

# Elizabeth Wachs

Curriculum Vitae

July 23, 2020

Agricultural and Biological Engineering  
Purdue University  
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## EDUCATION

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- 2020 Ph.D., Agricultural and Biological Engineering, Purdue University, West Lafayette  
Dissertation: Market Acceptance of Renewable Energy Technologies for Power Generation
- 2007 M.A., Desert Studies; Area of Specialization: Man in Drylands, Ben-Gurion University of the Negev, Sede Boker, Israel
- 2015 B.S.ChE., Chemical Engineering, Purdue University, West Lafayette
- 2001 B.A., Ancient History and Classical Civilization, *magna cum laude*, University of Texas, Austin

## ADDITIONAL TRAINING

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- 2019 Purdue NSF I-Corps Site Sept 2019 Introduction to Customer Discovery (ICD)
- 2018 26th Annual Short Course in Global Trade Analysis: "Introduction to Applied General Equilibrium Analysis in a Multi-Region Framework"

## PUBLICATIONS

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### Refereed/Accepted Journal Articles

- 2020 **Wachs, L.**, Singh, S. "Projecting the urban energy demand for Indiana, USA, in 2050 and 2080." *Climatic Change*. <https://doi.org/10.1007/s10584-019-02618-z>
- 2019 Gotham, D., McClain, W., Mukhopadhyay, S., Nateghi, R., Preckel, P., Raymond, L., Schubert, P., Singh, S., **Wachs, E.** 2019. "Projected climate change impacts on Indiana's energy demand and supply." *Climatic Change*. pp. 1-15 <https://doi.org/10.1007/s10584-018-2299-7>
- 2018 **Wachs, E.**, Singh, S. 2018. "A modular bottom-up approach for constructing physical input-output tables (PIOTs) based on process engineering models," *Journal of Economic Structures*. 7:26. <https://doi.org/10.1186/s40008-018-0123-1>
- 2009 **Wachs, E.**, Tal, A. 2009. "Herd No More: Livestock Husbandry Policies and the Environment in Israel," *Journal of Agricultural and Environmental Ethics*, 22(5): 401-422. <https://doi.org/10.1007/s10806-009-9162-9>

**Submitted Journal Articles**

- 2020 **Wachs, E.,** Engel, B. “Land Use for United States Power Generation: A Critical Review of Existing Metrics with Suggestions for Going Forward.” Submitted to *Renewable & Sustainable Energy Reviews*.
- 2020 **Wachs, E.,** Engel, B. “Reliability versus Renewables: Modeling Decision Making in CAISO and PJM to Identify Market Barriers and Supports to Renewable Energy Adoption in the US.” <https://doi.org/10.31224/osf.io/vngzq>. Submitted to *The Electricity Journal*.
- 2020 **Wachs, L.,** Engel, B. “Quantifying Barriers to Market Acceptance of Renewables: A Portfolio Optimization Approach.” Submitted to *Energy Policy*.

**Journal Articles in Preparation**

- 2020 **Wachs, L.,** Cortes Selva, A., Engel, B. “Ecosystems for Decision Making in Indiana Power Generation Capacity.” Planned submission to *Energy Policy*.

**Articles in Proceedings**

- 2019 **Wachs, L.,** Engel, B. “Do Market Barriers Exist for Renewables? A Portfolio Approach.” Proceedings of 37<sup>th</sup> United States Association of Energy Economics (USAEE)/International Association of Energy Economics (IAEE) North American Conference

**Master’s Thesis**

- 2007 **Wachs, E.** “Herd No More: Livestock Husbandry Policies and the Environment in Present-Day Israel from 1900 until Today.”

**AWARDS AND HONORS**

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- 2020 Best Oral Presentation, Environmental and Natural Resources Engineering track, Agricultural and Biological Engineering Graduate Student Organization Symposium, Purdue University
- 2020 Best Poster Presentation, Environmental and Natural Resources Engineering track, Agricultural and Biological Engineering Graduate Student Organization Symposium, Purdue University
- 2019 NSF I-Corps Site Grant for Customer Discovery, Midwest Node
- 2019 PhD Day Selected Paper, United States Association of Energy Economics (USAEE)
- 2019 Purdue College of Engineering Office of Graduate Education Conference Travel Funds Recipient
- 2018 Purdue Graduate Student Government Travel/Professional Grant
- 2018 Fellowship, 26th Annual Short Course in Global Trade Analysis: "Introduction to Applied General Equilibrium Analysis in a Multi-Region Framework"

- 2017 American Institute of Chemical Engineers (AIChE) Women's Initiative's Committee (WIC) Women's Workplace Retention & Reentry Award
- 2017 Fall 2017 Women in Engineering Travel Grant
- 2015 Ross Fellowship, Purdue University
- 2014 Summer Undergraduate Research Fellowship, Purdue University
- 2014 Award of Excellence for Top Research Talk, Purdue Summer Undergraduate Research Fellowship Symposium
- 2005 Full fellowship, Blaustein Institutes for Desert Research

### **CONFERENCE ACTIVITY AND PARTICIPATION**

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- 2020 Quantifying Market Barriers to Renewables: A Portfolio Optimization Approach. Feb. 7. Agricultural and Biological Engineering Graduate Student Organization Symposium, Purdue University. Winner of best poster presentation and best oral presentation in Environmental and Natural Resources Engineering track.
- 2020 Land Use and Power Generation. Feb. 7. Agricultural and Biological Engineering Graduate Student Organization Symposium, Purdue University.
- 2019 Do Market Barriers Exist for Renewables? A Portfolio Approach. L. Wachs and B. Engel. Nov. 2-6. 37<sup>th</sup> United States Association of Energy Economics (USAEE)/International Association of Energy Economics (IAEE) North American Conference. Presenter and Discussant, PhD Day. Oral Presentation. Participant in Workshop on Aggregation in Modeling.
- 2019 Understanding Market Acceptance of Renewables: Modeling the Decision to Add Generation Capacity to the US Electric Grid. March 25. Agricultural and Biological Engineering Graduate Student Organization Symposium, Purdue University.
- 2019 Powering Our Homes: Generation Capacity Additions to the Electric Grid in California and the Mid Atlantic. March 25. Agricultural and Biological Engineering Graduate Student Organization Symposium, Purdue University.
- 2018 Tracking Nutrients through Industry and Back: An Interdisciplinary, Process-Based Approach, L. Wachs and S. Singh. May 2. Office of Interdisciplinary Graduate Programs Spring Reception, Purdue University.
- 2018 Compiling Physical Input-Output Tables from Process Simulations to Measure Environmental Impacts, L. Wachs and S. Singh. Feb. 9. Agricultural and Biological Engineering Graduate Student Organization Symposium, Purdue University.
- 2018 Compiling Physical Input-Output Tables from Process Simulations to Measure Environmental Impacts, L. Wachs and S. Singh. Feb. 2. Association of Environmental Engineering and Science Professors (AEESP) Distinguished Lecturer Conference, Purdue University

- 2017 Changing Global Demand for Fossil Based Electricity with Adoption of Renewables at Urban Scale, E Wachs and S Singh. Oct. 29-Nov 2. AIChE Annual Meeting.
- 2017 A Physical Input-Output Model for the Food-Energy-Water (FEW) Nexus in Indiana, E Wachs and S Singh. Oct. 29-Nov 2. AIChE Annual Meeting.
- 2017 A Process Modeling Based Physical Input-Output Table (PIOT) for Nitrogen Flows Using ASPEN Plus: A Comparison with an Empirical PIOT for Illinois, E Wachs and S Singh. June 25-29. Science in Support of Sustainable and Resilient Communities: 2017 Joint Conference International Society for Industrial Ecology and International Symposium on Sustainable Systems and Technology.
- 2016 Computational Approaches in Systems Modeling for Environmental Impacts of Industries Automating Physical Input-Output Tables (PIOTs) Via Aspen Process Modeling, E Wachs and S Singh. Nov. 13-18. AIChE Annual Meeting.
- 2016 Exploring Regional and Telecoupled Land Use Change Impacts from Environmental Shocks. K Hill, E Wachs, B Hardiman, D Yu, S Singh. Aug. 4. Summer Undergraduate Research Fellowship Symposium, Purdue University.
- 2015 Role of Catalyst in Biomass Gasification with CO<sub>2</sub>. N Kumar, E Wachs, P Basak, J Gore. May 17-20, 2015. 9<sup>th</sup> US National Combustion Meeting.
- 2014 The Role of Surface Area in Catalytic Gasification of Biomass. E Wachs, N Kumar, I Sircar, P Basak, J Gore. Aug. 7. Summer Undergraduate Research Fellowship Symposium, Purdue University.

### Proceedings Volumes Edited

- 2006 Fargnoli, M., Lawhon, P., and L. Wuerker, eds. Deserts and Desertification: Challenges and Opportunities. Book of Abstracts.

### TEACHING EXPERIENCE

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Teaching Assistant, Life Cycle Analysis and Industrial Ecology (Senior Level Environmental and Ecological Engineering).	Spring 2017 Spring 2018
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### ADDITIONAL RESEARCH EXPERIENCE

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- 2016 Graduate Mentor for Summer Undergraduate Research Fellowship (SURF) program to Kevin Hill using mixed methods modeling including input-output to understand trade flows and how they reflect environmental shocks with associated land use changes. Abstract available at <http://docs.lib.purdue.edu/surf/2016/presentations/53/>.
- 2016 Forecast world urban energy demand in transportation, heating and electricity for International Renewable Energy Agency (IRENA) for report entitled: Renewable Energy in Cities, Oct. 2016.

- 2014- 2015 Performed laboratory work on catalytic biomass gasification as part of research team with mentor and another student as part of Purdue's SURF program. Continued work for course credit in spring 2015. Abstract of research available at <http://docs.lib.purdue.edu/surf/2014/presentations/127>.

## **RELATED PROFESSIONAL SKILLS**

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MATLAB  
GAMS  
Aspen Plus  
Python  
Global Trade Analysis Project (GTAP)

## **NON-ACADEMIC WORK**

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- 2008- 2009 Monterey Museum of Art, Monterey, California, Grant Writer and Development Assistant
- 2007 Drylands, Deserts and Desertification 2008, Sede Boker, Israel  
Conference Coordinator in early stages of planning.
- 2002- 2005 Amazon Conservation Team, Arlington, Virginia  
Administrative Assistant, Communications Coordinator

## **LANGUAGES**

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Fluent Spanish  
Intermediate Hebrew: limited conversational Hebrew, can read with dictionary

## **PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS**

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American Institute of Chemical Engineers (AIChE)  
International Society for Industrial Ecology (ISIE)  
International Input-Output Association (IIOA)  
United States Association of Energy Economics (USAEE)