

# 2019 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | May 6-10, 2019 | Arlington, VA

## Basic Research Innovation and Collaboration Center

4100 North Fairfax Drive (Suite 450)  
Arlington, VA 22203

Day 1 - Monday, 6 May 2019

TIME	TOPIC	SPEAKER
0800-0820	<b>REGISTRATION</b>	
0820-0830	Introduction	<b>Dr. Sofi Bin-Salamon</b> Program Manager Air Force Office of Scientific Research
0830-0900	Life-like Self-assembly through Dissipative Adaptation	<b>Prof. Jeremy England</b> Department of Physics Massachusetts Institute of Technology
0900-0930	Influence of Hydration and Protein Collective Motions on Biological Activities	<b>Prof. Vinh Nguyen</b> Department of Physics Virginia Tech University
0930-1000	Autonomous Enzyme-Powered Nanomotors and Micropumps: Transport and Collective Behavior	<b>Prof. Ayusman Sen</b> Department of Chemistry Pennsylvania State University
1000-1030	Biocene: The Age of New Life?	<b>Dr. Vikram Shyam</b> Lead, Turbomachinery and Turboelectric Systems National Aeronautics and Space Administration – Glenn Research Center
1030-1100	<b>BREAK</b>	
1100-1130	Toward Metabolic Diagnosis by Non-invasive Measurement of Fluorescence Lifetime of Retina	<b>Dr. Yoko Miura</b> Institute of Biomedical Optics University of Lübeck
1130-1200	NanoBiomaterials for Targeted Therapies	<b>Dr. Ana Pêgo</b> Institute of Biomedical Engineering i3S/University of Porto
1200-1230	Graphene Microfluidics for Dynamic Electron Microscopic Imaging	<b>Prof. Xiaocheng Jiang</b> Biomedical Engineering Tufts University
1230-1330	<b>LUNCH</b>	
1330-1400	Nano-Biosensing Program	<b>Dr. Chenzhong Li</b> Program Director National Science Foundation

<b>1400-1440</b>	Quantum Approaches to Biophysical Systems, Imaging and Sensing	<p><b>Prof. Vladislav Yakovlev</b> Department of Biomedical Engineering Texas A&amp;M University</p> <p><b>Prof. Girish Agarwal</b> Department of Physics and Astronomy Texas A&amp;M University</p>
<b>1440-1500</b>	Biological Quantum Battery	<p><b>Dr. James Quach</b> Institute of Photonics &amp; Advanced Sensing University of Adelaide</p>
<b>1500-1530</b>	<b>BREAK</b>	
<b>1530-1600</b>	Towards Human Performance Enhancement through Radiogenetically-controlled Signaling Elements	<p><b>Dr. Morgan Schmidt</b> 711th Human Performance Wing Air Force Research Laboratory</p>
<b>1600-1630</b>	Biosensing and Bioimaging using Hybrid Diamond Structures and Ultrathin Light Field Imaging Probes	<p><b>Prof. Brant Gibson</b> Department of Physics Royal Melbourne Institute of Technology</p>
<b>1630-1700</b>	Watching Biology – Breaking Imaging Limits to Observe Fundamental Intracellular dynamics in Real-time	<p><b>Dr. Joel Bixler</b> 711th Human Performance Wing Air Force Research Laboratory</p>
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	

# 2019 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | May 6-10, 2019 | Arlington, VA

## Basic Research Innovation and Collaboration Center

4100 North Fairfax Drive (Suite 450)

Arlington, VA 22203

Day 2 - Tuesday, 7 May 2019

TIME	TOPIC	SPEAKER
0800-0830	<b>REGISTRATION</b>	
0830-0900	Blending Engineering and Physics into Biomedical Research	<b>Dr. Larry Nagahara</b> Associate Dean of Research Johns Hopkins University
0900-0915	Opportunities with the Air Force Office of Scientific Research	<b>Dr. Milton Blackwood</b> Deputy Director Air Force Office of Scientific Research
0915-0930	AFOSR International Initiatives	<b>Dr. Misoon Mah</b> International Program Manager Air Force Office of Scientific Research
0930-1000	An Overview of the Army Research Office and Life Sciences	<b>Dr. Stephen Lee</b> Chief Scientist Army Research Office
1000-1030	<b>BREAK</b>	
1030-1100	Penn State and AFOSR: Mutual Priorities and Opportunities for Partnership	<b>Dr. Neil Sharkey</b> Vice President for Research Pennsylvania State University
1100-1130	Horizon 2020, Europe's Research and Innovation Program: Open to the World	<b>Dr. Mary Kavanagh</b> Minister-Counsellor, Research and Innovation Delegation of the European Union to the United States
1130-1200	Improving Optical Measurement and Trapping using Quantum Mechanics	<b>Prof. Warwick Bowen</b> Department of Physics University of Queensland
1200-1330	<b>LUNCH</b>	
1330-1400	4D Megahertz OCT with augmented reality for surgical guidance	<b>Prof. Robert Huber</b> Institute of Biomedical Optics University of Lübeck
1400-1430	Sub-Diffraction Temperature Mapping of Protein Interconversions	<b>Prof. Somin Lee</b> Department of Biomedical Engineering University of Michigan

<b>1430-1500</b>	Optical Sensing with Non-Hermitian Singularities	<b>Prof. Sahin Ozdemir</b> Department of Engineering Science and Mechanics Pennsylvania State University
<b>1500-1530</b>	<b>BREAK</b>	
<b>1530-1600</b>	Quantum Trilateration of Two Particles: A Classically Impossible Task with a Quantum Solution	<b>Prof. Andrew Greentree</b> Department of Physics Royal Melbourne Institute of Technology
<b>1600-1630</b>	Understanding the “Mission Versatility” of Membrane Proteins via Nanoscopic Imaging	<b>Prof. Qian Chen</b> Department of Materials Science University of Illinois Urbana-Champaign
<b>1630-1700</b>	Nano-electronic Probes of Mitochondrial Function	<b>Prof. Peter Burke</b> Department of Electrical Engineering and Computer Science University of California, Irvine
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	

# 2019 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | May 6-10, 2019 | Arlington, VA

## Basic Research Innovation and Collaboration Center

4100 North Fairfax Drive (Suite 450)  
Arlington, VA 22203

Day 3 - Wednesday, 8 May 2019

TIME	TOPIC	SPEAKER
0800-0830	REGISTRATION	
0830-0900	The Protein Corona as a Novel Platform in Pharmaceutical Nanoformulation	<b>Dr. Alfonso Garcia-Bennett</b> Department of Molecular Sciences Macquarie University
0900-0930	Optimised Growth of Lanthanide Upconversion Nanoparticles	<b>Prof. James Piper</b> Department of Physics and Astronomy Macquarie University
0930-0945	BREAK	
0945-1000	Multi-Disciplinary University Research Initiative: Nanoelectropulse-Induced Electromechanical Signaling and Control of Biological Systems	<b>Prof. Andrei Pakhomov</b> Frank Reidy Center for Bioelectrics Old Dominion University
1000-1015	Megahertz Compression of Nanosecond Stimuli	<b>Prof. Andrei Pakhomov</b> Frank Reidy Center for Bioelectrics Old Dominion University
1015-1030	Electrostatic CAN-CAN by Nanosecond Multiphasic Pulses	<b>Prof. Shu Xiao</b> Department of Electrical and Computer Engineering Old Dominion University
1030-1050	Bipolar Signal Cancellation of Electrostimulated Transmembrane Traffic — Multiple Distinct Phenomena of Membrane Perturbation and Permeabilization	<b>Prof. Thomas Vernier</b> Department of Computer Science Old Dominion University  <b>Ms. Federica Castellani</b> Department of Computer Science Old Dominion University
1050-1105	Nascent Biophysical Tools to Elucidate Nanoelectropulse-induced Electromechanical Interactions	<b>Prof. Vladislav Yakovlev</b> Department of Biomedical Engineering Texas A&M University
1105-1125	Revealing Molecular Mechanisms of Permeabilization, Activation, and Bipolar Cancellation with Nanoelectropulses	<b>Prof. Olga Pakhomova</b> Frank Reidy Center for Bioelectrics Old Dominion University
1125-1145	From Cancellation to Stimulation within Nanoseconds: Bipolar Pulse Delay Behavior in Excitable Neuroendocrine Adrenal Chromaffin Cells Exposed to 2 ns Pulses	<b>Prof. Gale Craviso</b> School of Medicine University Nevada Reno

<b>1145-1245</b>	<b>LUNCH</b>	
<b>1245-1255</b>	Multi-Disciplinary University Research Initiative: Cells and Cell Groups as Coupled Biochemical, Electrical, and Mechanical Systems	<b>Prof. Wolfgang Losert</b> Department of Physics University of Maryland
<b>1255-1315</b>	Precisely modulating cell signaling pathways by local electric fields	<b>Prof. Quan Qing</b> Department of Physics Arizona State University
<b>1315-1325</b>	Quantifying Spatio-temporal Dynamics Across MURI	<b>Mr. Leonard Companello</b> Department of Physics University of Maryland
<b>1325-1335</b>	Precise control of cell-substrate interactions with nanotopography across MURI	<b>Mr. Matt Hourwitz</b> Department of Physics University of Maryland
<b>1335-1355</b>	Regulating ERK signaling dynamics to control cell fate	<b>Prof. Min Zhao</b> Department of Dermatology University of California Davis
<b>1355-1415</b>	Excitable systems in cells - precise control of cell signals and excitability	<b>Prof. Peter Devreotes</b> Department of Cell Biology Johns Hopkins University
<b>1415-1425</b>	Modulating the intracellular dynamics of neural cells	<b>Dr. Kate O'Neill</b> Department of Physics University of Maryland
<b>1425-1435</b>	In Vivo Electric Field Activation	<b>Prof. Patrick Kanold</b> Department of Biology University of Maryland
<b>1435-1445</b>	MURI Summary and Outlook	<b>Prof. Wolfgang Losert</b> Department of Physics University of Maryland
<b>1445-1500</b>	<b>BREAK</b>	
<b>1500-1530</b>	Trans-NIH Programs	<b>Dr. Stephanie Morris</b> Program Director, Office of the Director National Institutes of Health
<b>1530-1600</b>	Research, Education and Security in Global Health at Penn State	<b>Prof. Isabella Cattadori</b> Department of Biology Pennsylvania State University
<b>1600-1630</b>	Gut Neuroscience	<b>Prof. Elisa Hill</b> School of Health Royal Melbourne Institute of Technology
<b>1630-1700</b>	Gut Microbiome	<b>Prof. Ashley Franks</b> School of Life Sciences La Trobe University
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	

# 2019 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | May 6-10, 2019 | Arlington, VA

## Basic Research Innovation and Collaboration Center

4100 North Fairfax Drive (Suite 450)

Arlington, VA 22203

### Day 4 - Thursday, 9 May 2019

TIME	TOPIC	SPEAKER
0800-0830	REGISTRATION	
0830-0900	Embodied Intelligence	<b>Dr. Samuel Stanton</b> Program Manager Army Research Office
0900-0930	Smart Sensor Systems for Human Health and Environmental Applications	<b>Dr. Gary Hunter</b> Lead, Intelligent Systems Hardware National Aeronautics and Space Administration – Glenn Research Center
0930-0950	Overview of Mintek's Research and Development	<b>Dr. Makhapa Makhafola</b> General Manager: R&D MINTEK National Science Council of South Africa
0950-1010	Viral Proteins Inhibition and Bio Organic Polymeric Materials	<b>Dr. Mabel Coyanis</b> Advanced Materials Division MINTEK National Science Council of South Africa
1010-1030	Sandwich based SERS probe for malaria detection: A proof of concept	<b>Dr. Thabang Ntho</b> Advanced Materials Division MINTEK National Science Council of South Africa
1030-1100	<b>BREAK</b>	
1100-1115	The Role of Research Administrators and Resources to Facilitate International Collaboration	<b>Ms. Claire Chen</b> Manager, NCURA Global National Council of University Research Administrators
1115-1130	EURAXESS: Funding Opportunities for Researchers of all Nationalities and Research Fields	<b>Ms. Viktoria Bodnarova</b> Regional Representative EURAXESS
1130-1200	ENRICH in the USA Initiative and Opportunities for EU-US Research and Innovation Collaboration	<b>Ms. Johanna Füllmann</b> Scientific Officer DLR Project Management Agency German Aerospace Center

<b>1200-1215</b>	Research Opportunities for Italy-US Research Collaboration	<b>Dr. Stefano Lami Moscheni</b> Science Counselor Embassy of Italy to the United States
<b>1215-1230</b>	Introduction to CSIRO, Opportunities for Collaboration	<b>Ms. Nicole Forrester</b> Counsellor Science Capability Commonwealth Scientific and Industrial Research Organisation
<b>1230-1330</b>	<b>LUNCH</b>	
<b>1330-1400</b>	Experimental and Theoretical Investigation of the Mechanisms of Free-Electron-Mediated Modification of Biomolecules in Nonlinear Microscopy	<b>Prof. Alfred Vogel</b> Institute of Biomedical Optics University of Lübeck
<b>1400-1420</b>	Shedding Light in Brain Microdomains	<b>Dr. Valentina Benfenati</b> Institute of Synthesis and Photoreactivity National Research Council of Italy
<b>1420-1440</b>	Forest of Disordered Gold Covered Silicon Nanowires: A Versatile Platform for Interfacing Cells	<b>Dr. Annalisa Convertino</b> Institute for Microelectronics and Microsystems National Research Council of Italy
<b>1440-1500</b>	Three-dimensional Brain In Vitro Models via Electrofluidodynamics	<b>Dr. Vincenzo Guarino</b> Institute of Polymers, Composites and Biomaterials National Research Council of Italy
<b>1500-1530</b>	Shining Light on the Neuroimmune Interface	<b>Prof. Mark Hutchinson</b> School of Medicine University of Adelaide
<b>1530-1600</b>	<b>BREAK</b>	
<b>1600-1700</b>	Biophysical Investigations on Additive Manufactured Nanoscale Biosensors	<b>Prof. Shashank Priya</b> Materials Science and Engineering Pennsylvania State University  <b>Prof. Thomas Brown</b> Department of Electronic Engineering University of Rome, Tor Vergata  <b>Prof. Zhijian Pei</b> Department of Industrial Engineering Texas A&M University
<b>1700</b>	<b>MEETING ADJOURNED FOR THE DAY</b>	

# 2019 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | May 6-10, 2019 | Arlington, VA

## Basic Research Innovation and Collaboration Center

4100 North Fairfax Drive (Suite 450)

Arlington, VA 22203

Day 5 - Friday, 10 May 2019

TIME	TOPIC	SPEAKER
0800-0830	<b>REGISTRATION</b>	
0830-0900	Optical Manipulation of Neuronal Excitation Using a Fast Thermal Gradient	<b>Dr. Christopher Valdez</b> 711th Human Performance Wing Air Force Research Laboratory
0900-0930	Tools for Understanding Molecular Scale Mechanisms in LGICs: Single Molecule Kinetics, Super-Resolution Imaging, and Hidden Markov Walks	<b>Prof. James Brozik</b> Department of Chemistry Washington State University
0930-1000	Probing Quantum Coherence in Bacterial Photosynthesis at the Ensemble and Single Complex Level	<b>Prof. Jennifer Ogilvie</b> Department of Physics University of Michigan
1000-1030	Quantum Coherence and Dynamics in Biological Processes: Molecular Isomerization in Vision	<b>Prof. Paul Brumer</b> Department of Chemistry University of Toronto
1030-1100	<b>BREAK</b>	
1100-1130	Water Transport in Brain Cells: Aquaporin-4 Supramolecular Structure Transition Regulates Adhesion, Migration and Differentiation Dynamics of Brain Astrocytes	<b>Prof. Grazia Paola Nicchia</b> Department of Bioscience, Biotechnology and Biopharmaceutics University of Bari
1130-1200	Noninvasive Imaging of Neuronal Activity In Vivo	<b>Prof. Gereon Hüttmann</b> Institute of Biomedical Optics University of Lübeck
1200-1230	Detail Mechanism of the Visual Process	<b>Prof. Peter Rentzepis</b> Department of Electrical and Computer Engineering Texas A&M University
1230-1330	<b>LUNCH</b>	
1330-1400	The Chilean Neuromorphic Computing Initiative	<b>Prof. Tomas Perez-Acle</b> Life and Science Foundation University of Valparaíso
1400-1430	Cell Membrane Dynamics in Infrared Nerve Stimulation and Blocking	<b>Prof. Michelle Sander</b> Department of Electrical and Computer Engineering Boston University

<b>1430-1500</b>	Exploring New Biophysical Processes with Quantum Entanglement	<b>Prof. Theodore Goodson</b> Department of Chemistry University of Michigan
<b>1500-1530</b>	<b>BREAK</b>	
<b>1530-1600</b>	National Facilities and Instrumentation Program in the Division of Materials Science at NSF	<b>Dr. Guebre Tessema</b> Program Director National Science Foundation
<b>1600-1630</b>	Using Human Stem Cells to Vascularized Organoids	<b>Prof. Sharon Gerecht</b> Department of Biomedical Engineering Johns Hopkins University
<b>1630-1700</b>	AFOSR Principal Investigators and U.S. Government Only	<b>Dr. Sofi Bin-Salamon</b> Program Manager Air Force Office of Scientific Research
<b>1700</b>	<b>MEETING CONCLUSION</b>	