

October 1-4, 2019

Institute of Physics,
National Academy of Science of Ukraine
Kyiv, Ukraine

Nanobiophysics: fundamental and applied aspects

Organizers:

- **Institute of Physics, National Academy of Sciences of Ukraine, Kyiv, Ukraine**
- **B. Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine**

Supported by:

- HORIZON 2020 project “Asymmetry of biological membrane: theoretical, experimental and applied aspects” (690853-assymcurv-H2020-MSCA-RISE-2015/H2020-MSCA-RISE-2015)
- NATO “A novel method for the detection of biohazards” (985291 SPS)
- Development of 2D materials and "smart" sensors for medical and biological purposes 11/1 2019

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Taisiia Serdenko
Valentyn Rudenko
Kirylo Pyrshev

NATO SPS project Workshop

“Towards getting of “lipid passport” of pathogenic microorganisms by physical and computational lipidomics”

Moving from conventional lipidomics (e.g. determination of molecular forms of individual lipids by mass-spectrometry) to physical and computational lipidomics e.g. building of supramolecular lipid structures

Saturday, 28 September, 2019

Prof. Mikhail Bogdanov

University of Texas, McGovern Medical School-Houston

“What new strategies do successful pathogenic bacteria deploy to “camouflage” their surface such that it is not recognized either by infected host or “man made” surveillance systems? What strategies can be developed by us?”

Prof. Galina Dovbeshko

Institute of Physics of National Academy of Science of Ukraine

“IR and Raman markers of artificial and real membranes and their changes under external stimuli”

Prof. Gianmario Martra

Università di Torino – Chimica, Italy

On the interaction of silica (nano)particles and membranes: insights on surface features responsible for membranolysis

Discussions

Sunday, 29 September 2019

Profs. Christophe Ramseyer and Semen Yesylevskyy

University of Franche-Comté, Besançon (UFC) Besançon France)

Computer-aided molecular dynamic simulations of supramolecular lipid structures.

Prof. Ago Rinke

University of Tartu, Estonia

Possibilities of fluorescent spectroscopy for visualization of supramolecular lipid structures.

Discussions

Tuesday, October 1			
8:00-9:30	Registration		
9:30-9:45	Opening the conference		
<i>Conference hall of Institute of Physics</i>			
<i>Physical properties of biomolecular nanosystems. Theory and computer modeling of nanoscopic biological systems</i>			
Chairman – Gianmario Martra			
9:45-10:15	Ago Rinken	Characterization of interactions between proteins with their ligands using TIRF microscopy	<i>Plenary</i>
10:15-10:45	Eugene Kryachko	Unveiling the reality of point tautomeric mutations in the base pairs of DNA	<i>Plenary</i>
10:45-11:15	Alexander Chalyi	Surface phenomena in confined liquids	<i>Plenary</i>
11:15-11:45 Coffee break			
Chairman – Leonas Valkunas			
11:45-12:15	Gianmario Martra	On the interaction of silica (nano)particles and membranes: insights on surface features responsible for membranolysis	<i>Plenary</i>
12:15-12:45	Alexander Demchenko	Carbonic nanostructures as efficient instruments in molecular and cellular research	<i>Plenary</i>
12:45-13:05	Volodymyr Berest	Membranotropic action of gramicidin S and its relation to lipid membrane composition	<i>Plenary</i>
13:05-13:25	Oleksii Skorokhod	Biophysical and biochemical properties of nanocrystal hemozoin produced by malaria	<i>Oral</i>
13:25-15:00 Lunch			
Chairman – Ago Rinken			
15:00-15:30	Leonas Valkunas	Tracing feed-back driven exciton dynamics in molecular aggregates	<i>Plenary</i>

15:30-16:00	Alexander Vidybida	Selectivity gain in olfactory projection neurons at low odor concentrations	<i>Plenary</i>
16:00-16:20	Alexander Gabovich	Electric charge and dipole interaction in layered structures	<i>Oral</i>
16:20-16:35 Coffee break			
	Chairman Alexander Demchenko		
16:35-17:05	Alexander Krivchikov	Hybridization between optic and acoustic modes in amorphous solids	<i>Plenary</i>
17:05-17:25	Mohamed Nasr	Heat shock proteins in the “hot” mitochondrion: identity and putative roles	<i>Oral</i>
17:25-17:45	Natalia Rusinchuk	Near-Field Interaction in nano sized systems: mechanism of antiviral activity of nanoparticles	<i>Oral</i>
17:45-18:45 Poster session, chairman Volodymyr Berest			
17:45-19:30 Welcome party			
Wednesday, October 2			
<i>Interactions of biomolecules with nanoparticles and nanostructured surfaces</i> <i>Enhancement of optical processes in biomolecules by nanostructured metal surfaces</i>			
Chairman - Francesca Cecchet			
9:30-10:00	Anatoliy Dragan	Metal Enhanced Fluorescence: recent progress and perspectives	<i>Plenary</i>
10:00-10:30	Andriy Chmyrov	Fluorescence super-resolution microscopy for mechanobiological studies of ultrasound-mediated cell junction interruption	<i>Oral</i>
10:30-11:00 Coffee break			
Chairman - Andriy Chmyrov			
11:00-11:30	Francesca Cecchet	Shedding light on nanoparticles/cell membranes interactions through vibrational nonlinear optical spectroscopy	<i>Plenary</i>

11:30-12:00	Hanna Bandarenka	SERS-spectroscopy of macromolecules: nanoparticles vs. nanovoids	<i>Plenary</i>
12:00-12:20	Alessandro Damin	Z-Synthesis and characterization of Au/SiO ₂ systems for SERS	<i>Oral</i>
12:20-12:40	Nikita Kurnosov	Photoluminescence from molybdenum disulfide layers exfoliated with nucleotides	<i>Oral</i>
12:40-13:15 Poster session, chairman Anna Lukowiak (beginning)			
13:15-15:00 Lunch			
Chairman - Wieslaw Strek			
15:00-15:30	Anna Lukowiak	Luminescent bioactive glasses and composites	<i>Plenary</i>
15:30-16:00	Victor Karachevstsev	Photoluminescence from single-walled carbon nanotubes for biosensing and biomedical applications	<i>Plenary</i>
16:00-16:20	Vasyl Pivovarenko	Dual-chromophore molecular tweezer for fluorescent recognition of ATP nucleotide	<i>Oral</i>
16:20-16:40 Coffee break			
Chairman – Anatoliy Dragan			
16:40-17:10	Chérif F. Matta	Controlled Thermogenesis in the Mitochondrion (videopresentation).	<i>Plenary</i>
17:10-17:30	Galyna Dovbeshko	The role of mitochondria and its vibrational markers	<i>Oral</i>
17:30-:18:30 Poster session (continued), chairman Anna Lukowiak			
19:00-21:30 Conference dinner			
Thursday, October 3			
<i>Biomolecules, hybrids of biomolecules with carbon nanostructures (graphene, nanotubes, fullerenes, and other carbon nanoparticles)</i>			
Chairman - Hanna Bandarenka			
9:30-10:00	Anatoliy Goltsev	Methods of cancer stem cells inactivation	<i>Plenary</i>

10:00-10:30	Baiba Berzina	Luminescent nanoparticles for optical imaging of biological materials	<i>Plenary</i>
10:30-10:50	Serhij Verevka	Beta-structured protein nano-aggregates: ubiquitous complication <i>in vivo</i> and <i>in vitro</i>	<i>Oral</i>
10:50-11:30 Coffee break			
Chairman - Victor Karachevstsev			
11:30-12:00	Wieslaw Strek	Laser stimulated lighting of graphene materials	<i>Plenary</i>
12:00-12:20	Anna Artemenko	Diamond aminated with plasma polymer as biocompatible substrate for protein attachment	<i>Oral</i>
12:20-12:40	Olga Biloivan	Carbon nanomaterials in design of electrochemical biosensors	<i>Oral</i>
12:40-13:00	Stepan Stepanian	Complexes of MoS ₂ with nucleic acid bases: a computational study	<i>Oral</i>
13:00-14:30 Lunch			
Chairman Stepan Stepanian			
14:30-15:00	Oleksii Ilchenko	Orientation mapping using polarized Raman microscopy (<i>via skype</i>)	<i>Oral</i>
15:00-15:30	Valeriy Yashchuk	Optical properties of telomeres and telomerase. Their structure and functionality	<i>Plenary</i>
15:30-15:50	Dmytro Ivanskyi	Mechanical action of transverse spin momentum and vertical spin of evanescent waves on micro- and nanoobjects	<i>Oral</i>
15.50-16.10 Coffee-break			
Chairman - Semen Yesylevskyy			
16:10-16:30	Kyrylo Pyrshev	Membrane permeability for carbon nanoparticles as a function of plasma membrane lipid order	<i>Oral</i>
16:30-16:50	Volodymyr Ermakov	Influence of the cell wall on cyanide destruction by bacteria in the model of	

		respiratory mechanism	
16:50-17:10	Vitalii Boiko	Near-infrared persistent luminescence nanoparticles for optical imaging of biological tissues	<i>Oral</i>
17:10-17:30	Markiyan Malynovskyi	Fluorescence of molecular composites that consist of nematic liquid crystal and mercocyanins	<i>Oral</i>
Ballet, Master and Margarita, 19.00			
Friday, October 4			
8:00-13:00 Excursion to Mezhyhirya			
14:00-15:00 Lunch			
Chairman - Alessandro Damin			
15:20-15:50	Semen Yesylevskyy	Molecular dynamics of the curved membranes: recent methodological advances	<i>Plenary</i>
15:50-16:10	Liliya Batyuk	On the dielectric relaxation of nanoparticles in system of red blood cells	<i>Oral</i>
16:30-17:20	G. Martra, A. Rinke, F. Cecchet, A. Gogotsy, G. Dovbeshko, S. Yesylevskyy R. Tomala, B. Berzina	Round table on Horizon 2020 N 690853 and NATO N 985291 projects	
Closing of the conference			

Tuesday, October 1		Wednesday, October 2		Thursday, October 3		Friday, October 4	
8:00-9:30	<i>Registration</i>	9:30-10:00	A. Dragan	9:30-10:00	A. Goltsev	8:00-13:00	<i>Excursion</i>
9:30-9:45	<i>Opening</i>	10:00-10:30	A. Chmyrov	10:00-10:30	B. Berzina	14:00-15:00	<i>Lunch</i>
9:45-10:15	A. Rinken	10:30-11:00	<i>Coffee break</i>	10:30-10:50	S. Verevka	15:20-15:50	S. Yesylevskyy
10:15-10:45	E. Kryachko	11:00-11:30	F. Cecchet	10:50-11:30	<i>Coffee break</i>	15:50-16:10	L. Batyuk
10:45-11:15	A. Chalvi	11:30-12:00	H. Bandarenka	11:30-12:00	W. Strek	16:30-17:20	<i>Round table</i>
11:15-11:45	<i>Coffee break</i>	12:00-12:20	A. Damin	12:00-12:20	A. Artemenko		<i>Closing</i>
11:45-12:15	G. Martra	12:20-12:40	N. Kurnosov	12:20-12:40	O. Biloivan		
12:15-12:45	A. Demchenko	12:40-13:15	<i>Poster session</i>	12:40-13:00	S. Stepanian		
12:45-13:05	V. Berest	13:15-15:00	<i>Lunch</i>	13:00-14:30	<i>Lunch</i>		
13:05-13:25	O. Skorokhod	15:00-15:30	A. Lukowiak	14:30-15:00	O. Ilchenko		
13:25-15:00	<i>Lunch</i>	15:30-16:00	V. Karachevtsev	15:00-15:30	V. Yashchuk		
15:00-15:30	L. Valkunas	16:00-16:20	V. Pivovarenko	15:30-15:50	D. Ivanskyi		
15:30-16:00	A. Vidybida	16:20-16:40	<i>Coffee break</i>	15:50-16:10	<i>Coffee break</i>		
16:00-16:20	A. Gabovich	16:40-17:10	Ch. F. Matta	16:10-16:30	K. Pyrshev		
16:20-16:35	<i>Coffee break</i>	17:10-17:30	G. Dovbeshko	16:30-16:50	V. Ermakov		
16:35-17:05	A. Krivchikov	17:30-18:30	<i>Poster session</i>	16:50-17:10	V. Boiko		
17:05-17:25	M. Nasr	19:00-21:30	<i>Dinner</i>	17:10-17:30	M. Malynovskyy		
17:25-17:45	N. Rusingchuk			19:00	<i>Ballet</i>		
17:45-18:45	<i>Poster session</i>						
17:45-19:30	<i>Welcome party</i>						

NOTES