

DEPARTMENT OF GEOSCIENCES
COLLEGE OF ARTS AND SCIENCES

FOR APPLICATION YEAR: 2024

PROJECT TITLE: Historical meandering of alluvial streams in buried valleys, southern Ohio, USA

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Project Description

This project will focus on the sweeping of modern alluvial streams across buried valleys of southern Ohio, including the Scioto R., Little Miami R., Mill Creek, and Great Miami R. The rivers are actively and rapidly meandering within alluvium, outwash, and glacial till that partially fill deeper bedrock valleys carved by the ancestral Ohio (Teays) River. Meandering is an important natural process by which rivers maintain a healthy floodplain, but it also actively rewrites property lines and endangers developed areas and known archeological sites. Stabilization efforts in some watersheds have reduced meandering locally, but with unknown effects downstream. The student will compile and digitally georeference historical maps and aerial and satellite images, and use GIS tools to analyze meandering rate, the frequency at which rivers abandon their channels (avulsion), and other changes over time. We aim to test the hypotheses that 1) meandering rates in buried valleys have changed over the last century due to climate change; and 2) that urbanization and other human activity in a catchment influences meandering rates and patterns. Final products might include a map of southern Ohio showing meandering rates in each valley in time slices over the last century, individual valley maps showing meander history, and/or a site analysis evaluating risk to a particular site or set of sites, including archeological sites. This project will also contribute relevant data and analysis to a greater understanding of the relationships between river valleys, ice sheets and their deposits, and the landscapes that form at intermittent ice sheet margins.

Key skills:

- Basic understanding of geomorphology and landforms, particularly alluvial landforms
- Familiarity with southern Ohio archeological features

- Experience with reading and interpreting maps, DEMs, and aerial or satellite photos, and other environmental data
- Basic experience with GIS software

Training under this program will exercise and extend those key skills, plus:

- Introduction to field work with a drone and 3D photogrammetry
- Opportunities to participate in other activities of our research group e.g. geophysical data collection