Rebecca J. Alcock

PhD candidate, Department of Industrial and Systems Engineering, UW–Madison
+1 (563) 380-9527 • ralcock@wisc.edu • linkedin.com/in/rebeccaalcock

Education

ETH Zürich (Zürich, Switzerland)

Fulbright US Student Program 11/2024 - 08/2025
NCCR Automation Fellow 02/2024 - 07/2024

- Working on my dissertation in collaboration with Professors Gabriela Hug of the Power Systems Laboratory and Elizabeth Tilley of Global Health Engineering and ETH4D

University of Wisconsin–Madison (Madison, Wisconsin, USA)

Ph.D. in Industrial and Systems Engineering 09/2020 - exp. 05/2025

- Focus areas: operations research, climate-health systems, global health
- Committee members: Justin Boutilier, Jeffrey Linderoth, Oguzhan Alagoz, Giri Venkataramanan, Lennon Rodgers
- Ph.D. minor: planetary health
- Ph.D. certificate: global health

M.S. in Industrial and Systems Engineering 09/2020 - 5/2022
M.S. in Biomedical Engineering 09/2018 - 5/2020

- Focus areas: product design, human-centered design, global health
- M.S. certificate: entrepreneurship

B.S. in Biomedical Engineering 09/2014 - 5/2018

- Focus area: biomechanics, medical device design
- B.S. certificate: international engineering (focus area: Latin America)

Research Experience

Analytics for Human Development Lab (Professor Justin J. Boutilier) 03/2020 - Current
Department of Industrial and Systems Engineering

- Methods: data analytics, optimization, simulation, machine learning
- Topics: global health, rural health facility electrification, disaster preparedness and response
- Dissertation: Community-engaged Operations Research for the design of resilient health and climate-health systems
  - Chapter 1: Toolkit development for optimal design and evaluation of solar, storage, and micro e-mobility energy systems for last-mile health facilities
  - Chapter 2: Last-mile micro e-mobility network design for smallholder farmers in Kenya
  - Chapter 3: Algorithmic matchmaking support for the PPE supply chain during COVID-19
  - Chapter 4: Classic facility location of solar-powered phone charging stations for people facing housing instability in Wisconsin

Morgridge Fab Lab (Professor Kevin Eliceiri) 01/2019 - 08/2020
Department of Biomedical Engineering, Morgridge Institute for Research

Badger Athletic Performance Lab (Professor Bryan Heiderscheit) 09/2015 - 05/2019
Department of Orthopedics & Rehabilitation, UW School of Medicine

Skills

Computer Languages: Python, R, Julia, MATLAB
Human Languages: English (native), Spanish (proficient), German (beginner)
Fieldwork/study experience: Colombia, Ecuador, Guatemala, Kenya, Malawi

Publications

Alcock, R., Boutilier, J. J., & Hug, G. (In progress). MtM Toolkit: Load estimation, optimal sizing, and simulation of micromobility-to-microgrid systems for last-mile health clinic electrification.

Alcock, R. & Tilley, E. (In progress). Micromobility in healthcare around the globe and in Malawi: enablers for and challenges to adoption and scaling. *Malawi Medical Journal.*

Alcock, R., Docter, R., & Lakeman, E. (2023). Engineers Without Borders UW–Madison: Student-led international infrastructure development. In E. Ahn (Ed.), *Wisconsin in the World: Internationalization at the University of Wisconsin–Madison* (pp. 229 – 242). Information Age Publishing.

Ahn, E. S., **Alcock, R.**, Block, P., & Tupesis, J. P. (2023). International COVID-19 Response: A University-Intergovernmental Organization Partnership. In E. Ahn (Ed.), *Wisconsin in the World: Internationalization at the University of Wisconsin–Madison* (pp. 333 – 348). Information Age Publishing.

Alcock, R. & Puccinelli, J. P. (2023). Benefits of a Low-Stakes Show and Tell Session in Biomedical Engineering Design. In *2023 ASEE Annual Conference & Exposition*.

Alcock, R., Boutilier, J. J., & Siddiq, A. (2022). Shield-net: Matching supply with demand for face shields during the COVID-19 pandemic. *INFORMS Journal on Applied Analytics*, *52*(6), 485-507.

- Finalist for INFORMS Doing Good with Good OR Student Paper Competition (2021)

Wille, C., Hurley, S. A., Adluru, N., **Alcock, R.**, Heiderscheit, B. C., & Kijowski, R. (2019). Quantitative muscle microstructural changes detected with diffusion tensor imaging following acute hamstring strain injuries. In *Proceedings of the Radiological Society of North America Annual Meeting*.

Blogs

Alcock, R. (2020, November 20). COVID-19 Response: Reflections from the (Virtual) Trenches. *Sustaining Capabilities Blog.*

Alcock, R. & Eliceiri, K. (2020, November 12). Engineering through and after COVID-19: A Global Perspective. *Morgridge Institute for Research.*

Fun Side Quests

Collaborator, Research to explore extreme heat solutions for schools in Puerto Rico Current
UW–Madison

- Investigating dynamic scheduling policies for schools without air conditioning to minimize education loss and adverse health effects
- Collecting in-classroom temperature data in San Juan for validation

Participant, Humanitarian Operations and Supply Chain Management Seminar Spring 2024
ETH Zürich

- Unravelling the complexities of supply chain management in crisis situations under the leadership of Dr. Stephan Wagner, Dr. Bublu Thakur-Weigold, and Dr. Andrew Parris
- Evaluating and selecting a supply chain strategy for Ebola outbreak containment in DRC

Co-Organizer, One Health Makeathon Fall 2023
UW–Madison

- Planned and executed a 3-day makeathon with the Global Health Institute with the goal of engineering solutions to mitigate the health impacts of extreme heat on particularly vulnerable populations (e.g., people facing housing instability, the elderly, livestock)

Participant, Global Health Field School on One Health and Indigenous Wellbeing Summer 2022
UW–Madison study abroad in Ecuador

- Examined the complex relationships between ecological, socioeconomic, and political drivers of health in several communities–an Afro-Ecuadorian community in the Chota Valley, Indigenous Kichwa families in the Amazon, and urban inhabitants with Indigenous heritage in Otavalo
- Studied the connection between human, animal, and environmental health in these areas with particular emphasis placed on the impacts of climate change and the role Western countries and capitalism play in their dependence on oil companies

Co-Organizer, Solympics Summer Solar Makeathon Summer 2021
UW–Madison

- Planned and executed a 3-day makeathon in partnership with the Wisconsin Office of Energy Innovation and the Great Lakes Community Conversation Corps
- Created a solar-powered device-charging kiosk for individuals without housing

Professional Experience

Health Economics and Outcomes Research Intern 07/2024 - 11/2024
Exact Sciences

- Evaluating screening policies for colorectal cancer using novel microsimulation models
- Quantifying the environmental impact of non-invasive screening vs endoscopy

International COVID-19 Engagement Coordinator 07/2020 - 01/2021
United Nations Development Programme/UW–Madison Partnership

- Organized livelihood efforts for the UNDP Crisis Bureau in 10+ countries
- Developed engagement frameworks and response strategies for effective pandemic response

Graduate Assistant for Electronics and Instruction 09/2018 - 08/2020
Grainger Engineering Design Innovation Laboratory, UW–Madison

- Led open-source PPE dissemination efforts in response to COVID-19
- Created a rapid prototyping course for the core curriculum of a new master's program

BioMech Lab Intern 06/2019 - 04/2020
Engineering Division, Johnson Health Tech

- Designed and performed motion capture, VO2, EMG, and accelerometry studies
- Directed biomechanics and ergonomics design decisions for new product development

Field Fellow 05/2018 - 08/2018

Engineers Without Borders Guatemala

- Surveyed future project sites for suitability and provided specifications for engineering design
- Evaluated local capacity for infrastructure project management and maintenance

Analytical Instrumentation Intern 05/2017 - 12/2017

Research and Advanced Development, Thermo Fisher Scientific

- Used regression analysis to replace an arduous manual calibration with a software process
- Developed software and hardware components to improve microscope performance

Fellowships

Fulbright US Student Program/Swiss Government Excellence Scholarship 11/2024 - 08/2025

IIE and FCS/ESKAS (Zurich, Switzerland)

NCCR Automation Research Fellowship 02/2024 - 07/2024

NCCR Automation (Zurich, Switzerland)

- Awarded one of sixteen paid fellowships to conduct research as part of the NCCR Automation network of academic and industry professionals on energy systems and mobility of the future

STEM Public Service Fellows (community-engaged teaching track) 01/2022 - 01/2023

Wisconsin Institute for Science Education and Community Engagement, UW–Madison

- Selected out of UW–Madison STEM graduate student applicants
- Acquired foundational skills for ethical and sustainable community engagement
- Developed strategies for culturally responsive, inclusive, asset-based collaboration with partners

Morgridge Fellows for Community-Engaged Scholarship 09/2021 - 05/2022

Morgridge Center for Public Service, UW–Madison

- Selected out of UW–Madison faculty, staff, and graduate student applicants from all disciplines
- Developed a robust understanding and conducted a critical analysis of community-engaged teaching, research, and service

Clinton Global Initiative University 03/2021 - 10/2021

Clinton Foundation

- Selected out of a competitive pool of thousands of international applicants
- Evaluated the feasibility and desirability of decision-support tech for food assistance programs

Planetary Health Graduate Scholars 09/2020 - 05/2021

UW–Madison Global Health Institute

- Selected out of UW–Madison graduate student applicants
- Used the funds to construct a solar microgrid prototype for my research at a community garden

Research Internships in Science and Engineering (canceled due to Covid-19) 05/2020 - 08/2020

Indo-US Science and Technology Forum

- Selected out of STEM graduate student applicants from around the United States
- Planned to carry out my master's thesis research at CMC Vellore in Vellore, Tamil Nadu, India

Teaching Experience

ME 549 Product Design, UW–Madison (3 cr.) Fall 2023

Teaching Assistant

- Guided 56 students through a project-based design course and accompanying homeworks
- Offered feedback on students' implementation of various design techniques, including ethnography, prototyping, and concept testing, for example
- Led the high-fidelity prototyping and inclusive design/design bias lectures

IntegSci 140 Exploring Service in STEM, UW–Madison (1 cr.) Fall 2022

Lead Instructor

- Revamped the course content and structure and incorporated ungrading practices
- Received overwhelmingly positive course evaluations from students

ISyE 210 Introduction to Industrial Statistics, UW–Madison (3 cr.) Fall 2021, Spring 2022

Teaching Assistant

- Helped create and administer an introductory statistics course for engineers
- Developed topic review sheets, practice questions, and homework questions

InterEgr 170 Introduction to Engineering Design, UW–Madison (3 cr.) Fall 2019

Co-Lead Lab Instructor

- Created a First-Year Interest Group for the course under the theme of global innovation
- Taught a weekly 3-hour lab for this design practicum and coached students in design thinking
- Nominated by students for and received the Honored Instructor designation

InterEgr 601 Tools for Prototyping and Manufacturing, UW–Madison (1, 2, or 3 cr.) Summer 2019

Lead Instructor & Course Designer

- Developed an asynchronous, lab-based, and modular curriculum on prototyping tools
- Served as the lead instructor for the first offering of the course

DS 501 Design Thinking for Underserved Communities, UW–Madison (3 cr.) Summer 2019

Study Abroad Teaching Assistant

- Supported a 3-week study abroad program in Kenya on women's empowerment through design

Leadership & Service

Institute for Operations Research and the Management Sciences (INFORMS)

- Subdivisions Council 01/2024 - Current
- Chapters & Forums Committee 01/2024 - Current
- Health Applications Society, Student Liaison 11/2022 - Current
- Women in OR/MS, Student Liaison 10/2021 - Current
- UW–Madison Student Chapter, Secretary 09/2022 - 05/2023

Engineers Without Borders USA, Madison Area Professional Chapter 09/2018 - Current

Mentor

- Provide the UW–Madison student chapter of Engineers Without Borders with fundraising, project management, and solar design guidance

Abdelkader Education Project 09/2022 - Current

Alumni Advisory Board Member

- Support the annual essay contest and strategic planning efforts for the organization

Global Health Innovation Club (UW–Madison) 01/2019 - 05/2022

Founder and President

- Created a student organization to cultivate a community around global health engineering
- Organized regular seminars and events to feature those working in this field and opportunities
- Hosted a $1,000 grant competition for impact-oriented engineering projects

COVID-19 Response Team, Engineers Without Borders USA 03/2020 - 08/2021

Engineer

- Researched, validated, and recommended PPE options for use in resource-limited settings

UW–Madison Women in Engineering Conference 11/2019 - 03/2020

Organizer

- Helped organize the first ever Women in Engineering Conference at the university

Biomedical Student Advisory Committee (UW–Madison) 09/2018 - 05/2019

Chair

- Directed initiatives to improve the student experience in the department
- Created the Biomedical Engineering Showcase, an event to share our field with the community

Engineers Without Borders USA, UW–Madison Guatemala Chapter 01/2017 - 05/2018

Project Manager

- Led two infrastructure design projects with communities in rural Guatemala

Scholarships & Awards

Reid Bryson Scholarship Runner-Up 2023

Nelson Institute Center for Climatic Research

- Awarded $1,000 for my research poster on health clinic electrification

5 Under 25 Rising Tech Leaders to Watch 2022

Wisconsin Inno (Milwaukee Business Journal)

- Honored for my impactful contributions to the Wisconsin innovation community

Graduate Student Research Award and Scholarship 2021

UW–Madison Global Health Institute

- Provided researching funding for my work on health clinic electrification

COVID-19 Student Action Fund Award and Scholarship 2020

Clinton Foundation

- Awarded $1,500 to evaluate the business viability of a COVID-19 project proposal

Exceptional Leader Award Honorable Mention 2020
Engineers Without Borders USA
- Honored for my consistent commitment to and leadership in the organization

Outstanding Entrepreneurship Student Co-Winner 2019
Weinert Applied Ventures in Entrepreneurship, UW–Madison
- Voted by classmates as the student who provided the most valuable feedback to others

Runner Up 2019
Transcend Innovation Competition, UW–Madison
- Awarded $10,000 for an ergonomic syringe after a two-day pitch event for early-stage ventures

4W Engagement Award and Scholarship 2019
Women & Wellbeing in Wisconsin & the World Initiative, UW–Madison
- Provided seed funding to create a First-Year Interest Group for engineering students under the theme of global innovation with particular emphasis retaining young women engineers

Student Service Award 2019
Department of Biomedical Engineering, UW–Madison
- Honored for exceeding expectations in developing programming to improve the department

Dream Boost Scholarship 2018
American Family Insurance BIG Dream Gathering
- Received $1,500 to pursue the field fellowship in Guatemala with Engineers Without Borders

Gary Losse Student Investigator Award for Sports Medicine Research 2016
Badger Athletic Performance, UW–Madison
- Honored for my research accomplishments on ACL injury recovery

Runner Up 2016
Abdelkader Global Leadership Prize, Abdelkader Education Project
- Awarded a scholarship for my essay analyzing the life and legacy of Emir Abdelkader

Full Engineering Scholarship 2014 - 2018
Ross Wagner Foundation
- Awarded to one high school senior annually who commits to study engineering at one of the top 30 engineering schools in the United States

Presentations & Talks (*indicates invited)

*"Last-mile health facility electrification with micromobility-to-microgrid networks" 10/2024
INFORMS Annual Meeting (Seattle, WA, USA)

*"Panel Discussion on Energy Challenges and Creative Solutions for Global Health" 12/2023
UW–Madison Global Health Institute (Madison, WI, USA)

*"Panel Discussion on Design and Algorithmic-Biases and Fairness Solutions" 10/2023
INFORMS Annual Meeting (Phoenix, AZ, USA)

*"Novel Renewable Energy Network Optimization for Global Health Clinics" 10/2023
INFORMS Annual Meeting (Phoenix, AZ, USA)

*"COVID-19 Response in Wisconsin and Abroad: Reflections from the (Virtual) Trenches" 03/2023
National Society of Professional Engineers-Wisconsin (virtual)

*"Health Clinic Electrification via a Novel Vehicle-to-Microgrid Network" 10/2022
INFORMS Annual Meeting (Indianapolis, IN, USA)

*"Health Clinic Electrification in LMICs via Vehicle-to-Microgrid Networks" 06/2022
CORS-INFORMS International Conference (Vancouver, BC, Canada)

*"Shield-Net: Matching Supply with Demand for Face Shields During the COVID-19 Pandemic" 06/2022
CORS-INFORMS International Conference (Vancouver, BC, Canada)

*"Shield-Net: Matching Supply with Demand for Face Shields During the COVID-19 Pandemic" 10/2021
INFORMS Annual Meeting, Doing Good with Good OR Competition Session (virtual)

*"Health Clinic Electrification in LMICs via Vehicle-to-Microgrid Networks" 10/2021
INFORMS Annual Meeting (virtual)

*"Health Clinic Electrification: Micro-Solutions for Major Impact" 10/2021
UW–Madison Global Health Institute Board of Visitors Annual Meeting (virtual)

"Global Partnerships for Community COVID-19 Response in Guatemala" 10/2021
Engineers Without Borders-USA Annual Conference (virtual)

*"Global Partnerships for Local Solutions: Helping Yemen's Young Engineers Fight COVID-19" 06/2021
United Nations Development Programme panel (virtual)

*"Shield-Net: Matching Supply with Demand for Face Shields During the COVID-19 Pandemic" 06/2021
INFORMS Healthcare Bi-Annual Meeting (virtual)

*"Engineers Without Borders COVID-19 Response" 11/2020
CV 3900 Humanitarian Engineering guest lecture, Milwaukee School of Engineering (virtual)

*"Tech-enabled health innovations for COVID-19 response and recovery in low-income markets" 06/2020
United Nations Global Compact Leaders Summit breakout session panel (virtual)

*"COVID-19 Response with Engineers Without Borders" 06/2020
VentCon, Public Invention (virtual)

*"Panel: Building a Community of Makers" (canceled due to COVID-19) 04/2020
Build It, Badgers!, Wisconsin Alumni Research Foundation (Madison, WI, USA)

"Becoming an Engineer Without Borders" 03/2020
Women in Engineering Conference, UW–Madison (Madison, WI, USA)

"Engineering Ethics" 10/2017
Engineers Without Borders USA National Conference (Milwaukee, WI, USA)

"Engineering for Good in Guatemala" 03/2017
Wisconsin Spring Technical Conference, American Society of Civil Engineers (Madison, WI, USA)

Media

For recent media, please see my personal site (sites.google.com/wisc.edu/rebeccaalcock).