

**RNDr. Hana Lísalová (Vaisocherová-Lísalová), Ph.D.**

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## PROFESSIONAL INTERESTS / RESEARCH EXPERTISE

I am interested in biophysics, interactions of biomolecules and complex biological systems with artificial surfaces, surface chemistries, new bio-functional materials, biomimetic systems, and point-of-care biosensors. These research topics are addressed via highly interdisciplinary research and advanced experimental techniques.

*Professional Experience Resume:* Accomplished research senior scientist in the area of biointerfaces and biosensors with 15+ years of experience from the Czech Republic and USA, project manager and team leader; Author of 40+ world-recognized publications, 3 book chapters and 6 patents; 5+ invited lectures; h-index Scopus: 24, WOS: 23, Citations (WOS): >2400; PhD in Biophysics, chemical and macromolecular physics; government body expert advisor, Supervisor of 5+ PhD students.

## EDUCATION

2002-2006      **Ph.D., RNDr.** - Charles University in Prague, Czech Republic

1998-2002      **M.Sc.** - Charles University in Prague, Czech Republic

## PROFESSIONAL EXPERIENCE

2019-present      **HEAD OF LABORATORY OF FUNCTIONAL BIOINTERFACES** | Institute of Physics of the Czech Academy of Sciences (FZU), Prague

- Pursued fundamental and applied interdisciplinary research in biofunctional coatings and their biosensing applications
- Design, synthesis, characterization, and functionalization of novel antifouling (bio)materials
- Research and development of biochip technologies for medical diagnostics and food safety
- Research on fundamentals of biomolecular interactions at artificial surfaces and nanostructures
- PI/Co-PI of multiple local and international research projects
- Served as scientific supervisor of 5+ PhD students and postdocs

2018-2019      Maternity Leave (3<sup>rd</sup> child)

2017-2018      **SENIOR SCIENTIST** | Institute of Physics of the CAS (FZU), Prague

- Leading research projects
- Served as a scientific supervisor of PhD students and undergraduates
- Development of (bio)functional coatings
- Research and development of piezoelectric and optical biosensors for food safety and medical diagnostics

2017-present      **EXPERT ADVISOR** | Ministry of Education, Youth, and Sports of the Czech Republic (part-time), research-related Operational Programmes advisor

2013-2017	<b>RESEARCH SCIENTIST</b>   Institute of Photonics and Electronics of the CAS, Prague Maternity Leave (1 <sup>st</sup> and 2 <sup>nd</sup> child)
2008-2012 206-2008	<b>POSTDOCTORAL RESEARCH FELLOW</b>   Department of Chemical Engineering, University of Washington, Seattle, research on antifouling zwitterionic functional biomaterials and their biosensor applications

## PUBLICATION ACTIVITIES

**h-index of 24 Scopus**, as of September 2022; 42 records and 2400+ citations according to WoS.

Selected journal publications:

1. I. Víšová, et al., **H. Vaisocherová-Lísalová**, Tuning of Surface Charge of Functionalized Poly(carboxybetaine) Brushes can Significantly Improve Label-Free Biosensing in Complex Media, *Advanced Materials Interfaces*, 2022, invited paper, selected for front cover page, DOI: 10.1002/admi.202201210.
2. M. Forinová et al., **H. Vaisocherová-Lísalová**, Functionalized terpolymer brush-based biointerface with improved antifouling properties for ultra-sensitive direct detection of virus in crude clinical samples, *ACS Appl Mat & Int*, 13 (50), 2021, DOI: 10.1021/acsami.1c16930. IF: 10.4; Times Cited (WOS): 8
3. J. Anthi, V. Kolivoska, **H. Vaisocherová-Lísalová**, Probing polymer brushes with electrochemical impedance spectroscopy: a mini review, *Biomaterials Science*, 2021, 10.1039/d1bm01330k. IF: 7.6; Times Cited (WOS): 8
4. R. Oborilova, H. Simeckova, et al., **H. Vaisocherova-Lisalova**, et al. Z. Farka, Atomic force microscopy and surface plasmon resonance for real-time single-cell monitoring of bacteriophage-mediated lysis of bacteria, *Nanoscale*, 2021, 13, 13538-13549. IF: 8.3; Times Cited (WOS): 2.
5. I. Víšová, B. Smolková, et al., **H. Vaisocherová-Lísalová**, Modulation of Living Cell Behavior with Ultra-Low Fouling Polymer Brush Interfaces, *Macromol Biosci*, 2020, 20, 1900351 (cover page image invited). IF: 5.8; Times Cited (WOS): 11. I Víšová, et al.,
6. **H. Vaisocherova-Lisalova**, Surface Preconditioning Influences the Antifouling Capabilities of Zwitterionic and Nonionic Polymer Brushes, *Langmuir*, 2020, 36, 8485-8493. IF: 4.3; Times Cited (WOS): 12
7. **H. Vaisocherová-Lísalová**, I. Víšová, et al., Low-fouling SPR biosensor for multi-step detection of foodborne bacterial pathogens in complex food samples, *Bios Bioel*, 2016, 80, 84-90, 10.1016/j.bios.2016.01.040. IF: 12.5; Times Cited (WOS): 139
8. **H. Vaisocherová**, V. Ševců, et al., Functionalized ultra-low fouling carboxy- and hydroxy-functional surface platforms: functionalization, biorecognition, and resistance to fouling from undiluted biology. media, *Bios Bioel*, 2014, 51, 50-157, DOI: 10.1016/j.bios.2013.07.015. IF: 12.5; Times Cited (WOS): 71.
9. **H. Vaisocherová**, W. Yang, et al., Ultralow fouling and functionalizable surface chemistry based on a zwitterionic polymer enabling sensitive and specific protein detection in undiluted blood plasma, *Anal Chem*, 2008, 80, 7894-7901, published as a correspondence paper, DOI: 10.1021/ac8015888, IF: 8; Times Cited (WOS): 342.
10. Z. Zhang. G. Cheng, **H. Vaisocherová**, et al., The hydrolysis of cationic polycarboxybetaine esters to zwitterionic polycarboxybetaines with controlled properties, *Biomaterials*, 2008, 29, 4719-4725, 10.1016/j.biomaterials.2008.08.030. IF: 19; Times Cited (WOS): 73

11. Z. Zhang, H. Vaisocherová, et. al., Nonfouling Behavior of Polycarboxybetaine-Grafted Surfaces: Structural and Environmental Effects, *Biomacromolecules*, 2008, 9, 2686 – 2992, 10.1021/bm800407r. IF: 7; Times Cited (WOS): 211.

#### APPLICATION RESULTS

6 patents; 8 functional samples of biosensor components documented; technology transfer experienced (for example, ongoing collaborative project with industrial partner CZ.01.1.02/0.0/0.0/20\_321/0024852).

#### PATENTS:

1. H. Lísalová, I. Víšová et al., Terpolymer and polymer brushes for use against non-specific adsorption of substances from biological media PCT/CZ2021/050033, filed in 2021.
  - I. Víšová, M. Houska, et al., H. Lísalová, Postup pro zvýšení odolnosti funkcionalizovaného substrátu obsahujícího karboxybetainové funkční skupiny vůči nežádoucí depozici z biologických médií, CZ 309305, granted in 2022.
2. H. Lísalová, I. Víšová, et al., Terpolymer pro použití proti nescifické adsorpci látek z biologických médií, polymerní kartáče jej obsahující, CZ 309314, granted in 2022.
3. C. Rodriguez-Emmenegger et al., H. Lísalová, J. Homola, Copolymer of N-(2-hydroxypropyl) methacrylamide and carboxybetaine methacrylamide, polymer brushes, WO2016177354, filed in 5/2016, US/EU granted.
4. H. Lísalová, E. Brynda, et al., Způsob přípravy povrchu substrátu obsahujícího karboxybetainové funkční skupiny, PV 2016-361, granted in 2017.
5. S. Jiang, Z. Zhang, S. Cheng, and H. Vaisocherová, Dual-functional Nonfouling Surfaces and Materials, WO/2008/083390. US8835144 B2, granted and licensed in 2014.

#### RESEARCH GRANTS

Since 2016 acquired more than 1.6 million Euro on national and international research grants and contract research projects:

		International
2019 – 2023	(ongoing project) Czech Academy of Sciences, PI, Lumina quaeruntur Praemium, Molecular-level mechanisms of biofouling at functional synthetic surfaces: from theories to novel bio-inspired materials, LQ100101902, 690 kEUR	
2021 – 2023	(ongoing project) Czech Science Foundation, standard project, PI, Advanced antifouling functional coatings in complex biological fluids, Institute of Physics of the Czech Academy of Sciences, 21-19779S, 200 kEUR.	
2021 – 2022	(ongoing project) OP PIK (co-funded by EU), Co-PI, Biosensors for sustainable industrial production, CZ.01.1.02/0.0/0.0/20_321/0024852, 180 kEUR	
2019 – 2021	Operational Programme Prague (co-funded from EU), PI, Advanced biochip technologies for food safety, CZ.07.1.02/0.0/0.0/17_049/0000832, 540 kEUR.	
2022 – 2024	(ongoing project) Bilateral project with CNR Italy, Czech Academy of Sciences, Czech PI, High-performance Nanolayer-coated fiber-based Biosensing platforms with Antifouling Brushes for detection of post-Acute COVID-19 Syndrome biomarkers in blood plasma, 12 kEUR (NABABAS).	Yes

### SELECTED INVITED TALKS AT INTERNATIONAL CONFERENCES

- 1 M. Forinová et al., **H. Vaisocherová-Lísalová**, Rapid detection of SARS-CoV-2 in real-world samples using A-QCM biosensor, XXVI. Annual Congress of Czech and Slovak Societies for Biochemistry and Molecular Biology with cooperation of Austrian and German Biochemical Section, České Budějovice, Czech Republic, 2021, invited lecture.
- 2 **H. Vaisocherová-Lísalová** et al., Rapid one-step quantitative detection of SARS-CoV-2 virus in crude samples using antifouling quartz crystal microbalance biosensor, European Biosensor Symposium (EBS) 2021, online oral presentation.
- 3 **H. Vaisocherová-Lísalová** et al., Functionalizable Ultra-Low Fouling Nonionic and Zwitterionic Surfaces: Effects of Surface Physico-Chemical Properties on Living Cells, ICBZM, Kerkrade, Netherlands, 2019.
- 4 **H. Vaisocherová**, J. Homola, Functionalized Ultra-low Fouling Surface Platforms for Biosensing in Real-world Media, OSA Advanced Photonics Congress, Barcelona, Spain, 2014 (invited).

### AWARDS AND FELLOWSHIPS

2022	Werner von Siemens Award for supervising PhD dissertation thesis (2 <sup>nd</sup> place)
2019	Lumina Quaeruntur Award for perspective scientists (Czech Academy of Sciences)
2018	Otto Wichterle Award (Czech Academy of Sciences)
2011	Czech L'ORÉAL-UNESCO Award for Women in Science
2006	Bolzano Award of the Charles University for doctoral dissertation thesis

### COMMISSIONS OF TRUST AND SERVING SCIENTIFIC COMMUNITY

2022 - Present	Nominated Member of Young Academy of Europe
2017 – Present	Reviewer of research grant proposals for the Czech Agency for Medical Research (Czech Republic), Czech Ministry of Education, Youth, and Sports (Czech Republic), Technology Agency of the Czech Republic, FWF Austrian Science Fund (Austria).
2019 – Present	Member of Ethical Committee of the FZU of the Czech Academy of Sciences
2018 – Present	Nominated Member of the Academy Assembly of the Czech Academy of Sciences
2015 – 2017	Member of the Board of the Institute, Institute of Photonics and Electronics of the Czech Academy of Sciences, Prague
2022 – Present	Nominated member of the Branch Board Biophysics, Chemical and Macromolecular Physics (4F4), Faculty of Mathematics and Physics, Charles University in Prague
2015 – Present	Member of Editorial Boards/Guest Editor of peer-reviewed journals: Journal of Sensors, Journal of Functional Biomaterials.
2015 – Present	Participating in Gender and Science Programme
2015 – Present	Science popularization activities – numerous popularization lectures, TV/Video/Radio spots

### TEACHING AND SUPERVISION OF STUDENTS

2018 – Present	Scientific supervisor of 5+ Ph.D. students and postdocs, 1 student received a Ph.D. degree under my supervision in 2021 and this PhD thesis titled “THE STUDY ON INTERACTIONS OF FUNCTIONAL SURFACES WITH BIOLOGICAL SYSTEMS” (and supervision) was awarded by Werner von Siemens Award 2022
2022 – Present	Supervision of 6 undergraduate students via Open Science activity organized by the Czech Academy of Sciences.
2022 – Present	Supervisor of undergraduates via <a href="#">Radius Centre project</a> organized by the Institute of Physics of the Czech Academy of Sciences