

Deputy Director for Science
Frank Laboratory of Neutron Physics
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Curriculum vitae

Academy:

- 1994 – 1999 Faculty of Mathematics and Physics,
Comenius University in Bratislava, Slovakia
Student of Theoretical and Mathematical Physics
Master (Diploma) Thesis: Model-independent determination of the course of the
electromagnetic form factor of pion.
Supervisor: Professor A.Z.Dubničková
- 1999 – 2003 Faculty of Pharmacy and Faculty of Mathematics and Physics,
(14.5.2003) Comenius University in Bratislava, Slovakia
PhD. student of Biophysics
PhD. project: SANS and SAXS studies of the effects of additive molecules on the
phospholipid membranes.
Supervisor: Associate Professor P. Balgavý
- 10.3.2017 Pavol Jozef Šafárik University in Košice, Slovakia
Doctor of Physical Sciences
Doctoral dissertation: Biophysical Perspectives of Model Biological Membranes Studied
by Neutron and X-ray Scattering

Professional Career:

- 1999 – 2003 Faculty of Pharmacy Comenius University in Bratislava
PhD graduate student at the Department of chemical theory of drugs
- 2003 – 2006 Department of Physics, Carnegie Mellon University, Pittsburgh, Pennsylvania
Postdoctoral Research Associate in the Biophysical laboratory of Professor John F. Nagle
- 2006 – 2008 National Research Council of Canada – Canadian Neutron Beam Centre v Chalk River,
Ontario
Postdoctoral Research Associate in the Biophysical group of Dr. John Katsaras
- 2007 – pres. Faculty of Pharmacy Comenius University in Bratislava**
Faculty member at Department of Physical Chemistry of Drugs
- 2008 – 2011 NRC, Canadian Neutron Beam Centre, Chalk River, Ontario
Biophysical group of John Katsaras
Assistant Research Officer under the Research Associate Program
- 2011 – 2013 NRC, Canadian Neutron Beam Centre, Chalk River, Ontario
Assistant Research Officer
- 2013 – 2014 NRC, Canadian Neutron Beam Centre, Chalk River, Ontario
Associate Research Officer
Seconded to the Atomic Energy of Canada Limited, Chalk River, Ontario
- 2014 – pres. JINR, Frank Laboratory of Neutron Physics, Dubna, Russia**
Deputy Director for Science

Teaching and Research Experience

- 1999 – 2003 Biophysical Laboratory of Prof. P. Balgavý
Faculty of Pharmacy, Comenius University in Bratislava, Slovak Republic
- 2001 – 2003 Teaching Assistant for Introductory course to Molecular Modeling
Faculty of Pharmacy, Comenius University in Bratislava, Slovak Republic
- 2000, 2001 Small Angle Neutron Spectrometer YUMO
Joint Institute of Nuclear Research, Dubna, Russia
- 2002 Small Angle Neutron Spectrometer PAXE
Laboratoire Léon Brillouin, CEA/Saclay, France
- 2003 – 2006 Biophysical Laboratory of Prof. J. F. Nagle
Physics Department, Carnegie Mellon University, Pittsburgh, PA, USA
- 2003 – 2012 X-ray spectrometers C1, D1 a G1
Cornell High Energy Synchrotron Source in Ithaca, New York
- 2004, 2005 Advanced Neutron Diffractometer/Reflectometer, National Institute of Standards and
Technology, Gaithersburg, Meryland
- 2006 – 2011 Biophysical laboratory of Dr. J. Katsarasa, Canadian Neutron Beam Centre v Chalk River,
Ontario
- 2006, 2009 Small Angle Neutron Spectrometer NG7, National Institute of Standards and Technology,
Gaithersburg, Meryland
- 2009, 2011 Small Angle Neutron Spectrometer BioSANS, Oak Ridge National Laboratory, Oak
Ridge, Tennessee
- 2006 – 2014 Neutron “triple-axis” spectrometer N5 and reflectometer D3, Canadian Neutron Beam
Centre v Chalk River, Ontario
- 2008 – 2014 Co-supervisor of 3 master students, 3 graduate students and 3 doctoral students at the N5
spectrometer, Canadian Neutron Beam Centre v Chalk River, Ontario
- 2015 – 2017 Lecturer of the course Experimental methods in molecular biophysics
Moscow Institute of Physics and Technology in Dolgoprudny, Russia
- 2016 – 2017 Supervisor of 1 master student, 1 graduate student and 1 postdoctoral fellow

Management Experience

- 2011 – 2014 National Research Council of Canada – Canadian Neutron Beam Centre in Chalk River, ON
Research program manager
- 2013 National Research Council of Canada – Canadian Neutron Beam Centre in Chalk River, ON
Workshop organizer
- 2014 – pres. Frank Laboratory of Neutron Physics, Dubna, Russia
Deputy Director for Science
- 2015 Frank Laboratory of Neutron Physics, Dubna, Russia
Program committee member of the AYSS conference
- 2015 – pres. Central European Neutron Initiative – Institut Laue-Langevin, Grenoble, France
Representative of Slovak Republic
- 2016 Frank Laboratory of Neutron Physics, Dubna, Russia
Co-chairman of the III International Conference on SANS
- 2016 Faculty of Pharmacy, Comenius University in Bratislava, Slovak Republic
Chairman of the 4th EJTEMM conference

Scientific Membership

- 2003 – 2014 Biophysical Society, USA
2006 – 2008 Advanced Foods and Materials Network, Canada
2006 – 2009 The Canadian Association of Physicists, Canada
2006 – pres. Canadian Institute for Neutron Scattering, Canada
2012 – pres. Slovak Biophysical Society, Slovakia
2015 – pres. Slovak Physical Society, Slovakia

Fellowships and Awards

- 2000, 2001, 2002 Comenius University Fellowship, Slovakia
2000 Summer-school Fellowship, Ruder Boškovic Institute, Chorvátsko
2001 HERCULES Fellowship, Université Joseph Fourier in Grenoble, France
2002 International Travel Award for XIV International Biophysics Congress, IUPAB, France
2003 International Travel Award for the 3rd ECNS conference, LLB Saclay, France
2005 Scientific work of young physicists award, Slovak Physical Society, Slovakia
2008 – 2010 Co-proponent of VEGA grant 1/0295/08
2009 Award for three-year scientific impact, Literary fond, Slovakia
2009 – 2014 Co-investigator of collaborative project JINR, Dubna – FPharmUK, Bratislava
2010 Scientific work of young physicists award, Slovak Physical Society, Slovakia
2011 – 2012 Co-proponent of VEGA grant 1/0159/11
2014 – 2015 Co-investigator of Ontario Research Fund grant
2012 – 2015 Co-proponent of VEGA grant 1/1224/12
2015 – 2017 Principal investigator of collaborative project JINR, Dubna – FPharmUK, Bratislava
2015 Award for three-year scientific impact, Literary fond, Slovakia
2017 Prize for scientific impact awarded by Slovak Physical Society, Slovakia

Summary of Skills and Experiences

- Theoretical and Mathematical Physics (master degree)
- Membrane Biophysics (PhD and DrSc degree)
- Teaching experience in Molecular Modeling, Experimental Methods in Molecular Biophysics
- Preparation of biomembranes in a form of unilamellar vesicles via extrusion technique, or oriented multilayers via deposition from solvent
- Experience in performing Small Angle Neutron Scattering (JINR, Dubna, Russia; LLB, Saclay, France; NIST, Gaithersburg, USA; CNBC, Chalk River, Canada), Neutron Diffraction and Reflectometry (NIST, Gaithersburg, USA; CNBC, Chalk River, Canada; ILL, Grenoble, France)
- Experience in performing Small Angle X-ray Scattering, and X-ray Diffraction (CHESS, Ithaca, USA; Rigaku Ultima III, Chalk River, Canada)
- Extensive experience in data analysis
- Computer Languages: Fortran, C++, Tcl/Tk
- Computer Operating Systems: MS Windows, Linux Red Hat/Fedora Core, Mac OS X
- Office productivity: LaTeX, MS Office (Word, PowerPoint, Excel, Outlook)
- Languages: Slovak, English, Russian

- 2013 Bio-Workshop - satellite to the 12th Canadian Neutron Scattering Summer School, Chalk River, Ontario, June 7, 2013
- 2013 Biological Membranes and Membrane Proteins: Challenges for Theory and Experiment, Snowmass, Colorado, July 21-26, 2013
- 2014- invited** 39th meeting of the Program Advisory Committee for Condensed Matter Physics, Joint Institute of Nuclear Research in Dubna, Russia, January 20-21, 2014
- 2014 39th meeting of the Program Advisory Committee for Nuclear Physics, Joint Institute of Nuclear Research in Dubna, Russia, January 30-31, 2014
- 2014 Biophysical society 58th annual meeting, San Francisco, California, February 15-19, 2014
- 2014 International Conference "Condensed Matter Research at IBR-2", Dubna, Moscow region, Russia, June 24-27, 2014
- 2014- invited** Complex and Magnetic Soft Matter Systems: Physico-Mechanical Properties and Structure, Dubna, Russia, 29 September - 3 October 2014
- 2014 Совещание по использованию рассеяния нейтронов и синхротронного излучения в конденсированных средах, Санкт-Петербург, Старый Петергоф, 27-31 октября 2014
- 2015- invited** XIX International Conference of Young Scientists and Specialists, Dubna, Russia, February 16-20, 2015
- 2015- invited** Institute of Molecular Biosciences seminar, Univeristy of Graz, Austria, April 14, 2015
- 2015- invited** VIII International Spring School on Nuclear Physics - JINR Days in Bulgaria, Borovets, Bulgaria, May 19-22, 2015
- 2015 10th European Biophysics Congress, Dresden, Germany, July 18-22, 2015
- 2015 21. konferencia slovenských fyzikov, Nitra, Slovakia, September 7-10, 2015
- 2015- invited** 3rd European Joint Theoretical/Experimental Meeting on Membranes, Stockholm, Sweden, September 30 - October 2, 2015
- 2016 III International Conference on Small Angle Neutron Scattering, Dubna, Russia, June 6 - 9, 2016
- 2016-invited** Student Training Course, FLNP JINR, Dubna on August 29 - Spetember 2, 2016
- 2016 4th European Joint Theoretical/Experimental Meeting on Membranes, Bratislava, Slovakia, September 7 - 9, 2016
- 2017-invited** School of XFEL and Synchrotron Radiation Users, Liptovsky Jan, Slovakia, May 9-12, 2017
- 2017 The Future of Biology and Soft Matter Research on Reactor PIK, St. Peterhof, Russia, May 14-16, 2017
- 2017 Complex and Magnetic Soft Matter Systems: Physico-Mechanical Properties and Structure, Dubna, Russia, June 28-30, 2017
- 2017-invited** Neutron Diffraction and the Mesoscale, Daejeon, Republic of Korea, July 6-7, 2017
- 2017 International Conference on Neutron Scattering, Daejeon, Republic of Korea, July 9-13, 2017
- 2017-invited** The 8th International Student Summer School "Nuclear Physics – Science and plications", Brasov, Romania, July 26 - August 4, 2017
- 2017-plenary** 19th conference of czech and slovak physicists, Presov, Slovakia, September 4-7, 2017
- 2017 Molecular Simulation Studies in Materials and Biological Sciences, St. Petersburg, Russia, September 7-10, 2017
- 2017-plenary** XXI International Scientific Conference of Young Scientists and Specialists, Dubna, Russia, October 2-6, 2017

2017-invited 5th European Joint Theoretical/Experimental Meeting on Membranes, Krakow, Poland, December 6-8, 2017

2018 Physics of liquid matter: Modern problems, Kiev, Ukraine, May 18-22, 2018

2018 School of XFEL and Synchrotron Radiation Users, Liptovsky Jan, Slovakia, May 27-31, 2018

2018 Membranes Beyond, Hamilton, Ontario, July 2-4, 2018

- Norbert Kučerka, Daniela Uhríková, Biophysical perspectives of lipid membranes through the optics of neutron and X-ray scattering. in Biological Membranes edited by Mu-Ping Nieh, Fred A. Heberle and John Katsaras. DeGruyter (*submitted*).
- Tomáš Kondela, Jana Gallová, Thomas Hauß, Jonathan Barnoud, Siewert-J. Marrink, Norbert Kučerka; Alcohol interactions with lipid bilayers. *Molecules* 22 (2017) 2078.
- Kondela T., Gallová J., Hauß T., Ivankov O., Kučerka N., Balgavý P.; Effect of alkan-1-ols on the structure of dopc model membrane. *European Pharmaceutical Journal* 64 (2017) 4-8.
- Norbert Kučerka, Ermuhammad Dushanov, Kholmirzo T. Kholmurodov, John Katsaras, and Daniela Uhríková; Cation-Containing Lipid Membranes - Experiment and Simulations. *European Pharmaceutical Journal* 64 (2017) 9-14.
- Norbert Kučerka, Ermuhammad Dushanov, Kholmirzo T. Kholmurodov, John Katsaras, and Daniela Uhríková; Lipid membranes loaded with Ca²⁺ and Zn²⁺ cations. *Journal of Physics: Conference Series* 848 (2017) 012008.
- Norbert Kučerka, Ermuhammad Dushanov, Kholmirzo T. Kholmurodov, John Katsaras, and Daniela Uhríková; Calcium and zinc differentially affect the structure of lipid membranes. *Langmuir* 33 (2017) 3134-3141.
- Drew Marquardt, Norbert Kučerka, Stephen R. Wassall, Thad A. Harroun, John Katsaras; Cholesterol's location in lipid bilayers. *Chemistry and Physics of Lipids* 199 (2016) 17-25.
- Xiaoling Leng, Jacob J. Kinnun, Drew Marquardt, Norbert Kučerka, John Katsaras, Jeffrey Atkinson, Thad A. Harroun, Scott E. Feller and Stephen R. Wassall; α -Tocopherol Is Well Designed to Protect Polyunsaturated Phospholipids: MD Simulations. *Biophysical Journal* 109 (2015) 1608-1618.
- Norbert Kučerka, Frederick Heberle, Jianjun Pan, John Katsaras; Structural Significance of Lipid Diversity as Studied by Small Angle Neutron and X-ray Scattering. *Membranes* 5/3 (2015) 454-472.
- Michal Belička, Yuri Gerelli, Norbert Kučerka, Giovanna Fragneto, The component group structure of DPPC bilayers obtained by specular neutron reflectometry. *Soft Matter* 11/31 (2015) 6275-6283.
- Yan Xia, Ming Li, Norbert Kučerka, Shutao Li, Mu-Ping Nieh, In-Situ Temperature-Controllable Shear Flow Device for Neutron Diffraction and SANS Measurements - An Example of Aligned Bicellar Mixtures. *Review of Scientific Instruments* 86 (2015) 025112-7.
- Drew Marquardt, Norbert Kučerka, John Katsaras, and Thad A. Harroun, α -Tocopherol's location in membranes is not affected by their composition. *Langmuir* 31/15 (2015) 4464-4472.
- Norbert Kučerka, Brad Van Oosten, Jianjun Pan, Frederick A. Heberle, Thad A. Harroun, and John Katsaras, Molecular Structures of Fluid Phosphatidylethanolamine Bilayers Obtained from Simulation-to-Experiment Comparisons and Experimental Scattering Density Profiles. *Journal of Physical Chemistry B* 119 (2015) 1947-1956.
- Richard J. Alsop, Laura Toppozini, Drew Marquardt, Norbert Kučerka, Thad A. Harroun, and Maikel C. Rheinstädter, Aspirin Inhibits Formation of Cholesterol Rafts in Fluid Lipid Membranes. *BBA-Biomembranes* 1848 (2015) 805-812.
- Laura Toppozini, Sebastian Meinhardt, Clare L. Armstrong, Zahra Yamani, Norbert Kučerka, Friederike Schmid, and Maikel C. Rheinstädter, Structure of Cholesterol in Lipid Rafts. *Physical Review Letters* 113 (2014) 228101(5).
- Jianjun Pan, Drew Marquardt, Frederick A. Heberle, Norbert Kučerka, John Katsaras, Revisiting the Bilayer Structures of Fluid Phase Phosphatidylglycerol Lipids: Accounting for Exchangeable Hydrogens. *Biochimica et Biophysica Acta - Biomembranes* 1838 (2014) 2966-2969.
- Jianjun Pan, Xiaolin Cheng, Luca Monticelli, Frederick A. Heberle, Norbert Kučerka, Peter D. Tieleman, John Katsaras, The Molecular Structure of a Phosphatidylserine Bilayer Determined by Scattering and Molecular Dynamics Simulations. *Soft Matter* (2014) 10 (2014) 3716-3725).
- Michal Belička, Norbert Kučerka, Daniela Uhríková, Akhmed Kh. Islamov, Alexander I. Kuklin, Ferdinand Devínsky, Pavol Balgavý, Effects of N,N-dimethyl-N-alkylamine-N-oxides on DOPC bilayers in unilamellar vesicles. Small-angle neutron scattering study. *European Biophysics Journal* 43 (2014) 179-189.

- Jianjun Pan, Norbert Kučerka, Mu-Ping Nieh, Frederick A. Heberle, Paul Drazba, John Katsaras, Lipid Diversity and Its Implication on Membrane Organization in Liposomes. in *Lipid Bilayers and Model Membranes: From Basic Research to Application* edited by Georg Pabst, Norbert Kučerka, Mu-Ping Nieh, John Katsaras. Boca Raton, FL: CRC Press, Taylor & Francis Group (2014).
- P. Heftberger, B. Kollmitzer, F.A. Heberle, J. Pan, M. Rappolt, H. Amenitsch, N. Kučerka, J. Katsaras, G. Pabst, Global small-angle X-ray scattering data analysis for multilamellar vesicles: the evolution of the scattering density profile model. *Journal of Applied Crystallography* 47 (2014) 173-180.
- Drew Marquardt, Justin Williams, Jacob Kinnun, Norbert Kučerka, Jeffrey Atkinson, Stephen R. Wassall, John Katsaras, and Thad A. Harroun, Dimyristoyl phosphatidylcholine: A remarkable exception to α -tocopherol's membrane presence. *Journal of American Chemical Society* 136 (2014) 203-210.
- Ming Li, Hannah H. Morales, John Katsaras, Norbert Kučerka, Yongkun Yang, Peter M. Macdonald, and Mu-Ping Nieh, Morphological Characterization of DMPC/CHAPSO Bicellar Mixtures: A Combined SANS and NMR Study. *Langmuir* 29 (2013) 15943-15957.
- E. Drolle, N. Kučerka, Y. Choi, J. Katsaras, Z. Leonenko, Effect of melatonin and cholesterol on the structure of DOPC and DPPC lipid membrane. *Biochimica et Biophysica Acta - Biomembranes* 1828 (2013) 2247-2254.
- Clare L Armstrong, Drew Marquardt, Hannah Dies, Norbert Kučerka, Zahra Yamani, Thad A Harroun, John Katsaras, An-Chang Shi, Maikel C Rheinstädter, The Observation of Highly Ordered Domains in Membranes with Cholesterol. *The Public Library of Science (PLoS)* 8/6 (2013) e66162:1-10.
- Drew Marquardt, Justin A. Williams, Norbert Kučerka, Jeffery Atkinson, Stephen R. Wassall, John Katsaras, and Thad A. Harroun, Tocopherol activity correlates with its location in a membrane: A new perspective on the anti-oxidant Vitamin E. *Journal of American Chemical Society* 135 (2013) 7523-7533.
- Frederick A. Heberle, Robin S. Petruzielo, Jianjun Pan, Paul Drazba, Norbert Kučerka, Robert F. Standaert, Gerald W. Feigenson, and John Katsaras, Bilayer thickness mismatch controls raft size in model membranes. *Journal of American Chemical Society* 135 (2013) 6853-6859.
- Suanne Mahabir, Darcy Small, Ming Li, Wankei Wan, Norbert Kučerka, Kenneth Littrell, John Katsaras, Mu-Ping Nieh, Growth kinetics of lipid-based nanodiscs to unilamellar vesicles - A time-resolved small angle neutron scattering (SANS) study. *Biochimica et Biophysica Acta - Biomembranes* 1828 (2013) 1025-1035.
- Norbert Kučerka, Thad Harroun, and John Katsaras, Neutron Scattering of Membranes. in *Encyclopedia of Biophysics*. Volume 3 edited by Gordon C. K. Roberts. Springer-Verlag Berlin Heidelberg (2013) 1706-1710.