



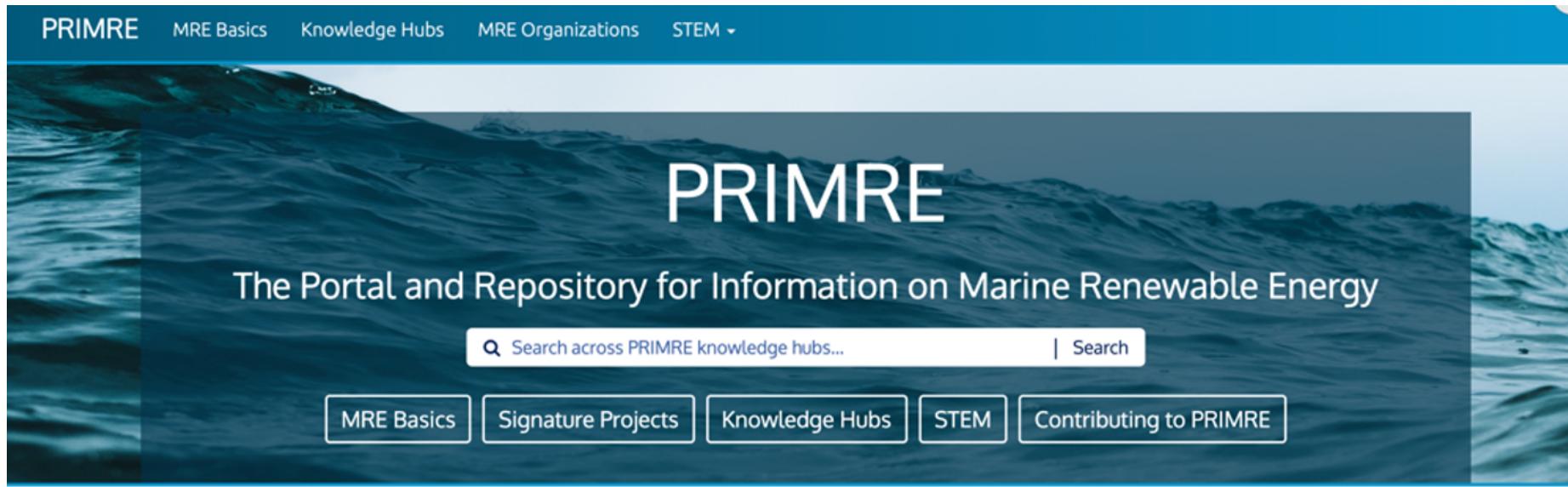
## PRIMRE Workshop Breakout Group

# Introducing MRE Software

**Hosted by Kelley Ruehl, Mat Topper, and Cesar Castillo  
(Sandia National Laboratories and Data Only Greater)**

Ocean Renewable Energy Conference  
September 24, 2021

# PRIMRE (Portal and Repository for Information on Marine Renewable Energy)



PRIMRE seeks to provide broad access to engineering, resource characterization, and environmental effects information on marine renewable energy projects to facilitate the commercial development of the MRE industry.

<https://openei.org/wiki/PRIMRE>

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# PRIMRE Knowledge Hubs

1. Tethys
2. Tethys Engineering
3. Marine Energy Projects Database
- 4. MRE Software**
5. Telesto
6. Marine Energy Atlas
7. MHK Data Repository

[https://openei.org/wiki/PRIMRE/Knowledge\\_Hubs](https://openei.org/wiki/PRIMRE/Knowledge_Hubs)



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# PRIMRE Knowledge Hubs

- **Marine and Hydrokinetic Data Repository (MHKDR)** hosts data collected by WPTO funded R&D, including device testing data, resource characterization data, etc.
- **Tethys** hosts over 6,700 documents on the environmental effects of wind and MRE development and supports Ocean Energy Systems' Environmental initiative.
- **Tethys Engineering** hosts over 4,800 documents on the engineering and technical aspects of MRE development, as well as a library of MRE photos for third-party use (2019)



**MHK Data Repository**

The Marine Hydrokinetic Data Repository (MHKDR) is the repository for data collected using funds from the Water Power Technologies Office of the U.S. Department of Energy (DOE). It contains data on MHK devices, testing, resource and environmental impact assessments, cost analyses, and more.

[View MHKDR](#)



**Tethys**

Tethys facilitates the exchange of information and data on the environmental effects of wind and marine renewable energy technologies and serves as a commons for wind and marine renewable energy practitioners and therefore enhance the connectedness of the renewable energy community.

[View Tethys](#)



**Tethys Engineering**

Tethys Engineering stores documents from around the world about the technical and engineering aspects of marine renewable energy.

[View Tethys Engineering](#)

# PRIMRE Knowledge Hubs

- **MRE Technology Database** contains information on MRE devices, points to companies active in the MRE field, and traces the development of projects around the world (2020)
- **Telesto** is a collection of information and guidance for testing, measurement, and data analysis for MRE research, development, and demonstration (2020)
- **MRE Software** is a collection of software relevant to MRE development, including the **MRE Code Hub** and **PRIMRE Code Catalog** (2020)



**MRE Technology Database**

Provides up-to-date information on marine and hydrokinetic renewable energy. The database includes wave, tidal, current, and ocean thermal energy, and contains information on the various energy conversion technologies, companies active in the field, and development of projects in the water.

[View Tech Database](#)



**Telesto**

Telesto is home to open source Wikis and Databases which provide a comprehensive explanation of and guidance for MRE testing, measurement, and data processing based on experience, lessons learned from prior laboratory and field testing, industry standards, and best practices.

[Visit Telesto](#)

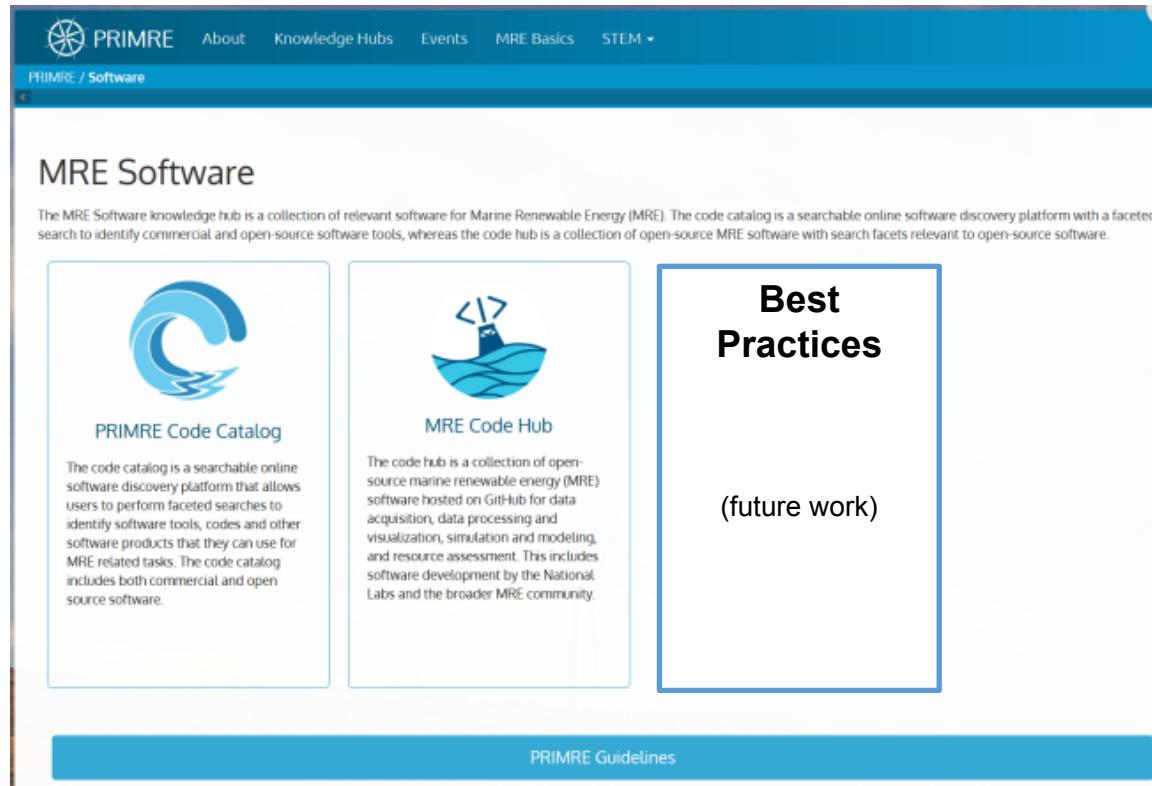
**MRE Software**

A collection of MRE relevant software, including the code hub and code catalog. The code hub is a collection of open source MRE software for simulating devices, and processing and analyzing data. The code catalog is a searchable online software discovery platform with a faceted search to identify software tools, codes and other software products.

[View MRE Software](#)

<https://openei.org/wiki/PRIMRE/Software>

# MRE Software Knowledge Hub



**MRE Software**

The MRE Software knowledge hub is a collection of relevant software for Marine Renewable Energy (MRE). The code catalog is a searchable online software discovery platform with a faceted search to identify commercial and open-source software tools, whereas the code hub is a collection of open-source MRE software with search facets relevant to open-source software.

**PRIMRE Code Catalog**

The code catalog is a searchable online software discovery platform that allows users to perform faceted searches to identify software tools, codes and other software products that they can use for MRE related tasks. The code catalog includes both commercial and open-source software.

**MRE Code Hub**

The code hub is a collection of open-source marine renewable energy (MRE) software hosted on GitHub for data acquisition, data processing and visualization, simulation and modeling, and resource assessment. This includes software development by the National Labs and the broader MRE community.

**Best Practices**  
(future work)

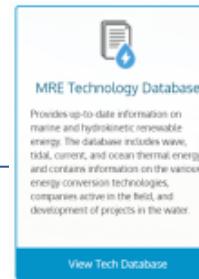
PRIMRE Guidelines

All MRE software, commercial and open-source

Open-Source MRE software (on GitHub)

Software development best practices

<https://openei.org/wiki/PRIMRE/Software>



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[View Tech Database](#)



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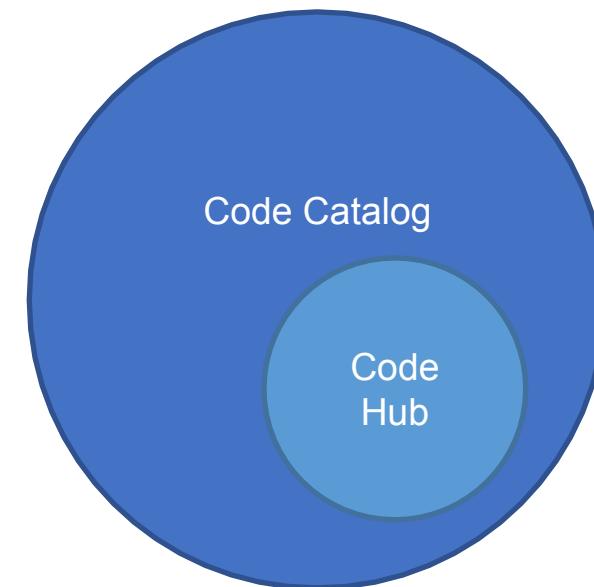
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[View MRE Software](#)



# PRIMRE Code Catalog

[https://openei.org/wiki/PRIMRE/Code\\_Catalog](https://openei.org/wiki/PRIMRE/Code_Catalog)

Searchable online software discovery platform  
with search facets for all MRE relevant software

ANSYS AQWA	
<a href="#">?.. version</a>	2020 R2
<a href="#">Other</a>	
Submission Information	
<p>Ansys AQWA software addresses the vast majority of analysis requirements associated with hydrodynamic assessment of all types of offshore and marine structures. These include SPARs, FPSOs, Semi-submersibles, Tension leg platforms, Ships, Renewable energy devices, and Breakwaters. Ansys AQWA Suite extends Ansys AQWA Diffraction to include analysis capabilities for global performance of moored and/or connected systems subject to random sea states. Simulations may be static or dynamic in frequency and/or time domain. More advanced requirements, such as dynamic position systems and energy dissipation, can be accomplished through a user-defined function.</p>	
Submission Type	Commercial Software
URL	<a href="https://www.ansys.com/products/structures/ansys-aqua">https://www.ansys.com/products/structures/ansys-aqua</a>
Landing Page	<a href="https://www.ansys.com/products/structures/ansys-aqua">https://www.ansys.com/products/structures/ansys-aqua</a>
Tags(s)	hydrodynamics, structural mechanics, modeling, finite element modeling
Author(s)	ANSYS, Inc.
Organization	ANSYS, Inc.
Primary Contact	ANSYS, Inc.
Email Address	<a href="mailto:ansyinfo@ansys.com">ansyinfo@ansys.com</a>
License and Development Status	
<a href="#">?.. origination date</a>	Jan 01, 2010
License Type	Commercial Software
Dependencies	ANSYS AQWA License
Cost	<a href="#">\$95.00</a>
MRE Applicability and Technology Types	
BEMRosetta	
<a href="#">?.. version</a>	v1.0
<a href="#">C++</a>	
Submission Information	
<p>Hydrodynamic coefficients viewer and converter for Boundary Element Method (BEM) solver formats</p>	
Submission Type	<a href="#">Public Repo (ug, public, gt, report)</a>
URL	<a href="https://github.com/colabt23/BEMRosetta">https://github.com/colabt23/BEMRosetta</a>
Landing Page	<a href="https://github.com/colabt23/BEMRosetta">https://github.com/colabt23/BEMRosetta</a>
Tags(s)	hydrodynamics, meshviewer, mesh-processing, potential-flow, offshore-wind-platforms, hydrodynamic-coefficients-viewer, boundary-element, wave-energy
Author(s)	Malek Zabala
Primary Contact	Malek Zabala
Online Forum	<a href="https://github.com/colabt23/BEMRosetta/issues">https://github.com/colabt23/BEMRosetta/issues</a>
License and Development Status	
<a href="#">?.. origination date</a>	Mar 18, 2019
License Type	GNU General Public License v3.0
Source Code Availability	Compiled code (with source code available)
Cost	<a href="#">\$0.00</a>
MRE Applicability and Technology Types	
MRE Technology Type	Wave

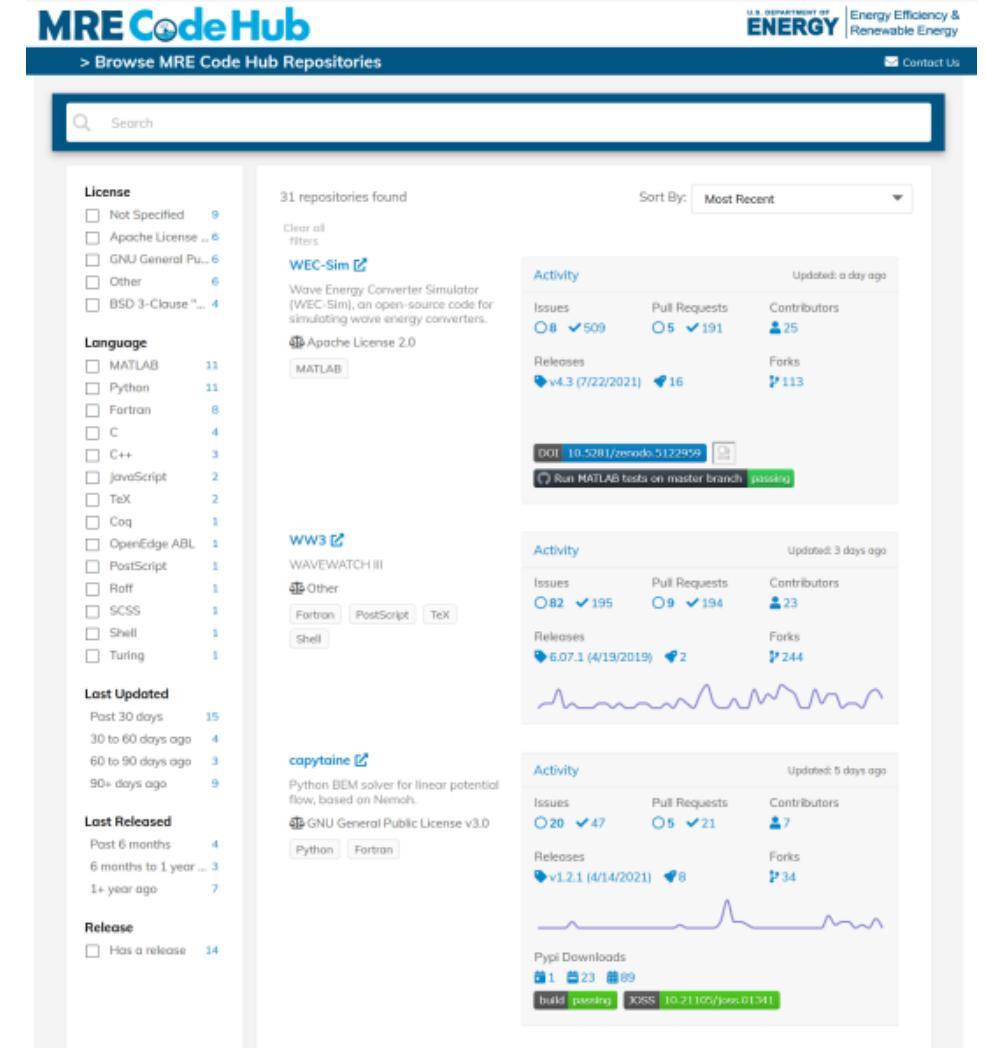
# MRE Code Hub

<https://mrecodehub.org/>

GitHub repository for open-source MRE software, includes a landing page with search functionality



The landing page for the MRE Code Hub features a large banner image of a wave. The header includes the "MRE Code Hub" logo, the U.S. Department of Energy Energy Efficiency & Renewable Energy logo, and a "Contact Us" link. Below the banner, there are three main sections: "Browse MRE Code Hub Repositories", "Search MRE Code Hub Source Code", and "Register Your Software". Each section has a brief description and a corresponding icon. At the bottom, there are three "New Releases" cards: "tsdat v0.2.6", "WEC-Sim v4.3", and "MHKIT-Python 0.4.0", each with a "Code" and "Documentation" link.



The search results page for the MRE Code Hub shows a list of 31 repositories. The results are filtered by "Most Recent". The first repository listed is "WEC-Sim", which is described as a "Wave Energy Converter Simulator (WEC-Sim), an open-source code for simulating wave energy converters." It is licensed under Apache License 2.0 and is written in MATLAB. The repository has 509 issues, 191 pull requests, 25 contributors, and 113 forks. The second repository listed is "WW3", which is described as "WAVEWATCH III". It is licensed under Other and is written in Fortran, PostScript, Roff, SCSS, Shell, and Turing. The repository has 195 issues, 194 pull requests, 23 contributors, and 244 forks. The third repository listed is "capytaine", which is described as "Python BEM solver for linear potential flow, based on Nemoh". It is licensed under GNU General Public License v3.0 and is written in Python and Fortran. The repository has 47 issues, 21 pull requests, 7 contributors, and 34 forks. The page also includes a "Search" bar and filters for License, Language, and Last Updated.

# MRE Software

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What MRE software do you/your organization use or develop?

Is there any specific MRE software or supporting tools that are not available as either commercial or open-source products? If so, which would be the most important to produce?

# Code Catalog

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[https://openei.org/wiki/PRIMRE/Code\\_Catalog](https://openei.org/wiki/PRIMRE/Code_Catalog)

What information would you like to find when searching for MRE software packages to use?

When searching for software for your use-case, which categories would you like to filter by?

Which search terms might you use to find a software package?

Which features of the code catalog are superior to searching using a general engine (like Google) and which are worse?

# Code Hub

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<https://mrecodehub.org/>

As a software developer, what information would help you choose open-source software packages?

When searching for software to develop, which categories would you like to filter by?

Which search terms might you use to find a software package?

How would you like to sort the results of your searches?

Would it be useful to extend the functionality to software stored on other open-source repositories (e.g. GitLab, sourceforge)?

# Thank you!

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