

Detrekóí Seminar Lecture Series

**Talk by visiting lecturer Dr. Robert Brakenridge, University of Colorado (USA)**

**Tuesday, September 19, at 4.15 p.m.**

In-person at: Kf12.

**The new visiting Fulbright Specialist will present:**

**"Space-based Measurement of River Discharge, Floods, and Droughts"**

Join the Detrekóí seminar lecture of the Department of Photogrammetry and Geoinformation for the talk followed by Q&A.

Summary:

River discharge (flow rate) measurements are critical to hydrology research and water resource management worldwide. Such data have long been collected on the ground at gauging stations, but environmental monitoring in an era of climate change and expanding population now requires major improvements in its quantity and quality. River flow area can be used to monitor streamflow variation, and such area observations are available from a variety of orbital satellite sensors with some data extending back to 1998. Passive microwave information offers the advantage of frequent (near daily) sampling with little interference from cloud cover. Flow area is monitored for defined satellite gauging reaches (SGRs) measuring 10–36 km in length depending on the sensor and band used. As demonstrated by comparison to ground gauging stations, Ka-band and L-band microwave information can both be used successfully. Ka-band data offer higher spatial resolution and a time series extending back to 1998. L-band SGR data from the SMAP polarimetric radiometer are less sensitive to small geolocation errors and may provide better results especially for the larger rivers or those with forested floodplains. The path forward to automated, near-real time global flood and river low flow detection and measurement is now clear. Such a system can make use of a suite of NASA, ESA, and JAXA satellites and sensors.

**Meet the new visiting scientist to our Faculty,**

**G. ROBERT BRAKENRIDGE**

Biographical Sketch



Founder and Associate Director, Dartmouth Flood Observatory

<http://floodobservatory.colorado.edu/>

Senior Research Scientist, INSTAAR, University of Colorado, Boulder CO

Email: [Robert.Brakenridge@Colorado.edu](mailto:Robert.Brakenridge@Colorado.edu)

**EDUCATION**

Ph.D. 1982, University of Arizona, Tucson, Geosciences

M. S. 1979, University of Arizona, Geosciences

B.S. 1975, Beloit College, Environmental Geology

Postdoctoral Research, 1982 (German Academic Exchange Scholarship), West Germany

**EXPERIENCE**

2010-Present Senior Research Scientist, University of Colorado

1987-2011 Assistant, Associate, Full Research Professor, Dartmouth College, Dept. of Geography; Adjunct Professor, Dept. of Earth Sciences

1991-1992 JPL/California Institute of Technology Visiting Senior Scientist and Geology Program Manager, Solid Earth Sciences, NASA Headquarters, Washington, D.C.

1983-1987 Assistant Professor, Dept. Geology, Wright State University

**EXAMPLE ACTIVITIES**

2018 NASA/USAID/PEER project workshop: "Applied tools to monitor water discharge and flooding for South American Rivers", EAFIT University, Medellín, Colombia

2014-2018 Steering Committee, Global Flood Partnership: public, private and international groups performing global flood monitoring, modeling and forecasting

2017 Invited Expert, Global Risk Assessment in support of the Sendai Framework, UN-ISDR, Geneva

2014 - 2017 Advisory Board, "[Earth2Observe](#)", Global Earth Observation for Integrated Water Resource Assessment. European Commission project included 27 EU partners

**SELECTED RECENT PUBLICATIONS**

Tellman, B., Sullivan, J. A., Kuhn, C., Albert J. Kettner, Doyle, C. S., Robert Brakenridge, Erickson, T. A., Slayback, D. A. 2021: *Satellite imaging reveals increased proportion of population exposed to floods*. *Nature*, 596: 80-86. DOI: 10.1038/s41586-021-03695-w

- Brakenridge, G. R., Nghiem, S. V., & Kugler, Z. (2023). *Passive microwave radiometry at different frequency bands for river discharge retrievals*. **Earth and Space Science**, 10, e2023EA002859. DOI: 10.1029/2023EA002859
- Podkowa, A., Kugler, Z., Nghiem, S. V., & Brakenridge, G. R. (2023). *Ice freeze-up and break-up in Arctic rivers observed with Satellite L-band passive microwave data from 2010 to 2020*. **Water Resources Research**, 59, e2022WR031939. DOI:10.1029/2022WR031939
- Restrepo, J. D., Albert J. Kettner, Robert Brakenridge 2020: *Monitoring water discharge and floodplain connectivity for the northern Andes utilizing satellite data: A tool for river planning and science-based decision-making*. **Journal of Hydrology**, 586: 124887. DOI: 10.1016/j.jhydrol.2020.124887
- Zeng, Z., Gan, Y., Albert J. Kettner, Yang, Q., Zeng, C., Robert Brakenridge, Hong, Y. 2020: *Towards high resolution flood monitoring: An integrated methodology using passive microwave brightness temperature and Sentinel synthetic aperture radar imagery*. **Journal of Hydrology**, 582: 124377. DOI: 10.1016/j.jhydrol.2019.124377