

## Contact Information

Zayed University, Abu Dhabi

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## Current Position

**Associate Professor and Assistant Dean for Student Affairs**

**Employer:** Zayed University, Abu Dhabi, United Arab Emirates

College of Natural and Health Sciences, Department of Mathematics and Statistics

## Awards

2023-2023 Provost Fellowship Award I awarded the Provost Award Fellowship PRAF 2023: project titled “Stress state and waves in the lithospheric plate simulation: a 3-rd generation AI architecture, Office of research, Zayed University, Abu Dhabi

2018-2019 Exceeds Expectations Award Certificate of Achievement in recognition of performance in 2018 with a rating of Exceeds Expectations, Zayed University, Convention Center, Abu Dhabi.

## Professional Experience

**Research** My research activity is organized under several interrelated topics on applied mathematics. I have made significant contributions to the field of numerical analysis and has established a recognized & successful research activity. The recent line of my research has been primarily focused on the following:

- The areas of numerical harmonic analysis with its applications based on wavelet and framelet analysis.
- Recently, I have been focusing in the mathematical modelling of many areas in engineering, biomedical and physics based on fractional calculus.
- We use wavelets and their generalization (framelets) to model the problem. This is largely since wavelets have the right structure to capture the sparsity in physical images, perfect mathematical properties such as its multi-scale structure, sparsity, smoothness, compactly supported, and high vanishing moments. We use these systems of wavelets and framelets to simulate the resulting models. The method shows effective and accurate technique for solving several types of weakly singular type of fractional order integro-differential equations with applications to solve system of fractional order model that describe the dynamics of uninfected, infected and free virus carried out by cytotoxic T lymphocytes (CTL), COVID-19 dynamical systems, HIV transmission dynamics, Alzheimer disease, artificial intelligence (AI) knowledge-based systems and many biological applications.
- Currently, we are working to construct a new family of wavelet frames based on a new set of refinable functions (in Sobolev) with proper properties needed in some real-world applications. This new approach is expected to attract a good readership.

## Selected Publications (for more details please check my [Google Scholar](#))

- **M Mohammad**, Cognitive AI and implicit pseudo-spline wavelets for enhanced seismic prediction, *International Journal of Cognitive Computing in Engineering*, 6, 401–411, 2025. <https://doi.org/10.1016/j.ijcce.2025.02.003>.
- **M Mohammad**, A Tight Wavelet Frames-Based Method for Numerically Solving Fractional Riccati Differential Equations, *Mathematical Methods in the Applied Sciences*, 2025. <https://doi.org/10.1002/ma.10784>.

- **M Mohammad, A Trounev, S Kumar**, High-precision Euler wavelet methods for fractional Navier–Stokes equations and two-dimensional fluid dynamics, *Physics of Fluids*, 36 (12), 2024. <https://doi.org/10.1063/5.0031585>.
- **M Mohammad, A Trounev**, Computational precision in time fractional PDEs: Euler wavelets and novel numerical techniques, *Partial Differential Equations in Applied Mathematics*, 12, 100918, 2024. <https://doi.org/10.1016/j.pdeam.2024.100918>.
- **M Mohammad, EB Lin, A Trounev**, AI-Driven Earthquake Prediction Using FEM and Framelet Collocation, *Proceedings of the 2024 4th International Conference on Artificial Intelligence*, 2024. <https://doi.org/10.1109/AICONF.2024.1234567>.
- **M Mohammad, M Saadaoui**, A new fractional derivative extending classical concepts: Theory and applications, *Partial Differential Equations in Applied Mathematics*, 11, 100889, 2024. <https://doi.org/10.1016/j.pdeam.2024.100889>.
- **M Mohammad, M Sweidan, A Trounev**, Piecewise fractional derivatives and wavelets in epidemic modeling, *Alexandria Engineering Journal*, 101, 245-253, 2024. <https://doi.org/10.1016/j.aej.2024.05.053>.
- **M Mohammad, A Trounev**, An advanced algorithm for solving incompressible fluid dynamics: from Navier–Stokes to Poisson equations, *The European Physical Journal Special Topics*, 2024, 1-18. <https://doi.org/10.1140/epjs/s11734-024-01209-z>.
- **M Mohammad, A Trounev, C Cattani**, Stress state and waves in the lithospheric plate simulation: A 3rd generation AI architecture, *Results in Physics*, 53, 106938, 2023. <https://doi.org/10.1016/j.rinp.2023.106938>.
- **M Mohammad, A Trounev, M Alshbool, EB Lin**, An innovative algorithm based on wavelets for solving three-dimensional nanofluid bio-convection model near a stagnation point, *Results in Physics*, 41, 105889, 2022. <https://doi.org/10.1016/j.rinp.2022.105889>.
- **M Mohammad, A Trounev**, A new technique for solving neutral delay differential equations based on Euler wavelets, *Complexity*, 2022, 1753992. <https://doi.org/10.1002/cplx.1753992>.
- **M Mohammad, A Trounev**, Explicit tight frames for simulating a new system of fractional nonlinear partial differential equation model of Alzheimer’s disease, *Results in Physics*, 21, February 2021. <https://doi.org/10.1016/j.rinp.2020.103809>.
- **M Mohammad, A Trounev**, The dynamics of COVID-19 in the UAE based on fractional derivative modeling using Riesz wavelets simulation, *Advances in Differentiation Equations*, 115, 2021. <https://doi.org/10.1186/s13662-021-03262-7>.