



# The Floating Offshore Wind and Controls Advanced Laboratory (FOCAL) Experimental Program

**Principal Investigator:** Amy Robertson, National Renewable Energy Laboratory (NREL)

FOCAL will perform the following four model-scale test campaigns to supply data for validation of fundamental concepts necessary for floating wind controls co-design:

1. Advanced wind turbine control strategies (for scaled testing)

2. Active hull controls (ballast and tuned mass dampers [TMD])

**3.** Hull flexibility (accurate modeling of streamlined designs)

4. System-level control strategy (integrated turbine and hull).

Four campaigns focused on developing data sets to validate fundamental concepts for advanced floating wind concepts with advanced control



**1. Scaled Turbine** Controls





DNV·GL

**Team Members:** Alan Wright, NREL • Matt Fowler, University of Maine (UMaine) • Rich Kimball, UMaine • Andrew Goupee, UMaine • Anthony Viselli, UMaine • Benjamin Child, DNV GL



## 2. Hull Controls **3. Hull Flexibility**



## Need:

Validation data are critically needed to advance floating wind design tools.

#### **Solution:**

IMU

Publish four data sets enabling validation of controls co-design software tools and subsequent floating wind designs.

#### **Innovation:**

- Controller scaling methodology
- System-level controller incorporating turbine and hull control for optimized structural design
- Local load measurements to validate light weighting of support structures

### **Dissemination:**

Data sets shared with the public and other project teams through the U.S. Department of Energy (DOE) Data Archive & Portal.

### **Collaboration Tasks:**

- Validate the modeling tools being developed in Task 2 using the first two data sets from FOCAL.
- Develop scaling methodologies for testing of novel turbine designs (e.g., vertical-axis wind turbines) and hull controls.



University of Maine's Wind-Wave Ocean Engineering Laboratory

