

Maxwell Woody

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EDUCATION

University of Michigan (2025)	Doctor of Philosophy (Ph.D.) <i>Independent Interdepartmental Doctoral Program</i> Mechanical Engineering & Environment and Sustainability <i>Graduate Certificate in Science, Technology, and Public Policy</i>	
University of Michigan (2020)	Master of Science in Engineering Mechanical Engineering <i>College of Engineering</i>	Master of Science Environment and Sustainability <i>School for Environment and Sustainability</i>
Tulane University (2018)	Bachelor of Science in Engineering Engineering Physics <i>School of Science and Engineering</i>	Bachelor of Science Economics <i>School of Liberal Arts</i>

RESEARCH EXPERIENCE

University of Michigan	Center for Sustainable Systems – Research Assistant <ul style="list-style-type: none">•Calculating energy efficiency of hydrogen pathways for road, rail, marine and air transportation•Analyzing vehicle scrappage policies and their decarbonization impacts•Modeling the total cost of ownership of ICEVs vs BEVs in U.S. cities•Evaluating U.S. vehicle electrification goals in relation to U.S. GHG emissions goals•Modeling cradle to grave emissions if ICEV, HEV, and BEV sedans, SUVs and pickup trucks•Modeling GHG emissions of medium duty delivery vehicles, including USPS vehicles•Determining spatiotemporal variability of EV emissions based on climate, grid, and drive cycle•Researching battery degradation mechanisms, variables, best practices for lifetime extension
Tulane University	Photonic Materials and Devices Lab – Research Assistant <ul style="list-style-type: none">•Characterized solar cells and 2D devices by testing thermal and electrical performance•Created a prototype for a directly cooled hybrid photovoltaic/solar thermal module
NASA Ames Res. Center	Coded Structures Laboratory Robotics Intern <ul style="list-style-type: none">•Assisted with the construction of a 14-foot blended body, flexible-winged aircraft

TEACHING EXPERIENCE

January 2019 – May 2020	University of Michigan – Graduate Student Instructor <ul style="list-style-type: none">•General Physics II Lab (Electricity and Magnetism)•Industrial Ecology
August 2017 – May 2018	Tulane University – Makerspace Prototyping Assistant <ul style="list-style-type: none">•Helped students with woodworking, metalworking, laser cutting, 3-D printing, etc.•Conducted registration and safety training for new users

VOLUNTEER EXPERIENCE

- April 2015 – **Tulane Engineers Without Borders** – *Co-Founder, Trip Leader, Vice President*
May 2018
- Accounting; fundraising; trip planning; report, application, and grant writing; outreach
 - Established a partnership with the community of Laquigo, Ecuador
 - Led a group of five students on a weeklong trip to evaluate water supply and quality

OTHER PROJECT EXPERIENCE

- January 2019 – **Dow Sustainability Fellowship** – *Team Member*
December 2019
- Assessed opportunities for local foods in Michigan’s Western Upper Peninsula
 - Developed master planning documents to encourage support for local food systems
- August 2016 – **NASA Big Idea Challenge** – *Team Member, 1st Place Team*
February 2017
- Contributed to the design of a modular Solar Electric Propulsion cargo transport spacecraft

AWARDS

- Rackham One-Term Dissertation Fellowship (2025)
- 3M Award for Outstanding Achievement in Industrial Ecology (2024)
- Glancy Climate Innovation Award (2024)
- Dow Sustainability Fellowship (2019)
- Wege and Bulkley Fellowship in Sustainable Systems (2018)
- Academic Leadership Fellowship (2018)
- C.W. Ricker Award (2018)
- Tulane SSE Undergraduate Researcher of the Year Honorable Mention (2017)
- Tulane Presidential Scholarship (2014-2018)
- National Merit Scholarship (2014-2018)

SKILLS

Life Cycle Assessment	Technoeconomic Analysis	Systems Modeling
Greenhouse Gas Accounting	Multi-Objective Optimization	Policy Analysis

PUBLICATIONS

- Works in Progress
- Maxwell Woody**, Gregory Keoleian, Robert De Kleine, Hyung Chul Kim, James Anderson, “Batteries vs Fuel Cells for Medium- and Heavy-Duty Vehicle Decarbonization” *In Progress*
- Tim Wallington, **Maxwell Woody**, Geoffrey Lewis, Gregory Keoleian, Eytan Adler, Joaquim Martins, Matthew Colette, “A Critical Review of Hydrogen as a Sustainable Transportation Fuel” *In Progress*
- Maxwell Woody**, Antara Green, Christian Hitt, Gregory Keoleian, Sabina Thompkins, “Total Cost of Ownership of Electric and Gasoline Used Vehicles” *In Progress*
- Under Review
- Tim Wallington, **Maxwell Woody**, Geoffrey Lewis, Gregory Keoleian, Eytan Adler, Joaquim Martins, Matthew Colette, “Green Hydrogen Pathways, Energy Efficiencies, and Intensities for Ground, Air, and Marine Transportation” *Under Review*
- Maxwell Woody**, Samuel Stolper, Parth Vaishnav, Gregory Keoleian, “Vehicle Scrappage Policies for Transportation Decarbonization” *Under Review*

Published
Journal
Articles

Maxwell Woody, Shawn Adderly, Rushabh Borha, Gregory Keoleian, “Electric and Gasoline Vehicle Total Cost of Ownership Across U.S. Cities” *Journal of Industrial Ecology*, **2024**
<https://doi.org/10.1111/jiec.13463>

Maxwell Woody, Gregory Keoleian, Parth Vaishnav, “Decarbonization Potential of Electrifying 50% of U.S. Light Duty Vehicle Sales by 2030” *Nature Communications*, **2023**
<https://doi.org/10.1038/s41467-023-42893-0>

Maxwell Woody, Michael Craig, Parth Vaishnav, Gregory Keoleian “Life Cycle Greenhouse Gas Emissions of the USPS Next Generation Delivery Vehicle Fleet” *Environmental Science & Technology*, **2022** <https://doi/full/10.1021/acs.est.2c02520>

Maxwell Woody, Parth Vaishnav, Gregory Keoleian, Robert De Kleine, Hyung Chul Kim, James Anderson, Tim Wallington “The Role of Pickup Truck Electrification in the Decarbonization of Light-Duty Vehicles” *Environmental Research Letters*, **2022**
<https://doi.org/10.1088/1748-9326/ac5142>

Maxwell Woody, Michael Craig, Parth Vaishnav, Geoffrey Lewis, Gregory Keoleian “Optimizing Future Cost and Emissions of Electric Delivery Vehicles” *Journal of Industrial Ecology*, **2022** <https://doi.org/10.1111/jiec.13263>

Maxwell Woody, Parth Vaishnav, Michael Craig, Geoffrey Lewis, Gregory Keoleian, “Charging Strategies to Minimize GHG Emissions of Electrified Delivery Vehicles” *Environmental Science & Technology*, **2021** <https://doi.org/10.1021/acs.est.1c03483>

Maxwell Woody, Marayam Arbabzadeh, Geoffrey Lewis, Gregory Keoleian, Anna Stefanoupolo, “Strategies to limit degradation and maximize Li-ion battery service lifetime – critical review and guidance for stakeholders” *Journal of Energy Storage*, **2020**
<https://doi.org/10.1016/j.est.2020.101231>

John Robertson, Daniel Blomdahl, Kazi Islam, Timothy Ismael, **Maxwell Woody**, Jacqueline Failla, Michael Johnson, Xiaodong Zhang, Matthew Escarra, “Rapid-throughput solution-based production of wafer-scale 2D MoS₂”. *Applied Physics Letters*, **2019**
<https://aip.scitation.org/doi/10.1063/1.5093039>

John Robertson, Benjamin Lewson, Otto Lyon, Ethan Gasta, Matthew Gorban, **Maxwell Woody**, Afsheen Sajjadi. “The Sunflower: A modular and hexagonally symmetric SEP cargo transport spacecraft” *Journal of Spacecraft and Rockets*, **2019**
<http://arc.aiaa.org/doi/abs/10.2514/1.A34322>

Conference
Proceedings

Matthew D. Escarra, Daniel Codd, Fletcher Miller, James Ermer, Vince Romanin, Brian C. Riggs, John Robertson, Yaping Ji, Kazi Islam, Claire Davis, **Maxwell Woody**, Christopher M. Spitler, Jacob K. Platz, Naman Gupta, Jacob Tubbs, Dimitri Krut. “A Hybrid CPV/T System Featuring Transmissive, Spectrum-Splitting Concentrator Photovoltaics” *Presented at IEEE Photovoltaic Specialists Conference*, **2018**

Posters & Talks

Maxwell Woody, Shawn Adderly, Rushabh Borha, Gregory Keoleian, “Electric and Gasoline Vehicle Total Cost of Ownership: Review and Analysis Across Locations and Users” Poster Presented at *Transportation Research Board Annual Meeting*, **2024**

Maxwell Woody, Michael Craig, Parth Vaishnav, Gregory Keoleian “Life Cycle Greenhouse Gas Emissions of the USPS Next Generation Delivery Vehicle Fleet” Poster Presented at *Transportation Research Board Annual Meeting*, **2023**

Maxwell Woody, Parth Vaishnav, Gregory Keoleian, Robert De Kleine, Hyung Chul Kim, James Anderson, Tim Wallington “Life Cycle Assessment Across Vehicle Classes and Powertrains” **Invited Talk** at *Coordinating Research Council Sustainable Mobility Workshop*, **2022**

Maxwell Woody, Ethan Gasta, Olivia Formoso, Daniel Celluci, Greenfield Trinh, and Kenneth Cheung. “Evaluation of an Automated Voxel Extruding Robot (AVERY)” *Poster presented at NASA ARC Summer Research Colloquium*, **2017**

Maxwell Woody, John Robertson, Kazi Islam, Xue Liu, Jiang Wei, and Matthew Escarra. “Internal Quantum Efficiency Measurements of wafer-scale CVD grown MoS₂ Phototransistors” Talk given at *American Physical Society March Meeting*, **2017**.
<http://meetings.aps.org/link/BAPS.2017.MAR.H32.5>

Patents

Matthew Escarra, Luke Artzt, Yaping Ji, Daniel Codd, Matthew Barrios, Kazi Islam, David Bar-Or, Jacqueline Failla, Claire Davis, and **Maxwell Woody**, “Hybrid Receiver for Concentrated Photovoltaic-Thermal Power Systems, and Associated Methods”

Matthew Escarra, Kazi Islam, Yaping Ji, Daniel Codd, David Bar-Or, Jacqueline Failla, Claire Davis, and **Maxwell Woody**, “Spectrum-Splitting Concentrator Photovoltaic Module with Direct Fluid Cooling, and Associated Methods”

Reviewing Activity

Energy Policy, Energy for Sustainable Development, Environment Systems and Decisions, Environmental Research Communications, iScience, Journal of Cleaner Production, Journal of Environmental Management, Nature Communications, Science of the Total Environment, Transportation, Transportation Research Part D, Transportation Research Record