

Ammara Talib University of Wisconsin Madison
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[Google Scholar](#)

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EDUCATION

PhD Candidate Civil and Environmental Engineering University of Wisconsin Madison
06/ 2023

Thesis: Prediction and forecasting of Evapotranspiration (ET) and Ground water elevation (GWE) along with improved parameterization of ET in agricultural lands

MS Environmental Conservation (Water, Watersheds, and Wetlands)
cGPA-3.93/4

Thesis: Department of Environmental Conservation University of Massachusetts Amherst, USA
Thesis: Assessment of impacts of land use land cover (LULC) and climate change on water resources in SuAsCo watershed, Massachusetts
Managing emerging contaminants in watersheds: need for comprehensive, systems-based strategies

BS Earth & Environmental Sciences, College of Earth & Environmental Science, University of the Punjab, Lahore, Pakistan
cGPA-3.78/4

Thesis: Environmental Impact Assessment of Pan power plant near residential area in Pakistan
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ACADEMIC WORK EXPERIENCE

09/2018-2023 Research Assistant University of Wisconsin Madison
Duties included: Developing a Hydrologic model for water budget in Central Sands Wisconsin

01/2018-Present Teaching Assistant University of Wisconsin Madison
Duties included: Independent Project (IP) instructor for Introductory Biology (Bio 151, Bio 152). Guiding and preparing students for writing/presenting a scientific paper based on data obtained from meta-analysis as well as data from mentors, address concepts in cellular molecular biology, genetics and mammalian anatomy and physiology.

09/2018-12/2018 Teaching Assistant University of Wisconsin Madison
Duties included: Instructor for Meteorological measurement course (AOS 404). Guiding and preparing students for using instruments such as weather station, CO₂ Tracker, Windsond, DustTrak for meteorological measurements for NSF funded SAVANT project.

07/2015-05/2018 Research Assistant Environmental Fluid Mechanics Lab, Madison WI

09/2012-05/2015 Fulbright Research Fellow, Department of Environmental Conservation University of Massachusetts Amherst, USA

09/2006-08/2011: Science Teacher (Physics, Chemistry) to middle, High school students in Pakistan
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CURRENT RESEARCH

- Forecasting ground water fluctuation under the influence of high-density ground water pumping in Wisconsin.
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PUBLICATIONS

1. Talib, A., Desai, A. R., Huang, J., Spatial and Temporal Characterization of Forecasting GW anomalies in Wisconsin Central Sands (WCS) (**in preparation**)
2. Talib, A., Desai, A. R., Huang, J., Improving parameterization of atmospheric emissivity of a regional irrigation scheduling program for evapotranspiration estimation using eddy covariance measurements (**in preparation**)
3. Talib, A. and Randhir T. O. (2022) Long-term effects of Land-use Change on Water Resources in Urbanizing Watersheds **Submitted in *PLOS Water***, manuscript # PWAT-D-22-00096
4. Desai, A.R., J. Thom, S. Wiesner, B. Butterworth, N. Koupaei-Abyazani, A. Merrelli, B. Murphy, A. Muttakin, S. Paleri, A. Talib, J. Turner, J. Mineau. (2022). Drivers of decadal carbon fluxes across temperate ecosystems. *Journal of Geophysical Research: Biogeosciences*, <https://doi.org/10.1029/2022JG007014>
5. Ebert, L. A., Talib, A., Zipper, S. C., Desai, A. R., Paw U, K. T., Chisholm, A. J., Prater, J., & Nocco, M. A. (2022). How High to Fly? Mapping Evapotranspiration from Remotely Piloted Aircrafts at Different Elevations. *Remote Sensing*, 14(7). <https://doi.org/10.3390/rs14071660>
6. Talib, A., Desai, A. R., Huang, J., Griffis, T. J., Reed, D. E., & Chen, J. (2021). Evaluation of prediction and forecasting models for evapotranspiration of agricultural lands in the Midwest US. *Journal of Hydrology*, 126579. <https://doi.org/10.1016/j.jhydrol.2021.126579>
7. Chatterjee, S., Stoy, P. C., Debnath, M., Nayak, A. K., Swain, C. K., Tripathi, R., Chatterjee, D., Mahapatra, S. S., Talib, A., & Pathak, H. (2021). Actual evapotranspiration and crop coefficients for tropical lowland rice (*Oryza sativa* L.) in eastern India. *Theoretical and Applied Climatology*, 146(1–2). <https://doi.org/10.1007/s00704-021-03710-0>
8. Talib, A and T. O. Randhir. 2017. Climate change and land use impacts on hydrologic processes of watershed systems *Journal of Water and Climate Change* <https://doi.org/10.2166/wcc.2017.064>
9. Talib, A. and T. O. Randhir (2017), Managing emerging contaminants in watersheds: Need for comprehensive, systems-based strategies, *Sustainability of Water Quality and Ecology*, doi: <https://doi.org/10.1016/j.swaqe.2016.05.002>.
10. Talib, A. and Randhir T. O. (2016) Managing emerging contaminants: status, impacts, and watershed-wide strategies. *Exposure and Health* 8:143–158. doi: [10.1007/s12403-016-0000-0](https://doi.org/10.1007/s12403-016-0000-0)

CONFERENCE PRESENTATIONS

1. Desai, A.R., J. Thom, S. Wiesner, B. Butterworth, N. Koupaei-Abyazani, A. Merrelli, B. Murphy, A. Muttaqin, S. Paleri, **A. Talib**, J. Turner, J. Mineau. (2021) From half-hour to quarter century- Drivers of carbon fluxes across a northern ecosystem tower cluster, AGU Fall Meeting 2021, 13-17 December
2. **Talib A**, Desai, A. R. (2020) What have we learned from continuous crop and forest evapotranspiration observations in the Central Sands? Wisconsin Potato Vegetables & Growers Association, Grower Education Conference & Industry Show, Stevens Point, WI, Feb 5, 2020 (invited)
3. **Talib A**, Desai, A. R. (2020) Water Use by Crops and Forest and Improving Irrigation Planning- American Water Resource Association (AWRA) 44th Annual Conference 2020, 12 March
4. **Talib A**, Desai, A. R. (2020) Improving irrigation planning and early prediction for agricultural drought in Wisconsin, AGU Fall Meeting 2020, 07-11 December
5. LA Ebert, AJ Chisholm, J Prater, SC Zipper, **Talib A**, AR Desai, MA Nocco. (2020) How high to fly? Evaluating different elevations for mapping evapotranspiration from remotely piloted aircrafts, American Geophysical Union (AGU) Fall Meeting 2020, 07-11 December
6. **Talib A**, Desai, A. R. (2019) Improving forecasts of crop water demand with direct ET measurements over irrigated fields, Wisconsin Potato Vegetables & Growers Association, Grower Education Conference & Industry Show, Stevens Point, WI, Feb 5, 2019 (invited)
7. **Talib A**, Desai, A. R. (2019) Field-scale mapping and forecasting of water budgets in intensively irrigated agricultural regions through an advanced ensemble modeling framework, American Geophysical Union (AGU), Fall Meeting 2019, 09-13 December
8. LA Ebert, AJ Chisholm, J Prater, SC Zipper, **Talib A**, AR Desai, MA Nocco. (2019) Using remotely piloted aircrafts to evaluate potato water stress in Central Wisconsin, American Geophysical Union (AGU), Fall Meeting 2019, 09-13 December
9. **Talib, A.** and Desai, A. R; (2018). Efficacy of Machine Learning Algorithms for Identifying Hotspots of Groundwater Depletion in Intensively Irrigated Agricultural Regions, American Geophysical Union (AGU), Fall Meeting 2018, 10-14 December 2018
10. Nocco, M. A. ; McNamee, E. O. ; Bohman, B. ; **Talib, A.** ; Rosen, C. J. ; Desai, A. R. ; Kern, C. C. ; Kucharik, C. J. ; Twine, T. E. (2018) Pine to Potato Conversion Impacts to

Groundwater Recharge in the Northern Great Lakes Region, American Geophysical Union (AGU), 10-14 December 2018

11. **Talib, A.** and Desai, A. R. 2018, Water from ground to sky: New approaches to observing and predicting field to basin scale ET over crops and plantations, Wisconsin Potato Vegetables & Growers Association, Grower Education Conference & Industry Show, Stevens Point, Feb 6, 2018 (invited)
12. **Talib, A.** and Desai, A. R. 2017. Groundwater-Surface water interaction in agricultural watershed that encompasses dense network of High-Capacity wells, **American Geophysical Union (AGU)**, Fall Meeting 2017, 11-15 December
13. **Talib, A** and Randhir. 2014. Land Use Land Cover Impacts on Water Quantity and Quality in Watershed Systems, Lombard, Illinois, 69th **SWCS International Annual Conference**, making waves in conservation, our life on land and its impacts on water 27-30 July 2014
14. **Talib, A** and Randhir. 2014. Integrated Assessment of Land Use Land Cover and Climate Change Impacts on Water Quantity and Quality in SuAsCo Watershed System, 2014 **American Water Resource Association (AWRA)** Summer Specialty Conference on Integrated Water Resources Management (IWRM) from theory to application Reno, Nevada June 30- July 2, 2014.
15. **Talib, A** and Randhir. 2014. Climate Change Impacts on Water Quantity and Quality in Watershed Systems, **UCOWR-NIWR-CUAHSI Conference on Water Systems**, Science, and Society under Global Change, at Tuft University Medford, Massachusetts, 18-20 June 2014
16. **Talib, A** and Randhir. 2014. Climate Change Impacts on Water Resources, **Northeast Natural History Conference (NENHC)**, Springfield, Massachusetts, 7-9 April 2014

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GENERAL INTEREST HIGHLIGHTS

12/12/2018 Comparing Evapotranspiration on an irrigated potato field and pine plantation: Eddy covariance Flux Towers allow scientists to directly observe changes in plant water use (Page 20-22) https://issuu.com/bctater/docs/1812_standard

05/07/2019 Ways to Measure Evapotranspiration: New technologies make the science of measuring ET a bit more tangible (Page 24-26) https://issuu.com/bctater/docs/1905_standard

03/28/2017 It's not too late to conserve water resources in rapidly urbanizing areas <https://phys.org/news/2017-03-late-resources-rapidly-urbanizing-areas.html>

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AWARDS/FELLOWSHIPS

1. **UW Water Resources Institute**, Data-driven groundwater depth and risk forecasting in the Central Sands region of WI for sustainable management, \$71,499, 7/1/2021-12/31/2022
2. **State of Wisconsin Dept of Natural Resources**, *Evapotranspiration of irrigated crops: Monitoring and data collection*, \$15,000, 6/1/2018-10/31/2018
3. **Wisconsin Potato and Vegetation Growers Association (WPVGA)**, Monitoring

- evapotranspiration in Central Sands farms and forests, \$117,012, 7/1/2018-6/30/2023
4. **METER Grant A Harris** instrumentation fellowship, \$10,000, 03/15/ 2019
 5. **CPEP Seed Grant Award Center of Climate Research**, *Observing Wisconsin Central Sands Water Budget Component Under High Groundwater Demand and a Changing Climate*, \$8000, 5/1/2017-8/30/2017
 6. **Chancellor's Opportunity Award**, University of Wisconsin Madison \$3000, 9/1/2015
 7. **Academic scholarship**, University of Massachusetts Amherst \$300, 4/30/2015
 8. **Fulbright Scholarship** (University of Massachusetts Amherst, USA), \$980,00, 9/1/2012-5/30/2015
 9. **Merit scholarship for two undergraduate semesters** (College of Earth & Environmental Sciences in Punjab University Lahore, Pakistan), \$200, 3/1/ 2007, 5/1/ 2009.
 10. **Honors Rank student** (Islamic College Cooper Road, Lahore, Pakistan), May 2004.

CERTIFICATES

2018-06-25: Neural Networks and Deep Learning, Coursera

2018-07-09: Improving Deep Neural Networks- Hyperparameter Tuning, Regularization and Optimization, Coursera

2018-07-14: Structuring Machine Learning Projects, Coursera

2018-08-04: Convolutional Neural Networks, Coursera

2018-08-23: Sequence Models, Coursera

WORKSHOPS

2016-01-24: Graduate Assistants' Equity Workshops, Division of Diversity, Equity & Educational Achievement

2016-09-08: Graduate Assistants' Equity Workshops, Division of Diversity, Equity & Educational Achievement

COMPUTING EXPERTISE

Statistics: I am familiar with the use of deterministic functions, probability distributions, conduct classic one- and two-sample tests, utilize bootstrapping and Monte Carlo randomization procedures, and conduct stochastic simulations for ecological modeling.

Matlab: I am familiar with the use of Advanced Excel, Matlab Array, Loops and Logic plotting, Roots Finding and Linear System, Regression, Interpolation Symbolic, Integration differential Equation Symbolic

EES: Engineering Equation Solver

GIS: ARCGIS I have experience with basic GIS concepts such as spatial data sources and structure

Projections and coordinate systems, data editing and creation, geospatial analysis, habitat modeling, buffer analysis and arc hydro tools.

Remote sensing: I have carried out enhancement and correction of raster (LANDSAT) data, landuse landcover change detection, and error analysis of classified images.
Simulation:

STELLA: Skills in systems modeling and optimization to get insights into complex natural resources and ecosystems using a systems approach, to quantify and evaluate dynamic inter-linkages between and within biotic, abiotic, and socio-economic components of an ecosystem.

BASINS /HSPF: Calibration, validation and scenario analysis to assess the land use land cover (LULC) and climate impacts on hydrological resources.

SWAT/SWATCUP: Calibration/validation, uncertainty analysis

Modflow: Ground water Modeling

Hydrocad: Pond Design

Python: Data science and Machine Learning projections and coordinate systems, data editing and creation, geospatial analysis, habitat modeling, buffer analysis and arc hydro tools.

R: Data analysis, web design

Remote sensing: I have carried out enhancement and correction of raster (LANDSAT) data, landuse

High-throughput computing (HTC): Iteration of machine learning algorithms, flux tower data Ecostress and SMAP satellite data

Machin Learning/Artificial neural Network/Deep learning: Artificial neural network such as feedforward and recurrent neural network (LSTM), Random Forest

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LEADERSHIP ROLE

01/2021-Present: Member at "Outreach committee at water resource engineering (WRE)

The purpose of the organization, "Outreach Committee," is to organize events such as Engineering Expo, WI Science Festival, etc. I was also involved in helping plan/organize water resource engineering engagement in already established University & community events (e.g., Water@UW poster session). One current goal is to update the departmental website. During department seminars, I had the honor to introduce other graduate students before their talk that helped me with my communication skills.

01/2018-Present: Teaching Assistant University of Wisconsin Madison (Bio 151, Bio 152 lab, AOS 404 lab)

6-8/ 2011: Volunteer intern at Waste busters Pakistan Lahore: At Waste Busters, I translated poems and stories in the "Waste Busters Environmental Handbook" for primary school children from English to Urdu to inform them about their responsibilities. Considering children are growing up in a consumer-oriented society, this experience was essential to make them aware of reusing material and protecting the environment.

09/2006-08/2011: Science Teacher (Physics, Chemistry) to middle, High school students in Pakistan

6-8/2010: Volunteer intern at Environmental Protection Agency (EPA), Pakistan

At EPA, I performed Environmental Impact assessments of industrial development in residential areas. This internship helped me think about the consequences of power plants on the health of communities living adjacent to industrial sites.

6-12 2009: Volunteer intern at Greenlays clean Pakistan

I was part of conducting waste audits to estimate the value of recycling waste at Greenlays in our school.

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HOBBIES

Zumba and yoga: I started doing Zumba and hot yoga in school to decompress. These activities kept me grounded during stressful times and helped me strive to improve.

Skincare: Skincare is an interest of mine because I have chronic skin issues (cystic acne and eczema). I also enjoy learning about non-invasive antiaging regimes, e.g., hyaluronic acid, micro-needling, microcurrent and LED masks, and it gives me confidence.

Meal prep: I like to try vegan recipes I find online and from meal kits (e.g., purple carrot). Meal prep biweekly while listening to the Weight Loss Champion Chuck Carroll podcast has been very therapeutic.

Henna painting: I like to paint my and my friend's hands with beautiful paisley and floral designs formed from a thick brown paste. My friends loved my designs. I look forward to creative designs and having fun painting hands with nothing permanent.

Podcast: I listen to David Sinclair's podcast, a geneticist, about longevity, where he talked about the link between sirtuins, fasting, and the insulin pathway. I am interested in recent research about Resveratrol and NMN and its role in longevity, so I follow blog posts and listen to the experiences of people who are taking them.

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