

Alice F. Hill

Cooperative Institute for Research in Environmental Sciences
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EDUCATION

- 2017 Ph.D., Geography, University of Colorado, Boulder, Colorado
Focus areas: mountain hydrology, climate change induced water stress, socio-hydrology
Advisors: Noah Molotch, Waleed Abdalati, Richard Armstrong, Robert Stallard, Fengjing Liu
- 2012 M.S., Civil and Environmental Engineering (Water Resource Engineering Focus),
University of Colorado, Boulder, Colorado
- 2002 B.S., Civil and Environmental Engineering, Rice University, Houston, Texas

PUBLICATIONS

Peer Reviewed Journal Articles

- 2018 Armstrong, R., Rittger, K., Brodzik, M., Racoviteanu, A., Barrett, A., Khalsa, S., Raup, B., **Hill, A. F.**, Khan, A., Rittger, K., Wilson, A. M., Kayastha, R., Fetterer, F., Armstrong, B. Runoff from glacier ice and seasonal snow in High Asia: separating melt water sources in river flow. *Regional Environmental Change*. <https://doi.org/10.1007/s10113-018-1429-0>
- 2018 **Hill, Alice F.**, Stallard, R. F., & Rittger, K. Clarifying regional hydrologic controls of the Marañón River, Peru through rapid assessment to inform system-wide basin planning approaches. *Elem Sci Anth*, 6(1), 37. <https://doi.org/10.1525/elementa.290>
- 2017 **Hill, Alice F.**, Minbaeva, C. K., Wilson, A. M., & Satylkanov, R. Hydrologic Controls and Water Vulnerabilities in the Naryn River Basin, Kyrgyzstan: A Socio-Hydro Case Study of Water Stressors in Central Asia. *Water*, 9(5), 325. <https://doi.org/10.3390/w9050325>

Manuscripts in Review

Flora J. M. O'Brien, Almaraz, M., Foster, M. A., **Hill, A. F.**, Huber, D. P., King, E. K., Langford, H., Lowe, M., Mickan, B. S., Miller, V. S., Moore, O. W. Mathes, F., Gleeson, D., Leopold, M.. Soil electrical conductivity and pH drive diversity in soil microbial community composition along a lateritic slope in the Avon River Critical Zone Observatory, Western Australia. Submitted to *mBio*, January 2019.

Rittger, K., Raleigh, M.S, Dozier, J., **Hill, A.F.**, Lutz, J.S., Painter, T. H. Canopy Adjustment and Improved Cloud Cover for Remotely Sensed Snow Cover Mapping. Submitted to *Water Resources Research*, January 2019.

Manuscripts in Preparation

Hill, Alice F., Tshering, D., Dendup, T., Miller, H., Wilson, A. Meltwater's importance to river flow in the Brahmaputra headwaters. To be submitted in April 2019 to *Frontiers in Earth Science*.

Hill, Alice F., Liu, F., Shimabuku, M., Williams, M., Molotch, N. The fate of an alpine snowpack: geologic influence on the transport mechanisms of meltwater to streamflow. To be submitted in 2019 to *Water Resources Research*.

RESEARCH EXPERIENCE

2018 - 2019 Post-doctoral researcher, Contributions to High Asia Runoff from Ice and Snow (CHARIS) project at National Snow and Ice Data Center (NSIDC) and Cooperative Institute for Research in Environmental Science (CIRES). Physical hydrology and socio-hydro research topics addressing drivers of water stress in a warmer world. Focus areas include Aral Sea basin in Central Asia and Bhutan. Mentor: Richard Armstrong

2015 - 2017 Graduate research assistant, CHARIS project at NSIDC and CIRES. Research focus quantifies melt water from snow and ice in downstream surface water channels, and considers implications to water supply vulnerabilities in the context of climate change.
Advisor: Richard Armstrong

2015 - 2016 Hydrologist, The Marañón Project supported by National Geographic Committee for Science and Exploration. Project goal is to initiate an environmental baseline data set to clarify dynamics of the Marañón River system in the context of proposed major hydropower development.
Collaborators: Natalie Kramer-Anderson (Utah State University), Jaime Goode (College of Idaho), Diana Silva (Museo Historia Natural, Peru)

2013 - 2014 Graduate research assistant, NSF/USDA Water, Sustainability and Climate program: Water Storage as Snow and Trans-Basin Diversions project. Research focused on snowmelt-groundwater interactions in the alpine Colorado River Basin. Advisor: Noah Molotch

NON-ACADEMIC PROFESSIONAL WORK EXPERIENCE

2008 - present Senior Faculty, National Outdoor Leadership School (NOLS) and Wilderness Medicine Institute (WMI of NOLS), varied domestic and international teaching locations
2007 - 2008 Environmental Consultant, J. Edmonds & Associates, Queenstown, New Zealand
2005 - 2007 Civil Engineer, Civic Corporation Ltd, Wanaka and Queenstown, New Zealand
2003 - 2004 National Coordinator, Hydropower Reform Coalition of American Rivers, Washington, DC
2002 - 2003 Rice University Zeff Research Fellow, Houston, Texas

GRANTS

2019 Fulbright scholar (awarded for 2019, \$15,000)
2018 Nature, Environment, Science and Technology Studio for the Arts (\$10,000 split with co-investigator Toma Peiu)
2017 Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI) Pathfinder fellowship (\$5,000)
2016 American Alpine Club research grant (\$1,000)
2002 Rice University Zeff Research Fellowship (\$22,000)

AWARDS

- 2016 University of Colorado Hydrologic Sciences symposium best research poster award
- 2015 Arkansas River Basin Water Forum graduate scholarship
- 2015 Colorado Environmental Management Society scholarship
- 2014 Teaching Institute for Graduate Education Research (TIGER) teaching-as-research grant recipient

CONFERENCE ACTIVITY/PARTICIPATION

Sessions Organized and Convened

- 2017 Pursuing Water Security in Socio-Hydrological Systems. American Geophysical Union Fall Meeting, New Orleans, Louisiana. December 11-15, 2017.

Presentations

- 2018 **Hill, Alice F.**, A. M. Wilson, P. Normatov, T. Tuzova, M. J. Brodzik, K. Rittger, T. Bolch, A.E. Racoviteanu, R.L. Armstrong, I. Normatov. Crossing boundaries and combining approaches for regional scale hydrologic study in the Pamir Mountain source waters of the Aral Sea. American Geophysical Union Fall Meeting, Washington, D.C. December 10-14, 2018.
- 2018 Racoviteanu, A.E., Rittger, K., R. L. Armstrong, **A. F. Hill**, A. L. Khan, A. M. Wilson. “Estimating snowline altitudes across High Mountain Asia for melt modeling: challenges in using remote sensing.” European Geosciences Union General Assembly, Vienna, Austria. April 8-13, 2018.
- 2018 Rittger, K., R. L. Armstrong, N. Bair, M. J. Brodzik, A. E. Racoviteanu, **A. F. Hill**, A. M. Wilson, A. L. Khan, S. J. Singh Khalsa, A. P. Barrett, B. H. Raup, T. H. Painter. “The Contribution to High Asia Runoff from Ice and Snow (CHARIS): Understanding the source of cryospheric contributions to the water balance.” European Geosciences Union General Assembly, Vienna, Austria. April 8-13, 2018.
- 2017 **Hill, Alice F.**, C. K. Minbaeva, A. M. Wilson, R. Satylkanov, R. Armstrong. “Cryosphere, climate and capitalism: drivers of Central Asian water stress.” American Geophysical Union Fall Meeting, New Orleans, Louisiana. December 11-15, 2017.
- 2017 Wilson, Alana M., R. L. Armstrong, A. P. Barrett, M. J. Brodzik, F. Fetterer, J. L. Fluri, **A. F. Hill**, R. B. Kayastha, S. J. Singh Khalsa, A. L. Khan, C. K. Minbaeva, A. E. Racoviteanu, B. H. Raup, K. E. Rittger. “International cryospheric science capacity building and its role in policy and management.” American Geophysical Union Fall Meeting, New Orleans, Louisiana. December 11-15, 2017. Poster presentation.
- 2017 Rittger, K., R. L. Armstrong, N. Bair, A. E. Racoviteanu, M. J. Brodzik, **A. F. Hill**, A. M. Wilson, A. L. Khan, J. M. Ramage, S. J. Singh Khalsa, A. P. Barrett, B. H. Raup, T. H. Painter. “The Contribution to High Asia Runoff from Ice and Snow: Understanding the source and trends of cryospheric contributions to the water balance.” American Geophysical Union Fall Meeting, New Orleans, Louisiana. December 11-15, 2017. Poster presentation.
- 2017 Armstrong, R. L., A. P. Barrett, M. J. Brodzik, F. Fetterer, J. L. Fluri, **A. F. Hill**, H. Hughes, S. J. Singh Khalsa, A. L. Khan, C. K. Minbaeva, A. E. Racoviteanu, B. H. Raup, K. E. Rittger, M. Williams, A. M. Wilson. “Improving understanding of glacier melt contribution to high Asian river discharge through collaboration and capacity building with high Asian CHARIS partner

- institutions.” European Geosciences Union General Assembly, Vienna, Austria. April 23-28, 2017. Poster presentation.
- 2017 **Hill, Alice F.** “Clarifying hydrologic controls of Amazon headwaters for integrative basin planning.” International Conference on the Status and Future of the World’s Large Rivers. New Delhi, India. April 18-21, 2017.
- 2017 **Hill, Alice F.,** A. Wilson, R. Armstrong. “Using hydrochemical and isotopic tracer mixing models at a regional scale: upscaling techniques and challenges in glaciated basins.” Nepal Society of Hydrologists and Meteorologists conference, Kathmandu, Nepal. April 10-11, 2017. Poster presentation.
- 2016 **Hill, Alice F.,** A. Wilson, M. Williams. “Anticipating central Asian water stress: Variation in river flow dependency on melt waters from alpine to plains in the remote Tien Shan range, Kyrgyzstan using a rapid hydro assessment methodology.” American Geophysical Union Fall Meeting, San Francisco, California. December 12-16, 2016. Poster presentation.
- 2016 **Hill, Alice F.,** A. N. Kramer, J. Goode. “Using an Expedition Storyline, Baseline Data, Multiple Partnerships and a Varied Outreach Strategy to Engage Diverse Audiences in Geoscience Discourse: A Case Study on the Rio Marañon, Peru.” American Geophysical Union Fall Meeting, San Francisco, California. December 12-16, 2016. Poster presentation.
- 2016 Brodzik, Mary J., Armstrong, B., Armstrong, R. L., A. P. Barrett, F. Fetterer, J. L. Fluri, **A. F. Hill,** H. Hughes, S. J. Singh Khalsa, A. E. Racoviteanu, B. H. Raup, K. E. Rittger, M. Williams, A. M. Wilson. “CHARIS (Contribution to High Asia Runoff from Ice and Snow) Lessons Learned in Capacity-Building for Hydrological Sciences with Asian Partner Communities.” American Geophysical Union Fall Meeting, San Francisco, California. December 12-16, 2016. Poster presentation.
- 2016 **Hill, Alice F.,** M. Williams. “Use of a rapid hydrologic assessment methodology for clarifying future streamflow vulnerabilities in the context of river development decisions on the Rio Marañon, Peru.” Geologic Society of America Annual Meeting, Denver, Colorado. September 26-28, 2016. Poster presentation.
- 2016 Kramer, N. J. Goode, **A. F. Hill.** “Large scale remote region baseline data collection and outreach prior to proposed construction of multiple major hydropower projects on the Rio Marañon, Peru.” Geologic Society of America Annual Meeting, Denver, Colorado. September 26-28, 2016. Poster presentation.
- 2016 **Hill, Alice F.,** M. Williams, K. Chowanski. “Impact of seasonally frozen soil on snowmelt partitioning and groundwater recharge.” American Geophysical Union Fall Meeting, San Francisco, California, December 14-18, 2015 and University of Colorado Hydrologic Sciences symposium, March 31-April 1, 2016. Poster presentation, best poster award.
- 2015 **Hill, Alice F.,** M. Williams. 2015. “Characterizing the role and controls of snowmelt in alpine groundwater recharge.” Cooperative Integrated Research in Environmental Science (CIRES) Rendezvous. Boulder, Colorado. May 1, 2015. Poster presentation.
- 2014 **Hill, Alice F.,** M. Williams. “The Alpine Groundwater-Surface Water Puzzle: Piecing the Jigsaw Together.” Western Snow Conference. Durango, Colorado. April 13-17, 2014. Poster presentation.

- 2004 **Hill, Alice F.**, A. Fahlund. "Stakeholder access to critical energy infrastructure information amidst regulatory hurdles." HydroVision International Hydropower Conference, Montreal, Canada. August 16-20, 2004.

CAMPUS OR DEPARTMENTAL TALKS

- 2017 **Hill, Alice F.** "How important is snow and ice to Central Asian river flow? An examination of water stressors in a highly volatile region." Institute of Arctic and Alpine Research graduate seminar. Boulder, Colorado, USA. May 4, 2017.
- 2015 **Hill, Alice F.** "The Marañon Project: hydrologic baseline data collection from Andes to Amazon." Institute of Arctic and Alpine Research graduate seminar. Boulder, Colorado, USA. September 3, 2015.
- 2014 **Hill, Alice F.** "Research 'Teachwork' and fostering student inclusivity through untraditional teaching methods." Graduate Teacher Program workshops. Boulder, Colorado. October 16, 2014.
- 2014 **Hill, Alice F.** "Research-teaching happy hour: leveraging student learning opportunities through data collection." Graduate Teacher Program, Boulder, Colorado. August 22, 2014.

TEACHING EXPERIENCE

University Teaching

- 2015, 2014 Hydrologic field methods and research design (Instructor of record, including course design, development and listing of new course offering)
- 2014 Remote sensing of the environment (TA)
- 2014 Snow hydrology (TA)
- 2011 General biology laboratory (TA)

Outside-of-University Contract-Based Teaching

- 2013-present Wilderness Medicine Institute instructor
- 2008-present National Outdoor Leadership School (NOLS) senior faculty

Teaching-as-Research

- 2015 **Hill, Alice F.** "Social media as a curriculum reinforcement tool: intersecting students where they least expect it." Center for the Integration of Research, Teaching, and Learning (CIRTL) Forum 2015: Preparing the Future STEM Faculty for the Rapidly Changing Landscape of Higher Education. College Station, Texas. April 12-14, 2015.

UNIVERSITY AND ACADEMIC ACTIVITIES

- 2016 Instructor, NASA International Snow Working Group for Remote Sensing (iSWGR) snow measurements school. Fraser, Colorado.
- 2015 Steering Committee, University of Colorado-Boulder Hydrologic Sciences Research symposium. Boulder, Colorado.
- 2015 Selected participant, Worldwide University Network Critical Zone and Climate Change workshop. Perth, Australia.
- 2015 Instructor, Mountain Studies Institute/CU-Outreach Science Discovery Program alpine hydrology workshop. Durango, Colorado.
- 2014 Program Coordinator, University of Colorado-Boulder undergraduate snow internship. Boulder, Colorado.

TEACHING AREAS

- Introductory classes relating to earth systems, climate and landscape
- Mountain geography
- Remote sensing, introductory through to advanced image processing techniques
- Surface water hydrology, from introductory to advanced courses and either from a physical science process approach or engineering/applications framework
- Groundwater hydrology
- Snow hydrology
- Hydrologic field methodology, data collection
- Research design related to physical science topics
- Introductory ArcGIS
- Introductory programming for environmental statistics using R