

# ATHER ABBAS

**Mailing address:** Room # 1002, Building # 308, UNIST-gil 50, ulju-gun, Eonyang-eup, Ulsan, Republic of Korea.  
**Email:** [atherabbas@unist.ac.kr](mailto:atherabbas@unist.ac.kr) & [ather\\_abbas786@yahoo.com](mailto:ather_abbas786@yahoo.com)  
**Web:** <https://atrcheema.github.io>

## Research Objective

I work at the intersection of water sciences and machine learning. I am interested in application of data-driven approaches to solve problems related to water resources with special focus on surface water quality, catchment dynamics and water treatment.

## Qualification

- Doctor of Philosophy (PhD) Environmental Engineering**  
Thesis: Artificial intelligence for modeling of surface water resources: Application from streamflow to water quality  
Ulsan National Institute of Science and Technology, Ulsan, South Korea  
*Jun. 2018- Mar. 2022*
- Master of Science (MS) Hydrogeology and Environmental Science**  
Thesis: Estimation of hydraulic Aquifer parameters by integral transform methods applied to aquifer and river stream head responses (Leine River)  
George August University of Goettingen, Germany  
*Sep. 2013-Feb. 2017*
- Bachelor of Science (BE) Applied Geology**  
Thesis: Hydrogeological investigation of Munara area (Pakistan) and surroundings  
University of the Punjab, Lahore, Pakistan  
*Sep. 2008-Mar. 2013*

## Experience

- PostDoc researcher**  
School of Urban and Environmental Engineering,  
Ulsan National Institute of Science and Technology, Ulsan, South Korea.  
**Responsibilities**
  - Water quality modelling using deep learning
  - Modelling of waste water treatment using Machine Learning*Sep 2022 - Present*
- Researcher**  
School of Urban and Environmental Engineering,  
Ulsan National Institute of Science and Technology, Ulsan, South Korea.  
**Responsibilities**
  - Surface and ground water modeling using HSPF and heat equation*Sep 2017-Aug 2018*
- Internee**  
G.E.O.S Ingenieurgesellschaft mbH  
Schwarze Kiefern 2  
09633 Halsbrücke Freiberg, Germany.  
**Responsibilities**
  - Numerical modeling of magma emplacement in MATLAB.
  - Modeling of reactive groundwater transport using PhreeqC and COMSOL
  - numerical modeling of groundwater flow, temperature distribution in crust using MATLAB*Oct 2016- Aug 2017*
- Jr. GIS Professional**  
The Urban Unit,  
Office No. 503, Shaheen complex, Edgerton Road, Lahore, Pakistan.  
**Responsibilities**
  - Preparation of land-use maps using GIS
  - Preparation of flood inundation maps using GIS*Jun. 2013- Sep. 2013*

## Research Interests

- Water treatment modeling
- Surface water modeling
- Supervised and reinforcement learning
- Automated machine learning for tabular data

## Technical Skills

- Programming MATLAB, Python, FORTRAN
- Operating System Microsoft Windows, Ubuntu
- Software HSPF, SWAT, MODFLOW, ArcMap, QGIS, LaTeX
- Machine Learning Frameworks Keras, TensorFlow, PyTorch, Scikit-learn

## Open-source projects

- **AI4Water**  
Framework for data-driven modeling of tabular data with focus on hydrology  
<https://ai4water.readthedocs.io>
- **AutoTab**  
<https://autotab.readthedocs.io>
- **SeqMetrics**  
<https://SeqMetrics.readthedocs.io>
- **easy\_mpl**  
<https://easy-mpl.readthedocs.io>

## Publications

### Journal Publications

\* Co-first author

1. **Abbas, A.**, Boithias, L., Pachepsky, Y., Kim, K., Chun, J. A., & Cho, K. H. (2022). AI4Water v1.0: an open-source python package for modeling hydrological time series using data-driven methods. **Geoscientific Model Development**, 15(7), 3021-3039 (**IF = 6.9**).
2. Jaffari, Z. H., **Abbas, A.**, Lam, S-M., Sanghun, P., Chon, K., Kim, E-S., & Cho, K. H. (2022). Machine learning approaches to predict the photocatalytic performance of bismuth ferrite-based materials in the removal of malachite green. *Journal of Hazardous Materials*, (Accepted) (**IF = 14.3**)
3. **Abbas, A.**, Baek, S., and Cho, K. H. Deep learning-based algorithms for long-term prediction of chlorophyll-a in catchment streams. **Journal of Cleaner Production** (**IF = 11**).
4. Kwon, D. H., Hong, S. M., **Abbas, A.**, Pyo, J., Lee, H. K., Baek, S. S., & Cho, K. H. (2023). Inland harmful algal blooms (HABs) modeling using internet of things (IoT) system and deep learning. *Environmental Engineering Research*, 28(1). <https://doi.org/10.4491/eer.2021.280> (**IF=2.5**)
5. Lee, J., **Abbas, A.**, McCarty, Gregory W., Zhang, X., Lee, S., Cho, K. H., (2022) Estimation of base and surface flow using deep neural networks and a hydrologic model in two watersheds of the Chesapeake Bay. **Journal of Hydrology**. (Accepted) (**IF=6.2**)
6. Son, M., Yoon, N., Jeong, K., **Abass, A.**, Logan, B. E., & Cho, K. H. (2021). Deep learning for pH prediction in water desalination using membrane capacitive deionization. **Desalination**, 516, 115233. (**IF = 11.2**)
7. **Abbas, A.**, Baek, S., Silvera, N., Soulileuth, B., Pachepsky, Y., Ribolzi, O., ... & Cho, K. H. (2021). In-stream Escherichia coli modeling using high-temporal-resolution data with deep learning and process-based models. **Hydrology and Earth System Sciences**, 25(12), 6185-6202 (**IF = 6.6**)
8. Yoon, N., Kim, J., Lim, J. L., **Abbas, A.**, Jeong, K., & Cho, K. H. (2021). Dual-stage attention-based LSTM for simulating performance of brackish water treatment plant. **Desalination**, 512, 115107. (**IF = 11.2**).
9. Jang, J., **Abbas, A.\***, Kim, M., Shin, J., Kim, Y. M., & Cho, K. H. (2021). Prediction of antibiotic-resistance genes occurrence at a recreational beach with deep learning models. **Water Research**, 196, 117001 (**IF = 13.4**)
10. Yun, D., **Abbas, A.**, Jeon, J., Ligaray, M., Baek, S. S., & Cho, K. H. (2021). Developing a deep learning model for the simulation of micro-pollutants in a watershed. **Journal of Cleaner Production**, 300, 126858. (**IF = 11**).
11. Jeong, K., **Abbas, A.\***, Shin, J., Son, M., Kim, Y. M., & Cho, K. H. (2021). Prediction of biogas production in anaerobic co-digestion of organic wastes using deep learning models. **Water Research**, 205, 117697. (**IF = 13.4**)
12. **Abbas, A.**, Baek, S., Kim, M., Ligaray, M., Ribolzi, O., Silvera, N., ... & Cho, K. H. (2020). Surface and sub-surface flow estimation at high temporal resolution using deep neural networks. **Journal of Hydrology**, 590, 125370. (**IF = 6.7**).

## Language Proficiency

- English
- German
- Persian

## References

### **Zeeshan Haider Jaffari**

Research Professor, School of urban and environmental engineering, Ulsan national institute of science and technology, Ulsan, South Korea.

Email: [zeeshan@unist.ac.kr](mailto:zeeshan@unist.ac.kr) Phone: +82-10 67680917

### **Asad Mustafa Karim**

Research Professor, Department of Biological Sciences, School of Biotechnology and Environmental Engineering, South Korea

Email: [laurie.boithias@get.omp.eu](mailto:laurie.boithias@get.omp.eu) Phone: +33 561332712

### **Junaid Haider**

Research Professor, Energy and Chemical Engineering Department, Ulsan National Institute of Science and Technology, Ulsan, South Korea,

Email: [haiderjunaid92@gmail.com](mailto:haiderjunaid92@gmail.com) Phone: +82-10 4467244