Martin Mathew

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SUMMARY

Computational Engineering graduate with an M.Sc. from Technische Universität Dresden and international research experience in **computational fluid dynamics, numerical modelling, scientific computing, and multiphysics simulation**. Experienced in developing, automating, validating, and analysing numerical models for complex engineering systems using **ANSYS Fluent, STAR-CCM+, OpenFOAM, ANSYS Rocky, ICEM CFD, Python, MATLAB, and Linux/HPC environments**.

Research experience spans **hydrodynamics, heat transfer, multiphase flow, particle simulation, turbulence, computational mechanics, and CFD–control integration**. At Fraunhofer IKTS, worked on coupled particle-packing and CFD simulations of fixed-bed reactor systems, including flow behaviour, heat transfer, and pressure-drop analysis. At Chalmers University of Technology, developed a coupled CFD–control framework for hydrofoil hydrodynamics using STAR-CCM+, Java, and MATLAB/Simulink.

Strong interest in **high-fidelity CFD, advanced numerical methods, multiphysics modelling, HPC, scientific machine learning, particle-based methods, and simulation-driven engineering**. Motivated by technically challenging problems where numerical modelling, automation, and rigorous validation can support better engineering decisions.

TECHNICAL SKILLS

- **CFD & Simulation Tools:** STAR-CCM+, ANSYS Fluent, ANSYS Rocky, ANSYS ICEM CFD, OpenFOAM
- **Methods:** RANS turbulence modelling, multiphase modelling, mesh sensitivity studies, transient simulation, simulation-test correlation and validation
- **Programming & Automation:** Python (simulation automation, post-processing), MATLAB/Simulink, Java
- **Post-Processing:** ParaView, CFD-Post, EnSight
- **Other:** LaTeX, closed-loop control integration (PID), HPC/Linux-based computational workflows
- **Languages:** English (C1), German (A2)
- **Core Strengths:** Cross-functional collaboration, structured analytical problem-solving, technical documentation and reporting, adaptability across multicultural teams
- **Research Practice:** Solver validation against reference/experimental data, reproducible workflow design, benchmark case development, technical documentation and reporting

PRACTICAL EXPERIENCE

Research Intern | University of Split, Croatia | Mar 2026 – Aug 2026

- Validated CFD solver accuracy across a set of 2D benchmark flow cases against analytical and reference datasets, establishing a reproducible validation baseline for extension to 3D.
- Investigated the influence of mesh resolution, time-stepping, and solver settings on solution quality to identify robust, reproducible simulation parameters.
- Built a validated 2D case framework designed for extension to 3D benchmark studies intended to run on HPC systems.
- Developed reproducible workflows for simulation setup and post-processing to support consistent results across studies.

Student Research Assistant | Fraunhofer IKTS, Dresden, Germany | May 2024 – Sep 2025

- Automated multi-case CFD workflows in Python, running batch parameter studies (e.g., pressure drop across a range of inlet velocities) from a single script to eliminate manual case setup and execution.
- Performed CFD studies on particle bed reactors using ANSYS Fluent, generating and refining high-quality meshes in ANSYS ICEM CFD supported by systematic mesh sensitivity studies.
- Collaborated with experimental teams to validate simulation results against lab-scale measurements, supporting simulation-to-physical-test correlation.

- Delivered automated data analysis and reporting tools used by internal stakeholders to accelerate results review.

M.Sc. Thesis Exchange Semester | Chalmers University of Technology, Sweden | Sep 2024 – Mar 2025

- Designed and built a coupled CFD-control simulation framework (STAR-CCM+, Java automation, MATLAB/Simulink) for hydrofoil hydrodynamics, engineered for reuse so future researchers could develop and test more sophisticated controllers.
- Implemented closed-loop PID control to regulate hydrodynamic objectives within the CFD environment.
- Integrated Java-based automation to couple control logic directly with the CFD solver, removing manual intervention between control and simulation steps.
- Pre-validated control strategies in MATLAB/Simulink across a range of operating conditions prior to CFD integration.

EDUCATION

M.Sc. Computational Engineering | TU Dresden, Germany | Oct 2022 – Sep 2025

GPA 2.2 (good). Built strong foundation in discretization techniques, numerical stability, and numerical accuracy relevant to industrial CAE workflows.

B.Tech. Mechanical Engineering | APJ Abdul Kalam Technological University, India | Aug 2016 – Oct 2020

8.41/10 (very good). Coursework: Mechanics of Solids, Mechanics of Fluids, Thermodynamics, Design of Machines, Automotive Engineering, Fluid Machinery.

AWARDS & SCHOLARSHIPS

- DAAD Scholarship (Erasmus+), Exchange Semester, Chalmers University, Gothenburg, Sweden — 2024
- DAAD Scholarship (Erasmus+), Exchange Traineeship, Žilina, Slovakia — 2025

INTERNATIONAL EXPERIENCE

Research and academic experience across **Germany, Sweden, Croatia, Slovakia, and India**, working in international and interdisciplinary environments involving academic research, industrial R&D, computational engineering, and experimental collaboration.

RESEARCH INTERESTS

- High-Fidelity CFD
- Turbulence Modelling
- Multiphase & Multicomponent Flows
- Marine & Offshore Hydrodynamics
- Particle Simulation & DEM
- Multiphysics Modelling
- Heat Transfer
- High-Performance Computing
- Data-Driven Modelling
- Simulation Automation

LANGUAGES

English: Fluent / C1 | **German:** A2 – Basic | **Malayalam:** Native

ADDITIONAL INFORMATION

- Currently based in Dresden, Germany
- Open to relocation
- Strong interest in long-term development in multiphysics simulation and engineering R&D
- Available for full-time employment