

## Michal Bathory

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### Education

- 2020 PhD in *Mathematical and Computer Modelling*, Charles University  
advisor: M. Bulíček,  
thesis: *Analysis of unsteady flows of incompressible heat-conducting rate-type viscoelastic fluids with stress-diffusion*
- 2016 Master degree in *Mathematical Modelling in Physics and Technology*, Charles University  
advisor: B. Opic, thesis: *Conjugate function*
- 2014 Bachelor degree in *Mathematics*, Charles University in Prague  
advisor: B. Opic, thesis: *Conjugate Fourier series*

### Position

2024: Member of the M. Bulíček's Expro project (GAČR)

2022–2023: Postdoc at the University of Vienna on an own project (ÖAW APART-MINT)

2020–2021: Postdoc at the University of Vienna on a Ulisse Stefanelli's project (FWF)

### Net research experience

4 years before PhD and 3 years after PhD.

### Research interests

Partial differential equations, calculus of variations, fluid mechanics, non-Newtonian fluids.

Singular integral operators, Hardy-type inequalities, rearrangement invariant spaces.

### Academic publications

1. M. Bathory, M. Bulíček and J. Málek: [Coupling the Navier-Stokes-Fourier equations with the Johnson-Segalman stress-diffusive viscoelastic model: Global-in-time and large-data analysis](#), *Math. Models Methods Appl. Sci.*, **34** (2024), no. 3, 417–476.  
[DOI:10.1142/S0218202524500064](https://doi.org/10.1142/S0218202524500064)
2. M. Bathory and U. Stefanelli: [Variational resolution of outflow boundary conditions for incompressible Navier-Stokes](#), *Nonlinearity*, **35** (2022), 5553. [DOI:10.1088/1361-6544/ac8fd8](https://doi.org/10.1088/1361-6544/ac8fd8)

3. M. Bathory: [Sharp nonlinear estimates for multiplying derivatives of positive definite tensor fields](#), *Math. Inequal. Appl.* **25** (2022), no. 3, 751–769. DOI:10.7153/mia-2022-25-48
4. M. Bathory, M. Bulíček and J. Málek: [Large data existence theory for a three dimensional unsteady flow of rate-type viscoelastic fluids with stress diffusion](#), *Adv. Nonlinear Anal.*, **10**, 1 (2021), 501–521. DOI:10.1515/anona-2020-0144
5. M. Bathory, M. Bulíček and O. Souček: [Existence and qualitative theory for nonlinear elliptic systems with a nonlinear interface condition used in electrochemistry](#), *Z. Angew. Math. Phys.* **71**:74 (2020). DOI:10.1007/s00033-020-01293-w
6. M. Bathory: [Joint weak type interpolation on Lorentz-Karamata spaces](#), *Math. Inequal. Appl.*, **21**, 2 (2018), 385–419. DOI:10.7153/mia-2018-21-28
7. M. Bathory: [Outflow Boundary Condition Leading to Minimal Energy Dissipation for an Incompressible Flow](#), *WDS'17 Proceedings*, Prague, Matfyzpress, pp. 7–12, 2017. ISBN:978-80-7378-356-3

## 10 additional research achievements

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| 2022      | Promotional article <a href="#">Modelling and analysis of flows of viscoelastic fluids: Beyond the Navier–Stokes equations</a> DOI:10.32907/RO-132-3331282634            |
| 2021–2023 | Recipient of the <a href="#">ÖAW APART-MINT Fellowship</a> No. 11976, project <i>Mathematics of optimal outlet design</i> (p.i. M. Bathory)                              |
| 2020      | Talk during <i>Multiscale Models for Complex Fluids: Modeling and Analysis (Online)</i> , Banff, Canada  |
| 2020–2021 | Member of the FWF project, <i>Challenges for the WIDE principle</i> (p.i. U. Stefanelli)   |
| 2019      | Talk during <i>Progress in Mathematical Fluid Dynamics</i> , Cetraro, Italy  |
| 2019–2021 | Member of the project GA UK No. 1652119, <i>Analysis of mathematical model of incompressible viscoelastic rate-type fluid with stress-diffusion</i> , (p.i. M. Dostalík) |
| 2018      | Top 10 in the student paper competition during the <a href="#">AIMS 2018 conference in Taipei</a>  |
| 2017–2019 | Member of the project GA UK No. 584217, <i>Role of boundary conditions in the analysis of flow of homogeneous incompressible fluids</i> , (p.i. E. Maringová)            |
| 2017      | Poster at <i>SIAM Conference on Analysis of Partial Differential Equations</i> , Baltimore, USA  |
| 2016      | 1st place in <a href="#">Czech and Slovak students' competition SVOČ</a> in mathematical analysis  |