

DR. UZAIR KHALEEQ UZ ZAMAN

Head of Policy – Science, Technology & Innovation, CoE-CPEC (MoPD&SI) | SMART Manufacturing & Industry 4.0 | Technology Transfer, Industrial Policy & CPEC 2.0

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PROFESSIONAL EDUCATION

- **Ph.D. Industrial Engineering** Arts et Métiers ParisTech, Metz, France (02/2019)
- **MS Mechanical Engineering** College of Electrical & Mechanical Engineering (CEME), National University of Sciences and Technology (NUST), Pakistan (06/2014)
- **BSc Mechanical Engineering**, GIK Institute of Engineering Sciences and Technology (GIKI), Pakistan (06/2009)

RESEARCH METRICS

- Publications: **55+**
- Books: **3 International Books** (CRC Press/Taylor & Francis)
- Book Chapters: **13**
- Funded Projects: **3**
- Patents: **4 (Filed / Granted)**

BOARD & ADVISORY ROLES

- **Academic Board Member Mechanical** – Fauji Fertilizer Company (FFC), Rawalpindi, Pakistan, since Dec 2025
- **External Member – Technical Board**, Joyland (Theme Park), Ayub Park, Rawalpindi, Pakistan, since Oct 2025
- **Member – Board of Studies**, Sarhad University of Science & IT, Peshawar, Pakistan, since Aug 2025
- **Member – Academic Advisory & Transformation Forum**, GIKI, since Feb 2026.

PROFILE

Engineering academic, policy professional, and smart manufacturing specialist with a PhD in Industrial Engineering from Arts et Métiers ParisTech, France, and over 16 years of experience across academia, industry, research, administration, and public policy. Currently serving as Head of Policy – Science, Technology & Innovation at the Centre of Excellence for CPEC, with a focus on evidence-based policy research, stakeholder engagement, and advisory support for CPEC 2.0. Areas of expertise include Pakistan-China STI cooperation, technology transfer, industrial modernization, smart manufacturing, digital transformation, applied R&D, advanced skills, innovation ecosystems, and productivity enhancement. Previously served for approximately 12 years at the College of Electrical & Mechanical Engineering, NUST, including as Head of the Department of Mechanical Engineering. Industry and advisory experience includes Pakistan Tobacco Company, TUSDEC, Orient Electronics, FFC, and Joyland.

WORK HISTORY

Head of Policy (Science, Technology & Innovation)

Centre of Excellence (CoE)

07/2026 – Present

China-Pakistan Economic Corridor (CPEC)

Ministry of Planning, Development & Special Initiatives, Government of Pakistan

- Leading the Science, Technology & Innovation (STI) policy domain at the CoE – CPEC, with a focus on evidence-based research, policy analysis, stakeholder engagement, and advisory input for CPEC 2.0.
- Key areas of work include:
 - Conducting and guiding policy research on STI-related opportunities under CPEC 2.0 to strengthen Pakistan's innovation capacity, industrial competitiveness, and technology-led growth
 - Mapping Pakistan-China collaboration opportunities in AI, digital infrastructure, smart manufacturing, advanced manufacturing, and technology transfer

CORE COMPETENCIES

- **STI Policy & Strategic Leadership:** Head of Policy (STI) with expertise in evidence-based research, strategic planning, stakeholder engagement, and advisory support for CPEC 2.0.
- **Academic & Institutional Leadership:** Former Department Head experienced in curriculum development, OBE accreditation, faculty management, research supervision, quality assurance, and academic planning.
- **Smart Manufacturing & Digital Transformation:** Expertise in Industry 4.0/5.0, AI-enabled manufacturing, digital twins, Industrial IoT, automation, predictive maintenance, and zero-defect manufacturing.
- **Technology Transfer & Industry-Academia Collaboration:** Strong experience in applied R&D, technology localization, university-industry partnerships, MoUs/DoUs, skills development, and policy-relevant research.
- **Sustainable Industrial Systems:** Focus on resource- and energy-efficient manufacturing, asset performance, circular production, green technologies, and industrial resilience.
- **Systems Thinking & Policy Analytics:** Expertise in decision-support systems, optimization, risk and bottleneck analysis, scenario assessment, and actionable policy development.

- Supporting stakeholder engagement and convening seminars, policy dialogues, and consultations with government, academia, industry, and international stakeholders.

Head of Department

11/2024 - 06/2026

Department of Mechanical Engineering CEME, NUST, Islamabad, Pakistan

- Provide academic leadership of the Mechanical Engineering department, overseeing teaching, research development, accreditation (OBE), curriculum modernization, faculty management, and resource planning.
- Strengthen international partnerships and structured industry-academia engagement through advisory boards, collaborative projects, and targeted outreach.
- Lead OBE accreditation, lab audits, and continuous quality improvement initiatives in line with PEC requirements.
- Supervise and mentor postgraduate students and early-career academics.

Associate Professor

02/2024 - Present

(Mechanical / Industrial Engineering) Department of Mechanical Engineering CEME, NUST, Islamabad, Pakistan

- Delivered and coordinated UG and PG courses in smart manufacturing, reliability engineering, optimization, machine design, and data-driven decision systems.
- Conducted applied research in AI-enabled manufacturing, predictive maintenance, asset performance, and industrial digital transformation.
- Supervised undergraduate capstone projects and postgraduate research in intelligent manufacturing systems.
- Contributed to funded research initiatives and industry-linked consultancy projects.

Assistant Professor

03/2019 - 02/2024

Department of Mechatronics Engineering CEME, NUST, Islamabad, Pakistan

- Taught UG and PG courses, served as Head of the Undergraduate Program, led the Quality Control Cell, acted as CPD Coordinator and Board Member for the Industry Outreach Program
- Enhanced curriculum and industry collaboration, fostered student success through academic advisement, performance evaluation, and mentorship, and guided them towards internships and career opportunities.

GLOBAL ENGAGEMENT

- **Research Collaborator:** ADaMS Lab, University of Alberta, Canada (2024–2026)
- **PhD Jury Member:** University of Luxembourg (2023) ParisTech, France (2023).

INDUSTRY-ACADEMIA PROJECTS

- HEC NRPU (2026–2028): Additive Manufacturing of Nature-Inspired PCM Heat Exchangers for AI-Guided Passive Thermal Regulation in Pakistani Buildings (**PKR 7.5 Million**)
- Govt. of Pakistan (2021–2024): Designed & developed a power generation system for thermoacoustic devices (**PKR 0.3 Million**).
- NCRA, Rawalpindi (2021–2022): Automated a textile warehouse using Industry 4.0 technologies (**PKR 13.127 Million**).
- G.F.C. Fans, Gujrat (2013–2014): Optimized assembly line sequencing via genetic algorithms (MS Thesis, lodging & messing funded).

Visiting Academic

- **International Visiting Professor** **09/2021 - 01/2024**
Beihang University, Beijing, China
 - Delivered undergraduate course in Intelligent Manufacturing Engineering (2021–2023) remotely, promoting interactive learning and conducting comprehensive assessment and feedback.**03/2018 - 02/2019**
- **Visiting Instructor**
IAE, Ecole Universitaire de Management, Metz, France
 - Conducted comprehensive instruction in Quality and DOE for MBA students, fostering engagement and adapting teaching strategies to enhance learning outcomes.**09/2017 - 05/2018**
- **Teaching Assistant**
LCFC, Arts et Métiers ParisTech, Metz, France
 - Co-taught “Machine Design (ME3180)” at Georgia Tech Lorraine.

Business Data Cleanser

03/2013 - 05/2014

Pakistan Tobacco Company; a member of British American Tobacco (BAT), Islamabad, Pakistan

- Led implementation of Project TaO (OneSAP Target Operating Model) across BAT operations in Asia (Pakistan & Singapore)
- Managed data harmonization across Production Planning, Logistics Execution, Plant Maintenance, Operations Finance, and Material Master
- Improved data quality through structured validation and cleansing procedures
- Collaborated with cross-functional teams to ensure seamless integration of business data across functions

Associate (R&D)

05/2012 - 05/2013

Technology Upgradation and Skill Development Company, Ministry of Production, GoP, Lahore, Pakistan

- Drafted and secured funding through grant proposals in renewable energy, industrial technology gap analysis, and donor-funded programs (GIZ, EU, USAID, UNIDO)
- Conducted market research to identify product and technology gaps
- Maintained structured project documentation to support knowledge transfer and continuity.

INDUSTRIAL PATENTS

- **Utility Patent** (2025): Thermo-acoustic power generation system using bi-directional turbines (IPO Pakistan, submitted).
- **Design Patent** (2024): High-maneuverability agricultural robot with individual wheel steering (IPO Pakistan, submitted).
- **Design Patent** (2023): Flexible automated vehicle platform (IPO Pakistan, submitted).
- **Design Patent** (2019): Inclined concentric quadrupole magnetic actuators for targeted drug delivery (IPO Pakistan, Patent No. 20169).

REFERENCES

- Dr. Syed Hasanat Shah (Executive Director, CoE-CPEC, Pakistan) hasanatsyed@pide.org.pk
- Prof. Ali Siadat (Director - LCFC, Arts et Metiers ParisTech, France) ali.siadat@ensam.eu
- Prof. Aamer Ahmed Baqai (Dean, CEME, NUST) aamer.baqai@ceme.nust.edu.pk

Assistant Manager

03/2011 - 05/2012

Inclusive Resource Management (Pvt.) Ltd., Islamabad, Pakistan

Managed solar and renewable energy projects in Gilgit Baltistan with SkyFire LEDs (OEM, USA), overseeing operations to ensure performance, quality, and service standards.

Trainee Engineer

09/2010 - 03/2011

Orient Electronics (Pvt.) Ltd., Lahore, Pakistan

Conducted R&D and product development for Orient Appliances, updated BOM in SAP, assisted in routine testing, developed engineering solutions for recurring issues, and collaborated on complex projects with senior engineers.

PROFESSIONAL TRAININGS

- Undertaken extensive national and international training in smart manufacturing, AI in education, digital transformation, and project management. Key programs include **Generative AI for CEOs** (GIKI, 2025), **AI and Education** (NUST, 2024), and **Digital Intelligence in the 4th Industrial Revolution** (NPO, 2024).
- Completed specialized training in **project management, monitoring & evaluation, and technical report writing** through national institutions (PPMI, AHKNCRD). International exposure includes training in **data systems and planning** (Singapore, Thailand) and **clean development mechanisms**.
- Additional engagement in environmental sustainability, **circular economy** (UNIDO), and **industrial safety** workshops supports applied research and teaching in sustainable manufacturing systems.

AUTHORED WORKS - Published Books

- Intelligent Manufacturing: Concepts and Beyond (2025) Taylor & Francis (**Textbook**) - ISBN: 9781032777924
- Linear Control Systems in Engineering: Basics and Beyond (2024) Taylor & Francis (**Textbook**) - ISBN: 9781032776286
- Handbook of Manufacturing Systems and Design: An Industry 4.0 Perspective (2023) Taylor & Francis, DOI: 10.1201/9781003327523

ACADEMIC VOICE

- Demonstrated expertise in applied AI, Industry 4.0 principles, smart manufacturing strategies, additive manufacturing, digital twins, and industrial transformation, with impactful contributions to academia and industry.
- Facilitated scholarly discourse and thought leadership at the following leading international conferences:
 - International Conference on Solar, Storage, Flexibility (2026) – Pakistan – **Discussant**
 - International Conference on Quantum Meets AI: From Qubits to Quantum Advantage (2026) – Pakistan – **Guest of Honour**
 - International Conference on Modern Technologies in Mechanical & Material Engineering (2024, 2025, 2026) – Pakistan – **Keynote Speech, Session Chair, Panelist**
 - 19th CIRP Conference on Computer Aided Tolerancing (2025) – Canada – **Member Scientific Committee**
 - Casablanca International Conference on Additive Manufacturing (2020, 2022, 2025) – Morocco – **Member Technical Committee**
 - World Congress on Mechanical and Mechatronics Engineering (2018) – Dubai, UAE – **Invited Speaker**
 - International Conference on Uses of AI in Medical Sciences (2025) – Pakistan – **Keynote Speaker**
 - International Conference on Climate Change and Sustainable Development (2024) – (2024) – **Session Chair**
 - IEEE International Conference on Robotics and Automation in Industry (2019, 2021, 2024) – Pakistan – **Session Chair, Publication Chair**
 - International Workshop on Functional Reverse Engineering of Machine Tools: AI for Industrial Transformation (2024) – Pakistan – **Keynote Speaker, Session Chair**

RECENT RELEVANT PUBLICATIONS

- Zehra F, Marcucci BR, **Zaman UK**, Butt SU, Qureshi AJ, (2026) “Towards Digital Twins with IIoT-Enabled Sensing System for Manufacturing Processes”, Smart and Sustainable Manufacturing Systems: 1-25
- Braian R, Zehra F, **Zaman UK**, Butt SU, Qureshi AJ (2026) “Impact of Data Collection on Digital Shadow Modeling in Manufacturing: A Digital Twin Approach”, Smart and Sustainable Manufacturing Systems, 10(1): 1-21
- Rukh L, Ahmad Y, **Zaman UK**, Naseem A, Kumar AA (2026) “Empirical framework for Cobot Deployment in Emerging Manufacturing Industries using Interpretive Structural Modeling (ISM) and Structural Equation Modeling (SEM)” (International Journal of Management Science and Engineering Management – Accepted)
- Akbar MA, Naseem A, **Zaman UK**, Petronijevic J (2025) “Framework for Integrated Decision Support System (DSS) for Risk Identification and Mitigation in Manufacturing Industry: Aiming Zero Defect Manufacturing (ZDM)”, International Journal of Management Science and Engineering Management, 1-25
- Rehman RU, **Zaman UK**, Aziz S, Jabbar H, Shujah A, Khaleequzzaman S, Hamza A, Qamar U, Jung DW (2022) “Process Parameter Optimization of Additively Manufactured Parts using Intelligent Manufacturing”, Sustainability, 14(22): 15475