



Dr. Shumaila Noreen

Assistant Professor

Mathematical and Physical Sciences - Mathematics Section

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Time at UoN: Since 2023

Marital Status: Married.....

I completed my PhD in Applied Mathematics under guidance of Alona Ben-Tal at School of Natural and Computational Sciences, Massey University, New Zealand. My thesis entitled: Mathematical modelling of the cardiovascular system to study the effects of respiratory sinus arrhythmia and heart failure. This scholarship was funded by Health research council of New Zealand. I developed a lumped parameter model of the cardiovascular system with a specific aim of simulating the system dynamics over a range of heart rates. The models contained several new modelling features that have been introduced progressively throughout the thesis starting with isolated models and continuing with closed loop models of the circulation. Specifically, the contraction of the cardiac chambers was modelled using a time-dependent muscle force with constant elasticity instead of time dependent elasticity. A new hypothesis was proposed about the mechanical contraction of the atria to generate realistic pressure volume loops. The inter-ventricular interaction was modelled as well. Additionally, hysteresis was incorporated in the aortic valve to produce an end-systolic reverse (negative) flow.

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Academic Qualifications

PhD, Massey university, New Zealand, 2021, Mathematical modelling of the cardiovascular system to study the effects of respiratory sinus arrhythmia and heart failure

M.Phil, Quaid-e-Azam University, Islamabad (Pakistan), 2007, Heat transfer analysis of the steady flow of a fourth grade fluid

M.Sc, Quaid-e-Azam University, Islamabad (Pakistan), 2005

B.Sc , University of Punjab (Pakistan), 2003

F.Sc, Sargodha board (Pakistan), 2001

Teaching Activities

I am currently working as an assistant professor of mathematics at the University of Nizwa in Oman in February 2023. Teaching both undergraduate and graduate students in a range of courses, including Linear Algebra I, Linear Algebra II, Ordinary Differential Equations, Foundations of Mathematics, Calculus I, Pre-Calculus, and Mathematical Modelling II, is one of my current responsibilities., 2 years

I was employed at Kinnaird College for Women in Lahore from August 2022 to February 2023 as an Assistant Professor of mathematics. The subjects I taught were Functional Analysis, Calculus, Core Mathematics, and Mathematical Statistics., 7 months

I worked as an assistant professor of mathematics at COMSATS University Islamabad (Lahore Campus) from August 2021 to August 2022. Calculus, Analytical Geometry, and Numerical Computation with MATLAB were the courses I taught, 1 year

I was an Assistant Professor Mathematics at the University of Engineering and Technology (U.E.T.) Lahore (Faisalabad Campus), from 2008 to 2017. The following courses are among those I have taught: Multiple times in Applied Mathematics, Calculus, Vector Algebra and Complex Analysis, Linear algebra, Numerical Analysis with C++, Numerical Methods, Numerical Analysis with MAT-LAB, Calculus and Analytical Geometry, Functional Analysis, Mathematical Statistics, and Applied Mathematics., 9 years

Research Activities

- *Research Interests*

Mathematical Modelling of Cardiovascular System (Bio- Mathematics), Numerical Analysis, Differential Equations, Fluid Mechanics and Dynamical System, Graph Theory

- *Conference Presentations*

Poster presentation, Forum for Mathematics for Industry (FMFI)`` in November 2019.,
12/10/2020

Mathematical modelling of the cardiovascular system, SNCS Postgraduate Conference,,
New Zealand, 12/10/2019

Poster presentation, ICIAM (The International Council for Industrial and Applied
Mathematics)`, Spain, 15/07/2019

Poster presentation, INMS Post-Graduate Students Conference, New Zealand, 17/11/2018

Heat transfer analysis of a fourth grade fluid, International Conference on Recent
Developments in Fluid Mechanics, Pakistan, 02/07/2007

- Publications

Article:

1. 2025 Estimation of Oman's future population using Mathematical models and Machine Learning approach
2. 2024 A Traffic Plan To Lessen The SMOG Season Air Pollution in Lahore, Pakistan,
<https://doi.org/10.54938/ijemdss.2023.02.2.224>
3. 2022 . [Mathematical modelling of atrial and ventricular pressure-volume dynamics and their change with heart rate](#)
4. 2021 ["Mathematical modelling of the cardiovascular system to study the effects of respiratory sinus arrhythmia and heart failure](#)
5. 2010 [Steady flow of a fourth grade fluid in a porous medium](#)
6. 2008 [Heat transfer analysis of the steady flow of a fourth grade fluid](#)

Community Services

01/12/2024: GRADUTE STUDIES AND RESEARCH COMMITTEE (member)

01/11/2024: eLearning committee (member)

1. Obtained first position in the Board of Intermediate Secondary Education Sargodha Board, Sargodha, in the Intermediate Exam on merit, a Merit Certificate and Gold Medal were awarded.
2. I received a certificate of excellence (XII Star Award) in the area of ``The Adolescent Girls`` in

the field of education (students) from South Asian Publications Karachi.

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