

# CURRICULUM VITAE

Prof. Dr. Martin Hof DSc.

Vice-Director at J. Heyrovský Institute of Physical Chemistry; Academy of Sciences of the Czech Republic (ASCR)

born 21.9.1962 in Friedberg/Germany; Permanent residenceship in the Czech Republic since 1996

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Family: Married to Mgr. Iveta Hofova, November 25, 1995; 1 child, Maxim (born May 28, 1997)

## **Education and positions**

### Education:

1987 "Diplom-Chemicker" at the "Universität Würzburg"; ("with excellence (1.0)")  
1990 Dissertation in Physical Chemistry at the "Universität Würzburg" ("with excellence (1.0)")  
1999 Habilitation at the "Faculty for Chemistry and Pharmacy" of the "Universität Würzburg".  
2006 Doctor of Science (DSc.), Academy of Sciences of the Czech Republic  
2009 Full Professor for Physical Chemistry named by the Czech president

### Professional positions:

2007→ Vice-Director of the J. Heyrovský Institute of Physical Chemistry  
2007-2012 Chairman of the Board of the J. Heyrovský Institute of Physical Chemistry  
2006-2011 Coordinator of the Research Centre „Advanced Fluorescence Microscopy in Biosciences“  
2006→ Head of the newly founded Department of Biophysical Chemistry  
2004-2006 Chairman of the Scientific Board of the J. Heyrovský Institute of Physical Chemistry  
2001→ Lecturer and PhD adviser at the Faculties of Nature Sciences of the Charles University Prague and of the Palacky University Olomouc, at the Faculty of Nuclear Sciences and Physical Engineering of the Czech technical University in Prague, and at the Biological Faculty of the South Bohememian University  
  
2000→ Senior Research Fellow at the J. Heyrovský Institute of Physical Chemistry;  
2000 Start-up of an own scientific group.  
  
1997-1999 Assistant Professor at the Julius-Maximilians-Universität Würzburg (Habilitation stipend)  
1997-1999 Research Fellow at the J. Heyrovský Institute of Physical Chemistry  
1996 Visiting scientist at the University of Patras, Greece  
1993-1995 Visiting scientist (Habilitation stipend) at the Charles University Prague (Physical Chemistry)  
1991-1993 "Postdoctoral Fellowship" at the "University of North Carolina at Chapel Hill (USA)" and University Würzburg

## **Fellowship awards**

1991 Dissertation awarded by the "Unterfränkische Gedenkjahresstiftung" as an outstanding bavarian dissertation  
1987, 1991, 1993, 1997 Four Stipends: PhD (Fonds der Deutschen Chemischen Industrie), Post-Doc (Deutsche Forschungsgemeinschaft), and two Habilitation Stipends (Fonds der Deutschen Chemischen Industrie, Deutsche Forschungsgemeinschaft)  
2007 Award of the AS CR for exceptionally successful solution of program and grant projects  
2011 Elected Fellow of the Learned Society of the Czech Republic  
2011 Praemium Academie by the AS CR (comparable to the Leibniz award in Germany).

## Research profile

Research focuses on the development of novel fluorescence techniques and their applications in biophysics and biology. The group succeeded to develop and apply several novel fluorescence techniques including the fluorescence solvent relaxation technique, z-scan Fluorescence Correlation Spectroscopy (FCS), Fluorescence Lifetime Correlation Spectroscopy (FLCS), Fluorescence Spectral Correlation Spectroscopy (FSCS) and Dynamic Saturation Optical Microscopy (DSOM). Moreover, the group implemented cutting edge fluorescence techniques (e.g. raster image correlation spectroscopy (RICS), photoactivation localization microscopy (PALM), cross correlation Number & Brightness analysis) and further improved such already existing techniques (fluorescence lifetime imaging (FLIM/FRET) for quantitative size determination of nanodomains, fluorescence antibunching for membrane-associated aggregation phenomena, and 2-foci FCS). Applications of those techniques are connected with running/recent grants, like e.g.: The role of hydrophobic plasma membrane interior in DOR regulation of trimeric G protein activity (ends 2016); Exploring the structure function relationship of membrane-pore-forming FGF2 oligomers - a single molecule approach (2016); Membrane interactions of proteins associated with alzheimer's disease and parkinson's disease implications for diseases' pathologies and therapeutic avenue (2015); Molecular level physiology and pathology of oxidized phospholipids (ended 2012); Specific ion effects for proteins in solution and related biologically relevant systems (2012).

### **15 representative publications starting from the year 2002 (out of 149 since 2002; group members in bold)**

1. **Sýkora, J.**; Brezovský, J.; Koudeláková, T.; Lahoda, M.; Fořtová, A.; **Chernovets, T.**; Chaloupková, R.; Štěpánková, V.; Prokop, Z.; Smatanová, I.K.; **Hof, M.**; Damborský, J. **Dynamics and hydration explain failed functional transformation in dehalogenase design.** 2014, *Nat. Chem. Biol* 10, 428–430.
2. **Štefl, M.**; **Šachl, R.**; **Olžýnska, A.**; **Amaro, M.**; Savchenko, D.; Deyneka, A.; Hermetter, A.; **Cwiklik, L.**; **Humpolíčková, J.**; **Hof, M.** **Comprehensive portrait of cholesterol containing oxidized membrane.** 2014, *BBA - Biomembranes*, 1838, 7, 1769-1776.
3. **Jurkiewicz, P.**; **Cwiklik, L.**; **Vojtíšková, A.**; Jungwirth, P.; **Hof, M.** **Structure, Dynamics, and Hydration of POPC/POPS Bilayers Suspended in NaCl, KCl, and CsCl Solutions.** 2012, *BBA - Biomembranes* 1818, 3, 609-616
4. **Štefl, M.**; **Šachl, R.**; **Humpolíčková, J.**; **Cebecauer, M.**; **Macháň, R.**; **Kolářová, M.**; Johansson, L.B.-Å.; **Hof, M.** **Dynamics and Size of Cross-Linking-Induced Lipid Nanodomains in Model Membranes.** 2012, *Biophysical Journal* 102, 9, 2104-2113.
5. **Šachl, R.**; **Humpolíčková, J.**; **Štefl, M.**; Johansson, L.B.-Å.; **Hof, M.** **Limitations of Electronic Energy Transfer in Lipid Nanodomain Size Estimation.** 2011, *Biophys. J.*, 101, L60-L62.
6. Huranová, M.; Ivani, I.; **Benda, A.**; Poser, I.; Brody, Y.; **Hof, M.**; Shav-Tal, Y.; Neugebauer, K.; Staněk D. **The differential interaction of snRNPs with pre-mRNA reveals splicing kinetics in living cells.** 2010, *Journal of Cell Biology* 191, 75-
7. **Humpolíčková, J.**; **Benda, A.**; **Macháň, R.**; Enderlein, J.; **Hof, M.** **Dynamic saturation optical microscopy: employing dark-state formation kinetics for resolution enhancement.** 2010, *Physical Chemistry Chemical Physics* 12, 12457-
8. Jesenská, A., J. **Sýkora, A.** **Olžýnska, J.** Brezovský, Z. Zdráhal, J. Damborský, and **M. Hof.** **Nanosecond Time-Dependent Stokes Shift at the Tunnel Mouth of Haloalkane Dehalogenases.** *Journal of the American Chemical Society*, 2009. 131(2): p. 494-501.
9. **Humpolíčková, J.**, **A. Benda, J. Sýkora, R. Macháň, T. Kral, B. Gasinska, J. Enderlein,** and **M. Hof.** **Equilibrium dynamics of spermine-induced plasmid DNA condensation revealed by fluorescence lifetime correlation spectroscopy.** *Biophysical Journal*, 2008. 94(3): p. L17-L19.
10. **Jurkiewicz, P., A. Olžýnska, M. Langner,** and **M. Hof.** **Headgroup hydration and mobility of DOTAP/DOPC bilayers: A fluorescence solvent relaxation study.** *Langmuir*, 2006. 22(21): p. 8741-8749
11. **Przybyło, M., J. Sýkora, J. Humpolíčková, A. Benda, A. Zan,** and **M. Hof.** **Lipid diffusion in giant unilamellar vesicles is more than 2 times faster than in supported phospholipid bilayers under identical conditions.** *Langmuir*, 2006. 22(22): p. 9096-9099
12. **Humpolíčková, J., E. Gielen, A. Benda, V. Fagulovala, J. Vercaammen, M. Vandeven, M. Hof, M. Ameloot,** and Y. Engelborghs. **Probing diffusion laws within cellular membranes by Z-scan fluorescence correlation spectroscopy.** *Biophysical Journal*, 2006. 91(3): p. L23-L25
13. **Beneš, M., D. Billy, A. Benda, H. Speijer, M. Hof,** and W.T. Hermens. **Surface-dependent transitions during self-assembly of phospholipid membranes on mica, silica, and glass.** *Langmuir*, 2004. 20(23): p. 10129-10137.
14. **Benda, A., M. Beneš, V. Mareček, A. Lhotský, W.T. Hermens,** and **M. Hof.** **How to determine diffusion coefficients in planar phospholipid systems by confocal fluorescence correlation spectroscopy.** *Langmuir*, 2003. 19(10): p. 4120-
15. **Sýkora, J., P. Kapusta, V. Fidler,** and **M. Hof.** **On what time scale does solvent relaxation in phospholipid bilayers happen?** *Langmuir*, 2002. 18(3): p. 571-574