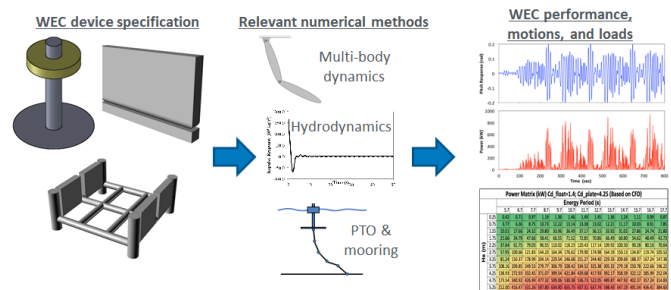# WEC-Sim (WAVE ENERGY CONVERTER SIMULATOR)

WEC-Sim (Wave Energy Converter SIMulator) is an open-source software for simulating wave energy converters. The software is developed in MATLAB/ SIMULINK using the multi-body dynamics solver Simscape Multibody.

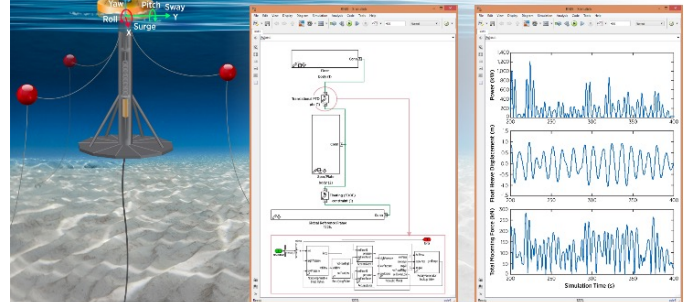*WEC-Sim modeling workflow.*

WEC-SIM CAPABILITIES

WEC-Sim has the ability to model devices that are comprised of bodies, joints, power take-off systems, and mooring systems. WEC-Sim can model both rigid bodies and flexible bodies with generalized body modes. Simulations are performed in the time-domain by solving the governing wave energy converter equations of motion in the 6 Cartesian degrees-of-freedom, plus any number of user-defined modes.

WEC-SIM OPEN SOURCE SOFTWARE

The open-source code for simulating wave energy converters is developed in MATLAB/ SIMULINK, with the ability to model devices that are comprised of rigid bodies, joints, power take-off systems, and mooring systems. The WEC-Sim source code is publicly available on GitHub, and more information can be on the software's documentation. WEC-Sim has regular releases, and maintains stable and development branches of the software on GitHub. Due to its extensive use and impact on the community, WEC-Sim won a 2021 **R&D 100 award** for software/services.

WEC-SIM APPLICATIONS REPOSITORY

The WEC-Sim applications repository contains a wide variety of scenarios that WEC-Sim can be used to model, including desalination, mooring dynamics, nonlinear hydrodynamic bodies, passive yawing, batch simulations and many others. The software is quite flexible and can be adapted to many scenarios within the wave energy industry.

Graphic of wave energy converter and WEC-Sim simulation. Courtesy of NREL.

WEC-SIM TEAMER FACILITY

WEC-Sim was established as a TEAMER facility in 2021, and has since become one of the most requested facilities. The WEC-Sim team regularly supports industry partners through TEAMER awards. Refer to the TEAMER website for information about how to apply for WEC-Sim support through TEAMER.

WEC-SIM DEVELOPERS

WEC-Sim is a collaboration between Sandia National Laboratories and the National Renewable Energy Laboratory, and funded by the U.S. Department of Energy's Water Power Technologies Office.

CO-LEADS:

Kelley Ruehl, Sandia
Kelley.Ruehl@sandia.gov

David Ogden, NREL
David.Ogden.NREL@outlook.com