

Peter Bella

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Birth date and place: January 26, 1984, Bratislava, Slovakia
Married, 2 daughters (Parental leave: May–Aug 2012, Nov 2014–Jan 2015).

Work

- **Mathematisches Institut, Universität Leipzig** Leipzig, Germany
Emmy Noether Junior Group Leader 2016 – present
- **Max Planck Institute for Mathematics in the Sciences** Leipzig, Germany
Postdoc 2012 – 2016
– Mentor: Felix Otto
- **Courant Institute of Mathematical Sciences** New York, NY, USA
Research Assistant 2007–2012
- **Institute of Mathematics of the Academy of Sciences of Czech Republic** Prague, Czech Republic
Research Assistant 2007

Education

- **Courant Institute of Mathematical Sciences, New York University** New York, NY, USA
Ph.D. in Mathematics 2007 – 2012
– Advisor: Robert V. Kohn
– Thesis project: Wrinkling as a relaxation of compressive stresses
- **Charles University** Prague, Czech Republic
Mgr. in Mathematics 2002 – 2007
– Advisor: Eduard Feireisl
– Thesis: On models of gases in astrophysics
– Graduated Summa Cum Laude, GPA 4.0, Program: Mathematical Analysis

Grants

- **Limiting theories in Material Science: Mathematical derivation and Analysis** 2016–2021
DFG project in the Emmy Noether program, 1M EUR Universität Leipzig

Supervised students and postdocs

Carlos Román Parra (postdoc) 2017-
Adolfo Arroyo Rabasa (postdoc) 2017-

Publications

- 1) *Labeling planar graphs with a condition at distance two*, (with D. Král, B. Mohar, K. Quittnerová), *European Journal of Combinatorics* **28**(8) (2007), 2201–2239.
- 2) *Long time behavior of weak solutions to Navier-Stokes-Poisson system*, *Journal of Mathematical Fluid Mechanics* **14** (2012), 279–294.
- 3) *Long time behavior and stabilization to equilibria of solutions to the Navier-Stokes-Fourier system driven by highly oscillating unbounded external forces*, (with E. Feireisl and D. Pražák), *Journal of Dynamics and Differential Equations* **25** (2013), 257–268.
- 4) *Wrinkles as the result of compressive stresses in an annular thin film*, (with R. V. Kohn), *Communications on Pure and Applied Mathematics* **67** (2014), no. 5, 693–747.
- 5) *Metric-induced wrinkling of a thin elastic sheet*, (with R. V. Kohn), *Journal of Nonlinear Science* **24** (2014), no. 6, 1147–1176.
- 6) *Dimension reduction for compressible viscous fluids*, (with E. Feireisl, A. Novotný), *Acta Applicanda Mathematica* **134** (2014), 111–121.
- 7) *Nucleation barriers at corners for cubic-to-tetragonal phase transformation*, (with M. Goldman), *Proceedings of the Royal Society of Edinburgh* **145A** (2015), 715–724.
- 8) *Study of island formation in epitaxially strained films on unbounded domains*, (with M. Goldman and B. Zwirnagl), *Archive for Rational Mechanics and Analysis* **218** (2015), no. 1, 163–217.
- 9) *Transition between planar and wrinkled regions in uniaxially stretched thin elastic film*, *Archive for Rational Mechanics and Analysis* **216** (2015), no. 2, 623–672.
- 10) *Robustness of strong solutions to the compressible Navier-Stokes system*, (with E. Feireisl, B.J. Jin, A. Novotný), *Mathematische Annalen* **362** (2015), no. 1-2, 281–303.
- 11) *Corrector estimates for elliptic systems with random periodic coefficients*, (with F. Otto) *Multiscale Modeling and Simulation* **14** (2016), no. 4, 1434–1462.
- 12) *A rigorous justification of the Euler and Navier-Stokes equations with geometric effects*, (with E. Feireisl, M. Lewicka, and A. Novotný), *SIAM Journal on Mathematical Analysis* **48** (2016), no. 6, 3907–3930.
- 13) *Quantitative stochastic homogenization: local control of homogenization error through corrector*, (with A. Giunti and F. Otto), to appear in *IAS/Park City Mathematics Series*. <http://arxiv.org/abs/1504.02487>
- 14) *Coarsening of folds in drapes*, (with R. V. Kohn), *Communications on Pure and Applied Mathematics* **70** (2017), no. 5, 978–1021.
- 15) *Wrinkling of a thin circular sheet bonded to a spherical substrate*, (with R. V. Kohn), *Philosophical Transactions of the Royal Society A* **375** (2017), 2017 375 20160157 <http://dx.doi.org/doi:10.1098/rsta.2016.0157>
- 16) *A Liouville theorem for elliptic systems with degenerate ergodic coefficients*, (with B. Fehrman and F. Otto), to appear in *Annals of Applied Probability* <http://arxiv.org/abs/1605.00687>.
- 17) *Green's function for elliptic systems: moment bounds*, (with A. Giunti), to appear in *Networks and Heterogeneous Media*. <http://arxiv.org/abs/1512.01029>
- 18) *Stochastic homogenization of linear elliptic equations: higher-order error estimates in weak norms via second-order correctors*, (with B. Fehrman, J. Fischer, and F. Otto), to appear in *SIAM Journal on Mathematical Analysis*. <http://arxiv.org/abs/1609.01528>

Awards and Honors

Harold Grad Memorial Prize for outstanding performance, Courant Institute	2011
Dean's Dissertation Fellowship, NYU	2011 – 2012
MacCracken Doctoral Fellowship, NYU	2007 – 2012
First prize at the Czech and Slovak Student Scientific Conference in the section Mathematical Analysis, Czech Republic	2007
First prize at the Czech and Slovak Student Scientific Conference in the section Mathematical Structures – Combinatorics (with K. Quittnerová), Czech Republic	2005
First prize at the International Competition in Mathematics, Macedonia	2004
Gold medal at the International Olympiad in Informatics, South Korea	2002
Absolute winner of the Central European Olympiad in Informatics, Slovakia	2002
Bronze medal at the International Mathematics Olympiad, UK	2002

Invited talks at conferences and workshops

- Multiscale problems and relaxation in nonlinear elasticity, Dresden, Germany (July 2017)
- Modern trends in continuum mechanics, Zagreb, Croatia (April 2017)
- Fourth Workshop on Thin Structures, Naples, Italy (Sept 2016)
- PIRE-CNA 2016 Summer School: “New Frontiers in Nonlinear Analysis for Materials”, CMU, Pittsburgh, PA (June 2016)
- Calculus of Variations, MFO Oberwolfach (July 2014)
- Pattern Formation and Multiscale Phenomena in Materials, Oxford University, UK (Sept 2011)
- Strain Induced Shape Formation: Analysis, Geometry and Materials Science, IMA, Minneapolis, MN (May 2011)

Contributed and seminar talks

- Mathematical Institute, University of Oxford (Feb 2017)
- University of California, Santa Barbara, Applied/PDE Seminar (Feb 2016)
- Second Leipzig-Prague Weekend seminar (May 2015)
- Seminar on PDE and Mathematical Physics, Universität Zürich (March 2014)
- GAMM Annual Meeting, Minisymposium on “Variational Models in Elasticity and Plasticity”, Erlangen (Mar 2014)
- Workshop on Implicitly constituted materials: Modeling, analysis, and computing, Liblice, Czech Republic (Nov 2013)
- Oberseminar Analysis, Institute for Applied Mathematics, Universität Bonn (Nov 2013)
- Graduate Seminar Analysis, RWTH Aachen University (Nov 2013)
- First Leipzig-Prague Weekend seminar (Oct 2013)
- Seminar on Qualitative theory of Partial Differential Equations, Comenius University, Bratislava (Oct 2013)
- SIAM Conference on Mathematical Aspects of Material Science - section “Stress-induced Wrinkling of Thin Elastic Sheets”, Philadelphia (June 2013)

- SIAM Conference on Mathematical Aspects of Material Science - section “From Microscopic to Continuum: Variational Multiscale Methods”, Philadelphia (June 2013)
- Seminar on PDEs, Institute of Mathematics CAS, Prague, Czech Republic (Dec 2012)
- Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany (Jan 2012)
- Max Planck Institute, Leipzig, Germany (Jan 2012)
- SIAM Conference on Analysis of Partial Differential Equations (PD11), San Diego, CA (Nov 2011)
- Seminar on PDEs, Institute of Mathematics CAS, Prague, Czech Republic (June 2011)
- Material Working Group Seminar, Courant Institute (Oct 2010)
- Comenius University Alumni Week, Bratislava, Slovakia (Dec 2009)

Participation in Workshops and Conferences

- **Modern trends in continuum mechanics**
University of Zagreb Zagreb, Croatia
April 3-6, 2017
- **Fourth Workshop on Thin Structures**
Naples, Italy
September 8-10, 2016
- **New Frontiers in Nonlinear Analysis for Materials**
PIRE-CNA 2016 Summer School, CMU Pittsburgh, USA
June 2-10, 2016
- **Geometry, elasticity, fluctuations, and order in 2D soft matter**
Kavli Institute for Theoretical Physics, UCSB Santa Barbara, CA
January 25-February 12, 2016
- **Stochastic Homogenization**
Oberwolfach Seminar Oberwolfach, Germany
September 6-12, 2015
- **Interplay of Analysis and Probability in Applied Mathematics**
MFO Workshop Oberwolfach, Germany
July 26-August 1, 2015
- **Geometric Analysis, Free Boundary Problems and Measure Theory**
MPI Leipzig Leipzig, Germany
June 15-17, 2015
- **Calculus of Variations**
MFO Workshop Oberwolfach, Germany
July 13-19, 2014
- **GAMM Annual Meeting 2014**
Erlangen, Germany
March 10-14, 2014
- **Implicitly constituted materials: Modeling, analysis, and computing**
MORE Workshop Liblice, Czech Republic
Nov 24-27, 2013
- **Equadiff 13**
Prague, Czech Republic
August 26-30, 2013
- **Geometric Measure Theory and Optimal Transport**
ICTP Workshop Trieste, Italy
July 27-August 2, 2013
- **Emerging structures in Analysis and Probability**
Leipzig University Leipzig, Germany
June 24-26, 2013
- **Mathematical Aspects of Material Science (minisymposium organizer)**
SIAM Conference Philadelphia, USA
June 9-12, 2013
- **Modern Perspectives on Thin Sheets: Geometry, Elasticity, and Statistical Physics**
Lorentz Center Workshop Leiden, NL
Sept 3-7, 2012
- **Analysis of Partial Differential Equations (minisymposium organizer)**
SIAM Conference San Diego, USA
Nov 14-17, 2011
- **Pattern Formation and Multiscale Phenomena in Materials**
Mathematical Institute, University of Oxford Oxford, UK
Sept 26 - 28, 2011
- **Strain Induced Shape Formation: Analysis, Geometry and Materials Science**
Institute for Mathematics and Its Applications Minneapolis, USA
May 16 - 20, 2011

- **Summer School in Calculus of Variations and PDEs**
GNAMPA – ERC Ischia, Italy
June 13 - 18, 2010
- **Mathematical Aspects of Material Science**
SIAM Conference Philadelphia, USA
May 23 - 26, 2010
- **Rivière–Fabes Symposium on Analysis and PDE**
University of Minnesota Minneapolis, USA
April 23 - 25, 2010
- **Analysis of nonlinear PDEs: Applications to homogenization**
Pacific Institute for the Mathematical Sciences Vancouver, Canada
July 20-24, 2009
- **Asymptotic analysis in the calculus of variations and PDEs**
Pacific Institute for the Mathematical Sciences Vancouver, Canada
July 6-10, 2009
- **Contemporary Topics in Nonlinear PDEs**
Center for Nonlinear Analysis, CMU Pittsburgh, USA
May 29 - Jun 7, 2008
- **Workshop on Geomaterials**
Nečas Center for Mathematical Modeling Prague, Czech Republic
Sep 25-27, 2006
- **Variational Analysis and its Applications**
Spring School, Charles University Paseky nad Jizerou, Czech Republic
April 23-29, 2006
- **Function spaces and Applications**
Spring School, Charles University Paseky nad Jizerou, Czech Republic
May 29 - June 4, 2006
- **Spring School on Combinatorics**
Charles University Vysoká Lípa, Czech Republic
May 3 - 13, 2004
- **Spring School on Combinatorics**
Charles University Borová Lada, Czech Republic
May 12 - 18, 2003

Teaching

Lectures:

- **Fourier Analysis** Leipzig University, Winter Semester 2015
- **Fourier Analysis II** Leipzig University, Summer Semester 2016

Extensive experience as Teaching Assistant for:

- **Analysis I** New York University, Spring 2012
- **Calculus I** New York University, Fall 2011
- **Calculus I** New York University, Fall 2010
- **Abstract Algebra** New York University, Spring 2009
- **Algebra and Calculus** New York University, Fall 2008
- **Calculus for Social Sciences** New York University, Spring 2008
- **Calculus I** New York University, Fall 2007
- **Calculus Proseminar** Charles University, Fall 2006
- **Calculus Proseminar** Charles University, Spring 2006
- **Calculus Proseminar** Charles University, Fall 2005
- **Discrete Mathematics** Charles University, Fall 2004

Supervised high school student:

- **Tim Matzeck** (Besondere Lernleistung, Wilhelm-Ostwald-Gymnasium Leipzig)

Academic Service and Contributions

- Refereed papers for the following journals:
 - Communications on Pure and Applied Mathematics
 - Archives for Rational Mechanics and Analysis
 - Journal of Nonlinear Science
 - Journal of Functional Analysis
 - Multiscale Modeling and Simulation
 - Philosophical Transactions of the Royal Society of London A
 - Nonlinear Analysis Series B: Real World Applications
 - Indiana University Mathematics Journal
 - Nonlinearity
 - SIAM Journal on Mathematical Analysis
 - Multiscale Modeling and Simulation
- Organizer of the joint Oberseminar ANALYSIS - PROBABILITY at MPI/Universität Leipzig

References

Prof. Dr. Eduard Feireisl

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Prof. Dr. Felix Otto

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Prof. Dr. Robert V. Kohn

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Prof. Dr. Stefan Müller

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