Sahara Ali

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D3 Lab: ci.unt.edu/data-driven-decisions-lab; LinkedIn: linkedin.com/in/saharaali**;** Google Scholar: Sahara Ali

EDUCATION:

Jan 2020 – Aug 2024	**Ph.D. in Information Systems, University of Maryland, Baltimore County** Advisor: Dr. Jianwu Wang Thesis: Spatiotemporal Forecasting and Causality Methods for Arctic Amplification
Jan 2020 – May 2023	**Masters of Science in Information Systems, University of Maryland, Baltimore County** CGPA: 3.97/4.00
Oct 2012 – Jun 2016	**Bachelors of Science in Computer Science, University of Engineering and Technology (UET), Lahore** CGPA 3.72/4.00

RESEARCH EXPERIENCE:

Sept 2024 - Present — **Director – Data-Driven Decisions Lab (D3 Lab)**

- Lead cutting-edge research on causal inference, spatiotemporal data mining, scientific machine learning (SciML), retrieval augmented generation and Earth Informatics.

Jun 2022 – Aug 2024 — **Research Assistant — iHARP, NSF HDR Institute at University of Maryland Baltimore County**

- Conducted ML-aided causal inference study to identify causal flow in thermodynamic processes.
- Developed time-series and spatiotemporal causal inference models to estimate causal effects of atmospheric drivers on sea ice and Greenland ice sheet variations.

Jun - Dec 2021, Jan – Jun 2022 — **Research Assistant — Big Data Analytics Lab at University of Maryland Baltimore County**

- Developed multi-scale spatiotemporal deep learning predictive models for multiple Earth Science problems including dust classification, cloud retrieval and detection, and sea ice forecasting.
- Preprocessed geospatial datasets based on physics-based models in collaboration with NASA/NOAA research scientists.
- Worked on parallelization of deep learning models using UMBC's high performance computing facility.

TEACHING EXPERIENCE:

Aug 2024 - Present — **Assistant Professor Data Science – University of North Texas, Denton**

Fall 2024 / Spring 2025: Data Modeling for Information Professionals (INFO 5707)

Jan - Jun 2020, Jan – Dec 2021 — **Teaching Assistant — University of Maryland Baltimore County**

Courses: Introduction to Databases Design (IS 410/610) / Computer Programming II (IS-247)

- Led discussion sections and lab sessions to reinforce concepts taught in lectures.
- Proctored and graded exams, assignments, and projects according to established criteria and provided constructive feedback to students.
- Offered academic support and held office hours to provide individual or group assistance, answering students' questions and clarifying course materials.
- Prepared instructional materials, such as presentations, handouts, and study guides, to aid in teaching and learning.
- Assisted in curriculum development, lesson planning, and updating course content as needed.
- Facilitated student discussions on online platforms (Piazza, UMBC Blackboard).

MENTORSHIP EXPERIENCE:

Sept 2024 – Present	**D3 Lab:** Supervise and mentor graduate (Masters, PhD) researchers at UNT working on interdisciplinary research projects focusing on deep learning based causal inference, large-language models and retrieval augmented generation.
Jun 2021 – Aug 2021	**NSF-funded REU Student Mentor:** Mentored undergraduate students from UMD College Park, University of Wisconsin-Madison, Georgia Institute of Technology and UMBC on an interdisciplinary research project focusing on deep learning based multitask modeling, leading to peer-reviewed publication at IEEE BigData 2021.
Dec 2022 – Aug 2024	**Ingenuity Project:** Supervised Louis Lapp - a high school student from Baltimore Polytechnic Institute on his interdisciplinary research utilizing deep learning based predictive models for studying climate change.
Jun 2022 – Aug 2024	**iHARP / BDAL Lab:** Mentored new graduate researchers at iHARP, providing guidance on lab datasets, research methodologies and experimental design.

INDUSTRIAL EXPERIENCE:

May 2018 - Jan 2020 **Project Coordinator – Engineering, i2c Inc. Pakistan**

- Managed coordination of entire PMO consisting of 11 engineering teams, release planning for up to 3 releases and setting priorities, identified resource requirements within Engineering department, and liaised with external departments for new processes implementation.
- Defined KPIs and worked on the formation of a new Artificial Intelligence team of 12 Data Science Associates.
- Monitored AI team's deliverables, project progress and implemented strategies to mitigate risks using RAID strategy.

Jun 2016 - May 2018 **Software Engineer, i2c Inc. Pakistan**

- Developed REST and SOAP APIs in Java EE for credit and debit payment processing, ensuring functionality, reliability, and security.
- Developed and executed test cases, including unit testing, integration testing, and validation of API endpoints, ensuring accuracy and reliability of payment transactions.
- Provided technical support and guidance to internal teams, external developers, and clients integrating the payment API.

PUBLICATIONS: (*student/mentee authors)

Conference / Workshops:

1. **Ali, S.,** & Wang, J. (2024, October). Tutorial on Causal Inference with Spatiotemporal Data. In Proceedings of the 1st ACM SIGSPATIAL International Workshop on Spatiotemporal Causal Analysis (pp. 23-25). [**pdf**]
2. **Ali, S.,** Faruque, O., & Wang, J. (2024, August). Estimating Direct and Indirect Causal Effects of Spatiotemporal Interventions in Presence of Spatial Interference. In Joint European Conference on Machine Learning and Knowledge Discovery in Databases (pp. 213-230). Cham: Springer Nature Switzerland. [**pdf**]
3. Lapp, L.*, **Ali, S.,** & Wang, J. (2023, December). Integrating Fourier Transform and Residual Learning for Arctic Sea Ice Forecasting. In 2023 International Conference on Machine Learning and Applications (ICMLA) (pp. 1753-1758). IEEE.
4. **Ali, S.,** Faruque, O., Huang, Y., Gani, M. O., Subramanian, A., Schlegel, N. J., & Wang, J. (2023, December). Quantifying causes of arctic amplification via deep learning based time-series causal inference. In 2023 International Conference on Machine Learning and Applications (ICMLA) (pp. 689-696). IEEE. **[pdf]**
5. **Ali, S.,** & Wang, J. (2022, December). Mt-icenet-a spatial and multi-temporal deep learning model for arctic sea ice forecasting. In 2022 IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT) (pp. 1-10). IEEE. **[pdf]**
6. **Ali, S.,** Mostafa, S. A., Li, X., Khanjani, S., Wang, J., Foulds, J., & Janeja, V. (2022, July). Benchmarking probabilistic machine learning models for arctic sea ice forecasting. In IGARSS 2022-2022 IEEE International Geoscience and Remote Sensing Symposium (pp. 4654-4657). IEEE. **[pdf]**
7. Kim, E.*, Kruse, P.*, Lama, S.*, Bourne, J.*, Hu, M.*, **Ali, S.,** ... & Wang, J. (2021, December). Multi-task deep learning based spatiotemporal arctic sea ice forecasting. In 2021 IEEE International Conference on Big Data (Big Data) (pp. 1847-1857). IEEE. **[pdf]**
8. **Ali, S.,** Huang, Y., Huang, X., & Wang, J. (2021). Sea ice forecasting using attention-based ensemble LSTM. Tackling Climate Change with Machine Learning, ICML 2021. arXiv preprint arXiv:2108.00853. **[pdf]**

9. Huang, X., **Ali, S.,** Wang, C., Ning, Z., Purushotham, S., Wang, J., & Zhang, Z. (2020, December). Deep domain adaptation based cloud type detection using active and passive satellite data. In *2020 IEEE International Conference on Big Data (Big Data)* (pp. 1330-1337). IEEE. **[pdf]**
10. Huang, X., **Ali, S.,** Purushotham, S., Wang, J., Wang, C., & Zhang, Z. (2020, January). Deep multi-sensor domain adaptation on active and passive satellite remote sensing data. In 1st KDD Workshop on Deep Learning for Spatiotemporal Data, Applications, and Systems (DeepSpatial 2020). **[pdf]**

Journal Articles / Book Chapters:

1. **Ali, S.,** Hasan, U., Li, X., Faruque, O., Sampath, A., Huang, Y., ... & Wang, J. (2024). Causality for Earth Science--A Review on Time-series and Spatiotemporal Causality Methods. (In Review at American Meteorological Society's Journal of Artifical Intelligence for Earth Systems), arXiv preprint arXiv:2404.05746. **[pdf]**
2. Bushuk, M., **Ali, S.,** Bailey, D. A., Bao, Q., Batté, L., Bhatt, U. S., ... & Zhang, Y. (2024). Predicting September Arctic Sea Ice: A Multi-Model Seasonal Skill Comparison. Bulletin of the American Meteorological Society. (IF: 8.0)
3. **Ali, S.,** Huang, Y., & Wang, J. (2023). AI for sea ice forecasting. In Artificial intelligence in earth science (pp. 41-58). Elsevier. **[pdf]**

Abstracts:

1. S.F. Shaik *. Tariq, Z., **Ali, S.** Leveraging Big Data frameworks Hive and Spark for global diabetes prediction on AWS. Accepted at the 6th National Big Data Health Science Conference, 2025
2. **Ali, S.,** Faruque, O., Huang, Y., Gani, M. O., Subramanian, A., Schlegel, N., ... & Wang, J. (2024). Estimating Causal Effects of Greenland Blocking on Arctic Sea Ice Melt using Deep Learning Technique. In American Meteorological Society's 23rd Conference on Artificial Intelligence for Environmental Science 2024
3. Hossain, E., **Ali, S.,** Faruque, O., Huang, Y., Gani, M. O., Subramanian, A., Schlegel, N., ... & Wang, J. Incorporating Causality with Deep Learning in Predicting Short-term and Seasonal Sea Ice.. In American Meteorological Society's 23rd Conference on Artificial Intelligence for Environmental Science 2024
4. Bushuk, M., **Ali, S.,** Bailey, D. A., Bao, Q., Batté, L., Bhatt, U. S., ... & Zhang, Y. (2022, December). A Multi-model Comparison of September Arctic Sea Ice Seasonal Prediction Skill. In AGU Fall Meeting Abstracts (Vol. 2022, pp. GC52B-02).

Work In Progress:

1. [Conference Paper] "TTCD: Transformer Integrated Temporal Causal Discovery from Non-Stationary Time Series Data" **(In preparation)**
2. [Journal paper] "Causal Inference for analyzing drivers of Greenland Ice Sheet surface melt" **(In preparation)**

GRANTS / AWARDS:

Role	Grant	Funding Agency	Amount	Status
PI	Scientific Machine Learning for Analyzing Air Quality of North Texas (01/01/2025 – 01/01/2026)	UNT, College of Information (Research Seed Grant)	$4,200	Funded
PI	Causality at Scale for Polar Regions. (01/01/2025-01/01/2026)	iHARP SIP Award	$13,000	Funded
Senior Personnel	T-AIR: Transforming Air Quality Insights into Research and Actions for Texas Communities. (04/18/2025-04/17/2028)	NASA (MUREP ESSR)	$1,200,000	Pending

ACHIEVEMENTS:

- Winner Protothon, **UMBC 2023**
- Best Paper Award, **BDCAT 2022**
- Winner IS PhD Research Symposium, Department of Information Systems, **UMBC 2022**
- Student Travel Award, **IEEE BigData 2021, UAI 2022, BDCAT 2022**
- Community Fellowship, **ESIP 2021-22**
- Runner up — 3MT competition, **UMBC 2021**

- Global Finalist – NASA Space App Challenge, **2020**
- **Dean's Honor Award** for High Achievers **UET Lahore, 2012 - 2016**

MICROCREDENTIALS / CERTIFICATIONS:

Jan - May 2025	Generative AI in Teaching – **UNT**
Nov 2019	Big Data / Hadoop Foundations **– IBM**

SERVICES TO UNIVERSITY / COMMUNITY:

- Workshop Chair, 1st International Workshop on Spatiotemporal Causality (STCausal) 2024 co-located at **ACM SIGSPATIAL 2024**
- Workshop Organizer, NSF CISE MSI Aspiring PIs Workshop at **UNT 2024**
- Program Committee Member, IEEE International Workshop on Benchmarking, Performance Tuning and Optimization for Big Data Applications **(BPOD), 2024**
- Reviewer, Session Chair and Program Committee Member, **IEEE ICMLA 2023**
- Student Representative from College of Engineering and IT (COEIT) on UMBC Graduate School's **MORE Faculty Development Committee**, **2023**
- Co-Chair Graduate Assistants Advisory Committee - **UMBC Graduate Students Association 2022-23**
- Session Chair, **IEEE BDCAT 2022**
- Student volunteer at **ICML 2021,** Super volunteer at **ICML 2020**
- Co-Chair **Software Square** – **UET Lahore**, **2015-16**
- Vice Chair Women In Engineering - **WIE IEEE UET Chapter 2014-15**
- Co-founder **IEEE Computer Society** UET Chapter and student member at **IEEE International**

INVITED TALKS:

- Guest lecturer "Information Systems Logic and Structured Design" (IS-125), **UMBC, Spring 2023**
- Speaker **TEDxUMBC 2020** and former Curator **TEDxUET 2015– 2016**
- Speaker ML4Polar Workshop**, Columbia University, 2022**