

2020 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | August 31-September 4, 2020 | Virtual

Day 1 - Monday, 31 August 2020

TIME	TOPIC	SPEAKER
0820-0850	Login	
0850-0900	Introduction	Dr. Sofi Bin-Salamon Program Manager Air Force Office of Scientific Research
0900-0930	Shining Light on the Neuroimmune Interface	Prof. Mark Hutchinson School of Medicine University of Adelaide
0930-1000	Elucidating the Cellular and Sub-Cellular Dynamics during Electromagnetic Modulation of the Nervous System	Prof. Anita Mahadevan-Jansen Department of Biomedical Engineering Vanderbilt University
1000-1030	Directed Electromagnetic Perturbation and Quantum Biological Effects in Retinal Cells and Networks using Coherent Control of Femtosecond Optical Pulses	Prof. Stephen Boppart Beckman Institute University of Illinois Urbana-Champaign
1030-1100	BREAK	
1100-1130	Three-dimensional Brain In Vitro Models via Electrofluidodynamics	Dr. Vincenzo Guarino Institute of Polymers, Composites and Biomaterials National Research Council of Italy
1130-1200	Graphene Microfluidics for Dynamic Electron Microscopic Imaging	Prof. Xiaocheng Jiang Biomedical Engineering Tufts University
1200-1230	3D Printing of Simulated Gut Environment for Brain-Gut Axis Research	Prof. Zhijian Pei Department of Industrial and Systems Engineering Texas A&M University Prof. Hongmin Qin Department of Biology Texas A&M University
1230-1330	LUNCH	
1330-1400	Nano-electronic Probes of Mitochondrial Function	Prof. Peter Burke Dept. of Electrical Engineering and Computer Science University of California, Irvine
1400-1430	Detail Mechanism of the Visual Process	Prof. Peter Rentzepis Dept. of Electrical and Computer Engineering Texas A&M University

1430-1500	Biophysics of Neuromodulation by Rapid Deposition of Energy	Dr. Christopher Valdez 711th Human Performance Wing Air Force Research Laboratory
1500-1530	BREAK	
1530-1600	Cell Membrane Dynamics in Infrared Nerve Stimulation and Blocking	Prof. Michelle Sander Dept. of Electrical & Computer Engineering Boston University
1600-1630	Development of 3D Cell Culture Systems for Evaluating Real-time Stimulation and Sensing Techniques	Prof. Sally McArthur Department of Biomedical Engineering Swinburne University of Technology
1630-1700	Smart Sensor Systems for Human Health and Environmental Applications	Dr. Gary Hunter Lead, Intelligent Systems Hardware National Aeronautics and Space Administration – Glenn Research Center
1700	MEETING ADJOURNED	

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Day 2 - Tuesday, 1 September 2020

TIME	TOPIC	SPEAKER
0800-0830	Login	
0830-0900	Blending Engineering and Physics into Biomedical Research	Prof. Larry Nagahara Associate Dean for Research Johns Hopkins University
0900-0915	Building Australia's Research Data Commons	Ms. Rosie Hicks Chief Executive Officer Australian Research Data Commons
0915-0945	Using innovative science and technology to solve major challenges – <i>How Australia's national science agency delivers impact using breakthrough science and engineering</i>	Dr. Cathy Foley Chief Scientist Commonwealth Scientific and Industrial Research Organisation
0945-1015	The National Research Council of Italy - Integration of knowledge for successful international collaborative initiatives	Prof. Luigi Ambrosio Director, Institute of Polymers, Composites & Biomaterials National Research Council of Italy
1015-1030	BREAK	
1030-1100	Challenges and Opportunities in the Defense Sector	Colonel (AF) Alessio Grasso Director, Territorial Technical Office – Naples Directorate for Air Armaments & Airworthiness Secretariat General of Defence Italian Ministry of Defence
1100-1130	South Africa's Response to COVID 19	Dr. Makhapa Makhafola Executive Director, Richards Bay Campus University of Zululand
1130-1200	Advanced Manufacturing Program	Dr. Khershed Cooper Program Director National Science Foundation
1200-1215	How to Foster, Grow and Nurture Innovation Ecosystems: the GW Accelerate National and International Experiences	Mr. Giulio Busulini Senior Advisor for International Programs George Washington University - OIE
1215-1300	LUNCH	
1300-1330	Sub-Diffraction Temperature Mapping of Protein Interconversions	Prof. Somin Lee Department of Biomedical Engineering University of Michigan

1330-1345	Quantum Coherence and Quantum Interactions in Microtubules and Surrounding Environment	Prof. Vladislav Yakovlev Department of Biomedical Engineering Texas A&M University
1345-1400	Enhanced Sensitivity with Quantum Light for Absorption Measurements	Prof. Girish Agarwal Department of Physics and Astronomy Texas A&M University
1400-1410	New Measurement Strategies for Enhanced Spatial Resolution of Trace Amounts of Bio-materials	Prof. Marlan Scully Department of Physics and Astronomy Texas A&M University
1410-1430	The Quantum Biology of Reactive Oxygen Species	Prof. Robert Usselman Dept. of Biomedical and Chemical Engineering and Sciences Florida Institute of Technoly
1430-1500	Multiscale Electrical Mapping of Biosystems	Prof. Jinglei Ping Mechanical and Industrial Engineering University of Massachusetts Amherst
1500-1530	BREAK	
1530-1600	Understanding the "Mission Versatility" of Membrane Proteins via Nanoscopic Imaging	Prof. Qian Chen Department of Materials Science University of Illinois Urbana-Champaign
1600-1630	Quantum Correlation Microscopy: Progressing Nanoscopy	Prof. Andrew Greentree Department of Physics Royal Melbourne Institute of Technology
1630-1700	Hybrid Diamond Materials for Quantum Biosensing Applications	Prof. Brant Gibson Department of Physics Royal Melbourne Institute of Technology
1700	MEETING ADJOURNED	

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Day 3 - Wednesday, 2 September 2020

TIME	TOPIC	SPEAKER
0830-0900	Login	
0900-0930	Free-electron-mediated Modifications of Biomolecules – from Physical Indicators to Molecular Mechanisms	Dr. Norbert Linz Institute of Biomedical Optics University of Lübeck
0930-1000	Photon Budgeting for Non-invasive Two-photon Optical Biopsy of Retinal Fluorophores	Prof. Alfred Vogel Institute of Biomedical Optics University of Lübeck
1000-1015	BREAK	
1015-1035	Multi-Disciplinary University Research Initiative: Nanoelectropulse-Induced Electromechanical Signaling and Control of Biological Systems	Prof. Andrei Pakhomov Frank Reidy Center for Bioelectronics Old Dominion University
1035-1055	The Interplay of Excitation and Electroporation in Nanosecond Pulse Stimulation	Prof. Andrei Pakhomov Frank Reidy Center for Bioelectronics Old Dominion University
1055-1135	Electrostimulated Transmembrane traffic 1. Nanosecond Field Reversal Distinguishes Cell Membranes from Lipid Vesicles 2. Molecular Simulations of Lipid Pore Response to Picosecond Field Reversal	Prof. Thomas Vernier Department of Computer Science Old Dominion University Ms. Federica Castellani Department of Computer Science Old Dominion University
1135-1205	Identifying the Membrane Protein Targets for nsPEF-Induced Pore Formation and Cell Death	Prof. Olga Pakhomova Frank Reidy Center for Bioelectronics Old Dominion University
1205-1300	LUNCH	
1300-1325	Nanosecond Pulse Generations and Method of Delivery for CANCAN	Prof. Shu Xiao Department of Electrical and Computer Engineering Old Dominion University
1325-1405	Cancellation of Cellular Responses in Excitable Adrenal Chromaffin Cells requires Ultrashort Bipolar Nanosecond Electric Pulses	Prof. Gale Craviso Prof. Josette Zaklit School of Medicine University Nevada Reno
1405-1435	Synergistic Effects of nsEP Interactions and Observation of "invisible" Effects of nsEP Interactions with Living Cells	Prof. Vladislav Yakovlev Department of Biomedical Engineering Texas A&M University
1435-1445	MURI Summary	Prof. Andrei Pakhomov Frank Reidy Center for Bioelectronics Old Dominion University

1445-1500	BREAK	
1500-1530	Lessons Learned from a Tissue Engineered 3D Model of the Glial Scar	Dr. Ana Pêgo Institute of Biomedical Engineering i3S/University of Porto
1530-1600	Developing a Predictive, Multi-scale Understanding of Energy-Utilizing Polymers	Prof. Holly Goodson Department of Chemistry University of Notre Dame
1600-1630	Autonomous Enzyme-Powered Nanomotors and Micropumps: Transport and Collective Behavior	Prof. Ayusman Sen Department of Chemistry Pennsylvania State University
1630-1700	Influence of Hydration and Protein Collective Motions on Biological Activities	Prof. Vinh Nguyen Department of Physics Virginia Tech University
1700	MEETING ADJOURNED	

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Day 4 - Thursday, 3 September 2020

TIME	TOPIC	SPEAKER
0800-0830	Login	
0830-0900	Ion-doped Apatite Nanoparticles with Intelligent Biofunctionalities and Biocide Ability	Dr. Simone Sprio Institute of S&T for Ceramics National Research Council of Italy
0900-0920	Shedding Light in Brain Microdomains	Dr. Valentina Benfenati Institute of Synthesis and Photoreactivity National Research Council of Italy
0920-0940	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
0940-1000	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
1000-1015	BREAK	
1015-1035	MURI: Cells and Cell Groups as Coupled Biochemical, Electrical, and Mechanical Systems	Prof. Wolfgang Losert Department of Physics University of Maryland
1035-1055	Excitable Systems in Cells - Precise Control of Cell Signals and Excitability	Prof. Peter Devreotes Department of Cell Biology Johns Hopkins University
1055-1115	Esotaxis – Experiments and Modeling	Prof. John Fourkas Department of Chemistry and Biochemistry University of Maryland
1115-1130	Electric Field (EF) Guidance of Biochemical and Biomechanical Signals	Ms. Qixin Yang Department of Physics University of Maryland
1130-1200	EF Driven Regulation of ERK Signaling to Control Cell Fate and Collective Behavior	Prof. Min Zhao Department of Dermatology University of California Davis
1200-1300	LUNCH	
1300-1320	ERK Signaling: Toward Precision Measurement and Control of Cell Behavior	Prof. Quan Qing Department of Physics Arizona State University

1320-1335	<i>In-Vivo</i> Electric Field Control of Cells	Prof. Patrick Kanold Department of Biology University of Maryland Prof. Quan Qing Department of Physics Arizona State University
1335-1350	New Charge and Voltage Sensors	Mr. Tatsat Banerjee Department of Cell Biology Johns Hopkins University
1350-1405	Voltage and Cytoskeletal Imaging of Electrically Excitable Cells	Mr. Sylvester Gates Department of Physics University of Maryland
1405-1420	EF Control of Neuronal Cells	Prof. Min Zhao Department of Dermatology University of California Davis
1420-1430	MURI Summary	Prof. Wolfgang Losert Department of Physics University of Maryland
1430-1445	Decoding Astrocyte Natural Rhythms: Impact of Actin and Channel Protein Dynamics across Scales	Dr. Kate O'Neil Department of Physics University of Maryland
1445-1500	BREAK	
1500-1530	Fundamental Biophysics Investigations on Upconversion Nanoparticles Modified Photoreceptive Composite Architectures for Enhanced Quantum Optoelectronics	Prof. Shashank Priya Materials Science and Engineering Pennsylvania State University
1530-1600	Colour Sensitive Organic Semiconductor Pixelated Photosensitive Device	Prof. Thomas Brown Department of Electronic Engineering University of Rome, Tor Vergata
1600-1630	Optimising Lanthanide Nanoparticle Design and Growth for Increased near-IR to Visible Upconversion Efficiency	Prof. James Piper Department of Physics and Astronomy Macquarie University
1630-1700	Improving Optical Measurement and Trapping using Quantum Mechanics	Prof. Warwick Bowen Department of Physics University of Queensland
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Day 5 - Friday, 4 September 2020

TIME	TOPIC	SPEAKER
0800-0830	Login	
0830-0845	AFOSR International Initiatives	Dr. Misoon Mah International Program Manager Air Force Office of Scientific Research
0845-0900	US – Italy S&T Cooperation	Dr. Stefano Lami Science Counselor Embassy of Italy to the United States
0900-0930	The University of Bologna and the US: Perspectives and Opportunities for Innovation	Prof. Beatrice Fraboni Rector's Delegate for International Relations with North America and Europe University of Bologna
0930-1000	Bringing Ideas to the Market: the Impact Driven Approach in the CNR Research Area in Bologna	Dr. Roberto Zamboni Director, Institute for Organic Synthesis and Photoreactivity National Research Council of Italy
1000-1030	Opportunities to Enrich your Research and Innovation Journey: Enrich in the USA	Ms. Claire Chen Director, Global Initiatives National Council of University Research Administrators Ms. Johanna Füllmann Senior Scientific Officer German Aerospace Center (DLR)
1030-1100	BREAK	
1100-1130	International Research Collaborations at Texas A&M Engineering	Prof. Dimitris Lagoudas Senior Associate Dean for Research Texas A&M University
1130-1200	Exploring New Biophysical Processes with Quantum Entanglement	Prof. Theodore Goodson Department of Chemistry University of Michigan
1200-1230	NCI Sensor Science – An Update	Dr. Jeffrey Buchsbaum Medical Officer and Program Director National Cancer Institute, NIH
1230-1330	LUNCH	
1330-1400	Universal Quantum Standards for Stochastic Biophysics	Prof. James Brozik Department of Chemistry Washington State University
1400-1430	Multidimensional Spectroscopic Probes of Heme Protein Functionality at Molecular and Cellular Scales	Prof. Jennifer Ogilvie Department of Physics University of Michigan

1430-1500	Quantum Coherence and Dynamics in Biological Processes: Molecular Isomerization in Vision	Prof. Paul Brumer Department of Chemistry University of Toronto
1500-1530	BREAK	
1530-1600	Using Human Stem Cells to Vascularized Organoids	Prof. Sharon Gerecht Department of Biomedical Engineering Johns Hopkins University
1600-1630	Biophysics of Intracellular Traffic: Linking Molecular Cues of Cytoskeletal Regulation and Extracellular Vesicle and Exosome Production	Prof. Ravi Radhakrishnan Department of Bioengineering University of Pennsylvania
1630-1700	Opportunities to engage with the Basic Research Office	Dr. Ololade Fatunmbi Program Scientist, SAINC Basic Research Office Office of the Under Secretary of Defense (R&E)
1700-1710	Closing	Dr. Sofi Bin-Salamon Program Manager Air Force Office of Scientific Research
1710	MEETING CONCLUSION	