

Project Summary

The proposed project will give four undergraduate and graduate students from any U.S. institution as well as one graduate student, selected from and funded by the NSF-IGERT program at the Scripps Institution of Oceanography (SIO), an opportunity to do research in coastal oceanography at the Institute of Marine Sciences (IMS) in Zanzibar, Tanzania for three months each year from 2008 to 2010. The unifying research theme will be on modeling the dynamics of the Zanzibar Channel, an about 40km-wide and 100km-long body of water between the Tanzanian mainland and the island of Zanzibar. The research goal is to develop a model that produces an annual cycle that resembles as closely as possible the real annual cycle and thus forms a base for further model development aimed at addressing natural resource management issues. The goal for the students' professional development is to enable them to work as a team in a project with many international partners.

Students will pursue three types of research projects: 1) Modeling projects, to further develop a Zanzibar Channel model begun by the PI's previous student using the Regional Ocean Modeling System (ROMS); 2) Data projects, to collect oceanographic data in the Zanzibar Channel; 3) Environmental context projects, in which students will investigate scientific, societal, and economic issues such as pollution, beach erosion, and coral reef health to which the modeling could have utility.

Oceanographic institutions in the East African region, including IMS, recently made coastal modeling one of their top priorities, citing its cost-effectiveness in understanding processes that affect their coasts. The prioritization of modeling is encouraged and fully supported by the Intergovernmental Oceanography Commission at UNESCO and the Environment Department at the World Bank as both have a mandate to promote capacity development in the marine sciences in the developing world. Both are actively supporting the proposed project, representing partnerships that the National Science Board strongly recommends. Because little is known about the coastal dynamics in this region, the proposed activities present novel research opportunities for students.

Intellectual Merit The proposed project is the logical extension of the PI's previous NSF-supported student research project and collaboration on IOC regional training activities. It benefits from the PI's 12 years of experience of sending students to Africa. Because relatively little physical oceanographic research on the dynamics of the Zanzibar Channel has been conducted, the proposed research will provide a first understanding of the dynamics of the Zanzibar Channel. Beyond local relevance, coastal oceanographers are interested in new cases that might reveal new coastal processes or could be used for comparison with other coastal regions. To maximize the model's benefit it will also be important to investigate its usefulness to other fields such as coral reef research. Because the proposed project addresses one of IMS' top priorities, IMS will provide new oceanographic instrumentation and use of a research boat. Additional instruments and a computer cluster will be provided at no cost by SIO and the Georgia Institute of Technology, respectively.

Broader Impacts The combination of the relatively unknown dynamics of the Zanzibar Channel and the support of a dedicated and diverse Advisory Committee will provide the students with an exciting research and learning experience. A diverse group of students will be selected because it can better master the challenges of the research and the different culture, thus making the experience more rewarding. Because students can be selected nationwide, many new partnerships within the U.S. will originate which will also become connected through the students to the networks already existing in East Africa. Results of the research and the experiences made by sending students to Zanzibar will be documented in publications, at conferences, and via a website.