Rahaf Hasan, PhD

LCA & Sustainability Specialist | Carbon Accounting | Decarbonization & Climate Strategy
Pittsburgh, PA · Relocation preferred | rahaf.hasan.phd@gmail.com | (856) 803-4304 | linkedin.com/in/rahaf-hasan

Professional Summary

PhD-level Life Cycle Assessment (LCA) and sustainability specialist with 5+ years of experience in carbon accounting, decarbonization, and environmental systems modeling across buildings, infrastructure, materials, and products. Quantifies full life cycle environmental impacts, identifies emission hotspots, and develops high-impact strategies supporting net-zero, energy efficiency, and circular economy goals. Applies LCA across diverse sectors and disciplines, integrating data from multidisciplinary teams and large-scale environmental datasets to support evidence-based decision-making. Experienced communicator of technical findings to both technical and non-technical audiences. Led NSF-funded research and co-developed a statewide LCA tool for PennDOT, delivering decision-ready insights for government and industry stakeholders. Recognized as an Aspen Future Climate Leader.

Professional Experience

Life Cycle Assessment (LCA) Specialist & Environmental Systems Modeler

Mascaro Center for Sustainable Innovation (MCSI), University of Pittsburgh 2022–Present

LCA & Decarbonization

- Conducted cradle-to-grave LCA across buildings, infrastructure, materials, and products covering production, construction, operation, maintenance, and end-of-life stages.
- Led dynamic building stock LCA for commercial buildings, quantifying long-term GHG trajectories and identifying highest impact decarbonization pathways under evolving grid and climate conditions.
- Evaluated material selection, energy efficiency, heat pump electrification, renewable energy integration, nature-based strategies, and circular economy interventions to optimize emissions reductions across the full life cycle.

Data Analytics & Environmental Modeling

- Built and analyzed large-scale environmental datasets using Python and Excel, integrating material inventories, energy consumption, emissions factors, and climate scenarios.
- Applied ISO 14040/44, EN 15978, TRACI, EC3, EIO-LCA, MFA, MSA, EnergyPlus, and EPD data to quantify environmental impacts and evaluate decarbonization strategies.

Multidisciplinary Decision Support & Sustainability Tools

- Conducted LCA for a statewide pavement assessment for PennDOT, collaborating with multidisciplinary teams to gather project-specific data and deliver sustainability findings that informed infrastructure planning decisions.
- Conducted LCA within a large multi-university research team, translating multidisciplinary inputs into environmental impact results that contributed to climate resilience investment decisions.

Communication & Training

- Presented technical analyses and recommendations to multidisciplinary teams, government agencies, and external stakeholders, translating complex results into actionable insights.
- Instructed 77-student graduate and undergraduate course covering LCA, GHG accounting, carbon accounting, energy systems, circular economy, climate change mitigation, and green building design, developing and delivering course materials, assignments, and hands-on projects.
- Mentored graduate and undergraduate researchers in LCA, environmental modeling, data analysis, and technical communication.

Materials & Data Analyst

Center for Research and Education in Advanced Transportation Engineering Systems (CREATEs) 2019–2021

- Conducted data analysis and performance evaluation on DOD-funded research on innovative materials, including electrically conductive concrete, delivering findings through peer-reviewed publications, technical reports, and conference presentations to academic and government stakeholders.

Education

Ph.D., Civil & Environmental Engineering — Expected 2026
Major: Sustainable Engineering |Minor: Data Science & Analytics
University of Pittsburgh

M.S., Civil & Environmental Engineering — 2024
Concentration: Sustainable Engineering
University of Pittsburgh| **GPA: 3.9/4.0**

M.S., Civil & Environmental Engineering — 2021
Concentration: Innovative Infrastructure Materials
Rowan University| **GPA: 4.0/4.0**

B.Sc., Civil Engineering — 2019
University of Jordan| **Top 5% of class**

Core Competencies

LCA & Standards:	openLCA | SimaPro | ecoinvent | ISO 14040/44 | EN 15978 | TRACI | EIO-LCA
Carbon & GHG:	Embodied carbon | GHG emissions quantification | Scope 1/2/3 accounting | EPD interpretation | carbon footprinting | Social Cost of Carbon | carbon sequestration & nature-based carbon benefits
LCA Methods:	Attributional LCA | hotspot analysis | sensitivity & uncertainty analysis | end-of-life modeling | recycling credits | avoided burden | waste allocation | circular economy strategies
Data & Analytics:	Python| R | large-scale environmental dataset processing| statistical analysis |Advanced Excel
Energy & Climate:	Grid decarbonization| renewable energy systems| heat pump electrification | climate change Scenarios (IPCC SSPs)
Materials & Systems:	Material Flow Analysis (MFA) |Material Stock Analysis (MSA) |stock-level modeling |infrastructure systems analysis | sustainable & innovative materials
Buildings:	Building energy simulation | EnergyPlus | whole-building LCA |LEED familiarity |green building design |EC3
Communication:	Technical reports | stakeholder presentations | proposals | peer-reviewed publications | training material development

Selected Publications

- *Dynamic LCA of Decarbonization Strategies for Urban Commercial Buildings: Evaluating Material, Energy, Nature-Based, and End-of-Life Interventions.* ***[Dissertation]***
- *A Dynamic Stock-Level LCA Framework Integrating Material, Energy, Climate Change Scenarios, and Grid Decarbonization in Urban Commercial Buildings. Building and Environment.* ***[Accepted]***
- *A Comparative Life-Cycle Assessment of Structural, Non-Structural and Nature-Based Flood Resilience Measures. Environmental Research: Infrastructure and Sustainability.* ***[Under Review]***
- *Optimal life-cycle adaptation of coastal infrastructure under climate change.* ***Nature Communications.*** *[Co-author]*
- *Life cycle assessment of green-grey coastal flood protection infrastructure. Environmental Research: Infrastructure and Sustainability.*
- *Laboratory evaluation of electrically conductive asphalt mixtures for snow and ice removal. Transportation Research Record*

Awards, Leadership & Service

- Scholarship Recipient & Member, Aspen Future Climate Leaders Network, Aspen Institute — 2023–Present
- President, Graduate Student Association, CEE Dept., University of Pittsburgh — 2022–2024
- Board Member, Women's Transportation Seminar, Philadelphia Student Chapter — 2020–2022
- Board Member, Helen Elbich Memorial Scholarship, Women's Transportation Seminar — 2020
- Graduate Academic Scholarship, Rowan University — 2019-2021
- IAESTE International Research Exchange, Universite Libre de Bruxelles, Brussels — 2018