Curriculum Vitae

Shahrukh Agha

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Park Road, Chak Shahzad, Islamabad, Pakistan
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Education:

2002 – 2006: PhD Electronic System Design
Loughborough University, Loughborough, UK
Dissertation: *Software and Hardware Techniques for Accelerating MPEG2 Motion Estimation*

2001 – 2002: MSc Digital Communication Systems (Distinction)
Loughborough University, Loughborough, UK

1995 – 2001: BSc Electronics Engineering,
University of Engineering and Technology, Taxila, Pakistan

Professional Experience:

2007 – Present: Assistant Professor,
Department of Electrical and Computer Engineering, COMSATS University Islamabad, Park Road, Chak Shahzad, Islamabad

Teaching and Research Supervision:

Graduate Courses: Computer Aided Design of Digital Systems, VLSI Architectures and Algorithms, VLSI System Design, Special Topics in Digital Signal Processing, Design of System on Chip, Special Topics in Digital Design.

Undergraduate Courses: Digital Logic Design, Electric Circuit Analysis, VLSI System Design, Signals and Systems, Electronics 1, Electronics 2, Microprocessor Systems and Interfacing, Digital System Design

Final Year Projects: 43 Final Year Projects supervised related to Communication Systems, Digital Signal and Image Processing, FPGA, DSP and Microcontroller based implementations.

MS Projects: 11 MS thesis supervised related to the field of VLSI Design, Image Processing and Power Systems.

PhD Projects: 4 Phd Thesis supervised related to Iris Recognition for Biometric Systems, Space Radiation Effects on VLSI Circuits, Efficient Topologies for Network On Chip and VLSI Turbo Decoding.

CERN Project: Involved in CERN (ALICE) Gigabit Transceiver project.

Research Interests:

Low Power and High Speed VLSI Design, Iris Localisation, Video Encoding, Error Correction Coding and Machine Learning.

Hands-On Expertise:

MATLAB, VHDL, Verilog HDL, C/C++, CUDA C/C++, Python, CUDA Python, OpenCL, OpenMP, Java, Fortran 77, Perl, Simulink, Linux, Unix (Solaris), POSIX, HTML, Java Script, Latex, FPGA (VHDL, Verilog), CPLD, DSP (C programming), 8051, AVR and ARM microcontrollers, Graphics Processing Units, Tanner, Microwind, Cadence Tools, Xilinx Synthesis Tools, Vivado, ModelSim, Raspberry pi processor, STM32 microcontrollers, Zynq FPGA.

List of Publications:
Journals with Impact Factor

Total Impact Factor: 61.54

1. Agha S, Nazir S, Kaleem M, Najeeb F, Talat R (2025) **"Performance evaluation of reduced complexity deep neural networks"**. PLoS ONE 20(3): e0319859. https://doi.org/10.1371/journal.pone.0319859
2. Shahrukh Agha, et al., **"Efficient motion estimation and discrete cosine transform implementation using the graphics processing units",** PLOS One, 19(8): e0307217, 2024
3. Khan L, Khan L, Agha S, Hafeez K, Iqbal J (2024) "**Passivity-based Rieman Liouville fractional order sliding mode control of three phase inverter in a grid-connected photovoltaic system"**. PLoS ONE 19(2): e0296797, 2024
4. A. Latif, L. Khan, S. Agha, S. Mumtaz and J. Iqbal, **"Nonlinear control of two-stage single-phase standalone photovoltaic system"**, PLoS ONE, 19(2), e0297612, 2024
5. Mohammad Kaleem, Shahrukh Agha, et al., "**Sputtering Al2O3 enhanced bandgap engineering for integrated photonic devices"**, Optics & Laser Technology, vol. 162, 2023.
6. Nouman Akram, Laiq Khan , Shahrukh Agha, and Kamran Hafeez, **"Global Maximum Power Point Tracking of Partially Shaded PV System Using Advanced Optimization Techniques**", MDPI Energies, vol. 15, 2022.

7. Shahrukh Agha, Farmanullah Jan**, "A low complexity Iris localization algorithm for Iris biometrics",** Multimedia Tools and Applications, vol. 81, 2022
8. Shahrukh Agha, Mansoor Khan, Farmanullah Jan**, "Efficient fast motion estimation algorithm for real-time applications",** Journal of Real Time Image Processing, vol. 19, 2022
9. Mansoor Khan, Shahrukh Agha**, "Class-E amplifier design for efficient CMUT transmission and wide band operation",** Analog Integrated Circuits and Signal Processing, vol. 110, 2021
10. Mansoor Khan, Shahrukh Agha**, "Least squares linear phase FIR filter design and its VLSI Implementation"**, Analog Integrated Circuits and Signal Processing, **105**, pp 99–109 (2020).
11. Farmanullah Jan, Shahrukh Agha et al, **"A robust iris localization scheme for the iris recognition"**, Multimedia Tools and Applications, vol. 80, 2020
12. F. Shaheen, M. Fasihuddin, S. Agha, et al. **"Performance Analysis of High Throughput MAP Decoder for Turbo Codes and Self Concatenated Convolutional Codes",** IEEE Access, vol. 7, issue 1, pp. 138079-138093, 2019.
13. Agha, S., Gulzari, U.A., Shaheen, F. et al. **"A high throughput two-dimensional discrete cosine transform and MPEG4 motion estimation using vector coprocessor**", J Real-Time Image Proc, vol. 17, (2019).
14. Usman Gulzari, Sheraz Anjum, Shahrukh Agha, "**An Efficient and Scalable Cross-By-Pass-Mesh Topology for Networks-on-Chip",** IET Computers & Digital Techniques, vol. 11, issue 4, pp. 140-148, 2017.
15. Usman Gulzari, Muhammad Sajid, Shahrukh Agha, **"A New Cross-By-Pass-Torus Architecture Based on CBP-Mesh and Torus Interconnection for on-Chip Communication",** PLoS ONE, 11(12): e0167590, 2016.
16. Muhammad Sajid, Shahrukh Agha, **"Space radiation environment prediction for VLSI microelectronics devices onboard a LEO Satellite using OMERE-TRAD software",** Advances in Space Research, vol. 56, issue 2, 2015, pp. 314-324.
17. Shahrukh Agha, Shahid Ahmed Khan, Shahzad Malik, Raja Ali Riaz, **"Reduced Bit Low Power VLSI Architectures for Motion Estimation"**, Journal of Systems Engineering and Electronics, vol. 24, issue 3, 2013, pp. 382 – 399.
18. F. Jan, I. Usman and S. Agha, **"A non circular iris localization algorithm using image projection function and gray level statistics"**, Optik – Int. J. Light Electron Opt., vol. 124, 2013, pp. 3187-3193.
19. Jan F. , Usman I. , Agha S, **"Reliable iris localization using Hough transform, histogram-bisection, and eccentricity"**, Signal Processing, Volume 93, Issue 1, January 2013, pp. 230-241.
20. Farmanullah Jan, Imran Usman, Shahrukh Agha, "**Iris localization in frontal eye images for less constrained iris recognition systems"**, Digital Signal Processing, vol. 22, Issue 6, 2012, pp. 971-986.
21. F. Jan, I. Usman, S. Agha, **"Reliable iris localization using integral projection function and 2D-shape properties"**, Chinese Optics Letters, Vol. 10, Issue 11, 2012, pp. 111501-111501.
22. V. A. Chouliaras, V. M. Dwyer, S. Agha, J. L. Nunez-Yanez, D. Reisis, K. Nakos, K. Manolopoulos, **"Customization of an embedded RISC CPU with SIMD extensions for video encoding: A case study"**, Integration, the VLSI journal, vol. 41, issue 1, 2008, pp. 135 – 152.
23. V. A. Chouliaras, S. Agha, T. R. Jacobs, V. M. Dwyer **"Quantifying the benefit of thread and data parallelism for fast motion estimation in MPEG-2"**, IEE Electronic Letters, vol. 42, issue 13, 2006, pp. 747-748.

24. S. Agha, V. M. Dwyer and V. A. Chouliaras, **"Motion estimation with low resolution distortion metric"**, Electronic Letters, vol. 41, No. 12, 2005, pp. 693 – 694.

Conferences:

1. Mahrukh Mazhar, , Faisal Najeeb, Adnan Naseem,Shahrukh Agha, Hammad Omer **"Multiscale Feature Analysis for Unsupervised GAN-based MRI Reconstruction"** accepted at annual scientific meeting of European society for magnetic resonance in medicine and biology (ESMRMB) 2024 to be held 2-4 Oct at Bar Solana Spain. Abstract ID # ESMRMB2024-0451

2. Shahrukh Agha, Farman ullah Jan, Dilshad Sabir, Khurram Saleem, Usman Gulzari, Atif Shakeel, "**Optimal Motion Estimation using Reduced bits and its low power VLSI Implementation",** Proc. of the 2017 IEEE International Conference on Signal and Image Processing Applications (IEEE ICSIPA 2017), Malaysia, September 12-14, 2017

3. Sheraz Anjum, Usman Ali Gulzari, Shahrukh Agha, "**Cross By Pass-Mesh Architecture for on-Chip Communication**", 9th IEEE MCSoC-15 Symposium, 23-25 September 2015 in Turin, Italy.

4. Muhammad Sajid, Frank Sill Torres, N.G. Chechenin, E.U.Khan, Sharukh Agha, **"Space Radiation Environment Prediction for VLSI microelectronics devices onboard a LEO Satellite using OMERE-Trad Software"**, in 40th COSPAR Scientific Assembly, 2-10 August, 2014, Moscow, Russia.

5. F. Jan, I Usman and S. Agha, **"Less-constrained Iris Biometric System for VW (Visible Wavelength) Data"**, in: Symposium on Research Innovation in IT and Engineering (RIITE), April 2013, COMSATS Institute of Information Technology, Attock, Pakistan

6. Usman Ali Gulzari, Sheraz Anjum, Shahrukh Agha, Sarzamin Khan, **"A 2-Dimensional Router for 2D Mesh Network for on Chip Communication"**, in International Conference on Modeling and Simulation (ICOMS 2013), 25-27 November, 2013, Air University, Islamabad, Pakistan.

7. Vincent M Dwyer, Shahrukh Agha and Vassilios A Chouliaras , **"Reduced-Bit, Full Search Block-Matching Algorithms and their Hardware Realizations"**, Proceedings of the 7th International Conference in Advanced Concepts for Intelligent Vision Systems (ACIVS 2005), 20-23 September 2005, pages 372 - 380, University of Antwerp, Antwerp, Belgium.

8. Vassilios A. Chouliaras, Vincent M. Dwyer and Shahrukh Agha, **"On the performance improvement of sub-sampling MPEG-2 Motion Estimation Algorithms with vector/SIMD architectures"**, Proceedings of the 7th International Conference in Advanced Concepts for Intelligent Vision Systems (ACIVS 2005), 20-23 September 2005, pages 595 – 602, University of Antwerp, Antwerp, Belgium

9. Chouliaras, V., Nunez-Yanez, J.L. and Agha, S., **"Silicon Implementation of a Parametric Vector Datapath for Real-Time MPEG2 Encoding"**, 6th IASTED International Conference on Signal and Image Processing , Honolulu, Hawaii, 23-25 August 2004, pp 298-303.

10. V. M. Dwyer, S. Agha and V. Chouliaras , **"Low Power Full-Search Block Matching using reduced bit SAD values for early termination"**, Proceedings of Mirage 2005 International conference on Computer Vision/Computer Graphics collaboration techniques, INRIA Rocquencourt Paris, France, 1-2 March 2005, pages 191 – 196

References:

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