Association of Environmental & Engineering Geologists
San Francisco Bay Area Chapter

Announcing our **January 19, 2022** Meeting

2021-2022 Jahns Distinguished Lecturer

Richard M. Wooten, P.G.
Formerly of the North Carolina Geological Survey

"Debris Flows, Big Slow Movers, and Rocks Slides: Assembling the Geospatial Legacy of Landslides using Lidar, Drones, and Boots on the Ground"

MEETING DETAILS

Virtual Meeting Place	**Date and Time**
Online with Teams	**Wednesday, January 19, 2022**
A link will be sent the day before the meeting	6:00 pm – 7pm

Cost: FREE (optional donation towards our Student Scholarship)

Reservations: Spaces are limited, RSVP in advance!
Please fill out the online form by **12 PM, Tuesday January 18, 2022.**

Thank you for your RSVP! See you on Wednesday, Jamuary 19, 2022!

Debris Flows, Big Slow Movers, and Rocks Slides: Assembling the Geospatial Legacy of Landslides using Lidar, Drones, and Boots on the Ground

Damaging landslides are a recurring problem in the Blue Ridge Mountains of North Carolina as in other mountainous regions worldwide. Since 1879 landslides in western North Carolina have resulted in at least 84 fatalities and 22 injuries, over 84 destroyed or condemned homes and damage to 60 others, continued damage and threats to regional infrastructure, and have cost well over $53 million since 1990 in direct losses alone. Assembling and maintaining a landslide geodatabase is a multi-year, ongoing effort using data collected from landslide hazard mapping and responses to landslide events. Developing such a geodatabase is a fundamental component of proactive landslide loss reduction.

The NCGS's landslide geodatabase documents the areal extents prehistorical and historical landslides of various types - key predictors for where landslides may happen in the future. Debris flows, large slow-moving, deep-seated, debris slides and weathered-rock slides (big slow movers); and, rockslides comprise the main types of landslides. Rainfall from landfalling tropical cyclones can trigger hundreds to thousands of debris flows. Rapidly moving debris flows can travel 30 mi/hr (13 m/sec) and have resulted in fatalities and destroyed homes. Mapped debris flows and past debris flow deposits provide the empirical bases for debris flow susceptibility and pathways models – important components of landslide hazard maps. Big slow movers continue to damage and threaten homes, and critical regional transportation and energy infrastructure. Historic reactivation of once-dormant big slow movers typically coincides with extended periods of above normal precipitation, and within composite deposits from past landslides including those modified by human activity. Rockslides and rockfalls pose a significant threat to transportation routes like I-40 and the Blue Ridge Parkway. Direct mitigation costs for a major rockslide can be on the order of $10 million. The resulting extended closures of I-40 and Blue Ridge Parkway can incur $1 million a day in lost revenue, with substantial negative impacts to local and regional economies dependent on these transportation routes.

Archival aerial photography, orthophotography, and satellite imagery are important remote sensing tools used to detect, and optimize field verification of suspected landslide features. The advent of lidar digital elevation models and uncrewed aerial systems (UAS) technology has revolutionized landslide mapping and landslide response capabilities. Integrating geospatial landslide data with historical and meteorological information increases our knowledge of the frequency and magnitude of landslide triggering storms, and sheds light on landslide causes and triggers, and their connections with geology, climate, weather patterns, forests, and land use. The confluence of new technology, the passage of the National Landslide Preparedness Act, and the ongoing impacts of extreme weather patterns linked to climate change present a compelling opportunity for the geoscience community to press forward in a coordinated effort to reduce losses from landslides. An essential part of meeting this challenge is building partnerships within and outside of the scientific community to increase public awareness of geologic hazards.

Speaker Bio:

Richard (Rick) Wooten has over 40 years of experience in applied geology in the Cascade Mountains of Washington State and applied geologic research in the Piedmont and Blue Ridge Mountains of North Carolina. He earned his BS and MS degrees in geology at the University of Georgia in 1973 and 1980. Rick recently retired from the North Carolina Geological Survey where he was the Senior Geologist for Geohazards and Engineering Geology from 1990 to 2021. His previous work includes mapping geologic resources and conditions for land-use planning, landslide investigations, and applied geotechnical geology for the USDA Forest Service on the Gifford Pinchot National Forest in Washington State from 1980 to 1990. His work with the North Carolina Geological Survey includes the scientific regulatory review and field investigations for a low-level radioactive waste disposal project and bedrock geologic mapping in the Piedmont and Blue Ridge Mountains. Since 2003, his main focus has been on landslide hazard mapping and research and responding to landslide events North Carolina Blue Ridge. He has a special interest in the relationships of ductile and brittle bedrock structures with geomorphology and landslides processes and communicating landslide hazards information with stakeholders.