

EINARA ZAHN

[einaraz@princeton.edu](mailto:ainaraz@princeton.edu)

[Google Scholar](#)

[GitHub](#)

RESEARCH INTERESTS

Land-atmosphere Interactions, Environmental Fluid Mechanics, Urban Microclimate and Hydrometeorology, Extreme Events, Urban Sustainability and Resilience, Multiscale Atmospheric Modeling

EDUCATION

Ph.D. in Civil and Environmental Engineering Princeton University	Sep. 2018 – May 2023 Princeton, New Jersey
<ul style="list-style-type: none">• Dissertation: Towards better representation of water, CO₂, and temperature exchanges at the land-atmosphere interface	
Master of Science in Environmental Engineering Federal University of Paraná (UFPR)	Mar. 2014 – Mar. 2016 Curitiba, Brazil
Bachelor of Science: Environmental Engineering Federal University of Paraná (UFPR)	Mar. 2010 – Mar. 2014 Curitiba, Brazil

RESEARCH EXPERIENCE

Thermofluids of Urban and Natural Environments Lab at Princeton Postdoctoral researcher	June 2023 – present Princeton, NJ
Thermofluids of Urban and Natural Environments at Princeton Graduate researcher. Advisor: Elie Bou-Zeid	Sep. 2018 – May 2023 Princeton, NJ
Laboratory for Environmental Monitoring and Modeling Analysis at UFPR Undergraduate/graduate researcher	May 2013 – March 2016 Curitiba, Brazil
<ul style="list-style-type: none">• Research on quality control of micrometeorological datasets;• Investigation of micrometeorological phenomena above forests in the Amazonian Tall Tower Observatory (ATTO) project;• Fieldwork in the Amazon Forest in collaboration with the Green Ocean Amazon (GOAmazon) project to help set up micrometeorological equipment in a 50m-tall tower and to operate a tethered balloon.	
Department of Hydraulics and Sanitation at UFPR Undergraduate researcher	January 2012 – May 2013 Curitiba, Brazil
<ul style="list-style-type: none">• Research on greenhouse gas emissions from reservoirs;• Development of a mathematical model to estimate carbon dioxide and methane emissions from reservoirs.	

PROFESSIONAL EXPERIENCE

Simepar — The Paraná State Meteorological Agency Hydrologist	September 2016 – August 2018 Curitiba, Brazil
<ul style="list-style-type: none">• Quality control of hydrometeorological datasets and data processing;• Implementation of rainfall-runoff models for flood forecasting.	
Envex — Engineering and Environmental Consulting Environmental Consultant	March 2016 – August 2016 Curitiba, Brazil
<ul style="list-style-type: none">• Quality control of precipitation and stream gauging stations data from the Energy Company of Paraná (COPEL).	

HONORS AND AWARDS

January 2022 Agricultural and Forest Meteorology (AGMET) Editors' choice Paper on partitioning of eddy-covariance fluxes is selected as AGMET Editors's choice of the month	Jan 2022
Walbridge Graduate Award Princeton University	Spring 2021
William G. Bowen Merit Fellowship Princeton University	Fall 2018

TEACHING EXPERIENCE

Princeton University Assistant Instructor in Boundary-Layer Meteorology	Spring 2023 Princeton, NJ
Princeton University Assistant Instructor in Hydrology and Climate	Spring 2021 Princeton, NJ
Princeton University Assistant Instructor in Environmental Fluid Mechanics	Fall 2019 Princeton, NJ
Federal University of Paraná Teaching assistant in Computer Programming with the language C++	March 2011 – December 2011 Curitiba, Brazil

ACADEMIC AND PROFESSIONAL ACTIVITIES

AMS Board on Atmospheric Biogeosciences	July 2023–present
Boundary-Layer Meteorology Early-Career Researchers' board	Jan 2022–present
Review activities Journal articles	ongoing
<ul style="list-style-type: none">• Agricultural and Forest Meteorology, Water Resources Research, Journal of Atmospheric Sciences, Geophysical Research Letters, Journal of Fluid Mechanics, Boundary-Layer Meteorology, Journal of Hydrology, Theoretical and Applied Climatology	

ADVANCED TRAINING

Machine Learning Specialization DeepLearning.AI and Stanford University	May 2024
---	----------

PUBLISHED REFEREED ARTICLES

1. **Zahn, Einara**, Ghannam, K., Chamecki, M., Moene, A. F., Kustas, W. P., Good, S. & Bou-Zeid, E. Numerical Investigation of Observational Flux Partitioning Methods for Water Vapor and Carbon Dioxide. *Journal of Geophysical Research: Biogeosciences* **129**, e2024JG008025. <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2024JG008025> (2024).
2. **Zahn, Einara** & Bou-Zeid, E. Setting up a Large-Eddy Simulation to Focus on the Atmospheric Surface Layer. *Boundary-Layer Meteorology*. <https://doi.org/10.1007/s10546-023-00841-x> (2024).
3. **Zahn, Einara**, Bou-Zeid, E. & Dias, N. L. Relaxed Eddy Accumulation Outperforms Monin-Obukhov Flux Models Under Non-Ideal Conditions. *Geophysical Research Letters* **50**. <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2023GL103099> (2023).
4. Gao, R., Torres-Rua, A. F., Nieto, H., **Zahn, Einara**, Hipps, L., Kustas, W. P., Alsina, M. M., Bambach, N., Castro, S. J., Prueger, J. H., Alfieri, J., McKee, L. G., White, W. A., Gao, F., McElrone, A. J., Anderson, M., Knipper, K., Coopmans, C., Gowing, I., Agam, N., Sanchez, L. & Dokoozlian, N. ET Partitioning Assessment Using the TSEB Model and sUAS Information across California Central Valley Vineyards. *Remote Sensing* **15**. ISSN: 2072-4292. <https://www.mdpi.com/2072-4292/15/3/756> (2023).

5. Nieto, H, Alsina, M. d. L., Kustas, W. P., Tejera, O. J., Chen, F, Bambach, N, Gao, F, Alfieri, J. G., Hipps, L. E., Prueger, J. H., McKee, L. G., **Zahn, Einara**, Bou-Zeid, E, McElrone, A. J., Castro, S. J. & Dokoozlian, N. Evaluating different metrics from the thermal-based Two-Source Energy Balance model for monitoring grapevine water stress. *Irrigation Science* **40**, 697—713. <https://doi.org/10.1007/s00271-022-00790-2> (2022).
6. Burchard-Levine, V, Nieto, H, Kustas, W. P., Gao, F, Alfieri, J. G., Prueger, J. H., Hipps, L. E., Bambach-Ortiz, N, McElrone, A. J., Castro, S. J., Alsina, M. M., McKee, L. G., **Zahn, Einara**, Bou-Zeid, E & Dokoozlian, N. Application of a remote sensing three-source energy balance model to improve evapotranspiration partitioning in vineyards. *Irrigation Science* **40**, 593—608. <https://doi.org/10.1007/s00271-022-00787-x> (2022).
7. Kustas, W. P., Nieto, H, Garcia-Tejera, O, Bambach, N, McElrone, A. J., Gao, F, Alfieri, J. G., Hipps, L. E., Prueger, J. H., Torres-Rua, A, Anderson, M. C., Knipper, K, Alsina, M. M., McKee, L. G., **Zahn, Einara**, Bou-Zeid, E & Dokoozlian, N. Impact of advection on two-source energy balance (TSEB) canopy transpiration parameterization for vineyards in the California Central Valley. *Irrigation Science*. <https://doi.org/10.1007/s00271-022-00778-y> (2022).
8. **Zahn, Einara**, Bou-Zeid, E., Good, S. P., Katul, G. G., Thomas, C. K., Ghannam, K., Smith, J. A., Chamecki, M., Dias, N. L., Fuentes, J. D., Alfieri, J. G., Kwon, H., Caylor, K. K., Gao, Z., Soderberg, K., Bambach, N. E., Hipps, L. E., Prueger, J. H. & Kustas, W. P. Direct partitioning of eddy-covariance water and carbon dioxide fluxes into ground and plant components. *Agricultural and Forest Meteorology* **315**, 108790. ISSN: 0168-1923. <https://www.sciencedirect.com/science/article/pii/S0168192321004767> (2022).
9. **Zahn, Einara**, Welty, C., Smith, J. A., Kemp, S. J., Baeck, M.-L. & Bou-Zeid, E. The Hydrological Urban Heat Island: Determinants of Acute and Chronic Heat Stress in Urban Streams. *JAWRA Journal of the American Water Resources Association*. <https://onlinelibrary.wiley.com/doi/abs/10.1111/1752-1688.12963> (2021).
10. Chor, T. L., Dias, N. L., Araújo, A., Wolff, S., **Zahn, Einara**, Manzi, A., Trebs, I., Sá, M. O., Teixeira, P. R. & Sörgel, M. Flux-variance and flux-gradient relationships in the roughness sublayer over the Amazon forest. *Agricultural and Forest Meteorology* **239**, 213–222. ISSN: 0168-1923. <https://doi.org/10.1016/j.agrformet.2017.03.009> (2017).
11. **Zahn, Einara**, Dias, N. L., Araújo, A., Sá, L. D. A., Sörgel, M., Trebs, I., Wolff, S. & Manzi, A. Scalar turbulent behavior in the roughness sublayer of an Amazonian forest. *Atmospheric Chemistry and Physics* **16**, 11349–11366. <https://acp.copernicus.org/articles/16/11349/2016/> (2016).

SUBMITTED REFEREED ARTICLES

1. Banerjee, T., Katul, G., **Zahn, Einara**, Dias, N. & Bou-Zeid, E. A Single Compartment Relaxed Eddy Accumulation Method. *JGR: Atmospheres*. (Submitted) (2024).
2. Allouche, M., Sevostianov, V. I., **Zahn, Einara**, Zondlo, M. A., Dias, N. L., Katul, G. G., Fuentes, J. D. & Bou-Zeid, E. Estimating scalar turbulent fluxes with slow-response sensors in the stable atmospheric boundary layer. *Atmospheric Chemistry and Physics*. (Submitted) (2023).

BOOK CHAPTERS

1. Katul, G. G., **Zahn, Einara**, & Bou-Zeid, E. *Unstably Stratified Shear Flows* (eds Bou-Zeid, E. & Sarkar, S.) (Elsevier Science, 2024).

UNREFEREED OR ARCHIVED SCIENTIFIC PUBLICATIONS

1. **Zahn, Einara**, Ghannam, K., Chamecki, M., Moene, A., Kustas, W. P., Good, S. & Bou-Zeid, E. Numerical Investigation of Observational Flux Partitioning Methods for Water Vapor and Carbon Dioxide. *ESS Open Archive*. DOI: [10.22541/essoar.170716371.17109325/v1](https://doi.org/10.22541/essoar.170716371.17109325/v1) (2024).

2. **Zahn, Einara**, Welty, C., Smith, J. A., Kemp, S. J., Baeck, M.-L. & Bou-Zeid, E. The Hydrological Urban Heat Island. Urban Climate News. Quarterly Newsletter of the IAUC. <http://www.urban-climate.org/wp-content/uploads/newsletter/IAUC082.pdf> (82 2022).
3. **Zahn, Einara**, Chor, T. L. & Dias, N. L. A Simple Methodology for Quality Control of Micrometeorological Datasets. *American Journal of Environmental Engineering* **6**, 135–142. doi:10.5923/s.ajee.201601.20 (2016).

RESEARCH DATASETS AND SOFTWARE

1. **Zahn, Einara & Bou-Zeid, E.** *Partitioning of water and CO₂ fluxes at NEON sites into soil and plant components: a five-year dataset for spatial and temporal analysis [dataset]* version 1.0. June 2024. <https://doi.org/10.5281/zenodo.12191876>.

CONFERENCES

1. **Zahn, Einara & Bou-Zeid, E.** *Partitioning of water and CO₂ fluxes at NEON sites into soil and plant components: a five-year dataset for spatial and temporal analysis [dataset]* version 1.0. June 2024. <https://doi.org/10.5281/zenodo.12191876>.
1. *Numerical Investigation of Flux Partitioning Methods for Water Vapor and Carbon Dioxide.* American Geophysical Union (AGU) Fall Meeting (talk). 2023.
2. *Numerical Investigation of Flux Partitioning Methods for Water Vapor and Carbon Dioxide.* 103st American Meteorological Society Meeting (talk). 2023.
3. *What causes departure from the Monin-Obukhov functions for scalars?* 75th Annual Meeting of the APS Division of Fluid Dynamics (talk). 2022.
4. *Numerical and experimental investigation of CO₂ and H₂O flux partitioning methods.* American Geophysical Union (AGU) Fall Meeting (talk). 2021.
5. *Direct Partitioning of Eddy Covariance Water Vapor and Carbon Fluxes into Surface and Plant Components.* 101st American Meteorological Society Meeting (talk). 2021.
6. *Direct Partitioning of Eddy Covariance Water Vapor and Carbon Fluxes into Surface and Plant Components.* American Geophysical Union (AGU) Fall Meeting (poster). 2020.
7. *Temperature Surges Caused by Hot Runoff in Urban Watersheds.* American Geophysical Union (AGU) Fall Meeting. San Francisco, California (poster). 2019.
8. *Quality control of high-frequency data in the ATTO project.* IX Brazilian Workshop of Micrometeorology. Santa Maria, Brazil. 2015.
9. *Zero-dimensional mathematical model for greenhouse gas emissions in reservoirs.* XX Brazilian Symposium on Water Resources. Bento Gonçalves, Brazil. 2013.
10. *Development of a zero-dimensional mathematical model to estimate greenhouse gas emissions in reservoirs.* XX Scientific Initiation Event - Federal University of Parana. Curitiba, Brazil. 2012.