

Abdul Haleem Butt, PhD

Assistant Professor (RTDa), Faculty of Engineering, Free University of Bozen-Bolzano (unibz)

University Academic Curriculum Vitae

Research identifiers

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Education since leaving school

Oct 2015 – Feb 2019: Ph.D. in BioRobotics, Scuola Superiore Sant'Anna, Pisa, Italy; Supervisor: Prof. Filippo Cavallo.

Thesis: First Principal Data-Driven Models in Neurological Diseases with Wearable Technology: Parkinson Disease and Post-Stroke. **Final score: 100/100, thesis completed with distinction.**

Jan 2010 – Mar 2012: M.S. in Computer Engineering (Artificial Intelligence), Dalarna University, Borlänge, Sweden; Supervisor: Prof. Jerker Westin.

Thesis: Speech assessment for the classification of hypokinetic dysarthria in Parkinson's disease. **Completed with distinction.**

Sep 2004 – Sep 2008: B.Sc. in Computer Engineering, University of Engineering and Technology, Taxila, Pakistan.

Present appointment

Assistant Professor (RTDa), Faculty of Engineering, Free University of Bozen-Bolzano (unibz), NOI Techpark, Bozen-Bolzano, Italy.

Start Date: August 2026 (teaching and research assignment, through August 2029)

Accomplished researcher, educator, and AI specialist with over 13 years of experience, including 7 years of post-PhD research and academic leadership in Artificial Intelligence, BioRobotics, and Wearable Technologies. Expertise in developing data-driven and AI-powered solutions for neurological disease assessment, with a particular focus on Parkinson's disease, post-stroke rehabilitation, and digital health.

Proven track record of securing competitive international research funding exceeding €180,000, publishing in high-impact journals, and leading multidisciplinary collaborations across Europe and Pakistan.

Professional experience

Aug 2026 – Aug 2029: Assistant Professor (RTDa), Faculty of Engineering, Free University of Bozen-Bolzano (unibz), NOI Techpark, Bozen-Bolzano, Italy.

Aug 2025 – Aug 2026: Assistant Professor, Faculty of Computing and Artificial Intelligence, Air University, Islamabad, Pakistan.

Oct 2024 – Sep 2025: Senior Postdoctoral Research Fellow, Department of Brain and Behavioural Sciences, University of Pavia, Italy.

Feb 2023 – Sep 2024: Senior Postdoctoral Research Fellow, Department of Biomedical and Neuromotor Sciences, University of Bologna, Italy.

July 2020 – Jan 2023: Assistant Professor and Programme Lead of Artificial Intelligence, Faculty of Computing and Artificial Intelligence, Air University, Islamabad, Pakistan.

Feb 2019 – Sep 2020: Postdoctoral Research Fellow, Ambient Assistive Robotics Lab, The BioRobotics Institute, Scuola Superiore Sant'Anna, Pisa, Italy.

April 2018 – Aug 2018: Industrial PhD Fellow, Biomechanics Line of the E-Health Unit, Eurecat, Barcelona, Spain.

Nov 2013 – Sep 2015: Lecturer, Department of Computer Science, The University of Lahore, Lahore, Pakistan.

Practice-related projects & contributions (Italy, Europe, Pakistan)

- Presto Project: Collaboration with Telecom Italia and Cisanello University Hospital, Pisa, leading the project “Validation of the Leap Motion Controller for Parkinson’s Disease” (Oct 2015 – Sep 2016).
- ECHORD++ Keraal Project: Served as Managerial Moderator for this European collaboration; coordinated international partners, monitored and evaluated project progress, and provided technical support for robot-mediated physical exercises for patients with low back pain (Oct 2015 – Sep 2018).
- Intelligent Home Environment: Development of data-driven methods for activity classification and acoustic sound localization. Led the project and supervised MS students (June 2022 – July 2023).
- DePWiseN Project: “Deforestation in Pakistan: Combating through Wireless Sensor Networks,” under the Pakistan-UK Education Gateway (ICRG-2020). Led the project and supervised the MS student (June 2022 – July 2023).
- DAPHNE Project: Development of mHealth and ICT technologies for early diagnosis and management of Parkinson’s disease, supported by Regione Toscana. Led the project as a PhD student (Oct 2015 – Sep 2018).
- EBRAINS 2.0: “Enhancement of the Cerebellar Cortex Model for Application in Robotics Control,” in collaboration with the University of Pavia. Led as Postdoctoral Researcher (Oct 2024 – Sep 2025).
- Age-IT Partnership: Extended partnership funded under the PNRR (Mission 4) to support ageing societies through research-to-business initiatives. Led a project on sleep analysis as Postdoctoral Researcher (Feb 2023 – Sep 2024).

Experience in academic teaching (last 5 years)

- Special Topics in Human-Computer Interaction — Air University, Islamabad. Subject: HCI. Level: PhD. (Student feedback available.)
- Time Series Analysis and Prediction — Air University, Islamabad. Subject: AI. Level: Postgraduate. (Student feedback available.)
- Advanced Artificial Intelligence — Air University, Islamabad. Subject: AI. Level: Postgraduate. (Student feedback available.)
- Deep Learning — Air University, Islamabad. Subject: AI. Level: Postgraduate. (Student feedback available.)
- Digital Logic and Design — Air University, Islamabad. Subject: Computer Engineering. Level: Undergraduate. (Student feedback available.)
- Artificial Intelligence — Air University, Islamabad. Subject: AI. Level: Undergraduate. (Student feedback available.)
- Programming Fundamentals — Air University, Islamabad. Subject: Computer Science. Level: Undergraduate. (Student feedback available.)
- Introduction to Information and Communication Technologies — Air University, Islamabad. Subject: IT. Level: Undergraduate. (Student feedback available.)
- Biomedical Data Processing — Air University, Islamabad. Subject: Biomedical Engineering. Level: Undergraduate. (Student feedback available.)

- Computer Organization and Assembly Language — Air University, Islamabad. Subject: Computer Engineering. Level: Undergraduate. (Student feedback available.)

Summary of significant personal achievements in teaching

I have developed and delivered a diverse portfolio of undergraduate, postgraduate, and PhD-level courses in Artificial Intelligence, Data Science, Human-Computer Interaction, and Biomedical Data Processing. My teaching is grounded in an interdisciplinary approach, integrating computational neuroscience, machine learning, and data-centric AI, providing students with both theoretical foundations and practical competencies.

A key achievement was the design and delivery of Time Series Analysis and Prediction and Advanced Artificial Intelligence, incorporating real-world datasets, hands-on programming assignments, and research-oriented problem-solving. At the doctoral level, I introduced Special Topics in Human-Computer Interaction, fostering critical thinking and independent inquiry among PhD scholars. I have consistently received strong student feedback across courses.

Student supervision (last 5 years)

PhD Students

Supervised/supervising 2 PhD students (1 completed, 1 ongoing):

- Awais Ahmed — StrideSense: Enriching Lower Extremity and Kinetics in ACLR Patients via Sonic Insights; School of Computer Science and Technology, University of Science and Technology of China, Hefei, Anhui, China. (Completed.)
- Sadaf Abbasi — Large Language Models (LLMs), general intelligence, and agentic AI in healthcare and beyond; Faculty of Computing and AI, Air University, Islamabad. (Ongoing.)

MS Students

Supervised 8 MSc students in the Faculty of Computing and Artificial Intelligence, across: LLMs in healthcare; AI for cardiac monitoring and emotion detection; gait analysis for Parkinson's disease; ADL detection for post-stroke patients using wearables; geospatial data analysis; wildfire detection; acoustic AI for smart homes; and semantic segmentation/YOLO-based object detection in aerial imagery:

- **Jahzeb Khan** — A Multi-Class Confounder-Aware Deep Learning Framework for Wildfire Smoke and Fire Classification; Faculty of Computing and AI, Air University, Islamabad, Pakistan (completed with distinction, 2026).
- **Asifa Mehmood** — Semantic Segmentation and YOLO Detector over Aerial Vehicle Images; Faculty of Computing and AI, Air University, Islamabad, Pakistan (completed with distinction, 2023). Secured a PhD scholarship in Ireland.
- **Ahsan Bashir** — Enhancing Smart Home Environments: A Novel Pattern Recognition Approach to Ambient Acoustic Event Detection and Localization; Faculty of Computing and Artificial Intelligence, Air University, Islamabad, Pakistan (completed with distinction, 2023). Secured a PhD scholarship in Italy.
- **Ata-ur-Rehman** — Impact of Tree Cover Loss on Carbon Emission: A Learning-Based Analysis; Faculty of Computing and Artificial Intelligence, Air University, Islamabad, Pakistan (completed, 2023). Secured a faculty position in Pakistan.
- **Zain-ul-Abideen** — NLP-Based Semantic Analysis in Social Media; Faculty of Computing and AI, Air University, Islamabad, Pakistan (completed, 2022). Founded a startup.
- **Muhammad Hassan** — Activity Classification in Post-Stroke Patients Using Wearable Sensors; Faculty of Computing and AI, Air University, Islamabad, Pakistan (completed, 2022).

- **Ammar Ali Khan** — Event-Aligned Deep Learning for EEG-Based Emotion Recognition; Faculty of Computing and AI, Air University, Islamabad, Pakistan (in progress, 2026). Currently running his own startup.
- **Rana Muhammad Umar** — Ontology-RAG Clinical Decision Support for Medication Recommendations; Faculty of Computing and AI, Air University, Islamabad, Pakistan (in progress, 2026).

Bachelor Students

Supervised 8 BSc students in the Faculty of Computing and Artificial Intelligence, in biomedical engineering and artificial intelligence applications.

Other academic responsibilities

Internal appointments to faculty and university boards

- **Programme Lead**, Undergraduate Programme in Artificial Intelligence, Air University, Islamabad, Pakistan (2020–2022).
- **Managerial Moderator**, ECHORD++ European Project, Scuola Superiore Sant'Anna, Pisa, Italy (2015–2018).
- **Member and Head of the Examination Committee**, Faculty of Computing, Air University, Islamabad, Pakistan (2020–2022).

Responsibilities for organizing conferences/seminars/exhibitions

- Organizer, First International Cyber Security Conference, Air University, Islamabad (23 November 2021).
- Organizer, First International Symposium on Data Science and Artificial Intelligence, Air University, Islamabad (9 November 2022).
- **Program Committee Member**, 23rd International Conference on Frontiers of Information Technology (FIT 2026), COMSATS University Islamabad, Pakistan (14–15 December 2026).

Memberships & conference participation

- Permanent Member, Pakistan Engineering Council.
- Reviewer for high-impact-factor journals, including *Applied Intelligence* (Springer).
- Conference participation (attendee/presenter): IBCAST 2025, IBCAST 2026, FIT'25, FIT'26.

Summary of research and scholarship during the previous 5 years

Currently engaged in two collaborative research projects with the University of Halmstad (Sweden) and the University of Glasgow (UK), focusing on healthcare AI for Disaster Management and Virtual Human Twins for clinical decision support in prevention and diagnosis. These projects involve the National Disaster Management Authority (Pakistan) and Zaytrics (Pakistan).

Successfully secured over €180,340 in competitive international research funding as Principal Investigator, across the projects detailed in the grants table below.

Founded and led the Computational Intelligence and Healthcare Lab at Air University to promote national and international research collaborations.

<https://abdulhaleem21.github.io/Butt-Lab-of-AI/>

Research projects and grants

Date granted	Funding body	Title	Amount
Aug 2026 - Aug 2029	UNIBZ	Scalable Database Solutions for Temporal and Timeseries Data processing	€126,000.00
Oct 2024 – Sep 2025	EBRAINS 2.0	Generation and simulation of a cerebellar robotic controller	€30,000.00
Feb 2023 – Sep 2024	Age-IT (PNRR)	Patient and caregiver monitoring tools: bio-medical indicators	€48,640.76
Oct 2018 – Sep 2020	CAPSULA CORSA, ACCRA	Development of Deep Learning Models for Validation of Wearable Sensors for Parkinson's Disease	€43,200.00
Oct 2015 – Sep 2018	Daphne (Regione Toscana)	Development of ML/DL Models for Validation of Wearable Sensors in Neurological Diseases	€57,000.00
Apr 2018 – Aug 2018	Erasmus+	Development of Data-Driven Models and Validation of Wearable Sensors for Assessment of Post-Stroke Patients	€1,500.00
Jan 2010 – Mar 2012	Dalarna University, Sweden	Development of Data-Driven Models for the Classification of Hypokinetic Dysarthria in Parkinson's Disease	Tuition fee waiver

Total competitive funding secured (excluding tuition waiver): €304,340.76

Publications

Journal articles in refereed academic journals (DOI given where available). Scopus quartile (year of publication) and Journal Impact Factor (JIF, Clarivate) are indicated where the journal is indexed.

- Ahmed, Awais, et al. "StrideSense: Enriching Lower Extremity and Kinetics in ACLR Patients via Sonic Insights." IEEE Internet of Things Journal (2025). 10.1109/JIOT.2025.3545744. **Ranking: Q1.** Impact Factor: 9.0.
- Shabbir, Ahsan, et al. "Enhancing smart home environments: a novel pattern recognition approach to ambient acoustic event detection and localization." Frontiers in Big Data 7 (2025): 1419562. <https://doi.org/10.3389/fdata.2024.1419562>. **Ranking: Q2.** Impact Factor: 3.8.
- Capulli, Emma, et al. "Ethical and Legal Implications of Health Monitoring Wearable Devices: A Scoping Review." Social Science & Medicine (2025): 117685. <https://doi.org/10.1016/j.socscimed.2025.117685>. **Ranking: Q1.** Impact Factor: 4.1.
- Palmese, Francesco, et al. "Wearable sensors for monitoring caregivers of people with dementia: a scoping review." European Geriatric Medicine (2024): 1-11. <https://doi.org/10.1007/s41999-024-01113-8>. **Ranking: Q1.** Impact Factor: 3.9.
- Qureshi, Asifa Mehmood, et al. "Semantic Segmentation and YOLO Detector over Aerial Vehicle Images." Computers, Materials & Continua 80.2 (2024). <https://doi.org/10.32604/cmc.2024.052582>. **Ranking: Q2.** Impact Factor: 2.4.
- Butt, Abdul Haleem, et al. "Impact of tree cover loss on carbon emission: a learning-based analysis." Computational Intelligence and Neuroscience 2023.1 (2023): 8585839. <https://doi.org/10.1155/2023/8585839>. **Ranking: Q2.** Impact Factor: 3.0.
- Malik, Zoraez Ashfaq, et al. "Performance evaluation of classification algorithms for intrusion detection on NSL-KDD using RapidMiner." International Journal of

Innovations in Science & Technology 4 (2022): 135-146.
<https://doi.org/10.33411/ijist/2022040110>.

- Baig, Muhammad Shahzaib, et al. "Natural language to SQL queries: A review." International Journal of Innovations in Science & Technology 4 (2022): 147-162.
<https://doi.org/10.33411/ijist/2022040111>.
- Khan, Muhammad Imran, et al. "Activity detection of elderly people using smartphone accelerometer and machine learning methods." International Journal of Innovations in Science & Technology 3.4 (2021): 186-197.
<https://doi.org/10.33411/IJIST/2021030405>.
- Butt, A.H., Rovini, E., Fujita, H., et al. "Data-Driven Models for Objective Grading Improvement of Parkinson's Disease." Annals of Biomedical Engineering 48 (2020): 2976-2987. <https://doi.org/10.1007/s10439-020-02628-4>. **Ranking: Q1.** Impact Factor: 4.0.
- Butt, Abdul Haleem, et al. "Biomechanical parameter assessment for classification of Parkinson's disease on clinical scale." International Journal of Distributed Sensor Networks 13.5 (2017): 1550147717707417.
<https://doi.org/10.1177/1550147717707417>. **Ranking: Q2.** Impact Factor: 2.0.
- Butt, A.H., et al. "Objective and automatic classification of Parkinson's disease with Leap Motion controller." Biomedical Engineering Online 17.1 (2018): 168.
<https://doi.org/10.1186/s12938-018-0600-7>. Impact Factor: 2.8.

Chapters in books

- Butt, Abdul Haleem, et al. "Wearable Sensors for Gesture Analysis in Smart Healthcare Applications." Human Monitoring, Smart Health and Assisted Living: Techniques and Technologies 9 (2017): 79. https://doi.org/10.1049/PBHE009E_ch4.

Conference papers (CORE rating adopted by GII/GRIN, where available)

- Khan, Ammar Ali, et al. "Event-Aligned Deep Learning for EEG-Based Emotion Recognition." 2026 International Conference on Information Technology (ICIT). <https://icit.nu.edu.pk/accepted-papers>.
- Khan, Jahzeb, et al. "A Multi-Class Confounder-Aware Deep Learning Framework for Wildfire Smoke and Fire Classification." 2026 International Conference on Information Technology (ICIT). <https://icit.nu.edu.pk/accepted-papers>.
- Butt, A.H., et al. "Synaptic Plasticity Mechanisms and Dynamics in the Cerebellar Spiking Microcircuit." Organization for Computational Neuroscience 2025. Ranking: A.
- Silvani, Alessandro, et al. "Measuring spontaneous activity, sleep, and heart rate with wearable sensors to improve prediction of incident falls in older subjects: The DARE FALLSPREDICT project." Journal of Sleep Research 33 (2024). <https://doi.org/10.1111/jsr.14293>. Ranking: A.
- Di Florio, Paola, et al. "Looking-glass MIAR: A pilot open-access database of multi-wearable sensor monitoring of acceleration and heart rate during sleep." Journal of Sleep Research 33 (2024). Ranking: A.
- Sicbaldi, Marcello, et al. "Can we use a sensor on the lower back to assess sleep?" Journal of Sleep Research 33 (2024). Ranking: A.
- Silvani, Alessandro, et al. "Multi-wearable sensor sleep monitoring of family caregivers of people with dementia: The iCARE-IT AVERE-CURA project protocol." Journal of Sleep Research 33 (2024).
- Sicbaldi, Marcello, et al. "Monitoring the association between movements and heart rate changes during sleep with a multi-sensor wearable system setup." Journal of Sleep Research 33 (2024).
- Capulli, Emma, et al. "Wearable Health-Monitoring Devices: Data Protection and Other Ethical Issues." The Journal of Hospital Ethics 9.2 (2023): 23-24.

- Qureshi, Asifa Mehmood, et al. "A Machine Learning Approach for Vehicle Detection and Tracking over Novel Aerial Image." 24th IEEE International Multi Topic Conference (2023).
- Butt, A.H., Cavallo, F., Maremmani, C., Rovini, E. "Biomechanical parameters assessment for the classification of Parkinson Disease using Bidirectional Long Short-Term Memory." 2020 42nd Annual International Conference of the IEEE EMBS, 5761-5764. doi:10.1109/EMBC44109.2020.9176051. Ranking: A.
- Butt, Abdul Haleem, et al. "Assessment of Purposeful Movements for Post-Stroke Patients in Activities of Daily Living with Wearable Sensor Device." 16th IEEE International Conference on Computational Intelligence in Bioinformatics and Computational Biology (2019). <https://doi.org/10.1109/CIBCB.2019.8791470>. Ranking: A.
- Butt, Abdul Haleem, et al. "Leap motion evaluation for assessment of upper limb motor skills in Parkinson's disease." 2017 International Conference on Rehabilitation Robotics (ICORR). doi:10.1109/ICORR.2017.8009232. Ranking: A.
- Butt, Abdul Haleem, et al. "Speech Assessment for the Classification of Hypokinetic Dysarthria in Parkinson Disease." Presented at ICNR & NRC 2014.

Entrepreneurship

Research and Development Collaboration with Industry: established strong industrial collaborations to develop R&D proposals; engaged graduate students in industry-linked theses. Collaborated with Halmstad University (Sweden), the National Disaster Management Authority (Pakistan), and the University of Glasgow (UK).

- Founder, Intelligent Multimedia Centre Lab (2025): <https://abdulhaleem21.github.io/Butt-Lab-of-AI/>
- Led an Intelligent Home Environment project in collaboration with Halmstad University (2024).
- Led "Impact of Tree Cover Loss on Carbon Emission," under the Pakistan-UK Education Gateway (DePWiseN).
- Led a Wildfire Early Detection System project in collaboration with the National Disaster Management Authority, Pakistan (2026).

Statement of interest

My research focuses on developing intelligent technological solutions leveraging Artificial Intelligence, Machine Learning, Deep Learning, wearable sensors, IoT, and remote sensing to address complex, data-driven challenges across two interconnected domains: health and environment.

My primary contribution to unibz is the integration of BioRobotics and Computational Intelligence into clinical diagnostics. Having secured over €180,000 in competitive international research funding — including EBRAINS 2.0, PNRR Age-IT, and Daphne (Regione Toscana) — I bring a high degree of research autonomy and a proven ability to lead complex, multi-stakeholder projects.

Language competence

Urdu: native.

English: near-native proficiency; level C1 (internal C1 exam, Scuola Superiore Sant'Anna, Pisa, Dec 2018).

Italian: A0 level; preparing for A1 certification.