Dr. Kawa Manmi

kawa.manmi@warwick.ac.uk

Visit my Website
github.com/KawaManmi

Research interests

physics-based battery models, modelling bubble dynamics; boundary integral method, numerical methods; computational fluid dynamics.

Experience

Resaerch Fellow, Mathematics Institute, University of Warwick, UK. 2023–2024

Focus: physics-based Li-ion battery modelling:

- Joined Multiscale Modelling team at Faraday Institution to work on physics-based Li-ion battery modelling.
- Alongside core research activities, provided teaching support and marking for undergraduate courses.

Computing Tutor, De Montfort University International College (DMUIC). 2022–2023

Focus: teaching and assessing Visual Web Development (C#, HTML, JavaScript) and networking.

Lecturer, Mathematics Department, College of Science, Salahaddin University-Erbil, IRAQ. Concurrently served as a part-time Lecturer in the IT Department, Tishk International University, Erbil, Iraq 2019–2020

Responsibilities included:

- Teaching courses in Multivariable Calculus, Introduction to Probability, Discrete Mathematics, and Numerical Methods.
- Participating as a member of the scientific committee for undergraduate and postgraduate studies.
- Supervising post-graduate students.

Research Fellow, School of Mathematics, University of Birmingham, UK. 2018–2019

Engaged in the research project "Maximizing cavitation to clean dental implants" funded by an EPSRC grant. Key contributions included:

- Developing numerical models for cavitation and single bubble dynamics using Finite Volume Method (FVM) and Finite Element Method (FEM).
- Authoring research papers.
- Actively participating in scientific events such as workshops, conferences, seminars, weekly research group meetings, and training courses.

Lecturer, Mathematics Department, College of Science, Salahaddin University-Erbil, IRAQ. Concurrently served as a part-time Lecturer in the IT Department, Lebanse French University, Erbil, Iraq 2015–2018

Responsibilities included:

- Teaching courses in Calculus I and II, and Computational Mathematics using Matlab
- Administration duties include being head of the department and a member of exam board.
- Academic activities, including writing research paper.

Lecturer (MSc), Mathematics Department, College of Science, Salahaddin University-Erbil, IRAQ. 2007–2011

Responsibilities included:

- Teaching courses in Introduction to Numerical Analysis, Introduction to Visual Basic and Linear Programming.
- Administration duties include being coordinator of the department, in charge of lecture timetable and member of exam board.

Education

Ph.D. Applied Mathematics, School of Mathematics, University of Birmingham,UK 2011–2015

Thesis: Three Dimensional Acoustic Microbubble Dynamics Near Rigid Boundary. (eprint)

Supervisors: Dr. Qianxi Wang

M.Sc. Numerical analysis, Mathematics Department, College of Science, Salahaddin University-Erbil, IRAQ 2005–2007

B.Sc. Mathematics, Mathematics Department, College of Science, Salahaddin University-Erbil, IRAQ 1999–2003

Training Course

- **Design of Experiments** at WMG, University of Warwick 29 Feb 2024
- **APP PGR Academic and Professional Pathway for Postgraduate Researchers who Teach**, 7th Nov 2023 – 21st Feb 2024, University of Warwick.
- **Faraday THRIVE Program**, "Skill 4 Thrive Program", Oct 2023 - Feb 2024.
- **CISM** Advanced Course "Batteries - Basic Principles, Experimental Investigations, and Modeling Across Scales", Udine, Italy, 25-29 Sep, 2023.
- **Introduction Course for New Lecturers in the Mathematical Sciences**, IMA Isaac Newton Institute for Mathematical Sciences, Cambridge, UK (18 - 19 Sep 2023)
- **PyBaMM workshop**, University of Warwick, UK (14 - 15 Sep 2023)
- **Midlands Fluid Mechanics Meeting**, Aston University, UK (5 Sep 2023)
- **Software Development Course**, Code Your Future (Jun 2022 - Mar 2023) Acquired proficiency in HTML, CSS, JavaScript, NodeJS, React, Express, and Postgres.
  - Learnt Agile methodologies and personal development.
  - Completed a 5-week full stack final project using Agile methodology.
  - Monthly performance evaluations (known as "Beyond Milestone" reports) are conducted and based on metrics such as Codewars rank, codility assessment, number of Github pulls, and attendance.
- **Web Development Bootcamp**, Bath Spa University, (Jun - Aug 2022).
  - Learnt semantic HTML, responsive web design, CSS animation, flex/grid layout, JavaScript, and React.
  - Learnt Vanilla JavaScript, small projects including a simple calculator, a Hangman game, and Rock-paper-scissors game.
- **Data Science Bootcamp**, TechTalent Academy, (Feb 2022 - Jun 2022)
  - Completed an intensive 14-week course on data science fundamentals.
  - Developed strong skills in data manipulation using Numpy and Pandas.
  - Learnt to visualize data using Python libraries such as Matplotlib and Altair.
  - Completed all weekly home learning tasks, submitted via GitHub.
  - Received a BCS Foundation Award in 'What is Machine Learning? V1.0.
- **Analysing Data Bootcamp**, Babington (Dec 2021 - Feb 2022).

  - Completed 135-hour programme focused on data literacy, data-driven software, Excel, PowerBI, data analysis, and presentation.
  - Completed a Ucertify course for Microsoft Excel 2019.
- **Fundamentals in software Development**, Code Your Future four weeks, in May 2022 The course focused on personal development as well as an introduction about several tools around coding including how using Visual studio, link it to Github and how ship it to live.
- **Action Tutor** Online training session for volunteer tutoring in Action Tutor, 17 Mar 2022.
- **Academic Consultancy**, One Day Workshop, University of Birmingham Enterprise Limited, 29 May 2019.
- **Depp Learning**, the NVIDIA Deep Learning Institute (DLI) and Advanced Research Computing, University of Birmingham, Jan 16, 2019.
- **Software Carpentry-Python**, the workshop focused on Python and the curriculum will include: The Unix Shell, Version Control with Git, and Programming with Python,27 - 28 Dec 2018, University of Birmingham, UK,
- **Online OpenMP Course**, four sessions on consecutive Wednesday starting on 24th October with the last session on 14 Nov 2018, by Mark Bull in EPCC.
- **Continual Professional Development**: Meshing Methods for Computational Fluid Dynamics, 24 - 26 July, 2018, University of Central Lancashire, Preston, UK.

Publications

Peer-reviewed journal articles

14. Agha, Jegyr Anwar, Manmi, Kawa M.A., and Dadvand, Abdolrahman (2024). Dynamics of a bubble-pair between two parallel rigid walls. *Ocean Engineering*, (doi, url)
13. Jund, Asaad A, Dadvand, Abdolrahman, Aziz, Imad A, and Manmi, Kawa MA (2024). An extended laplacian smoothing for boundary element analysis of 3d bubble dynamics. *Engineering Analysis with Boundary Elements*, 160:76–88
12. Bapir, Saman A, Manmi, Kawa MA, Saeed, Rostam K, and Dadvand, Abdolrahman (2024). Oscillation of an ultrasonically driven gas bubble in an asymmetric confined domain. *International Journal of Mechanical Sciences*, 265:108861
11. Dadvand, Abdolrahman, Manmi, Kawa MA, and Aziz, Imad A (2023). Three-dimensional bubble jetting inside a corner formed by rigid curved plates: Boundary integral analysis. *International Journal of Multiphase Flow*, 158:104308
10. Manmi, Kawa MA, Aziz, Imad A, Arjunan, Arun, Saeed, Rostam K, and Dadvand, Abdolrahman (2021). Three-dimensional oscillation of an acoustic microbubble between two rigid curved plates. *Journal of Hydrodynamics*, 33(5):1019–1034
9. Manmi, KMA, Wu, WB, Vyas, Nina, Smith, WR, Wang, QX, and Walmsley, AD (2020). Numerical investigation of cavitation generated by an ultrasonic dental scaler tip vibrating in a compressible liquid. *Ultrasonics Sonochemistry*, 63:104963
8. Vyas, N, Wang, QX, Manmi, KA, Sammons, RL, Kuehne, SA, and Walmsley, AD (2020). How does ultrasonic cavitation remove dental bacterial biofilm? *Ultrasonics Sonochemistry*, 67:105112
7. Aziz, Imad A, Manmi, Kawa MA, Saeed, Rostam K, and Dadvand, Abdolrahman (2019). Modeling three dimensional gas bubble dynamics between two curved rigid plates using boundary integral method. *Engineering Analysis with Boundary Elements*, 109:19–31
6. Vyas, Nina, Manmi, Kawa, Wang, Qianxi, Jadhav, Ananda J, Barigou, Mostafa, Sammons, Rachel L, Kuehne, Sarah A, and Walmsley, A Damien (2019). Which parameters affect biofilm removal with acoustic cavitation? a review. *Ultrasound in medicine & biology*, 45(5):1044–1055
5. Manmi, Kawa and Wang, Qianxi (2017). Acoustic microbubble dynamics with viscous effects. *Ultrasonics sonochemistry*, 36:427–436
4. Wang, Qianxi, Manmi, Kawa, and Calvisi, Michael L (2015a). Numerical modeling of the 3d dynamics of ultrasound contrast agent microbubbles using the boundary integral method. *Physics of Fluids*, 27(2)

3. Wang, Qian and Manmi, Kawa (2014). Microbubble dynamics near a wall subjected to a travelling acoustic wave. *Physics of Fluids*, 26:032104
2. Wang, Qianxi, Manmi, Kawa, and Liu, Kuo-Kang (2015b). Cell mechanics in biomedical cavitation. *Interface Focus*, 5(5):20150018
1. Saeed, Rostam K and Aziz, Kawa M (2008). An iterative method with quartic convergence for solving nonlinear equations. *Applied mathematics and computation*, 202(2):435–440

Scientific Meeting

9. ModVal 2024, the 20th Symposium on Modeling and Validation of Electrochemical Energy Technologies, 13-14 March 2024 in Baden, Switzerland (Poster)
8. Faraday Institution Conference, University of Birmingham, Birmingham, UK, 11-13 September 2023.
7. PERCAT Postdoctoral Researcher Conference (EPS LES) University of Birmingham, UK, 26 June 2019 (Poster).
6. Workshop on Cavitation Exploitation in Ljubljana, Slovenia 27-28 September 2018. Presentation entitled Numerical Investigation of Acoustic Cavitation as a Novel Method of Dental Plaque Removal
5. 1st International Conference on Information Technology (ICoIT17), 2017. Presentation entitled New Weights in Laplacian Smoothing on Triangular Mesh.
4. First Swedish-Kurdish Workshop on Educational Aspects of Applied and Industrial Mathematics (October 2015) University of Zakho/ Duhok, Kurdistan Region-Iraq. Presentation entitled (3D Microbubble Dynamics Near a Wall Subject to High Intensity Ultrasound Using BIM)
3. The Murfy International Scientific Meeting, Amazing (cavitation) bubbles: great potentials and challenges (nov. 2014), Kavli Royal Society Centre, Buckinghamshire, UK
2. Meeting to celebrate the career of Professor John Blake (Sep, 2013) Mathematical challenges in bubbles and biological fluid mechanics School of Mathematics, University of Birmingham, UK.
1. 4th annual BEAR PGR Conference on Research Computing (2013) University of Birmingham, UK.

Invited Talks/Webinars

2. Salahddin University-Erbil, Iraq, March 2024. Math Meets Batteries: An Overview of Physics-Based Modeling.
1. Mathematics Forever Organization, Kurdistan Region, Iraq, Mrach 2024. An Overview of Mathematical Modelling: Fluid Dynamics as an Example

References are available upon request