SSIO 2015 Internship Opportunity Position

Internship Information

Project title:	**Getting that sinking feeling: how to find stability in an area of subsidence?**
NOAA mission goal:	**Resilient Coastal Communities and Economies**
Hypothesis or objectives:	**Understanding vertical rates of land motion along our nation's coastline is critical for evaluating coastal resiliency to changing water levels. Both sea levels and land elevations may change at millimeter-per-year rates, but most of our nation's terrain elevation databases (i.e. the National Elevation Database) are accurate to at best decimeters. In addition, whereas we have very good models accounting for the horizontal movement of continental plates, vertical motion (uplift and subsidence) can be very local and poorly defined or modeled. Therefore, projects have to examine site-specific data to understand local vertical ground motion.** **The National Geodetic Survey (NGS), which is the national authority on coordinates, positions, and the national spatial reference system, holds extensive high precision/high accuracy elevation data on bench marks and continuous Global Positioning System (GPS) stations.In addition, NGS has a dataset holding GPS-derived positions on reference marks. NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) holds extensive datasets of water levels and water level trends around the country accurate to the sub-centimeter.** **This project will mine existing NOAA (NGS and CO-OPS) database and the Harris-Galveston Subsidence District (HGSD) GPS Monitoring Network data to determine the effect of assumptions of geographic stability on estimations of vertical motion in a subsidence area. For example, how far away from a subsidence area must one go to reach a stable solution? How sensitive are different GPS-derived positions to the fixed constraints? How can one incorporate sea level trends from a tide station with trends obtained using repeat leveling data to solve for vertical land motion? The investigator will learn both leveling and GPS processing methods, how to access NOAA data, and how to perform constrained adjustments and interpret the results. The investigator will learn such tools as OPUS (NGS's Online Position User Service) and LOCUS (the Leveling Online Computations User Service).**
Academic status:	**Undergraduate**
Area(s) of discipline:	**Civil Engineering, Climate Change, Computer Science, Earth Science, Engineering, Environmental Science Studies, Geography, Geology, Geophysical Engineering, Mathematics, Physical Sciences, Physics, Spatial Analysis**
Internship location:	**Silver Spring, MD**
Duties and responsibilities:	**The student will learn to mine existing NOAA (NGS and CO-OPS) databases and the Harris-Galveston Subsidence District (HGSD) GPS Monitoring Network data to determine the effect of**

	GPS Monitoring Network data to determine the effect of assumptions of geographic stability on estimations of vertical motion in a subsidence area. The student will also learn the fundamentals of both leveling and GPS processing, how to perform constrained adjustments and interpret the results. The student will learn on-line analysis tools as OPUS (NGS's Online Position User Service) and LOCUS (the Leveling Online Computations User Service).
Special skills/training required:	**The student should have very solid analytic and computational skills. No prior experience with leveling or GPS adjustments is necessary, but for the project to be effective, the student should have the aptitude and willingness to learn basic concepts and tools involved with processing geodetic data. The project is computer-based, although as part of NGS' Ecosystems and Climate Operations (ECO) Team, the student may be provided opportunities to assist on other survey and/or field research projects.**
Expected outcomes:	**The student will learn real-life applications of high precision geodetic survey data that affect everything from coastal community resilience to underground fluid extraction. Vertical motion is the least well-known motions on the Earth's crust: the student will become knowledgeable of not just causes of vertical motion, but also techniques for measuring and analyzing vertical change, which is critical for all coastal communities in a climate of changing sea levels.**
Guidance and supervision:	**The student will be mentored by a physical scientist with the National Geodetic Survey. The student will be assisted by other researchers at NOAA who are working in this area of vertical motion and sea level change. The student should be very motivated and able to work independently, with guidance provided by the mentor and colleagues.**
Posted or modified date/time:	**Thursday, October 23, 2014 - 4:18:00 PM**

Internship Travel Information

Purpose (student's role):	**---**
Mode of transportation:	**---**
Date(s):	**---**
Destination:	**---**
Estimated cost:	**---**
Source of funding:	**---**

Mentors Contact Information

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Co-Mentor email: **---**
Agency or organization: **---**

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