Jen Cardona, Ph.D.

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ENERGY AND ENVIRONMENTAL ECONOMICS, INC. San Francisco, CA
Senior Consultant

Dr. Jen Cardona supports E3's Climate Pathways 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:

- **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.

- **US Climate Alliance, Greenhouse Gas Emissions Scenarios to Net Zero, 2021.** E3 supported the US Climate Alliance with modeling and scenario analysis for their annual report, which detailed Alliance-wide GHG emissions under various scenario assumptions. Dr. Cardona developed a method to downscale model results to the state level.

STANFORD UNIVERSITY, DABIRI LAB Stanford, CA
Research Assistant September 2016 – August 2021

- Implemented deep learning algorithms to infer wind speeds from videos of flags and trees
- Collected and processed 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 Providence, RI
Research Engineer 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 Providence, RI
Undergraduate Research Assistant September 2014 – April 2015

- 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 Stanford, CA
Ph.D., Mechanical Engineering 2021

Stanford University Stanford, CA
M.S., Mechanical Engineering 2019

Brown University Providence, RI
Sc.B., Mechanical Engineering with Honors 2015

Citizenship

United States

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.*