Curriculum Vitae

Assoc. Prof. Ing. Ivo Stachiv, Ph.D.

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Nationality: Czech

Highest Degree:

Ph.D. (2009) *National Taiwan University*, Graduate Institute of Applied Mechanics (Research: Applied mechanics / physics & Nanotechnology)

Experience:

03/2009 – now	Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic (**Scientist 01/2022 – now; Assoc. Scientist 09/2016 – 12/2021; Postdoc 03/2009 – 08/2016**)
	Research: Nano-/biosensors; Smart devices utilizing properties of shape memory alloys and shape memory polymers; Multifunctional materials and smart structures; 4D metamaterials; Early-stage diagnosis of dementia; Biomarkers` detection; Neuroimaging techniques.
02/2018 – now	Drážní revize, s.r.o., Ostrava, Czech Republic (**Head of Research and Development)**
	Research: Smart sensors for industry 4.0; Smart multifunctional structures with embedded sensing elements and AI software
08/2016 – 12/2019	School of Sciences, Harbin Institute of Technology - Shenzhen (HITSZ), Shenzhen, Guangdong, China. (**Associate Professor**)
	Research: Multilayered structures; Depression and dementia; Biosensors for early an biomarkers detection and early onset-detection of dementia
02/2015 – 07/2016	Department of Mechanical Engineering, National Kaohsiung University of Applied Sciences, Kaohsiung, Taiwan. (**Assistant Professor)**
	Research: Nanomechanics and Nanomaterials; characterization: nanoindentation, In-situ TEM nanoindentation, Compression test, mathematical modeling; MD simulations
08/2013 – 02/2015	AIM-HI, National Chung Cheng University, Chiayi, Taiwan. (**Postdoc**)
	Research: Modelling and simulations of micro-/nanomaterials
09/2010 – 07/2013	Institute of Physics, Academia Sinica, Taipei, Taiwan. (**Postdoc**)
	Research: Polymer physics and complex fluid problems; LB & MD simulations, numerical modeling; Development of AFM methods for measurement in viscous fluids
2007	Department of Mechanical Engineering, University of Washington at Seattle, Seattle, WA, USA (invited by: Prof. W.-C. Wang). (**International Predoctoral fellow**)
	Research: experimental and numerical investigations on the optical macro-

/micro viscosimeter

Areas of interest:

Metamaterials; 4D metamaterials; Micro-/nanomechanics; Functional (SMA) thin films; Sensors; Multifunctional structures; Early-stage diagnosis of neurodegenerative diseases; railroad sensors and green energy systems.

- Solid and polymer-based materials with controllable mechanical and physical properties (e.g., materials with SMA components, solid to liquid materials, materials with negative indexes);
- Early-stage diagnosis of neurodegenerative diseases – ultrasensitive biomarkers identification and detection methods, novel neuropsychological assessments, SPECT.
- Design of solid and polymer structures with controllable physical and mechanical properties for various applications utilizing functional materials and thin films;
- Study the properties and behaviour of structures with sputtered SMA films combined with other active materials (e.g., magneto-electrical material layers);
- Ultrasensitive mass, force, fluid, spin and quantum sensors based on magneto-electrical and smart memory alloy structures and films deposited partially on the elastic substrates;
- 4D metamaterials with embedded elements of smart materials (development of 3D printing techniques to combine polymers and metals

Languages:

Czech: *native speaker*   English: *fluent*   Chinese: *intermediate*   Polish: *passive*

Scientific / teaching awards:

2021   Ph.D. student supervision pay award, Institute of Physics, Czech Academy of Sciences, Prague, Czech Rep.

2019   Master degree thesis award (Ministry of Education of the People`s Republic of China) – thesis supervisor.

2015-2016 National Kaohsiung University of Applied Sciences, Academic Year Talent Merit Pay Award (for excellence in teaching and research), Kaohsiung, Taiwan.

Funded projects as (co-)Principal Investigator – academic project (last 5 years):

Ongoing projects

- 22-14387J – Design and manufacturing of 4D metamaterials based on printed structures with embedded elements of smart materials (4META), *Grant Agency of Czech Republic*, 2022-2024.
- 21-12994J – Smart MEMS/NEMS resonators with functional material layers utilizing local and global nonlinearities for ultrasensitive (bio)sensing applications, *Grant Agency of Czech Republic*, 2021-2023.

Finished projects

- 905299048034 – Contactless high frequency resonators utilizing lattice softening in NiMnGa for micro-robot applications, *Guangdong Province Science and Technology Agency*, 2020-2022.
- 13045866720 – Mechanics of micro-structures with embedded SMA elements, *Research fund of HIT-Shenzhen*; 2016-2019.
- 15-13174J – Micromechanical resonators with intentionally changeable physical and mechanical properties applicable in various biomaterials and physical sensors, *bilateral project GACR (Czech) – MOST (Taiwan)*, 2015-2017.
- MOST 104-2218-E-151-002- – Shape memory hybrid composite micro-structures with controllable physical and mechanical properties applicable in micro-/nanosized mechanical sensors, *MOST (Taiwan)*, 2015- 2016**.**

Industrial / applied research projects in Drazni revize s.r.o. as Head of R&D:

Ongoing projects
- FW01010281 – Axle Counter 4.0, *Technology Agency of Czech Republic*, 2020-2023.

Finished projects
- TM01000016 – Affordable Railroad Smart Sensing System 4.0, *Technology Agency of Czech Republic*, 2020-2022.

Profession Service (Editor & committee):

<u>*Special issue editor*</u>: *Metals* (IF=2.351); *Applied Sciences* (IF=2.679)

<u>*Associate editor:*</u> *Modeling and Numerical Simulation of Material Science*; *Future Integrative medicine.*

<u>*SCI journal reviewer:*</u> Nature Communications; ACS Sensors; Advanced electronics materials; Nanotechnology; Journal of Applied Physics, Applied Physics A; Smart materials and Structures; American Journal of Alzheimer's Disease and Other Dementias, Journal of Alzheimer`s disease, World journal of psychiatry.

Project evaluation expert:
- Technology Agency of Czech Republic, European Union (www.tacr.cz)
- Research projects of Charles University, Prague (www.cuni.cz)

SCI journal papers from 2020 ([*]corresponding author)**:**

1. C.-Y. Kuo, H.-Y. Tseng, **I. Stachiv**[*]**,** C.-H. Tsai, Y.-C. Lai, T. Nikolai. Combining neuropsychological assessment with neuroimaging to delineate early-stage Alzheimer`s disease from frontotemporal lobar degeneration in non-western tonal native language speaking individuals living in Taiwan: a case series. *J. Clin. Med.* (IF = 4.964) - *accepted*.

2. D. Vokoun, S. Samal, **I. Stachiv**[*] Impact of cyclic loading on mechanical properties and performance of Nafion directly applicable in design of micro/nanosensors. *Sensors* **2023**, *23*, 1488 (IF = 3.847).

3. W. Li and **I. Stachiv**[*] Computational Modeling and Parametric Analysis of SMA Hybrid Composite Plates under Thermal environment. *Sensors* **2023**, *23*, 1344 (IF = 3.847).

4. S. Samal[*]; B. Svomova; M. Spasova; O. Tyc; D. Vokoun; **I. Stachiv**. Physical, Thermal, and Mechanical Characterization of PMMA Foils Fabricated by Solution Casting. *Appl. Sci.* **2023,** *13*, 1016 (IF = 2.838).

5. **I. Stachiv**[*], C.-Y. Kuo, W. Li. Protein adsorption by nanomechanical mass spectrometry: Beyond the real-time molecular weighting. *Front. Molecul. Biosci.* **2023**, *9*, 1058441 (IF = 6.117).

6. S. Samal[*], O. Kosjakova, D. Vokoun, **I. Stachiv** Shape change and recovery of PMMA coated NiTi alloy under thermal cycles for SMA and SE substrate. *Polymers* **2022**, *14*, 2932 (IF = 4.329).

7. C.-Y. Kuo and **I. Stachiv**[*] Biological mechanisms and possible primary prevention of depression, *World Journal of Psychiatry* **2022**, 9, 770-772 (IF = 4.571). [Invited paper].

8. **I. Stachiv**[*], Z. Machu, O. Sevecek, Y.-R. Jeng[*], W.-L., Li; M. Kotoul, J. Prasek. Achievable accuracy of resonating nanomechanical systems for mass sensing of larger analytes in GDa range. *Int. J. Mech. Sciences* **2022**, *224*, 107353 (IF = 6.772).

9. D. Vokoun, S. Samal, **I. Stachiv**[*] Magnetic force microscopy in physics and biomedical applications, *Magnetochemistry* **2022**, *8*, 42 (IF = 3.336). [Editor`s choice]

10. **I. Stachiv**[*]**,** Z. Machu, O. Sevecek, O. Tuhovcak, M. Kotoul, Y.-R. Jeng[*] Resolving measurement of large (~GDa) chemical / biomolecule complexes with multimode nanomechanical resonators, *Sens. Act. B: Chem.* **2022**, *353*, 131062 (IF = 9.221).

11. **I. Stachiv**[*]**,** E. Alarcon, M. Lamac Shape Memory Alloys and Polymers for MEMS/NEMS Applications: Review on Recent Findings and Challenges in Design, Preparation, and Characterization, *Metals* **2021**, *11*, 415 (IF=2.695) [Editor`s choice & Featured paper].

12. **I. Stachiv**[*]**,** L. Gan, C.-Y. Kuo, P. Sittner, O. Sevecek, Mass Spectrometry of Heavy Analytes and Large Biological Aggregates by Monitoring Changes in the Quality Factor of Nanomechanical Resonators in Air, *ACS Sensors* **2020**, *5*, 2128 (IF=9.618).

13. C.-Y. Kuo, **I. Stachiv**[*], T. Nikolai Association of Late Life Depression, (Non-) Modifiable Risk and Protective Factors with Dementia and Alzheimer's Disease: Literature Review on Current Evidences, Preventive Interventions and Possible Future Trends in Prevention and Treatment of Dementia, *Int. J. Environ. Res. Public Health* **2020**, *17*, 7475 (IF=4.614).