

Abd'gafar Tunde Tihamiyu, PhD

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Professional Summary

Doctor of Philosophy in Mathematics with expertise in numerical analysis, computational mathematics, deep learning, and inverse problems with Electrical Impedance Tomography (EIT). Developed innovative algorithms and data-driven models addressing diverse computational challenges. Published several peer-reviewed papers in high-impact journals, advancing computational and applied mathematics. Proficient in Python, MATLAB, and high-performance computing, with a proven ability to translate theoretical advancements into practical solutions across computational and machine learning applications as a driven and collaborative researcher.

Education

The Chinese University of Hong Kong, Shatin, N.T. Hong Kong Aug 2021 – Jul 2025

PhD in Mathematics

Funded by: Hong Kong PhD Fellowship Scheme

Dissertation: Novel regularization and deep learning approaches for electrical impedance tomography (EIT) problems with partial measurement data

Advisor: Professor Jun Zou

Federal University of Technology, Minna, Niger State, Nigeria Oct 2012 – Nov 2017

Bachelor of Technology (B. Tech) in Mathematics (First Class Honours)

MTN Foundation Scholarship for Academic Excellence

Research Interest

- Inverse problems and regularization
- Numerical optimization
- Scientific machine learning
- Deep learning for computational imaging
- Partial differential equations

Research Experience

Doctoral Researcher, The Chinese University of Hong Kong Aug 2021 – July 2025

- Developed novel variational inversion schemes using adaptive primal-dual hybrid gradient methods, mitigating ill-posedness and nonlinearity in EIT reconstructions.
- Integrated deep neural networks with physics-oriented models, improving accuracy by 15% in noisy and incomplete measurement datasets.
- Devised data-driven approaches for learning multi-parameter total variation-like regularizers via convex optimization, surpassing baselines in image restoration efficiency and quality.
- Conducted rigorous numerical experiments on synthetic and experimental data, demonstrating robustness to high noise levels, generalization, and partial measurements.

Visiting Researcher, University of Graz, Austria Oct 2023 – June 2024

- Developed primal-dual algorithms with learned regularizers for EIT, improving reconstruction accuracy by 5% over traditional methods.
- Implemented GPU-accelerated TensorFlow models for real-time imaging, reducing computation time significantly.

- Collaborated with international teams on algorithm development for EIT, enhancing interdisciplinary research outcomes.

Research Assistant, Kano University of Science and Technology, Nigeria Jun 2018 – Apr 2019

- Collaborated on numerical solutions for differential and integral equations, contributing to five published manuscripts.
- Conducted numerical experiments using MATLAB and Maple, producing results and findings for the team research outputs.

Publications

- He J., and Tihamiyu A.T., "Physics-informed neural networks in iterative form of nonlinear equations for numerical algorithms and simulations of delay differential equations," *Physica A: Statistical Mechanics and its Applications*, 2025.
- Ahmad S. and Tihamiyu A.T., "Numerical simulation of time-dependent non-Newtonian compressible fluid flow in porous media: finite element method and time-dependent approach," *International Communications in Heat and Mass Transfer*, 2024.
- Audu K.J., Tihamiyu A.T., Akpabio J.N., Ahmad H., and Olabiyi M.A., "Numerical assessment of some semi-analytical techniques for solving a fractional-order leptospirosis model," *Malaysian Journal of Science*, 2024
- Yusuf A., Adekunle T.S., Tihamiyu A.T., and Aliyu A.M., "Double diffusive nonlinear convective MHD unsteady slip-flow regime in a rectangular channel," *WSEAS Transactions on Fluid Mechanics*, 2023.
- Tihamiyu A.T., Falade K.I., and Abubakar A.S., "Computational assessment of external force acting on beam elastic foundation," *Pamukkale University Journal of Engineering Sciences*, 2022.
- Tihamiyu A.T., Cole A.T., and Audu K.J., "A backward differentiation formular for third-order initial or boundary value problems using collocation method," *Iranian Journal of Optimization*, 2021.
- Tihamiyu A.T., Falade K.I., Rauf Q.O., and Akande S.A., "A numerical technique for direct solution of special fourth-order ordinary differential equation via hybrid linear multistep method," *Cankaya University Journal of Science and Engineering*, 2021.
- Falade K.I., Baoku I.G., Tihamiyu A.T., and Isyaku I., "On numerical computational solution of seventh order boundary value problems," *Journal of Nigerian Mathematical Society*, 2020.

Awards and Grants

- Ernst Mach Grant, Worldwide, Austria Oct 2023 – Jun 2024
Monetary value: EUR 1150/month and EUR 1000 for travel allowance
- Hong Kong PhD Fellowship Scheme, RGC, Hong Kong Aug 2021 – Jul 2024
Monetary value: HK\$ 340,800*/year and HK\$ 14, 200 annual travel allowance
- CUHK Vice-Chancellor's Scholarship Aug 2021 – Jul 2025
Monetary value: HK\$ 100,000 and HK\$ 28,400/month in the fourth year
- MTN Foundation Scholarship, Nigeria 2014/2015 – 2016/2017
Monetary value: NGN 200,000/year
- Sir Peter Ojongbede's Prize for Best Graduating Student in Mathematics Feb 2018

Professional Experience

Teaching Assistant, The Chinese University of Hong Kong Aug 2021 – July 2025

- Led weekly tutorials for undergraduate courses, including Calculus for Engineers (Fall 2022 and 2023) and Games and Strategic Thinking (Fall 2024), serving 50+ students per session.

- Designed homework assignments and exams, incorporating real-world applications to improve student engagements and boost problem-solving skills.

Mathematics Tutor, KUST Staff School, Kano State, Nigeria

May 2019 – Dec 2020

- Taught mathematics to over 100 high school students, developing customized curricula that increase average examination scores.
- Collaborated with school staff to track progress, resulting in 85% of students advancing to advanced tracks.

Technical Skills

- *Programming and Tools*: Python, MATLAB, C++, Git, VS code
- *Deep Learning Frameworks*: PyTorch, TensorFlow
- *Scientific and Image Processing*: Numpy, Scipy, Pandas, OpenCV, scikit-image
- *Other*: Data analysis, academic writing, project management

Professional Memberships

- Society for Industrial and Applied Mathematics (SIAM) 2021 – Present
Member, CUHK Student Chapter
- Inverse Problems International Association (IPIA) 2022 – Present
Member

Leadership and Community Involvement

- Vice President, SIAM Student Chapter, CUHK 2024 – 2025
Led chapter operations and coordinated the chapter's events
- Co-organizer, Minisymposium, HK-SIAM Conference, Hong Kong 2025
Designed and moderated a minisymposium uniting over 30 young researchers and postgraduates from 10 global institutions to present on computational and applied mathematics.
- Secretary, SIAM Student Chapter, CUHK 2023 – 2024
Managed logistics, communications, and chapter's activities
- Co-organizer, SIAM Student Chapter Workshop, CUHK 2024
Coordinated a workshop for over 30 graduate students from diverse fields, facilitating research presentations and professional networking sessions to enhance career development.

References

- **Professor Jun Zou**
Fellow of SIAM and AMS, Chairman and Choh-Ming Li Professor of Mathematics
Department of Mathematics, The Chinese University of Hong Kong
Email: zou@math.cuhk.edu.hk
- **Professor Bangti Jin**
Global STEM Scholar, Department of Mathematics
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- **Professor Kristian Bredies**
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