

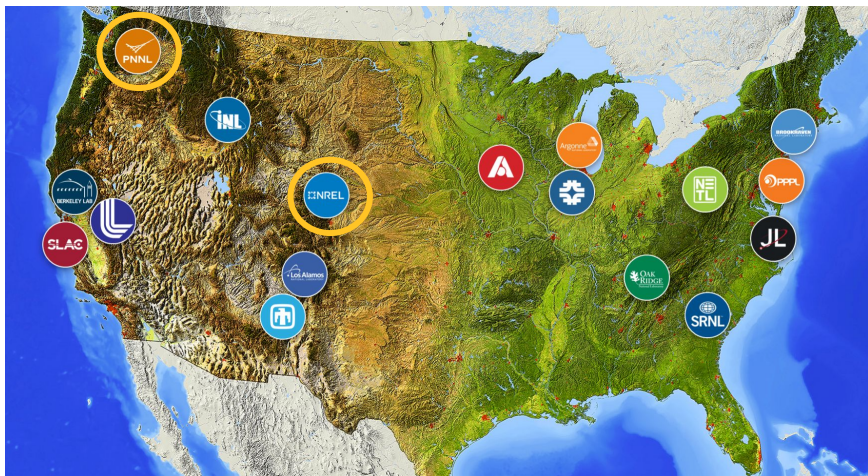


Marine Energy Career Panel

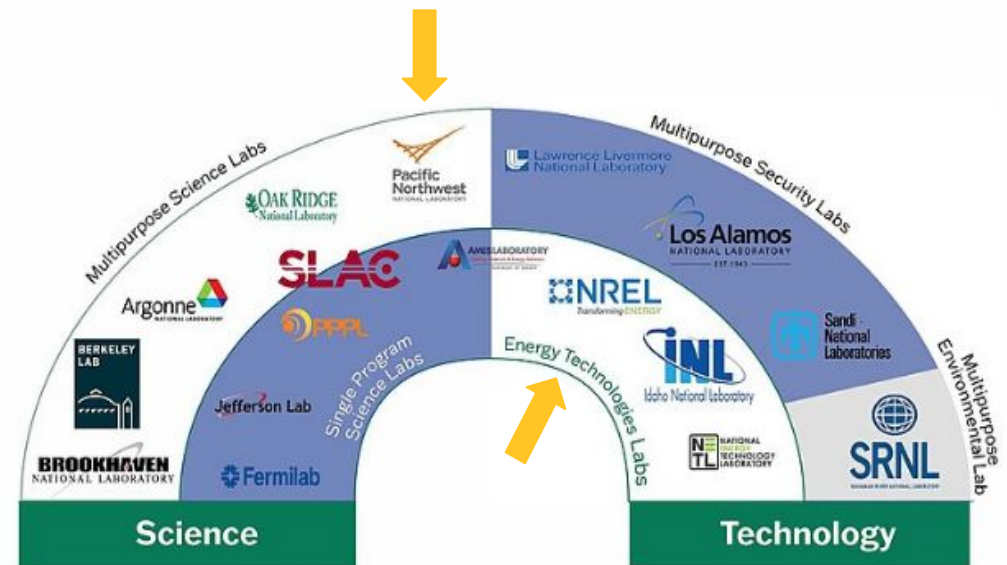
April 10, 2023

Overview of National Laboratories

- The US Department of Energy's (DOE) 17 national laboratories tackle critical scientific challenges
- **Goal:** conduct R&D addressing national priorities such as energy and climate, the environment, etc.



DOE EXECUTES ITS MISSIONS THROUGH DIVERSE NATIONAL LABS



NREL at-a-Glance

2,926

Workforce, including

219 postdoctoral researchers
60 graduate students
81 undergraduate students



World-class

facilities, renowned
technology experts

More than
900

Partnerships

with industry,
academia, and
government



Campus

operates as a
living laboratory



NREL Water-Power Research

Driving innovation in the design and utilization of next generation marine energy and hydropower/pumped storage systems through foundational research, tool development, and laboratory and in-water optimization.

Research Challenges

- Advancing scientific understanding to enable the full potential of hydropower/pumped storage hydropower to contribute to reliability, resilience, and renewables integration in our rapidly evolving power systems
- Developing technology to enable wave, tidal, ocean, and river current energy systems to provide reliable power to utility scale and blue economy markets (e.g., ocean observing)
- Transforming technology to drastically improve performance and reduce marine energy and hydropower generation costs.

Pacific Northwest National Laboratory (PNNL)



PNNL - ~6,000 researchers and support staff, based in WA

Coastal Sciences Division - conducts research related to coastal science, including marine energy

- PNNL-Sequim - DOE's only marine research laboratory (~80 staff)
 - *Mission:* promote adaptation to climate change and enable sustainable marine energy production
- OES-Environmental and Triton projects - focus on environmental effects of marine energy



Photo courtesy of Shanon Dell, PNNL

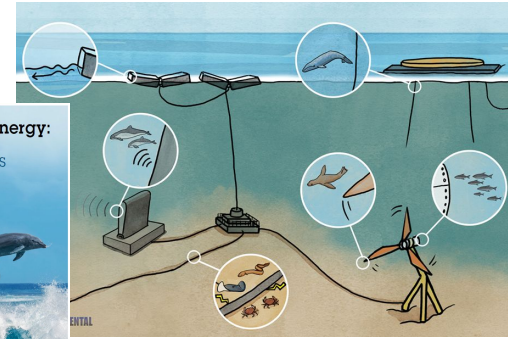
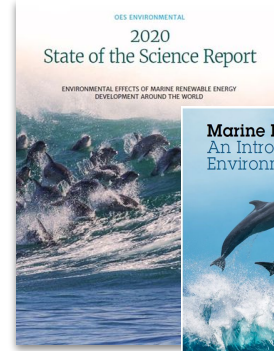


Panel Introductions



Images courtesy of CorPower, CalWave, and PNNL

Mikaela Freeman – Research Scientist, PNNL



Education

- 2012: BS Biology, minor Environmental Policy - University of Puget Sound
- 2015: Masters of Marine Affairs - University of Washington

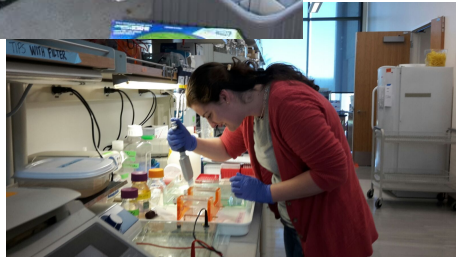
Career

- 2015-2016: Marine Policy Fellowship
- Joined PNNL in 2016 as Post Masters Research Associate
- Coastal Sciences Division

Focus

- Marine and environmental policy and social science
- Environmental effects of marine energy (OES-Environmental)
- Outreach and engagement, stakeholders and communities
- Co-location marine energy and aquaculture

Alexandra Freibott – Communications Professional, PNNL



Education

- 2017: PhD Oceanography – Scripps Institution of Oceanography (SIO)
- 2013: MS Marine Biology – SIO
- 2011: BS Biology – Arizona State University

Career

- 2017-2022: Oak Ridge Institute for Science and Education (ORISE) Fellow, PNW Research Station US Forest Service
- Joined PNNL in 2022 as Comms Professional
- Communications and External Engagement

Focus:

- Science communications (science writing and editing, content creation, project management)
- Focus on marine energy and hydropower

Lenaig Hemery – Benthic Ecologist, PNNL



Education

- 2011: **PhD** – National Museum of Natural History, Paris (France)
- 2008: **MS** – University Pierre & Marie Curie, Paris (France)
- 2006: **BS** – University Western Brittany, Brest (France)

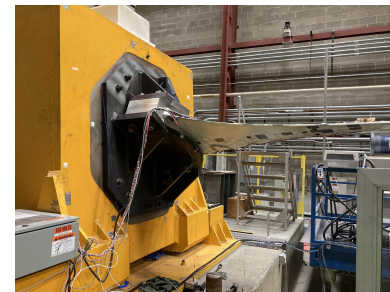
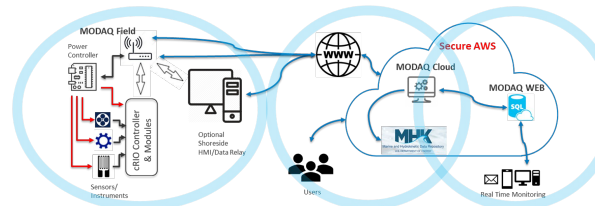
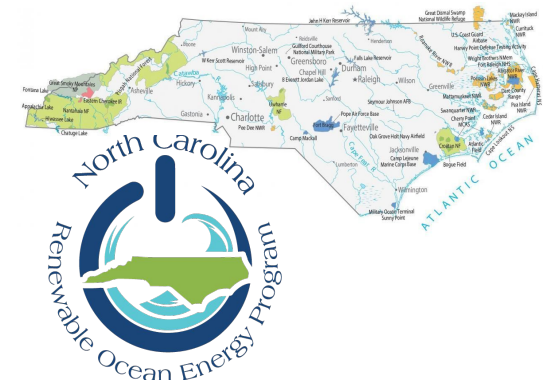
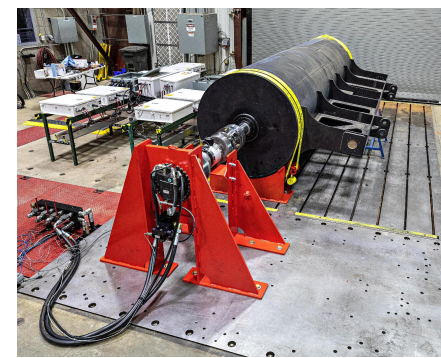
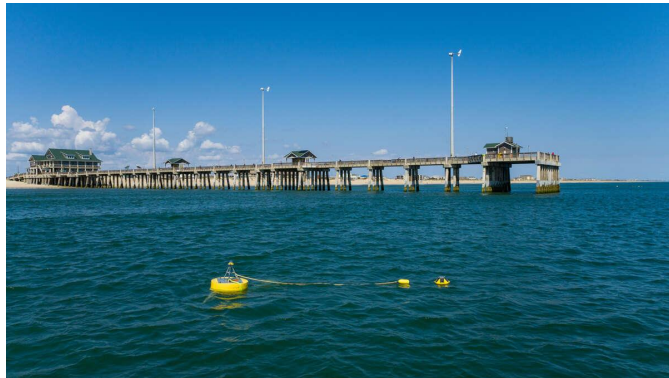
Career

- Post-doctorate at Oregon State University
- Joined PNNL in 2019 as Earth Scientist 2
- Coastal Sciences Division, Coastal Ecosystem Team

Focus

- Environmental effects of marine energy, offshore wind, and marine carbon dioxide removal
- Environmental monitoring methodologies (eDNA, video)

Casey Nichols – Research Engineer, NREL



Education

- 2018: B.S. Mechanical Engineering Technology, UNC Charlotte
- 2019: M.S. Applied Energy and Electromechanical Systems, UNC Charlotte
- Worked as a graduate research assistant during my Masters (NCROEP)

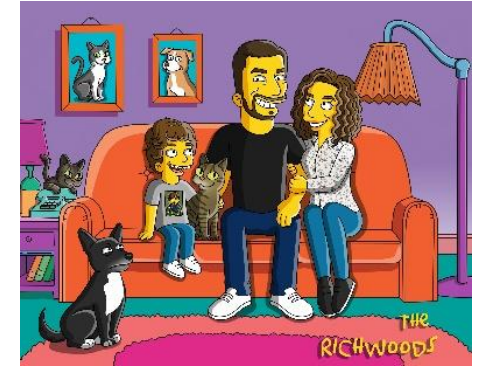
Career

- Joined NREL in 2018 as an intern and switched to a full time engineer in 2020
- Title: Marine Instrumentation Engineer, Researcher 2, Mechanical Engineering
- At NREL, I split my time ~75% water power and 25% wind power

Focus

- MRE device testing and validation in laboratory and field settings (Wave, Tidal, Power Elect., Composites)
- Data acquisition + control system development and deployment
- Robotics and automation research for manufacturing

Michael Richlen – Project Manager, PNNL



Education

- 1999: BS Biology – University of Washington
- 1999: BS Zoology – University of Washington
- 2005: MS Biology – Western Illinois University
- 2018: PhD Zoology – University of Hawaii

Career

- 1999 – 2012: Field biologist and acoustician
- 2010 – 2022: Research Biologist and Project Manager at HDR Inc.
- Joined PNNL in 2022 as a Project Manager
- Coastal Sciences Division

Focus

- Marine mammal research and conservation
- Environmental monitoring and mitigation
- Environmental effects for marine energy and offshore wind
- Bioacoustics

Panel Discussion



Images courtesy of Andritz, CorPower, and PNNL

Get involved! The U.S. Department of Energy's Water Power Technologies Office (WPTO) is investing in the next generation of hydropower and marine energy experts. WPTO provides a variety of educational resources and programs to help develop the water power workforce needed to make the clean energy future a reality.

**WPTO
Collegiate
Competitions**

- Year-long competitions running the academic calendar (autumn-spring) with applications due the previous spring.
- Competitors meet and learn from experts and gain real-world experience to prepare for future careers in marine energy or hydropower.
- Open to undergraduate and graduate students.

**ORISE Marine Energy
Graduate Student
Research Program**

- Open to doctoral candidates and master's students.
- Minimum six-month placement with an eligible host facility.

**Sea Grant Knauss
Fellowship**

- Open to graduate students with an interest in marine science.
- Year-long placement in Washington, D.C.

**AAAS Science and
Technology Policy
Fellowship**

- Open to post-docs as well as experienced professionals with a master's in engineering.
- Year-long placement in Washington, D.C.

Yearly Student Opportunities with WPTO

FALL

September: Applications open for the ORISE Marine Energy Graduate Student Research Program.

Fall: Applications open for the Sea Grant Knauss Fellowship.

SUMMER

June: Applications open for the AAAS Science and Technology Policy Fellowship.

Summer: Finalists notified for the Sea Grant Knauss Fellowship.



WINTER

December: Applications close for the ORISE Marine Energy Graduate Student Research Program.

February: Applications due to State Sea Grant Programs for the Sea Grant Knauss Fellowship.

SPRING

March: Applications open for the Marine Energy and Hydropower Collegiate Competitions.

April: Applications close for the Collegiate Competitions.

Spring: Applications close for the Sea Grant Knauss Fellowship.

DOE Office of Science Internship / Exchange Opportunities

Science Undergraduate Laboratory Internships (SULI)

- Encourages undergraduate students and recent graduates (up to 2 years after completing undergraduate)
- Interns can apply to work at one of the 17 participating DOE laboratories/facilities - suggest reaching out to labs
- Interns perform research, under guidance of laboratory staff on projects supporting DOE missions

Approximate Start Dates

Fall term: Third Monday in August for 16 weeks

Spring term: Third Monday in January, for 16 weeks

Summer term: First Monday in June, for 10 weeks

Informational Links:

- <https://science.osti.gov/wdts/suli>
- <https://www.nrel.gov/careers/suli.html>
- <https://www.pnnl.gov/suli-internships>



DOE Office of Science Visiting Faculty Program (VFP)

- Faculty members collaborate with DOE laboratory research staff on a project of mutual interest
- Solicited annually for a Summer Term (10 weeks)
- For more information: <https://science.osti.gov/wdts/vfp>

Additional Graduate Student Opportunities

The Office of Science Graduate Student Research (SCGSR) Program

For more information:

<https://science.osti.gov/wdts/scgsr>

National Consortium for Graduate Degrees for Minorities in Engineering, Science, Inc. (GEM)

- Network of leading corporations, laboratories, universities, and top research institutions
- Enables qualified students from underrepresented communities to pursue graduate education in applied science and engineering

For more information:

<https://www.gemfellowship.org/>

NREL Director's Postdoctoral Fellowship

Applications accepted for two rounds per year.

For more information:

<https://www.nrel.gov/careers/directors-fellowship.html>

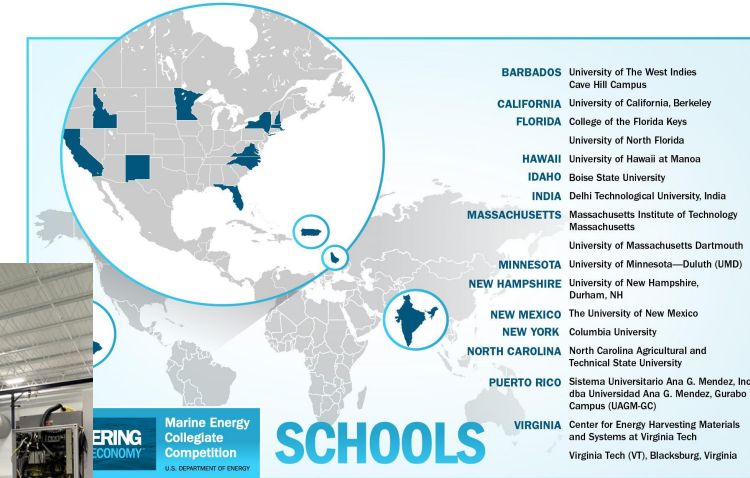
PNNL's Postdoctoral Fellowship

For more information:

<https://www.pnnl.gov/projects/linus-pauling-distinguished-postdoctoral-fellowship>

Marine Energy Collegiate Competition (MECC)

- Established in 2020
- Teams of students:
 - **Develop** business plan and detailed technical design of a system to address power needs for the blue economy
 - **Build and test** a device to achieve energy production
 - **Pitch** their plan to a panel of judges and hypothetical investors
 - **Engage** with their community through outreach and educational activities
- Applications for the 2024 MECC are open:
<https://www.herox.com/marine-energy-collegiate-competition>



Marine Energy Professional Organizations

Students interested in a career in marine energy: consider joining a young professional societies such as INORE, SNAME, POES, and YCSECA.



Stay Connected

Thank you for joining!

If you'd like to stay connected and learn more about the careers and research discussed today, check out the following links:

- **OES-Environmental:** tethys.pnnl.gov/about-oes-environmental
 - Sign up for Tethys Blasts: tethys.pnnl.gov/tethys-blasts
- **Triton:** pnnl.gov/projects/triton
 - Sign up for the Triton newsletter: bit.ly/Triton-Newsletter
- **NREL Marine Energy:** nrel.gov/water/marine-energy
- **PRIMRE STEM Portal:** <https://openei.org/wiki/PRIMRE/STEM>

