Curriculum vitae

Name	**Assoc. Prof Zdeněk Hadaš, Ph.D.**
Affiliation to BUT	**Faculty of Mechanical Engineering, Institute of Solid Mechanics, Mechatronics and Biomechanics**
Role in the project	**Excellent**

1. Education and academic qualification

- 2003, Engineer's degree (Ing.), Applied Sciences in Engineering, Mechatronics, Faculty of Mechanical Engineering, Brno University of Technology
- 2007, Doctoral degree (Ph.D.), Engineering Mechanics, Faculty of Mechanical Engineering, Brno University of Technology
- 2015, Associate Professor, Applied Mechanics, Faculty of Mechanical Engineering, Brno University of Technology

2. Career overview

- 2005 - 2006, Academic internships abroad, EADS Innovation Works, Sensors, Electronics & Systems Integration (IW-SI), now AIRBUS GROUP, Munchen, Germany
- 2007 - 2015, academic - senior lecturer, Institute of Solid Mechanics, Mechatronics and Biomechanics, Faculty of Mechanical Engineering, Brno University of Technology
- 2007 - 2015, researcher, CEITEC, Brno University of Technology
- 2014 - 2018, Head of Mechanics Group, Division of Mechatronics, NETME Centre, Faculty of Mechanical Engineering, Brno University of Technology
- since 2015, academic - associate professor, Institute of Solid Mechanics, Mechatronics and Biomechanics, Faculty of Mechanical Engineering, Brno University of Technology

3. Research and development, experience

- Research interest: R&D of energy harvesting devices, simulation and modelling of multidicsiplinar mechatornic systems
- Publications and other R&D activities:
  - more than 20 research articles in peer reviewed journals (e.g. *Mechanical Systems and Signal Processing, Mechatronics, European Physical Journal, Microsystem Technologies, atd.*),
  - more than 100 outcomes registered in RIV – Register of information and outcomes (peer reviewed journal papers, conference papers, monographs, chapters in books, patents, function samples etc.).

4. Activities related to R&D (pedagogic activities, supervisor in PhD study)

- Guarantor of mechanical and mechatronics courses and lecturer in bachelor and master degree programmes.
- Implementation of research-oriented course Energy harvesting for Mechatronics.
- Supervisor in PhD study programme Engineering Mechanics (5 current Ph.D. students).

5. Relevance and interconnection of current research activities with goals, programmes and activities of the project, potential for successful realization of the project

- Research and development activity of recent technologies:
  - Development of energy harvesting devices
  - Multidisciplinary simulation of dynamic systems
  - Virtual prototyping/Virtual twins
- Cooperation with industry in employing of innovation
- Cost Action ODIN
- Consortium member of project H2020 S2R-OC-IP2-02-2017 Etalon - Energy harvesting for signalling and communication systems, 777576

6. Sum of citations total/without self-citations

WoS 401/184
Scopus 643/331

7. h-index:

11 (WoS; ResearcherID: I-4299-2014)
15/10 (Scopus, with/without self-citations; Author ID: 24767676300)

8. 5 most significant results

- HADAS, Zdenek, Ludek JANAK and Jan SMILEK, 2018. Virtual prototypes of energy harvesting systems for industrial applications. *Mechanical Systems and Signal Processing* [online]. B.m.: Elsevier Ltd, **110**, 152–164. ISSN 0888-3270.
- BAI, Yang, Pavel TOFEL, Zdenek HADAS, Jan SMILEK, Petr LOSAK, Pavel SKARVADA and Robert MACKU, 2018. Investigation of a cantilever structured piezoelectric energy harvester used for wearable devices with random vibration input. *Mechanical Systems and Signal Processing* [online]. **106**, 303–318. ISSN 08883270.
- HADAS, Zdenek, Filip KSICA and Ondrej RUBES, 2019. Piezoceramic patches for energy harvesting and sensing purposes. *European Physical Journal: Special Topics* [online]. **228**(7), 1589–1604. ISSN: 1951-6355
- HADAS, Zdenek, Vojtech VETISKA, Rostislav HUZLIK and Vladislav SINGULE, 2014. Model-based design and test of vibration energy harvester for aircraft application. *Microsystem Technologies* [online]. **20**(4–5), 831–843 [vid. 2014-07-17]. ISSN 0946-7076.
- KSICA, Filip, Zdenek HADAS aand Jiri HLINKA, 2019. Integration and test of piezocomposite sensors for structure health monitoring in aerospace. *Measurement: Journal of the International Measurement Confederation* [online]. **147**. 106861. ISSN: 0263-2241.

9. Publications (selection)

Five most recent articles in peer reviewed journals:

- Hadas, Z., L. Janak, and J. Smilek. 2018. “Virtual Prototypes of Energy Harvesting Systems for Industrial Applications.” Mechanical Systems and Signal Processing 110. https://doi.org/10.1016/j.ymssp.2018.03.036.
- Rubes, Ondrej, Martin Brablc, and Zdenek Hadas. 2019. “Nonlinear Vibration Energy Harvester: Design and Oscillating Stability Analyses.” Mechanical Systems and Signal Processing 125 (June): 170–84. https://doi.org/10.1016/j.ymssp.2018.07.016.

- Ksica, F, Z Hadas, and J Hlinka. 2019. “Integration and Test of Piezocomposite Sensors for Structure Health Monitoring in Aerospace.” Measurement: Journal of the International Measurement Confederation 147. https://doi.org/10.1016/j.measurement.2019.106861.
- Hadas, Z, F Ksica, and O Rubes. 2019. “Piezoceramic Patches for Energy Harvesting and Sensing Purposes.” European Physical Journal: Special Topics 228 (7): 1589–1604. https://doi.org/10.1140/epjst/e2019-800156-6.
- Smilek, J, Z Hadas, J Vetiska, and S Beeby. 2019. “Rolling Mass Energy Harvester for Very Low Frequency of Input Vibrations.” Mechanical Systems and Signal Processing 125: 215–28. https://doi.org/10.1016/j.ymssp.2018.05.062.

Ten most cited articles in peer reviewed journals and conference papers in project topic:

- Hadas, Z., C. Ondrusek, and V. Singule. 2010. “Power Sensitivity of Vibration Energy Harvester.” Microsystem Technologies 16 (5). https://doi.org/10.1007/s00542-010-1046-4.
- Hadas, Zdenek, Martin Kluge, Vladislav Singule, and Cestmir Ondrusek. 2007. “Electromagnetic Vibration Power Generator.” In 2007 IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, 451–55. IEEE. https://doi.org/10.1109/DEMPED.2007.4393136.
- Hadas, Z., V. Vetiska, R. Huzlik, and V. Singule. 2014. “Model-Based Design and Test of Vibration Energy Harvester for Aircraft Application.” Microsystem Technologies 20 (4–5): 831–43. https://doi.org/10.1007/s00542-013-2062-y.
- Hadas, Z., J. Kurfurst, C. Ondrusek, and V. Singule. 2012. “Artificial Intelligence Based Optimization for Vibration Energy Harvesting Applications.” Microsystem Technologies 18 (7–8). https://doi.org/10.1007/s00542-012-1432-1.
- Hadas, Z., V. Singule, S. Vechet, and C. Ondrusek. 2010. “Development of Energy Harvesting Sources for Remote Applications as Mechatronic Systems.” In Proceedings of EPE-PEMC 2010 - 14th International Power Electronics and Motion Control Conference. https://doi.org/10.1109/EPEPEMC.2010.5606867.
- Hadas, Z., V. Vetiska, V. Singule, O. Andrs, J. Kovar, and J. Vetiska. 2012. “Energy Harvesting from Mechanical Shocks Using a Sensitive Vibration Energy Harvester.” International Journal of Advanced Robotic Systems 9. https://doi.org/10.5772/53948.
- Bai, Yang, Pavel Tofel, Zdenek Hadas, Jan Smilek, Petr Losak, Pavel Skarvada, and Robert Macku. 2018. “Investigation of a Cantilever Structured Piezoelectric Energy Harvester Used for Wearable Devices with Random Vibration Input.” Mechanical Systems and Signal Processing 106 (June): 303–18. https://doi.org/10.1016/j.ymssp.2018.01.006.
- Hadas, Z., L. Janak, and J. Smilek. 2018. “Virtual Prototypes of Energy Harvesting Systems for Industrial Applications.” Mechanical Systems and Signal Processing 110. https://doi.org/10.1016/j.ymssp.2018.03.036.
- Hadas, Zdenek, Vojtech Vetiska, Jan Vetiska, and Jiri Krejsa. 2016. “Analysis and Efficiency Measurement of Electromagnetic Vibration Energy Harvesting System.” Microsystem Technologies, January. https://doi.org/10.1007/s00542-016-2832-4.
- Hadas, Z., and C. Ondrusek. 2015. “Nonlinear Spring-Less Electromagnetic Vibration Energy Harvesting System.” The European Physical Journal Special Topics 224 (14–15): 2881–96. https://doi.org/10.1140/epjst/e2015-02595-3.

10. Projects and grants (executor or co-executor)

- 2005 – 2008, WISE Integrated WIreless SEnsing, 6FP, AST4-CT-2004-516470
- 2007 – 2011, Simulation modeling of mechatronic systems, MSM 0021630518
- 2009 – 2012, Knowledge and Skills in Mechatronic Innovations - Transfer to Practice CZ.1.07/2.3.00/09.0162
- 2009 – 2012, Introduction of Problem Based Learning to Mechanical Engineering Curricula CZ.1.07/2.2.00/07.0406
- 2012 – 2013, NETME Centre, Junior researcher
- 2012 – 2015, Complex Affordable Aircraft Engine Electronic Control, TAČR - TA02010259

- 2012 – 2014, Research of the Micro Electro Mechanical Artificial Cochlea Based on Mechanical Filter Bank, GAČR - 13-18219S
- 2012 – 2015, ESPOSA, 7FP, NO. ACP1-GA-2011-284859-ESPOSA
- Since 2014, NETME Plus, Senior researcher
- Since 2015, Reaserch Centre of Special Electric Machines, TAČR - TE02000232
- Since 2017, Novel material architectures for SMART piezoceramic electromechanical converters, GAČR - GA17-08153S
- Since 2017, H2020 S2R-OC-IP2-02-2017, Etalon - Energy harvesting for signalling and communication systems, 777576
- Since 2019, NCK Národní centrum kompetence Mechatroniky a chytrých technologií pro strojírenství, TN01000071, vedoucí VP3 Mechatronika, chytré technologie a virtuální dvojčata
- Since 2019, Výroba a analýza flexibilních piezoelektrických vrstev pro chytré strojírenství, GAČR - GA19-17457S
- Since 2020, Modulární počítač náprav 4.0, FW01010281 TACR
- Since 2020, Cenově dostupný chytrý snímací systém pro železnice 4.0, RM01000016 TACR
- Since 2020, Výhybka 4.0, CK01000091 TACR

11. Patents, applied results and other forms of protection of intellectual property

- HADAŠ, Z.; Vysoké učení technické v Brně, Brno, CZ: Auxetická struktura s elektromechanickou přeměnou. 308206, patent (2020)
- HADAŠ, Z.; KŠICA, F.; RUBEŠ, O.; Vysoké učení technické v Brně: Snímací vrstva pro strojní součásti. 33551, utility model certificate. (2019)
- SMILEK, J.; HADAŠ, Z.; Brno University of Technology, Brno, CZ: Zařízení pro výrobu elektrické energie, 307799, patent. Czech Republic (2019)
- SMILEK, J.; HADAŠ, Z.; Brno University of Technology, Brno, CZ: Zařízení pro výrobu elektrické energie. 31234, utility model certificate. Czech Republic (2017)
- FIALA, P.; ONDRŮŠEK, Č.; SINGULE, V.; HADAŠ, Z.; Brno University of Technology: Vibrační generátor pro výrobu elektrické energie. 305591, patent. Czech Republic (2015)
- HADAŠ, Z.; ONDRŮŠEK, Č.; SINGULE, V.; FIALA, P.; Frank L.laczko - Allen, TX, US: ELECTROMAGNETIC VIBRATORY GENERATOR FOR LOW FREQENCY VIBRATIONS. 20100237719, patent. USA (2010)
- FIALA, P.; ONDRŮŠEK, Č.; HADAŠ, Z.; SINGULE, V.; Brno University of Technology: ELECTROMAGNETIC VIBRATORY GENERATOR FOR LOW FREQUENCIES OF VIBRATIONS. EP2143193, patent. USA (2010)
- HADAŠ, Z.; SINGULE, V.; ONDRŮŠEK, Č.; FIALA, P.; Brno University of Technology, Brno, CZ: ELEKTROMAGNETICKÝ VIBRAČNÍ GENERÁTOR PRO NÍZKÉ FREKVENCE VIBRACÍ. 299911, patent. Czech Republic, Praha (2008)

12. Cooperation with industry and with other users of outcomes of R&D

- 2020, Simulation of Gyroscopes, Honeywell, ČR
- 2018 - 2019, Inovation of precise actuator, DI Industrial, ČR
- 2016 - 2017, FEM and MBS models of SKIDs and operation analysis, ŠKODA, ČR.
- 2015 - 2016, Energy harvesting device for wearable electronics, HUAWEI, Čína
- 2014 - 2015, Optimalization of design of Thermacut davices, THERMACUT, ČR
- 2013, FEM calculation and an analysis of bending profile, IFE-CR, a.s, ČR
- 2012, Simulation and FEM models of linear actuators, HIWIN Brno, ČR

13. Membership in international and national organizations, platforms

- Organizing committee of European Energy Harvesting workshops
- Organizing and scientific committee of International Conferences Mechatronics & Mechatronika
- Member EASN Association (European Aeronautics Science Network), 2015 - 2016
- ACerS membership (The American Ceramic Society), since 2019 - 2020