

Florida Atlantic University

Southeast National Marine Renewable Energy Center

Marine Renewable Energy (MRE) is the resource embodied in ocean currents, waves, tides, and thermal gradients. Tapping MRE resources will reduce our reliance on fossil fuels and help Florida along the road to energy self-sufficiency. Research areas of focus include improving understanding of ocean current and thermal-gradient resources, implementing testing capabilities to expedite commercial development of these resources, and understanding potential environmental impacts and how to mitigate them.

PI: Susan H. Skemp, Co-Investigators (at FAU): Howard P. Hanson, Taghi Khoshgoftaar, Pierre-Phillippe Beaujean, Len Berry, Megan Davis, Peter Tatro, Mohammad Ilyas, Jeanette Wyneken, Manhar Dhanak, John Reed, James VanZwieten, Karl vonEllenrieder

Students:

Student Name	Thesis/Dissertation Title	Degree
Lynn Rauchenstein	Global and Local Ocean Thermal Energy Conversion Resource Assessment	MS
Fisher, Aaron Donnelly	Development and implementation of an Adaptive Controller for Station Keeping of Small Outboard-Powered Vessels	graduated Dec. 2010 - MS
Hacker, Jr., Basil Lee	numerical simulation of ocean current turbines	MS
Seibert, Michael	Analysis of anchoring methodologies suitable for mooring ocean energy systems off the Southeast coast of Florida.	Spring 2011 - MS
Krupski, Andrew	Design of a dynamically positioned ocean current turbine testing platform	MS
Lovenbury, James	FAU Center for Ocean Energy Technology Proposed Shear Profile and Frequency Spectra	MS
Young, Matthew	Ocean Current Turbine Prototype hydrodynamic performance and motion quantification for the validation of numerical models	MS
Psarrou, Dimitrios	Electromechanical energy conversion, modeling & control w/applications to renewable power-plants	MS
Akram, Mohammad Wasim	Fatigue Modeling of Composite Ocean Current Turbine Blade	Graduated Fall 2010 - MS
Zhou, Fang	Finite Element and Experimental Studies of Composite Ocean Current Turbine Blades under Dynamic Loading."	MS
Cribbs, Allison	NUMERICAL ANALYSIS OF A MOORING SYSTEM FOR AN OCEAN CURRENT TURBINE TESTING PLATFORM	Graduated Dec 2010 - MS
Smentek, Alana	Practical Assessment of Producibile Energy from the Gulf Stream off the Southeast Coast of Florida	Ph.D
Guerra, Julian	Estimates of Water Turbine Noise Levels	Spring 2011
Thew, Ryan	Analysis and Deterction of Marine Animals by their Sound	MS
Bulek, Savaskan	Blind Separation of Speech Signal	Ph.D. Dec. 2010
Esfahanian, Mahdi	Detection and Tracking of Marine Animals using Passive Means in Gulf Stream	MS
Oliver, Benjamin Garry	CFD Simulations of underwater turbine in Gulf Stream using Reynolds Average Navier Stokes Method	MS
Chen, Qingde	Structural Design & Optimization of Underwater Turbine Blade	MS
Perez, Jorge Joaquin, Jr.	CFD and stress modeling of turbine blade (exact title not determined yet)	MS



Miglis, Yohann	Stress Corrosion Problems in Probabilistic and Interval setting and Tidal Energy Reliability Issues (exact title not determined yet)	MS
Hurley, Shaun	Reliability - based Fatigue Design of Marine Current Turbine Blades: Load and Resistance Factors	MS
Senat, Junior	Fatigue Load Modeling for Marine Current Energy System.	MS
Singh, Amit Janesh	Structural Design & Optimization of Underwater Turbine Blade	MS
Duhaney, Janell	Application of Data Fusion in Monitoring Ocean Turbines	MS
Sloan, John	Finite Safety Models for High-Assurance Systems	graduated August 2010** Now Post-doc.
Wald, Randall	Prognostics and Health Management Techniques for Autonomous Ocean Systems	MS
Aghera, Sagar	Design and Development of an Areal Video Aquistion System	MS
Reza, Waazim	Detection and Classification of Marine Animals from Areal Video	graduated 12/2010 - MS
Friedel, Reena Ursula	Thesis topic: 3D modeling and visualization	MS
Giusti, Rafael	Design and Development of a Web-based Video Annotation and Browsing System	MS
Rahman, Asif	Web-based interfaces for video browsing and querying	MS
Tavililov, Timur	Adaptive Resourse Management for Sensor Information Delivery over Constrained Wireless Link	MS
Vailbav. Lad	Finding functional equivalent genes in micro-array expression data under Prof. Hill Zhu	graduated 12/2010 - MS
Duraiswamy, Abishek	Embedded Data Gateway for Prognostic Health Monitoring Systems for Ocean Energy	MS
Gadipudi, Raviteja	Developing a Software Framework for Prognostic Health Monitoring	MS
McMichael, Erin	Ontogenetic habitat selection and resource use in green (<i>Chelonia mydas</i>) and loggerhead (<i>Caretta caretta</i>) sea turtles.	Ph.D
Wojtisek, Elizabeth	MBA Program does not require a dissertation	MBA
Bozec, Alexandra	Development of a local ocean prediction model of the Fort Lauderdale region for energy extraction purpose	FSU post doc

Description: The SNMREC mission is to catalyze ocean-based solutions to the Florida's energy challenge. A primary focus is on determining the potential of Florida's ocean-current resource and on ocean thermal energy conversion in waters offshore. Part of this involves the regulatory process at State and Federal levels for ocean energy infrastructure and operation in the offshore continental shelf, which is neither clearly defined nor have the roles and interdependencies of the individual agencies been clearly articulated. In addition, knowledge to make these decisions is more on a macro- rather than the micro-level necessary to assess individual devices. SNMREC's role is to bridge the gap between concept and commercial deployment of ocean energy technologies by providing at-sea testing facilities for both ocean current and thermal energy research and for technology development. Research cuts across environmental, ecological, resource, and technology areas.

Universities: Florida Atlantic University, with UCF, FSU, USF, ERAU, University of Miami, Oregon State University, University of Washington, Pennsylvania State University, University of New Hampshire, University of Hawaii, University of Edinburgh, Heriot-Watt University, Nova Southeastern University, Virginia Polytechnic Institute and State University, and Florida Institute of Technology



External Collaborators: Numerous industry and State and federal government as well as FFRDCs, such as the National Renewable Energy Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Woods Hole Oceanographic Institution, U.S. Department of Energy (Office of Energy Efficiency and Renewable Energy, U.S. Department of Interior (Bureau of Ocean Energy Management, Regulation, and Enforcement), U.S. Department of Commerce (National Oceanic and Atmospheric Administration), Florida Department of Environmental Protection, and others as well as numerous industry partners.

Progress Summary

Mooring and Telemetry Buoy



- Buoy constructed and initial dockside and tow testing complete
 - Sensor and power systems final development and testing
 - Communications and telemetry under development
- July 2011 readiness



Motor-Generator Dynamometer

- 20kW onshore grid-connected coupled motor dynamometer
- Full simulation of offshore power and monitoring system(s): configuration, integration, and testing
- Dynamic offshore rotor behavior emulation with in situ data
- Smart grid and heterogeneous device-to-grid research

