**Marissa K. Webber**

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| Campus Address:  5000 Forbes Avenue  Pittsburgh, PA  15213  USA | 609-902-1773 / 876-856-7070  [mwebber2@andrew.cmu.edu](mailto:mwebber2@andrew.cmu.edu)  [webber.marissa@gmail.com](mailto:webber.marissa@gmail.com)  <https://www.linkedin.com/in/marissa-webber/>  <https://orcid.org/0000-0002-8035-732X> | Permanent Address:  PO Box 84  UWI Mona Post Office  Kingston 6  Jamaica, W. I. |

**RESEARCH OBJECTIVE/INTERESTS**

My research focuses on climate adaptation strategies for stormwater infrastructure in the urban environment, specifically how stakeholders are using existing climate data for planning and adaptation, and the use of green infrastructure and nature-based solutions for effective adaptation in the face of deep uncertainty associated with climate change.

**EDUCATION**

**Carnegie Mellon University,** Pittsburgh, PA August 2024

Doctor of Philosophy in Civil and Environmental Engineering (CEE)

Proposed Dissertation title: Exploring Effectiveness and Centering Equity for Green Infrastructure and Nature-Based Solutions (NBS) in Climate Change Adaptation and Flood Management for Urban Infrastructure

Dissertation Advisors: Constantine Samaras, David Rounce

**Carnegie Mellon University,** Pittsburgh, PA GPA: 4.00/4.00 December 2019

Master of Science in Civil and Environmental Engineering (CEE)

**Princeton University,** Princeton, NJ GPA: 3.63/4.00 June 2018

Bachelor of Science in Engineering in Civil and Environmental Engineering (CEE)

Minor in Sustainable Energy, Elected to Membership of Society of Sigma Xi

**PUBLICATIONS AND PRESENTATIONS**

**Peer Reviewed Publications**

* **Webber, M.K.**, Mei, L., Samaras, C. (in prep.) “Bridging the Gap: Leveraging Riverine Nature-Based Solutions (NBS) for Climate Resilient Transportation Infrastructure”
* López-Cantú, T., **Webber, M.K.**, Samaras, C. (2022). “Incorporating uncertainty from downscaled rainfall projections into climate resilience planning in US cities” *Environmental Research: Infrastructure and Sustainability, 2(4),* <https://iopscience.iop.org/article/10.1088/2634-4505/ac8a6c>
* **Webber, M.K.**, & Samaras, C. (2022). A Review of Decision Making Under Deep Uncertainty Applications Using Green Infrastructure for Flood Management. *Earth’s Future*, *10*(7), e2021EF002322. <https://doi.org/10.1029/2021EF002322>
* Miro, M.E., DeGaetano, A.T., López-Cantú, T., Samaras, C., **Webber, M.**, Grocholski, K.R. (2021) “Developing Future Projected Intensity-Duration-Frequency (IDF) Curves: A Technical Report on Data, Methods and IDF Curves for the Chesapeake Bay Watershed and Virginia” Santa Monica, CA: RAND Corporation, 2021. <https://www.rand.org/pubs/tools/TLA1365-1.html>

**Peer Reviewed Open Data**

* **Webber, Marissa**;Mei, Lillian; Samaras, Constantine (2023) “Database categorizing 91 projects using nature-based solutions (NBS) in riverine environments across the US” Carnegie Mellon University. Dataset. <https://doi.org/10.1184/R1/23393702.v2>
* Lopez-Cantu, Tania; Samaras, Constantine; **Webber, Marissa** (2022) “Future 24-hour Depth-Duration-Frequency curves for selected U.S. cities.” Carnegie Mellon University. Dataset. <https://doi.org/10.1184/R1/13330805.v1>
* **Webber, Marissa**;Samaras, Constantine (2021) “Data Collected for A Review of Decision Making Under Deep Uncertainty Applications using Green Infrastructure for Flood Management.” Carnegie Mellon University. Dataset. <https://doi.org/10.1184/R1/14981121.v2>
* Lopez-Cantu, Tania; Samaras, Constantine; **Webber, Marissa** (2020) “Compilation of U.S. City Climate Adaptation Plans.” Carnegie Mellon University. Online resource. <https://doi.org/10.1184/R1/13125473.v2>

**Conference Posters and Presentations**

* **Webber, M.K.**, Ozis, F. (submitted). “Preparing the Next Generation of Engineers for Decision Making under Deep Uncertainty: Exploring the Pedagogical Role of the Decisions for the Decade Game” American Society for Engineering Education (ASEE) 2024 Annual Conference and Exposition
* **Webber, M.K.**, Rounce, D., Samaras, C. (2023) “Uncertainty and Decision Making for Community Scale Urban Stormwater Modeling” AGU Fall Meeting 2023, December 11-15. Poster Presentation H33T-2042
* **Webber, M.K.**, Rounce, D., Samaras, C. (2023) “Assessing Performance of an Aging Green Roof in Pittsburgh, PA” Environmental & Water Resources Institute (EWRI) Low Impact Development (LID) Conference 2023, August 6-9. Oral Presentation in Session 4.1
* **Webber, M.K.**, Rounce, D., Samaras, C. (2022) “Synthesizing Guidelines and Lessons Learned for Implementation of Riverine Nature-Based Solutions (NBS) near to Transportation Infrastructure” AGU Fall Meeting 2022, December 12-16. Oral Presentation NH25A-01
* **Webber, M.K.**, Tebyanian, N., Rounce, D., Fischbach, J., Samaras, C. (2022) “Modeling Urban Flood Impacts and Potential Solutions at Community Scales in Pittsburgh, PA” AGU Fall Meeting 2022, December 12-16. Oral Presentation GH25A-08
* **Webber, M.K.**, Mei, L., Samaras, C. (2022) “Riverine Nature Based Solutions (NBS) for Climate Resilient Highways and Transportation Corridors” Transportation Research Board (TRB) 2022 Annual Meeting, January 9-13. Poster Presentation TRBAM-22-02144
* **Webber, M.K.**, Mei, L., Samaras, C. (2021) “Riverine Nature Based Solutions for Climate Resilient Highways and Transportation Corridors” AGU Fall Meeting 2021, December 13-17. Poster Presentation EP25B-1316
* **Webber, M.K.**, Samaras, C. (2021) “A Review of Decision Making Under Deep Uncertainty Applications Using Green Infrastructure for Flood Management” AGU Fall Meeting 2021, December 13-15. Oral Presentation GC12B-02
* López-Cantú, T., **Webber, M.**, Samaras, C. (2020) “The impact of climate information choices on city-scale resilience planning in the U.S.” AGU Fall Meeting 2020, December 1-17. Oral Presentation H149-07

**Other Publications and Presentations**

* **Webber, M.**, Samaras, C. (2021). “Cost-Effective Method to Estimate Green Infrastructure Performance.” Carnegie Mellon University Civil and Environmental Engineering Research Showcase; May 5, 2021.
* **Webber, M.**, Samaras, C. (2019). “Hamerschlag Hall Green Roof likely to become slightly less effective at reducing stormwater runoff over time.” Carnegie Mellon University Civil and Environmental Engineering Summer Research Program Poster Session; July 26, 2019.
* **Webber, M.** (2018) “Seismic Chimneys: Potential for Leakage from Snøhvit’s Carbon Dioxide (CO2) Storage Formation.” (Senior Thesis) Princeton University, Princeton. Advised by Celia, M. and Bandilla, K. <http://arks.princeton.edu/ark:/88435/dsp01h128nh43t>

**Webinar Presentations, Media Interviews, Blog Posts, and Research Mentions**

* Habic, E. and **Webber, M**. “Insights on Using Nature-Based Solutions for Highway Resilience” in AASHTO Resilience Webinar #1 “Reducing the effects of climate change on transportation infrastructure using natural and nature-based solutions”, May 9 2022.
* Guest speaker on the Future Cities Podcast “Decision Making Under Deep Uncertainty & Green Infrastructure” Episode 67, July 1 2022 <https://www.stitcher.com/show/future-cities/episode/decision-making-under-deep-uncertainty-green-infrastructure-204540793>

**EXPERIENCE**

**Research Experience**

**CEE Department, Carnegie Mellon University (CMU)** Jan. 2020 – present

*Research Assistant* Pittsburgh, PA

* Synthesized 122 publications in the flood management literature using decision making under deep uncertainty (DMDU) approaches and referring to green infrastructure as a potential solution. Published a literature review identifying useful trends and highlighting successful practices to facilitate equitable research in these fields.
* Specified and installed a solar-powered ultrasonic sensor to measure runoff from the Hamerschlag Hall green roof on Carnegie Mellon’s campus. Measurements will be used to validate a Python-based water balance model and therefore assess the performance of the green roof under the effects of age and climate change.
* Extended an existing 1D dual drainage model in PCSWMM to capture block flows and flooding for a Pittsburgh community with a history of disinvestment. This model is calibrated and validated using data collected by local utilities, and will be further extended to a 1D-2D dual drainage model to inform green infrastructure and other climate adaptation solutions being considered by local stakeholders.

**CEE Department, Carnegie Mellon University (CMU)** Jun. – Aug. 2019

*Summer Research Intern* Pittsburgh, PA

* Investigated performance of green roofs for reducing stormwater runoff in Pittsburgh. Used GIS to categorize types of green infrastructure in the City of Pittsburgh. Specified, designed and installed a solar-powered weather sensing and roof monitoring package on the Hamerschlag Hall green roof on Carnegie Mellon’s campus to measure atmospheric variables as well as soil moisture and temperature. Analyzed intensity, duration, and roof performance for initial precipitation event. Presented initial results as a poster.

**Princeton Environmental Institute (P.E.I.)** May – Aug. 2017

*Summer Intern with Energy Systems Analysis Group*  Princeton, NJ

* Developed a spreadsheet-based framework for analysis of low net-carbon emission biomass-based transportation in the USA, referencing relevant national energy and land-use databases.

**Teaching Experience**

**Carnegie Mellon University,** Pittsburgh, PA

* Guest lecturer Fall 2023 for 12726: Mathematical Modeling of Environmental Quality Systems (14-week graduate course)

**Carnegie Mellon University,** Pittsburgh, PA

* Teaching Assistant Spring 2023 for 12749: Climate Change Adaptation (7-week graduate course)
* Prepared and delivered two 80-minute lectures

**Carnegie Mellon University,** Pittsburgh, PA

* Teaching Assistant Fall 2022 for 12401: CEE Design (14-week undergraduate course)

**Carnegie Mellon University,** Pittsburgh, PA

* Teaching Assistant Spring 2022 for 12749: Climate Change Adaptation (7-week graduate course)
* Prepared and delivered an 80-minute lecture

**Carnegie Mellon University,** Pittsburgh, PA

* Teaching Assistant Fall 2020 for 12200: CEE Challenges: Design in a Changing World (14-week undergraduate course)
* Prepared and delivered a brief (15-minute) in-class presentation

**Carnegie Mellon University,** Pittsburgh, PA

* Teaching Assistant Fall 2019 for 12612/712/19712: Introduction to Sustainable Engineering (14-week graduate and undergraduate course)

**Work, Internship, and Volunteer Experience**

**Centre for Marine Sciences (C.M.S.), UWI Mona**  Jun. – Jul. 2018

*Volunteer Sampling Assistant* Kingston, Jamaica

* Conducted field measurements as part of a larger team sampling for an ongoing project aiming to quantify carbon sequestration contributions of mangrove forests in the Kingston Harbor.

**Climate Foundation**  Jun. – Aug. 2016

*Summer Intern with Princeton Internships in Civic Service (P.I.C.S.)*Woods Hole, MA

* Collaborated with an interdisciplinary team to brainstorm and design a viable marine permaculture system while writing funding proposals for implementation in the Pacific and Indian Oceans. Project was selected as one of ten [winners of the 2016 Blue Economy Challenge.](https://theblueeconomychallenge.com/announcing-the-winners-of-the-blue-economy-challenge/)

**Princeton Environmental Institute (P.E.I.)** Nov. 2015

*Volunteer Sampling Assistant* Princeton, NJ

* Collaborated with a sampling team to understand atmospheric methane emissions from abandoned plugged, abandoned unplugged, and operational oil and gas wells in West Virginia.

**Workshops and Symposia**

CMU CEE Rising Stars Workshop Sept. 2022 – Mar. 2023

*Participant*

* Participated in three sessions (one in-person, two remote) designed for doctoral students and postdoctoral scholars who are interested in pursuing academic teaching and research careers in Civil and Environmental Engineering. Received valuable personal feedback on mock application materials and networked with fellow students as well as faculty.

Coastal Engineering 101 – The Caribbean Context Nov. – Dec. 2020

*Participant*

* Attended four modules presented by Caribbean coastal engineers and experts in the field to understand risks faced in the Caribbean, common frameworks and models for design in the region, and how to evaluate and construct coastal protection and enhancements.

Get Ready, Get SETS, GI! Symposia Jul. – Nov. 2020

*Participant*

* Engaged with Early Career scholars, activists, community organizers, and practitioners to learn how to build urban resilience, while also exploring equitable and multifunctional green infrastructure implementation for the new climate normal. Networking opportunities and preparation of deliverables such as a white paper continued through 2021-22: <https://get-sets.com/>.

**GRANTS, AWARDS, HONOURS, AND PATENTS**

* Completed Future Faculty Program, Eberly Center for Teaching Excellence and Educational Innovation, Carnegie Mellon University
* Awarded ASCE Freeman Fellowship 2023-2024
  + Total Award: $5,000
* Awarded the 2021 Dwight David Eisenhower Transportation Fellowship Program (DDETFP) Fellowship for research project assignment “Riverine Nature-Based Solutions for Highway Resilience"
  + Grant number: 693JJ32145222, Total Award: $41,500
* Awarded Carnegie Mellon University Civil and Environmental Engineering Outstanding Teaching Assistant Award at the 2021 Graduate Student Commencement Awards
* One of 10 finalists for the Jamaica Rhodes Scholarship in 2017

**SKILLS**

**Application Software:** *Advanced:*PCSWMM, *Intermediate:* ArcGIS, QGIS, MATLAB; *Beginner:* SWMM, OpenRefine, SolidWorks, CorelDRAW

**Programming Languages:** *Intermediate:* RStudio, Python

**Technical Experience:** *Beginner:* Rabbit Laser Cutter, Dremel3D40 3D printer

**PROFESSIONAL MEMBERSHIPS**

**Association of Environmental Engineering and Science and Professors (AEESP)**

* Student/Postdoctoral Researcher Member

**American Society of Civil Engineers (ASCE):**

* Student Member
* Environmental and Water Resources Institute (EWRI) Member
* Member of the Pittsburgh Section

**American Society for Engineering Education (ASEE)**

* Member of the Environmental Engineering Division
* Member of the Engineering Ethics Division
* Member of the Engineering and Public Policy Division
* Member of the Equity, Culture & Social Justice in Education Division
* Member of the Student Division

**Sigma Xi**: Full Member 2023-2024

**Transportation Research Board (TRB)**

* Friend of AEP70: Standing Committee on Environmental Analysis and Ecology
* Friend of AKD50: Standing Committee on Hydrology, Hydraulics, and Stormwater
* Friend of AKG30: Standing Committee on Geo-Environmental and Climatic Impacts on Geomaterials
* Friend of AME10: Standing Committee on Equity in Transportation
* Friend of AME20: Standing Committee on Women and Gender in Transportation
* Friend of AME40: Standing Committee on Transportation in the Developing Countries
* Friend of AMR10: Standing Committee on Critical Transportation Infrastructure Protection
* Friend of AMR50: Standing Committee on Extreme Weather and Climate Change Adaptation

**PROFESSIONAL SERVICE OPPORTUNITIES AND EXTRACURRICULAR ACTIVITIES**

Student Volunteer for the inaugural Carnegie Mellon University Civil and Environmental Engineering DEI Hackathon in Fall 2022

Board Member for Environmental and Water Resources Institute (EWRI) Student Chapter at Carnegie Mellon University for AY21-22, AY22-23, and AY23-24

Graduate Student Representative to Carnegie Mellon University College of Engineering (CIT) College Council for AY20-21