#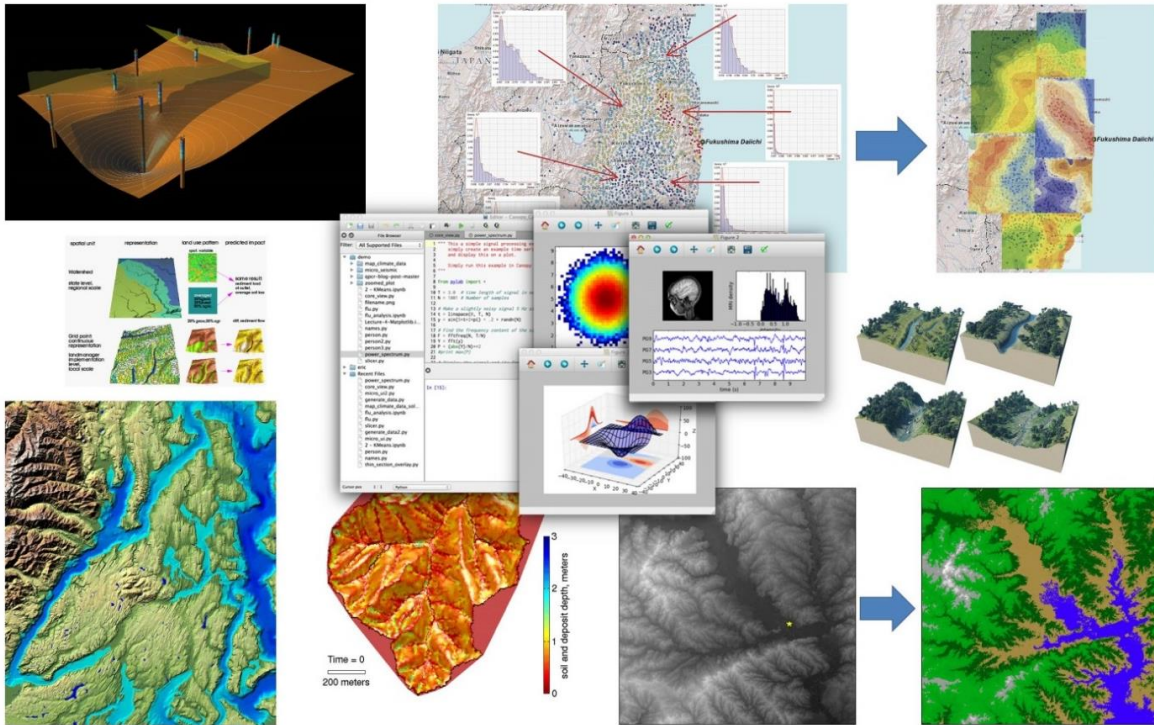 ESS 521: Advanced Geospatial Analysis with Python for the Earth Sciences – A Survey of Programming Applications and Numerical Methods
Spring 2019
MW 12:00-1:20, 4 credits

Course Summary:
This course provides a survey of advanced approaches to geospatial analysis for the earth sciences. Though the course material partly encompasses elements of GIS and GIScience, we will delve in greater detail into the numerical methods used to analyze spatial pattern. Foci and applications will at least in part be determined by the students' interests, but may include elements such as the following: three-dimensional surface/subsurface analysis; hydrologic routing and modeling; inclusion of spatiotemporal change in understanding geomorphic processes; image classification methods and pattern analysis; and general spatial modeling. Discussion of geospatial statistics, with a particular emphasis on geostatistical methods such as kriging, will also be included.

Our approach to the subject matter will emphasize extensive hands-on learning in a collaborative "workshop" framework for learning. In particular, most of the work in the course will revolve around use of the Python programming language, an accessible, high-level language that is becoming increasing prominent in geospatial analysis. Students will first learn the basics of Python, and then will cover the fundamental data structures and numerical methods necessary for geospatial analysis. Course structure will consist largely of computer lab work, combined with a mix of instructor and guest lectures, in-class discussion and "brainstorming" sessions, and special-topic video lectures.

Intro-level GIS (e.g., ESS 420) or more required. For more information and/or registration add-code (please indicate prior GIS background), contact Steven Walters, Senior Lecturer in ESS, swalt826@uw.edu