

Kyle Pappas

Ocean Engineer

Objective

Ocean Engineer specializing in fluid structure interactions. Proficient in LS Dyna Multiphysics Simulations for Fluid Structure Interaction analysis, Matlab/Simulink, data analysis, CAD, experimentation, technical drawings, and ROV piloting.

Education

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| 2023 | University of Hawai'i at Manoa
MS Ocean and Resources Engineering
Thesis: "Fluid-Structure Interaction Analysis of an Oscillating Wave Surge Energy Converter using LS-Dyna"
Advisor: Dr. Ersegun Deniz Gedikli |
| 2020 | University of California, San Diego
BS Oceanic and Atmospheric Science |

Research Experience

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| 2024-Present | Hawai'i Natural Energy Institute, Honolulu, HI
Position: Junior Researcher (R2) <ul style="list-style-type: none">• Design and operate the HALONA Power Take Off Bench tester for Oscillating Water Column applications in preparation for open water deployment at the Kilo Nalu Observatory.• Design and calibrate novel high flow PTO system for wave energy applications inspired by pumped storage devices.• Investigate and implement multiple control strategies for various wave energy converter architypes.• Perform Hydrodynamic modeling of the FOSWEC in Orcaflex in preparation for experiments with a mooring system.• Perform Power Take Off Bench testing for the HAWSEC project in preparation for multiple journal paper submissions.• Partner with the National Renewable Energy Laboratory in preparation for open water deployment of the HAWSEC flap at the Makai Research Pier; collaboratively designing the structure to support the flap and Power Take Off systems.• Develop point absorber WEC prototype utilizing a direct drive impulse turbine for subsurface operation.• Pilot Remotely Operated Vehicle for inspections at the Wave Energy Test Site |
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2022-2023

Master's Thesis University of Hawai'i at Manoa, Honolulu, HI

Advisor: Dr. Ersegun Deniz Gedikli

- Perform a comprehensive fluid structure interaction analysis of the Hawaii Wave Surge Energy Converter to make structural optimizations and reduce the risk of potential failure points.
- Developed proficiency in utilizing the LS-Dyna Multiphysics software to model and simulate complex fluid structure interaction scenarios with the specific focus on wave energy converters.
- Achieved accurate simulation results using both the Arbitrary Lagrangian Eulerian method and the Incompressible Computation Fluid Dynamics method when compared to experimental hydrodynamic results.
- Produced expected stress/strain/deformation contours of a wave energy converter under hydrodynamic wave loading.
- Attained proficiency in Hypermesh Finite Element preprocessing for structure meshing.

2020-2023

University of Hawai'i | Wave Energy Test Site, Honolulu, HI

Position: Graduate Research Assistant, **Advisor:** Dr. Patrick Cross

- CFD modeling in Ansys LS-Dyna for fluid structure interaction analysis utilizing a numerical wave tank with experimental validation.
- Simulating wave energy converter motion using WEC-Sim package in Matlab and utilizing Simulink to simulate hydraulic system to the power take off section of the device.
- 3D CAD modeling of wave energy converter devices, and adjacent apparatus', in Fusion 360 for technical drawings.
- Heavily assist in the research and development of multiple Wave Energy Converter concepts.
- Investigate the effectiveness of an overtopping wave energy converter for integration into the Hilo Breakwater.
- Developed deep understanding of mooring hardware installed at the Wave Energy Test Site
- Pilot Remotely Operated Vehicle for underwater inspection and recovery operations.

2018-2020

University of California, San Diego | Center of Climate Change Impacts and Adaptations, La Jolla, CA

Position Beach Survey Analysis Assistant, **Advisor** Dr. Mark Merrifield

- Collection and analysis of GPS and Lidar beach survey data in Imperial Beach, performing statistical analysis in Matlab utilizing both new and large historical data set of the beach profile.
 - Provide valuable observations and data collection of extreme flooding events in Imperial Beach.
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Publications

In Preparation	Rajagopalan, K., Heitmann, T. W., Pappas, K., Nihous, G., Gedikli, E. D., Cross, P., Full scale projections for the Hawai'i oscillating surge wave energy converter (HAWSEC). Renewable Energy 2024
In Preparation	Heitmann, T. W., Rajagopalan, K., Pappas, K., Nihous, G., Gedikli, E. D., Cross, P., Validation of a coupled oscillating surge wave energy converter with hydraulic power take-off unit for high head hydro turbine applications. Renewable Energy
In Preparation	Rajagopalan, K., Heitmann, T. W., Pappas, K., Nihous, G., Gedikli, E. D., Nichols, C., Raye, R, Cross, P., Hydrodynamic calibration and validation of an oscillating surge wave energy converter. Renewable Energy
In Preparation	Heitmann, T. W., Rajagopalan, K., Pappas, K., Nihous, G., Gedikli, E. D., Nichols, C., Raye, R, Cross, P., Model development and calibration of a hydraulic power take-off unit for wave energy converters. Renewable Energy
2024	Pappas, K., "Structural Optimization for the Hawai'i Wave Surge Energy Converter Comparing Experimental and Simulated Results", ISOPE
2023	Pappas, K., "Fluid-Structure Interaction Analysis of an Oscillating Wave Surge Energy Converter using LS-Dyna", University of Hawai'i at Manoa
2021	Merrifield, M., Johnson, M., Guza, R.T., Fiedler, J.W., Young, A.P., Henderson, C., Lange, A., O'Reilly, W., Ludka, B., Okihiro, M., Gallien, T., Pappas, K., Engeman, L., Behrens, J., Terrill, E., "An early warning system for wave-driven coastal flooding at Imperial Beach, CA", Nat. Hazards

Conference Presentations

April 2024	Conference: UMER+METS, Location: Duluth, Minnesota Heitmann, T., Cross, P., Pappas, K., Rajagopalan, K., Accelerating Hydraulic PTO Design and Validation through the HAWSEC Platform
Nov. 2023	Conference: APS-DFD, Location: Washington, DC Pappas, K., "Optimizing Performance and Reliability of the Hawaii Wave Surge Energy Converter through Fluid-Structure Interaction Analysis"
Sept. 2022	Conference: UMER+METS, Location: Portland, OR Pappas, K., Cross, P., Rajagopalan, K., Heitmann, T., Nihous, G., Gedikli, E.D., Druetzler, A., "Hawaii Wave Surge Energy Converter (HAWSEC)"

Computer Skills

Engineering
Design

- Engineering CAD (Fusion 360)
- 3D Fused Deposition Modeling

Programing

- Matlab/Simulink
- Python
- Java

CFD/FEM/Fluid
Dynamics

- Ansys LS-Dyna
 - WEC-Sim
 - WecOptTool
 - Proteus DS
 - Hypermesh
 - OrcaFlex
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