

Dr.-Ing. Tomislav Marić

Computational scientist / research leader / consultant

Verified agentic discovery and design for thermofluid systems

I combine open-source computational fluid dynamics, experiments, probabilistic machine learning, Bayesian optimization, and durable research software. Agent systems support method development and audit; explicit verification, validation, provenance, and human review determine whether computational evidence is accepted for engineering decisions.

23	6 + 2	5	687
peer-reviewed contributions	completed + ongoing doctorates as primary supervisor	industry-funded doctoral projects	citations, September 2026

Current appointments and affiliations

Athene Young Investigator

Oct 2020 - present | Mathematics and Mechanical Engineering, TU Darmstadt

Independent interdisciplinary research leadership spanning numerical methods, multiphase CFD, machine learning, research software, and industrial transfer.

Principal Investigator

Feb 2023 - present | Thermo-Fluids & Interfaces, Research Field Energy + Environment, TU Darmstadt

Research and supervision in interface-resolved simulation, microfluidics, data-assisted modelling, and optimization.

Member

Mar 2023 - present | Computational Engineering, TU Darmstadt

Interdisciplinary participation in computational engineering research and education.

Departmental Representative

Apr 2024 - present | Research Data Working Group, Department of Mathematics, TU Darmstadt

Representation and development of research-data and reproducibility practices.

Professional experience

Postdoctoral Researcher

Jul 2016 - Oct 2020 | Department of Mathematics, TU Darmstadt

Interface-resolving methods, geometric volume-of-fluid algorithms, research software, and doctoral supervision.

Co-founder, part-time

Apr 2014 - Nov 2017 | Sourceflux UG

Scientific software and engineering consultancy alongside academic research.

Doctoral Researcher

Apr 2011 - Jul 2016 | Department of Mathematics, TU Darmstadt

Research on unstructured geometrical volume-of-fluid methods for incompressible two-phase flows.

Education

Dr.-Ing. in Applied Mathematics, summa cum laude

Apr 2011 - Jul 2017 | TU Darmstadt

Dissertation on unstructured geometrical volume-of-fluid methods for incompressible two-phase flows.

M.Eng. Mechanical Engineering, grade 1.0

Oct 2008 - Nov 2010 | Technical University of Munich and University of Zagreb

Graduate study in mechanical engineering.

B.Eng. Mechanical Engineering, grade 1.35

Sep 2004 - Sep 2008 | University of Zagreb

Undergraduate study in mechanical engineering.

Awarded leadership and funding

Principal Investigator, SFB 1194 Z-INF

Jul 2024 - Jun 2025

Led the central research-data and research-software project in the final funding phase; contributed to successful B01 and B02 proposals.

Lead, NFDI4Ing Base Service S-2

Jul 2022 - Sep 2025

Led the research-software-development measure for sustainable engineering research software.

Industry-funded doctoral research

2017 - 2026

Primary academic supervision for five fully funded doctoral projects: four with Bosch and one with Rimac. The ongoing Rimac project is jointly supervised with the University of Manchester.

TU Darmstadt mobility grants

Awarded

Two competitively awarded mobility grants with total funding of EUR 8,670.

Supervision

Primary supervisor of six completed and two ongoing doctorates. Ten completed master's theses spanning data-driven CFD, Bayesian optimization, interface methods, physics-informed mesh deformation, impact, heat transfer, and annular flows. Five doctoral projects were fully funded by industry.

Selected teaching

Mathematics II for Electrical Engineering

Apr - Jul 2026

Lead lecturer responsible for course delivery and assessment.

Machine Learning in Fluid Mechanics

Apr - Jul 2025

Conceived, built, and organized with Dieter Bothe for 10 master's students; joined physical modelling, data, implementation, and engineering judgment.

LEIA Methods I and II

Apr 2021 - Apr 2022

Independent course on interface-resolving numerical methods and their verification.

Research software, data, and OpenFOAM-ML formats

2022 - 2026

Seminars and hackathons on version control, testing, metadata, HPC, CFD-machine-learning integration, research-data management, and reproducible computational workflows.

Academic and professional service

Guest Editor

May 2024 - present | European Physical Journal Special Topics

Co-chair, Software Engineering SIG

Sep 2023 - present | OpenFOAM Governance

Member, Multiphase Technical Committee

Jul 2022 - present | OpenFOAM Governance

Co-chair, Data-Driven Modelling SIG

Nov 2021 - present | OpenFOAM Governance

Co-organization of minisymposia and workshops at WCCM-ECCOMAS, ECCOMAS, GAMM, COUPLED, GACM, and OpenFOAM events.

Selected publications

2026 | A residual-based non-orthogonality correction for force-balanced unstructured volume-of-fluid methods.

J. Liu, T. Tolle, T. Marić

European Physical Journal Special Topics 235, 317-347. doi:10.1140/epjs/s11734-025-01758-x

2025 | Combining machine learning with computational fluid dynamics using OpenFOAM and SmartSim.

T. Marić, M. E. Fadel, A. Rigazzi, A. Shao, A. Weiner

Meccanica 60(6), 1831-1850. doi:10.1007/s11012-024-01797-z

2025 | Experimental and numerical study of microcavity filling regimes for Lab-on-a-Chip applications.

L. Nagel et al.

International Journal of Multiphase Flow 188, 105208. doi:10.1016/j.ijmultiphaseflow.2025.105208

2024 | Experimental study of dynamic wetting behavior through curved microchannels with automated image analysis.

H. Zhang et al.

Experiments in Fluids 65(6), 95. doi:10.1007/s00348-024-03828-7

2023 | An unstructured finite-volume level set/front tracking method for two-phase flows with large density-ratios.

J. Liu, T. Tolle, D. Bothe, T. Marić

Journal of Computational Physics 493, 112426. doi:10.1016/j.jcp.2023.112426

2021 | Iterative Volume-of-Fluid interface positioning in general polyhedrons with Consecutive Cubic Spline interpolation.

T. Marić

Journal of Computational Physics: X 11, 100093. doi:10.1016/j.jcp.2021.100093

2020 | Unstructured un-split geometrical Volume-of-Fluid methods - A review.

T. Marić, D. B. Kothe, D. Bothe

Journal of Computational Physics 420, 109695. doi:10.1016/j.jcp.2020.109695

Complete record: <https://tmaric.gitlab.io/publications/>

Selected research software

OpenFOAM-SmartSim

Online, in-memory CFD + ML coupling for parallel simulations.

github.com/OFDataCommittee/openfoam-smartsim

OpenFOAM ML Hackathon

Open exercises and infrastructure for realistic solver/ML integration.

github.com/OFDataCommittee/OFMLHackathon

DeboRheo

Unstructured geometric VOF methods for viscoelastic two-phase flows.

gitlab.com/deborheo/deborheorelease

TwoPhaseFlow research fork

Research fork of the framework originally developed by Henning Scheufler and Johan Roenby; used for method development and reference implementations.

github.com/tmaric/TwoPhaseFlow

Public profiles

ORCID: <https://orcid.org/0000-0001-8970-1185>

Google Scholar: <https://scholar.google.com/citations?user=2lm0PzAAAAAJ>

LinkedIn: <https://www.linkedin.com/in/marictomislav>

GitHub: <https://github.com/tmaric>

GitLab: <https://gitlab.com/tmaric>

Public version. Deliberately excludes private address, telephone number, birth data, signatures, application documents, and third-party reference contacts. Publication and citation metrics are dated September 2026.