

# Florian Oschmann

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## Curriculum Vitae

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### Personal data

First name Florian  
Family name Oschmann  
Date of birth 19.03.1995  
Place of birth Friedrichroda, Germany  
Nationality German  
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### Recent employment

since 07/2022 **Postdoctoral fellow**, *Akademie Věd České Republiky, Praha*  
Department of Evolutionary Differential Equations; Head of group: Šárka Nečasová

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### Education

2018–2022 **Ph.D. in Mathematics**, *TU Dortmund, Dortmund*  
Title of PhD thesis: Homogenization of compressible fluids in perforated domains;  
Supervisor: Prof. Dr. Peter Bella, *Final grade: magna cum laude (very good)*

2017–2019 **B.Sc. in Physics**, *Universität Leipzig, Leipzig, Final grade: 1.6*

2013–2018 **Graduate Mathematician (Diplom-Mathematiker)**, *Universität Leipzig, Leipzig, Final grade: 1.2*  
Title of Diploma thesis: Über die Joukowski-Abbildung und ihre Anwendungen in der Aerostatik;  
Supervisor: Prof. Dr. Hans-Peter Gittel

2005–2013 **High School Diploma (Abitur)**, *Perthes-Gymnasium, Friedrichroda, Germany, Final grade: 1.1*

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### Employment history

2019–2022 **Ph.D. student**, *TU Dortmund, Dortmund*  
2018–2019 **Ph.D. student**, *Universität Leipzig, Leipzig*

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### Teaching Experience

Summer 2022 **Tutor of exercise classes for Bachelor students**, TU Dortmund  
Analysis II

Winter 2021/22 **Consultant in Masterseminar**, *Homogenization of compressible Navier–Stokes–Fourier equations*, TU Dortmund  
*Supervisor: Prof. Dr. Peter Bella*

- 2020–2022 **Tutor and organization of exercise classes for Analysis I-III**, TU Dortmund  
*Lecturer: Prof. Dr. Peter Bella*
- 2019–2020 **Tutor of exercise classes for Bachelor students**, TU Dortmund  
Analysis II (Summer 2020)  
Analysis I (Winter 2019/2020)
- 2016–2019 **Tutor of exercise classes for Diploma and Bachelor students**, Universität Leipzig  
Mathematik 4 für Physiker (english) (Summer 2019)  
Mathematik 3 für Physiker (english) (Winter 2018/2019)  
Gewöhnliche Differentialgleichungen LA Gymnasien (Summer 2018)  
Analysis für Lehramt Grund- und Oberschule (Winter 2017/2018)  
Mathematik für Wirtschaftswissenschaftler 2 (Summer 2017)  
Gewöhnliche Differentialgleichungen (Winter 2016/2017)

## Research activities

### Organizing committee

- 20.05.–25.08.2023 **ICIAM23**, Tokyo, Japan, co-organizer of Minisymposium “Limit behavior and asymptotic properties in fluid mechanics”, together with Thomas Eiter

### Participation in workshops and conferences

- 20.05.–25.08.2023 ICIAM23 (Tokyo, Japan; co-organizer of Minisymposium “Limit behavior and asymptotic properties in fluid mechanics”)
- 26.06.–30.06.2023 Shocking Developments: New Directions in Compressible and Incompressible Flows: A Conference in Honor of Alexis Vasseur’s 50th Birthday (Leipzig, Germany)
- 30.05.–02.06.2023 GAMM23 (Dresden, Germany)
- 18.10.–22.10.2022 Against the flow (Będlewo, Poland)
- 22.08.–26.08.2022 Mathematical Fluid Mechanics In 2022 (Praha, Czech republic)
- 11.07.–15.07.2022 Equadiff 15 (Brno, Czech republic)
- 23.08.–27.08.2021 Summer School “Fluids under Control” (Praha, Czech republic; online)
- 22.02.–26.02.2021 Winterschool on Analysis and Applied Mathematics (Münster, Germany; online)
- 15.02.–19.02.2021 Multi-scale Analysis: Thematic Lectures and Meeting (Bengaluru, India; online)
- 2020–present One World PDE Seminar (Bath, UK; online)
- 17.06.–21.06.2019 Progress in Mathematical Fluid Dynamics (Cetraro, Italy)
- 10.06.–14.06.2019 International Conference on Fluids and Variational Methods (Budapest, Hungary)
- 03.06.–06.06.2019 Material theories, statistical mechanics, and geometric analysis: A conference in honor of Stephan Luckhaus’ 66th birthday (Leipzig, Germany)

### Scientific talks

- August 2023  **$\Gamma$ -convergence for nearly incompressible fluids**, ICIAM23, Minisymposium “Limit behavior and asymptotic properties in fluid mechanics”, Tokyo
- 30.05.2023  **$\Gamma$ -convergence for nearly incompressible fluids**, GAMM23, Young Researcher’s Minisymposium “Emergent behaviour in systems of hydrodynamically interacting particles”, Dresden

- 02.05.2023 **Some insights in homogenization of compressible Navier-Stokes equations**, *Seminar on Partial Differential Equations*, Czech Academy of Sciences, Praha
- 24.04.2023 **Singular limits for stratified fluids**, Polish Academy of Sciences, Warszawa
- 13.03.2023 **Some insights in homogenization of compressible Navier-Stokes equations**, *Nečas Seminar on Continuum Mechanics*, Charles University, Praha
- 31.01.2023 **Stratified fluids: On pancakes and non-local temperatures**, University of Hradec Králové, Hradec Králové
- 18.01.2023 **Stratified fluids: On pancakes and non-local temperatures**, *Langenbach-Seminar*, WIAS Berlin, Berlin
- 09.11.2022 **An unexpected term for the Oberbeck–Boussinesq approximation**, *Séminaire EDP*, Université Paris Cité, Paris
- 19.10.2022 **Results on (no) collision of a falling solid in a compressible fluid**, *Against the flow*, Polish Academy of Sciences / Będlewo conference center, Będlewo
- 04.10.2022 **An unexpected term for the Oberbeck–Boussinesq approximation**, *Seminar on Partial Differential Equations*, Czech Academy of Sciences, Praha
- 25.08.2022 **Homogenization of compressible fluids in porous media**, *MFMI-IN 2022*, Czech Academy of Sciences, Praha
- 11.07.–15.07.2022 **Homogenization of compressible NSE in randomly punctured domains**, *Equadiff 15*, Masaryk university, Brno  
Poster
- 08.09.2021 **Inverse of divergence and homogenization of compressible Navier-Stokes equations in randomly perforated domains**, *Seminar on Partial Differential Equations*, Czech Academy of Sciences, Praha

## Research visits

- November 2023 **Polish Academy of Sciences, Warszawa**, collaboration with Aneta Wróblewska-Kamińska and Piotr Gwiazda
- 21.04.–28.04.2023 **Polish Academy of Sciences, Warszawa**, collaboration with Aneta Wróblewska-Kamińska
- 30.01.–03.02.2023 **University of Hradec Králové**, collaboration with Andrii Khrabustovskyi
- 16.01.–20.01.2023 **WIAS Berlin**, collaboration with Thomas Eiter
- 07.11.–11.11.2022 **IMJ-PRG, Université Paris Cité**, collaboration with Richard Höfer
- 06.09.–09.09.2021 **Czech Academy of Sciences, Praha**, collaboration with Peter Bella and Eduard Feireisl

## Publications and Preprints

### Research interests

partial differential equations, homogenization of Navier–Stokes and Navier–Stokes–Fourier equations, singular limits, fluid–structure interaction, collision problems

### Publications

- Inverse of Divergence and Homogenization of Compressible Navier–Stokes Equations in Randomly Perforated Domains (2023)**  
Peter Bella, Florian Oschmann; published in “Archive for Rational Mechanics and Analysis”;

<https://doi.org/10.1007/s00205-023-01847-y>

2. **Homogenization of compressible fluids in perforated domains (2022)**  
Florian Oschmann (PhD thesis) <http://dx.doi.org/10.17877/DE290R-22795>
3. **Homogenization and low Mach number limit of compressible Navier-Stokes equations in critically perforated domains (2022)**  
Peter Bella, Florian Oschmann; published in “Journal of Mathematical Fluid Mechanics”; <https://doi.org/10.1007/s00021-022-00707-1>
4. **Homogenization of the full compressible Navier-Stokes-Fourier system in randomly perforated domains (2022)**  
Florian Oschmann; published in “Journal of Mathematical Fluid Mechanics”; <https://doi.org/10.1007/s00021-022-00679-2>

### Preprints

1. **Homogenization of the unsteady compressible Navier-Stokes equations for adiabatic exponent  $\gamma > 3$  (2023)**  
Florian Oschmann, Milan Pokorný; submitted to “Journal of Differential Equations”; <https://arxiv.org/abs/2302.13789>
2. **On two Kuznetsov’s conjectures (2023)**  
Florian Oschmann; minor revisions in “Examples and Counterexamples”; <https://arxiv.org/abs/2209.11074>
3. **On the incompressible limit of a strongly stratified heat conducting fluid (2022)**  
Danica Basarić, Peter Bella, Eduard Feireisl, Florian Oschmann, and Edriss S. Titi; accepted in “Journal of Mathematical Fluid Mechanics”; [http://www.math.cas.cz/fichier/preprints/IM\\_20221220094335\\_32.pdf](http://www.math.cas.cz/fichier/preprints/IM_20221220094335_32.pdf)
4.  **$\Gamma$ -convergence for nearly incompressible fluids (2022)**  
Peter Bella, Eduard Feireisl, and Florian Oschmann; submitted to “Journal of Mathematical Physics”; [http://www.math.cas.cz/fichier/preprints/IM\\_20221213174627\\_54.pdf](http://www.math.cas.cz/fichier/preprints/IM_20221213174627_54.pdf)
5. **Homogenization of the two-dimensional evolutionary compressible Navier-Stokes equations (2022)**  
Šárka Nečasová and Florian Oschmann; submitted to “Calculus of Variations and Partial Differential Equations”; <https://arxiv.org/abs/2210.09070>
6. **Collision/No-collision results of a solid body with its container in a 3D compressible viscous fluid (2022)**  
Bumja Jin, Šárka Nečasová, Florian Oschmann, Arnab Roy; submitted to “Nonlinear Analysis”; <https://arxiv.org/abs/2210.04698>
7. **Rigorous derivation of the Oberbeck-Boussinesq approximation revealing unexpected term (2022)**  
Peter Bella, Eduard Feireisl, Florian Oschmann; submitted to “Communications in Mathematical Physics”; [http://www.math.cas.cz/fichier/preprints/IM\\_20220721120958\\_85.pdf](http://www.math.cas.cz/fichier/preprints/IM_20220721120958_85.pdf)

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### Languages

German native  
English fluently  
Czech intermediate

Prague, May 22, 2023