

# TOMER DUMAN, PhD

## RESEARCH ASSISTANT PROFESSOR DEPARTMENT OF BIOLOGY UNIVERSITY OF NEW MEXICO

EMAIL ADDRESS: [tomerduman@unm.edu](mailto:tomerduman@unm.edu)

PHONE NUMBER: +1 919 308 0231

RESEARCHGATE PROFILE: [www.researchgate.net/profile/Tomer\\_Duman](http://www.researchgate.net/profile/Tomer_Duman)

GOOGLE SCHOLAR PROFILE: <http://scholar.google.com/citations?user=Q5sn1ecAAA&hl=en>

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### EDUCATION

PhD (direct track) in *Agricultural Engineering*, Technion - Israel Institute of Technology, Haifa, Israel (2006 - 2012)

*Thesis Title:* Particle transport at porous media interfaces

*Advisor:* Prof. Uri Shavit

BSc in Agricultural Engineering (*Summa Cum laude*), Technion - Israel Institute of Technology, Haifa, Israel (2003 - 2006)

### WORK EXPERIENCE

Department of Biology, University of New Mexico, Albuquerque, NM

Jan 2018 – today

Research Assistant Professor

- Studying the effects of extreme drought events on ecosystem processes in the New Mexico Elevation Gradient, using long-term measurements of eddy covariance, soil and vegetation data.
- Development of algorithms for studying the effects of climate-driven land-cover conversions on energy and flux balance
- In charge of quality control, processing, analysis and submission of Ameriflux core site, including 7 flux towers.

Rutgers University, Newark, NJ

Jan 2016 – Sep 2017

Postdoctoral associate

- Bridging between atmospheric sciences and ecosystem ecology research in the study of coastal tidal wetlands. Studying the effects of human amendments and wetland restoration on carbon gas exchange, and estimating the productivity and carbon storage potential of wetlands.
- Measurement and analysis of eddy covariance data, flux chamber measurements of soil respiration, leaf gas exchange and other environmental factors.
- collecting data and performing instrument maintenance at two flux towers in the Meadowlands

Nicholas School of the Environment, Duke University

Sep 2012 – Dec 2015

Postdoctoral researcher

- Numerical modeling and analysis of atmospheric boundary layer data in canopy environments.
- Development of models to predict the dispersion of gasses and particles in atmospheric turbulence and tools to assess the footprint of eddy covariance measurements, using Lagrangian stochastic methods.

**TEACHING  
AND MENTORING  
EXPERIENCE**

Teaching assistant, Technion - Israel Institute of Technology, Haifa, in the following courses: Applied mechanics 1, Applied mechanics 2, Pumps and pumping systems. Teaching included full responsibility for preparing and giving tutorials, writing and checking homework assignments and exams (2003-2012).

Guest lecturer in the graduate courses: atmospheric boundary-layer flows, Duke University (2015); New Frontiers in Earth System Science, Rutgers University (2017); Biology 480/580 Global Change Biology, UNM (2018-2020)

Mentorship/Student Supervision:

Ryan Schultze - Master student – 2020-2021

Diane Radwanski - Master student - Spring 2016

Serafima Kurepa - Master student - Fall 2016 – Fall 2017

Kristen Tomasicchio - Master student - Fall 2016 – Fall 2017

Yanting Hu - Visiting PhD student - Fall 2016

Hayley Hilfer, Michael Kirtz (Summer 2016), Amber Bartlett, Chioma Anaemejeh, Chisomnazu Nwigwe (summer 2017) - Undergraduate research assistants - REU (Research Experience for Undergraduates) -

Halima Mahmoud - Undergraduate research assistant - LSAMP (Louis Stokes Alliances for Minority Participation) - Summer 2016

Giselle Guaman (summer 2016,2017), Ranol Handapangoda (summer 2017) - High school summer research interns - the American Chemical Society SEED program

**EDITORIAL  
RESPONSIBILITIES**

Reviewer for the following international journals:

Advances in Water Resources (Elsevier)

Agricultural and Forest Meteorology (Elsevier)

Boundary-Layer Meteorology (Springer)

Ecological Engineering (Elsevier)

Frontiers Plant Science

International Journal of Heat and Mass Transfer (Elsevier)

Journal of Geophysical Research - Biogeosciences

Journal of Hydrology

Scientific Reports (Nature)

Transport in Porous Media (Springer)

Water Resources Research

Reviewer for NSF grant proposals

## LIST OF PUBLICATIONS

### PUBLICATIONS IN PEER REVIEWED JOURNALS

- Housen Chu, Xiangzhong Luo, Zutao Ouyang, W. Stephen Chan, Sigrid Dengel, Sébastien C. Biraud, Margaret S. Torn, Stefan Metzger, Jitendra Kumar, M. Altaf Arain, Tim J. Arkebauer, Dennis Baldocchi, Carl Bernacchi, Dave Billesbach, T. Andrew Black, Peter D. Blanken, Gil Bohrer, Rosvel Bracho, Shannon Brown, Nathaniel A. Brunsell, Jiquan Chen, Xingyuan Chen, Kenneth Clark, Ankur R. Desai, Tomer Duman, David Durden, Silvano Fares, Inke Forbrich, John A. Gamon, Christopher M. Gough, Timothy Griffis, Manuel Helbig, David Hollinger, Elyn Humphreys, Hiroki Ikawa, Hiroki Iwata, Yang Ju, John F. Knowles, Sara H. Knox, Hideki Kobayashi, Thomas Kolb, Beverly Law, Xuhui Lee, Marcy Litvak, Heping Liu, J. William Munger, Asko Noormets, Kim Novick, Steven F. Oberbauer, Walter Oechel, Patty Oikawa, Shirley A. Papuga, Elise Pendall, Prajaya Prajapati, John Prueger, William L. Quinton, Andrew D. Richardson, Eric S. Russell, Russell L. Scott, Gregory Starr, Ralf Staebler, Paul C. Stoy, Ellen, Stuart-Haëntjens, Oliver Sonnentag, Ryan C. Sullivan, Andy Suyker, Masahito Ueyama, Rodrigo Vargas, Jeffrey D. Wood, Donatella Zona. Footprint Representativeness of Eddy-Covariance Flux Measurements Across AmeriFlux Sites. *Agricultural and Forest Meteorology* (accepted for publication).
- Duman, T., Bohbot-Raviv, Y., Moltchanov, S., and Shavit, U. Error estimates of double-averaged flow statistics due to sub-sampling in an irregular canopy model. *Boundary-layer meteorology* (accepted for publication).
- Duman, T., Huang, C.W. and Litvak, M.E., (2020) Recent land cover changes in the Southwestern US lead to an increase in surface temperature. *Agricultural and Forest Meteorology*, 108246.
- Huang, C.W., Krofcheck, D.J., Duman, T., Fox, A.M., Pockman, W.T., Lippit, C.D., McIntire, C.D. and Litvak, M.E., 2020. Ecosystem-level energy and water budgets are resilient to canopy mortality in sparse semi-arid biomes. *Journal of Geophysical Research: Biogeosciences*, p.e2020JG005858.
- Hu, Y., Duman, T., Vanderklein, D., Zhao, P. and Schäfer, K.V., 2019. A stomatal optimization approach improves the estimation of carbon assimilation from sap flow measurements. *Agricultural and Forest Meteorology*, 279, p.107735.
- Schäfer, K.V.R., Duman, T., Tomasicchio, K., Tripathee, R., Sturtevant, C., (2019). Carbon dioxide fluxes of temperate urban wetlands with different restoration history. *Agricultural and Forest Meteorology*, 275, 223-232.
- Treep, J.H., de Jager, M., Kuiper, L.S., Duman, T., Katul, G.G., Soons, M.B., (2018) Costs and benefits of non-random seed release for long-distance dispersal in wind-dispersed plant species, *Oikos*. 127(9), 1330-1343.
- Duman, T., Holtzman, R. and Shavit, U., (2018). The effect of gravitational settling on concentration profiles and dispersion within and above fractured media. *International Journal of Multiphase Flow*.
- Duman, T., Schäfer, K.V.R., (2017). Partitioning net ecosystem exchange of native and invasive plants in an urban tidal wetland. *Ecological Engineering*. DOI 10.1016/j.ecoleng.2017.08.031
- Ghannam, K., Duman, T., Salesky, S., Chamecki, M., Katul, G. The nonlocal character of turbulence asymmetry in the convective atmospheric boundary layer. (2017). *Quarterly Journal of the Royal Meteorological Society*. 143(702), 494-507.
- Huang, C.W., Domec, J.C., Ward, E., Duman, T., Manoli, G., Parolari, A., Katul, G. (2016). The effect of plant water storage on water fluxes within the coupled soil-plant system, *New Phytologist*, 213(3), 1093-1106.
- Duman, T., Trakhtenbrot, A., Poggi, D., Cassiani, M., Katul, G. (2016). Dissipation intermittency increases long-distance dispersal of heavy particles in the canopy sublayer, *Boundary-Layer Meteorology*, 159(1), 41-68.
- Moltchanov, S., Bohbot-Raviv, Y., Duman, T., Shavit, U. (2015). Canopy edge flow: a momentum balance analysis, *Water Resources Research*, 51(4), 2081-2095.
- Duman, T., Siqueira M., Tanny J., Katul, G. (2015). Footprint estimation of water vapor and CO<sub>2</sub> sources and sinks in screenhouse-protected agro-systems, *Boundary-Layer Meteorology*, 155(2), 229-248.
- Duman, T., G.G. Katul, M.B. Siqueira, Cassiani M. (2014). A velocity-dissipation Lagrangian stochastic model for turbulent dispersion in atmospheric boundary layer and canopy flows, *Boundary-Layer Meteorology*, 152(1), 1-18.
- Duman, T. and Shavit, U., (2010). A solution of the laminar flow for a gradual transition between porous and fluid domains, *Water Resources Research*, 46(9), W09517.

Duman, T. and Shavit, U., (2009). An apparent interface location as a tool to solve the porous interface flow problem. *Transport in Porous Media*, 78(3), 509-924.

## CONFERENCES PRESENTATIONS

- Litvak, M.E., Duman, T., Webster, A., Using flux towers, remote sensing and resilience theory to quantify resiliency of dryland carbon sequestration to drought and disturbance. The American Geophysical Union Annual Fall Meeting, New Orleans (2021).
- Duman, T., Huang, C.W., Krofcheck, D., and Litvak, M.E., Response of Surface Temperature to Fire in a Semi-Arid Subalpine Forest in the Southwestern U.S. 2019 AmeriFlux PI Meeting, Boulder, CO (2019).
- Wu, Z., Walker, J.T., Chen, X., Oishi, A.C. and Duman, T., Estimating Sources, Sinks, and Fluxes of Reactive Nitrogen and Sulfur within a Forest Canopy Using Eulerian and Lagrangian Inverse Models. 99th American Meteorological Society Annual Meeting, Phoenix, AZ (2019).
- Duman, T., Huang, C.W. and Litvak, M.E., Impact of drought on daytime surface temperature in semi-arid biomes across the New Mexico Elevation Gradient. The American Geophysical Union Annual Fall Meeting, San Francisco (2019).
- Litvak, M.E., Krofcheck, D., Duman, T., and Huang, C.W., Semi-arid biome vulnerability to nearly two decades of uncharacteristic drought in the Southwestern US. The American Geophysical Union Annual Fall Meeting, San Francisco (2019).
- Duman, T., Huang, C.W. and Litvak, M.E., The Effects of Land-Cover Changes on Surface Temperature in Semi-Arid Ecosystems at the Southwestern United States. The American Geophysical Union Annual Fall Meeting, Washington DC (2018).
- Litvak, M.E., Duman, T., Huang, C.W. and Pockman, W., Biome-specific responses of water-limited ecosystems to precipitation pulses across the New Mexico Elevation Gradient (NMEG). The American Geophysical Union Annual Fall Meeting, Washington DC (2018).
- Huang, C.W., Litvak, M.E., Katul, G.G., Sevanto, S., Anderegg, W., Sala, A., Sapes, G., Duman, T. and Pockman, W., The responses of coordinated xylem-phloem-photosynthetic machinery system to varying environmental conditions. The American Geophysical Union Annual Fall Meeting, Washington DC (2018).
- Schäfer, K.V.R., Tomasicchio, K.M., Duman, T. and Tripathee, R., Modeling and Measuring Methane Emission from Chambers to Ecosystems. The American Geophysical Union Annual Fall Meeting, Washington DC (2018).
- Litvak, M., Duman, T., Huang, C.W., Pockman, W., Drought resilience and recovery of ecosystem function in semi-arid biomes across the Southwestern US. Ecological Society of America Annual Meeting, New Orleans (2018).
- Duman, T., Huang, C.W. and Litvak, M.E., The effect of land-cover conversions on surface temperature in semi-arid ecosystems at the Southwestern United States. 2018 AmeriFlux PI Meeting, Bloomington, Indiana (2018).
- Schafer, K.V., Kurepa, S., Duman, T., Scott, M., Pechmann, I., Vanderklein, D.W., The Effect of Restoration on Soil Respiration in an Urban Tidal Wetland in the Meadowlands, New Jersey, The American Geophysical Union Annual Fall Meeting, New Orleans (2017).
- Wu, Z., Walker, J. T., Chen, X., Oishi, A. C., & Duman, T., Estimation of In-canopy Flux Distributions of Reactive Nitrogen and Sulfur within a Mixed Hardwood Forest in Southern Appalachia. The American Geophysical Union Annual Fall Meeting, New Orleans (2017).
- Duman T., Schäfer, K.V.R., The contribution of coherent structures to momentum and heat fluxes in the atmospheric surface layer above a coastal urban wetland. The American Geophysical Union Annual Fall Meeting, San Francisco (2016).
- Schäfer, K.V.R., Duman T., Kurepa, S., Challenges and Opportunities assessing Methane and Carbon Dioxide dynamics in Tidal Wetlands – the Blue Carbon Perspective. The American Geophysical Union Annual Fall Meeting, San Francisco (2016).
- Schäfer, K.V.R., Radwanski, D., Duman, T., Clark, K.L., Canopy water use efficiency before, during and after gypsy moth attack in an upland forest in the New Jersey Pine Barrens. Ecological Society of America Annual Meeting, Florida (2016).

- Duman, T., Walker, J.T., Bash, J.O., Ghannam, K., Huang, C.W., Khlystov, A., Katul, G., Estimating sources, sinks and fluxes of reactive atmospheric compounds within a forest canopy. The American Geophysical Union Annual Fall Meeting, San Francisco (2015).
- Ghannam, K., Duman, T., Salesky, S., Chamecki, M., Katul, G. Closure of the heat flux budget with the ejection-sweep cycle in the convective atmospheric boundary layer. The American Geophysical Union Annual Fall Meeting, San Francisco (2015).
- Huang, C.W., Domec, J.C., Duman, T., Manoli, G., Parolari, A., Katul, G. The Role of Plant Water Storage on Water Fluxes within the Coupled Soil-Plant System. The American Geophysical Union Annual Fall Meeting, San Francisco (2015).
- Duman, T., Trakhtenbrot, A., Poggi, D., Cassiani, M., Katul, G., A Velocity-Dissipation Stochastic Trajectory Model for Dispersal of Heavy Particles inside Canopies. The American Geophysical Union Annual Fall Meeting, San Francisco (2014).
- Duman, T., Siqueira, M., Tanny, J., and Katul, G., Footprint Estimation from Multi-Layered Sources in Forests and Protected Agro-Systems. 31st Conference on Agricultural and Forest Meteorology, Portland, OR (2014).
- Duman, T., Siqueira, M., Tanny, J., and Katul, G., Footprint estimation of water vapor and CO<sub>2</sub> sources and sinks in greenhouse-protected agro-systems using a Superstatistical Lagrangian model. The American Geophysical Union Annual Fall Meeting, San Francisco (2013).
- Duman, T., and Katul, G., The effects of time-dependent turbulent kinetic energy dissipation rate on particle trajectory models in canopy flows, International Workshop on Eco-hydrology of semiarid environments, Beer Sheva, Israel (2013).
- Shavit, U., Moltchanov, S., Duman, T., and Bohbot-Raviv, Y., Canopy edge flows, International Workshop on Eco-hydrology of semiarid environments, Beer Sheva, Israel (2013).
- Bohbot-Raviv, Y., Moltchanov, S., Duman, T., and Shavit, U., A Lattice Boltzmann model (LBM) and Particle Image Velocimetry (PIV) measurements of the turbulent flow within and above a finite modeled canopy, International Workshop on Eco-hydrology of semiarid environments, Beer Sheva, Israel (2013).
- Duman, T., Bohbot-Raviv, Y., Moltchanov, S., and Shavit, U., On the Importance of Spatial Information in Modeling Scalar Dispersion in Canopy Flows, The American Geophysical Union Annual Fall Meeting, San Francisco (2012).
- Duman, T., Bohbot-Raviv, Y., and Shavit, U., A Lagrangian stochastic model for particle transport within canopy turbulence, the 3rd International Symposium on Shallow Flows, Iowa, USA (2012).
- Duman, T., and Shavit, U., An apparent interface location as a tool to solve the porous interface flow problem, Annual conference of the Israeli Soil Science and Agricultural Engineering societies, Haifa, Israel (2009).
- Duman, T., and Shavit, U., Modeling permeability at the transition layer of fluid-porous interfaces, The 7th Double Averaging Method (DAM) Workshop, Izmir, Turkey (2008).
- Duman, T., and Shavit, U., An apparent interface location as a tool to solve the porous interface flow problem, River Flow - International Conference on Fluvial Hydraulics, Izmir, Turkey (2008).