Mohammad Atif

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Research Interests

- Theoretical, Computational, and Rotational Seismology
- Seismic Wave Propagation
- Ordinary and Partial differential equations
- Transformation Techniques
- Engineering and Applied Mathematics

Education

Ph.D., Indian Institute of Technology Madras, India   **2017-2023**
CGPA:8.71/10

- Thesis Title:**"Mathematical Models to study the response of seismic sources in the reduced micropolar medium"**

- Advisor: Prof. Raghukanth STG and Prof. S R Manam

M.Sc., Jamia Millia Islamia, New Delhi, India   **2014-2016**
CGPA:9.35/10

- Majors: Mathematics with Computer Science

- Project Title:"Comparative Study of fixed point iteration methods via Picard, Mann and S-iteration"

- Advisor: Dr. Izhar Uddin and Dr. Ahmad Kamal

B.Sc.,University of Lucknow, India   **2011-2014**
Percentage:73%

- Majors: Physics and Mathematics

- Minor: Chemistry

Refereed Journal Publications

1. Finite-fault simulations for rotations and strains in the near-fault subjected to layered reduced micropolar half-space.
   Mohammad Atif, Raghukanth, S. T. G., Manam, S. R.
   Journal of Seismology. DOI: 10.1007/s10950-023-10140-0

2. Reduced micropolar half-space subjected to earthquake sources.
   Mohammad Atif, Raghukanth, S. T. G., Manam, S. R.
   Int. J. Earthquake and Impact Engineering (in Press)

3. A mathematical model for a buried source in the layered reduced micropolar half-space.
   Mohammad Atif, Raghukanth, S. T. G., Manam, S. R.
   Pure and Applied Geophysics (revision submitted).

4. Normal mode solution for spherical Earth using reduced micropolar theory.
   Mohammad Atif, Raghukanth, S. T. G.
   Journal of Geophysical Research: Solid Earth (in preparation).

Research Experience

Ph.D. Research

- My PhD research mainly focuses to develop mathematical models for seismic sources and the application of these models in simulating the Earthquake phenomenon. These mathematical models are the homogeneous Earth model, layered Earth model, and spherically symmetric Earth model. These models are derived using reduced micropolar theory, as previously developed earthquake models generally used the elastodynamic equation of classical elasticity.

- The emergence of rotational seismology has provided a compelling reason to consider the reduced micropolar theory as a suitable approach for modelling and analysis. Further, these formulations are derived such that solutions for the classical elastic theory are obtained as a particular case of reduced micropolar theory.

- The simulations are performed on a large scale to observe the effect of ground motion due to the variability of earthquake fault parameters and additional parameters of the reduced micropolar theory. Moreover, simulations are also carried out for different earthquake scenarios, and results are compared to those obtained using classical elastic theory and reduced micropolar theory, as well as those obtained for homogeneous and layered half-space models.

- It should be noted that High Performance Computing Environment (HPCE) of the Indian Institute of Technology Madras has been used to obtain all the simulated results.

Masters Research Project

- For my master's project, I developed functions in the object-oriented programming language *JAVA* that compare the rate of convergence of three fixed point iterative methods (Picard, Mann, and S-iteration) for any given mapping.

Skills

Programming Languages
- C, Java, Fortran, Python

Tools
- Matlab, Wolfram Mathematica, Unix/Linux Shell Script, LaTeX, Microsoft Office

Numerical Technique
- Programming of the DWN, FDM, and FEM

Languages
- English(Fluent), Hindi (Mother tongue), Urdu (Mother tongue), Arabic (Basic)

Contributed Talks

1. Seismic response of reduced micropolar elastic half-space.
   Mohammad Atif, Dhabu, A., Raghukanth, S.T.G., and Manam, S.R.
   5th *meeting* *of the International Working Group on Rotational Seismology* **(IWGoRS)**, *held in* **Sun Moon Lake, Taiwan**, *September 22-26, 2019.*

2. Finite-fault simulations for rotations and strains in the near-fault subjected to layered reduced micropolar half-space.
   Mohammad Atif, Raghukanth, S.T.G., and Manam, S.R.
   6th *meeting* *of International Working Group on Rotational Seismology* **(IWGoRS)**, *held in* **Paris, France**, *November 21-23, 2022.*

Graduate Courses

Advanced Mechanics of Structure	Theory of Wavelets
Advanced Differential Equations	Non-Linear Partial Differential Equations
Advanced Analysis	Engg. Seismology and Hazard Assessment (Audit)

Achievements	• Received a ***five-year doctoral fellowship*** from the Ministry of Human Resource Development (MHRD), Government of India
	• Cracked the GATE exam of 2017 in mathematics and was among the nearest ***top 100 students*** all over India
	• Qualified ***National Eligibility Test (NET)*** - an exam to determine the eligibility for the post of assistant professor in any Indian university
	• Honoured to receive the ***Jamia Merit Scholarship*** in M.Sc. for securing the 2nd position in the class
	• ***Gold medallist*** at graduation for securing the highest marks in the college

Teaching Experience	### Indian Institute of Technology Madras

- Teaching Assistant: Function of several variables (MA1101) (Aug 2018 – Nov 2018)
- Teaching Assistant: Differential Equations (MA2020) (Jul 2019 – Nov 2019)
- Teaching Assistant: Series and Matrices (MA1102) (Jan 2020 – May 2020)
- Teaching Assistant: Series and Matrices (MA1102) (Jan 2021 – May 2021)
- Teaching Assistant: Differential Equations (MA2020) (Jul 2021 – Nov 2021)

Tutoring Experience

- During my undergraduate studies, I acquired significant teaching experience by working as a tutor for high school and intermediate-level students.

Position of Responsibility	• Volunteered at the 2018 National Symposium on Mathematics and its Applications (NSMA) organized by the Indian Institute of Technology Madras, assisted with logistical support, program coordination, and participant communication
	• Served as a principal member of MSA- an independent student body at the Indian Institute of Technology Madras, from 2018-2019
	• Elected as the class representative for MSc. second year, served as a liaison between students and faculty
	• Served as the president of the science student association during undergraduate studies, led and collaborated with a diverse team to implement initiatives and enhance student life on campus

References	Dr. Wu-Cheng Chi (Postdoc Mentor) Dr. Raghukanth S T G (PhD advisor)

Dr. Wu-Cheng Chi (Postdoc Mentor)
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