Faculty of Mathematics
University of Vienna
Oskar-Morgenstern-Platz 1
1090 Vienna
ORCID:0000-0001-5682-5149
☎ +43 1 4277 50712
✉ wojciech.gorny@univie.ac.at
www.mat.univie.ac.at/~wgorny/

Wojciech Górny

Curriculum Vitæ

Education

2024 **Habilitation**, *University of Vienna*, Austria.

2020 **Ph.D**, *University of Warsaw*, Poland, Graduated with distinction.

2016 **Mag.Sc.**, *University of Warsaw*, Poland, Graduated with distinction.

Employment

2022-now **Senior postdoc**, *University of Vienna*, Faculty of Mathematics.

2020-2022 **Postdoc/University assistant**, *University of Vienna*, Faculty of Mathematics.

2020-2022 **University assistant (unpaid leave)**, *University of Warsaw*, Faculty of Mathematics, Informatics and Mechanics.

Research interests

Main research fields: Calculus of Variations, Partial Differential Equations, Geometric Measure Theory, Optimal Transport, Analysis in Metric Spaces.

Keywords: Nonlinear and singular PDEs, 1-Laplacian, Least gradient problem, Gradient flows, Minimal surfaces, Anisotropy, Γ-convergence, Relaxation, Functionals with linear growth, Conductivity imaging, Random walk spaces, Optimal design, Crystallisation, Discretisation.

5 Most Important Publications

Link to all published publications: https://www.mat.univie.ac.at/~wgorny/listofpublications.pdf

1. W. Górny, P. Rybka, A. Sabra, *Special cases of the planar least gradient problem*, Nonlinear Anal. **151** (2017), pp. 66-95, doi.org/10.1016/j.na.2016.11.020.
2. W. Górny, *Planar least gradient problem: existence, regularity and anisotropic case*, Calc. Var. Partial Differential Equations **57** (4) (2018), Art. 98, doi.org/10.1007/s00526-018-1378-y.
3. W. Górny, *Bourgain-Brezis-Mironescu approach in metric spaces with Euclidean tangents*, J. Geom. Anal. **32** (4) (2022), Art. 128, doi.org/10.1007/s12220-021-00861-4.
4. W. Górny, J.M. Mazón, *On the p-Laplacian evolution equation in metric measure spaces*, J. Funct. Anal. **283** (2022), 109621, doi.org/10.1016/j.jfa.2022.109621.
5. W. Górny and J.M. Mazón, Functions of Least Gradient, Monographs in Mathematics, vol. 110, Birkhäuser, 2024, ISBN 978-3-031-51880-5, doi.org/10.1007/978-3-031-51881-2.

Received grants and awards

1. Kazimierz Kuratowski award, 2021.
2. Polish Mathematical Society award for young mathematicians, 2020.
3. Principal investigator in the grant ESP 88 ESPRIT-Programm funded by the Austrian Science Fund, title: "Inhomogeneous-growth problems including a linear-growth term", 2022-2025.
4. Principal investigator in the grant 2017/27/N/ST1/02418 (PRELUDIUM) funded by the National Science Centre, Poland, title: "Anisotropic least gradient problem", 2018-2022.
5. Distinction in the Juliusz Schauder Prize for young mathematicians, 2022.
6. Distinction in the International Stefan Banach Prize, 2021.
7. 2nd distinction in the Juliusz Schauder Prize for young mathematicians, 2020.
8. 1st place in the competition "Krok w przyszłość" (best student work in mathematics, organised by the mBank Foundation), 2016.

Invited talks

1. *Characterisation of weak solutions to gradient flows of general linear growth functionals* at "Degenerate and Singular PDEs", Vienna, 24-28 February 2025.
2. *Evolution equations on two overlapping random walk structures* at "Recent Progress in PDEs", Rome, 20-21 February 2025.
3. *Optimal transport techniques in geometric problems* at the "VIII Symposium on Nonlinear Analysis", Toruń, 17-21 June 2024.
4. *Weak solutions to gradient flows in metric measure spaces* at "Nonlinear Partial Differential Equations 2023", conference on the occasion of J.M.Mazón's 70th birthday, València, 24-26 October 2023.
5. *Duality methods for gradient flows of linear growth functionals* at the "10th International Congress on Industrial and Applied Mathematics" (ICIAM 2023), minisymposium "Frontiers of gradient flows: well-posedness, asymptotics, singular limits", Tokyo, 20-25 August 2023.
6. *Geometric aspects of the planar least gradient problem* at "International Banach Prize Mini-Conference", Banach Center, Warsaw, 18-19 May 2023.
7. *A new notion of solutions to gradient flows in metric measure spaces* at "Nonuniformly elliptic problems", Banach Center, Warsaw, 5-9 September 2022.
8. *Weak solutions to gradient flows in metric measure spaces* at the "92nd Annual Meeting of the International Association of Applied Mathematics and Mechanics" (GAMM Annual Meeting 2022), minisymposium "Evolution equations with gradient flow structure", Aachen, 15-19 August 2022.
9. *Weak solutions to the total variation flow in metric measure spaces* at the "XXVII Congress of differential equations and applications / XVI Congress of applied mathematics" (XXVII CEDYA/XVII CMA), minisymposium "New trends on the 1-Laplacian", Zaragoza, 18-22 July 2022.
10. *Zagadnienie najmniejszego gradientu* at the "Polish Mathematical Society Mini-Conference", Banach Center, Warsaw, 2-3 June 2022.

11. *Geometric aspects of the* 1*-Laplacian* at the "XII Forum of Partial Differential Equations", Banach Center, Będlewo, 19-25 September 2021.
12. *Least gradient problem and minimal surfaces* at the "Juliusz Schauder Medal Awarding Ceremony", Toruń (online), 18 June 2021.
13. *Optimal transport methods in the least gradient problem* at the "Nonlocal diffusion problems, nonlocal interface evolution", Banach Center, Warsaw (online), 1-3 October 2020.
14. *The least gradient problem with respect to a non-smooth or non-strictly convex norm* at the "9th International Congress on Industrial and Applied Mathematics" (ICIAM 2019), minisymposium "A broad view of the least gradient problems", València, 15-19 July 2019.
15. *Hölder regularity of anisotropic least gradient functions* at "Variational Problems in Optical Engineering and Free Material Design", Banach Center, Warsaw, 7-9 June 2018.
16. *The issue of uniqueness of solutions in isotropic and anisotropic least gradient problem* at "Anisotropy 2017", Banach Center, Warsaw, 23-25 February 2017.

Other conference presentations

1. *A double-bubble problem for the* ℓ_1 *anisotropy*, talk at the "3rd Austrian Calculus of Variations Day", Vienna, 23-24 November 2023.
2. *1-Laplacian on metric random walk spaces*, poster at "Winterschool on Analysis and Applied Mathematics", Münster (online), 22-26 February 2021.
3. *Least gradient problem on unbounded domains*, poster at "VII School of Analysis in memory of A. Pełczyński", Banach Center, Będlewo, 28-31 March 2019.
4. *Existence and regularity of minimizers in the anisotropic least gradient problem*, poster at "Joint Meeting of UMI-SIMAI-PTM", Wrocław, 17-20 September 2018.
5. *(Non)uniqueness of minimizers in least gradient problem*, poster at "Emerging issues in nonlinear elliptic equations: singularities, singular perturbations and non local problems", Banach Center, Będlewo, 18-24 June 2017.

Invited seminar presentations

At Universität Wien, Faculty of Mathematics:

1. *A formula relating the* L^p*- and weak* L^p*-norms* at the Calculus of Variations seminar, on 13 May 2024.
2. *Gradient flows of functionals with linear growth* at the PDE Afternoon, on 1 March 2023.
3. *A discrete double-bubble problem on* $\mathbb{Z}^2$ at the Calculus of Variations seminar, on 24 March 2022.
4. *Linear structures and gradient flows in metric spaces* at the Calculus of Variations seminar, on 31 May 2021.
5. *Geometric aspects of the least gradient problem* at the PDE Afternoon, on 3 March 2021.
6. *The least gradient problem* at the Calculus of Variations seminar, on 15 January 2020.

At MIMUW, seminar of the Mathematical Physics Equations Group:

7. *Structure of solutions to the least gradient problem*, on 23 January 2020.

8. *Least gradient problem on unbounded domains*, on 21 March 2019.
9. *(Non)uniqueness of minimizers in the least gradient problem*, on 12 October 2017.
10. *Existence of solutions in the least gradient problem*, on 24 November 2016.

Other locations:

11. *Random walk spaces and their applications to nonlocal PDEs* at TU Wien, Department of Mathematics, on 14 January 2025.
12. *A discrete version of the double-bubble problem* at the Universitat de València, Department of Mathematical Analysis, on 25 May 2022.
13. *Least gradient problem in 2D and optimal transport* at the Łódź University of Technology, Institute of Mathematics, on 16 November 2021 (online).
14. *A discrete double bubble problem on the square lattice* at the WEMM Seminar, Wien-Erlangen-München-Münster, on 9 November 2021 (online).
15. *Planar least gradient problem* at the American University of Beirut, Department of Mathematics, on 26 October 2021 (online).
16. *Least gradient problem for discontinuous boundary data* at the Universitat de València, Department of Mathematical Analysis, on 10 April 2019.

Research visits

1. 1-week research visit at Universitat de València (Departamento de Análisis Matemático), 18-27 May 2022, cooperation with prof. José M. Mazón.
2. 4-week research visit at Scuola Normale Superiore di Pisa, 25 January - 22 February 2020, under the supervision of prof. Luigi Ambrosio.
3. 5-week research visit at Universitat de València (Departamento de Análisis Matemático), 8 April - 10 May 2019, cooperation with prof. José M. Mazón.

Participation in research projects

1. Project participant in the OeAD-WTZ international joint project CZ 01/2021 (Austrian part: I5149), title: "Scales and Shapes in Continuum Thermomechanics", 2021-2025.
2. Project participant in the DFG-FWF international joint project FR 4083/3-1/I4354 (Austrian part: I4354), title: "Variational Modeling of Molecular Geometries", 2020-2022.
3. Project participant in the grant SFB 65 (project part 11) funded by the Austrian Science Fund, title: "Taming complexity in partial differential equations", 2020.

Teaching experience

1. A lecture mini-course "Functions of bounded variation and their applications" at the Vienna School of Mathematics (doctoral school), during the academic year 2023/24.
2. Exercises to lectures at the University of Vienna: in Partial Differential Equations, during the academic year 2021/22; in the course Introduction to Mathematics (2023/24).

3. Exercises to lectures at the University of Warsaw: in Measure Theory, during the academic years 2016/17 and 2017/18; in Ordinary Differential Equations (2017/18); in Analysis I (2018/19).
4. Classes in classical geometry in the XIV Secondary School in Warsaw (2017).
5. Several mini-courses for the Polish Children's Fund: in classical geometry, in projective geometry and in finite group theory (2012-2014).

Supervision experience

1. Bachelor thesis: Hans Peter Koch, University of Vienna (2025).
2. Bachelor thesis: Eduard Blezinger, University of Vienna (2025).

Organisational experience

1. Member of the organising comittee of the conference "Variational Problems in Optical Engineering and Free Material Design", Banach Center, Warsaw, 6-9 June 2018.
2. Member of the organising comittee of the conference "Pushing Frontiers of Analysis and PDE's, the Legacy of Marek Burnat", MIMUW, Warsaw, 6-7 May 2016.
3. Participation in the organisation of various science camps for the Polish Children's Fund (2011-2014).
4. Participation in the organisation of the Polish Mathematical Olympiad (2016, 2018).

Review activity

1. Journal articles: Calc. Var. PDE; J. Eur. Math. Soc.; J. Funct. Anal.; J. Differ. Geom.; J. Differ. Equ.; Nonlinear Anal.; Ann. Sc. Norm. Super. Pisa, Cl. Sci.; Commun. Anal. Geom.; J. Geom. Anal.; Adv. Math.; Ann. Mat. Pura Appl.; J. Math. Anal. Appl.; Open Math.; Appl. Math. Optim.; Opuscula Math.; Discrete Comput. Geom.
2. Book proposals: World Scientific Publishing.
3. Paweł Domański Competition for Students' Works in Mathematics.
4. zbMATH; MathRev.

Spoken languages

English (CPE certificate), French (communicative), German (communicative).

Education (full)

2024 **Habilitation**, *University of Vienna*, Austria. Thesis: *Geometric problems involving minimisation of total variation*. Reviewers: prof. Giovanni Bellettini (Università degli Studi di Siena), prof. Peter Sternberg (Indiana University), and prof. Elvira Zappale (Sapienza Università di Roma).

2016-2020 **PhD in mathematics**, *University of Warsaw*, Poland, Graduated with distinction. Thesis: *Anisotropic least gradient problems*. Supervisor: prof. dr hab. Piotr Rybka. Reviewers: prof. Salvador Moll (University of València), review, and prof. Matteo Novaga (University of Pisa), review.

2014-2016 **Master of mathematics**, *University of Warsaw*, Poland, Graduated with distinction. Thesis: *Least gradient problems*. Supervisor: prof. dr hab. Piotr Rybka.

2011-2015 **Bachelor of physics**, *University of Warsaw*, Poland, Thesis: *Application of Dirac structures: RLC circuits as an example of a system with nonholonomic constraints*. Supervisor: dr hab. Katarzyna Grabowska.

2011-2014 **Bachelor of mathematics**, *University of Warsaw*, Poland, Thesis: *Classification of meromorphic linear differential equations. Stokes phenomenon*. Supervisor: dr hab. Marcin Bobieński.