

Lisa Rennels

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EDUCATION

PhD in Energy and Resources – August 2019 – present

MSc in Energy and Resources – August 2017 – May 2019

University of California, Berkeley

- Data Sciences for the 21st Century (DS421) National Science Foundation Research Traineeship program member and NSF Fellow in DS421
- Graduate Student Researcher (GSR) position focused on software development to support integrated assessment models including user interface design, uncertainty analysis, and sensitivity analysis, among other sections of the code base (<https://www.mimiframework.org>)
- Culminating master's project titled Global Sensitivity Analysis of Integrated Assessment Models
- Coursework focused on environmental science/modeling and computer science

Research foci include:

- Climate Change Economics
- Integrated Assessment Modeling
- Sensitivity & Uncertainty Analysis
- Software Engineering & Development
- Usability and Design of Embedded Domain Specific Languages

MSc in Computer Science – August 2020 – May 2022

University of California, Berkeley

Thesis: Contextual Inquiry into Programmers' Use of Mimi and Implications for Embedded DSL Design

- EECS Excellence Award (2020)
- Focus on programming languages/systems, software engineering and development, and software usability analysis

Post-Baccalaureate in Computer Science – January 2015 – July 2017

Tufts University, Medford, MA

- GPA 3.95/4.0
- Coursework: Data Structures (C++), Discrete Mathematics, Fundamentals of Computational Design (Optimization; MATLAB), Introduction to Algorithms, Computational Biology, Theory of Computation, Linear Algebra

BA (High Honors, Cum Laude) in Environmental Studies – September 2010 – June 2014

Dartmouth College, Hanover, NH

- GPA 3.69/4.0; Major GPA 3.84/4.0
- Downey Family Prize for Excellence in Independent Research (Environmental Studies Department) for senior thesis
- Research Topics: Payments for Ecosystem Services; Payments for Watershed Services
- Relevant Coursework: natural sciences, environmental economics, introductory computer science and introductory environmental modelling

WORK EXPERIENCE

Independent Consultant – May 2021 – present

Various independent consulting positions focused on climate economics and the social cost of carbon, integrated assessment modeling, and software engineering:

- For Terra.do: Co-design and teach a 6-week online course entitled Climate Change for Software Engineers.
- For University of California, Santa Cruz on project for University of California Office of the President (UCOP): Serve as an expert consultant and technical lead for developing a social cost of carbon for use within the UC System.

Graduate Student Researcher – August, 2017 – present

Energy Resources Group at University of California, Berkeley

UC Berkeley PI: Professor David Anthoff

Grantee Organization: Resources for the Future

- work towards outlined goals with a four-person software development team
- design, deploy, and document a computing platform, written in Julia, for the new social cost of carbon (SCC) estimation framework, and use it to implement the socioeconomic, climate

- system, climate damages, and discounting components of the updated SCC estimation process per the new National Academy of Sciences (NAS) recommendations
- employ the computing platform to carry out novel research on the social cost of carbon as well as developing software for climate research

Researcher for Resources for the Future (RFF) – May 2021 – January 2022

Resources for the Future, Washington, D.C.

- serve as lead modeler and contributing researcher for the Social Cost of Carbon team at RFF to support the U.S. Environmental Protection Agency in developing an updated social cost of carbon

Research Analyst – July 2014 – present

Industrial Economics Inc., Cambridge, MA

- perform data processing and analysis tasks using MATLAB, Geospatial Informatics Software (ArcGIS), and Excel on projects involving a large suite of biophysical and economic models
- manipulate and process large climatological datasets using a thorough understanding of climate modelling
- Climate Change, Water Resources, Economic Valuation, and Implications for Policy Decisions
- evaluate effects of changes in water availability and allocation; evaluate the physical and economic impacts of climate change, as well as mitigation options and various adaptation responses, and evaluate potential policy responses to these impacts based on economics and country-specific factors
- communicate with sub-contractors and clients on project work in the United States, Sub-Saharan Africa, and Central Asia
- Natural Resource Damage Assessments
- perform verification and holistic validation of datasets
- work with Excel and Geospatial Informatics Software (ArcGIS)
- member of Recruiting Team

Teaching Assistant – January 2014 – March 2014

Environmental Studies Dpt. (course: Ecological Economics)

Dartmouth College, Hanover, NH

- lead weekly office hours for undergraduate students
- grade student assignments and exams

Research Assistant – January 2013 – January 2014

Environmental Studies Dpt.- funded by New Hampshire Experimental Program to Stimulate Cooperative Research (NH EPSCoR)

Dartmouth College, Hanover, NH

- review scholarly literature on market-based solutions for framing and valuing ecosystem service, specifically those related to payments for watershed services (PWS) and forest management in the Northern Forest
- culminated in an independent study paper summarizing eight Northern Forest PWS schemes and their implications for PWS schemes in the Northern Forest.
- meet bi-weekly with a team of professors and graduate students to discuss team member's research and upcoming opportunities for further research and application of findings

Teaching Assistant – April 2012 – June 2012

Chemistry Dpt. (course: Inorganic Chemistry)

Dartmouth College, Hanover, NH

- supervise and instructed weekly 6-hour lab section for twenty undergraduate students
- lead weekly office hours for undergraduate students
- grade student assignments
- meet bi-weekly with staff to discuss improvements to coursework and roles of TAs

LEADERSHIP ROLES

Executive Committee Student Representative – August 2019 – present

Energy and Resources Group, Berkeley, CA

- provide broad, consultative advice to the Chair and Core Faculty on the welfare and operation of ERG from all ERG constituents
- aid the Chair in administration of ERG
- review policy recommendations from the various committees of the Faculty
- advise the Chair on appointment of Committees
- approve nominations for appointment of Affiliates
- make recommendations to the Core Faculty on matters of policy and curriculum; and identify and report new matters of concern to the Chair, Core Faculty, and staff

Alumni Relations Student Representative – August 2019 – present
Energy and Resources Group, Berkeley, CA

Team Board Member – August 2019 – present
UC Berkeley Women's Club Water Polo, Berkeley, CA

Program Co-Chair, Awards Manager – January 2012 – Spring 2014
Special Olympics Club at Dartmouth College, Hanover, NH

- manage logistics, fundraising, and communication with Tucker Foundation at Dartmouth College for our program in connection with Upper Valley Special Olympics
- supervise the awards ceremony and delegate ceremony responsibilities during the bi-annual Special Olympics Games
- organize and attend weekly events with adult athletes

Team Captain – June 2012 – May 2014

Dartmouth Women's Club Water Polo, Hanover, NH

- facilitate recruitment and hiring of coach
- organize logistics of daily practice, training trip in California, and various competitions
- manage team budget (~\$45,000)
- organize fundraising events and solicitations
- engage in organized meetings with Collegiate Water Polo Association

SKILLS

Language: English (native), Spanish (intermediate)
Computer Languages/Software Programs (most proficient, not comprehensive): Java, Julia, C/C++, MATLAB, ArcGIS

REFERENCES

References are available on request.

PRESENTATIONS

Cora Kingdon and Lisa Rennels. "Mimi.jl – Next Generation Climate Economics Modeling". JuliaCon 2019. Baltimore, MD. July 25, 2019.

We presented Mimi.jl, a next generation platform for Integrated Assessment Modelling widely used in climate economics research. The talk outlined technical aspects of the platform, as well as its adoption and impact both on research at universities and in the US federal climate regulation process.

Anthoff, David, Koptis, Elizabeth, Moore, Frances C., and Muller, Nicholas Z. "Advances in Integrated Assessment Modeling." Association of Environmental and Resource Economists Annual Summer Conference Pre-Conference Workshop. Incline Village, NV. May 29, 2019.

PEER-REVIEWED PUBLICATIONS

Wong, Tony E, Lisa Rennels, Frank Errickson, Vivek Srikrishnan, Alexander Bakker, Klaus Keller, David Anthoff (2022). MimiBRICK.jl: A Julia package for the BRICK model for sea-level change in the Mimi integrated modeling framework. *Journal of Open Source Software* (in review).

Rennert, K., Prest, B. C., Pizer, W. A., Newell, R. G., Anthoff, D., Kingdon, C., ... & Errickson, F. (2021). The Social Cost of Carbon: Advances in Long-Term Probabilistic Projections of Population, GDP, Emissions, and Discount Rates. *Brookings Papers on Economic Activity*.

Melvin, A.M., Larsen, P., Boehlert, B., Neumann, J.E., Chinowsky, P., Espinet, X., Martinich, J., Baumann, M.S., Rennels, L., Bothner, A. and Nicolsky, D.J. (2017). Climate change damages to Alaska public infrastructure and the economics of proactive adaptation. *Proceedings of the National Academy of Sciences*, 114(2), E122-E131.

Chapra, S. C., Boehlert, B., Fant, C., Bierman Jr, V. J., Henderson, J., Mills, D., Mas, D., Rennels, L., Jantarasami, L., Martinich, J., Strzepek, K. M., Bierman, V., and Paerl, H. (2017). Climate change impacts on harmful algal blooms in US freshwaters: a screening-level assessment. *Environmental Science & Technology*, 51(16), 8933-8943.

Fant, C., Srinivasan, R., Boehlert, B., Rennels, L., Chapra, S. C., Strzepek, K. M., ... and Martinich, J. (2017). Climate change impacts on US water quality using two models: HAWQS and US basins. *Water*, 9(2), 118.

Larsen, P. H., Boehlert, B., Eto, J., Hamachi-LaCommare, K., Martinich, J., and Rennels, L. (2018). Projecting future costs to US electric utility customers from power interruptions. *Energy*, 147, 1256-1277.

Melvin, A. M., Murray, J., Boehlert, B., Martinich, J. A., Rennels, L., and Rupp, T. S. (2017). Estimating wildfire response costs in Alaska's changing climate. *Climatic Change*, 141(4), 783-795.

SELECTED REPORTS

Global Sensitivity Analysis of Integrated Assessment Models. Lisa Rennels. August, 2019.

EPA. 2017. Avoiding and Reducing Long-term Risks of Climate Change: A Technical Report for the Fourth National Climate Assessment. United States Environmental Protection Agency, Office of Atmospheric Programs, EPA 430-R-17-001.

Climate Change in the United States: Benefits of Global Action (2017). (<https://www.epa.gov/cira>)

Climate Change in the United States: Benefits of Global Action, estimates the physical and monetary benefits to the U.S. of reducing global greenhouse gas emissions. This report summarizes results from the Climate Change Impacts and Risks Analysis (CIRA) project, a peer-reviewed study comparing impacts in a future with significant global action on climate change to a future in which current greenhouse gas emissions continue to rise.

The Contribution of Water Resources Development and Environmental Management to Uganda's Economy. Kenneth Strzepek, Brent Boehlert, Jacqueline Willwerth, and James Neumann. August 16, 2016.

Most sectors of the Ugandan Economy rely on environmental and natural resources goods and services for enhancing their productivity, providing the necessary raw materials, and reducing the cost of public expenditure for providing the services in those sectors. The objective of this assignment is to assess the economic value of water and environmental goods and services – and the costs of degradation and insufficient action in the sector to assist the Ministry of Water and Environment (MWE) in establishing and clearly articulating the value of their management services. This assessment seeks to value these goods and services through a series of impact channels which trace raw resources such as arable land, water (as runoff and lakes), and wetlands and forest from their sources, through MWE management, and into the economy. Biophysical models are used to estimate the interaction of natural systems and MWE intervention. The results of these models are then fed into an economy wide model to estimate a variety of economic indicators related to the specified management regime.

The Costs of Climate Change Impacts and Responses on DOI Sites in the Southeastern United States. Brent Boehlert and Jessica Murray. March 8, 2016.

This report presents the results of a regional climate change impact analysis to Department of the Interior (DOI) sites in the U.S. southeast. Our goal was to estimate to what degree climate change physical and economic impacts to site-level resources (infrastructure, ecosystems and habitats, and recreation) may accrue to DOI in a future in which current greenhouse gas (GHG) emissions continue to grow unchecked.