DHAIRYA SHAH

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EDUCATION

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

- Achieved excellence in courses such as Tensor Calculus and General Relativity, Special Relativity and Electromagnetism, Classical Dynamics showcasing a strong foundation in theoretical frameworks essential for advanced studies
- Demonstrated proficiency in Applied Complex Analysis, Quantum Mechanics – I and Vortex Dynamics, underscoring a deep understanding of mathematical principles relevant to theoretical physics
- Other Modules: Numerical Solutions of Ordinary Differential Equations, Methods for Data Science

❑ **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

- Received perfect scores (10/10) in all mathematical modules across eight semesters, setting an unbroken record
- Demonstrated mastery in foundational mathematical physics concepts, including Differential Geometry, Real Analysis, Complex Analysis, and Fluid Mechanics, providing a strong basis for advanced studies in theoretical physics
- Selected Modules: Integral Equations, Integral Transforms, Topology, Special Functions, Differential Equations

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 the 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

❑ *BSc 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: 37 (as of July 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 ≈ £700** in 2018 by Pandit Deendayal Energy University to present a conference paper in the U.K.

PRESENTATIONS AND DEFENCES

- ❑ <u>Postgraduate Thesis Defence</u> – *Local Solution to Electro-Capillary Phenomenon near Sharp Corner*   **18th Sep 2023**
  Department of Mathematics, **Imperial College London, UK**

- ❑ <u>Postgraduate Poster Presentation</u> – *Complex Analytical Approach to Electrowetting*   **26th Jul 2023**
  Department of Mathematics, **Imperial College London, UK**

- ❑ <u>Undergraduate Thesis Defence</u> – *On Numerical Methods for Real Solutions of One Variable Nonlinear Equations*   **2nd Jun 2021**
  School of Liberal Studies, **Pandit Deendayal Energy University, India**

- ❑ <u>Conference Presentation</u> – *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, London, UK**

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

- ❑ **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