

College of Electrical and Mechanical
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Dr. Shoab Ahmed Khan

- Professor of Computer Engineering, National University of Sciences and Technology, Pakistan
- Associate Adjunct Professor of Electrical Engineering, Michigan State University, USA
- CEO Center for Advanced Research in Engineering (CARE)
- Member Board of Trustees (CASE)

Education

- 1991 – 1995 Georgia Institute of Tech, Atlanta, GA, USA
MS & PhD in Electrical & Computer Engineering
- 1985-1989 College Of Aeronautical Engineering, NED University
BE in Avionics (*Gold Medalist*)

Professional experience

1. College of E&ME, NUST

As Head of the Computer Engineering Department, has been helping the College and NUST to strengthen industrial base research culture.

2. Center for Advanced Research In Engineering (CARE)

As CEO and co-founded lead CARE to become one of the most celebrated and established engineering organizations in private sector of Pakistan. In last two years CARE has made history by winning 9 P@SHA ICT Awards and 7 Asia Pacific ICT Alliance Awards. CARE has executed national and international projects worth Millions of US \$.

3. Center for Advanced Studies In Engineering (CASE)

As cofounder and member board of trustees has helped CASE to become of the largest post graduate engineering programs in the country. CASE has already graduated 20+ PhDs and 1000+ MS in Computer Engineering and Engineering Management.

Representative Projects

1. World's Highest Density Media Processor for Carrier Class VoIP Gateways, Avaz Networks, USA

Dr Shoab was the chief architect and lead a team who designed world's highest density media processor System on Chip:

- Voice processing @ 32 ms LEC
- VZM1004L, 2048 x G.711 or 1024 x G.726
- VAD, CNG & LPC (Lost Packet Compensation)
- Voice band signaling: CAS, DTMF, MF
- ~6 mw/channel in .18m Standard Cell



Media Gateway SoC AVAZ

2. Arrhythmia And Sudden, Death Syndrome Detection Hybrid Network Based Telemedicine System
10 April 2010 - April 2012
PKR: 13.55 million from **ICT R&D Fund**
P@ASHA ICT 2011 Gold Award
Asia Pacific ICT Alliance (APICTA 2011), Thailand **Gold Award**

A tele-medicine system with network enabled high resolution ECG machines capable of self diagnosing different arrhythmic abnormalities as well as early detection of sudden cardiac condition.

3. Network Centric Warfare System for Pakistan Air Defense
Sep 2009 - Nov 2011
US \$9 million for first phase
P@ASHA ICT 2011 Gold Award
Asia Pacific ICT Alliance (APICTA 2011) Thailand Silver Award

The first major component of envisaged Net Centric Warfare System of Pakistan Army

4. Next Generation Software Defined Radio (SDR)
Sep 2009 - Nov 2011
US \$24 million for the digital electronics, waveform software
P@ASHA ICT 2010 Gold Award
Asia Pacific ICT Alliance (APICTA 2010), Malaysia **Silver Award**

An advanced multi-mode-multiband Software Defined Radio (SDR) that comes in different configurations and form factors

5. Lawful Interception System (LI)
Sep 2008 - Nov 2010
US \$8 million (Pakistan and Middle East)
P@ASHA ICT 2010 Gold Award
Asia Pacific ICT Alliance (APICTA 2010), Malaysia **Silver Award**

LI system for Cyber and Next Generation Network, the product is also delivered to a Middle East country.

6. Establishing a Lab for Multi-agent Intelligent Electro-mechanical Systems (MIEMS)
PKR: 3.5 million from HEC Fund
A Lab of MIEMS for research, development and training human resource in this critical area of technology is in the development

7. Massively parallel fingerprint Recognition system
This project is setting new technology trend in biometrics based identification and verification systems. It consists of state of the art fingerprint matching algorithms which transformed into a novel scalable fingerprint matching processor. The same novelty of the research project brought accolade by capturing first position in the R&D category at Pakistan All Software House Association ICT Awards 2010. The developed technology has the capability to attract a wide spectrum of commercial and military applications.

Post Doctoral Industrial experience in USA Jan 1996-Jan1997

1. CISCO System, USA
Developed algorithms for CISCO's V.90 and V.34 modem
2. Picture Tel Corporation, USA
Developed audio subsystem of PictureTel's video conferencing system
3. Scientific Atlanta, USA
Developed algorithm for IRIDIUM system for global cellular communications
4. Ingersol Rand, Torrington Company, USA
Developed a real-time grindless controller
5. ADI Electronics Corporation, USA
Developed a computerized telephony switch
6. Georgia Tech Digital And Signal Processing Lab
Developed DSP applications for SHARC-based multiprocessor
7. Advanced Packaging Research Center
Developed an optimization tool for system level design of a MCM-based system

8. Lab of Identification and Control of Highly Uncertain Systems
Developed a real-time system for controlling the surge of a jet engine

US Patents

1. Shoab A. Khan, Rehan Hameed, and Hassan Farooq, "Hardware function generator support in a DSP" United States Patent 07031992
2. Zaheer Ahmed, S. A. Khan, "Programmable and multiplierless Viterbi accelerator", United States Patent 6,883,021

3. Shoab A. Khan, Mohammad Mohsin Rahmatullah, "Distributed processing architecture with scalable processing layers", United States Patent 07516320
4. U.S. Pregrant Abstract 20030023960 Shoab A. Khan et al, "Microprocessor instruction format using combination opcodes and destination prefixes"
5. Jon Laurent Pang, Mohammad Usman, Shoab Ahmad Khan, Muhammad Mohsin Rahmatullah, "Methods and systems for managing variable delays in packet transmission" United States Patent 07835280
6. U.S. Patent Abstract 20020120915, Shoab A. Khan, Mohammed Sohail Sadiq, "Combined scheduling and mapping of digital signal processing algorithms on a VLIW processor"

Publications

- **Book** on Digital System Design by John Wiley & Sons UK 2011
- **16** ISI Indexed Journal publications
- **130** refereed conference publications

Students Supervised

- 5 Phd Students as Supervisor
 - a. Adeel Akram, Hassan Islam, Rizwana Mahboob, Atif Bin Mansoor, Asad Waqar Malik
- 4 PhD Students as co-supervisor (contribution in research work and publications)
 - b. Mohsin Rahmatullah, Zaheer Ahmed, Sheikh M. Farhan, Umar Farooq
- 50+ MS students supervised

Honors and Awards

1. 7 Asia Pacific ICT Alliance awards 2010-2011 including one gold to projects undertaken
2. 11 P@SHA Gold Awards 2010-2011 to projects undertaken
3. Presidential Tamgh-e-Imtiaz in the field of engineering 2009
4. Presidential Gold Medal for best teacher 2008
5. NCR National Excellence Award 2005-2006 for outstanding services in IT Education
6. PEF National Education Award 2001 for Outstanding Services to Science & Technology
7. Sword of Honor for overall best performance in PAF Academy Risalpure
8. CAE Gold Medal (1989) for being the top graduate of year 1989
9. Avionics Engineering Gold Medal

Members of Executive Bodies and Committees

1. Member National Computing Education Accreditation Council (NCEAC)
 2. Member National Curriculum Revision Committee (NCRC)
 3. Member Board of Trustees Engineering Education Trust
 4. Member Board of Trustees Endowment fund UET Taxila
 5. Member Executive Committee Sir Syed Memorial Society
 6. Member Planning Committee Tameer-e-Millat University
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