DHAIRYA SHAH

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EDUCATION

❑ **Imperial College London, United Kingdom** **10-2022 – 10-2023**
Master of Science in Applied Mathematics **Grade: Distinction**

- Selected Modules: Tensor Calculus and General Relativity, Special Relativity and Electromagnetism, Classical Dynamics, Vortex Dynamics, Applied Complex Analysis, Quantum Mechanics – I

❑ **Pandit Deendayal Energy University (PDEU), India** **07-2017 – 06-2021**
Bachelor of Science (Hons.)* in Mathematics and *Diploma in Liberal Studies **CPI: 9.10/10**

- Selected Modules: Differential Geometry, Topology, Mathematical Physics, Integral Equations, Integral Transforms, Special Functions, Differential Equations, Real Analysis

RESEARCH EXPERIENCE

❑ ***MSc Thesis:***
Local Solution to Electro-Capillary Phenomenon near Sharp Corner **10-2022 – 09-2023**

- Investigated the behaviour of the voltage local to the triple contact point for Electrowetting phenomenon
- Derived Eigenvalue condition near the triple contact point, demonstrating that the corresponding equipotential lines do not form eddies
- Supervised by Dr Samuel Brzezicki

❑ ***BSc Thesis:***
Numerical Methods for Solutions of One Variable Nonlinear Equations **07-2019 – 06-2021**

- Categorised methods developed over the last 250 years in four families and devised an analogy for interconversion
- Developed a set of efficient methods in fixed-point family and implemented different methods to solve nonlinear equations
- Showcased the fixed-point family as the most efficient and stable; resulting in a conference proceeding: 1
- Supervised by Dr Manoj Sahni and Dr Ritu Sahni

❑ ***Research Collaboration:***
Novel Formulae for Series Involving Floor and Ceiling Functions **06-2019 – 04-2022**

- Formulated and applied two original theorems to derive over 40 novel results pertaining to Floor and Ceiling functions
- Provided generalisations for different finite and infinite series as well as for the cases of Generalized Dirichlet series such as Riemann, Hurwitz, and Lerch Zeta functions; resulting in two published articles (I, II)
- In Collaboration with Dr Manoj Sahni, Dr Ritu Sahni, Dr Ernesto León-Castro and Dr Maricruz Olazabal-Lugo

❑ ***BSc Project II:*** Applications of the Fuzzy Set Theory **01-2018 – 04-2019**

- Derived the solution for second order Cauchy-Euler equation using generalised trapezoidal intuitionistic fuzzy numbers
- Fuzzified generalized Newton Raphson type method to solve one variable equations; resulting in four articles

❑ ***BSc Project I:*** Fixed Point Theory and Numerical Methods **08-2017 – 11-2019**

- Obtained a formula that provides exact number of iterations required based on initial guess for the fixed-point method
- Amalgamated the Fixed-Point and Newton-Raphson method to demonstrate that the integrated methods converge faster than the original pair; resulting in an article and a conference proceeding

SELECTED PUBLICATIONS

[1] ***D. Shah*** et al. "Series of Floor and Ceiling Function—Part I: Partial Summations". *Mathematics* 10.7 (2022), p. 1178. DOI: 10.3390/math10071178.

[2] ***D. Shah*** et al. "Series of Floor and Ceiling Functions—Part II: Infinite Series". *Mathematics* 10.9 (2022), p. 1566. DOI: 10.3390/math10091566.

[3] M. Sahni, ***D. Shah***, and R. Sahni. "A new modified accelerated iterative scheme using amalgamation of fixed point and NR method". *Journal of Interdisciplinary Mathematics* 22.5 (2019), pp. 679–688. DOI: 10.1080/09720502.2019.1649035.

[4] ***D. Shah***, M. Sahni, and R. Sahni. "Solution of algebraic and transcendental equations using fuzzified he's iteration formula in terms of triangular fuzzy numbers". *WSEAS Trans. Math* 18 (2019), pp. 91–96. DOI: 10.37394/23206.

[5] ***D. Shah*** and M. Sahni. "DMS way of finding the optimum number of Iterations for fixed point Iteration method". *Proceedings of the World Congress on Engineering*. Vol. 1. 2018, pp. 87–89. ISBN: 978-988-14047-9-4.

H-index: 4, Citations: 38 (as of Sept 2025) – google scholar account

AWARD AND GRANT

- Received **Certificate of Merit (Student)** for the 2018 International Conference of Applied and Engineering Mathematics for the paper entitled "DMS Way of Finding the Optimum Number of Iterations for Fixed Point Iteration Method"
- Awarded **Travel Grant** of **65000 INR** $\approx$ **£700** in 2018 by Pandit Deendayal Energy University to present a conference paper in the U.K.

PRESENTATIONS AND DEFENCES

- Postgraduate Thesis Defence – *Local Solution to Electro-Capillary Phenomenon near Sharp Corners* **18th Sep 2023**
  Department of Mathematics, **Imperial College London, UK**
- Postgraduate Poster Presentation – *Complex Analytical Approach to Electrowetting* **26th Jul 2023**
  Department of Mathematics, **Imperial College London, UK**
- Undergraduate Thesis Defence – *On Numerical Methods for Real Solutions of One Variable Nonlinear Equations* **2nd Jun 2021**
  School of Liberal Studies, **Pandit Deendayal Energy University, India**
- Conference Presentation – *DMS way of finding the optimum number of iterations for Fixed Point Iteration Method* **5th Jul 2018**
  2018 International Conference of Applied and Engineering Mathematics **World Congress on Engineering 2018, Lon**

TEACHING EXPERIENCE

- **The Charter School North Dulwich**, *Maths Graduate Teaching Assistant (**SEN, Mathematics**)* **09-2024 – Present**
  - Providing targeted support for SEN students in Mathematics through differentiated instruction, small-group interventions, and collaborative adaptation of resources with teachers
  - Supporting Year 7 students in preparing for the UKMT Junior Mathematical Olympiad through targeted problem-solving strategies
- **TeamUp - SYLA, London**, *Volunteer Tutor (**Mathematics**)* **11-2024 – 02-2025**
  - Delivered structured and interactive KS3 Mathematics tutorials, successfully covering five key topics, implementing differentiated lesson plans to cater to various learning styles, and enhancing students' problem-solving abilities and comprehension.
  - Evaluated student progress through regular assessments and targeted feedback, leading to measurable improvements in mathematical confidence and attainment
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Cardinal Hume Centre, London, *Homework Club Volunteer (**Mathematics**)* **05-2024 – Present**

- Providing support in using academic resources, assisting with homework, exam preparation, and teaching Mathematics up to GCSE level
- Supporting students in improving numeracy, engaging them with learning activities, and offering guidance with educational materials

❑ **Astronomy Club, PDEU**, *Course Facilitator of **Mathematical Aspects of Relativity*** **10-2023 – 12-2023**

- Designed, developed and delivered a 30-hour course on Mathematical Aspects of Relativity to undergraduate students, with focus on Lagrangian and Hamiltonian dynamics as well as advanced topics in Special Relativity
- Applied aforementioned concepts to teach principles such as the conservation of momentum and energy, as well as derivations such as $E = mc^2$, thereby fostering a deeper understanding of concepts of Relativity

❑ **Office of International Relations, PDEU**, *Teacher of **Foundations of Mathematics*** **12-2019 – 03-2020**

- Developed instructional material to reinforce foundational Mathematics skills for twelve international engineering students, achieving a 92% pass rate in subsequent mathematics exams
- Implemented innovative pedagogical methods, including real-world examples to enhance understanding of fundamentals

❑ **Yusuf Mehrally Centre (NGO), Kutch**, *Teacher of **Science** & **Mathematics*** **12-2018 – 01-2019**

- Taught Mathematics and Science to underprivileged 8th-grade students (UK Year 9 equivalent), tailoring methods to meet the needs of students with special learning requirements, resulting in a 20% increase in exam pass rates
- Demonstrated adaptability and dedication, ensuring higher success rates despite the challenging circumstances faced by the students

KEY ACADEMIC ENGAGEMENTS

❑ **Department of Mathematics, ICL, UK**, *MSc Programme Representative* **10-2022 – 09-2023**

- Chaired PG Student-Staff Committee meetings, ensuring seamless communication and implementation of key student suggestions and concerns as well as participated in various meetings by university and union staff
- Performed the role of liaison between the MSc cohort and the department, soliciting student feedback and sharing the areas of learning and opportunities appropriately with both parties

❑ **Second International Conference on Mathematical Modeling, Computational Intelligence Techniques and Renewable Energy (MMCITRE) - 2021**, *Head, Logistics Committee* **6th to 8th Feb 2021**

First International Conference MMCITRE - 2020, *Head, Associate Committee* **21st to 23rd Feb 2020**

- Directed associate and logistic committees of 30+ undergraduate and postgraduate students, overseeing hospitality, management, and other key departments in organising both conferences
- Managed a hybrid conference (offline and online) with 120+ presenters and speakers in 2021 and 90+ in 2020, successfully navigating through the challenges posed by the COVID-19 pandemic

RELEVANT SKILLS

❑ **Proficiency in Programming Languages**: Python, Wolfram Language, C/C++, MATLAB

❑ **Proficiency in Operating Systems & Tools**: Debian Linux, Windows, Git, Github, LaTeX, Google Collabetory, Libre/Microsoft Office