

# Spencer Checkoway

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## EDUCATION

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University of Michigan (2027 exp.) **Doctor of Philosophy (Ph.D.)**  
Civil Engineering and Sustainable Systems  
*College of Engineering & School for Environment and Sustainability*

University of Michigan (2024) **Master of Science in Engineering**  
Environmental Engineering  
*College of Engineering*

**Master of Science**  
Environment and Sustainability  
*School for Environment and Sustainability*

Bard College (2022) **Bachelor of Arts**  
Joint Program in Physics and  
Architecture

## RESEARCH INTERESTS

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The environmental impact and intersection of transportation and energy systems. Methods include life cycle assessment, policy analysis, system dynamics, techno-economic analysis, multi-objective optimization, and mathematical modeling.

## RESEARCH EXPERIENCE

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University of Michigan **Next Generation Transportation Systems Group - Research Assistant**  
*Hydrogen Infrastructure Financial Optimization Under Uncertainty*

- ❖ Robust optimization of financial parameters affecting the levelized cost of hydrogen production (LCOH)
- ❖ Collaboration between the Center for Sustainable Systems and the Next Generation Transportation Systems Group

**Center for Sustainable Systems - Research Assistant**  
*Hydrogen Fuel Ecosystem Planning Framework and Optimization*

- ❖ Cross-university collaboration assessing social, economic, and technological parameters for hydrogen supply chain management
- ❖ Engaged stakeholders across the region in a workshop to develop a framework of policy, community, and financial drivers for hydrogen supply chain development

*2025 Rosina M. Bierbaum Award in Climate Adaptation and Mitigation*

*Carbon Footprinting and Abatement Costs of US Maple Syrup Production*

- ❖ Constructed a carbon footprinting model to assess emissions and energy use in the maple syrup production process across archetypal scales
- ❖ Quantified abatement costs for technological decisions in variable season conditions

Bard  
College

**Gravitational Optics Laboratory**–*Research Assistant*

Simulated material defects for gravitational wave interferometer apparatus as part of the LIGO collaboration

**Decentralized Biofuel Energy Network**– *Senior Undergraduate Thesis*

Investigated materials to improve Mie scattering in photobioreactors and the spatial effects of localized energy production

*Winner of Alice P. Doyle Prize in Environmental Science and Social Impact*

## PUBLICATIONS

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Selected  
Publications  
and White  
Papers

**Spencer M. Checkoway**, Geoffrey M. Lewis, and Gregory A. Keoleian, “Carbon and Energy Footprinting across Archetypes for U.S. Maple Syrup Production” *Environmental Science & Technology*, **2024** 58 (49), 21499-21509 DOI: 10.1021/acs.est.4c03067

**Spencer M. Checkoway**, “A Simple Model of a Vacuum-Tubing System for Collecting Maple Sap” *Report No. CSS24-12* **2024** DOI: <https://hdl.handle.net/2027.42/192661>

**Spencer M. Checkoway**, “Creating a Discrete Model of Sap Processing Thermodynamics” *Report No. CSS24-11R1* **2024** DOI: <https://hdl.handle.net/2027.42/192660>

Sophie Daudon, **Spencer Checkoway**, Caroline Resor, “State of Washington Renewable Energy Policy Report” *Renewable Energy Policy Initiative Gerald R. Ford School of Public Policy* **2023**

**Spencer Checkoway**, Antonios Kontos, Ross Exo Adams, “Sustainable Energy Imaginaries: Utilizing Mie Optics to Reengineer Photobioreactors and Reimagine the Sociospatial Conditions of Autonomous Energy Production” *Bard College Senior Projects* **2022**

Works in  
Progress

**Spencer M Checkoway**, Geoffrey M. Lewis, Gregory A. Keoleian, Michael R. Moore, “Marginal Cost of Abatement for Technological Decisions Across Maple Syrup Production Archetypes” *In Review*

**Spencer M Checkoway**, Gregory A. Keoleian, Dimitris Gounaridis, “Development of a Framework and Principles for the Planning of a Hydrogen Ecosystem” *In Progress*

**Spencer M Checkoway**, Neda Masoud, Gregory A. Keoleian “Robust Optimization of Financial Structures For Green Hydrogen Projects Under Different Production Configurations” *In Progress*

Selected Posters & Presentations **Spencer M Checkoway**, Gregory A. Keoleian, Dimitris Gounaridis, “Fuzzy Cognitive Mapping and Principles for Green Hydrogen Ecosystem Development in Michigan” *International Symposium on Sustainable Systems and Technology*  
**June 2025 – Runner-Up for Best Poster**

## TEACHING EXPERIENCE

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**University of Michigan** - *Graduate Student Instructor*

EAS 574–Sustainable Energy Systems

**University of Michigan (Tau Beta Pi)** - *Tutor*

Calculus I and Physics I

**Bard College** - *Teaching Assistant*

Physics I Lab (Introduction to Classical Mechanics)

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