

NINA OMANI

Superior, CO 80027

Mobile: 979.402.9391 | Email: nomani@ucar.edu | [Portfolio](#)

As part of an NCAR/RAL team, I collected, organized, and analyzed hydrometeorological data from, hydrometeorological models (WRF-Hydro), remote sensing data, and in situ data. I also developed the hydrologic forecast models and performed verification from hydrometeorological (numerical weather prediction, nowcasting, and rainfall-runoff) models. I am experienced in remote sensing software (ENVI and ERDAS), GIS, geospatial data science.

My previous research focused on computer-based eco-hydrologic and water quality modeling, with an emphasis on quantifying the impact of land use, land management practices and climate change in large, complex watersheds. My research answers questions about global warming, and how it affects mountainous watersheds. I utilize big data from both observations and models, to understand how the extreme climate events has varied in the past, present, and how it impacts diffused pollution and crop production in the future.

RESEARCH INTERESTS

- Hydrometeorology
 - Climate Change Impact Assessment
 - Geospatial Data Science
 - Data-driven approaches in Water Resources
 - Data Assimilation
-

EDUCATION

Doctor of Philosophy

Major in Hydrology and Water Resources | Texas A&M University, College Station, TX, USA

Regent Fellowship awarded, 2014

- Dissertation: *Evaluation of SWAT Snowmelt Algorithm and Assessment of Climate Change on Glacier Melt*
- Advisor: Raghavan Srinivasan

Coursework toward Ph.D. (withdrawn)

Major in Water Resources | Sharif University of Technology, Tehran, Iran

18 credit hours, 2009

Master of Science in Civil Engineering

Major in Hydraulic Structures Engineering | Sharif University of Technology, Tehran, Iran

2006

Bachelor of Science in Civil Engineering
Shahid Chamran University, Ahvaz, Iran
2002

SKILLS

ArcGIS and Remote Sensing:

- ArcMap, ArcGIS Online, ENVI, ERDAS

Programming Languages | Computing Tools:

- R, R Shiny, FORTRAN, Python, Shell Scripting, NCL, HPC System, Linux/Unix System

Other:

- MPAS (self-trained), DART (self-trained), Model Evaluation Toolkit (MET), Hydrologic Data Assimilation, Geospatial Machine Learning
-

CERTIFICATION

Certificate in Statistics, 2024

Texas A&M University, Department of Statistics

Courses: Bayesian Statistics, Spatial Statistics, Mathematical Statistics, Regression Analysis with R

PROFESSIONAL EXPERIENCE

Associate Scientist III

National Center for Atmospheric Research | May 2021–Present

- Conduct hydrometeorological analyses of data products including radar, satellite, NWP models, snowpack, soil moisture, and streamflow data to quantify skill and uncertainty in hydrologic predictions.
- Perform hydrologic model experiments using WRF-Hydro/NWM to assess the impact of meteorological forcing and land surface characterization datasets on hydrologic simulation and prediction skills.
- Develop ensemble hydrologic forecasting systems and perform hydrologic data assimilation.
- Use the Model Evaluation Toolkit (MET) and/or Rwrhydro for statistical evaluation.

Postdoctoral Scientist

Syngenta Crop Protection Inc., Greensboro, NC, USA | Jan 2018–Jan 2020

Developed web-accessible tools via R Shiny for exploring water quality characteristics and predicting pesticide concentrations. The tool saves time and cost of water quality data processing by chemists at Syngenta.

- Designed statistical approaches for data imputation and developed interactive dashboards for extreme concentration predictions.
- Work samples available on [GitHub](#) and in my [Portfolio](#).

Postdoctoral Research Associate

Texas A&M AgriLife Research, TX, USA | Jan 2017–Sep 2017

- Investigated the effects of winter wheat cover crop and various irrigation strategies on soil health and cotton crop yield using DSSAT [5, 6, 8].

Postdoctoral Research Associate

Purdue University, Department of Earth, Planetary, and Atmospheric Science, IN, USA | Jun 2014–Oct 2016

- Predicted and simulated hydrologic components (surface runoff, sub-surface flow, groundwater, streamflow, and snow melt), nutrients and sediments transportation, water quality, and erosion in a large watershed on Purdue Supercomputer RCAC [4, 7, 23].
- Assessed the effect of climate change on water quality and quantity in the US Midwest [25, 29].
- Assessed spatiotemporal variation of present and future drought events characteristics using the Copulas joint probability approach [24].
- Evaluated the current ecosystem services such as food and freshwater provisioning under extreme climate conditions in the upper Mississippi River basin [10].
- Performed statistical analysis of climate data and visualization (ArcMap) [12].

Extension Specialist (Geospatial Analyst)

Texas A&M AgriLife Extension, Houston, TX | Feb 2020–Present

- Modeled urban watersheds in Texas to assess the effects of Low Impact Development on NPS loading.
- Developed educational ArcGIS Online web applications to transfer research knowledge to the public.
- Developed GIS toolbox and packages using Arcpy, geospatial data analysis (census, habitat, FEMA flood data, weather data).

Graduate Research Assistant

Texas A&M University, Spatial Sciences Laboratory, College Station, TX, USA | 2009–2014

- Conducted land use classification using SVM in ENVI, derived vegetation biophysical parameters, and processed airborne imagery for my Ph.D. research.

PUBLICATIONS AND CONFERENCE PAPERS

1. A. Rafieeinasab, A. Dugger, A. Mazrooei, T. Enzminger, I. Srivastava, D. Gochis, K. Sampson, **N. Omani**, J. Grim, Y. Zhang, J. LaFontaine, R. Viger, Y. Liu, Tim Schneider. A WRF-Hydro-based retrospective simulation of water resources for U.S. integrated water availability assessment. (Under review).
2. Arezoo Rafieeinasab, Michael N. Fienen, **Nina Omani**, Ishita Srivastava, Aubrey Dugger [Ensemble Methods for Parameter Estimation of WRF-Hydro](#). Manuscript # 2024WR038048. U.S. Geological Survey (USGS): Cooperative Agreement 1852977 (Under review).
3. Kessler, J., E. Espey, A. VanDeWeghe, A.D. Gronewold, T. Sorensen, B. Khazaei, E. James, T. Smirnova, M. Casali, D. Yates, **N. Omani**, J. Kelley, M. Barlage, S. Benjamin, E. Anderson. Depth Matters: Lake Bathymetry Selection in Numerical Weather Prediction Systems (Under review).
4. Qingyu Feng, Liding Chen, Lei Yang, Haw Yen, Ruoyu Wang, Feng Wu, Yang Feng, Cibin Raj, Bernard A. Engel, **Nina Omani**, Panagiotis D. Oikonomou, Asim Zia, A. (2023) distributed model parameter optimization toolbox performing multisite calibration in the lump and distributed mode for the SWAT model, *Environmental Modelling & Software*, Volume 168, 105785, ISSN 1364-8152, <https://doi.org/10.1016/j.envsoft.2023.105785>.
5. Himanshu S.K., Ale S., Bordovsky J.P., Kim J., Samanta S., **Omani N.**, Barnes E. (2021) Assessing the impacts of irrigation termination periods on cotton productivity under strategic deficit irrigation regimes. *Nature Scientific Reports* 11 (1), 1-16. <https://doi.org/10.1038/s41598-021-99472-w>
6. Ale S., **Omani N.**, Himanshu S.K., Bordovsky J.P., Thorp K.R., Barnes E.M. (2020) Determining optimum irrigation termination periods for cotton production in the Texas High Plains. *Transactions of the ASABE* 63 (1), 105-115
7. Feng Q., Chaubey I., Cibin R., Engel B., Sudheer K.P., Volenec J., **Omani N.** (2018) Perennial biomass production from marginal land in the Upper Mississippi River Basin. *Land Degrad Dev.* 1–8
8. Adhikari P., **Omani N.**, Ale S., De Laune P., Thorp K., Hoogenboom G., Barnes E. (2017) Simulated effects of winter wheat cover crop on cotton production system of the Texas Rolling Plains. *Transactions of the ASABE, Crop Modeling Special Collection. Transactions of the ASABE* 60(6)
9. **Omani N.**, Srinivasan R., Karthikeyan R., and Smith P. K. (2017) Hydrological modeling of highly glacierized basins (Andes, Alps, and Central Asia). *Water*, 9(2)
10. Li P., **Omani N.**, Chaubey I., and Wei X. (2017) Evaluation of drought implications on ecosystem services: freshwater provisioning and food provisioning in the Upper Mississippi River Basin. *Int. J. Environ. Res. Public Health*, 14(5), 496
11. **Omani N.**, Srinivasan R., Smith P. K. and Karthikeyan R. (2017) Glacier mass balance simulation using SWAT distributed snow algorithm. *Hydrological Sciences Journal*, 62(4)
12. Anandhi A., **Omani N.**, Chaubey I., Horton R., Bader D. and Nanjundiah, R. (2016) Synthetic scenarios from CMIP5 model simulations for climate change impact assessment in managed ecosystems and water resources: case studies in south Asian countries. *Transactions of the ASABE*, 59(6), 1715- 1731.

13. **Omani N.**, Srinivasan R., Karthikeyan R., Venkatta K. and Smith P. K. (2016) Impacts of climate change on the glacier melt runoff from five river basins. *Transactions of the ASABE*, 59(4).
 14. Kannan, N., **Omani, N.** and Miranda, R. (2014) Water quality modeling of an agricultural watershed with best practices. *IJRET*, (3)1, 553-564.
 15. **Omani N.**, Srinivasan R., and Lee T. (2013) Estimation of sediment and nutrient loads to bays from gauged and un-gauged watersheds. *Applied Engineering in Agriculture*, 30(6), 869.
 16. Lee T., Srinivasan R., Moon J. and **Omani N.** (2011) Estimation of fresh water inflow to bays from gaged and ungaged watersheds, *ASABE, Applied Engineering in Agriculture*, 27(6), 917–923.
 17. **Omani N.**, Tajrishy M. and Abrishamchi A. Modeling a river basin using SWAT model and SUFI-2. Conference paper, 4th International SWAT Conference, The Netherlands. 2007.
 18. **Omani N.**, Tajrishy M., and Abrishamchi A. Modeling a river basin using SWAT model and GIS. Conference Paper, 2nd International Conference on Managing Rivers in the 21st Century: Solutions Towards Sustainable River Basins, Kuching, Sarawak, Malaysia. 2007.
-

PRESENTATIONS (last updated: 2019)

19. Himanshu S.K., Ale S., **Omani N.**, Bordovsky J.P., Thorp R.K., Barnes E.M. Evaluation of irrigation termination effects on cotton yield and water use efficiency under deficit irrigation strategies in the Texas High Plains. Paper#1900799. ASABE Annual International Meeting, Boston, July 7-10, 2019.
20. Ale S., Himanshu S.K., **Omani N.**, Bordovsky J.P., Thorp R.K., Barnes E.M. A Modeling approach to determine optimum irrigation termination periods for cotton. ASA-CSSA-SSSA International Annual Meeting, San Antonio, Texas, Nov. 10-13, 2019.
21. Ale S., **Omani N.**, Bordovsky J., Adhikari P. and Thorp K. Water use efficiency and cotton yield as affected by irrigation termination dates. Cotton Agronomy, Physiology & Soil Conference, Beltwide Cotton Conferences. January 2018.
22. Ale S., Adhikari P., **Omani N.**, De Laune P., Thorp K., and Barnes E. Simulated effects of winter wheat cover crop on soil water balances, soil quality and yield of subsequent cotton crop. Paper#1701253. ASABE Annual International Meeting, Spokane, Washington, Jul 16-19, 2017.
23. Chaubey, I. and **Omani, N.** Climate change and food production in US Midwestern watersheds. Engineering and Technology Innovation for Global Food Security. An ASABE Global Initiative Conference, Cape Town Stellenbosch, South Africa. 24-27 October 2016.
24. **Omani N.** and Chaubey, I. Assessing sensitivity of two Indian river basins water quality, quantity, and agriculture to drought, ASABE Annual International Meeting, Orlando, FL. Jul 17-20, 2016.
25. **Omani N.** and Chaubey, I. Effects of droughts on two Indiana river basins' water quality and quantity. 10th International Symposium on Agriculture and the Environment, West Lafayette, IN. May 23-27, 2016.
26. Anandhi A., **Omani N.**, Chaubey I., Horton R., Bader D. and Nanjundiah, R. What changes do the CMIP5 climate models predict for South Asia and what are some potential impacts on managed ecosystems and water resources. ASABE 1st Climate Change Symposium: Adaptation and Mitigation, Chicago, IL. May 3-5, 2015.
27. Li, P., **Omani, N.**, Chaubey I. and Wei X. Impact of drought on freshwater provisioning ecosystem services in the Upper Mississippi River Basin. International SWAT Conference, West Lafayette, IN.

October 12-16, 2015.

28. Logsdon R., **Omani N.**, Cibin R., Chaubey I. and Srinivasan, R. The future of ecosystem services in the upper Mississippi River basin. ASABE 1st Climate Change Symposium: Adaptation and Mitigation. Chicago, IL. May 3-5, 2015.
 29. **Omani, N.**, Chaubey, I., and Li, P. Assessing sensitivity of UMRB agriculture and water resources to past and current drought. SWAT Conference, West Lafayette, IN. October 12-16, 2015.
 30. **Omani N.**, Srinivasan R., Karthikeyan R. and Smith, P. K. Impacts of climate change on the glacier melt
-

SERVICE

- **[Scientific Committee Member \(SESSION I3: LARGE SCALE APPLICATIONS\), Conference Moderator & Organization Committee Member](#)**
International SWAT Conference, Purdue University, 2015.
 - **Instructor**
Soil and Water Assessment Tool (SWAT) Workshop for Beginners, Purdue University, 2015.
 - **Guest Reviewer**
Publons Profile: [[Link](#)]
-

REFERENCES

- **Andy Wood**
Reference for Python, R skills, S2S forecasting, cycling data assimilation experiments, and processing large datasets in various formats (ASCII, GRIB, or NetCDF).
Email: andywood@ucar.edu | Phone: +1 303-497-1320
 - **David Yates (Supervisor)**
Reference for analyzing hydrometeorological model output and verification statistics.
Email: yates@ucar.edu | Phone: +1 303-497-8394
 - **Tim Schneider (Mentor, 2022)**
Senior Program Manager, NCAR-RAL Office of the Director & Rising Voices Center for Indigenous and Earth Sciences Council.
Email: tls@ucar.edu | Phone: +1 303-497-8406
-

WORK AUTHORIZATION

- **Status:** U.S. Citizen