

# Zahid Hussain Shamsi

Assistant Professor  
Department of Mathematics  
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## Employment

University of the Punjab, Department of Mathematics, Assistant Professor, February 29, 2016–present.

University of the Punjab, Department of Mathematics, Lecturer, January 01, 2009– February 28, 2016.

Comsats Institute of Information Technology (CIIT), Lahore , Department of Mathematics, Lecturer, July 17, 2007– December 31, 2008.

Govt. Degree College, Haveli Lakha (Okara), Lecturer in Mathematics, September 05, 2002– July 16, 2007.

## Education

Ph.D. Mathematics, Hanyang University, South Korea, 2016.

M.Sc. Computer Science, University of the Punjab, 2004.

M.Sc. Mathematics, University of the Punjab, 1999.

Bachelors of Science (Mathematics A & B, Physics), 1997.

Intermediate (Pre-Engineering), 1995.

Matriculation (Science), 1993.

## Research

HEC Approved PhD Supervisor

[List of HEC Approved Supervisors in the University of the Punjab](#)

### *Research Interests*

1. Computer vision, Image Restoration,
2. Sparse Representation, Compressed Sensing, Dictionary Learning
3. Machine Learning for Computer Vision & Image Restoration
4. Quantum Information Theory, & Relativistic Quantum Information Theory
5. Computational Fluid Dynamics

## International Research Collaboration

1. **Prof. Dr. Dai-Gyoung Kim**, Department of Applied Mathematics, Hanyang University (ERICA), South Korea.

(a) Image Processing & Computer Vision

- (b) Machine Learning & Artificial Intelligence Institute of Information and Communications Technology Planning and Evaluation (IITP) Grant funded by the Korean Government [Ministry of Science and ICT (MSIT)], Artificial Intelligence Convergence Research Center, Hanyang University (ERICA) (Grant Number: 2020-0-01343)
2. **Prof. Dr. Younghun Kwon**, Department of Applied Physics, Hanyang University (ERICA), South Korea.
    - (a) Quantum Information Processing & Relativistic Quantum Information
    - (b) Study of relativistic effects on Quantum Fisher Information (QFI) of localized Fermionic states in accelerated motion
  3. **Prof. Dr. Hye-Keun Oh**, Department of Applied Physics, Hanyang University (ERICA), South Korea.
    - (a) Mathematical modelling of stress analysis for Lithography
    - (b) Thermal and mechanical challenges and their remedies for Extreme Ultraviolet Lithography (EUVL)
  4. **Dr. Asif Mushtaq**, Fakultet for lærerutd., kunst og kultur, 8049, Bodø Norway .
    - (a) Quantum Information Theory, Quantum Computing, Quantum Error Correction, Multi-qubit Quantum Teleportation
    - (b) Computational Fluid Dynamics

## Journal Articles

1. Dai-Gyoung Kim, Arfan Anjum, Muhammad Asif Farooq, Asif Mushtaq, **Zahid Hussain Shamsi**. [Enhanced quantum teleportation using multi-qubit logical states](#). *Results in Physics* 50 (2023).
2. Dai-Gyoung Kim, Yasir Ali, Muhammad Asif Farooq, Asif Mushtaq, Muhammad Ahmad Abdul Rehman, **Zahid Hussain Shamsi**. [Hybrid Deep Learning Framework for Reduction of Mixed Noise via Low Rank Noise Estimation](#). *IEEE Access* 10 (2022).
3. **Zahid Hussain Shamsi**, Dai-Gyoung Kim, Mukhtar Hussain, Rana Muhammad Bakhtawar Khan Sajawal (2021). [Low-Rank Estimation for Image Denoising Using Fractional-Order Gradient-Based Similarity Measure](#). *Circuits, Systems, and Signal Processing* 40 (2021).
4. M. Irfan, M. Asif Farooq, A. Aslam, Asif Mushtaq, **Zahid Hussain Shamsi** (2021). [Magnetohydrodynamic Time-Dependent Bio-Nanofluid Flow in a Porous Medium with Variable Thermophysical Properties](#). *Mathematical Problems in Engineering* (2021).
5. Dai-Gyoung Kim, Mukhtar Hussain, Muhammad Adnan, Muhammad Asif Farooq, **Zahid Hussain Shamsi**, Asif Mushtaq. [Mixed Noise Removal Using Adaptive Median Based Non-local Rank Minimization](#). *IEEE Access* 9 (2021).
6. **Zahid Hussain Shamsi**, Amna Noreen, Asif Mustaq. [Analysis of quantum coherence for localized fermionic systems in an accelerated motion](#). *Results in Physics* 18C (2020).
7. M. Irfan, M. Asif Farooq, T. Iqra, Asif Mushtaq, **Zahid Hussain Shamsi**. [A Simplified Finite Difference Method \(SFDM\) for EMHD Powell–Eyring Nanofluid Flow Featuring Variable Thickness Surface and Variable Fluid Characteristics](#) *Mathematical Problems in Engineering* (2020).
8. M. Irfan, M. Asif Farooq, Asif Mushtaq, **Zahid Hussain Shamsi**. [Unsteady MHD Bionanofluid Flow in a Porous Medium with Thermal Radiation near a Stretching/Shrinking Sheet](#) *Mathematical Problems in Engineering* (2020).
9. Dai-Gyoung Kim, **Zahid Hussain Shamsi**. [Enhanced residual noise estimation of low rank approximation for image denoising](#). *Neurocomputing* 193 (2018).

10. Eun-Sang Park, **Zahid Hussain Shamsi**, Ji-Won Kim, Dai-Gyoung Kim, Jin-Goo Park, Jin-Ho Ahn, Hye-Keun Oh. [Mechanical deflection of a free-standing pellicle for extreme ultraviolet lithography](#). *Microelectronic Engineering* 143 (2015).
11. **Zahid Hussain Shamsi**, Dai-Gyoung Kim (2015). [Multiscale Hybrid Non-local Means Filtering Using Modified Similarity Measure](#). *Mathematical Problems in Engineering* (2015).

### Conference Publications

12. Eun-Sang Park, **Zahid Hussain Shamsi**, Ji-Won Kim, Dai-Gyoung Kim, and Hye-Keun Oh. [Measurement of Deflection of the Full scale Free Standing EUV Pellicle \(Poster Presentation 62\)](#). *International Workshop on EUV Lithography June 23-27, 2014 Makena Beach & Golf Resort Maui, Hawaii*.
13. Eun-Sang Park, **Zahid Hussain Shamsi**, Ji-Won Kim, Dai-Gyoung Kim, and Hye-Keun Oh. [The Mechanical Deflection of the Free Standing EUV Pellicle \(Poster Presentation 8054\)](#). *40<sup>th</sup> Micro and Nano Engineering Conference, September 22-26, 2014 Lausanne, Switzerland*.
14. Eun-Sang Park, **Zahid Hussain Shamsi**, Sung-Gyu Lee, Jong-Hoon Lee, Dai-Gyoung Kim and Hye-Keun Oh. [Thermomechanical Behavior of the EUVL Pellicle During the Exposure \(Poster Presentation P-MP-09\)](#). *International Symposium on Extreme Ultraviolet Lithography, October 5-7, 2015 Maastricht, The Netherlands*.
15. Eun-Sang Park, Jae-Keun Choi, Min-Ha Kim, Sollee Hwang, **Zahid Hussain Shamsi**, Dai-Gyoung Kim, Hye-Keun Oh. [The Impact of the Residual Stress on the EUV pellicle](#). *Proc. SPIE 9984, Photomask Japan 2016: XXIII Symposium on Photomask and Next-Generation Lithography Mask Technology, 99840F (May 10, 2016)*.

### M.Phil Thesis Supervision

1. Arfan Anjum. *Quantum Teleportation Using multi-Qubits Physical and Logical state* (2023).
2. Saba Hameed. *Analysis of Variational Quantum Algorithm with Applications* (2023).
3. Sidra Iftikhar. *Analysis of Pure and Hybrid Quantum Algorithms with Applications* (2023).
4. Ali Haider. *Fractional Order Gradient Coupled with SVD for Ill Posed Imaging Problems* (2021).
5. Yasir Ali. *Hybridized Deep Learning Framework for Image Restoration in the Presence of Mixed Noise* (2021).
6. Muhammad Ahmad Abdul Rehman. *A Survey of Supervised and Unsupervised Machine Learning Paradigms to Enhance Low Resolution Images* (2021).
7. Muhammad Shoaib. *Data Driven Paradigm for Computing Numerical Soliton Solution* (2021).
8. Mukhtar Hussain. *Low Rank Approximation for Image Restoration Using Fractional Order Based Similarity Measure* (2020).
9. Muhammad Adnan. *Adaptive Median Based Non-local Low Rank Algorithm for Mixed Noise Removal* (2020).
10. Rana Muhammad Bakhtawar Khan Sajawal. *Multi-scale Non-local Mean Approach for Image Restoration Using Fractional Order Gradient Patches* (2020).

### Programming Skills

*Programming Languages:* Matlab, Python , C++,  $\LaTeX$ .

*Machine Learning Platforms:* Keras, Tensorflow, Pytorch.

*Quantum Computing and Machine Learning Platforms:* Qiskit, PennyLane.

## Grants, Fellowships, & Awards

HEC Overseas Scholarship for M.S leading to PhD in Mathematics 2011-2016.

Research article supported by Prof. Dai-Gyoung Kim via Grant funded by [National Research Foundation of Korea (NRF)] (Grant Number NRF-2011-0026245).

Research articles supported by Prof. Dai-Gyoung Kim via Grant funded by the Korean Government [Ministry of Science and ICT (MSIT)] (Grant Number: 2020-0-01343)

Half Tuition Fee Scholarship During M.Sc. Computer Sciences (Awarded to top three position holders in a semester).

Research Grant (Year 2017) worth PKR. 0.15 M, University of the Punjab.

## Professional Activities

Served as reviewer for

*Neurocomputing*,

*IEEE Transactions on Circuits and Systems for Video Technology*,

*IEEE Access*,

*Digital Signal Processing*,

*Mathematical Problems in Engineering*,

Departmental service:

Managerial Secretary, [Punjab University Journal of Mathematics \(PUJM\)](#) (2010–11) and (September 30, 2020 – May 31, 2023).

Time Table Incharge (PhD, M.Phil, M.Sc. and BS Classes) (2017-to September 29, 2020).

## Teaching Experience

*Teaching at University of the Punjab*

### 2019-2023

Advanced Mathematical Physics (PhD/M.Phil in Mathematics)

Quantum Computation and Quantum Information (PhD/M.Phil in Mathematics)

Quantum Mechanics (B.S Mathematics)

Functional Analysis (B.S Mathematics)

Mathematical Statistics (B.S Mathematics)

Vectors & Tensor Analysis (B.S Mathematics)

Mechanics (B.S Mathematics)

Elementary Number Theory (B.S Mathematics)

### 2016-2019

Advanced Mathematical Physics (PhD/M.Phil in Mathematics)

Quantum Mechanics (M.Sc. in Mathematics)

Methods of Mathematical Physics (B.S and M.Sc. in Mathematics)

Advanced Analysis (M.Sc. in Mathematics)

Set Theory (B.S Mathematics)

Calculus-II (B.S Mathematics)

Functional Analysis (B.S Mathematics)

Numerical Analysis (B.S Mathematics)

**2011-2015**

Study leave for Ph.D

**2009-2011**

Special Theory of Relativity (B.S Mathematics)

Partial Differential Equations (B.S and M.Sc. in Mathematics)

Analytical Dynamics (B.S and M.Sc. in Mathematics)

*Teaching at Comsats University Islamabad (Lahore Campus)*

**2007-2008**

Linear Algebra (B.S Electrical Engineering, B.S Physics)

Calculus-II (B.S Electrical Engineering, B.S Physics)

Ordinary Differential Equations (B.S Electrical Engineering)

*Teaching at Govt. Degree College (B), Haveli Lakha, Distt. Okara*

**2002-2007**

Mathematics (Intermediate Part-I)

Mathematics (Intermediate Part-II)