

## PERSONAL INFORMATION:

Family name, First name: **VACHA, ROBERT**  
Date of birth: 29<sup>th</sup> December 1980  
ResearcherID, ORCID: M-3809-2019, 0000-0001-7610-658X  
URL for web site: <http://vacha.ceitec.cz/>  
H-index, articles, citations: 30, 55, 2900

## EDUCATION:

09/05 – 06/09 **Ph.D.** with **Pavel Jungwirth** at Faculty of Science, Charles University in Prague - ***Molecular simulations of surfaces of aqueous solutions***  
09/07 – 06/09 **International Max Planck Research School** for "Dynamical Processes in Atoms, Molecules and Solids" in Dresden, Germany  
09/99 – 05/05 **MSc.** in Biophysics and Chemical Physics at Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic

## POSITIONS:

07/17 – **Group leader**, CEITEC (Central European Institute of Technology) and Faculty of Science at Masaryk University, Brno (Czech Republic)  
04/16 – 06/17 **Associate Professor** and **Researcher**, CEITEC (Central European Institute of Technology) and Faculty of Science at Masaryk University, Brno (Czech Rep.)  
10/11 – 04/16 **Assistant Professor** and **Researcher**, CEITEC (Central European Institute of Technology) and Faculty of Science at Masaryk University, Brno (Czech Rep.)  
08/11 – 10/11 **Postdoctoral Research Associate**, group of Mikael Lund, Department of Chemistry, **Lund University** (Sweden)  
08/09 – 07/11 **Postdoctoral Research Associate**, group of Daan Frenkel, Department of Chemistry, **University of Cambridge** (UK)

## FELLOWSHIPS:

06/10 – 08/11 **Junior Research Fellowship** at Churchill College, Cambridge Highly competitive research fellowship - few postdoc positions within the whole University of Cambridge per year  
11/08 – 12/08 **Fellowship** in group of Nobuyuki Matubayasi at Institute for Chemical Research, **Kyoto University** in Japan: *Investigation and application of free energy calculations*  
09/07 – 09/07 **Short fellowship** in group of **Max Berkowitz** at University of North Carolina, USA  
07/06 – 08/06 **Fellowship** in group of **Rainer Böckmann** at University of Saarland, Germany

## INSTITUTIONAL RESPONSIBILITIES:

2011 – Faculty member, Masaryk University, Czech Republic  
2013 – Member of MSc. committee, Faculty of Science, Masaryk University, Czech Rep.  
2017 – Member of IT committee at CEITEC MU

## GRANTS:

2020 – 2025 Ministry of Education Youth and Sports of Czech Republic (**ERC CZ**) – PI, Peptide Killers, 5 years (2 500 000 EUR)  
2020 – 2022 Czech Science Foundation grant (**GACR**) – PI, Protein Affinity and Selectivity to Cellular Membranes, 3 years (320 000 EUR)  
2018 – 2019 Technology Agency of the Czech Republic (**TACR**) – PI, Toxicity and Activity of Antimicrobial Peptides, 1 year (31 000 EUR)  
2017 – 2019 Czech Science Foundation grant (**GACR**) – PI, Amphiphilic Peptides at Phospholipid Membranes, 3 years (180 000 EUR)  
2017 – 2019 Grant Agency of Masaryk University (**GAMU**) – co-PI, Computational chemistry for Wnt signaling pathway, 3 years (190 000 EUR)  
2014 – 2016 Czech Science Foundation grant (**GACR**) – PI, Self-assembly of patchy spherocylinders, 3 years (160 000 EUR)

## INVITED LECTURES (selected in last 5 years):

2018 CECAM workshop - Nano-structured soft matter: a synergy of approaches to amphiphilic and block copolymer systems, Lincoln, United Kingdom  
2018 43<sup>rd</sup> FEBS Congress Prague, Czech Republic  
2018 CECAM workshop - Frontiers in Computational Biophysics, Lugano, Switzerland

- 2017 CECAM workshop - The future of biomembrane simulations: hidden pitfalls and future challenges, Lyon, France
- 2017 Joint Meeting of Czech and German Biophysicists, Hünfeld, Germany
- 2016 Organizing Molecular Matter - A soft matter symposium, Lund, Sweden

#### AWARDS:

- 2014 Best talk of early stage researcher – CECAM workshop
- 2013 International travel award from Biophysical Society
- 06/10 – 08/11 **Junior Research Fellowship** at Churchill College, Cambridge  
Highly competitive and prestigious research fellowship – a dozen postdoctoral positions are offered per year within the whole of the University of Cambridge
- 2010 **Bolzano Prize** in natural sciences - Charles University in Prague – awarded to the two best Ph.D. theses in the natural sciences at Charles University each year
- 09/99 – 06/04 Scholarship for the 50 best students in each year (about 10% of all students)

#### TEACHING ACTIVITIES AND MENTORING:

- 2017 - **Lecturing** – *Problems and issues of molecular modelling* C9926 Masaryk University, Brno, Czech Republic
- 2015 - **Lecturing** - *Physics of biopolymers* F8510 Masaryk University, Czech Republic
- 2013 - **Lecturing** - *Interactions of proteins and membranes – introduction to soft matter* NBCM147, Charles University, Prague, Czech Republic
- 2012 - **Lecturing** - *Introduction to soft matter models of membranes and proteins* C9925, Masaryk University, Brno, Czech Republic

#### MAJOR RESEARCH COLLABORATIONS:

- Mikael Lund – Lund University, Sweden – Development of new protein models and Monte Carlo methods (7 joint papers and 1 in preparation)
- Sara Linse and Emma Sparr – Lund University, Sweden – Experiments on protein self-assembly and their interaction with lipid membranes (2 joint papers)
- Martin Hof – Academy of Sciences, Czech Rep. – Fluorescence measurements on phospholipid membranes and proteins (5 joint papers and 2 papers in preparation)
- Karl Lohner and Georg Pabst– University of Graz, Austria – SAXS, SANS, leakage assays, antimicrobial peptide activity (3 joint paper and 1 in preparation)
- Pavel Plevka – Masaryk University, Czech Republic – CryoEM of viruses and their interactions (1 joint paper and 2 papers in preparation)

#### SELECTED PUBLICATIONS (in last 5 years):

In total, I have published **55 peer-reviewed articles**, 1 book chapter and 3 editorial comments resulting in more than **3100 citations** (excluding self-citations, ISI Web of Science, Jan 2020), yielding an **H-index of 30**. These publications include Nature Communication, PNAS, Nano letters, ACS Nano, JACS, Angewandte Chemie, and Accounts of Chemical Research.

- Buchta, D.; Füzik, T.; Hřebík, D.; Levčanský, Y.; Sukeník, L.; Mukhamedova, L.; Moravcová, J.; **Vácha, R.**; Plevka, P.: Enterovirus particles expel capsid pentamers to enable genome release. *Nature Communication* **2019**, 10, 1138
- Harnoš, J.; Alonso Cañizal, M.C.A.; Jurásek, M.; Kumar, J.; Holler, C.; Schambony, A.; Hanáková, K.; Bernatík, O.; Zdráhal, Z.; Gömöryová, K.; Gybel, T.; Radaszkiewicz, T.W.; Kravec, M.; Trantírek, L.; Ryneš, J.; Dave, Z.; Fernández-Llamazares, A.I.; **Vácha, R.**; Tripsianes, K.; Hoffmann, C.; Bryja, V.: Dishevelled-3 conformation dynamics analyzed by FRET-based biosensors reveals a key role of casein kinase 1. *Nature Communication* **2019**, 10, 1804
- Tuerkova, A.; Kabelka, I.; Králová, T.; Sukeník, L.; Pokorná, Š.; Hof, M.; **Vácha, R.**: Effect of helical kink in antimicrobial peptides on membrane pore formation. *eLife* **2020**, 9, e47946
- Schubertová, V.; Martínez-Veracochea, F.J.; **Vácha, R.**: Design of Multivalent Inhibitors for Preventing Cellular Uptake. *Scientific Reports* **2017**, 7, 11689
- Amaro, M.; Sachl, R.; Aydogan, G.; Mikhalyov, I.I.; **Vácha, R.**; Hof, M.: GM1 Ganglioside Inhibits beta-Amyloid Oligomerization Induced by Sphingomyelin. *Angewandte Chemie International Edition* **2016**, 55, 1-6
- Kabelka, I.; Pachler, M.; Prévost, S.; Letofsky-Papst, I.; Lohner, K.; Pabst, G.; **Vácha, R.**: Magainin 2 and PGLa in Bacterial Membrane Mimics II: Membrane Fusion and Sponge Phase Formation. *Biophysical Journal* **2020**, 118, 3, 612-623
- Kabelka, I.; **Vácha, R.**: Optimal Hydrophobicity and Reorientation of Amphiphilic Peptides Translocating Through Membrane. *Biophysical Journal* **2018**, 115 (6), 1045-1054, IF=3.632