Kazi Sher Ahmed

Mechatronics Engineer
Karachi, Pakistan
kazisherahmed@gmail.com | kazi-sher.github.io | github.com/Kazi-Sher

Research Interests

Control systems, active magnetic bearing (AMB), rotordynamics, ultra-high-speed motors

Education

Doctoral Studies – Sabanci University, Turkiye Sep. 2021 – July 2023

Mechatronics Engineering (coursework completed)

- Dissertation Topic: Optimization and Realization of AMB Spindle for Chatter Suppression
- Advisor: Dr. Bekir Bediz
- Relevant Coursework: Machine Learning, Metal Cutting Mechanics, Tribology, Scaling in Energy Systems
- Status: Program paused due to family obligations. Currently finalizing publications

MS – Sabanci University, Turkiye Sep. 2018 – July 2021

Mechatronics Engineering

- Thesis: Design of Active Magnetic Bearing Spindles for Micro-Milling Applications
- Advisor: Dr. Bekir Bediz
- Relevant Coursework: Real-Time Systems, Integrated Sensors, Mechanical Vibrations, Topology Optimization, Finite Element (FE) Method, Machine Tool Engineering

BS – GIK Institute, Pakistan Aug. 2011 – June 2015

Mechanical Engineering

- Senior Year Project: Development & Finite Element Modeling of a Rotor-Bearing Testrig
- Award: Second Best Senior Year Project

Journal Papers & Manuscript

K S Ahmed, G Kiziltas, & B Bediz, 2026, 'Design framework and manufacturing of an active magnetic bearing spindle for micro-milling applications', *Preprint*

K S Ahmed, G Kiziltas, & B Bediz, 2025, 'Integrated design optimization of a motorized active magnetic bearing spindle for micro-milling applications', *Journal of Mechanical Science and Technology*, vol. 39, pp. 2015–2027

K S Ahmed & S M Ahmad, 2019, 'VibronRotor, an open-source rotordynamic code: Development and benchmarking', *Measurement*, vol. 131, pp. 546–558

Conference Papers

K S Ahmed & B Bediz, 2022, 'Design of an active magnetic bearing spindle for micro-milling applications', *19th International Conference on Machine Design and Production*, Cappadocia, Turkiye, Aug. 31–Sep. 3

A Rehman, **K S Ahmed**, F A Umrani, B Munir, A Mehboob, Z Kazmi, & S M Ahmad, 2015, 'Finite element modeling of a generic rotor-bearing system and experimental validation', *ASME Dynamic Systems and Control Conference*, Ohio, USA, Oct. 28–30

Research Projects

Design Framework & Manufacturing of AMB Spindle Sabanci University
Graduate Researcher [Preprint | UMTIK Paper] 2019 – 2023

- Proposed a systematic framework to design and manufacture a micro-milling AMB spindle with an aim to consolidate fragmented design knowledge
- Validated the framework as a case study involving topology selection, modeling, optimization, analysis, and manufacturing of spindle components
- Manufactured the physical prototype and executed manufacturing/assembly decisions for reproducibility of similar AMB spindles

Integrated Design Optimization of Motorized AMB Spindle Sabanci University
Graduate Researcher [JMST Paper] 2022 – 2023

- Co-authored a successful grant proposal (TUBITAK Grant: 123M121)
- Developed a multidisciplinary design optimization workflow integrating often separately treated AMB and motor performance

- Employed analytical models covering electromagnetics, mechanics, & rotordynamics
- Constructed a 3D finite-element model to: (i) analyze and reduce AMB-motor electromagnetic coupling, (ii) numerically correct the AMB analytical model
- Generated Pareto-optimal designs optimizing torque-to-loss ratio & spindle mass enabling design selection based on application requirements

Open-Source Rotordynamic Software GIK Institute

Laboratory Engineer [Measurement Paper | Code] 2017 – 2018

- Developed and benchmarked VibronRotor, an open-source finite-element rotordynamic code compatible with MATLAB and free scientific programming language GNU Octave
- Implemented key analysis: Campbell diagram, critical speed map, mode shapes, imbalance response, orbit plots, & instability threshold analysis
- Instrumented a rotor testrig with eddy current probes for experimental modal analysis for code validation

Skills

Methods: FE analysis, electromagnetics, rotordynamics, control system design, design optimization, experimental modal analysis

Programming & numerical computing: C/C++, Python, MATLAB, Mathematica

CAD & simulation: Solidworks, COMSOL, ANSYS, MATLAB/Simulink

Experimental & data acquisition: Testrig instrumentation, LabVIEW

Peer Review Service

Journal of the Brazilian Society of Mechanical Sciences and Engineering, Springer

Journal of Mechanical Science and Technology, Springer

Work and Teaching Experience

Graduate Researcher & Teaching Assistant, Sabanci University Sep. 2018 – May 2023

- Research outcome: 1 journal article (JMST 2025), 1 conference paper (UMTIK 2022), 1 preprint
- Weekly recitations, grading, and office hours for courses: Control Systems, Mechanical Vibrations, Linear Algebra, Statics, Dynamics, Mechanical Systems, Discrete Mathematics, Calculus
- Mentored undergraduate students on the development of an active magnetic damper

Laboratory Engineer, GIK Institute Sep. 2016 – Aug. 2018

- Research outcome: 1 journal article (Measurement 2019), open-source rotordynamic code
- Designed & conducted lab experiments in Mechanical Vibrations and Fluid Mechanics
- Teaching assistant course assignments: Fluid Mechanics, Mechanical Vibrations
- Served as Problem-Based Learning Committee Coordinator

Project Engineer, GIK Institute Sep. 2015 – Aug. 2016

- Designed & conducted computational fluid dynamics analysis of a micro-hydro Kaplan turbine for a Khyber-Pakhtunkhwa Govt. Project
- Delivered a seminar talk on 'Indigenous R&D of Micro-Hydro Power Plants', CIIT Lahore (2016)

Summer Intern, K-Electric Combined Cycle Power Plant June 2014 – July 2014

- Completed on-site trainings on plant operations and delivered technical reports

Research Intern, MARC, Koc University July 2013 – Aug. 2013

- Designed & conducted stress analysis of a dynamically-loaded spring for linear compressors

HammerHead Arc (Shell Eco-marathon team) Dec. 2012 – May 2015

- Led the team and represented Pakistan in Shell Eco-marathon 2015, Philippines
- Project goals: Design, fabrication, & testing of an ultra energy-efficient electric vehicle

Managing Editor, Science Aurora Magazine Aug. 2012 – May 2013

- Researched content, wrote articles, & managed the project

Awards

- Graduate studies tuition waiver & stipend support at Sabanci University, Turkiye (2018–2023)
- Second position in Senior Year Project Competition at GIK Institute (2015)
- Represented Pakistan in Shell Eco-marathon Asia, Manila, Philippines (2015)
- Best Design Award in National Shell Eco-marathon Off-track Event, Pakistan (2015)
- Sixth position in Battery Electric Category, 2014 Shell Eco-marathon Asia, Manila. Project also won Best Ecological Footprint Award at National Shell Eco-marathon event (2014)

Membership American Society of Mechanical Engineers (ASME)

Test Scores TOEFL: 106/120 (2021)

References

Dr. Bekir Bediz
Associate Professor, Sabanci University, Turkiye
bbediz@sabanciuniv.edu (MS-PhD advisor)

Dr. Gullu Kiziltas Sendur
Professor, Sabanci University, Turkiye
gkiziltas@sabanciuniv.edu (Research collaborator)

Dr. Sarvat Mushtaq Ahmad
Associate Professor, King Fahd University of Petroleum and Minerals, Saudi Arabia
sarvat.ahmad@kfupm.edu.sa (BS advisor & research collaborator)

Updated: January 24, 2026