

# Dr. Muhammad Rehman Zafar, PhD

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Google Scholar: <https://scholar.google.ca/citations?user=O5Nu1IAAAAAJ>

## SUMMARY OF QUALIFICATIONS

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- 6+ years of postsecondary teaching experience across multiple academic levels in higher education.
- 12+ years of professional experience in software engineering, data science, AI-driven applications, and data analytics.
- Skilled in curriculum development, course delivery, and assessment design aligned with academic and industry standards.
- Proven leadership in mentoring students, supervising projects, and fostering collaborative, inclusive learning environments.
- Strong communicator adept at explaining complex technical concepts to diverse audiences.
- Experienced in bridging academia and industry through applied research and technology-driven teaching practices.

## EDUCATION

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**Doctor of Philosophy (PhD) Electrical and Computer Engineering** Jan 2018 - Aug 2024

Toronto Metropolitan University (formerly Ryerson University), Ontario, Canada

Dissertation Title: A framework to Interpret, Visualize and Analyze the decisions of black box models for trustworthy AI

Research Domains: Explainable Artificial Intelligence, Interpretable Machine Learning, Few-shot Learning

Advisor: Dr. Naimul Khan

**Master of Science in Computer Science** Sep 2015 - Aug 2017

Bahria University, Islamabad, Pakistan

Dissertation Title: A Context-aware Approach to News Article Retrieval

Research Domains: Recommendation Systems, Natural Language Processing

Advisor: Dr. Arif-Ur-Rahman

**Bachelor of Science in Computer Science** Sep 2007 - Mar 2012

International Islamic University, Islamabad, Pakistan

Thesis: Lungs Tumor Detection from CT Scan Images

Application Domains: Healthcare, Digital Image Processing, Machine Learning

Advisor: Dr. Ayyaz Hussain

## ACADEMIC POSITIONS

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**Contract Lecturer** Sep 2025 – Present

Toronto Metropolitan University, Toronto, Canada

Contract, Part-time

- COE70A - Engineering Capstone

**Postdoctoral Research Fellow** Jun 2025 – Present

Toronto Metropolitan University, Toronto, Canada

Contract, Full-time

- Lead cutting-edge research on explainable artificial intelligence, interpretable machine learning, and large language models.
- Collaborate with multidisciplinary teams of academics, industry professionals, and stakeholders to deliver impactful research.
- Work as technical lead of the Observatory on Immigration Discourses (IDIO) project under the Bridging Divides program at TMU.
- Conduct and coordinate software development, research project ideation, and reporting on IDIO.
- Supervise other project team members (PhD and master's students) under the guidance of the PI.

**Professor** Jan 2023 – Present

Humber Polytechnic College, Toronto, Ontario, Canada

Contract, Partial Load

At Humber, I teach the following courses:

- ITE5410 Deep Learning
- ITE5324 Big Data 1

- ITE5424 Big Data 2
- ITE5432 J2EE Business Components
- ITC5104 Introduction to Database and SQL

### Sessional Instructor

Apr 2025 – Sep 2025

Odette School of Business, University of Windsor, Windsor, Ontario, Canada  
Contract, Part-time

At UWindsor, I teach the following courses:

- BSMM8730 Data Acquisition and Management

### Professor

Seneca Polytechnic College, Toronto, Ontario, Canada  
Contract, Part-time

Jan 2023 – Jun 2025

At Seneca, I teach the following courses:

- DBD800 Accessing Big Data
- BAN110 Data Preparation and Handling

### Graduate Teaching Assistant

Toronto Metropolitan University, Toronto, Ontario, Canada  
Contract, Part-time

Jan 2018 – Apr 2022

At TMU, I served as a Graduate Teaching Assistant, where I was responsible for preparing and evaluating assignments and lab activities, as well as providing tutoring and support during lab sessions for the following courses:

- DS8003 Management of Big Data and Big Data Tools
- CIND830 Python Programming for Data Science
- CIND123 Data Analytics: Basic Methods
- CIND110 Data Organization for Data Analysts
- COE318 Software Systems
- COE628 Operating Systems

## PUBLICATIONS

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- **Muhammad Rehman Zafar**, and Naimul Khan. "Attentional Feature Fusion for Few-Shot Learning." 2024 International Joint Conference on Neural Networks (IJCNN). IEEE, 2024.
- Zeeshan Ahmad, Syeda Rabbani, **Muhammad Rehman Zafar**, Syem Ishaque, Sridhar Krishnan, Naimul Khan. "Multi-level Stress Assessment from ECG in a Virtual Reality Environment using Multimodal Fusion," in IEEE Sensors Journal, 2023.
- **Muhammad Rehman Zafar** and Naimul Mefraz Khan. "Deterministic Local Interpretable Model-Agnostic Explanations for Stable Explainability". Machine Learning and Knowledge Extraction. 2021, 3, 525-541.
- **Muhammad Rehman Zafar** and Naimul Mefraz Khan. 2019. "DLIME: A Deterministic Local Interpretable Model-Agnostic Explanations Approach for Computer-Aided Diagnosis Systems". In Proceedings of Anchorage'19: ACM SIGKDD Workshop on Explainable AI/ML (XAI) for Accountability, Fairness, and Transparency (Anchorage'19).
- **Muhammad Rehman Zafar** and Munam Ali Shah. "Fingerprint authentication and security risks in smart devices." 22<sup>nd</sup> International Conference on Automation and Computing (ICAC), 2016, pp. 548-553. IEEE, 2016.
- **Muhammad Rehman Zafar** and Muhammad Asfand-e-Yar, "Scheduling on Heterogeneous Multi-core Processors Using Stable Matching Algorithm" International Journal of Advanced Computer Science and Applications (IJACSA), 7(6), 2016 .
- **Muhammad Rehman Zafar** and Arif Ur Rahman "Urdu Text Ambiguities and Their Impact on Named Entity Recognition, Word and Sentence Segmentation." 5<sup>th</sup> Student Conference on Engineering Sciences and Technology (SCONEST), IEEE, 2016.

## PATENTS

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- Biggs, Edward W., L. O. W. E. Brianna, Justin Robert Caguiat, Naimul Mefraz Khan, Nabila Miriam Abraham, **Muhammad Rehman Zafar**, Syeda Suha Shee Rabbani, Zeeshan Ahmad, Mihai Constantin Albu, and Jacky Zhang. "Stress management in clinical settings." U.S. Patent Application 16/663,223 filed April 29, 2021.

## AWARDS AND SCHOLARSHIPS

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- **PhD:**
  - Toronto Met Graduate Development Award
  - Toronto Met International Student Scholarship
  - Toronto Met Graduate Fellowships

- Toronto Met Graduate Travel Awards
- **Master's:**
  - Gold Medal for Academic Excellence
  - Magna Cum Laude honor
  - Recognized in Rector's Honor list (2015-2017)
  - Open merit scholarship

## ACADEMIC SERVICES

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- **Reviewer:**
  - Conference: IEEE International Joint Conference on Neural Networks (IJCNN) 2025
  - Journal: Machine Learning, Publisher: Springer
  - Journal: Big data Mining and Analytics, Publisher: IEEE
  - Journal: PLOS ONE, Publisher: PLOS
  - Journal: Heliyon, Publisher: Cell Press
  - Book Chapters: Interpretable machine learning with python, Publisher: Packt
  - Book: Human-in-the-Loop Machine Learning, Publisher: Manning Publications
- **Workshops and Discussion Panelist:**
  - Aggregate Intellect, Explainable AI Stream Owner Sep 2020 – Dec 2022
    - Conceptualized and developed workshop materials on Explainable AI
    - Led discussions on Explainable AI

## PROFESSIONAL AFFILIATIONS

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- Institute of Electrical and Electronics Engineers (IEEE).
- International Neural Network Society (INNS).

## INDUSTRY EXPERIENCE

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### Software Development Consultant

Self-employed, Toronto, Canada

Permanent, Full-time

Jul 2020 – Present

- Lead and contribute to project planning by defining scope, timelines, and deliverables for both data science and software development projects.
- Collaborate with clients to understand business challenges and translate them into technical and data-driven solutions.
- Design, develop, and implement software applications, machine learning models, and data pipelines using modern programming languages, frameworks, and tools.
- Provide expert guidance on software architecture, data architecture, system integration, and technology stack selection to deliver scalable and efficient solutions.
- Lead and coordinate with cross-functional teams to ensure seamless delivery and deployment of software applications and data-driven solutions.
- Lead and contribute to the optimization of application performance, scalability, and model accuracy based on user feedback and evolving business needs.
- Lead and conduct rigorous testing, debugging, and validation to ensure high-quality, reliable, and impactful outcomes.

### Senior Software Developer

ARB Labs, Toronto, Canada

Permanent, Part-time

Aug 2017 – Mar 2020

- Spearheaded the design and deployment of an optical bet recognition system, automating data capture for real-time player and table metrics.
- Eliminated manual data entry processes by implementing automated analytics, driving revenue growth and ensuring accuracy in decision-making.
- Utilized machine learning, computer vision, and artificial intelligence to resolve complex challenges in real-time systems.

### Assistant Manager Data Analytics and Mobile Applications

Interactive Group of Companies, Islamabad, Pakistan

Permanent, Full-time

Sep 2016 – Jul 2017

- Launched machine learning models to predict patient drop-offs and health shocks by mining hospital data.
- Led large-scale application development, driving revenue growth and improving user experience.

- Managed a research and development team, achieving key project milestones and delivering user-centric mobile solutions.
- Led analytics initiatives to extract actionable insights, optimize processes, and enhance decision-making.

### **Lead Software Engineer**

Interactive Group of Companies, Islamabad, Pakistan

Dec 2014 – Aug 2016

Permanent, Full-time

- Directed the development of Pakistan's first on-board entertainment system for national transport company.
- Designed and implemented prediction models using machine learning algorithms, enabling data-driven decision-making.
- Conducted data analytics and visualization using various tools to generate actionable insights.
- Designed and managed database architectures to support scalable and efficient data-driven applications.

### **Senior Software Engineer**

Medical Transcription and Billing Company, Rawalpindi, Pakistan

Apr 2013 – Jun 2014

Permanent, Full-time

- Designed and implemented scalable backend systems, optimizing performance and ensuring seamless integration with web services and APIs.
- Led a team of backend developers, providing technical guidance, conducting code reviews, and enhancing team efficiency.
- Streamlined database management through optimized queries and script development, improving data retrieval and storage processes.

### **Software Engineer**

Medical Transcription and Billing Company, Rawalpindi, Pakistan

May 2012 – Mar 2013

Permanent, Full-time

- Developed and maintained backend systems, including web services and APIs, ensuring functionality and scalability.
- Collaborated with senior developers to debug code, implement database scripts, and improve application performance.

## **SELECTED APPLIED RESEARCH PROJECTS**

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### **Data Observatory**

- Data Observatory is a centralized platform that collects, processes, and visualizes data from diverse sources to generate insights for research, monitoring, and decision-making.

### **Bet Recognition and Hand Count System**

- Developed and implemented an advanced table bet recognition system for casinos, achieving 96% prediction accuracy and enhancing operational efficiency.

### **Health-Shock Prediction: Cloud enabled framework for Data Analytics and Visualization**

- Developed a cloud-enabled predictive framework integrated with GIS, aiding stakeholders in understanding health shock causal factors.

### **IntuiRA**

- Developed IntuiRA, an enterprise information retrieval system enabling intelligent, context-based document searches with advanced access rights management.