

Department of Physics and Materials Science

SEMINAR



From Particles to Plans: How Flood Sediment
Inform Flood Risk Management

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Abstract: Flood hazards are likely to increase in a warming world. Instrumented flood records only provide insight into the last ~120 years of flood variability when climate was distinct from future trends and river regulation muted natural variability. Consequently, we do not have a clear knowledge on what drives the most extreme floods (magnitudes with > 100-yr recurrence intervals) and how often these floods occur. Fortunately, rivers are self-gauging systems and preserve sedimentological records of past flood events (paleofloods) in the floodplains and valley margins. My talk will discuss novel methods for leveraging the particle sizes of flood sediment to estimate minimum flood discharges with reworked shear stress equations. I will highlight key instrumentation that make this analysis possible. Specifically, a Bettersizer S3 Laser Particle Size and Particle Shape Analyzer which uses laser diffraction to rapidly measure particle sizes ranging 0.01 - 3500 μm . The detailed particle size data and age dating through optically stimulated luminescence enabled our research group to extend the flood record by 6,000 years. In doing so, we were able to utilize improved flood frequency estimates into the Tennessee Valley Authority dam safety program and gain key insights into extreme flood response to abrupt climate change.

Bio: Dr. Rachel Lombardi is an assistant professor in the Earth Sciences Department at the University of Memphis (UofM). She received her B.S. in Environmental Sciences at Longwood University, and her M.S. and Ph.D. in geography at the University of Alabama in 2022. At the University of Alabama, she was the recipient of the prestigious David Weaver Award. Her research interests include extreme flood drivers, flood sedimentation in alluvial rivers, and flood risk and communication.

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Friday Oct. 14th, 3 - 4 PM Manning Hall 201



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