

Chien-Yung Tseng

Research Interests

Environmental Fluid Mechanics, Turbulent Mixing, Eco-hydraulics, Sediment Transport, Gravity Currents, Experimental Methods in Flow Measurement, Hydropower and Marine Energy

Research Employment/Appointment

2024-present *Assistant Professor, Colorado State University* - Dept of CEE
2022-2023 *Postdoctoral Associate, Oak Ridge National Laboratory* - Environmental Sciences Division
2017-2022 *Grad Research Fellow, University of Illinois at Urbana-Champaign* - Dept of CEE
2019-2021 *Grad Research Assistant, Illinois Water Resources Center*
2018-2019 *Grad Research Assistant, Illinois State Geological Survey*
2017 *Research Associate, National Taiwan University* - Dept of Eng Sci & Ocean Eng
2013-2016 *Grad Research Assistant, National Taiwan University* - Institute of Applied Mechanics

Education

2022 Ph.D. **University of Illinois at Urbana-Champaign, Water Resources Engineering and Science (UIUC)** *Minor in Statistics*
Concentration in Computation Sci and Eng
2015 M.S. **National Taiwan University (NTU), Applied Mechanics (Fluid Mechanics)**
2013 B.S. **National Tsing Hua University (NTHU), Physics**

Honors and Awards

Spring 2022 UIUC List of Teachers Ranked as Excellent by Their Student
2021 – 2022 UIUC Grainger College of Engineering - Mavis Future Faculty Fellowship
2021 Best Young Professional Award - IAHR - The 9th International Symposium on Environmental Hydraulics
2020, 2021 UIUC Graduate College Conference Travel/Presentation Award
2017 Taiwan MOE - UIUC Graduate Student Fellowship (4yrs Ph.D. Fellow Award)
2015 Membership of the Phi Tau Phi Scholastic Honor Society (Summa Cum Laude), NTU
2013 NTHU International Public Service Leader Scholarship
2011 NTHU - University of Science and Technology of China Undergraduate Research Program Scholarship

Teaching and Mentoring

Teaching Assistant

- Spring 2022 Water Resources Engineering (CEE350), **University of Illinois at Urbana-Champaign**
Spring 2018 Earth Environmental Problems and Resolutions (IPCS7001), **National Taiwan University**
Spring 2015 Fundamental Fluid Dynamics (AM7097), **National Taiwan University**
Fall 2014 Fundamental Fluid Dynamics (AM7097), **National Taiwan University**

Guest Lecturer

- Fall 2018 Mixing in Environmental Flows (CEE555), **University of Illinois at Urbana-Champaign**

Student Research Mentor

- Summer 2020 Graduate Student Summer Research Mentor
Fall 2019 Undergraduate Student Research Mentor

Publications

- [12] Vona, I., **Tseng, C. Y.**, Tinoco, R., Nardin, W. (In review). Oysters' integration on submerged breakwaters: A laboratory study with scaled-down oyster castles, *Ecological Engineering*
- [11] **Tseng, C. Y.** and Musa, M. (In review). Hydrokinetic energy applications within hydropower tailrace channels: implications, siting, and U.S. potential, *Renewable Energy*
- [10] **Tseng, C. Y.**, Ham, K., Sasthav, C., Basub, S., DeSomberb, K., Musa, M. (In review). Renewable and Sustainable Energy Reviews Hydraulic testing needs for hydropower innovations, *Renewable and Sustainable Energy Reviews*
- [9] **Tseng, C. Y.**, Lee, J., Guala, M., Musa, M. (In review). Quantification of Lateral Bedload Transport Induced by a Yawed Submerged Vane Array in Open-Channel Flows, *Journal of Hydraulic Engineering*
- [8] **Tseng, C. Y.** and Tinoco, R. O. (2024). Canopy Randomness, Scale, and Stem Size Effects on the Interfacial Transfer Process in Vegetated Flows, *Water Resources Research*
- [7] **Tseng, C. Y.**, Ghadiri, M., Kumar, P., Meidani, H. (2023). Estimation of hydraulic conductivity in a watershed using multi-source data via co-kriging and Bayesian experimental design, *Advances in Water Resources*, 178, 104489
- [6] Musa, M., Ghobrial, L., Heineman, J., Rencheck, M., Stewart, K., DeNeale, S., **Tseng, C. Y.**, White D., Davis, L., Nachman M., Rugani K. (2023). Advanced Manufacturing for Hydropower: Challenges and Opportunities, *Oak Ridge National Laboratory*, ORNL/TM-2023/2835, Oak Ridge, TN (United States)
- [5] **Tseng, C. Y.** and Tinoco, R. O. (2022). From substrate to surface: A turbulence-based model for gas transfer across sediment-air-water interfaces in vegetated streams, *Water Resources Research*, 58(1), e2021WR030776
- [4] **Tseng, C. Y.** and Tinoco, R. O. (2021). A two-layer turbulence-based model to predict suspended sediment concentration in flows with aquatic vegetation, *Geophysical Research Letters*, 48(3), e2020GL091255
- [3] Lin, Y. F., **Tseng, C. Y.**, Sargent, S. L. (2020). User's manual for the portable thermal response test device, Technical Report, *Illinois State Geological Survey*, Prairie Research Institute, Circular no. 603
- [2] **Tseng, C. Y.** and Tinoco, R. O. (2020). A model to predict surface gas transfer rate in streams based on turbulence production by aquatic vegetation, *Advances in Water Resources*, 143, 103666

- [1] **Tseng, C. Y.** and Chou, Y. J. (2018). Nonhydrostatic simulation of hyperpycnal river plumes on sloping continental shelves: flow structures and nonhydrostatic effect, *Ocean Modelling*, 124, 33-47

In Preparation

- [13] **Tseng, C. Y.**, Turner, S., Montgomery, C., Massey, M. P., Gangrade, S., Stewart, K., Kao, S. C. (In prep). Sensitivity of Thermal Stratification in Two Southeastern Reservoirs in Response to Changes in Long-Term Temperature and Flow Discharge, *Journal of Hydrology*

Published Datasets/Codes

- [5] **Tseng, C. Y.** and Tinoco, R. O. (2024). Canopy Randomness, Scale, and Stem Size Effects on the Interfacial Transfer Process in Vegetated Flows. figshare. Dataset.
<https://doi.org/10.6084/m9.figshare.24320746>
- [4] **Tseng, C. Y.**, Ghadiri, M., Larson, T. H., Kumar, P., Meidani, H. (2022). Bayesian experimental design coupling with multi fidelity Gaussian processes, GitHub. Repository.
<https://doi.org/10.5281/zenodo.7098032>
- [3] **Tseng, C. Y.** and Tinoco, R. O. (2021). From Substrate to Surface: A Turbulence-based Model for Gas Transfer across Sediment-water-air Interfaces in Vegetated Streams. figshare. Dataset.
<https://doi.org/10.6084/m9.figshare.16862926>
- [2] **Tseng, C. Y.** and Tinoco, R. O. (2020). A Two-Layer Turbulence-based Model to Predict Suspended Sediment Concentration in Flows with Aquatic Vegetation. figshare. Dataset.
<https://doi.org/10.6084/m9.figshare.13333769>
- [1] **Tseng, C. Y.** and Tinoco, R. O. (2020). A model to predict surface gas transfer rate in streams based on turbulence production by aquatic vegetation. figshare. Dataset.
<https://doi.org/10.6084/m9.figshare.12486590>

Invited Talks

- 2023 Dept of Civil and Environmental Engineering, Colorado State University, Fort Collins, CO, USA
- 2023 Dept of Civil and Environmental Engineering, Virginia Tech, Blacksburg, VA, USA
- 2023 Dept of Civil and Environmental Engineering, University of Tennessee, Knoxville, TN, USA
- 2022 Invited Webinar Talk, Taiwanese Scholar Association in St. Louis, St. Louis, MO, USA
- 2022 Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA
- 2022 Dept of Civil Engineering, National Taiwan University, Taipei, Taiwan
- 2022 Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM, US
- 2022 Dept of Biological and Environmental Engineering, Cornell University, Ithaca, NY, USA
- 2021 Hydro-Geo Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, USA
- 2021 Rowland Institute, Harvard University, Boston, MA, USA

Selected Conference Presentations

- 2023 AGU Fall Meeting 2023, "Quantification of Lateral Bedload Transport Induced by a Submerged Vane

- Array in Open-Channel Flows”, San Francisco, CA, USA
- 2023 AGU Fall Meeting 2023, “Sensitivity of Thermal Stratification in Two Southeastern Reservoirs in Response to Changes in Long-Term Temperature and Flow Discharge”, San Francisco, CA, USA
- 2022 AGU Fall Meeting 2022, “Canopy Randomness and Stem Size Effects on the Sediment-Water-Air Interfacial Transfer in Vegetated Flows”, Chicago, IL, USA
- 2022 APS-DFD Annual Meeting 2022, “Siting Optimization of In-stream Hydrokinetic Turbines within Hydropower Tailrace Channels”, Indianapolis, IN, USA
- 2021 AGU Fall Meeting 2021, “From substrate to surface: a turbulence-based model to predict interfacial gas transfer across sediment-air-water interfaces in vegetation streams with sediments”, New Orleans, LA, USA
- 2021 AGU Fall Meeting 2021, “Estimation of Hydraulic Conductivity in a Watershed Using Multi-source Data via Co-Kriging and Bayesian Experimental Design”, New Orleans, LA, USA
- 2021 12th Symposium on River, Coastal and Estuarine Morphodynamics – RCEM2021, “Laboratory Study on Sediment Suspension and Bed Morphodynamics in Vegetated Fluvial Systems”, Virtual Webinar
- 2021 5th International Symposium on Shallow Flows 2021, “Turbulence effects by the aquatic vegetation on interfacial transfer process with sediment”, Nanjing, China
- 2021 9th International Symposium on Environmental Hydraulics 2021, “A turbulence-based, two-layer model to predict sediment suspension in vegetated flows”, Seoul, Korea
- 2020 AGU Fall Meeting 2020, “Effects of aquatic vegetation on gas exchange process across air-water and sediment-water interface”, San Francisco, CA, USA
- 2019 AGU Fall Meeting 2019, “Quantifying the effect of aquatic vegetation on interfacial gas transfer in Streams”, San Francisco, CA, USA
- 2019 AGU Fall Meeting 2019, “Laboratory study of gravity currents over submerged vegetation canopies”, San Francisco, CA, USA
- 2016 The 38th Ocean Engineering Conference in Taiwan 2016, “Numerical investigation of plunging hyperpycnal plume on an idealized shelf slope”, Taipei, Taiwan
- 2015 Gordon Research Conference on Coastal Ocean Modeling 2015, “Nonhydrostatic numerical simulation of plunging hyperpycnal river plumes on continental shelves”, Biddeford, ME, USA

Professional Activities/Services

Professional Registration

- 2020 – present American Physical Society (APS) – Division of Fluid Dynamics
- 2020 – present International Association for Hydro-Environment Engineering and Research (IAHR)
- 2018 – present American Geophysical Union (AGU)
- 2017 – present International Water Resources Association (IWRA)

Conference Organization

- 2022 AGU Fall Meeting 2023, EP42B - Ecohydraulics and Ecomorphodynamics: Biophysical Interactions Within Fluvial Systems across an Elevation Gradient, San Francisco, CA, USA

Grant Reviewer

- National Science Foundation (NSF) - Hydrologic Sciences Program

Journal Reviewer

Water Resources Research (AGU)

Geophysical Research Letters (AGU)

Journal of Hydrology (Elsevier)

Ocean Engineering (Elsevier)

Environmental Science and Ecotechnology (Elsevier)

Journal of Hydraulic Research (IAHR)

Journal of Engineering Mechanics (ASCE)

Scientific Reports (Nature)

Frontiers in Earth Science (Frontiers)

Student Chapter Service

2017 – 2022 Treasurer of the local IAHR Student Chapter at UIUC