

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

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

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Day 2 - Tuesday, 7 May 2019

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

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

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Day 3 - Wednesday, 8 May 2019

TIME	TOPIC	SPEAKER
0800-0830	REGISTRATION	
0830-0900	The Protein Corona as a Novel Platform in Pharmaceutical Nanoformulation	Dr. Alfonso Garcia-Bennett Department of Molecular Sciences Macquarie University
0900-0930	Optimised Growth of Lanthanide Upconversion Nanoparticles	Prof. James Piper 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	Prof. Andrei Pakhomov Frank Reidy Center for Bioelectrics Old Dominion University
1000-1015	Megahertz Compression of Nanosecond Stimuli	Prof. Andrei Pakhomov Frank Reidy Center for Bioelectrics Old Dominion University
1015-1030	Electrostatic CAN-CAN by Nanosecond Multiphasic Pulses	Prof. Shu Xiao 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	Prof. Thomas Vernier Department of Computer Science Old Dominion University Ms. Federica Castellani Department of Computer Science Old Dominion University
1050-1105	Nascent Biophysical Tools to Elucidate Nanoelectropulse-induced Electromechanical Interactions	Prof. Vladislav Yakovlev Department of Biomedical Engineering Texas A&M University
1105-1125	Revealing Molecular Mechanisms of Permeabilization, Activation, and Bipolar Cancellation with Nanoelectropulses	Prof. Olga Pakhomova 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	Prof. Gale Craviso School of Medicine University Nevada Reno

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

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Day 4 - Thursday, 9 May 2019

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

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

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Day 5 - Friday, 10 May 2019

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

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