Jen Cardona, Ph.D.

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

Dr. Cardona joined E3 as a consultant in the Climate Pathways group in 2021 after completing her Ph.D. in Mechanical Engineering at Stanford where she sought to address challenges in renewable energy through the application of physics and statistical methods to real-world experiments. For her dissertation, Dr. Cardona developed physics-based and machine learning models to infer wind speeds from videos of objects such as trees, with the goal of using pre-existing objects in an environment as ubiquitous low-cost flow sensors. Prior to her graduate studies, Dr. Cardona led field testing of a hydrokinetic energy harvesting device as a research engineer at Brown University. In addition to her Ph.D., Dr. Cardona also holds an M.S. from Stanford University and an Sc.B. from Brown University.

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 (to appear).*

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, Breur 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.*