Fengwei Hung, PhD

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PROFILE

I am a hydrologist and water resources engineer committed to addressing critical challenges at the intersection of water, climate adaptation, and urban resilience. My research combines process-based hydrologic modeling, remote sensing, agent-based modeling, and advanced data-driven approaches, including machine learning and artificial intelligence, to better understand and manage complex human–water systems. Focusing on urban and transboundary waters, I develop decision-support tools that promote sustainable water management, climate-resilient infrastructure design, and integrated food–energy–water solutions.

EDUCATION

Johns Hopkins University   September 2018
Doctor of Philosophy (Ph.D.)   Baltimore, MD
Department of Geography and Environmental Engineering
Advisor: Benjamin F. Hobbs, PhD
Dissertation: *Green infrastructure evaluation and planning for adaptive stormwater management*

Johns Hopkins University   May 2017
Master of Science in Engineering (M.S.E.)   Baltimore, MD
Department of Applied Mathematics and Statistics
Concentration: Operations Research and Optimization

Johns Hopkins University   December 2012
Master of Science in Engineering (M.S.E.)   Baltimore, MD
Department of Geography and Environmental Engineering
Concentration: Environmental Systems Analysis, Economics & Public Policy

National Sun Yat-Sen University   June 2004
Master of Science in Engineering (M.S.E.)   Kaohsiung, Taiwan
Department of Marine Environment and Engineering
Advisor: Yang-chi Chang, PhD
Thesis: *A system dynamic-based decision support system for sustainable coral reef management in Kenting coastal zone, Taiwan*

National Sun Yat-Sen University   June 2002
Bachelor of Science (B.S.)   Kaohsiung, Taiwan
Department of Marine Environment and Engineering

WORK EXPERIENCE

Arizona State University   September 2024 – Present
Global Futures Lab, School of Sustainability   Tempe, AZ
Research Scientist
- Develop an integrated modeling framework for assessing groundwater depletion in the Colorado River Basin
- Combine remote sensing and modeling approaches to generate immediate, actionable and evidence-based solutions to strengthen water security in Arizona
- Explore heat mitigation strategies with green infrastructure to enhance resilience in arid and semi-arid cities
- Lead the development of proposals for external funding programs on water resources management and climate adaptation

University of Notre Dame   June 2023 – August 2024

Environmental Change Initiative   Notre Dame, IN
Senior Research Scientist
- Created a resilient city assessment framework for ten global pilot cities
- Generated measurable and decision-relevant heat metrics for urban heat mitigation
- Evaluated cities' climate vulnerability to extreme weather and identified high-risk communities

University of Notre Dame   July 2022 – May 2023
Department of Civil and Environmental Engineering
Postdoctoral Research Associate
- Assessed agricultural water use impacts on transboundary aquifers and generated strategies for resolving water conflicts
- Investigated urbanization effects on flooding and heatwaves in megapolitan areas
- Designed and conducted original research in socio-hydrology

Lehigh University   October 2019 – May 2022
Department of Civil and Environmental Engineering   Bethlehem, PA
Postdoctoral Research Associate
- Developed an investment planning model to improve the resilience of Texas energy systems under diverse climate risks
- Formulated an agent-based modeling framework for multi-level decision analysis in food-energy-water systems and evaluated climate change impacts on regional water resources management in the Colorado River Basin
- Collaborated with colleagues to define and scope projects or proposals to understand compound fluvial and pluvial floods

Utah State University   October 2018 – September 2019
Utah Water Research Lab   Logan, UT
Postdoctoral Researcher
- Proposed a hydraulic-based environmental flow framework for unregulated river management and analyzed the tradeoffs between economic and ecosystem water uses
- Presented and disseminated findings of the application of the framework in the Redwood Creek watershed in Northern California at UCOWR and AGU conferences

Johns Hopkins University   September 2013 - September 2018
Department of Geography and Environmental Engineering   Baltimore, MD
Graduate Student Researcher

Taiwan Institute of Economic Research   September 2010 - July 2011
Project Manager   Taipei, Taiwan

Environmental Science & Technology Consultants Co.
February 2007 - June 2010 *Project Manager/Consultant*
Taipei, Taiwan

RESEARCH GRANTS AND GRANT WRITING EXPERIENCE
Project Title: Performance and effectiveness of urban green infrastructure: Maximizing benefits at the subwatershed scale through measurement, modeling, and community-based implementation
Sponsor: US Environmental Protection Agency
Principal Investigator: Dr. Benjamin Hobbs
Student investigator: **Fengwei Hung** *(conducted the literature review and assisted with drafting the proposal)*
Duration: August 2013 – July 2018
Amount: $200,000
Status: *Successfully Funded*

Project Title: Food-energy-water infrastructure (FEW-I) for sustainable city development
Sponsor: National Science Foundation
Student investigator: **Fengwei Hung** *(conducted the literature review and assisted with drafting the proposal)*
Principal Investigator: Dr. Claire Welty
Duration: August 2018 – July 2021
Amount: $2,500,000
Status: Not funded

Project Title: Understand the cross-scale urban/catchment responses to compound fluvial and pluvial floods in a changing environment
Sponsor: National Science Foundation
Principal Investigator: Dr. Ethan Y.C. Yang
Co-Investigator: **Fengwei Hung**
Duration: August 2020 – July 2022
Amount: $150,000
Status: Not funded

Project Title: Assessing urban stormwater management impacts on compound fluvial and pluvial flooding: Theoretical and modeling frameworks of green infrastructure implementation on flood control
Sponsor: Ministry of Science and Technology, Taiwan
Principal Investigator: **Fengwei Hung**
Duration: August 2022 – July 2026
Amount: $150,000
Status: Not funded

Project Title: Confounding effects of climate, urbanization and stream network in urban flooding in US
Sponsor: Department of Energy (Environmental System Science)
Principal Investigator: Dr. Marc Muller
Co-Investigator: **Fengwei Hung**
Duration: August 2022 – July 2024
Amount: $400,000
Status: Not funded

Project Title: Advancing drought resilience through snow-informed integrated water modeling and management in the Colorado River Basin
Sponsor: National Aeronautics and Space Administration (ROSES)
Principal Investigator: Dr. James Famiglietti
Co-investigator: **Fengwei Hung**
Duration: August 2026 – July 2028
Amount: $300,000
Status: *Not submitted (submission deferred pending stakeholder partnership)*

(Please refer to the Research Statement for further details on grant writing experience)

RESEARCH INTERESTS

Methodology: Hydrology, water resources engineering, GIS and remote sensing, stochastics programming, agent-based modeling, risk and decision analysis, and machine learning/AI

Application areas: Water and natural resources, urban stormwater, green infrastructure, extreme weather, climate adaptation

TEACHING EXPERIENCE

Utah State University   June 2018
Guest Lecturer for a course on "Hydrology"

Swarthmore College   May 2020
External Examiner of the Honors Program   Swarthmore, PA
- Invited as a guest external examiner to give students who participated in the Honors program written and oral exams on environmental engineering and systems

Guest Lecturer for a course on "Operations Research"   June 2018
- Invited as a guest lecturer to present applications of optimization and operations research in environmental management to undergraduate students

Johns Hopkins University   Fall 2016
Lecturer for "Economy vs. Environment: Let's make optimal decisions (EN.500.111)"   Baltimore, MD
- Offered and taught a course to introduce concepts, mathematical tools and applications in environmental management and policymaking

Guest Lecturer for a course on "Energy Modeling and Policy"

MENTORING EXPERIENCE

Arizona State University   2024- 2025
- Behshad Mohajer, ASU PhD (expected Spring 2026), *Key natural influences on groundwater storage changes in central and southern Arizona*

Lehigh University   2021- 2022
- Qiaochu Son, LU PhD (expected Spring 2026), *Exploring policy impacts on nature-based stormwater management through coupled agent-based modeling*
- Ali Ghaffari, LU, PhD '24, *Navigating multisector dynamics: Challenges and solutions in the regional food-energy-water nexus*
- Jiaorui Zhang, LU, PhD '23, *Exploring the food-energy-water nexus: Insights from co-evolution in coupled human-nature systems*

Utah State University   2017- 2018
- Betsy Morgan, USU, MS '19, *Accounting for critical attributes and uncertainty in flow-ecology relationships* (2019)

Johns Hopkins University   2016-2017
- Jefferson Riera, JHU, MS '18, *Strategies to manage heat stress with green infrastructure* (2017)
- Hima Patel, JHU, MS '18, *Trash and litter accumulation in Baltimore City: Does the vicinity of green space matter?* (2017)

PUBLICATIONS AND PRESENTATIONS
JOURNAL PUBLICATIONS (Peer-reviewed; * indicates student/postdoc mentees)
- Cyndi Vail-Castro*, **Fengwei Hung**, and Murugesu Sivapalan. "Dissecting uncertainties in low impact development for peak flow reduction with a time-space scaling framework." *Water Resources Research (under review)*
- Marc F. Muller, Kyle F. Davis, and Davide Chiarelli, and **Fengwei Hung**. " Water competition and groundwater depletion in transboundary aquifers." *Science (under review)*
- **Fengwei Hung**, Mohamed Aboelnour, Danielle Wood and Jiaorui Zhang*. "A heat hazard index framework for global urban resilience assessment." *Urban Climate 64 (2025): 102659.*
- **Fengwei Hung,** Davide D. Chiarelli, James S. Famiglietti, and Marc F. Muller. " Downscaled global 60-meter resolution estimates of irrigation water sources (2000-2015)." *Scientific Data 12.1 (2025): 1632.*
- Yuan Qiu, James S. Famiglietti, Ali Behrangi, Mohammad Ali Farmani, Hossein Yousefi Sohi,

- Muhammad Jawad, Aniket Gupta, **Fengwei Hung**, Karem Abdelmohsen, Guo-Yue Niu. (2025). "The strong impact of precipitation intensity on groundwater recharge and terrestrial water storage change in Arizona, a typical dryland." _Geophysical Research Letters_ 52.14 (2025): e2025GL114747
- Mohamed Aboelnour, Alan F. Hamlet, Danielle Wood, **Fengwei Hung**. (2025) "Leveraging ERA5-Land reanalysis precipitation data for urban flood vulnerability and water security assessments: A global perspective". _Earth Systems and Environment_ : 1-19
- **Fengwei Hung**, Ali Ghaffari*, Y.C. Ethan Yang, and Gavin Dillingham. (2024). "An investment behavioral modeling framework for advancing power system transformation toward renewable energy integration." _Energy and Climate Change_,100127.
- Ali Ghaffari*, **Fengwei Hung**, Y. C. Ethan Yang, Jin Lu, Xingpeng Li. (2024) "Development of a coupled agent-based generation expansion planning tool with a power dispatch model". _Energy and Climate Change_, 100156.
- Jiaorui Zhang*, YC Ethan Yang, Guta W. Abeshu, Hongyi Li, **Fengwei Hung**, Chung-Yi Lin, and L. Ruby Leung. (2024) "Exploring the food-energy-water nexus in coupled natural-human systems under climate change with a fully integrated agent-based modeling framework." _Journal of Hydrology_: 131048
- Connor Mullen, Marc Muller, Gopal Penny, **Fengwei Hung** and Diogo Bolster. (2022). "Hydro-economic asymmetries and common-pool overdraft in transboundary aquifers." _Water Resources Research_: e2022WR032136
- **Fengwei Hung**, Benjamin F. Hobbs, Arthur McGarity, and Xiaoting Chen*. (2022). "A Modeling Framework for Assessing the Value of Learning in Dynamic Adaptive Planning: Application to Green Infrastructure Investment Evaluation." _Water Resources Research_: e2021WR031622
- **Fengwei Hung,** Kyongho Son, and Y.C. Ethan Yang. (2022). "Investigating uncertainties in human adaptation and their impacts on water scarcity in the Colorado River Basin, United States." _Journal of Hydrology_: 128015.
- **Fengwei Hung** and Y.C. Ethan Yang. (2022). "Assessing Adaptive Irrigation Impacts on Water Scarcity in Nonstationary Environments–A Multi-agent Reinforcement Learning Approach." _Water Resources Research_ 57.9: e2020WR029262.
- **Fengwei Hung**, Ciaran J. Harman, Benjamin F. Hobbs, and Murugesu Sivapalan. "Assessment of climate, sizing, and location controls on green infrastructure efficacy: A timescale framework." _Water Resources Research_ 56.5 (2020): e2019WR026141.
- YC Ethan Yang, Kyongho Son, **Fengwei Hung**, Vincent Tidwell. (2020). "Impact of climate change on adaptive management decisions in the face of water scarcity." _Journal of Hydrology_: 125015.
- **Fengwei Hung** and Benjamin F. Hobbs. (2019). "How can learning-by-doing improve decisions in stormwater management? A Bayesian-based optimization model for planning urban green infrastructure investments." _Environmental Modelling & Software_ 113: 59-72.
- Yang-chi Chang, **Feng-wei Hong**, and Mong-chong Lee. (2008) "A system dynamic based DSS for sustainable coral reef management in Kenting coastal zone, Taiwan," _Ecological Modeling_: Vol. 211, issue 1-2, pp. 153-168.

IN PREPARATION
- **Fengwei Hung**, Qianqiu Longyang, Jame S. Famiglietti, and Ruiji Zheng. "Balancing energy output against evaporative losses in arid regions: an operation strategy analysis" (_to be submitted to Water Resources Research_)

JOURNAL PUBLICATIONS (Conference Proceedings)
- **Fengwei Hung**, Benjamin F. Hobbs, et al. (2016). "Exploring win-win strategies for urban stormwater management: a case study in Philadelphia's Combined Sewer Area," _Proceedings of World Environmental and Water Resources Congress 2016_.
- Arthur McGarity, **Fengwei Hung**, et al. (2015) "Quantifying benefits of green stormwater infrastructure in Philadelphia" _Proceedings of World Environmental and Water Resources Congress 2015_.

ORAL PRESENTATIONS
- **Fengwei Hung** and Marc Muller. "Do tragedies of the commons contribute to the premature depletion of transboundary aquifers?" AGU 2022 Fall Meeting, Chicago, IL, Dec. 2022.
- **Fengwei Hung,** Kyongho Son, and Y.C. Ethan Yang. "Exploring human impacts on water scarcity uncertainty in a non-stationary environment: A Colorado River Basin case study." AGU 2021 Fall Meeting, New Orleans, LA, Dec. 2021
- **Fengwei Hung**, Betsy Morgan and Belize Lane. "An integrated modeling framework for ecohydraulic analysis." UCOWR 2019, Snowbird, UT, June 2019
- **Fengwei Hung**, Benjamin F. Hobbs, Arthur E. McGarity, and Xiaoting Chen. "Adaptive planning of green stormwater infrastructure under cost and performance uncertainty using Bayesian-based optimization: A case study in Philadelphia, PA" World Environmental and Water Resources Congress 2019, Pittsburgh, PA, May 2019
- **Fengwei Hung**, Benjamin F. Hobbs, Arthur E. McGarity, and Xiaoting Chen. "Green Stormwater Infrastructure Planning under Cost and Performance Uncertainty Using Bayesian-based Optimization – A Case Study in Philadelphia, PA," AGU 2018 Fall Meeting, Washington DC, Dec. 2018
- **Fengwei Hung** and Benjamin F. Hobbs. "A Two-stage Stochastic Programming Model for Adaptive Stormwater Management with Green Infrastructure," INFORMS Annual Meeting 2017, Houston, TX, Oct. 2017
- **Fengwei Hung** and Benjamin F. Hobbs. "Optimizing Adaptive Stormwater Management with Green Infrastructure: A Case Study in Wingohocking Watershed, Philadelphia," INFORMS Annual Meeting 2016, Nashville, TN, Nov. 2016
- **Fengwei Hung** and Benjamin F. Hobbs. "Decision Analysis for Adaptive Stormwater Management with Green Infrastructure Using Two-stage Stochastic Programming," INFORMS Annual Meeting 2015, Philadelphia, PA, Nov. 2015
- **Fengwei Hung**, Benjamin F. Hobbs, Arthur E. McGarity, Cristina Rosan. "Community-based Green Infrastructure Planning: A Case Study in Philadelphia's Combined Sewer Area," VUSP 2015, Villanova, PA, Oct. 2015
- **Fengwei Hung**, Benjamin F. Hobbs, Arthur E McGarity, Cristina Rosan, Shandor Szalay, and Megan Heckert. "Exploring Win-Win Strategies for Urban Stormwater Management: A Case Study in Philadelphia's Combined Sewer Area," World Environmental and Water Resources Congress 2015, West Palm Beach, FL, May 2015
- **Fengwei Hung**, Benjamin F. Hobbs and Arthur E McGarity. "Adaptive Urban Stormwater Management Using a Two-stage Stochastic Optimization Model," AGU 2014 Fall Meeting, San Francisco, CA, Dec. 2014

POSTER PRESENTATIONS
- **Fengwei Hung**, Mohamed Aboelnour, Danielle Wood, and Jiaorui Zhang. "Quantifying urban heat risks through the lens of metrics and indices." AGU Fall Meeting 2024, Washington DC, Dec. 2024
- **Fengwei Hung**, Belize Lane, Colin Bryne, Samuel Sandoval Solis, Gregory Pasternack, Charles Young, and Doug Chalmers. "Setting limits with limited information: A catchment-scale modeling framework to evaluate distributed human - ecological water management tradeoffs." AGU 2019 Fall Meeting, San Francisco, CA, Dec. 2019
- **Fengwei Hung**, Ciaran Harman, Benjamin Hobbs. "Hydrological analysis of GI's efficacy in reducing combined sewer overflows: Location matters." 1st International Conference on Water Security, Toronto, Canada, June 2018

VOLUNTEER SERVICE AND LEADERSHIP
PROFESSIONAL
Invited Talks
- United States
  2024: Oak Ridge National Laboratory, Arizona State University, Florida Gulf Coast University

2023: Iowa State University, University of Oklahoma
2022: Rutgers University, Clemson University, University of Nevada, Las Vegas
- Taiwan
2022: National Taiwan University, National Sun Yat-sen University

Peer-reviewed Journal Reviewer
- Water Resources Research
- Journal of Hydrology
- Hydrology and Earth System Sciences
- Journal of Water Resources Planning and Management
- Environmental Science & Technology
- European Journal of Operational Research
- Environmental Modelling & Software
- Restoration Ecology

Conference Session Moderator
- AGU Fall Meetings 2025 – Section Convener
- UCOWR 2019 – Session Moderator
- INFORMS Annual Meeting 2016 – Session Chair
- INFORMS Annual Meeting 2017 – Session Chair

Professional Society Activities
- American Geophysical Union (AGU) – Member
- AGU Hydrology Section Water and Society Technical Committee
- Environmental & Water Resources Institute (EWRI) – Member
- EWRI Environmental and Water Resources Systems Committee – Member
- American Society of Civil Engineers (ASCE) – Associate Member

UNIVERSITY AND COMMUNITY
Johns Hopkins University
International Student Ambassador Program   2016-2017
- Student Ambassador: Organizer for international student orientation sessions and webinars

Graduate Representative Organization   2014-2016
- Environmental Health Engineering Department Graduate Student Representative: Advocated for student travel grant policy amendment
- Treasurer: Proposed and managed the annual budget for the organization (2016)

Taiwanese Student Association   2015-2016
- Board Member: Event planner for Taiwanese movie night and night market event

International Student Seminar Club   2013-2016
- Chair: Convener of monthly seminars

PROGRAMMING AND SOFTWARE SKILLS
Programming: Matlab, Python, R, VBA
Optimization: AMPL, GAMS, AIMMS
Hydrology and Remote Sensing: EPA SWIMM, RiverWare, WEAP, ArcGIS, ERDAS, Google Earth Engine, QGIS
System Dynamics: STELLA, Vensim