

# CURRICULUM VITÆ

## 03/05/2024

### PERSONAL INFORMATION

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NAME: **Anastasia Molchanova**  
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### RESEARCH INTERESTS

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My research interests are primarily concerned with Analysis — especially *Functional* and *Quasiconformal Analysis*, as well as with *Calculus of Variations* and its application in *Materials Science*. I am also interested in *Control Theory*, *sub-Riemannian Geometry*, and *PDEs*. Currently, I am carrying out my research at the interface between these fields and binding them up together.

### EDUCATION

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- 12/12/2016 **Ph.D.** (Candidate of Sciences), Sobolev Institute of Mathematics, Novosibirsk, Mathematical, Functional and Complex Analysis  
Thesis: *Mappings with Finite Distortion and their Applications in Nonlinear Elasticity* (Rus.), supervised by Prof. S. Vodopyanov
- 28/06/2013 **M.Sc.** (Honours), Novosibirsk State University, Novosibirsk, Mathematical Analysis. Thesis: *Solving of Variational Problems in Certain Classes of Mappings with Finite Distortion* (Rus.), supervised by Prof. S. Vodopyanov
- 29/06/2011 **B.Sc.** (Honours), Novosibirsk State University, Novosibirsk, Mathematical Analysis. Thesis: *Stokes Theorem and Poincaré Inequality for Differential Forms of Sobolev Type* (Rus.), supervised by Prof. S. Vodopyanov

### CURRENT POSITION

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- 05/2021–06/2024 **REWIRE Fellow** at the [Research Group on Applied Mathematics and Modeling](#), University of Vienna, Austria  
Project: *Injectivity, Regularity, and Extensibility of Deformations*
- 07/2024–06/2028 **Elise Richter Research Fellow** at the Faculty of Mathematics, University of Vienna, Austria  
PI of the project *Global and Local Behavior of Deformations*

### PREVIOUS WORK EXPERIENCE

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- 06/2019–04/2021 **Lise Meitner Research Fellow** at the [Research Group on Multiscale Calculus of Variations and PDEs](#), Faculty of Mathematics, University of Vienna & Institute of Analysis and Scientific Computing, TU Wien, Austria  
PI of the project: *Mappings of Finite Distortion for Nonlinear Solid Mechanics*
- 03/2019–06/2019 **Post-Doctoral Fellow** at the [Research Group on Applied Mathematics and Modeling](#), University of Vienna, Austria
- 02/2017–03/2019 **Research Fellow** at the [Geometric Control Theory Laboratory](#), Sobolev Institute of Mathematics, Novosibirsk, Russia
- 12/2017–03/2019 **Vice-director for Academic Affairs** at the [Regional Mathematical Center](#), Novosibirsk State University, Novosibirsk, Russia
- 02/2014–12/2018 **Teaching Assistant**, Novosibirsk State University, Russia
- 09/2013–12/2016 **Junior Research Fellow** at the [Geometric Control Theory Laboratory](#), Sobolev Institute of Mathematics, Novosibirsk, Russia

## TEACHING ACTIVITIES

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- 03/2022–06/2022 Lectures with integrated exercises on **Analysis for Computational Science**, University of Vienna, Austria
- 02/2021 Mini-course on **Introduction to  $\Gamma$ -convergence**, Novosibirsk State University
- 10/2021–01/2022 Tutorials on **Advanced Analysis and Differential Geometry**, University of Vienna, Austria
- 09/2021 Mini-course on **Variational capacity and how to use it**, First Conference of Young Applied Mathematicians in Leuca, Italy
- 10/2020–01/2021 Lectures on **Introduction to space quasiconformal mappings**, TU Wien
- 10/2019–01/2020 Lecture on **Quasiconformal Analysis** within the *Calculus of Variations Seminar* (Prof. U. Stefanelli), University of Vienna, Austria.
- 02/2018–05/2018 Mini-course on **Quasiconformal mappings in Nonlinear Elasticity** within the course *Introduction to Geometric Analysis* (Prof. S. Vodopyanov), Novosibirsk State University, Russia
- 11/2014 Committee member of the **Final examination** at the Department of Mathematics and Mechanics, Novosibirsk State University, Russia.
- 02/2013–12/2018 Practice classes on **Mathematical Analysis**. 4-semester course for bachelor students, Novosibirsk State University, Russia
- 09/2012–05/2013 Special course on **Mathematical Olympic problems** for middle school students, School-Lyceum No 130, Novosibirsk, Russia

## THESES SUPERVISION

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- 09/2023 Kerim El-Timimi, University of Vienna  
Bachelor's Thesis "Geometrical Interpretation of the Determinant"
- 02/2023 Sarvenaz Seyyedain, University of Vienna  
Master's Thesis "Variational Approach to Nonlinear Elasticity"
- 02/2022 Johanna Hackl, University of Vienna  
Bachelor's Thesis "Brower's Fixed Point Theorem"

## RESEARCH FUNDINGS

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- 2024–2028 **Elise Richter Grant**, FWF (Austrian Science Foundation), 404K€, 4 years  
*Global and Local Behavior of Deformations*, PI: A. Molchanova
- 2022 Grant for the organization of the **ESI (Erwin Schrödinger Institute) Workshop Between Regularity and Defects: Variational and Geometrical Methods in Materials Science**, February 20–24, 2023;  
organizers: Stefano Almi and Anastasia Molchanova, 16K€
- 2020–2023 **REWIRE Grant**, Marie Skłodowska-Curie Actions COFUND, European Commission, 266K€, 3 years  
*Injectivity, Regularity, and Extensibility of Deformations*,  
PI: A. Molchanova, Co-applicant: U. Stefanelli (University of Vienna)
- 2019–2021 **Lise Meitner Grant**, FWF (Austrian Science Foundation), 159K€, 2 years  
*Mappings of Finite Distortion for Nonlinear Solid Mechanics*,  
PI: A. Molchanova, Co-applicant: E. Davoli (TU Wien)

## INVITED CONFERENCE TALKS

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- 21–23/02/2024 [Variational Models in Materials Science](#), Naples, Italy
- 8/12/2023 [GeoCa 23](#), Czech Republic
- 22/11/2023 [Lavrentiev’s phenomenon, approximation, and regularity](#), Warsaw, Poland
- 8/12/2022 [GeoCa 22](#), Czech Republic
- 6/09/2022 [Nonuniformly elliptic problems](#), Warsaw, Poland
- 15/09/2021 [The First Conference of Young Applied Mathematicians](#) in Leuca, Italy
- 17/05/2021 [SIAM MS21. Conference on Mathematical Aspects of Materials Science](#)
- 18/03/2021 [1st Early Career Applied Mathematics Meeting](#), Vienna, Austria
- 4/12/2020 [GeoCa 20](#), Czech Republic

## AWARDS, PRIZES, AND HONOURS

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- 2023 [Elise Richter Grant](#), [Austrian Science Foundation \(FWF\)](#)
- 2020 [Marie Skłodowska-Curie Actions COFUND REWIRE Grant](#), [European Commission](#)
- 2019 [Lise Meitner Grant](#), [Austrian Science Foundation \(FWF\)](#)
- 2019 [Marie Skłodowska-Curie Actions Seal of Excellence](#), [European Commission](#)
- 2011–2013 [Special Scholarship of the Academic Council](#), Department of Mathematics and Mechanics, Novosibirsk State University
- 2012 [The Lyapunov Scholarship](#), Noncommercial Partnership Foundation of the Department of Mathematics and Mechanics, Novosibirsk State University
- 2012 [The Ladyzhenskaya Scholarship](#), Noncommercial Partnership Foundation of the Department of Mathematics and Mechanics, Novosibirsk State University
- 2008–2011 [Scholarship given for excellent study](#), Department of Mathematics and Mechanics, Novosibirsk State University
- 2008 [Top ten in First Year Students](#) of the Department of Mathematics and Mechanics, Novosibirsk State University (among 250 students)
- 2007 [Award of the president of the Republic of Sakha \(Yakutia\)](#), Russia
- 2007 [2<sup>nd</sup> place Diploma in the Stage III All-Russian Olympiad in Mathematics](#)
- 2006 [1<sup>st</sup> place Diploma in the Stage III All-Russian Olympiad in Mathematics](#)

## ORGANIZATION OF CONFERENCES AND WORKSHOPS

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- 20–24/02/2023 [Between Regularity and Defects: Variational and Geometrical Methods in Materials Science](#), ESI, Vienna, Austria
- 02/02/2022 [Second Austrian Day of Women in Mathematics](#), Austria
- 23/02/2021 [First Austrian Day of Women in Mathematics](#), Austria
- 22–28/09/2019 [International conference on Geometric Analysis](#) in honor of the 90th anniversary of academician Yu. G. Reshetnyak, Novosibirsk, Russia
- 27–29/06/2018 [Youth Workshop on Analysis](#), Novosibirsk, Russia
- 14–19/08/2017 [Mathematics in the Modern World](#), Novosibirsk, Russia
- 8–12/12/2016 [Geometric Analysis and Control Theory](#), Novosibirsk, Russia
- 6–17/07/2015 [Dynamical systems, Geometry and Control Theory](#), Baikal Lake, Russia
- 3–8/08/2014 [Geometric Control Theory and Analysis on Metric Structure](#), Baikal Lake, Russia
- 25–30/07/2014 [Geometric Control Theory and Analysis on Metric Structure](#), Teletskoe Lake, Gorno-Altai, Russia
- 16–27/12/2013 [Multi-subject Workshop of Geometric Control Theory](#) Laboratory of Sobolev Institute of Mathematics, Novosibirsk, Russia

## OTHER ACADEMIC ACTIVITIES

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- Reviewer* for Journal of Elasticity, Mathematische Annalen, Mathematische Nachrichten, Proceedings of the Royal Society A, Rendiconti Lincei. Matematica e Applicazioni, Studia Mathematica
- 2022–*current* Organization of the [Geometric Analysis Seminar in Vienna](#)
- 2021–*current* Member of the [REWIRE-Network](#)
- 2020–*current* Member of the *executive committee* of the [Austrian Association of Women in Mathematics \(A<sup>2</sup>WiM\)](#)
- 2019–*current* Outreach activity on Twitter as [@AnastasiaMolc](#)
- 2010–2019 *Manager* of seminars and invited lecture courses

## LINGUISTIC SKILLS

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English: Fluent  
German: Intermediate (B1)  
Russian: Mother Tongue

## LIST OF PUBLICATIONS

- M18. S. Almi, M. Kružík, and A. Molchanova. Linearization in Magnetoelasticity. *Preprint arXiv*, 2024. <https://arxiv.org/abs/2401.09586>
- M17. A. Doležalová, S. Hencl, and A. Molchanova. Weak limit of homeomorphisms in  $W^{1,n-1}$ : invertibility and lower semicontinuity of energy. *ESAIM: Control, Optimisation and Calculus of Variations*, **30** (2024), 37. <https://doi.org/10.1051/cocv/2024006>
- M16. A. Doležalová and A. Molchanova. Differentiability almost everywhere of weak limits of bi-Sobolev homeomorphisms. To appear in *Pure and Applied Functional Analysis*. <https://arxiv.org/abs/2302.07578>
- M15. S. Almi, S. Krömer, and A. Molchanova. A new example for the Lavrentiev phenomenon in Nonlinear Elasticity. *Zeitschrift für Angewandte Mathematik und Physik*, **75**, 2 (2024). <https://doi.org/10.1007/s00033-023-02132-4>
- M14. S. Vodopyanov and A. Molchanova. Boundary correspondence of  $\mathcal{Q}_{q,p}$ -homeomorphisms. *Izvestiya: Mathematics*, **87**:4 (2023), 683–725. <https://doi.org/10.4213/im9376e>
- M13. E. Davoli, A. Molchanova, and U. Stefanelli. Equilibria of charged hyperelastic solids. *SIAM J. Math. Anal.* **54**:2 (2022), 1470–1487. <https://doi.org/10.1137/21M1413286>
- M12. A. Molchanova, T. Roskovec, and F. Soudský. Regularity of the inverse mapping in Banach function spaces. *Math. Nachr.* **294**:12 (2021), 2382–2395. <https://doi.org/10.1002/mana.201900374>
- M11. A. Menovschikov, A. Molchanova, and L. Scarpa. An extended variational theory for nonlinear evolution equations via modular spaces. *SIAM J. Math. Anal.*, **53**:4 (2021), 4865–4907. <https://doi.org/10.1137/20M1385251>
- M10. P. Jain, A. Molchanova, M. Singh, and S. Vodopyanov. On grand Sobolev spaces and pointwise description of Banach function spaces. *Nonlinear Anal.*, 202 (2021), 112100. <https://doi.org/10.1016/j.na.2020.112100>
- M9. O. Bouchala, S. Hencl, and A. Molchanova. Injectivity almost everywhere for weak limits of Sobolev homeomorphisms. *J. Funct. Anal.* **279**:7 (2020), 108658. <https://doi.org/10.1016/j.jfa.2020.108658>
- M8. A. O. Molchanova and S. K. Vodopyanov. Injectivity almost everywhere and mappings with finite distortion in nonlinear elasticity. *Calc. Var. Partial Differential Equations* **59**, 17 (2020). <https://doi.org/10.1007/s00526-019-1671-4>
- M7. L. Kleprlík, A. Molchanova, and T. Roskovec. Example of a smooth homeomorphism violating the Lusin  $\mathcal{N}^{-1}$  condition. *Sib. Math. J.* **60**:5 (2019), 886–895. <https://doi.org/10.1134/S0037446619050100>
- M6. A. Molchanova. A note on continuity of minors in grand Lebesgue spaces. *J. Fixed Point Theory Appl.* **21**, 49 (2019). <https://doi.org/10.1007/s11784-019-0686-y>
- M5. F. Soudský, A. Molchanova, and T. Roskovec. Interpolation between Hölder and Lebesgue spaces. *J. Math. Anal. Appl.* **466**:1 (2018), 160–168. <https://doi.org/10.1016/j.jmaa.2018.05.067>
- M4. A. O. Molchanova. A variational approximation scheme for the elastodynamic problems in the new class of admissible mappings. *Sib. J. Pure and Appl. Math.* **16**:3 (2016), 55–60 (Rus). <https://doi.org/10.17377/PAM.2016.16.305>
- M3. S. K. Vodopyanov and A. O. Molchanova. Lower semicontinuity of mappings with bounded  $(\theta, 1)$ -weighted  $(p, q)$ -distortion. *Sib. Math. J.* **57**:5 (2016), 778–787. <https://doi.org/10.1134/S0037446616050062>
- M2. S. K. Vodopyanov and A. O. Molchanova. Variational problems of nonlinear elasticity in certain classes of mappings with finite distortion. *Dokl. Math.* **92**:3 (2015), 739–742. <https://doi.org/10.1134/S1064562415060320>

M1. S. K. Vodop'yanov and A. O. Molchanova. [Stokes' theorem for differential forms of an arbitrary summability](#). *Bulletin of Kemerovo State University*, 2011, **3**:1, 239–243 (Rus).

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- A. O. Molchanova. Mappings with finite distortion and their applications in elasticity theory. *PhD Thesis* Novosibirsk, 2016 (Rus.)
- A. O. Molchanova. Solution of variational problems in certain classes of mappings with finite distortion. *Master Thesis* Novosibirsk, 2013 (Rus.)
- A. O. Molchanova. The Stokes theorem and the Poincare inequality for Sobolev-type differential forms. *Bachelor Thesis* Novosibirsk, 2011 (Rus.)