

# 2018 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | April 16-20, 2018 | Arlington, VA

Holiday Inn Arlington  
4610 Fairfax Drive, Arlington, VA 22203

## Day 1 - Monday, 16 April 2018

TIME	TOPIC	SPEAKER
0800-0850	<b>REGISTRATION</b>	
0850-0900	Introduction	<b>Dr. Sofi Bin-Salamon</b> Air Force Office of Scientific Research
0900-0930	Optical Magnetic Imaging of Neuronal Currents and Impedance Using Quantum Defects in Diamond	<b>Prof. Ronald Walsworth</b> Harvard University
0930-1000	Tools for Understanding Molecular Scale Mechanisms in LGICs: Single Molecule Kinetics, Super-Resolution Imaging, and Hidden Markov Walks	<b>Prof. James Brozik</b> Washington State University
1000-1030	Sub-Diffraction Temperature Mapping of Protein Interconversions	<b>Prof. Somin Lee</b> University of Michigan
1030-1100	<b>BREAK</b>	
1100-1130	New Approaches to Magnetometry and Sensing with Single Crystal Diamond	<b>Prof. Andrew Greentree</b> Royal Melbourne Institute of Technology University
1130-1200	Smart Sensor Systems for Human Health Applications: Steps Toward Distributed Intelligence	<b>Dr. Gary Hunter</b> National Aeronautics and Space Administration
1200-1230	Graphene Microfluidics for Dynamic Electron Microscopic Imaging	<b>Prof. Jiang Xiaocheng</b> Tufts University
1230-1330	<b>LUNCH</b>	
1330-1400	Molecular Modeling of Bio-nano Interfaces for Possibilities in Bio-sensing and Bio-imaging	<b>Prof. Tiffany Walsh</b> Deakin University
1400-1430	When Noise is the Signal	<b>Prof. Francesco Zerbetto</b> University of Bologna
1430-1500	Understanding the "Mission Versatility" of Membrane Proteins via Nanoscopic Imaging	<b>Prof. Qian Chen</b> University of Illinois Urbana-Champaign
1500-1530	<b>BREAK</b>	
1530-1600	Application of Cutting-Edge Technologies to Understand Biomolecular Interaction of Engineered Nanomaterials: Safety Issues and Challenges	<b>Dr. Saber Hussain</b> Air Force Research Laboratory 711th HPW

<b>1600-1630</b>	De Novo Design of Functional Protein Nano-materials at the University of Washington Institute for Protein Design	<b>Dr. Lance Stewart</b> University of Washington
<b>1630-1700</b>	Future of Fluorescent Nano-Diamonds (and Phosphors) for Bio-sensing	<b>Prof. Philip Hemmer</b> Texas A&M University
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	

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**Day 2 - Tuesday, 17 April 2018**

TIME	TOPIC	SPEAKER
0800-0900	<b>REGISTRATION</b>	
0900-0915	The Importance of International Collaboration in Basic Research for Supporting the Needs of Mission Agencies, Advancing the Scientific Frontier, and Contributing to Diplomacy	<b>Dr. E. William Colglazier</b> American Association for the Advancement of Science
0915-0935	The Role of Research Infrastructure in Supporting Research Collaborations	<b>Ms. Rosie Hicks</b> Australian National Fabrication Facility
0935-0955	The National Research Council of Italy - Smart Materials and Bio Interfaces	<b>Prof. Luigi Ambrosio</b> National Research Council of Italy
0955-1015	Overview of Mintek's Research and Development	<b>Dr. Makhapa Makhafola</b> MINTEK National Science Council of South Africa
1015-1030	AFOSR International Initiatives	<b>Dr. Misoon Mah</b> Air Force Office of Scientific Research
1030-1100	<b>BREAK</b>	
1100-1130	Elucidating the Cellular and Sub-Cellular Dynamics during Electromagnetic Modulation of the Nervous System	<b>Prof. Anita Mahadevan-Jansen</b> Vanderbilt University
1130-1200	Shedding Light in Brain Microdomains	<b>Dr. Valentina Benfenati</b> National Research Council of Italy
1200-1230	Shining Light on the Neuroimmune Interface	<b>Prof. Mark Hutchinson</b> University of Adelaide
1230-1330	<b>LUNCH</b>	
1330-1400	Exploring New Biophysical Processes with Quantum Entanglement	<b>Prof. Theodore Goodson</b> University of Michigan
1400-1430	Transducers as Remote Photoactivators to Aid in Functional Cell Imaging and Photobiomodulation	<b>Prof. Kelly Nash</b> University of Texas San Antonio
1430-1500	Multimodal Sensing with Hybrid Fluorescent Nanodiamond Complexes for Quantum Biological Measurements	<b>Prof. Brant Gibson</b> Royal Melbourne Institute of Technology University
1530-1600	<b>BREAK</b>	
1500-1530	Improving Optical Measurement and Trapping using Quantum Mechanics	<b>Prof. Warwick Bowen</b> University of Queensland

<b>1600-1615</b>	The Role of Research Administrators in International Research Cooperation	<b>Ms. Claire Chen</b> National Council of University Research Administrators
<b>1615-1630</b>	Research Priorities at Texas A&M Engineering	<b>Prof. Dimitris Lagoudas</b> Texas A&M University
<b>1630-1700</b>	Nano-Biosensing Program	<b>Dr. Chenzhong Li</b> National Science Foundation
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	

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## Day 3 - Wednesday, 18 April 2018

TIME	TOPIC	SPEAKER
0800-0830	REGISTRATION	
0830-0845	Multi-Disciplinary University Research Initiative: Nanoelectropulse-Induced Electromechanical Signaling and Control of Biological Systems	Prof. Andrei Pakhomov Old Dominion University
0845-0900	Universality of Bipolar Cancellation for Nanoporation and Nanoelectropulse Stimulation	Prof. Andrei Pakhomov Old Dominion University
0900-0920	Instrumentation for Studying Cancellation Effects Caused by Nanosecond Pulses	Prof. Shu Xiao Old Dominion University
0920-0940	Membrane Biophysics of Biphasic Electrostimulated Molecular Transport	Prof. Thomas Vernier Old Dominion University
0940-1000	A New Biophysical Model Can Explain Bipolar Cancellation of Molecule Transport	Prof. James Weaver Massachusetts Institute of Technology
1000-1020	Nascent Biophysical Tools to Elucidate Nanoelectropulse-Induced Electromechanical Interactions	Prof. Vladislav Yakovlev Texas A&M University
1020-1040	BREAK	
1040-1100	Nanoelectropulse and Excitable Membranes: Uncovering Mechanisms of Activation of Voltage-Gated Ca <sup>2+</sup> Channels	Prof. Olga Pakhomova Old Dominion University
1100-1120	Toward the Application of CAN-CAN Technology – Attenuation of Ca <sup>2+</sup> Signaling by Bipolar nsPEFs in a Neurosecretory Cell Type Involved in the “Flight or Fight” Response	Prof. Gale Craviso University of Reno Nevada
1120-1140	Summary of the Project Status: Principal Accomplishments, Scientific Impact, and Future Developments	Prof. Andrei Pakhomov Old Dominion University
1140-1240	LUNCH	
1240-1250	Multi-Disciplinary University Research Initiative: Cells and Cell Groups as Coupled Biochemical, Electrical, and Mechanical Systems	Prof. Wolfgang Losert University of Maryland
1250-1315	Electric Field Effects in Cells and Cell Groups	Prof. Min Zhao University of California Davis
1315-1340	Excitable Systems in Cells	Prof. Peter Devreotes Johns Hopkins University

<b>1340-1350</b>	Quantifying Excitable Systems	<b>Mr. Leonard Campanello</b> University of Maryland
<b>1350-1400</b>	Electric Field Effects on Excitable Systems	<b>Ms. Abby Bull</b> University of Maryland
<b>1400-1410</b>	Non-Invasive Measurements of Excitable Systems and Electric Field	<b>Dr. Kate O'Neil</b> University of Maryland
<b>1410-1430</b>	<b>BREAK</b>	
<b>1430-1455</b>	Integrating AC-Electric Fields into the Cell Microenvironment	<b>Prof. Quan Qing</b> Arizona State University
<b>1455-1520</b>	ErK Activation - An Example of Coupled Biochemical, Mechanical, and Electrical Systems	<b>Dr. Liang Guo</b> University of California Davis <b>Mr. Houpu Li</b> Arizona State University
<b>1520-1545</b>	In Vivo Neuronal Imaging	<b>Prof. Patrick Kanold</b> University of Maryland
<b>1645-1600</b>	Summary and Outlook	<b>Prof. Wolfgang Losert</b> University of Maryland
<b>1600-1615</b>	<b>BREAK</b>	
<b>1615-1630</b>	Smart Bandage for Monitoring Wound Perfusion	<b>Dr. Yoojeong Kim</b> Triton Systems
<b>1630-1700</b>	Nanomanufacturing Program	<b>Dr. Khershed Cooper</b> National Science Foundation
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	



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Day 4 - Thursday, 19 April 2018

TIME	TOPIC	SPEAKER
0800-0900	REGISTRATION	
0900-0930	AFOSR Principal Investigators and U.S. Government Only	<b>Dr. Sofi Bin-Salamon</b> Air Force Office of Scientific Research
0930-1000	NIH's Investments in Research Innovation: Program Snapshots	<b>Dr. Stephanie Morris</b> National Institutes of Health
1000-1030	Fe Doping-Induced Magnetism in Nano-Apatite: Application in Regenerative Medicine and Nanomedicine	<b>Dr. Anna Tampieri</b> National Research Council of Italy
1030-1100	BREAK	
1100-1130	MINTEK Biomedical Research within the Advanced Materials Division: Inhibitors of the HIV-1 Integrase - LEDGF Interactions	<b>Dr. Mabel Coyanis</b> MINTEK National Science Council of South Africa
1130-1200	Non-Invasive Detection of Unique Molecular Signatures in Laser-Induced Retinal Injuries: Future Battle Field Applications	<b>Dr. Rafat Ansari</b> National Aeronautics and Space Administration
1200-1230	Quantum Coherence and Dynamics in Biological Processes: Molecular Isomerization in Vision	<b>Prof. Paul Brumer</b> University of Toronto
1230-1330	LUNCH	
1330-1400	Probing Quantum Coherence in Bacterial Photosynthesis at the Ensemble and Single Complex Level	<b>Prof. Jennifer Ogilvie</b> University of Michigan
1400-1430	Detail Mechanism of the Visual Process	<b>Prof. Peter Rentzepis</b> Texas A&M University
1430-1500	DNA-Wrapped Carbon Nanotubes for Multiplex Sensing and Imaging	<b>Dr. Ming Zheng</b> National Institute of Standards and Technology
1500-1530	BREAK	
1530-1600	Bio-Templated Metal Nanoclusters: A New Class of Multifunctional Platform	<b>Dr. Shashi Karna</b> Army Research Laboratory
1600-1630	Forest of Disordered Gold Covered Silicon Nanowires: A Versatile Platform for Interfacing Cells	<b>Dr. Annalisa Convertino</b> National Research Council of Italy

<b>1630-1700</b>	The Chilean Neuromorphic Computer Initiative	<b>Dr. Tomas Perez</b> Life and Science Foundation <b>Dr. Samuel Hevia</b> Catholic University of Chile
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	



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Day 5 - Friday, 20 April 2018

TIME	TOPIC	SPEAKER
0800-0900	<b>REGISTRATION</b>	
0900-0930	Experimental and Theoretical Investigation of the Mechanisms of Free-Electron-Mediated Modification of Biomolecules in Nonlinear Microscopy	<b>Prof. Alfred Vogel</b> University of Luebeck
0930-1000	Cell Membrane Dynamics in Infrared Nerve Stimulation and Blocking	<b>Prof. Michelle Sander</b> Boston University
1000-1030	Polariton Enabled Spectroscopy and Dynamics	<b>Dr. Jeffrey Owruksky</b> Naval Research Laboratory
1030-1100	<b>BREAK</b>	
1100-1130	Bioinspired Nanomaterials	<b>Dr. Kenan Fears</b> Naval Research Laboratory
1130-1200	Imaging 3D Cell Culture Systems, Challenges and Opportunities for the Biophysics Community	<b>Prof. Sally McArthur</b> Swinburne University of Technology
1200-1230	Biological Approaches to Nuclear Security; the Bionuclear Working Group	<b>Dr. Heather Meeks</b> Defense Threat Reduction Agency
1230-1330	<b>LUNCH</b>	
1330-1400	Quantum Coherence in Reactive Oxygen Species Biology	<b>Prof. Robert Usselman</b> Montana State University
1400-1430	Electron Paramagnetic Resonance for Bionanomaterial Measurements	<b>Dr. Veronika Szalai</b> National Institute of Standards and Technology
1430-1500	Potentiality and First Steps in the Design of Electrochemical Nano Sensors	<b>Dr. Felice Simeone</b> National Research Council of Italy
1500-1530	<b>BREAK</b>	
1530-1600	Photovoltaic Approach for Quantifying Electronic Transport in Biological Materials	<b>Prof. Shashank Priya</b> Pennsylvania State University
1600-1630	Blending Engineering and Physics into Biomedical Research	<b>Dr. Larry Nagahara</b> Johns Hopkins University
1630-1700	AFOSR Principal Investigators and U.S. Government Only	<b>Dr. Sofi Bin-Salamon</b> Air Force Office of Scientific Research
1700	<b>MEETING CONCLUSION</b>	