

# DR. NADEEM SHAUKAT

Assistant Professor

Center for Mathematical Sciences  
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## DATE OF BIRTH

## NATIONALITY

## MARITAL STATUS

15 December, 1982

Pakistani

Married

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## RESEARCH INTERESTS AND EXPERTISE

- Development of static/dynamic Monte Carlo (MC) algorithms for the transient analysis of nuclear reactors and code parallelization for high performance computing.
- Development of time dependent MC algorithms for the detector responses in the Accelerated Driven Systems (ADS),
- Sensitivity/Uncertainty analysis for the parameters involved in supercritical and subcritical systems,
- Nuclear reactor dynamics analysis using analytical and numerical techniques,
- Nuclear reactor designing and analysis using deterministic and stochastic techniques
- Optimization techniques for the core reloading pattern search,
- Coupling of Monte Carlo code with high fidelity thermal-hydraulic codes,
- MPI based parallelization Techniques,
- Development/Implementation of evolutionary techniques for the optimization of important parameters related to On-shore/Off-shore wind turbines,
- Design Optimization of wind turbines.

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## EDUCATION

### 2013-2017 PhD in Nuclear Engineering

Seoul, National University Republic of Korea  
**Major(s)** Nuclear Engineering

### 2006-2008 MS in Nuclear Engineering

Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad.  
**CGPA** 3.35/4.00

- Major(s)** Nuclear Engineering.
- 2004-2006 M.Sc. (Honors) (Mathematics)**  
University of The Punjab, Lahore  
**CGPA** 3.84/4.00  
**Major(s)** Mathematics.
- 2001-2004 B.Sc. (Honors) (Mathematics)**  
University of The Punjab, Lahore  
**CGPA** 3.88/4.00  
**Major(s)** Mathematics.
- 1998-2000 Higher Secondary School Certificate (HSSC)**  
Govt. Forman Christian (F.C.) College, Lahore  
**Marks** 733/1100  
**Major(s)** Mathematics, Physics, Chemistry.
- 1996-1998 Secondary School Certificate (SSC)**  
Kasur Model High School, Kasur  
**Marks** 693/850  
**Major(s)** Mathematics, Physics, Chemistry, Biology.

## **PROFESSIONAL EXPERIENCE**

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### **Seoul National University, Seoul, South Korea**

- Teaching assistant for two semesters during first year of my PhD studies at Seoul National University.
  - Teaching assistant for the course “**Energy Systems Reliability Analysis**”
  - Teach “**Numerical Analysis for Mechanical Engineers**”
- Supervised undergraduate student for his under graduation thesis, “Genetic Algorithm based Core Reloading Pattern Optimization of MTR type Research Reactor using McCARD calculated parameters”.
- Supervised undergraduate student for his under graduation thesis, “Dynamic Monte Carlo Algorithm for Prompt and Delayed Alpha Eigenvalue Calculations for Two/Three Energy Group Problems”.

### **Pakistan Atomic Energy Commission (PAEC), Islamabad:**

- Currently working as an Assistant Professor in the Center for Mathematical Sciences (CMS) at PIEAS.
- Joined PAEC on 31st October, 2008, and working ever since on different projects related to development of data analysis software and Nuclear Engineering related computational softwares.
- Work related to solution of neutron diffusion equation based on different numerical techniques and stochastic techniques like Monte Carlo method.
- Development of a core reloads pattern optimization code based on Evolutionary Techniques like Genetic Algorithms (GAs).

## COMSATS Institute of Information Technology (CIIT), Attock:

- Five months teaching Experience in the Department of Computer Science from April 2006 to August 2006.
  - **Undergraduate Courses Taught:** Numerical Analysis, Digital Logic Design, Operations Research
  - **Graduate Courses Taught:** Business Mathematics

## SKILLS

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### COMPUTING SKILLS:

Programming Languages	Mathematics Software	Statistics Software	Operating Systems
➤ Object Oriented C++	➤ MATLAB	➤ R	➤ Linux
➤ Visual C	➤ Mathematica		➤ Windows
➤ FORTRAN	➤ Maple		
➤ Visual Basic			
Nuclear Reactor Simulators	Reactor Analysis Codes	Plotting Softwares	Engineering Design Packages
➤ PCTran	➤ McCARD	➤ OriginPro	➤ CATIA
➤ Advanced PCTran	➤ nTRACER		➤ Pro-Engineer
➤ iPWR	➤ CITATION		
➤ Micro Physics Simulator	➤ WIMSD		

### SCIENTIFIC/TECHNICAL SKILLS:

- Capability of implementing novel stochastic techniques in Monte Carlo codes to analyze the transient behavior of all kind of newly proposed reactor geometries for further refinement.
- Capability to couple the neutronics and thermal-hydraulic codes.
- Capability to develop/implement evolutionary techniques for optimization purposes

## RESEARCH THESIS

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- In Ph.D. (Nuclear Engineering), the research topic was *“Effective Realization of Time-Dependent Monte Carlo Simulation Method for Nuclear Reactor Transient Analysis”*
- In M.S. (Nuclear Engineering), the research topic was *“Optimization of Core Reload Patterns using Artificial Neural Networks and Genetic Algorithms”*.
- In M.Sc. (Honors) Mathematics, the research topic was *“Computational Modeling of Action of a Subgroup of the Möbius Group on an Imaginary Quadratic Field”*.
- In B.Sc. (Honors) Mathematics, the research topic was *“Applications of Piecewise Defined Curves for Computer Aided Geometric Design (CAGD)”*.

## INTERNATIONAL CONFERENCE PUBLICATIONS (04)

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### 2018

- “An Improved Numerical Technique for the Solution of Point Reactor Kinetic Equations with Temperature Feedback”, Submitted to International Conference of Applied and Engineering Mathematics, September 2018.

**2016:**

- “Dynamic Monte Carlo Transient Analysis with Thermal-Hydraulic Feedback by McCARD/CUPID”, American Nuclear Society, November 2016.
- “Alpha Eigenvalue Estimation from Dynamic Monte Carlo Calculation for Subcritical Systems”, Korean Nuclear Society, Spring Meeting, May 2016.

**2015:**

- “Uncertainty Propagation Analysis for the Time Dependent Monte Carlo Simulations”, Korean Nuclear Society, Autumn Meeting, October 2015.

**INTERNATIONAL JOURNAL PUBLICATIONS (04)**

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**2018**

- “Improvements in Methodology to Determine Feedback Reactivity Coefficients”, Submitted to Nuclear Engineering and Design, April 2018. (IF: 1.19 )

**2017:**

- “Dynamic Monte Carlo transient analysis for the Organization for Economic Co-operation and Development Nuclear Energy Agency (OECD/NEA) C5G7-TD benchmark”, Nuclear Engineering and Technology, May 2017. (IF: 1.66)
- “Estimation of disturbance propagation path using principal component analysis (PCA) and multivariate granger causality (MVGC) techniques”, Industrial and Engineering Chemistry Research, June 2017. (IF: 3.14)

**2010:**

- “Optimization of Core Reload Pattern for PARR-1 Using Evolutionary Techniques”, Nuclear Engineering and Design, 240 (2010) 2831–2835. (IF: 0.9)

**HONORS, AWARDS AND GRANTS**

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- Seoul National University (SNU) Global Scholarship Award for PhD studies at Department of Nuclear Engineering, Seoul National University, South Korea, 2013.
- Merit certificate by Pakistan Institute of Engineering & Applied Sciences (PIEAS) for excellence in thesis during MS (System Engineering), 2008.
- Fellowship in M.S. Nuclear Engineering from Pakistan Institute of Engineering and Applied Sciences (PIEAS) awarded by the Government of Pakistan, 2006.
- **Distinction** in M.Sc. (Honors) Mathematics, University of the Punjab, Lahore, Pakistan, 2006.
- **Distinction** in B.Sc. (Honors) Mathematics, University of the Punjab, Lahore, Pakistan, 2004.
- Got University Merit Scholarship during the two years of M.Sc. (Honors) Mathematics, awarded by the University of the Punjab, Lahore, Pakistan, 2004~2006.
- Got University Merit Scholarship during the three years of B.Sc. (Honors) Mathematics, awarded by the University of the Punjab, Lahore, Pakistan, 2001~2004.
- Merit Scholarship by Lahore Board of Intermediate and Secondary Education, Pakistan for excellence in secondary school examination, Pakistan, 1998

**REFERENCES**

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References will be furnished upon request.