

Research Interests

When asked to give a seminar on my research a few years ago, I titled the talk: *Adventures of a Wet Geologist*. The bulk of my research has been focused on the interaction of land, water, and people and I consider just about any issue in that very broad realm to be fair game.

I am particularly interested in engaging students to collect field data and conduct experiments that will ultimately contribute to better management of resources within a watershed or coastal zone. Students really value research with an obvious, practical benefit and there is no better training for graduate research and environmental employment in consulting, advocacy, and government.

Example Research Projects

What follows is a list of research projects I have been involved in over the past 6 years, with more recent initiatives listed first. To one degree or another, all of these projects have engaged undergraduate students as research assistants. There have been many more, but these are the ones that have been supported by outside agencies.

- ◆ Initiative to Improve Peconic Water Quality
- ◆ Physical, Sedimentary, and Hydrologic Impacts of Barrier Island Breach Events on Long Island Estuaries
- ◆ The Impact of Mosquito Spraying on Salt Marsh Biota
- ◆ Nutrient Concentrations of Groundwater Discharge in Quantuck Bay
- ◆ Disposal Alternatives for Dredge Spoil from the Navigation Channel in Old Fort Pond
- ◆ The Influence of Mosquito Ditches on the Transport of Upland Pollutants to Peconic Bay
- ◆ Bathymetric Map of Quantuck Bay
- ◆ Tidal and Event Variability of Suspended Sediment Data from the Sacramento River and Delta - Water Years 1999 and 2000
- ◆ Hamptons '02 Airborne Laser Terrain Mapping Project
- ◆ Environmental Monitoring and Assessment of Trout Pond and Associated Surface and Ground Waters Down-gradient of the Golf at the Bridge Development, Town of Southampton, NY
- ◆ Morphodynamic Investigation of Beachrock Impacts on Littoral Zone Processes and Coastal Evolution
- ◆ Rapid Cementation of Coastal Sand Deposits: Causes and Impacts on Coastal Evolution

General Research Interests

My research projects tend to revolve around the interaction of people and nature in these general areas:

- Flux and characteristics of water as it moves through the hydrologic cycle (hydrology/environmental chemistry)
- Evolution of landforms (geomorphology/sedimentology)
- Anthropogenic impacts on aquatic/marine sediments and ecology (biogeochemistry)

I have had great experiences monitoring the spatial and temporal variability in water quality as it fluxes from the atmosphere to the sea. Rain, streams, lakes, marshes, groundwater, estuaries – my students and I have sampled them all! In so doing, my students have gained a more visceral understanding of the hydrologic and biogeochemical cycles. Of course, it is also useful for identifying pollution sources and affects, which is the real interest in the community.

In addition to my interest in water as a medium for pollutants, I am also interested in water as a geomorphic force. This is manifested in my research in coastal and fluvial processes. I have an abiding interest in the morphodynamic response of the coastal zone to sea level rise, inlet breaching, storms, and hard stabilization. That research in turn requires an interest and facility in studying wave, current, and sediment dynamics. My experience in investigating these hydrogeologic processes is not restricted to the marine environment. I have applied the same techniques in studying fluvial, wetland, and lake processes.

All of my interests came together in my dissertation research on the formation and impacts of beachrock in Puerto Rico. My investigations of the rapid lithification of coastal sediments and the subsequent influence that their exposure has on coastal evolution called for a real interdisciplinary approach. In the course of my research, I had the opportunity to employ a wide variety of geoscience techniques, including:

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| ◆ beach profiling | ◆ aerial photography |
| ◆ bathymetric surveying | ◆ subtidal and subaerial coring |
| ◆ GPS and GIS | ◆ ground penetrating radar |
| ◆ sediment flux measurements | ◆ thin section analysis |
| ◆ sediment textural analysis | ◆ scanning electron microscopy |
| ◆ electromagnetic current and wave measurements and spectral analysis | ◆ lab experiments investigating the influence of nutrients, algae and bacteria on CaCO ₃ precipitation |