

CURRICULUM VITAE

MGR. JAKUB CACH

PERSONAL DATA

Mathematical Institute
Faculty of Mathematics and Physics
Charles University
Sokolovská 83
Praha 8 – Karlín
185 75, Czech Republic

Work Email: cach@karlin.mff.cuni.cz
Personal Email: jakubcach@gmail.com
Gender: Male
Year of birth: 1999
Place of birth: Czech Republic
Nationality: Czech

EDUCATION

- 10/2023 – present PhD student of the study programme *Mathematical and computer modeling*
Charles University in Prague, Faculty of Mathematics and Physics
Topic of dissertation: *Effect of viscoelastic rheology on the flow behavior of polymeric and biological fluids*
Advisors: RNDr. Karel Tůma, Ph.D.; prof. RNDr. Josef Málek, CSc., DSc.
- 2021 – 2023 Graduate degree with honours, study programme *Mathematical and Computational Modelling in Physics*
Charles University in Prague, Faculty of Mathematics and Physics
Thesis: *Viscoelastic rate-type fluids: a study of the effect of stress diffusion by means of numerical simulations*
Supervisor: RNDr. Karel Tůma, Ph.D.
- 2018 – 2021 Undergraduate degree in the study programme *General Physics*
Charles University in Prague, Faculty of Mathematics and Physics
Thesis: *Numerical comparison of two mathematical formulations of viscoelastic Oldroyd-B model*
Supervisor: RNDr. Karel Tůma, Ph.D.

AWARDS

- 6/2024 SIAM Student Chapter Certificates of Recognition (Charles University & CTU in Prague)
- 5/2023 Winner of the 23rd SVOČ competition (student competition organized by Czech and Slovak mathematical societies)
Work: *Numerical investigation of non-Newtonian phenomena in viscoelastic rate-type fluid models: Weissenberg effect*
Category: *Applied mathematics – Mathematical modeling of dynamics*
Liberec, Czech Republic

SCIENTIFIC PROJECTS

- 9/2025 – 12/2025 Visiting PhD Student, University of Oxford, Prof. Patrick Farrell: *Research on efficient computational solvers for viscoelastic fluid models*
- 2/2025 – present Team member, OP JAK, project FerrMion, supported by the Ministry of Education, Youth and Sport of the Czech Republic
- 1/2024 – present Principal investigator, Grant No. 131124 at the Charles University Grant Agency: *Implicit Constitutive Models with State-Dependent Material Parameters — Modeling and Numerical Simulations*
- 11/2023 – 2/2025 Team member, ERC-CZ LL2105, supported by the Ministry of Education, Youth and Sport of the Czech Republic: *The interaction of fluids and solids*, principal investigator Sebastian Schwarzacher
- 11/2024 Visiting researcher at Texas A&M University: *Numerical aspects of R2R nanoimprinting lithography process*

2023 Team member, Czech Science Foundation 23-05207S: *Development of reliable computational tools adequate for the study of fluid-structure interactions, with special relevance to cardiovascular problems*, principal investigator Josef Málek

CONFERENCES

9/2025 *European Conference on Numerical Mathematics and Advanced Applications (ENUMATH), Heidelberg*
Short talk: *Flow around an obstacle: Various approaches to calculate pointwise traction*

5/2025 *EMS School Mathematical Modelling, Numerical Analysis and Scientific Computing, Kácov*
Short talk: *Flow around an obstacle: Various approaches to calculate pointwise traction*

9/2024 *Modelling, PDE analysis and computational mathematics in materials science, Prague*
Short talk: *Flow around an obstacle: Various approaches to calculate pointwise traction*

5/2024 *High Performance Computing in Science and Engineering, Czech Republic*
Poster: *Comparison of different approaches to calculating pointwise traction in flow*

RESPONSIBILITIES

6/2025 – present Secretary of SIAM Student Chapter of Prague (Charles University & CTU in Prague)

6/2023 – 6/2025 President of SIAM Student Chapter of Prague (Charles University & CTU in Prague)

PROGRAMMING SKILLS

Python, FEniCS, Firedrake, NumPy, SciPy, MATLAB, Wolfram Mathematica

EXPERIENCE

6/2022 – 9/2022 Junior CFD analyst at Ricardo Prague s.r.o.

LANGUAGE KNOWLEDGE

Czech – native, English – C1

Prague, 10 February 2025