EXECUTIVE SUMMIT
ON MARINE AND HYDROKINETIC RESEARCH AND DEVELOPMENT

U.S. DEPARTMENT OF
ENERGY
Energy Efficiency &
Renewable Energy

March 2, 2016
Newseum
Washington, D.C.

Shaping the future of the marine and hydrokinetic energy industry

LETTER FROM THE DIRECTOR

Dear Industry Executive,

I would like to take this opportunity to personally welcome you to the Executive Summit on Marine and Hydrokinetic (MHK) Research and Development presented by the U.S. Department of Energy Wind and Water Power Technologies Office.

We are excited to bring together executive members from the U.S. Department of Energy (DOE), the national laboratories, and the MHK energy industry to showcase DOE's MHK investments in the national laboratories and identify activities ripe for technology transfer.

By participating in this summit, you will have a unique opportunity to hear firsthand about important innovations in the MHK research community and DOE's Small Business Voucher Pilot program (Round 2), and engage in a discussion about DOE's research and development priorities for ocean wave, tidal, current, and river energy.

Throughout the event, we encourage you to share your expertise and insights through panels, technology transfer discussions, and hands-on activities highlighting our laboratory capabilities available to the MHK industry participants, and discuss future research priorities and vision.

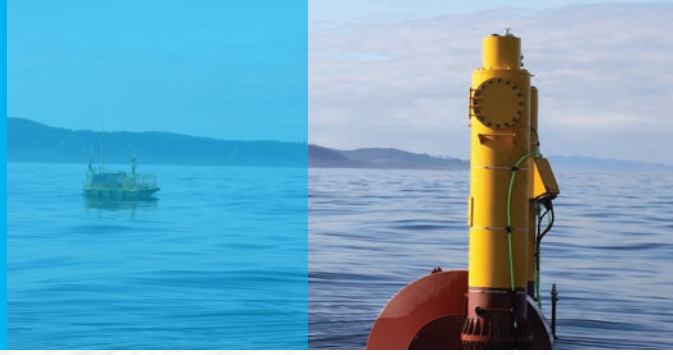
It's our goal to provide you with an opportunity to network and engage in substantive dialogues with other professionals and researchers, and continue to help us gain a better understanding of your needs and challenges that we can work together on moving forward.

I appreciate your commitment in attending the summit and your dedication to shaping the future of the MHK industry.

Sincerely,

José Zayas

SUMMIT AGENDA: **AT A GLANCE**



Wednesday, March 2	
8:00–9:00 a.m.	Networking Breakfast and Registration
9:00–9:15 a.m.	Welcome to the Executive Summit on Marine and Hydrokinetic Research and Development
9:15–9:45 a.m.	Keynote Address: MHK Commercialization—If You Don't Know Where You Are Going, You Will End Up Someplace Else
9:45–10:00 a.m.	U.S. Department of Energy Research and Development Priorities
10:00–11:00 a.m.	Driving Innovation with the National Laboratories
11:00–11:30 a.m.	Break—Lab Showcase
11:30 a.m.–12:15 p.m.	Technology Transfer 101
12:15–1:30 p.m.	U.S. Department of Energy Office of Technology Transitions
1:30–2:30 p.m.	Small Business Voucher Pilot
2:30–3:30 p.m.	Industry Panel
3:30–4:00 p.m.	Break—Lab Showcase
4:00–5:00 p.m.	Industry-Ready Tools and Technologies
5:00–5:30 p.m.	The Future of MHK
6:00 p.m.	No-Host Happy Hour

STATE-OF-THE-ART FACILITIES AND EXPERTISE AVAILABLE TO YOU

With unique instrumentation and equipment, state-of-the-art facilities, and on-site experts, the national laboratories offer a myriad of capabilities to advance your business and technology development.

NATIONAL RENEWABLE ENERGY LABORATORY *Golden, Colorado*

- **Simulation and Design Tools**—Simulation and analysis of marine energy systems in operating and extreme conditions to optimize system performance, controls, loading, structural design, and grid interaction.
- **Testing**—A world-renowned center that includes unique and highly versatile facilities and capabilities for controlled mechanical and electrical device and component testing of MHK devices including 225-kilowatt, 2.5-megawatt, and 5-megawatt dynamometers, a controllable grid interface, structural test laboratory, and the modular ocean instrumentation system for open water testing.
- **Resource and Site Characterization**—Assessment of operational and extreme environments, including current inflow and wave characterization, along with the potential of MHK resources in the United States via the MHK Atlas.
- **Market Transformation and Analysis**—Assessment of the potential levelized cost of energy, impacts and benefits, and development and deployment pathways of MHK technologies.

PACIFIC NORTHWEST NATIONAL LABORATORY *Richland, Washington*

- **Marine Sciences Lab**—Research capabilities in marine energy resource characterization, environmental monitoring technologies development, renewable energy environmental knowledge base, environmental chemistry, integrated coastal ocean modeling, wetland and coastal ecology, ecosystem modeling, biotechnology, remote sensing, and national and homeland security.
- **Systems Engineering Building**—Space and equipment that furthers basic and applied research in electricity markets, generation, transmission, distribution, and end use, including grid integration for buildings.
- **Lab Homes**—Custom side-by-side homes (i.e., baseline home and experimental home) built to conduct energy research in a typical, occupied home environment.

SANDIA NATIONAL LABORATORIES *Albuquerque, New Mexico*

- **High-Performance Computing**—Multiple platforms, codes, optimization, and visualization tools to develop high-fidelity modeling of fluid and structural dynamics as well as analyze complex flow physics and the fluid-structure interaction of MHK devices.
- **Structural Modeling**—Core strengths in structural dynamics analysis and fluid-structure interaction with broad experience in structural dynamic modeling in both wave energy converters and current energy converters.
- **Secure Scalable Microgrid Test Bed**—Electro-mechanical grid emulator allows for testing of control schemes that address variability and intermittency of energy sources based on MHK reference models.
- **Materials Science and Engineering Center**—Research conducted on materials, coatings, adhesives, and manufacturing processes to produce reliable, cost-effective renewable energy devices.
- **Advanced Manufacturing and 3-D Printing**—Development of enhanced advanced manufacturing process and materials technology using cutting-edge process diagnostics, characterization tools, and sophisticated computational models.
- **Sediment Erosion Actuated by Wave Oscillations and Linear Flow (SEAWOLF) flume**—A mobile test facility that directly measures and quantifies sediment erosion properties in wave-dominated coastal environments to minimize risk to marine renewable energy offshore infrastructure.

WORKING TOGETHER TO MOVE THE MHK INDUSTRY FORWARD

There are a variety of flexible ways to partner with the labs to access their unique capabilities and meet your needs.

Agreement Type	Definition	Cost	Estimated Timeline*	Benefits
Cooperative Research and Development Agreement (CRADA)	Collaboration between a lab and one or more partners outside the federal government (usually from industry, nonprofit organizations, or academia, domestic or foreign) collaborate and share the results of a jointly conducted research and development project	Lab and participant may share costs or participant pays 100% funds-in	1 month	• Leverage and optimize your resources • Share technical expertise in a protected environment • Option to obtain license to the lab CRADA-generated intellectual property (IP) on agreed-upon terms and conditions • 5-year data protection • Each partner may take title to its own CRADA-generated intellectual property
Agreements for Commercializing Technology (ACT)	Labs partner with nonfederal entities to complete a project using highly specialized or unique DOE facilities, services, or technical expertise	Participant pays full cost of recovery plus additional negotiated compensation to the contractor	1 month	• Flexible terms for your IP, indemnity, and advance payment • Optional performance guarantee • Negotiable IP terms • Option for limited government research and development license
Strategic Partnership Projects (SPP) *Formerly known as work for others*	Labs conduct work for non-DOE entities (such as industry, small businesses or other federal agencies) and may utilize DOE facilities	Participant pays full cost of the lab's effort	1 month	• Access to unique facilities, services, and/or technical expertise • Flexible terms for your IP and licensing rights
User Facility Agreements (UFAs)	User may access facilities, specialized equipment, instrumentation, and/or personnel, and so on, to conduct proprietary or nonproprietary research	User pays approved user rate or each party covers its own cost	2 weeks	• Generated data treated as proprietary (if proprietary UFA) • Access to unique facilities and equipment to validate or improve your technology
Technical Service Agreements	Lab staff provide short-term technical assistance to organizations with technical problems requiring expertise that is not available commercially	Participant pays full cost of the labs effort	5-10 business days	• Access to lab scientists' and engineers' expertise
Licenses	Companies acquire intellectual property rights (such as patents, copyrights, trademarks) to commercialize technology developed by the lab	Payment (in the form of issue fees, royalties on sales, equity in company, and so on) is nonrefundable and provided by the licensee	1 month or more, depending on the license	• Leverage cutting-edge inventions to drive your technology commercialization • The choice between a nonexclusive or exclusive license • Opportunity available to small and large businesses

Note that this table does not capture all partnering mechanisms and that there might be differences between each of the laboratories. Please contact the laboratory that you are interested in partnering with for additional information.

**The exact timeline for completing agreements is determined on a case-by-case basis (the estimated timelines above reflect time to complete agreements after the statement of work and funding have been agreed upon). Agreements with non-U.S. entities take longer.*

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Pacific Northwest
NATIONAL LABORATORY

Sandia
National
Laboratories

INTERESTED IN WORKING TOGETHER?

The national labs work with industry, government, academia, small businesses, international organizations, and nonprofits to advance the development and deployment of wind energy. Whether you want to partner with a lab to solve a specific problem, get access to unique testing facilities and instrumentation, or just want to learn more about opportunities available to you, the contacts below are committed to helping.

Laboratory	Contact	Email	Phone
National Renewable Energy Laboratory	Al LiVecchi	al.livecchi@nrel.gov	303-384-7138
Pacific Northwest National Laboratory	*Technology Communications:* Jennifer Hodas	jennifer.hodas@pnnl.gov	509-372-6960
	Industry: Rebecca O'Neil	rebecca.oneil@pnnl.gov	503-417-7543
Sandia National Laboratories	David Kistin	dkistin@sandia.gov	505-205-3598

WANT TO LEARN MORE?

Additional information on the unique opportunities available at each national laboratory can be found on their partnering, technology transfer, and commercialization Web pages.

National Renewable Energy Laboratory:
www.nrel.gov/workingwithus/

Pacific Northwest National Laboratory:
www.pnnl.gov/business/

Sandia National Laboratories:
www.sandia.gov/working_with_sandia/

SUMMIT DETAILS

Wednesday, March 2	
8:00–9:00 a.m.	**Networking Breakfast and Registration**
9:00–9:15 a.m.	**Welcome to the Executive Summit on Marine and Hydrokinetic Research and Development** • *Speaker*: Alex Lemke, Wind and Water Communications Team Lead, National Renewable Energy Laboratory Overview of the U.S. Department of Energy MHK initiatives that facilitate industry engagement with the national laboratories as well as a review of the summit objectives and agenda.
9:15–9:45 a.m.	**Keynote Address: MHK Commercialization—If You Don't Know Where You Are Going, You Will End Up Someplace Else** *Speakers:* • Andy Baldock, Director, Sustainable Energy Solutions at Black & Veatch Ltd. • John Miller, Renewable Energy Strategic Planning Project Manager, Black & Veatch Ltd.
9:45–10:00 a.m.	**U.S. Department of Energy Research and Development Priorities** • *Speaker*: Jose Zayas, Wind and Water Technologies Office Director, U.S. Department of Energy Learn about the newest department activities that are leading the nation's efforts to accelerate the deployment of MHK technologies through improved performance, lowered costs, and reduced market barriers.
10:00–11:00 a.m.	**Driving Innovation with the National Laboratories** *Session lead:* Jose Zayas, Wind and Water Technologies Office Director, U.S. Department of Energy *Featured Speakers:* • Vincent Neary, MHK Technology Lead, Sandia National Laboratories • Rebecca O'Neil, Sustainable Wind and Water Power Program Manager, Pacific Northwest National Laboratory • Robert Thresher, Research Fellow, National Renewable Energy Laboratory Ten-minute lightning talks from national lab management that will introduce who they are, their unique capabilities and facilities, and game-changing innovations from their individual labs.
11:00–11:30 a.m.	**Break—Lab Showcase**
11:30 a.m.–12:15 p.m.	**Technology Transfer 101** *Session lead:* Mark Higgins, Wind and Water Technologies Office Deputy Director, U.S. Department of Energy *Featured speakers:* • Amanda Spinney, Technical Business Development Specialist, Sandia National Laboratories • Erin Beaumont, Licensing Executive, Technology Transfer, National Renewable Energy Laboratory • Jennifer Hodas, Commercialization Manager, Pacific Northwest National Laboratory Commercialization experts at the national laboratories will dispel technology transfer myths and provide a basic overview of how to partner and work with the labs. Attendees will be provided "how to" guides that cover mechanisms for working with the labs, contact information, and market-/partner-ready technologies and lab capabilities.
12:15–1:30 p.m.	**Lunch: U.S. Department of Energy Office of Technology Transitions** *Speaker:* Jetta Wong, Director of the Office of Technology Transitions, U.S. Department of Energy Amazing things happen when scientists involve innovators who connect with entrepreneurs. Ideas are sparked, solutions are discovered, new products are created, and the entire economy is strengthened. That's why the U.S. Department of Energy recently created the Office of Technology Transitions. Learn more about the Clean Energy Investment Center, Technology Commercialization Fund, and other opportunities.

1:30–2:30 p.m.	**Small Business Voucher Pilot** *Session lead:* Mark Higgins, Wind and Water Technologies Office Deputy Director, U.S. Department of Energy *Featured Speakers:* • Victor Kane, National Lab Impact Director, U.S. Department of Energy • Reenst Lesemann, CEO, Columbia Power Technologies • David Kistin, Program Lead and Outreach Coordinator, Sandia National Laboratories • Al LiVecchi, Water Laboratory Program Manager, National Renewable Energy Laboratory
2:30–3:30 p.m.	**Industry Panel** *Session lead:* Hoyt Battey, Market Acceleration and Deployment Lead, U.S. Department of Energy Featured speakers: • VR V. Ramanan, Executive Consulting Scientist, ABB, Inc. • Christopher Sauer, President and CEO, Ocean Renewable Power Company • Jarrett Goldsmith, Project Manager, DNV GL • Steve Kopf, Founder & CEO, Northwest Energy Innovations • Alex Fleming, Chief Technology Officer, Aquantis, Inc. • Debbie Mursch, Director of Markets, Strategy and Development, GE Renewable Energy Industry representatives will discuss how to fulfill industry-wide research priorities, maintain feedback loops throughout the research and development process, and how to engage with private sector partners.
3:30–4:00 p.m.	**Break—Lab Showcase**
4:00–5:00 p.m.	**Industry-Ready Tools and Technologies** *Session lead:* Alison LaBonte, MHK Technology Lead, U.S. Department of Energy *Featured speakers:* • Testing and Model Validation—Al LiVecchi, Water Laboratory Program Manager, National Renewable Energy Laboratory • Tethys—Genevra Harker-Klimes, Project Manager, Marine Sciences Laboratory, Pacific Northwest National Laboratory • Open Source Wave Energy Converter SIMulator—Kelley Ruehl, Research and Development Engineer, Sandia National Laboratories • Resources, Extremes, and Modeling—Ryan Coe, Research and Development Engineer, Sandia National Laboratories Researchers will present innovations and capabilities that are primed for industry use. These facilities, tools, and information resources will improve power performance and reliability, decrease installed capital costs, and facilitate siting and permitting for the MHK industry.
5:00–5:30 p.m.	**The Future of MHK** *Speaker:* Jose Zayas Wind and Water Technologies Office Director, U.S. Department of Energy Closing remarks and an opportunity for final questions and answers with the summit attendees.
6:00 p.m.	**No-Host Happy Hour** The Source Bar and Lounge 575 Pennsylvania Ave NW, Washington, D.C. 20565

NOTES

Cover photo from iStock 55486650;
Page 4: Photo from National Renewable Energy Laboratory
Page 5: Photo from Pacific Northwest National Laboratory; photo from Sandia National Laboratories
Back photos starting at top left: photo by Ocean Renewable Power Company, NREL 17210; photo by Ocean Energy Limited, NREL 17873

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