

# CURRICULUM VITAE

MGR. JAKUB CACH

## PERSONAL DATA

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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

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- 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

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- 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

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- 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

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- 5/2024      *High Performance Computing in Science and Engineering*  
Poster: *Comparison of different approaches to calculating pointwise traction in flow*
- 9/2024      *Modelling, PDE analysis and computational mathematics in materials science*  
Short talk: *Flow around an obstacle: Various approaches to calculate pointwise traction*

## RESPONSIBILITIES

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

## PROGRAMMING SKILLS

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

## EXPERIENCE

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

## LANGUAGE KNOWLEDGE

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Czech – native, English – C1

Prague, 10 February 2025