Roni Goldshmid

Aerospace Engineering
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Appointments

Assistant Professor — 08/2024- present
Department of Aerospace Engineering
San Diego State University

Presidential Postdoctoral Fellow in Aerospace — 11/2023-08/2024
National Science Foundation, AGEP
Graduate Aerospace Laboratories
California Institute of Technology

Postdoctoral Scholar Research Associate — 12/2020 - 10/2023
Graduate Aerospace Laboratories
California Institute of Technology

Research and Development Wind Advisor at Heliogen — 10/2021 - 04/2023

Education

Technion - Israel Institute of Technology, Haifa, Israel — 12/2016 - 12/2020
Ph.D. in Environmental Engineering
Thesis: "Experimental study of thermally driven anabatic flows"
Advisor: Dan Liberzon

Technion - Israel Institute of Technology, Haifa, Israel — 10/2013 - 12/2016
M.S. in Environmental Engineering
Thesis: "Turbulence of anabatic (up-slope) thermally driven flow"
Advisor: Dan Liberzon

University of California, Berkeley, Berkeley, CA, USA — 08/2009 - 05/2012
B.S. in Environmental Economics and Policy

Awarded Grants

National Science Foundation grant, NSF 2019712, 2019
Title: "Seeing the Wind: Leveraging flow-structure interactions for visual anemometry"

Israel Science Foundation grant, ISF 2063/19, 2018
Title: "Investigation of thermally driven anabatic flows driving pollution and other scalar transport"

Office of Naval Research grant, STEM FOA N00014-23-S-F005, 2023
Title: "Stories of Women in Fluids Initiative: Anthologies to Inspire and Support Tomorrow's Leaders"

American Physical Society (APS) Forum on Outreach and Engaging the Public (FOEP) mini grant, 2023
Title: "Stories of Women in Fluids Initiative: Anthology Book Series"

Publications

Note: underline denotes mentees

Sheng S, Pradhan O, Cooper K, **Goldshmid RH**, Emami A. Experimentally characterizing atmospheric turbulence effects on millimeterwave propagation. *IGARSS 2024*, Submitted, 2024.

Goldshmid RH, Liberzon D. Laboratory investigation of nominally two-dimensional anabatic flow on symmetric double slopes. *Physics of Fluids*, 35, 115137, 2023. https://doi.org/10.1063/5.0164984

Dabiri JO, Howland MF, Fu MK, **Goldshmid RH**. Visual anemometry for physics-informed inference of wind. *Nature Reviews Physics*, 2023. https://doi.org/10.1038/s42254-023-00626-8

Sun JJ, Ryou S, **Goldshmid RH**, Weissbourd B, Dabiri JO, Anderson DJ, Kennedy A, Yue Y, Perona P. Self-supervised keypoint discovery in behavioral videos. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pp. 2171-2180, 2022. https://doi.org/10.1109/CVPR52688.2022.00221

Goldshmid RH, Winiarska E, Liberzon D. Next generation combined sonic-hotfilm anemometer: wind alignment and automated calibration procedure using deep learning. *Experiments in Fluids*, 63(1):30, 2022. https://doi.org/10.1007/s00348-022-03381-1

De Serio F, **Goldshmid RH**, Liberzon D, Mossa M, Negretti ME, Pisaturo GR, Righetti M, Sommeria J, Termini D, Valran T, Viboud S. Turbulent jet through porous obstructions under Coriolis effect: an experimental investigation. *Experiments in Fluids*, 62:1-5, 2021. https://doi.org/10.1007/s00348-021-03297-2

Mossa M, **Goldshmid RH**, Liberzon D, Negretti ME, Sommeria J, Termini D, De Serio F. Quasi-geostrophic jet-like flow with obstructions. *Journal of Fluid Mechanics*, 921:A12, 2021. https://doi.org/10.1017/jfm.2021.501

Goldshmid RH, Liberzon D. Automated identification and characterization method of turbulent bursting from single-point records of the velocity field. *Measurement Science and Technology*, 8;31(10):105801,2020.https://doi.org/10.1088/1361-6501/ab912b

Goldshmid RH, Liberzon D. Obtaining turbulence statistics of thermally driven anabatic flow by sonic-hot-films. *Environmental Fluid Mechanics*, 2018.https://doi.org/10.1007/s10652-018-9649-x

Goldshmid RH, Bardoel SL, Hocut CM, Zhong Q, Liberzon D, Fernando HJ. Separation of upslope flow over a plateau. *Atmosphere*, 30;9(5):165, 2018.https://doi.org/10.3390/atmos9050165

Teaching

AE 403 Aerospace Engineering Senior Project, SDSU	2024
Guest Lecturer *AE104 Experimental Methods, Caltech*	2024
Awarded "Teaching Excellence Awards" of course sizes of 50 to 300 students	2016 - 2020
Served as the supervising teaching assistant of 2-7 other TAs	
014211 Introduction to Fluid Mechanics, Technion	2015 - 2020
014006 Introduction to Numerical Methods, Technion	2015 - 2020
014006 Introduction to Numerical Methods, Technion International Program	2016 - 2020
014942 Hydraulic and Reservoir Engineering, Technion	2014 - 2015

Invited talks

Non-intrusive Wind Measurements for Aerospace Applications. Department of Aeronautics & Astronautics, Stanford University, Stanford, CA, USA. 2024

Non-intrusive Wind Measurements for Aerospace Applications. GALCIT Colloquium, Caltech, Pasadena, CA, USA. 2024

Non-intrusive Wind Measurements for Aerospace Applications. Department of Aerospace, San Diego State University, San Diego, CA, USA. 2024

The Stories of Women in Fluids Initiative: Actions for the future. APS DFD, Washington D.C., USA. 2023

The Stories of the Women in Fluids Initiative: Our Origins and Purpose. APS DFD, Washington D.C., USA. 2023

The Stories of Women in Fluids: Persevere, Survive, and Thrive. APS DFD, Washington D.C., USA. 2023

Leveraging fluid mechanics for the climate challenge. Department of Mechanical Engineering at *Tel Aviv University*, Tel Aviv, Israel. 2023

Sensing the wind using computer vision and vegetation. Department of Mechanical Engineering at the *University of Michigan*, Ann Arbor, Michigan, USA. 2023

Sensing the wind with vegetation. Engineering Department Seminar at the *University of Wisconsin-Madison*, Madison, Wisconsin, USA. 2022

Deep learning for visual anemometry. Computational Cameras Group seminar at *Caltech*, Pasadena, California, USA. 2022

Talks

Towards generalization of visual anemometry using honami wave theory. 76$^{\text{th}}$ annual American Physical Society Division of Fluid Dynamics conference. Washington, D.C., USA. 2023

Fine-scale characterization of urban atmospheric turbulence for reproduction in multi-fan wind facility. 76$^{\text{th}}$ annual American Physical Society Division of Fluid Dynamics conference. Washington, D.C., USA. 2023

Experimental investigation of anabatic (upslope) turbulent boundary layer flow properties. The 103$^{\text{rd}}$ Amerian Meteorological Society annual meeting. Denver, Colorado, USA. 2023

Physical constraints on visual anemometry from vegetation displacement statistics. 75$^{\text{th}}$ annual American Physical Society Division of Fluid Dynamics conference. Indianapolis, Indiana, USA. 2022

Visual AnemomeTree: Using deep learning to predict wind speeds from videoclips of swaying trees and canopies in nature. Ocean Sciences Meeting. Hawaii, Virtual meeting. 2022

Visual Anemometry: wind speed prediction using deep learning. Fluid Mechanics Research Conference at *Caltech*. Pasadena California, USA. 2022

Visual AnemomeTree: using deep learning to predict wind speeds from videoclips of swaying trees in nature. 74$^{\text{th}}$ annual American Physical Society Division of Fluid Dynamics conference. Phoenix, AZ, USA. 2021

Visual anemometry: using deep learning to predict wind speeds from videoclips of swaying trees and canopy in nature. Southern California Fluid Mechanics Conference, Virtual. 2021

Experimental study of thermally driven anabatic flows. PhD Defense at the *Technion-Israel Institute of Technology*, Haifa, Israel. 2020

Automatic identification and characterization of bursting periods in a turbulent velocity field. 72$^{\text{nd}}$ annual American Physical Society Division of Fluid Dynamics conference. Seattle, Washington, USA. 2019

Observations of water waves and wind-wave interactions in the Gulf of Aqaba (Eilat). 72nd annual American Physical Society Division of Fluid Dynamics conference. Seattle, Washington, USA. 2019.

Jets interacting with vegetation in the rotating LEGI platform. European Geosciences Union conference. Vienna, Austria. 2019

Experimental investigation of upslope flow separation on smooth and rough symmetric slopes. International Symposium on Environmental Hydraulics. South Bend, Indiana, USA. 2018

Experimental study of thermally driven anabatic flows. PhD Candidacy at the *Technion-Israel Institute of Technology*, Haifa, Israel. 2017

Statistical parameters of thermally driven turbulent anabatic flow. 69$^{\text{th}}$ annual American Physical Society Division of Fluid Dynamics conference. Portland, Oregon, USA. 2016

Turbulence of anabatic (up-slope) thermally driven flow. Final M.S. Defense at the *Technion-Israel Institute of Technology*, Haifa, Israel. 2016

Experimental study in search of spray generation mechanisms of wind induced water waves with absence of whitecaps. M.S. Candidacy at the *Technion-Israel Institute of Technology*, Haifa, Israel. 2015

Honors, prizes, and awards

Named Presidential Postdoctoral Fellow as part of the National Science Foundation and California Alliance for Graduate Education and the Professoriate (AGEP), *Caltech* 2023

Named a **rising star** in mechanical engineering, *Stanford University* 2022

Selected as one of 20 participants to the International Computer Vision Methods for Ecology workshop at *Caltech*, 2022

Teaching Excellence Awards, *Technion*, 2016-2020

Grinshpen prize for excellent research in environmental engineering and air quality, *Technion*, 2016

College of Natural Resources dean's honor roll, *University of California, Berkeley*, 2012

DATASETS

Goldshmid RH, Dabiri JO. Visual anemometry measurements of eight vegetation species. *CaltechDATA*, 2023.

De Serio F, Mossa M, Liberzon D, **Goldshmid RH**, Negretti ME, Sommeria J, Termini D, Pisaturo GR, Righetti M, Viboud S, Valran T. JEts through VEegetation in a Rotating Basin. *Zenodo*, 2021.

Goldshmid, RH, Liberzon, D. Experimental data revealing the 3D behavior of anabatic flow. *Mendeley Data*, 2020.

Goldshmid, RH, Liberzon, D. Anabatic flow field measurements and the detection algorithm of turbulent bursting periods. *Mendeley Data*, 2020.

Community Work

EQUITY, DIVERSITY, AND INCLUSION

Stories of Women in Fluids Initiative (SOWIF)
Two anthologies are being created as part of this initiative that sprouted in the 2022 annual conference of the American Physical Society Division of Fluid Dynamics, see newsletter, p.11. The first aims to encourage young girls to join the field of fluid dynamics, *Middle Grade* anthology. The second aims to mentor women already in the field of fluid dynamics *Career Journey* anthology. Co-authored several *successful* grants to fun the initiative.

- Serve on the **Leadership Committee, Career Content Committee**
- Author a chapter in *Career Journey* anthology
- Co-organize and minisymposium at APS DFD 2023 and invite speakers to talks

Research mentor in the First-Year Success Research Institute (FSRI) program to **introduce incoming historically excluded and/or marginalized first-year students to research** at *Caltech*, since 2023

Leadership role in the Future Ignited program at *Caltech* Accountability Partners Program to **increase diversity and inclusion in STEM**, since 2023

Future ignited mentor in the *Caltech* Accountability Partners Program to **increase diversity and inclusion in STEM**, since 2022.

Peer Mentor at American Physical Society Division of Fluid Dynamics conference to **increase equity and inclusively in STEM**, since 2022

Educating4Excellence mentor for elementary school kids from marginalized communities to **increase diversity, equity, and inclusively in STEM**, Israel 2013-2017

Sage Mentorship Project mentor for elementary school kids from marginalized communities to **increase diversity, equity, and inclusively in STEM**, Berkeley, CA 2010-2012

ACADEMIC SERVICE

Caltech Postdoctoral Association (CPA)
President of CPA, 2022 - 2023

CPA Treasurer, 2021 - 2022

CPA EAS Division Representative, 2021 - 2022

Serving at *Caltech* Committees

Caltech Postdoctoral Studies Committee member, 2022 - 2024

Caltech Fututre Ignited Committee member, 2023 - 2023

Postdoc Representative at *Caltech Faculty Board meetings*, 2022- 2023

Conference Service

Session chair, APS Division of Fluid Dynamics 2022 Annual Conference

Abstract sorting, APS Division of Fluid Dynamics 2021 Annual Conference

Session chair, APs Division of Fluid Dynamics 2021 Annual Conference

Reviewer

Physics of Fluids

Journal of Fluid Mechanics

Caltech Summer Undergraduate Research Fellowships (SURF)

Caltech Computer Vision for Ecology Workshop (CV4Ecology)

TED Audacious Project

Editor

APS Wiki Scientists 7

Competition Judge

Caltech Summer Undergraduate Research Fellowships (SURF) final competition

Caltech Three Minute Thesis (3MT) final competition

Research Mentorship

Certificate of Leadership Development from *Caltech*, 2022

Transforming Your Research into Teaching, 2023

Press Coverage

Featured on AeroWomen, 12/2023

Featured on the Caltech Vibrations magazine, Engineering and Applied Sciences, *Caltech* 09/2022

Visual anemometery talk named newsworthy at the annual American Physical Society Division of Fluid Dynamics conference, 2021