

Paweł Strzelecki

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Born: June 19, 1963—Warsaw, Poland
Nationality: Polish. Married since 1989, two sons.



Current position

Full Professor, Institute of Mathematics, University of Warsaw

Research Interests

Nonlinear PDE, Calculus of Variations, Geometric Analysis.

Employment

2015– Full Professor, Institute of Mathematics, University of Warsaw
2006–2015 Associate Professor, Institute of Mathematics, University of Warsaw
2002–2003 Humboldt Fellow, Mathematisches Institut der Universität Bonn; 12 months
1999–2001 Humboldt Fellow, Mathematisches Institut der Universität Bonn; 22 months
1994–2006 Assistant Professor, Institute of Mathematics, University of Warsaw
1994 Research Fellow, Laboratoire d'Analyse Numérique, Paris VI; 3 months
1987–1993 Teaching Assistant, Institute of Mathematics, University of Warsaw

Education

2011 Title of Professor (awarded by the President of Poland)
2005 Habilitation in Mathematics (with a honorary distinction), University of Warsaw
1993 PhD in Mathematics, Univeristy of Warsaw (thesis advisor: Bogdan Bojarski)
1987 MSc in Mathematics, Univeristy of Warsaw (thesis advisor: Bogdan Bojarski)

Awards

2015 Samuel Dickstein Award of the Polish Mathematical Society
for achievements for the benefit of mathematical culture
2004 Kuryłowicz Prize for the best Polish translation of scientific literature
2003 Hugo Steinhaus honorary distinction for popularizing mathematics in the media
1999 Alexander von Humboldt Research Fellowship, extended in 2000 and in 2002.

Service to the profession: major administrative activities

2016–2024	Dean, Faculty of Mathematics, Informatics and Mechanics, University of Warsaw
2012–2016	Vice-Dean (research affairs) Faculty of Mathematics, Informatics and Mechanics, University of Warsaw
2011–2012	Member of the Board of the Polish Mathematical Society
2009–2012	Member of the Jury of the Sierpiński medal
2008–2011	Member of the Senate Committee for student and teaching affairs, University of Warsaw
2005–2008	Vice-Dean (student and teaching affairs) Faculty of Mathematics, Informatics and Mechanics, University of Warsaw
2003–2005	Vice-Director (teaching affairs) Institute of Mathematics, University of Warsaw

Research stays outside Poland

- Paris VI, spring semester of 1994;
- CMLA, ENS de Cachan, September 1997 and September 1998;
- Bonn, three academic years, 1999-2000, 2000-2001 and 2002-2003;
- ETH Zurich, 3 weeks in January 2004;
- Centro de Giorgi, SNS Pisa, 2 weeks in November 2003 and 4 weeks in February–March 2009;
- RTWH Aachen, 4 weeks in June 2009 and 6 weeks in October-November 2009;
- Kavli Institute for Theoretical Physics, UCSB, 4 weeks in June–July 2012.

Numerous shorter stays in Finland, France, Germany, Italy, Spain, Switzerland, UK, USA, ...

Grants

1. Polish Ministry of Science and National Science Centre

Project Director or Principal Investigator:

2017–2020	Grant no. 2016/21/B/ST1/03138, <i>Selected topics on the borderline of nonlinear PDEs and geometric measure theory.</i>
2014–2017	Grant no. 2013/10/M/ST1/00416, <i>Curvature energies for non-smooth subsets of Euclidean spaces</i> , for German–Polish Cooperation, co-directed with Heiko von der Mosel.
2013–2016	Grant no. 2012/07/B/ST1/03366, <i>Systems of nonlinear elliptic equations: regularity of solutions, structure of singularities and related topics.</i>
2009–2012	Grant no. N N201 397737, <i>Nonlinear PDEs: geometric and variational problems.</i>
2011–2012	Grant no. N N201 611140, <i>Integral Menger curvature for surfaces of arbitrary codimension.</i> (Doctoral grant for Sławomir Kolasiński).
2005–2008	Grant no. PO3A-005-29, <i>Nonlinear geometric and variational problems.</i>
2001–2004	Grant no. PO3A-028-22, <i>Analysis on metric spaces and its applications to nonlinear elliptic equations, probability and calculus of variations.</i>

Team Member:

1998–2001	Grant no. PO3A-055-14, <i>Sobolev spaces, nonlinear PDE and calculus of variations: analytic methods in geometric problems.</i> (Project director: Bogdan Bojarski).
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- 1995–1997 Grant no. PO3A–034–08, Sobolev spaces: theory, applications in partial differential equations and numerical simulations. (Project director: Bogdan Bojarski).
- 1991–1994 Grant no. PO3A–034–08, Analytical and geometrical methods for Sobolev mappings and their applications. (Project director: Bogdan Bojarski).

2. International grants

- 2008–2011 Polish–German joint research project *Geometric curvature energies*, financed by MNiSzW and DFG, co-directed with Heiko von der Mosel.
- 1997–1998 French–Polish joint research project Polonium 97204, co-directed with Frédéric Hélein.

Publications

Published articles

- 2023 M. Miśkiewicz, B. Petraszczuk, P. Strzelecki. *Regularity for solutions of H -systems and n -harmonic maps with $n/2$ square integrable derivatives*. *Nonlinear Analysis TMA*, **232** (2023), Paper No. 113289, 22 pp.
- 2018b P. Strzelecki, H. von der Mosel. *Geometric curvature energies: facts, trends, and open problems*. In: *New Directions in Geometric and Applied Knot Theory*. Editors: S. Blatt, Ph. Reiter, A. Schikorra. Chapter 2, pages 8–35. Walter de Gruyter, 2018.
- 2018a S. Kolasiński, P. Strzelecki, H. von der Mosel. *Compactness and isotopy finiteness for submanifolds with uniformly bounded geometric curvature energies*. *Communications in Analysis and Geometry* **26** (2018), 1251–1316.
- 2017b K. Mazowiecka, P. Strzelecki, *The Lavrentiev gap phenomenon for harmonic maps into spheres holds on a dense set of zero degree boundary data*. *Advances in Calculus of Variations* **10** (2017), 303–314.
- 2017a A. Schikorra, P. Strzelecki. *Invitation to H -systems in higher dimensions: known results, new facts, and related open problems*. *EMS Surveys in Mathematical Sciences*, **4** (2017), no. 1, 21–42.
- 2016a K. Kazaniecki, M. Łasica, K. Mazowiecka, P. Strzelecki. *A conditional regularity result for p -harmonic flows*. *Nonlinear Differential Equations and Applications (NoDEA)*, **23** (2016), no. 2, art. 9, 13 pp.
- 2014 P. Strzelecki, H. von der Mosel. *How averaged Menger curvatures control regularity and topology of curves and surfaces*. *Journal of Physics: Conference Series*, **544** (2014), 12 pages.
- 2013e P. Strzelecki, H. von der Mosel. *Menger curvature as a knot energy*. *Physics Reports*, **530**, no. 3, (2013), 257–290.
- 2013d P. Strzelecki, M. Szumańska, H. von der Mosel. *On some knot energies involving Menger curvature*. *Topology and its Applications*, **160** (2013), 1507–1529.
- 2013c P. Strzelecki, H. von der Mosel. *Tangent-point repulsive potentials for a class of non-smooth m -dimensional sets in \mathbf{R}^n . Part I: Smoothing and self-avoidance effects*. *Journal of Geometric Analysis*, **23** (2013), 1085–1139.
- 2013b S. Kolasiński, P. Strzelecki, H. von der Mosel. *Characterizing $W^{2,p}$ submanifolds by p -integrability of global curvatures*. *Geometric and Functional Analysis*, **23** (2013), 937–984.
- 2013a P. Goldstein, P. Strzelecki, A. Zatorska-Goldstein. *Weak compactness of solutions for fourth order elliptic systems with critical growth*. *Studia Mathematica*, **214** (2013), 137–156.
- 2012 P. Strzelecki, H. von der Mosel. *Tangent-point self-avoidance energies for curves*. *J. Knot Theory Ramifications* **21**, no. 5 (2012).

- 2011 P. Strzelecki, H. von der Mosel. *Integral Menger curvature for surfaces*. Advances in Mathematics **226** (2011), 2233–2304.
- 2010 P. Strzelecki, M. Szumańska, H. von der Mosel. *Regularizing and self-avoidance effects of integral Menger curvature*. Annali della Scuola Normale Superiore di Pisa **9**, no. 1 (2010), 145–187.
- 2009b P. Goldstein, P. Strzelecki, A. Zatorska-Goldstein. *On polyharmonic maps into spheres in the critical dimension*. Annales de l’IHP, Analyse Non-Linéaire **26** (2009), 1387–1405.
- 2009a P. Strzelecki, M. Szumańska, H. von der Mosel. *A geometric curvature double integral of Menger type for space curves*. Annales Acad. Sci. Fenn. **34** (2009), 195–214.
- 2008b P. Hajłasz, P. Strzelecki, X. Zhong, *A new approach to interior regularity of elliptic systems with quadratic Jacobian structure in dimension two*, Manuscripta Math. **127** (2008), 121–135.
- 2008a P. Strzelecki, A. Zatorska-Goldstein. *On a nonlinear fourth order elliptic system with critical growth in first order derivatives*, Advances in Calc. Var **1** (2008), 205–222.
- 2007 P. Strzelecki, H. von der Mosel. *On rectifiable curves with L^p -bounds on global curvature: Self-avoidance, regularity, and minimizing knots*. Math. Z. **257** (2007), 107–130.
- 2006b P. Strzelecki, H. von der Mosel. *Global curvature for surfaces and area minimization under a thickness constraint*, Calculus of Variations and PDE **25** (2006), 431–467.
- 2006a P. Strzelecki. *Gagliardo–Nirenberg inequalities with a BMO term*, Bull. London Math. Soc. **38** (2006), 294–300.
- 2005d P. Strzelecki, H. von der Mosel. *On a mathematical model for thick surfaces*. Chapter 27 in: *Physical and Numerical Models in Knot Theory and their Application to the Life Sciences*, vol. 36, Series “Knots and Everything”, World Scientific Publishing, 2005.
- 2005c B. Bojarski, P. Hajłasz, P. Strzelecki. *On Sard’s theorem for mappings in Hölder and Sobolev classes*, Manuscripta Math. **118** (2005), 383–397.
- 2005b T. Rivière, P. Strzelecki. *A sharp non-linear Gagliardo–Nirenberg estimate and applications to regularity of nonlinear elliptic systems*, Communications in PDE **30** (2005), 589–604.
- 2005a P. Hajłasz, P. Strzelecki. *How to measure volume with a thread*. Amer. Math. Monthly, **112** (2005), 176–179
- 2004 P. Strzelecki, A. Zatorska-Goldstein. *A compactness theorem for higher dimensional H-systems*, Duke Math. Journal **121** (2004), 269–284.
- 2003c P. Strzelecki. *On regularity of generalized sphere-valued p -harmonic maps with small mean oscillations*, Manuscripta Math. **112** (2003), 473–487.
- 2003b P. Strzelecki. *On biharmonic maps and their generalizations*, Calculus of Variations and PDE **18** (2003), 401–432.
- 2003a P. Strzelecki. *A new proof of regularity of weak solutions of the H-surface equation*, Calculus of Variations and PDE **16** (2003), 227–242.
- 2002 B. Bojarski, P. Hajłasz, P. Strzelecki. *Improved approximation of higher order Sobolev functions in norm and capacity*, Indiana Univ. Math. Journal **51** (2002), 507–540.
- 2001 P. Strzelecki. *Hardy space estimates for higher order differential operators*. Indiana Univ. Math. Journal **50** (2001), 1447–1461.
- 1998 P. Hajłasz, P. Strzelecki. *Subelliptic p -harmonic maps into spheres and the ghost of Hardy spaces*, Mathematische Annalen **312** (1998), 341–362.
- 1996c P. Strzelecki. *Stationary p -harmonic maps into spheres*, in: *Singularities and Differential Equations*, Banach Center Publications vol. **33**, 383–393, Warszawa 1996.

- 1996b P. Strzelecki. *Asymptotics for a minimization of a Ginzburg–Landau energy in n dimensions*, Colloquium Math. **70** (1996), 271–289.
- 1996a P. Strzelecki. *Quasilinear elliptic systems of Ginzburg–Landau type*, in: *Free boundary problems and applications. Proceedings of 1995 Zakopane Congress*, pp. 158–165, Pitman Res. Notes Math. Ser., 363, Longman, Harlow, 1996.
- 1994 P. Strzelecki. *Regularity of p -harmonic maps from the p -dimensional ball into a sphere*, Manuscripta Math. **82** (1994), 407–415.
- 1993b P. Strzelecki. *Regularity of p -harmonic functions on a Riemann surface*, Proc. of the 4th Finnish-Polish Summer School in Complex Analysis, edited by Olli Martio and Julian Ławrynowicz, Ber. Univ. Jyväskylä Math. Inst. **55** (1993), 183–190.
- 1993a P. Hajłasz, P. Strzelecki. *On the differentiability of solutions of quasilinear elliptic equations*, Colloquium Math. **64** (1993), 287–291
- 1992b P. Strzelecki. *Pointwise differentiability properties of solutions of quasilinear parabolic equations*, Hokkaido Math. Journal **21** (1992), 543–567.
- 1992a P. Strzelecki. *Pointwise differentiability of weak solutions of parabolic equations with measurable coefficients*, Ann. Acad. Sci. Fenn. **17** (1992), 171–180.

Editor of conference proceedings

- 2014 R. Latała, A. Ruciński, P. Strzelecki, J. Świątkowski, D. Wrzosek, P. Zakrzewski. *European Congress of Mathematics. Kraków, 2 – 7 July, 2012*, ISBN 978-3-03719-120-0. European Mathematical Society Publishing House, Zurich, January 2014.
- 1996 M. Niezgódka, P. Strzelecki. *Free boundary problems and applications. Proceedings of 1995 Zakopane Congress*. Pitman Research Notes in Mathematics Series, vol. 363, Addison Wesley Longman, 1996.
- 1995 N. Kenmochi, M. Niezgódka, P. Strzelecki. *Proceedings of the Banach Center Minisemester Nonlinear Analysis and Applications*. Gakuto International Series Mathematical Sciences and Applications, vol. 7, Tokyo 1995.

Popular books, papers & translations

- 2011 P. Strzelecki, *Modern mathematics for thinking laymen*. (A popular book in Polish). Warsaw University Press.

Author of several Polish translations of textbooks and popular books, including

- *Proofs from the Book* by M. Aigner and G. Ziegler
- *Partial Differential Equations* by L.C. Evans, translated jointly with Piotr Rybka
- *The last recreations* by Martin Gardner
- *Math Hysteria* by Ian Stewart
- *Letters to a young mathematician* by Ian Stewart
- *The Drunkard's Walk: How Randomness Rules our Lives* by Leonard Mlodinow

Author of more than 50 articles popularizing mathematics which appeared mostly in the Polish popular monthly *Delta* but also in other journals and newspapers.

Teaching, a summary

- Analysis I and II (the standard two-year course, and the version ‘with honors’)

- Partial Differential Equations I and II
- MSc Student Seminar on Analysis and PDE
- Several advanced courses on PDE and Calculus of Variations
- Popular lectures on modern mathematics for students of College of Inter-Faculty Individual Studies in the Humanities

Results of anonymous student polls

In 2010-2019, my results for classes I taught in Warsaw were as follows (on the scale 1-7):

- ‘your general opinion on the teacher’: 6,63 with min 6,20 and max 7,00.
- ‘teacher’s preparation for class’: 6,81 with min 6,60 and max 6,93.

Specific examples include:

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| 2012-13 | Analysis I, general opinion on the course: 6.6 out of 7 (mean for the faculty: 5.52 with $\sigma = 1.49$). |
| 2011-12 | Analysis II, general opinion on the course: <i>the best result among all obligatory courses for math undergraduates</i> , 6.55 out of 7 (mean for the faculty: 5.39 with $\sigma = 1.44$). |
| 2010-11 | Analysis I, general opinion on the course: 6.59 out of 7 (mean for the faculty: 5.34 with $\sigma = 1.43$). |