IMRAN IQBAL

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RESEARCH EXPERIENCE & EDUCATION

New York University Langone Health, USA

Postdoctoral Fellow April 2024 to present

Department of Pathology at NYU Grossman School of Medicine

Project: Applying Machine Learning Approaches to Aid in the Classification and Prediction of Clinical Outcomes in Human Cancers using Digital Images.

Helmholtz-Zentrum Hereon, Germany

Postdoctoral Researcher Sep 2021 to Jan 2024

Institute of Functional Materials for Sustainability

Project: High-resolution Imaging and Computational Analysis to Study the Dynamics of Stem Cell-Biomaterial Interaction

Peking University, Beijing, China

Doctor of Natural Science in **Applied Mathematics** July 2021

School of Mathematical Sciences CGPA: **4.00**/4.00

Dissertation: Deep Learning to Medical Images for Classification and Detection Tasks

Air University, Islamabad, Pakistan

Master of Science in **Mathematical Modeling and Scientific Computing**

Faculty of Basic and Applied Sciences CGPA: **3.80**/4.00

Isra University, Hyderabad, Pakistan

Master of Information Technology

Department of Computer Sciences CGPA: **3.85**/4.00

University of Sindh, Jamshoro, Pakistan

Bachelor of Computer and Information Technology

Department of Computer Sciences CGPA: **3.57**/4.00

EXPERIENCE

- **Software Engineer**, County Cambridge School Oct 2010 – Aug 2012
- **Research Assistant**, Project: Energy Saving in Buildings in Pakistan sponsored through HEC Social Integration Outreach Program Aug 2015 – Oct 2015
- **Teaching Assistant**, Air University Sep 2015 – Jan 2016

JOURNAL & CONFERENCE REVIEWER

- **Applied Artificial Intelligence** Journal Aug 2020 – July 2021
- **Artificial Intelligence Review**, Springer; **Journal of Ambient Intelligence and Humanized Computing**, Springer; **Computer Methods and Programs in Biomedicine**, Elsevier; **Applied Computing and Informatics**, Emerald; IEEE Access, IEEE; World Journal of Gastroenterology, Baishideng; World Journal of Gastrointestinal Oncology, Baishideng; **PLOS ONE,** Public Library of Science; **Biomedical Physics & Engineering Express**, IOPscience; **Physics in Medicine and Biology**, IOPscience; Engineering Research Express, IOPscience**. Journal of Image and Graphics**, JIG; Environmental Monitoring and Assessment, Springer; **Computerized Medical Imaging and Graphics**, Elsevier; **The Journal of Supercomputing**, Springer; **Advanced Theory and Simulations**, Wiley.
- The 10th and 12th International Conference on **Biomedical Engineering and Biotechnology,** 15–18 Nov 2021, Suzhou, China and 17–20 Nov 2023, Macao, China; The 5th and 6th International Conference on **Machine Learning and Intelligent Systems,** 14 – 17 Aug 2023, Belgrade, Serbia and 17 – 20 Nov 2024, Kampar, Malaysia; The 8th International Conference on New Energy and Future Energy Systems, 21 – 24 Nov 2023, Matsue, Japan.

RECENT HONORS & AWARDS

- **Higher Education Commission** (HEC) scholarship for Master Program at Air University Jan 2013
- Recipient of Laptop through prestigious **Prime Minster Laptop Scheme** at Air University Mar 2014
- **China Scholarship Council** (CSC) scholarship for PhD Program (Sep 2016 – Jul 2021) July 2016
- Peking University **International Students Excellence Award** 2020 Dec 2020
- Ministry of Education Award for **Outstanding International Students** 2020 in China Dec 2020
- **Innovation Information Biologisation** (I2B) Funds for Postdoc Project Sep 2021 – Jan 2024
- Helmholtz Information and Data Science Academy Trainee Network, **Helmholtz Visiting Researcher Grant**, 2022-23 June 2022

RESEARCH INTEREST

- Generative AI, Large Language Models
- Computer Vision, Pattern Recognition, Image Processing
- Machine Learning, Deep Learning, Convolutional Neural Networks
- Classification and Segmentation of lesions/abnormalities in Medical Images

PROGRAMMING LANGUAGES & PACKAGES

- ANSYS; ASP; ASP.net; Assembly
- C; C++; Cool Edit Pro
- Maple; Mathematica; MATLAB
- OpenCV

- Electronic Work Bench; EnergyPlus; Ecotect
- FORTRAN; FoxPro; FeatFlow
- I Think; iDA
- Java Script; Java; Julia
- Keras
- Prolog; Python
- R; Rational Rose; RATScreen; Revit; Ruby
- SQL; Simulink; SketchUp; SAM; SPSS; Scikit-learn
- TensorFlow; TRNSYS
- VB Script; VB6; VB.net, XML

PUBLICATIONS

First author publications:

1. **I. Iqbal**, K. Walayat, M. U. Kakar and J. Ma, "Automated identification of human gastrointestinal tract abnormalities based on deep convolutional neural network with endoscopic images", **Intelligent Systems with Applications**, vol. 16, 2022.
2. **I. Iqbal**, M. Younus, K. Walayat, M. U. Kakar and J. Ma, "Automated multi-class classification of skin lesions through deep convolutional neural network with dermoscopic images," **Computerized Medical Imaging and Graphics**, vol. 88, 2021.
3. **I. Iqbal**, G. A. Odesanmi, J. Wang and L. Liu, "Comparative investigation of learning algorithms for image classification with small dataset," **Applied Artificial Intelligence**, vol. 35, no. 10, pp. 697-716, 2021.
4. **I. Iqbal**, G. Shahzad, N. Rafiq, G. Mustafa and J. Ma, "Deep learning-based automated detection of human knee joint's synovial fluid from magnetic resonance images with transfer learning," **IET Image Processing**, vol. 14, no. 10, pp. 1990–1998, 2020.
5. **I. Iqbal**, G. Mustafa and J. Ma, "Deep learning-based morphological classification of human sperm heads," **Diagnostics**, vol. 10, no. 5, p. 325, 2020.
6. **I. Iqbal** and I. Ahmed, "Energy saving potential in buildings for Karachi climate using daylight", Conference Proceedings of International Conference on Energy Systems and Policies 2014, November 24-26, 2014, Air University, Islamabad, Pakistan.

Co-author publications:

7. X. Xu, W. Wang, Y. Liu, J. Bäckemo, M. Heuchel, W. Wang, Y. Nie, **I. Iqbal**, K. Kratz, A. Lendlein and N. Ma, "Design criteria for geometrical cues reverting pluripotent stem cell state to naïvety", **Nature Materials**, 2024.
8. K. Walayat, S. Haeri, **I. Iqbal** and Y. Zhang, "PD-DEM hybrid approach for modelling leading edge erosion of wind turbine blades", **Computational Particle Mechanics**, 2024.
9. J. Abid, F. Khalil, S. Saeed, S. Khan, **I. Iqbal**, S. Khan, and S. Anthony, "Nano Revolution in Cardiovascular Health: Nanoparticles as Tiny Titans for Diagnosis and Therapeutics", **Current Problems in Cardiology**, 2024.
10. K. Walayat, S. Haeri, **I. Iqbal** and Y. Zhang, "Hybrid PD-DEM approach for modelling surface erosion by particles impact", **Computational Particle Mechanics**, 2023.
11. M. U. Kakar, H. K., G. Shabir, **I. Iqbal**, M. Akram, S. Ahmad, M. Shafi, P. Gul, S. Riaz, R. Rehman and H. Salari "A review on extraction, composition, structure, and biological activities of polysaccharides from different parts of Nelumbo nucifera" **Food Science & Nutrition**, 2023.
12. M. Younus, M. Rasheed, Z. Lin, S. A. Asiri, I. A. Almazni, M. A. Alshehri, S. Shafiq**, I. Iqbal**, A. Khan, H. Ullah, M. Umair and A. Waqas, "Homozygous Missense Variant in the N-Terminal Region of ANK3 Gene Is Associated with Developmental Delay, Seizures, Speech Abnormality, and Aggressive Behavior", **Molecular Syndromology**, 2022.
13. I. U. Kakar, M. Z. Mehboob, S. Zada, H. U. Soomro, M. Umair, **I. Iqbal**, S. F. Syed, S. Shaheen, Y. Deng and R. Dai, "A review on polysaccharides from Artemisia sphaerocephala Krasch seeds, their extraction, modification, structure, and applications," **Carbohydrate Polymers**, vol. 252, 2021.
14. M. Saddique, H. Liao, G. Yu, **I. Iqbal**, M. Lei, R. Lang, Z. Mi, C. Huanqing, Zonghua and X. Hu, "Reduction of threading dislocations in gallium nitride grown on patterned sapphire substrate masked with serpentine channel", **Materials Science in Semiconductor Processing**, 2021.
15. M. Kakar, K. Khan, M. Akram, R. Sami, E. Khojah, **I. Iqbal**, M. Helal, A. Hakeem, Y. Deng and R. Dai, "Synthesis of bimetallic nanoparticles loaded on to PNIPAM hybrid microgel and their catalytic activity", **Scientific Reports**, 2021.

16. S. Ullah, Z. Zuo, F. Zhang, J. Zheng, S. Huang, Y. Lin, **I. Iqbal**, Y. Sun, M. Yang and L. Yan, "GPM-based multitemporal weighted precipitation analysis using GPM_IMERGDF product and ASTER DEM in EDBF algorithm," **Remote Sensing**, vol. 12, no. 19, pp. 1–25, 2020.
17. K. Qu, W. Liang, G. A. Odesanmi and **I. Iqbal**, Task Space Robotic Manipulation Based on Revised Virtual Decomposition Plus PD Control, The 9th IEEE International Conference on CYBER Technology in Automation, Control, and Intelligent Systems, 29 July – 2 August 2019, Jinke Grand Hotel Suzhou, Suzhou, China.
18. G. A. Odesanmi, **I. Iqbal**, Bai Jie, Z. Cong, J. Wang and L. M. Liu, Q Learning Based Trajectory Generation for Robotic Grinding and Polishing, The 21st International Symposium on Advances in Abrasive Technology, October 14-17, 2018, Ryerson University, Toronto, Canada.

Articles under review:

19. **I. Iqbal**, I. Ullah, T. Peng, W. Wang and N. Ma, "End-to-end Deep Convolutional Neural Network-based Data-driven Fusion Framework for Identification of Human Induced Pluripotent Stem Cell-derived Endothelial Cells in Photomicrograph", **International Journal of Computer Vision**, 2023 (under review).
20. S. Ullah, L. Yan, M. S. Wong, K. Tenesy and **I. Iqbal**, "An Artificial Intelligence Framework for Improved High-Resolution Daily Extreme and Time Series Satellite Precipitation", **Journal of Hydrology**, 2023 (under review).
21. Z. Zuo, S. Ullah and **I. Iqbal**, "Spatial Downscaling and Correction Methodology for High-Resolution GPM Precipitation Using DNN Model and Kolmogorov-Smirnov Normality Test", **Remote Sensing**, 2023 (under review).

EXHIBITION, WORKSHOP & CONFERENCES

- W. Wang, **I. Iqbal**, X. Xu, Y. Nie, L. Gleiter, T. Peng, N. Ma and F. Toma, "Pushing the Boundaries of Deep Learning in Cell Imaging: From Pixels to Understanding and Beyond", Poster Presentation at Materials Science Engineering Day (MSE-Day): A Multifaceted Panorama of Material Sciences, Germany, 14 Nov 2023.
- Delivered a talk "Microscope image analysis based on control, coating and film groups for nuclear shape and fluorescence intensity measurement" at a MSE/P3T1 seminar series 'Functionality by information-guided design: From molecular concepts to materials', Germany, 26 June 2023.
- **I. Iqbal**, Y. Nie, Y. Liu, X. Xu, W. Wang, and N. Ma, "Computational Analysis of Morphological Change in Human Keratinocyte Cell Nuclei on Polydopamine Film", Poster Presentation at Helmholtz AI Conference, Deutschen Elektronen-Synchrotron, Hamburg, 12-14 June 2023.
- Love Data Week 2023, "Love your data? Make it reproducible!" A workshop on reproducibility in data science, Helmholtz Information and Data Science Academy, Helmholtz Open Science, 14 Feb 2023.
- Y. Nie, **I. Iqbal**, X. Xu, W. Wang and N. Ma, "Image-based analysis of cell-biomaterial interactions: from image to quantitative representation", Poster Presentation at Materials Science Engineering Day, Karlsruher Institute for Technology, Germany, 18 Nov 2022.
- SelectScience Webinar, An Introduction to Artificial Intelligence Image Analysis in Microscopy, Leica Microsystems, 18 Feb 2022.
- World Robot Conference, WRC2017, Etrong International Exhibition and Convention Center, Beijing, China (My team demonstrated the Robot which writes Chinese Characters), 22-27 Aug 2017.
- Computational Complexities Innovations and Solutions, Conference at COMSATS Institute of Information Technology Abbottabad, 12-13 May 2014.
- International Conference on Modeling and Simulation, Conference and short course on "Modeling and Simulation in Mathematical Finance" at Air University, 25-27 Nov 2013.

MOOCs

Registered for/completed several massive open online courses related to Generative AI, Large Language Models, Artificial Intelligence, Machine Learning, Deep Learning, Convolution Neural Networks, Computer Vision, Pattern Recognition, Image Processing, Python, TensorFlow, Keras, AI for Medical Diagnosis, Prognosis and Treatment, Bioinformatics, Genomics, Big Data, Data Science, Robotics, etc.

REFERENCES