

# Andrew DeBenedictis, Ph.D.

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

Cambridge, MA

*Director*

Dr. DeBenedictis rejoined E3 in 2018. He works in E3's Boston office, where he helps clients in New England and elsewhere work towards a cleaner, more efficient energy sector. A member of E3's DER team, Dr. DeBenedictis has experience developing grid modernization plans, including cost benefit analyses and business cases for investments, to accommodate the challenges of a two-way decarbonized grid. He also uses E3's extensive modeling capabilities to analyze the potential for and impacts of building electrification, including likely technology uptake given customer economics under a range of policy mechanisms.

Outside of the DER team, he enjoys working with clients to formulate broad decarbonization strategies through many avenues. Examples include Clean Energy Standards (CESs) designed to meet state carbon reduction targets, Performance Incentive Mechanisms (PIMs) to promote cross-sectoral decarbonization, and Integrated Resource Plans (IRPs) that balance clean energy, reliability, and affordability goals to plan utility investments.

Dr. DeBenedictis originally worked at E3 for five years before attending graduate school. During that time, he contributed to E3's landmark study, published in the journal *Science*, that analyzed the technology path to deep decarbonization by 2050. He also helped the California Public Utilities Commission develop a successor to its net energy metering (NEM) tariffs, helped to design a robust resource adequacy modeling platform, and conducted extensive rate design analysis for large commercial and industrial customers.

Dr. DeBenedictis received a Ph.D. and M.S. in Physics from Tufts University, and a B.A. in Physics and Astronomy from Bowdoin College.

## **PHYSICS AND ASTRONOMY DEPARTMENT**

Medford, MA

*Tufts University – Research Assistant*

2013 – 2018

- Developed Mathematica-based finite element model with adaptive moving mesh to solve shape/field coevolution problems
- Created C-based finite difference model to investigate liquid crystal behavior between patterned substrates
- Shared research findings through presentations and posters at more than 10 conferences
- Collaborated on research with peers and faculty from Tufts University Department of Mathematics, UNSW Chemical Engineering, UC Merced Department of Physics, UPenn Materials Science and Engineering, and Sheffield Hallam University Materials and Engineering Research Institute

## **ENERGY AND ENVIRONMENTAL ECONOMICS, INC. (E3)**

San Francisco, CA

*Consultant*

2008 – 2013

- Supported projects involving resource planning, rate design, cost-effectiveness evaluation, and modeling future emissions scenarios
- Designed several quantitative models utilized in public proceedings and for utility planning
- Managed projects totaling over \$1 million in contracted funds
- Clients included British Columbia Hydro (BCH), the California Public Utilities Commission (CPUC), the California Independent Systems Operator (CAISO), Lower Valley Energy (LVE), Pacific Northwest Generating Cooperative (PNGC), and Lawrence Berkeley National Laboratory (LBNL)

## **PHYSICS AND ASTRONOMY DEPARTMENT**

*Bowdoin College – Research Assistant*

Brunswick, ME

2007 – 2008

- Created Mathematica computer programs to calculate parameters for and investigate various string theory configurations

## **RESEARCH EXPERIENCE FOR UNDERGRADUATES (REU)**

*Michigan State University – Research Assistant*

East Lansing, MI

Summer 2007

- Built FORTRAN computer program to model bulk-heterojunction polymer solar cells to optimize cell efficiency

## Education

Tufts University

*Ph.D., Physics*

*Burlingame Fellowship*

Medford, MA

2018

2017

Tufts University

*M.S., Physics*

*Provost Fellowship*

Medford, MA

2015

2013 – 2015

Bowdoin College

*B.A., Physics and Astronomy (Highest Honors)*

*Sarah and James Bowdoin Scholar (Dean's List)*

Brunswick, ME

2008

2004 – 2005, 2005 – 2006, 2007 – 2008

## Selected Publications

- Xia Y., **DeBenedictis A.**, Kim D.S., Chen S., Kim S.U., Cleaver D.J., Atherton T.J., Yang, S. *Programming emergent symmetries with saddle-splay elasticity*. Nature Communications (2019), 10, 5104
- **DeBenedictis A.**, Rodarte A.L., Hirst L.S., Atherton T.J. *Modeling deformation and chaining of flexible shells in a nematic solvent with finite elements on an adaptive moving mesh*. Physical Review E (2018), 97:3, 032701.

- Dahiya, P., **DeBenedictis A.**, Atherton T.J., Caggioni, M., Prescott, S.W., Harteld, R.W., Spicer, P.T. *Arrested coalescence of viscoelastic droplets: triplet shape and restructuring*. *Soft Matter* (2017), 13, 2686-2697.
- **DeBenedictis A.**, Atherton T.J. *Shape minimisation problems in liquid crystals*. *Liquid Crystals* (2016), 43:13, 2352-2362.
- **DeBenedictis A.**, Anquetil-Deck C., Cleaver D.J., Emerson D.B., Wolak M., Adler J.H., Atherton T.J. *Competition of lattice and basis for alignment of nematic liquid crystals*. *Physical Review E* (2015), 92:4, 042501.
- **DeBenedictis A.**, Haley B., Woo C.K., Cutter E. *Operational energy-efficiency improvement of municipal water pumping in California*. *Energy* (2013), 53:5, 237-243.
- Williams J., **DeBenedictis A.**, Ghanadan R., Mahone A., Moore J., Morrow W., Price S., Torn M. *The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity*. *Science* (2012), 335:6064, 53-59.
- **DeBenedictis A.**, Hoff T.E., Price S., Woo C.K. *Statistically adjusted engineering (SAE) modeling of metered roof-top photovoltaic (PV) output: California evidence*. *Energy* (2010), 35:10, 4178-4183.
- Orans R., Woo C.K., Horii B., Chait M., **DeBenedictis A.** *Electricity Pricing for Conservation and Load Shifting*. *Electricity Journal* (2010), 23:3, 7-14.

## Citizenship

United States