

Contact Information	Melbourne, Australia	Phone: +61 498 996 037 Email: mbilalmce@gmail.com
Research Interests	Robotics, Human-Robot Interaction, Robot Learning	
Education	PhD in Computing and Information Systems	2023 – 2026
	The University of Melbourne, Australia	
	- Research Topic: Understanding and Improving Novice Kinesthetic Teaching for Robot Learning from Demonstration (PhD Thesis Link) - Supervisors: A/Prof Wafa Johal; A/Prof Nir Lipovetzky; Prof Denny Oetomo	
	MSc in Mechatronics Engineering	2018 – 2020
	University of Engineering and Technology, Lahore, Pakistan	
	- Research Topic: Implementation of Adaptive Variable Impedance Control for Dynamic Force Tracking on Redundant Manipulator	
	BSc in Mechatronics and Control Engineering	2014 – 2018
	University of Engineering and Technology, Lahore, Pakistan	
	- Awarded with Honours - Research Topic: Design and Control of 6 DoF Robotic Manipulator	
Research Experience [4+ Years]	Human-Centered Robotics Lab , National Center of Robotics and Automation, Pakistan	
	Team Lead	Oct 2021 – Feb 2023 (40-hr/week)
	- Led cross-functional research to deliver three core lab projects: Collaborative Robots (5-DoF & 7-DoF), Upper Limb Exoskeleton, and Lower Limb Prosthesis - Managed technical operations, component procurement, and inter-lab research collaborations across the labs under center	
	Research Assistant	Mar 2019 – Sep 2021 (40-hr/week)
	- Developed kinematic and dynamic models of robotic systems for motion planning - Developed and optimized mathematical models of semi-active prosthetic ankle joint - Designed and controlled an upper-limb exoskeleton for human power augmentation	
Conference Publications	[1] Muhammad Bilal, Tharaka Ratnayake, D. Antony Chacon, Nir Lipovetzky, Denny Oetomo, and Wafa Johal. <i>Design and Evaluation of AR-Based Real-Time Feedback System for Kinesthetic Robot Teaching</i>. In Proceedings of the ACM Designing Interactive Systems Conference (DIS), pp. 332–356, 2026. doi:10.1145/3800645.3812951 Honorable Mention Award [2] Muhammad Bilal, D. Antony Chacon, Nir Lipovetzky, Denny Oetomo, and Wafa Johal. <i>Investigating the Impact of Robot Degree of Redundancy on Learning from Demonstration</i>. In Proceedings of the 21st ACM/IEEE International Conference on Human-Robot Interaction (HRI), pp. 825–833, 2026. doi:10.1145/3757279.3785606	

	[3] Chen, Jiahao, D. Antony Chacon, Muhammad Bilal, Qiushi Zhou, and Wafa Johal. <i>Mr. LfD: A Mixed Reality Interface for Robot Learning from Demonstration</i>. In Proceedings of the 36th Australasian Conference on Human-Computer Interaction (OzCHI), pp. 275–285, 2024. doi:10.1145/3726986.3727004 [4] Muhammad Bilal, Nir Lipovetzky, Denny Oetomo, and Wafa Johal. <i>Beyond Success: Quantifying Demonstration Quality in Learning from Demonstration</i>. In Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), pp. 5120–5127, 2024. doi:10.1109/IROS58592.2024.10802187 [5] Syed Ali Huzaifa, Abdurrehman Akhtar, Meeran Ali Khan, and Muhammad Bilal. <i>Detection of Parkinson's Tremor in Real Time Using Accelerometers</i>. In Proceedings of the IEEE 7th International Conference on Smart Instrumentation, Measurement and Applications (ICSIMA), pp. 5–9, 2021. doi:10.1109/ICSIMA50015.2021.9526327 [6] Muhammad Bilal, Ali Raza, Mohsin Rizwan et al. <i>Towards Rehabilitation of Mughal Era Historical Places Using 7-DOF Robotic Manipulator</i>. In Proceedings of the IEEE International Conference on Robotics and Automation in Industry (ICRAI), pp. 1–6, 2019. doi:10.1109/ICRAI47710.2019.8967360
Journal Publications	[7] Muhammad Ali, Muhammad Bilal, M. Nadeem Akram, and Mohsin Rizwan. <i>Hybrid Position and Force Control for Upper Limb Rehabilitation of Stroke Patient</i>. American Journal of Mechanical and Industrial Engineering, 9(2), pp. 28–42, 2024. doi:10.11648/j.ajmie.20240902.12 [8] Muhammad Bilal, Mohsin Rizwan et al. <i>Design Optimization of Powered Ankle Prosthesis to Reduce Peak Power Requirement</i>. Science Progress, vol. 105, no. 3, pp. 1–16, 2022. doi:10.1177/00368504221117895 IF = 2.774 [9] Muhammad Bilal, M. Nadeem Akram, Mohsin Rizwan. <i>Adaptive Variable Impedance Control for Multi-Axis Force Tracking in Uncertain Environment Stiffness with Redundancy Exploitation</i>. Journal of Control Engineering and Applied Informatics, vol. 24, no. 2, pp. 35–45, 2022. IF = 1.299 [10] Muhammad Bilal, M. Nadeem Akram. <i>Indigenously Designed Development and Motion Control of Multi-DoF Robotic Manipulator</i>. International Research Journal of Engineering and Technology, vol. 9, no. 1, pp. 1–9, 2022.
Awards	- Honourable Mention Paper at ACM Designing Interactive Systems 2026, Singapore - PhD Write up Award (AUD\$3,500) 2026, the University of Melbourne, Australia - Winner, Robot Competition at HRI 2024, Boulder, USA - Runner-up, Robotics Vision Summer School 2024, ANU, Australia - Melbourne Research Scholarship (AUD\$114,000), the University of Melbourne, Australia
Teaching Experience	School of Computing and Information Systems, The University of Melbourne, Australia 1) AI Planning for Autonomy (COMP90054) Semester 2, 2023 — Semester 1, 2026 - Search algorithms and heuristic functions, Classical (AI) planning, Markov Decision Processes, Reinforcement learning, Game theory, Ethics in AI planning

2) **Designing Novel Interactions (INFO90003)**

Semester 1, 2024 and Semester 1, 2025

- Design and implementation of interactive systems, electronics prototyping, digital fabrication, and implementation with Unity game engine

Department of Mechatronics and Control Engineering, UET Lahore, Pakistan

Graduate Assistant

Oct 2018 – Mar 2019 (20-hr/week)

- Supervised undergrad final year projects, including 3R planar robotic manipulator and lower limb ankle prosthesis
- Prepared and graded quizzes, assignments, and maintained subject files

Technical Skill-Set

- Mathematical modelling of robotic systems, including **kinematics** and **dynamics**
- Development of **motion planning** algorithms using ROS 2 and MoveIt 2 on Linux (Ubuntu)
- Simulation of robotic systems using **MATLAB & Simulink**, **LabVIEW**, and **Gazebo**
- Statistical analysis using ANOVA and Linear/Cumulative-Link Mixed-Effects Models
- Development of **Vision Systems** for robotic manipulation using **OpenCV**
- Numerical computation and data analysis with **NumPy**, **SciPy**, **Scikit-learn**, and **MATLAB**
- 2D and 3D CAD modelling with **AutoCAD** and **SolidWorks**.
- Circuit design and simulation using **Multisim**, **Proteus**, and **Autodesk Fusion**
- Programming proficiency in **Python**, **R**, **C/C++**, **MATLAB**, and graphical programming (**LabVIEW**)

Academic Service

- Peer reviewer for
International Conference on Robotics and Automation (ICRA) 2026
ACM/IEEE Human-Robot Interaction (HRI) Short Contr. 2025, 2026
IEEE Robotics and Automation Letters (RA-L) 2026
Conference on Robot Learning (CoRL) 2025
- Student Volunteer at HRI 2025

Professional Memberships

- SIGCHI Melbourne chapter member (2024 – Present)
- Institute for Electrical and Electronics Engineers (IEEE), Member (2025 – Present)
- IEEE Robotics and Automation Society (2025 – Present)
- ACM Student Membership (2025 – Present)

References

Available upon Request