

**Annalisa Molini, Ph.D.**

Associate Professor  
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**EDUCATION:**

Ph.D., University of Basilicata and University of Genova, Italy, 2002  
M.S., University of Genova, Italy, 1998.

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**RESEARCH INTERESTS:**

- Hydroclimatology and Hydrological extremes,
- Soil-vegetation-atmosphere interactions,
- Ecohydrology of saline environments,
- Process-based modeling of hydrological and environmental processes,
- Climate change impacts on water resources and food security,
- Dry land hydro-climatology,
- Food-water-energy nexus and sustainable development,
- Climate sciences and micrometeorology applied to solar energy harvesting,

**BIOGRAPHY:**

Dr. Molini received her Master's degree in environmental sciences (Summa cum Laudæ) from the University of Genova (Italy) with a Major in Physics of Atmosphere, and her Ph.D. in Civil and Environmental Engineering from the University of Genova and the University of Basilicata (Italy) with a major in Hydroclimatology.

She is currently an Associate Professor in the River-Coastal Science and Engineering Department at Tulane University. Before joining Tulane University, she was an Associate Professor in the Civil Infrastructure and Environmental Engineering Department of Khalifa University of Science and Technology with a joint appointment at Masdar Institute, Abu Dhabi, United Arab Emirates, a Visiting Assistant Professor at the Ralph M. Parsons Laboratory of the Massachusetts Institute of Technology (MIT), and a Research Associate at Duke University, in the Department of Civil and Environmental Engineering, with a joint appointment at the Nicholas School of the Environment. She also served as a data manager and analyst in the World Meteorological Organization (WMO) Field Inter-comparison of Rainfall Intensity Gauges at the Italian Air-force Meteorological Center of Vigna di Valle, Rome, Italy.

Her research focuses on the connections between *the hydrological cycle, vegetation, and climate*, embracing several related research topics such as hybrid physically-based/stochastic models for ecohydrology, hydrometeorology, land/vegetation-atmosphere interactions at global, regional, and local scales, plant hydraulics, boundary layer meteorology and the modeling of extreme hydrological and environmental processes such as severe droughts and flash-floods.

Over the last ten years, she developed her research agenda at the interface between hydrology, physical climatology, ecohydrology, and sustainability sciences spanning different fields related to water

resources availability and food/water security in a changing climate, changes in the precipitation regime, and the ecohydrology of saline environments.

She is an Editor for Hydrological Processes (Wiley), where she is responsible for handling submissions in the field of ecohydrology, stochastic hydrology, and hydrometeorology, and an Associate Editor for Water and Wastewater Management (Frontiers in Environmental Science). In 2021, she served as an Expert team member (Arabian Peninsula) of the COP26 ‘Visions for a Net Zero Future’, in collaboration with Cambridge University UK.

### **SELECTED PUBLICATIONS:**

- Perri, S., Suweis, S., Marpu, P., Holmes, A., Entekhabi, D. and A. Molini (2020) River basin salinization as a form of aridity, *Proceedings of the National Academy of Sciences*, **117**(30), 17635–17642; doi:10.1073/pnas.2005925117.
- Yin, J., Molini, A. and A. Porporato (2020) Impacts of Solar Intermittency on Future Photovoltaic Reliability, *Nature Communications*, **11**, 4781; doi:10.1038/s41467-020-18602-6.
- Perri, S., Katul G., and A. Molini (2019) Xylem-phloem hydraulic coupling explains multiple osmoregulatory responses to salt-stress, *New Phytologist*, **224**, 644–662, doi:10.1111/nph.16072.
- Perri, S., Suweis, S., Entekhabi, D., and A. Molini (2018) Vegetation controls on dryland salinity, *Geophysical Research Letters*, **45**, 11,669–11,682, doi:10.1029/2018GL079766.
- Perri, S., Entekhabi, D. and A. Molini (2018) Plant Osmoregulation as an Emergent Water-Saving Adaptation, *Water Resources Research*, **54**(4), 2781–2798, doi:10.1002/2017WR022319.
- Lazzarini, M., Molini, A., Marpu, P.R., Ouarda, T.B.M.J. and H. Ghedira (2015) Urban climate modifications in hot-desert cities: The role of land-cover, local climate and seasonality, *Geophysical Research Letters*, **42**(22), 9980–9989, doi:10.1002/2015GL066534.
- Casagrande, E., Mueller, B., Miralles, D., Entekhabi, D. and A. Molini, (2015) Wavelet correlations to reveal multiscale coupling in geophysical systems, *Journal of Geophysical Research-Atmosphere*, **120**(15), 7555–7572, doi:10.1002/2015JD023265.
- Kumar, N.K., Entekhabi, D. and A. Molini (2015) Hydrological extremes in hyper- arid regions: A diagnostic characterization of intense precipitation over the Central Arabian Peninsula, *Journal of Geophysical Research-Atmospheres*, **120**(5), 1637–1650, doi:10.1002/2014JD022341.
- Lepore, C., Veneziano, D. and A. Molini (2015) Temperature and CAPE Dependence of Rainfall Extremes in the Eastern United States, *Geophysical Research Letters*, **42**(1), 74– 83, doi:10.1002/2014GL062247.
- Detto, M., Molini, A., Katul, G. G., Stoy, P., Palmroth, S. and D. Baldocchi (2012) Causality and Persistence in Ecological Systems: A Nonparametric Spectral Granger Causality Approach, *American Naturalist*, **179**(4), 524–535, doi:10.1086/664628.
- Molini, A., Talkner, P., Katul, G. and A. Porporato (2011) First passage time statistics of Brownian motion with purely time dependent drift and diffusion, *Physica A*, **390**(11), 1841–1852, doi:10.1016/j.physa.2011.01.024.
- Molini A., Katul, G. and A. Porporato (2011) Maximum discharge from snowmelt in a changing climate, *Geophysical Research Letters*, **38**, L05402, doi:10.1029/2010GL046477.
- Molini, A., Katul, G.G. and A. Porporato (2010) Scale-wise evolution of rainfall probability density functions fingerprints the rainfall generation mechanism, *Geophysical Research Letters*, **37**, L07403, doi:10.1029/2010GL042634.
- Molini, A., Katul, G.G. and A. Porporato (2010) Causality Across Rainfall Time Scales: A Wavelet Approach, *Journal of Geophysical Research-Atmospheres*, **115**, D14123, doi:10.1029/2009JD013016.

Molini, A., Katul, G. and A. Porporato (2009) Revisiting rainfall clustering and intermittency across different climatic regimes, *Water Resource Research*, **45**, W11403, doi:10.1029/2008WR007352.

Full list of publications available [here](#).

### **COURSES**

RCSE 6660 – Environmental Data Analysis in the Anthropocene (Fall 2022, Co-instructor)

RCSE 6850 – Rivers and Estuaries (Spring 2023, Co-instructor)