

Veteran Research Supplement – Proposed Research Program

This document summarizes planned research opportunities for two U.S. Military Veterans who are currently undergraduate students at U.S. colleges and universities. This program will be part of a National Science Foundation funded Research Experience for Undergraduates Site run at Florida Atlantic University, and will focus on extracting energy from ocean currents. This REU Site is entitled “REU Site: Removing Barriers to Ocean Current Based Electricity Production through Undergraduate Research” with information on the 2017 program (2018 information coming soon) available at <http://www.fau.edu/research/dor-hboi/reu-ocean-current-home.php>. While NSF funding for this program is expected through a Veteran Research Supplement (VRS) award, funding cannot be confirmed until after applicants have been selected per NSF program regulations.

Program Summary

Application Deadline: **January 2, 2018**

Applicants notified of selection before: January 9, 2018

Program Start Date: May 29th, 2018

Program End Date: August 3rd, 2018

Housing: Housing will be provided on FAU’s beautiful Harbor Branch Oceanographic Institute campus.

Stipends: Stipends of \$500/week will be provided, along with a food allowance of \$150/week.

Travel: Travel to/from Harbor Branch Oceanographic Institute will be reimbursed up to \$750.

Participant Work Expectations: Work days will typically run from 8 a.m. to 5 p.m, including student development and training events held 2-3 times weekly.

Overview: The Southeast National Marine Renewable Energy Center at FAU is hosting an intensive summer research program focused on science and engineering challenges related to the environmentally friendly creation of electricity from ocean currents. This ten-week program emphasizes training, mentoring and research, preparing students for graduate studies or careers in science, technology, engineering or math disciplines. See “Veteran Research Supplement – Proposed Research Projects” document for information related to the two proposed research projects.

How to Apply

Please e-mail the following information to Dr. VanZwieten at jvanzwi@fau.edu

1. Contact information for two references.
2. A current resume.
3. A one-page statement of interest describing your motivations, expectations, and interest in the proposed projects.

*For more information please contact Dr. VanZwieten at jvanzwi@fau.edu or (561) 297-0955

Veteran Research Supplement – Proposed Research Projects

We plan to offer the following two research projects during the summer of 2018 at FAU's Harbor Branch Oceanographic Institute. It is anticipated that these two projects will be funded through a Veteran Research Supplement (VRS) to an existing NSF REU Site program run at Florida Atlantic University. These projects will be made available to undergraduate U.S. Military Veterans, assuming NSF allocates the necessary funding. Both of these research projects are related to a "Drop-in Generator System" that is current under development, but have different research scopes.

Turbine Design: Drop-in Turbine Generator System

Ocean current turbines (OCTs) will be large, subject to powerful drag forces and installed in the open ocean. Therefore, it will be challenging and expensive to recover these systems. For this reason, designing OCTs to reduce the number of system recoveries will be critical to reducing operation and maintenance costs, an important step towards enabling the economically competitive generation of renewable ocean current based power. To reduce the frequency of OCT recoveries, Florida Atlantic University's Southeast National Marine Renewable Energy Center is working with Ocean Current Energy, LLC to design a novel approach for replacing the coupled generator/rotor systems utilized by their OCTs. Instead of recovering OCTs to repair/replace failed generator/rotor systems, these OCTs are being designed such that generator/rotor systems can be replaced at sea without recovering the entire OCT. This technological advancement will greatly reduce the size/class of vessel required for maintenance, and will reduce the down time for OCTs with generator/rotor failures. The two proposed VRS funded projects that are directly related to the development and usage of these drop-in generator/rotor systems are described below.

Project 1) Generator/Rotor Capture and Move System

In this project, the selected U.S. Veteran applicant will work to design and evaluate a system that will enable an ocean current turbine to capture a generator/rotor system lowered from a surface vessel and move it into place within an OCT. This mechanism will also be designed to enable the removal of failed generators/rotors from within a turbine, such that they can be recovered from a surface vessel. The selected applicant will work with SNMREC Chief Engineer (Bill Baxley) to design this capture and move mechanism. This participant will likely then build a small prototype and evaluate its effectiveness at capturing and moving a mock generator/rotor system.

Project 2) Steerable Towfish for Generator/Rotor Replacement

In this project, the selected U.S. Veteran applicant will work to design and evaluate a steerable towfish designed to help lower an OCT generator/rotor from a surface vessel to the capture and move mechanism on an OCT. This towfish will be designed such that it can be maneuvered using actuators (along with shipboard deployment equipment) down to an OCT to either retrieve a failed generator/rotor or deploy a replacement generator/rotor. It is required that the towfish be controllable both with and without the loadings associated with the generator/rotor system. The selected participant will work with the SNMREC Chief Engineer (Bill Baxley) to design this steerable towfish. The participant will then likely work to build a small prototype towfish, and evaluate its effectiveness at deploying/retrieving a generator/rotor to/from an OCT.