

# George H. Allen

*Virginia Tech*

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## Appointments

### Virginia Tech

- 2025–pres. Associate Professor, Department of Geosciences
- 2022–2025 Assistant Professor, Department of Geosciences

### Texas A&M

- 2018–2022 Assistant Professor, Department of Geography

### NASA Jet Propulsion Laboratory

- 2017–2018 Caltech Postdoc, Terrestrial Hydrology Group

## Education

- 2017 **University of North Carolina at Chapel Hill**  
PhD Geological Sciences
- 2012 **University of North Carolina at Chapel Hill**  
MS Geological Sciences
- 2008 **University of California at Davis**  
BS Geology

## Honors, Awards and Fellowships

- 2025 Clarivate Highly Cited Researcher
- 2024 NASA Early Career Investigator Award
- 2024 Universities Council on Water Resources Early Career Award
- 2022 NSF CAREER Award
- 2016 UNC Royster Society Fellow
- 2016 Paul C. Hardin Dissertation Year Fellowship
- 2016 North Carolina Space Grant Graduate Research Fellowship
- 2015 G. H. Stout Award for Innovative Student Papers, NC GIS Conference
- 2015 UNC Future Faculty Fellowship Award

This CV is abridged. Full CV is available [here](#)

## Selected Research Grants

- 2026 Co-I, NASA Water Quality Applications Program (PI: Cayelan Carey), "Integrating Earth observations into automated water quality forecasts to improve drinking water management", \$600,000, \$170,996 to Allen
- 2026 PI, VA Space Grant Consortium (Student: H. Thurman), "Uncovering Global Flood Magnitudes, Abundances, and Drivers with SWOT Satellite Observations", \$6,000
- 2025 Co-PI, NASA AIST (PI: Dani Selva), "3D-CHESS FO: Autonomous sensor web for inland water monitoring", \$1,398,092, \$459,231 to VT, \$183,822 to Allen
- 2024 Co-I, NASA SWOT Science Team (PI: Jida Wang), "Harnessing Lake-River Continuum (LARIC) for improving SWOT hydrological products and deciphering global reservoir water management", \$1,038,372, \$252,750 to Allen
- 2024 PI, NASA Early Career Investigator Program, "Assessing river surface light availability at the global scale", \$300,000, \$300,000 to Allen
- 2023 PI, Virginia Space Grant Consortium (Graduate Student Fellow: Carter Boyd), "Quantifying the size-distribution of rivers across scales: advancing estimates of global river surface area", \$5,500, \$5,500 to Allen
- 2023 PI, VT Presidential Postdoctoral Fellowship (Postdoc: Katie McQuillan), "Estimating reservoir evaporation loss using novel SWOT satellite radar observations for water resources management" \$107,570, \$107,570 to Allen
- 2022 PI, NASA FINESST (FI: Emily A. Ellis), "Remote Sensing of River Temperature and Discharge: Defining Connections and Assessing Changes", \$150,000, \$150,000 to Allen
- 2022 Co-I, NASA AIST (PI: Dani Selva), "3D-CHESS: Decentralized, distributed, dynamic and context-aware heterogeneous sensor systems", \$600,000, \$82,238 to Allen
- 2022 Co-I, NASA Earth Science Applications: Water Resources (PI: Huilin Gao), "Satellite Assisted Operational Reservoir Evaporation Monitoring and Forecasts for the Western U.S." \$985,548, \$102,376 to Allen
- 2022 PI, NSF CAREER, "CAREER: Integrating river hydrology across scales: advancing understanding of the global river-atmosphere interface", \$535,242, \$535,242 to Allen
- 2021 Co-PI, Jet Propulsion Laboratory Strategic University Research Program (SURP), "Assessing altimetry and optical remote sensing products to study global sediment transport dynamics in Earth's inland water bodies", \$180,000, \$122,794 to Allen
- 2020 PI, TAMU X-Grants 2020, "Developing a SmallSat Mission to Track the Global Movement of Water, Carbon, and Sediment across Landscapes", \$324,957, \$140,285 to Allen
- 2020 Co-PI, NASA SWOT Science Team (PI: Jida Wang), "Integrating reservoirs into SWOT's global surface water storage and discharge monitoring", \$799,644, \$140,055 to Allen
- 2019 PI, TAMU PESCA Grant Program, "Developing a Method for the Rapid Detection of Freshwater Plastic Pollution", \$25,000, \$25,000 to Allen
- 2018 Co-PI, NASA Terrestrial Hydrology Program (PI: Cedric David), "Filling the space/time gaps between surface water retrievals", \$479,978, \$78,830 to Allen

## Selected Journal Articles

\*Allen Group Student/Postdoc

[Google Scholar Profile](#)

- 2026 Feng, D., Yang, X., Pavelsky, T.M., **Allen, G.H.**, Bates, P., Gleason, C., Gardner, J., Lehner, B., Wang, J., Cooley, S.W., Tarpanelli, A., Battin, T., Yamazaki, D., Durand, M., Raymond, P., Boothroyd, R., Lin, P., Andreadis, K., Remote Sensing and the New Global River Science. *Nature Water*. <https://doi.org/10.1038/s44221-026-00665-2>
- 2026 He, X., Wang, J., **Allen, G.H.**, Gao, H., Rhoads, B., \***McQuillan, K.A.**, Bates, P.D., Crétaux, J-F, From Lotic to Lentic: SWOT Characterizes Seasonal Hydrodynamics in the Lake-River Continuum. *Geophysical Research Letters*.  
<https://doi.org/10.1029/2026GL122664>
- 2026 \***Riggs, R.M.**, Dickinson, J.E., Brinkerhoff, C.B., Sikder, M.S., Wang, J., Gao, H., **Allen, G.H.** Characterizing operational signatures of reservoirs with the SWOT satellite by comparing natural lake and reservoir dynamics. *Environmental Research Letters*,  
<https://doi.org/10.1088/1748-9326/ae436e>
- 2026 \***McQuillan, K.A.**, **Allen, G.H.**, Pearson, C., Homan, K.D., Huntington, J., Yadav, A., Gao, H., Improving the spatial representation of reservoir evaporation using SAR-based wind fields. *IEEE Geoscience and Remote Sensing Letters*.  
<https://doi.org/10.1109/LGRS.2026.3652374>
- 2025 \***Stroud, M.**, **Allen, G.H.**, Minear, J.T., Cisneros, J., Smith, L.C., SWOT Satellite: A New Tool for Fluvial Geomorphology, *GSA Today*. <https://doi.org/10.1130/GSATG630A.1>
- 2025 \***Boyd, C.A.**, **Allen, G.H.**, The Widths of Rivers and Streams Across Spatial Scales: A Framework for Improving River-Atmosphere Biogeochemical Exchange Estimates. *Geophysical Research Letters*. <https://doi.org/10.1029/2025GL115713>
- 2025 \***Thurman, H.R.**, **Allen, G.H.**, Williams, B., Cerbelaud, A., David, C.H., SWOT captures hydrologic waves traveling down rivers. *Geophysical Research Letters*.  
<https://doi.org/10.1029/2024GL113875>
- 2025 Saunio, M., Martinez, A., Poulter, B., Zhang, Z., Raymond, P., Regnier, P., Canadell, J.G., Patra, P.K., Bousquet, P., Jackson, R.B., Ciais, P., Dlugokencky, E.J., Lan, X., **Allen, G.H.**, et al., Global Methane Budget 2000-2020. *Earth System Science Data*.  
<https://doi.org/10.5194/essd-17-1873-2025>
- 2025 \***McQuillan, K.A.**, **Allen, G.H.**, Fayne, J., Gao, H., Wang, J., Estimating wind direction and wind speed over lakes with SWOT and Sentinel-1 satellite observations. *Earth and Space Science*. <https://doi.org/10.1029/2024EA003971>
- 2024 Langhorst, T., Konstantinos, K., **Allen, G.H.**, Global Cloud Biases in Optical Satellite Remote of Rivers. *Geophysical Research Letters*. <https://doi.org/10.1029/2024GL110085>
- 2024 Collins, E.L., David, C.H., \***Riggs, R.M.**, **Allen, G.H.**, Pavelsky, T.M., Lin, P., Pan, M., Yamazaki, D., Meentemeyer, R.K., Sanchez, G.M., Residence time is a prominent driver of global river water storage. *Nature Geoscience*.  
<https://doi.org/10.1038/s41561-024-01421-5>
- 2024 Gorr, J.B., Selva, D. Gao, H., \***Ellis, E.**, \***Morgan, J.**, \***Stroud, M.**, **Allen, G.H.**, Li, Y., Design of a satellite constellation for monitoring inland water quality. *Acta Astronautica*.  
<https://doi.org/10.1016/j.actaastro.2024.03.062>
- 2024 \***Ellis, E.A.**, **Allen, G.H.**, \***Riggs, R.M.**, Gao, H., Li, Y., Carey, C., Bridging the divide between inland water quantity and quality with satellite remote sensing: An

- interdisciplinary review. *WIREs Water*. <https://doi.org/10.1002/wat2.1725>
- 2024 \***Stroud, M., Allen, G.H.**, Simard, M., Jensen, D.J., Gorr, J.B., Selva, D., Optimizing satellite mission requirements to measure total suspended solids in rivers. *IEEE Transactions on Geoscience and Remote Sensing*. <https://doi.org/10.1109/TGRS.2023.3337641>
- 2023 \***Riggs, R.M., Allen, G.H.**, Wang, J., Pavelsky, T.M., Gleason, C.J., David, C.H., Durand, M., Extending Global River Gauge Records Using Satellite Observations. *Environmental Research Letters*. <https://doi.org/10.1088/1748-9326/acd407>
- 2023 \***Riggs, R.M., Allen, G.H.**, Brinkerhoff, C.B., Sikder, S.M., Wang, J., Turning lakes into river gauges using the LakeFlow algorithm. *Geophysical Research Letters*. <https://doi.org/10.1029/2023GL103924> (top viewed article)
- 2022 **Allen, G.H.**, Cause of the 2020 surge in atmospheric methane clarified. *Nature News and Views*. <https://doi.org/10.1038/d41586-022-04352-6>
- 2022 Liu, S., Kuhn, C., Amatulli, G., Aho, K., Butman, D.E., **Allen, G.H.**, Lin, P., Pan, M., Yamazaki, D., Brinkerhoff, C., Gleason, C., Raymond, P.A., The importance of hydrology in routing terrestrial carbon to the atmosphere via global streams and rivers. *Proceedings of the National Academy of Sciences*. (highlighted in Nature) <https://doi.org/10.1073/pnas.2106322119>
- 2021 Rosentreter, J.A., Borges, P.A., Deemer, B.R., Holgerson, Liu, S., C.M., Song, M.A., Melack, J., Raymond, P.A., Duarte, C.M., **Allen, G.H.**, Olefeldt, Poulter, B., D., Battin, T.I., Eyre, B.D., Half of global methane emissions come from highly variable aquatic ecosystem sources. *Nature Geoscience*. <https://doi.org/10.1038/s41561-021-00715-2>
- 2020 **Allen, G.H.**, Yang, X., Gardner J., \***Holliman, J.**, David., C.H., Ross, M., Timing of Landsat overpasses effectively captures flow conditions of large rivers. *Remote Sensing*. <https://doi.org/10.3390/rs12091510>
- 2020 Yang, X., Pavelsky, T.M., **Allen, G.H.**, The past and future of global river ice. *Nature*. <https://doi.org/10.1038/s41586-019-1848-1>
- 2019 Lin, P., Pan, M., Beck, H., Yang, Y., Yamazaki, D., Frasson, R.P.d.M, David, C.H., Durand, M., Pavelsky, T.M., **Allen, G.H.**, Gleason, C., Wood, E., Global reconstruction of naturalized river flows at 2.94 million reaches. *Water Resources Research*. (Editor's Choice Award) <https://doi.org/10.1029/2019WR025287>
- 2019 Yamazaki, D., Ikeshima, D., Sosa, J., Bates P.D., **Allen, G.H.**, Pavelsky, T.M., MERIT Hydro: A high-resolution global hydrography map based on latest topography datasets. *Water Resources Research*. (Editor's Choice Award) <https://doi.org/10.1029/2019WR024873>
- 2018 **Allen, G.H.**, David, C.H., Andreadis, K.M., Hossain, F., Famiglietti, J.S., Global estimates of river flow wave travel times and implications for low-latency satellite data. *Geophysical Research Letters*. <https://doi.org/10.1029/2018GL077914>
- 2018 **Allen, G.H.**, Pavelsky, T.M., Global extent of rivers and streams. *Science*. (cover story August 10) <https://doi.org/10.1126/science.aat0636>
- 2018 **Allen, G.H.**, Pavelsky, T.M., Barefoot, E.A., Lamb, M.P., Butman, D., Tashie, A., Gleason, C.J., Similarity of stream width distributions across headwater systems. *Nature Communications*. <https://doi.org/10.1038/s41467-018-02991-w>
- 2015 **Allen, G.H.**, Pavelsky, T.M., Patterns of river width and surface area revealed by the satellite-derived North American River Width data set. *Geophysical Research Letters*. <https://doi.org/10.1002/2014GL062764>

2013 **Allen, G.H.**, Barnes, J.B., Pavelsky, T.M., Kirby, E., Lithologic and tectonic controls on bedrock channel form at the northwest Himalayan front.  
*Journal of Geophysical Research Earth Surface*. <https://doi.org/10.1002/jgrf.20113>

## University Teaching

2023–pres.	<b>Virginia Tech</b>	
	Instructor	GEOS/GEOG/CSES 3304 Geomorphology
	Instructor	GEOS 4984/6104 Remote Sensing of Hydrology
	Instructor	GEOS 6104 Advanced Remote Sensing in Geosciences
	Instructor	GEOS 6204 Advanced Topics: Surface Processes
2018–2022	<b>Texas A&amp;M University</b>	
	Instructor	GEOG 312 Data Analysis in Geography
	Instructor	GEOG 361/651 Remote Sensing in Geosciences
	Instructor	GEOG 696 Geomorphology and Remote Sensing
2016	<b>UNC Chapel Hill</b>	
	Instructor	GEOL 483 GIS and Remote Sensing

## Graduate Student Supervision

Exp. 2029	Steve Yoon, PhD Geosciences, Remote sensing of water in small water bodies
Exp. 2029	David Go, PhD Geosciences, River surface dynamics
Exp. 2028	Hana Thurman, PhD Geosciences, SWOT remote sensing of river flow waves
Exp. 2027	Yohtaro Kobayashi, PhD Geosciences, River light availability
2021–2026	Emily Ellis, PhD Geosciences, Dissertation title: Joining Water Quantity and Water Quality: Assessing Altered River Thermal Regimes with Satellite Remote Sensing.
2021–2025	Molly Stroud, PhD Geosciences, Dissertation title: Exploring Innovative Methods to Study Inland Waters Using Remote Sensing.
2023–2025	Luisana Rodriguez Sequeira, MS Geosciences, Thesis title: Estimating microplastic concentrations in surface water using satellite-based turbidity measurements: a case study on the New River, VA.
2022–2024	Carter Boyd, MS Geosciences, Thesis title: Quantifying the Size Distribution of Rivers Across Spatial Scales.
2019–2024	Ryan Riggs, TAMU PhD Geography, Dissertation title: Improving Access to River Discharge Data Through Satellite Remote Sensing.
2020–2022	John Morgan, TAMU MS Geography, Thesis title: Characterizing River Width Across Spatial Scales in the Mississippi River Basin.
2019-2021	Ennis Rios (co-chair), TAMU MS Water Management & Hydrological Science, non-thesis.

## Postdoc Supervision

2023–2025	Katie McQuillan, Radar remote sensing of lake wind and evaporation
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## Recent Professional Activities & Service

- 2020–pres. Convener of 23 AGU Annual Meeting sessions
  - 2020–pres. Member, NASA SWOT Science Team
  - 2023–pres. Guest Editor, *Journal of Remote Sensing* Special Issue, Remote Sensing of Hydrology: Emerging Techniques and Applications
    - 2023 Invited Participant, Global River Observing Network (RIOS) Workshop, Bristol, UK
    - 2022 Panelist, Proposal peer review panel for NSF
  - 2020–2023 Panelist, Proposal peer review panels for NASA (2x)
  - 2020–pres. Ad-hoc proposal reviewer for NASA, NSF (2x), and USGS
  - 2019–2024 Member, NSF Dry Rivers Research Coordination Network
    - Member, DEI & Justice Working Group
  - 2019–2023 Contributor, Inland Waters Group, Global Carbon Project, RECCAP2
  - 2013–pres. Journal referee of >60 manuscripts for publications
- Memberships: American Geophysical Union (AGU)  
IEEE Geosciences and Remote Sensing Society (GRSS)

## Selected Data Products & Software

- 2025 Wang, J., Pottier, C., Cazals, C., Battude, M., Sheng, Y., Song, C., Sikder, M.S., Yang, X., Ke, L., Gosset, M., Oliveira, R., Grippa, M., Girard, F., **Allen, G.H.**, Biancamaria, S., Smith, L., Crétau, J-F, Pavelsky, T. SWOT Prior Lake Database (PLD).  
<https://hydroweb.next.theia-land.fr>
- 2024 Lehner, B., Anand, M., Fluet-Chouinard, E., Tan, F., Aires, F., **Allen, G.H.**, Bousquet, P., Canadell, J.G., Davidson, N., Finlayson, C.M., Gumbricht, T., Hilarides, L., Hugelius, G., Jackson, R.B., Korver, M.C., McIntyre, P.B., Matthews, E., Nagy, S., Olefeldt, D., Pavelsky, T., Pekel, J.-F., Poulter, B., Prigent, C., Wang, J., Worthington, T.A., Yamazaki, D., Thieme, M. Global Lakes and Wetlands Database V2 (GLWD v2),  
<https://www.hydrosheds.org/products/glwd>
- 2023 \*Riggs, R., Moulds, S., Wortmann, M. Slater, L., **Allen, G.H.**, RivRetrieve R Package for downloading global river gauge data  
<https://cran.r-project.org/web/packages/RivRetrieve>
- 2022 Wang, J., Walter, B.A., Yao, F., Song, C., Ding, M., Maroof, A.S., Zhu, J., Fan, C., Xin, A., McAlister, J.M., Sikder, S., Sheng, Y., **Allen, G.H.**, Crétau, J., Wada, Y., GeoDAR  
<https://zenodo.org/records/6163413>
- 2021 Lin, P., Pan, M., Wood, E.F., Yamazaki, D., **Allen, G.H.**, MERIT Hydro-Vector  
<https://doi.org/10.6084/m9.figshare.c.5052635>
- 2020 Yang, X., Pavelsky, T.M., **Allen, G.H.**, Global River Ice Dataset (GRID)  
<http://doi.org/10.5281/zenodo.3372709>
- 2019 Lin, P., Pan, M., Beck, H.E., Yang, Y., Yamazaki, D., Frasson, R., David, C.H., Durand, M., Pavelsky, T.M., **Allen, G. H.**, Gleason, C. J., Wood, E. F., Global Reach-Level A Priori Discharge Estimates for SWOT (GRADES)

<https://www.reachhydro.org/home/records/grades>

- 2019 Yamazaki, D., Ikeshima, D., Sosa, J., Bates P.D., **Allen, G.H.**, Pavelsky, T.M., MERIT Hydro [http://hydro.iis.u-tokyo.ac.jp/~yamada/MERIT\\_Hydro](http://hydro.iis.u-tokyo.ac.jp/~yamada/MERIT_Hydro)
- 2018 **Allen, G.H.**, Pavelsky, T.M., Global River Widths from Landsat (GRWL) <https://doi.org/10.5281/zenodo.1297434>

## Selected Invited Talks

- 2024 Department of Earth, Marine and Environmental Sciences Colloquium, University of North Carolina at Chapel Hill, NC, Apr. 17
- 2024 New River Symposium, New River Conservancy, Radford, VA Apr. 11-12
- 2024 Department of Earth Science Seminar, Southern Methodist University, Dallas, TX, Feb. 9
- 2023 Departmental of Environmental Science Seminar, Duquesne University, Virtual, Mar. 17
- 2022 USGS Water Mission Area Seminar, Virtual, Oct. 12
- 2022 Department of Earth, Environmental and Planetary Sciences Seminar, Rice University, Houston, TX, Sep. 29
- 2022 Department of Marine, Earth and Atmospheric Sciences Seminar, North Carolina State University, Virtual, Mar. 30
- 2021 Remote Sensing Interdisciplinary Graduate Education Program Seminar Series, Virtual, Mar. 8 (Student-nominated speaker)
- 2019 Distinguished Speaker Series, Institute for Sustainable Communities, TAMU, College Station, TX, Nov. 19
- 2019 South American Water from Space Conference, Manaus, Brazil, Nov. 4-7
- 2019 Crosscurrents Seminar, University of North Texas Department of Geography and the Environment, Denton, TX, Oct. 18
- 2018 Whole Earth Seminar, University of California at Santa Cruz, Department of Earth and Planetary Sciences, Santa Cruz, CA, Jan. 23