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Education

2014	Habilitation in mathematical analysis, Charles University, Prague, Czech Republic
2007	Privatdozent (Priv.-Doz.) in mathematics, Technical University, Munich, Germany
2006	Habilitation in mathematics (Dr. habil.), Technical University, Munich, Germany
1997	Ph.D. in mathematics, Charles University, Prague Dissertation: Oscillations, Concentrations and Microstructure Modeling (advisor: Tomáš Roubíček)
1993	M.Sc. in mathematics, Charles University, Prague Thesis: Variational Methods in Multipolar Elasticity (advisor: Jindřich Nečas)

Scientific interests/background

calculus of variations, convex compactifications, mathematical and numerical modeling in material science, nonlinear elasticity, magnetoelasticity, optimal control theory, partial differential equations, relaxation methods in the calculus of variations and optimal control theory, Young measures and their generalizations

Work experience

10/1993–now	Institute of Information Theory and Automation, Academy of Sciences of the Czech Republic, Prague, since 2004 head of the Department of Decision-Making Theory
04/2005–now	Department of Physics, Faculty of Civil engineering, Czech Technical University, Prague, research associate (part time)
2000 and 2002	Center of Advanced European Studies and Research (caesar), Bonn, Germany, research associate

2001	Center of Mathematical Sciences, University of Technology, Munich, Germany, research associate
10/1998-09/1999	Max-Plack-Institute for Mathematics in the Sciences, Leipzig, Germany, postdoctoral associate
10/1997–03/1998	School of Mathematics, University of Minnesota, Minneapolis, postdoctoral associate and visiting assistant professor
09/1996–06/1997	Institute for Mathematics and Its Application, University of Minnesota, Minneapolis, Fulbright's fellow

Teaching Experience

- 2015-now graduate course "Thermodynamics and mechanics of solids", Czech Technical University, Prague

- 11/2014 Compact course (16 hrs) "Mathematical methods in elasticity", University of Würzburg

- 2014-now undergraduate/graduate course "Thermodynamics and mechanics of solids", Charles University, Prague

- 2006-now, undergraduate/graduate course "Mathematical methods is continuum mechanics of solids", Charles University, Prague

- 1998, winter quarter - 2 courses on Multivariable differential calculus, University of Minnesota, Minneapolis, U.S.A.

2 Bc. students, 4 diploma students, 1 Ph.D. students
Member of the doctoral committee 4F11 (Mathematical modeling) at the Faculty of Mathematics and Physics, Charles University.

Participation at Selected Grant projects

- 2018-2020 Localization phenomena in shape memory alloys: experiments & modeling GAČR (CoPI)

- 2017-2019 Advanced mathematical methods for dissipative evolutionary systems GAČR (PI)

- 2016-2017 Non-interpenetration of matter and discrete-to-continuum passages in nonlinear elasticity AV ČR–DAAD (Czech PI)

- 2016-2017 Thermomechanics of Solids: Modeling, Analysis, and Simulations, MŠMT-WTZ (Austria) (Czech PI)

- 2016-2018 Variational structures in thermomechanics of solids GAČR-FWF (Austria) (Czech PI)

- 2014-2016 Experimentally justified multiscale modeling of shape memory alloys GA ČR (CoPI)

- 2013-2014 Semidefinite programming for nonconvex problems of calculus of variations and optimal control AVČR–CNRS (Czech PI)

- 2013-2015 Computational modeling of damage and transport processes in quasi-brittle materials GA ČR (team member)

- 2013-2014 Integral functionals: Weak lower semicontinuity along oscillating/concentrating sequences under differential constraints, AV ČR–DAAD (Czech PI)

- 2012-2015 A mechanism of ultra-fine substructure formation induced by severe plastic deformation GA ČR (team member)

- 2012-2014 Variational and numerical analysis in nonsmooth mechanics, GA ČR (team member)

- 2011-2013 Computational and theoretical methods for nonlinear material models with uncertain parameters, GA ČR (team member)

- 2010–2014 Modern mathematical and computer models for inelastic processes in solids, GA ČR (CoPI)

- 2009–2011 Analysis of rate-independent elasto-plasticity and applications in biomechanics, Royal society international joint project (Czech PI)

- 2008–2011 Nonsmooth and set-valued analysis in mechanics and thermomechanics GA AV ČR (team member)

- 2004–2008 Multi-scale modelling and characterisation for phase transformations in advanced materials - MULTIMAT, Marie Curie Research Training Network (team member)

- 2004-2007 Variational analysis of nonsmooth problems of mathematical physics, GA AV ČR (team member)

- 2000–2003 Variational problems in nonsmooth mathematical physics: theory and applications, GA AV ČR (team member)

- 1996–1998 Nonsmooth analysis in problems of continuum mechanics, GA AV ČR (team member)

Selected international cooperations during last five years
CNRS Toulouse; University of Bath; University of Cologne; University of Freiburg; IMATI CNR Pavia; University of Warsaw; Technical University of Lisbon; SISSA Trieste; University of Heidelberg; University of Würzburg; University of Vienna

Honors and Awards

summer semester 2015/16   Giovanni-Prodi Guest Professorship, University of Würzburg

11/2014	visiting professorship, University of Würzburg
2003	Otto Wichterle Award
2002	Josef Hlávka's Prize
1996	Fulbright's Commission Fellowship

Other professional activities

2001–now	AMS reviewer
	occasional journal referee
2010–2011	Editorial board member: ISRN Mathematical Analysis
2012–now	Editorial board member: Kybernetika
2017	Guest co-editor *Discrete and Continuous Dynamical Systems-S*
2013–now	Member of The International Society for the Interaction of Mechanics and Mathematics (ISIMM)
2017–now	Member of the Executive Committee of the ISIMM

Personal Data

Date of Birth	March 17, 1970
Citizenship	Czech Republic

April 10, 2018

- [1] Explicit characterization of L^p-Young measures (with T. Roubíček), *J. Math. Anal. Appl.* **198** (1996), 830–843.

- [2] On the measures of DiPerna and Majda (with T. Roubíček), *Mathematica Bohemica*, **122** (1997), 383–399.

- [3] Numerical approach to double well problems. *SIAM J. Num. Anal.* **35** (1998), 1833–1849.

- [4] DiPerna-Majda measures and uniform integrability., *Commentationes Math. Univ. Carolinae*, **39** (1998), 511–523.

- [5] Some geometric properties of sets of generalized Young functionals (with T. Roubíček), *Proc. Royal Soc. Edinburgh* **129A** (1999), 601–616.

- [6] On the composition of quasiconvex functions and the transposition, *J. Convex Anal.* **6** (1999), 207–213.

- [7] Numerical treatment of microstructure evolution modelling (with T. Roubíček), In: *ENUMATH 97*, Proc. 2nd European Conf. on Numer. Math. and Advanced Appl., Sept.28–Oct.3, 1997, Heidelberg (Eds. H.G.Bock et al.), World Scientific, Singapore, 1998, pp. 532–539.

- [8] Optimization problems with concentration and oscillation effects: relaxation theory and numerical approximation (with T. Roubíček), *Numer. Funct. Anal. Opt.* **20** (1999), 511–530.

- [9] Bauer's maximum principle and hulls of sets, *Calc. Var.* **11** (2000), 321–332.

- [10] Weierstrass-type maximum principle for microstructure in micromagnetics (with T. Roubíček), *Zeitschrift für Analysis u. ihre Anwendungen* **19** (2000), 415–428.

- [11] Young measure approximation in micromagnetics (with A. Prohl). *Num. Math.* **90** (2001), 291–307.

- [12] Microstructure evolution model in micromagnetics (with T. Roubíček). *Zeitschrift für Angewandte Math. u. Phys.* **55** (2004), 159–182.

- [13] Adaptive approximation algorithm for relaxed optimization problems (with T. Roubíček) In: Proceedings of "Fast Solutions of Discrete Optimization Problems" held in WIAS, Berlin, May 8–12, 2000, (Eds. V. Schulz, K.-H. Hoffmann and R.H.W. Hoppe), Birkhäser, Basel, 2001, pp. 242–254.

- [14] Variational models for microstructure in shape memory alloys and in micromagnetics and their numerical treatment. In: *Communications of the Bexbach Colloquium on Science 2000, vol. II.* Proceedings of the conference held in Bexbach, Germany, October 27–29, 2000 (Eds. M. Robnik and A. Ruffing), Shaker Verlag, Aachen, 2003, pp. 20–38.

- [15] Quasiconvex extreme points of convex sets. In: *Elliptic and Parabolic Problems*, Proceedings of the 4th European Conference held in 2001 (Eds. J. Bemelmans et al.) World Scientific, Singapore 2002, pp. 145–151.

- [16] Maximum principle based algorithm for hysteresis in micromagnetics. *Adv. Math. Sci. Appl.* **13** (2003), 461–485.

- [17] Specimen shape influence on hysteretic response of bulk ferromagnets. (with T. Roubíček) *Journal of Magnetism and Magnetic Materials* **256** (2003), 158–167.

- [18] A note on equality of functional envelopes. *Mathematica Bohemica* **128** (2003), 169–178.

- [19] The computation of martensitic microstructure with piecewise laminates. (with M. Luskin) *J. Sci. Comp.* **19** (2003), 293–308.

- [20] Macroscopic modeling of magnetic hysteresis. (with A. Prohl) *Adv. Math. Sci. Appl.* **14** (2004), 665–681.

- [21] Mesoscopical model for ferromagnets with isotropic hardening. (with T. Roubíček) *Zeitschrift für Angewandte Math. u. Phys.* **56** (2005), 107–135.

- [22] Interactions between demagnetizing field and hardening-like effects in bulk ferromagnets. (with T. Roubíček) *Journal of Magnetism and Magnetic Materials* **277** (2004), 192–200.

- [23] A phenomenological model for hysteresis in polycrystalline shape memory alloys. (with F. Otto) *Zeit. Angew. Math. Mech.* **84** (2004), 835–842.

- [24] Periodicity properties of solutions to a hysteresis model in micromagnetics. In: *Numerical Mathematics and Advanced Applications*, Proceedings of ENUMATH 2003, the 5th European Conference on Num. Math. and Adv. Appl. held in Prague, August 2003. (Eds. M. Feistauer et al.) Springer, Berlin, 2004, pp. 605–614.

- [25] Periodic solutions to a hysteresis model in micromagnetics. *J. Convex Anal.* **13** (2006), 81–99.

- [26] Mesoscopic model of microstructure evolution in shape memory alloys, its numerical analysis and computer implementation. (with T. Roubíček). *GAMM Mitteilungen* **29** (2006), 192–214.

- [27] Rate–independent behavior of ferromagnets. *Proc. Appl. Math. Mech.* **4** (2004), 67–70. DOI 10.1002/pamm.200410017 .

- [28] Recent developments in modeling, analysis and numerics of ferromagnetism. (with A. Prohl). *SIAM Review* **48** (2006), 439–483.

- [29] Spherical load indetation in submicron NiTiCu shape memory thin films. (with R. Hassdorf, J. Feydt, S. Thienhaus, L. Buforn, N. Conté, O. Pykhteev, N. Botkin, and M. Moske) In: *Proceedings of the 2004 Mater. Research Society Fall Meeting, Symposium on Fundamentals of Nanoindentation and Nanotribology III* held in Boston, MA, Nov. 29

– Dec. 2, 2004 (eds. D.F. Bahr, Y-T. Cheng, N. Huber, A.B. Mann, K.J. Wahl) **841** (2005) pp. R9.7.1-R9.7.6. (`This paper is a Ribbon Award winner.`)

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- [32] Oscillations and concentrations in sequences of gradients. (with A. Kałamajska), *ESAIM: Control Optim. Calc. Var.* **14** (2008), 71–104.

- [33] Mechanisms controlling formation of the ultra-fine microstructure in severly deformed materials. (with J. Kratochvíl, R. Sedláček, and A. Sveshnikov). *Engineering Mechanics* **13** (2006), 261–270.

- [34] Probing superelasticity in NiTi-based shape memory thin films and foils.(with R. Hassdorf, J. Feydt, S. Thienhaus, L. Buforn, N. Conté, O. Pykhteev, N. Botkin, and M. Moske) In: *Proceedings of the International Conference on Shape Memory and Superelastic Technologies* held in Baden-Baden, Germany, October 3–7, 2004.(eds. T.W. Duerig and A.R. Pelton), pp. 399–407, ASM International, Materials Park, OH, 2006.

- [35] Identification of Preisach-type hysteresis operators. (with J. Koutný, A. Kurdila, and T. Roubíček). *Numer. Funct. Anal. Opt.* **29** (2008), 149-160.

- [36] A mesoscopical model of shape-memory alloys. (with J. Koutný and T. Roubíček) *Proceedings of the Estonian Acad. Sci. Physics. Mathematics.* **56** (2007), 146–154.

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- [39] Evolutionary problems with linear growth. (with J. Zimmer) *ESAIM: Control Optim. Calc. Var.* **16** (2010), 1–22. DOI:10.1051/cocv:2008060

- [40] Variational approach to formation of misoriented microstructures in plastic deformations (with J. Kratochvíl, R. Sedláček, and C. Krempaszky) *Proc. Appl. Math. Mech.* **7** 4080005-4080006 (2007).

- [41] A model of ultra-fine microstructure evolution in materials deformed by high pressure torsion. (with J. Kratochvíl and R. Sedláček). *Acta Materialia* **57** (2009), 739–748.

- [42] Energetic approach to strain gradient plasticity. (with J. Kratochvíl and R. Sedláček). *Zeit. Angew. Math. Mech.* **90** (2010), 122–135.

- [43] Energetic formulation of nonlocal crystal plasticity. (with J. Kratochvíl and R. Sedláček). *Int. J. Mat. Res.* **100** (2009), 340–341.

- [44] Oscillations and concentrations generated by $\mathcal{A}$-free mappings and weak lower semi-continuity of integral functionals. (with I. Fonseca) *ESAIM Control Optim. Calc. Var.* **16** (2010), 472–502.

- [45] Rate-independent processes with linear growth and time-dependent boundary conditions. (with J. Zimmer) *Discrete Cont. Dyn. Systems - S.* **5** (2012), 591–604.

- [46] A model of shape memory alloys accounting for plasticity. (with J. Zimmer) *IMA J. Appl. Math.* **76** (2011), 193–216.

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- [48] Variational model for martensitic thin films and its numerical treatment. (with G. Pathó). *Technische Mechanik* **30** (2010), 203–210.

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- [54] Delamination and adhesive contact models and their mathematical analysis and numerical treatment. (with T. Roubíček and J. Zeman) In: *Math. Methods & Models in Composites* (Ed. V. Mantič), World Scientific, 2013, ISBN: 978-1-84816-785-8, pp. 349–400.

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- [59] Finite element approximation for time-dependent diffusion with measure-valued data. (with T.I Seidman, M.K. Gobbert, and D.W. Trott). *Num. Math.* **122** (2012), 709–723. DOI 10.1007/s00211-012-0474-8.

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- [61] Sequential weak continuity of null Lagrangians at the boundary. (with A. Kałamajska and S. Krömer). *Calc. Var. PDE* **49** (2014), 1263–1278.

- [62] Energetic approach to large strain gradient crystal plasticity. (with J. Kratochvíl). *Acta Polytechnica* **52**(6) (2012), 1–14.

- [63] Domain patterns and hysteresis in phase-transforming solids: analysis and numerical simulations of a sharp interface dissipative model via phase-field approximation. (with A. DeSimone). *Networks Heterog. Media* **8** (2013), 481–499. doi:10.3934/nhm.2013.8.481

- [64] Modeling of thin martensitic films with nonpolynomial stored energies. (with J. Zimmer). In: *Recent Trends in Dynamical Systems* - Springer Proceedings in Mathematics and Statistics **35** (eds. A. Johann, H.-P. Kruse, F. Rupp, S. Schmitz), Springer, 2013, pp. 587–608.

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- [67] Characterization of gradient Young measures generated by homeomorphisms in the plane. (with B. Benešová) *ESAIM Control Optim. Calc. Var.* **22** (2016), 267–288. DOI: http://dx.doi.org/10.1051/cocv/2015003.

- [68] Existence results for incompressible magnetoelasticity. (with. U. Stefanelli and J. Zeman).*Discrete Cont. Dyn. Systems* **35** (2015), 2615–2623.

- [69] $\mathcal{A}$-quasiconvexity and weak lower semicontinuity of integral functionals. (with J. Krämer, S. Krömer, and G. Pathó) *Adv. Calc. Var.* **10** (2017), 49–67. DOI: 10.1515/acv-2015-0009.

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- [72] Quasistatic evolution of magnetoelastic thin films via dimension reduction. (with U. Stefanelli and C. Zanini). Preprint arXiv:1405.6887 *Disc. Cont. Dyn. Systems* **35** (2015), 5999-6013.

- [73] Computations of quasiconvex hulls of isotropic sets. (with S. Heinz) *J. Convex Anal.* **24** (2017), 477–492.

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- [78] Computational modeling of magnetic hysteresis with thermal effects. (with J. Valdman) *Mathematics and Computers in Simulation* **145** (2018), 90–105. https://doi.org/10.1016/j.matcom.2017.03.004.

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- [80] Generalized $W^{1,1}$-Young measures and relaxation of problems with linear growth. (with M. Baia and S. Krömer). *SIAM J. Math. Anal.* **50** (2018), 1076–1119.

- [81] On the existence of minimisers for strain-gradient single-crystal plasticity. (with K. Anguige and P. Dondl) *Zeit. Angew. Math. Mech.* **98** (2018), 431–447. DOI. 10.1002/zamm.201700032.

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- [83] On the passage from nonlinear to linearized viscoelasticity. (with M. Friedrich) Preprint arXiv:1705.06438.

- [84] A note on locking materials and gradient polyconvexity. (with B. Benešová and A. Schlömerkemper). Preprint arXiv:1706.04055.

- [85] Quasistatic elastoplasticity via Peridynamics: existence and localization. (with C. Mora-Corral and U. Stefanelli) Preprint arXiv: arXiv:1711.03870.

H-index: 13, Citations: 502 (Web of Science)
H-index: 17, Citations: 1164 (Google Scholar)

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