theoretical basis of at-many-stations hydraulic geometry (AMHG). *Geophysical Research Letters*, 10.1002/2015GL064935.

**Gleason, C.J.,** & A.N. Hamdan (2015). Crossing the (watershed) divide: Satellite data and the changing politics of international river basins. *The Geographical Journal,* 10.1111/geoj.12155

**Gleason, C.J.,** Smith, L.C., Finnegan, D.C., LeWinter, A.L., Pitcher, L. H, and Chu, V.W. (2015). Technical note: Semi-automated classification of time-lapse RGB imagery for a remote Greenlandic river. *Hydrology and Earth Systems Sciences* 19, 1-8

Smith, L.C., Chu, V.W., Yang, K., **Gleason, C.J.,** Pitcher, L.H., Rennermalm, A.K., Legleiter, C.J., Behar, A.E., Overstreet, B.T., Moustafa, S.E., Tedesco, M., Forster, R.R., LeWinter, A.L., Finnegan, D.C., Sheng, Y., Balog, J. (2015), Efficient meltwater drainage through supraglacial streams and rivers on the southwest Greenland ice sheet, *Proceedings of the National Academy of Sciences*, 112(4) 1001-1006

**Gleason, C.J.** (2015) Hydraulic geometry: a review and future directions. *Progress in Physical Geography,* 10.1177/0309133314567584

**Gleason, C.J.,** Smith, L.C., & J. Lee (2014). Retrieval of river discharge solely from satellite imagery and at-many-stations hydraulic geometry: sensitivity to river form and optimization parameters. *Water Resources Research,* 10.1002/2014WR016109

**Gleason, C.J.** & L.C. Smith (2014). Towards global mapping of river discharge using satellite images and at-many-stations hydraulic geometry. *Proceedings of the National Academy of Sciences*, 111 (13) 4788-4791

Wang, J., Sheng, Y., **Gleason, C.J.,** & Y. Wada (2013). Downstream Yangtze River levels impacted by the Three Gorges Dam, *Environmental Research Letters,* 8 (4)

*Forestry Research at SUNY ESF*

**Gleason, C.J.,** & J. Im (2012). Forest biomass estimation from airborne LiDAR data using machine learning approaches. *Remote Sensing of Environment*, 125 80-91

**Gleason, C.J.** & J. Im (2012). A fusion approach for tree crown delineation from LiDAR data. *Photogrammetric Engineering & Remote Sensing*, 78(7) 679-692

**Gleason, C.J.,** & J. Im (2011). A review of remote sensing of forest biomass and biofuel: options for small area applications. *GIScience and Remote Sensing*, 48(2) 141-170

## AWARDS & HONORS

NSF CAREER grantee 2018-2023
UMassAir Fellow 2017-present
UCLA Rosenfield-Abrams Dissertation Year Fellow 2015-2016
NASA Earth and Space Sciences Fellow 2012-2015
UCLA Department of Geography Outstanding Student Publication Award 2014
UCLA Chancellor's Fellow 2011-2012
SUNY ESF Presidential Scholar 2005-2009

## RESEARCH GRANTS

**Gleason, C.J. (PI)** CAREER: Integrating field geomorphology, remote sensing, undergraduate education, and modelling to improve understanding of Arctic hydrology. (2018-2023). NSF CAREER award from NSF Arctic Natural Sciences division. (Total award $528,996)

Durand, M. (PI), **Gleason, C.J. (Co-I),** & D. Bjerklie. (2016-2020). Development and comprehensive validation of SWOT river discharge algorithms from AirSWOT, simulator, and field measurements. Submitted in response to NASA NRA A.10 Surface Water and Ocean Topography (SWOT) Science Team (Total Award $742,961, Gleason award $207,723)

Smith, L.C., Pietroniro, A., & **C.J. Gleason (Co-I).** (2016-2020). U.S.-Canada collaboration to build SWOT calibration/validation and science capacity for northern hydrology. Submitted in response to NASA NRA A.10 Surface Water and Ocean Topography (SWOT) Science Team (Total Award $746,644, Gleason award $206,057)

Tobiason, J., & **C.J. Gleason (Co-I).** 2016-2018. Water quality in DCR reservoirs 2016-2018. Total award $45,000.

## SCHOLARS ADVISED

### Post-doctoral scholars

**Mark Hagemann** (2016-2018)

**PhD students**

**Merritt Harlan** (2017-present)

**MS students**

**Liaqat Karim** (2017-2018)

**Graduate student committee member**

**Alex McIntyre** (defended MS 2016)

**Undergraduate students (independent research)**

**Martha Harris** (2018)
**Kyle Hampton** (2018)
**Christopher Fontaine** (2018)
**Caitline Barber** (2017)
**Olin Richter** (2017)
**Leigh Hamlet** (2017)
**Yuxi Suo** (2015-2016 @UCLA)
**Jinny Lee** (2014-2015 @UCLA)

## TEACHING

**CEE 560 Hydrology.** Students learn how to make a quantitative account of elements of the hydrologic cycle, including: atmospheric circulation and thermodynamics, precipitation, evapotranspiration, snowmelt, infiltration, surface runoff, and groundwater processes. Students apply basic laws from physics, meteorology, fluid mechanics, and thermodynamics, combined into simple mathematical descriptions used in the hydrologic design process.

**CEE 470/570 GIS for Engineers.** Introduction to fundamental principles and concepts necessary to carry out meaningful and appropriate geographic analysis with geographic information science (GIS). Reinforcement of key issues in GIS such as geographic coordinate systems, map projections, spatial analysis, use of remotely sensed data, and visualization of spatial data. Laboratory exercises use database query, database manipulation, and spatial analysis to address problems in hydrology, water treatment, renewable energy, and transportation with an emphasis on engineering design. Students gain familiarity with the leading commercial and open-source GIS platforms.

**CEE 697 Remote Sensing for Hydrology.** Project-based graduate class introducing remote sensing as relevant to hydrology. Students complete a rigorous project and consistently present on its progress in addition to assignments requiring the download and analysis of remotely sensed data.

## FIELD EXPERIENCE

**North Slope, Alaska, summer 2017**

Intensive three week field camp approx. 350mi north of Fairbanks, AK. Designed and assisted in collection of field data for 80km of the Sagavinirktok River.

**Saskatoon, Canada, summer 2017**

Collected lidar topography for the North Saskatchewan River and collected water surface elevation measurements under the NASA AirSWOT instrument via canoe.

**Kangerlussuaq, Greenland, summer 2015**

Logistics manager for international team of 9. Coordinated helicopter charter with media, science, and local personnel, and set personnel schedules.

**Kangerlussuaq, Greenland, winter 2015**

Drill through ice in proglacial rivers in search of winter discharge. Responsible for safety for team of 2 in -40C and colder temperatures.

**Eastern Sierra, California/Nevada, fall 2014**

Map shorelines and collect water surface elevation measurements in coordination with AirSWOT airborne Ka-band radar.

**Kangerlussuaq, Greenland, summer 2014**

Map streams in a supraglacial basin and use acoustic Doppler current profiling to measure stream discharge.

**Western Mojave Desert, fall 2014**

Delineate wetland area and inundated vegetation in coordination with AirSWOT airborne Ka-band radar.

**Sacramento River, fall 2014**

Establish measurement protocol and pilot a river raft to make hydraulic measurements.

**Kangerlussuaq, Greenland, summer 2013**

Design and lead 15-day hydrologic measurement campaign. Responsible for safe travel of team of three and for all measurement protocol and research design in back country without vehicular support.

**Sacramento River, spring 2013**

Establish pressure transducers in coordination with airborne instrument overflight (AirSWOT), and pilot both river rafts and motorized boats between camps established on the riverbank.

**Kangerlussuaq, Greenland and atop Greenland Ice Sheet, summer 2012**

Medical lead for a five-day ice camp as part of a team of four that made supraglacial stream measurements atop the ice from a base camp and from extensive helicopter travel. Additionally, establish a tundra camp for several weeks and make proglacial hydrologic measurements.

**Kangerlussuaq, Greenland, summer 2011**

Establish permanent time lapse camera installations in conjunction with the USACE and conduct helicopter surveys of a proglacial river.

**Heiberg Forest, Upstate New York, fall 2011**

Design, plan, and lead measurement of forest inventory plots. Responsible for research design and safety of team of four.

## SELECTED CONFERENCE PRESENTATIONS

**Gleason, C.J,** Wang, J, & Wada, Y. (2017). *Combining remote sensing and modelling to improve discharge estimation over the Nile.* Fall Meeting of the American Geophysical Union, San Francisco, CA.

**Gleason, C.J.** (2016). *Forward to the Future: Estimating River Discharge with McFLI.* Fall Meeting of the American Geophysical Union, San Francisco, CA.

**Gleason, C.J.** (2015). *Theoretical basis for at many stations hydraulic geometry (AMHG).* Fall Meeting of the American Geophysical Union, San Francisco, CA.

**Gleason, C.J.** (2015). *At many stations hydraulic geometry (AMHG): theoretical development and relationships with traditional hydraulic geometry.* Annual meeting of the Association of American Geographers, Chicago, IL

**Gleason, C.J.** & T.M. Pavelsky (2015). *Characterizing post launch hydrologic campaigns*. NASA/CNES Surface Water and Ocean Topography Satellite Science Definition Team Meeting, Toulouse, France

**[Invited] Gleason, C.J.** & L.C. Smith (2014). *Satellite data, river discharge, and at-many-stations hydraulic geometry.* Fall Meeting of the American Geophysical Union, San Francisco, CA.

**Gleason, C.J.** & L.C. Smith (2014). *River discharge and at-many-stations hydraulic geometry: theory and methods*. NASA/CNES Surface Water and Ocean Topography Satellite Science Definition Team Meeting, Toulouse, France

## SELECTED MEDIA COVERAGE

**The New York Times,** "As Greenland Melts, Where's the Water Going?" December 5, 2017

**The New York Times,** "Greenland is melting away," October 27, 2015

**The Los Angeles Times,** "Ice researchers capture catastrophic Greenland melt," January 12, 2015

**Southern California Public Radio,** "UCLA scientists find shortcut to estimating a river's volume," March 17, 2014

**Redorbit.com**, "Satellite-Based Imagery Could Make It Easier To Monitor River Discharge," March 19, 2014

**Phys.org**, "Geographers create 'easy button' to calculate river flows from space," March 18, 2014

**The New York Times**, "Probing a Glacier as It Thaws," August 5, 2011

## PROFESSIONAL SERVICE AND AFFILIATIONS

**Participant (March 2017):** International Workshop to Reconcile Northern Permafrost Region Methane Budgets

**Organizer and Co-Chair (October 2016):** NASA SWOT Discharge Algorithm Workshop, New York City

**Science Team Member (2016-Present):** NASA Surface Water and Ocean Topography Satellite

**Science Definition Team Member (2014-2016):** NASA Surface Water and Ocean Topography Satellite

**Reviewer:** Geophysical Research Letters

**Reviewer:** Water Resources Research

**Reviewer:** Hydrologic Earth Systems Science

**Reviewer:** Journal of Geophysical Reach-Atmospheres

**Reviewer:** Progress in Physical Geography

**Reviewer:** Journal of Hydraulic Engineering

**Reviewer:** International Journal of River Basin Management

**Reviewer:** Water

**Reviewer:** PLOS One

**Reviewer:** Hydrological Sciences Journal

**Reviewer:** River Research and Applications

**Member:** American Geophysical Union (2011-Present)

**Member:** European Geophysical Union (2015-Present)

**Member:** Association of American Geographers (2010-2011, 2014-Present)

## UNIVERSITY SERVICE

**UMass Civil and Environmental Geospatial Technologies Coordinator (2016-present):** Software, licensing, and general information coordinator for all geospatial technologies within the department.

**UMass Civil and Environmental Engineering Open House Committee (2017-present):** Coordinate with university administration to organize, execute, and refine open house day for prospective students.

**UMass Environmental and Water Resources Strategic Planning Committee (2017-present):** Define a vision for the future of EWRE and present findings to the broader EWRE faculty for review.

**UMass Environmental and Water Resources Awards Committee (2016-present)**: Coordinate the nomination of faculty for external awards