

# Jen Cardona, Ph.D.

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## **ENERGY AND ENVIRONMENTAL ECONOMICS, INC.**

*Managing Consultant*

San Francisco, CA

Dr. Jen Cardona supports E3's Climate Pathways and Electrification group, where she uses technical analysis and modeling to understand economy-wide emissions reductions strategies. Jen applies her technical problem-solving skills to challenges faced by energy systems impacted by climate change and deep decarbonization. She holds a Ph.D. in mechanical engineering from Stanford University and a Sc.B. in mechanical engineering from Brown University.

Selected E3 projects include:

- **Hawai'i State Energy Office, Hawai'i Pathways to Decarbonization, 2023.** Led a modeling team at E3 to support the Hawai'i State Energy Office in the development of a report to the State Legislature evaluating long-term pathways to economy-wide decarbonization in Hawai'i and recommending new policies to ensure the achievement of the state's decarbonization goals. Modeled decarbonization scenarios to evaluate trade-offs between different policy measures, including the impact on future GHG emissions, energy demands, and costs. Led stakeholder workshops on E3's modeling efforts, answering questions about E3's analytical approach.
- **US Climate Alliance, Greenhouse Gas Emissions Scenarios to Net Zero, 2023.** Led the E3 effort to support the US Climate Alliance with modeling and scenario analysis for their annual report, which detailed Alliance-wide GHG emissions under various scenario assumptions. Modeled the impact of a suite of policy measures on future greenhouse gas emissions in US Climate Alliance States. The economy-wide suite of mitigation measures included actions in the transportation, residential, commercial, and industrial sectors, as well as non-combustion emissions and negative emissions technologies.
- **California Air Resources Board (CARB), 2022 Scoping Plan for Achieving Carbon Neutrality, 2021-2022.** Supported E3's economy-wide modeling of pathways to achieving carbon neutrality in California for the 2022 Scoping Plan.
- **California Energy Commission (CEC), CEC Demand Scenarios Project, 2022.** Created an economy-wide pathways model that combined CEC energy demand forecasts for several key sectors with energy demands from E3's PATHWAYS model in other sectors. The resulting model delivered economy-wide energy demands, emissions, and 8760 load impacts.
- **California Public Utility Commission (CPUC), Distributed Energy Resources Avoided Cost Calculator (ACC), 2021-2022.** Developed a framework to account for the avoided costs resulting from a change in the amount or timing of high GWP refrigerant leakage.

## **STANFORD UNIVERSITY, DABIRI LAB**

*Research Assistant*

Stanford, CA  
September 2016 – August 2021

- Explored novel methods towards wind resource quantification for wind energy
- Implemented deep learning algorithms to infer wind speeds from videos of flags and trees
- Collected video datasets from lab and field experiments of flow-structure interactions
- Applied physical models to infer wind properties from structural deflections
- Analyzed a broad variety of datasets including video data and data from analog sensors

## **BROWN UNIVERSITY – LEADING EDGE HYDRO, BREUER LAB**

*Research Engineer*

Providence, RI  
June 2015 – August 2016

- Executed field and lab testing to assess viability of hydrokinetic energy harvesting device
- Led field testing of 1kW and 2kW prototypes
- Managed team of two interns to create data acquisition and instrumentation system

## **BROWN UNIVERSITY, FRANCK LAB**

*Undergraduate Research Assistant*  
2015

Providence, RI  
September 2014 – April

- Tested samples in Instron to characterize material properties of polymer foam that hardens on impact
- Performed digital image correlation using MATLAB to validate test results
- Modeled viscoelastic material behavior in Abaqus/CAE to predict response to other loading scenarios

## Education

Stanford University

*Ph.D., Mechanical Engineering*

Stanford, CA  
2021

Stanford University

*M.S., Mechanical Engineering*

Stanford, CA  
2019

Brown University

*Sc.B., Mechanical Engineering with Honors*

Providence, RI  
2015

## Publications

1. **Cardona JL, Dabiri JO (2021)** “Wind speed inference from environmental flow-structure interactions, part 2: leveraging unsteady kinematics” *Flow*.
2. **Cardona JL, Bouman KL, Dabiri JO (2021)** “Wind speed inference from environmental flow-structure interactions,” *Flow*.

3. *Wei NJ, Brownstein ID, **Cardona JL**, Howland MF, Dabiri JO (2020) "Near-wake structure of fullscale vertical-axis wind turbines," Journal of Fluid Mechanics.*
4. ***Cardona JL**, Howland MF, Dabiri JO (2019) "Seeing the wind: Visual wind speed prediction with a coupled convolutional and recurrent neural network," Neural Information Processing Systems (NeurIPS), December 8-14, Vancouver, Canada.*
5. ***Cardona JL**, Miller MJ, Derecktor T, Winckler S, Volkmann K, Medina A, Cowles S, Lorick R, Breuer KS, Mandre S (2016) "Field-testing of a 1kW Oscillating Hydrofoil Energy Harvesting System," Proceedings of the 4th Marine Energy Technology Symposium, April 25-27, Washington, D.C.*