

**Luděk Heller**

**Year of birth** 1977  
**Employer** Institute of Physics, Czech Academy of Sciences  
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**Researcher ID** B-2770-2011



**PROFESSIONAL INTERESTS / RESEARCH EXPERTISE**

Mechanics of functional and phase transforming materials; shape memory alloys; characterization of materials and deformation processes using deformation experiments, diffraction techniques, thermal analysis, microscopy.

**LEADERSHIP EXPERIENCE**

2012-now Head of the research group Functional materials and composites (<http://ofm.fzu.cz/about-fmc>), 10 FTE, currently 7 running national and international projects.

**EDUCATION**

2001 Ing. (MSc.) in Mechanical Engineering, specialization: Applied Mechanics, Technical University of Liberec, Czech Republic  
2005 Dr. (PhD) in Engineering Sciences, specialization: Applied Mechanics, Université de Franche-Comté, Besançon, France

**PROFESSIONAL EXPERIENCE (including INTERNATIONAL EXPERIENCE)**

2004 – 2005 **Université de Franche-Comté, Besançon, France**, assistant in research and education  
since 2005 **Institute of Physics, Czech Academy of Sciences**, group leader since 2012, deputy head of department since 2016.

**PUBLICATION ACTIVITIES**

***h*-index of 20 (Scopus)**, as of November 25 2022

Authored >70 peer reviewed journal papers which received >1300 citations.

Selected 5 most important papers:

- 1 Xiaohui Bian, **Luděk Heller**, Lukáš Kadeřávek, Petr Šittner, In-situ synchrotron X-ray diffraction texture analysis of tensile deformation of nanocrystalline NiTi wire in martensite state, Applied Materials Today, Volume 26, March 2022, 101378
- 2 **L Heller**, P Šittner, P Sedlák, H Seiner, O Tyc, L Kadeřávek, P Sedmák, M Vronka, Beyond the strain recoverability of martensitic transformation in NiTi, International Journal of Plasticity, Volume 116, May 2019, Pages 232-264
- 3 **L Heller**, H Seiner, P Šittner, P Sedlák, O Tyc, L Kadeřávek, On the plastic deformation accompanying cyclic martensitic transformation in thermomechanically loaded NiTi, International Journal of Plasticity, Volume 111, December 2018, Pages 53-71
- 4 Eduardo Alarcon, **Luděk Heller**, Shabnam Arbab Chirani, Petr Šittner, Jaromír Kopeček, Luc Saint-Sulpice, Sylvain Calloch, Fatigue performance of superelastic NiTi near stress-induced martensitic transformation, International Journal of Fatigue, Volume 95, February 2017, Pages 76-89
- 5 P Sedmák, J Pilch, **L Heller**, J Kopeček, J Wright, P Sedlák, M Frost, P Šittner, Grain-resolved analysis of localized deformation in nickel-titanium wire under tensile load, Science, 5 Aug 2016, Vol 353, Issue 6299, pp. 559-562

## APPLICATION RESULTS

- 1 **Czech patent no. 307924** granted on 17/07 2019, **Title:** Three-dimensional hollow fabric with reversible thickness depending on the temperature, how to manufacture it and change the thickness, **Inventors:** Luděk Heller, Petr Šittner, K. Janouchová
- 2 **European Patent EP2434984B1** granted on 17/02/2016, **Title:** Medical device, **Inventors:** Jürgen SEIBOLD, Erhard Müller, Karel Volenec, Petr Sittner, **Ludek Heller**, Jan Pilch
- 3 **Contracted research for European Space Agency**, 1/02/2016 – 30/04/2018, Shape-memory Coupling for connecting Pipes (A08294), ARTES 5.1 Programme
- 4 **Applied research project within National Centre of Competence MATCA**, Evaluation of the thermal response to cyclic loading for fast fatigue tests, Methodology and experimental software were developed for fast fatigue testing of 3D printed samples, 2020-2021

## RESEARCH GRANTS

		International
2016-2018	<b>Upscaling the applicability of NiTi shape memory alloys by improving their fatigue performance</b> , Czech Science Foundation (PI)	
2022-2024	<b>Strain compatibility issues in mechanically driven martensitic transformations in shape memory alloy polycrystals</b> , Czech Science Foundation (PI)	
2016-2021	European Spallation Source - participation of the Czech Republic – OP, Ministry of Education, Youth and Sports, Operational Programme: Research, Development and Education, <b>Leader of research task A4 “In-situ measurement of temperature and strain fields”</b> (Research Programme A within Key activity 3)	
2018-2023	SOLID21 - Fyzika pevných látek pro 21. století, Ministry of Education, Youth and Sports, Operational Programme: Research, Development and Education, <b>Leader of Scientific Activity “Shape Memory Alloys NiTi for Engineering Applications”</b> (VA2 within Scientific Programme 1)	

## INVITED TALKS AT INTERNATIONAL CONFERENCES

Regular seminars at universities and research institutions and invited talks at international conferences:

- 1 April 28 - May 2, 2019 - IUTAM Symposium on Phase Transformation in Shape Memory Materials: Modeling and Applications, Austin, TX, USA, April 28 - May 2, 2019.

## AWARDS and FELLOWSHIPS

2016	Member of the research team awarded by Werner Von Siemens award for best scientific work
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## TEACHING ACTIVITIES AND SUPERVISION OF STUDENTS

Regular teaching	Course on Mechanics of Advanced Materials, Faculty of Mechanical Engineering, Technical University of Liberec.
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## *Curriculum Vitae*

Ph.D. students      Since 2013: supervised 4 successfully defended Ph.D. students  
MSc. students      Since 2005: supervision of multiple French students within their 6-12  
                                 months internships.

### **COMMISSIONS OF TRUST AND SERVING SCIENTIFIC COMMUNITY**

**Proposal**            2022-2023 Member of beamtime allocation panel of European  
**Reviewer**            Synchrotron Research Facility  
**Journal**              Acta Materialia, Scripta Materialia, Journal of Alloys and Compounds,  
**Reviewer**            Intermetallics, Shape Memory and Superelasticity, MDPI Crystals, MDPI  
                                 Metals, etc.  
**Grant reviewer**      Grant Agency of Technical University in Liberec