

2024 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | November 18-22, 2024 | Washington, DC

Johns Hopkins University
Bloomberg Center
555 Pennsylvania Avenue NW, Washington, DC 20001

Day 1 - Monday, 18 November 2024

TIME	TOPIC	SPEAKER
0830-0850	REGISTRATION	
0850-0900	Remarks	Dr. Sofi Bin-Salamon Program Manager Air Force Office of Scientific Research
0900-0930	Understanding the “Mission Versatility” of Membrane Proteins and Cells by All-Scale Nanoscopic Imaging	Prof. Qian Chen Department of Materials Science University of Illinois Urbana-Champaign
0930-1000	Elucidating the Biophysical Mechanisms of Protein-Lipid Interactions in Nanodiscs	Prof. Aditi Das Parker H. Petit Institute for Bioengineering and Biosciences Georgia Tech Research Corporation
1000-1030	Deciphering and Orchestrating Dendritic Cell Membrane-Material Interactions for Immunotherapy	Prof. Hua Wang Department of Materials Science University of Illinois Urbana-Champaign
1030-1100	BREAK	
1100-1130	Nanomanufacturing Program	Dr. Khershed Cooper Program Director National Science Foundation
1130-1200	Innovation in Multi-functional Materials via Scalable Additive Manufacturing	Prof. Jochen Mueller Department of Civil and Systems Engineering Johns Hopkins University
1200-1230	Towards the study of the impact of environmental mechanostimulus on oligodendrocyte precursor differentiation and myelination	Dr. Ana Pêgo Institute of Biomedical Engineering i3S/University of Porto
1230-1330	LUNCH	
1330-1400	Quantum Coherence and Quantum Interactions in Microtubules and Surrounding Environment	Prof. Vladislav Yakovlev Department of Biomedical Engineering Texas A&M University

1400-1430	Modulation of astrocytes as new paths to dialogue with the brain - ASTROTALK	Dr. Valentina Benfenati Institute of Synthesis and Photoreactivity National Research Council of Italy
1430-1500	From bio-nanomaterials to quantum dots for biosensing and modulating cellular response	Dr. Maria Grazia Raucci Institute of Polymers, Composites and Biomaterials National Research Council of Italy
1500-1530	Quantum control of biomolecular vibrations	Prof. Warwick Bowen Department of Physics University of Queensland
1530-1600	BREAK	
1600-1630	Dissecting the physical principles that control the spatial organization of intracellular signaling	Prof. Lindsay Case Department of Biology Massachusetts Institute of Technology
1630-1700	Chemotactic Movement and Organization of Membranes and Protocells	Prof. Ayusman Sen Department of Chemistry Pennsylvania State University
1700-1730	Influence of Hydration and Protein Collective Motions on Biological Activities	Prof. Vinh Nguyen Department of Physics Virginia Tech University
1730-1800	Optical analysis of biological aerosols for intraoperative tissue characterization	Dr. José Rafael Guzmán Sepulveda Biophotonics and Optical Sensing Laboratory Cinvestav Unidad Monterrey
1800	MEETING ADJOURNED	

2024 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | November 18-22, 2024 | Washington, DC

Johns Hopkins University
 Bloomberg Center
 555 Pennsylvania Avenue NW, Washington, DC 20001

Day 2 - Tuesday, 19 November 2024

TIME	TOPIC	SPEAKER
0830-0900	REGISTRATION	
0900-0930	An Integrated Technology Platform with Photoelectrical and Electromagnetic Stimulator Arrays for Neuromorphic Vision	Prof. Jian-Ping Wang Department of Electrical and Computer Engineering University of Minnesota
0930-1000	Leveraging AI and computational methods for translational biophysics	Prof. Tinen Iles Department of Surgery University of Minnesota
1000-1030	Pixelated artificial retina models and biomodulation via organic semiconductors and light	Prof. Thomas Brown Department of Electronic Engineering University of Rome, Tor Vergata
1030-1100	BREAK	
1100-1130	Quantum Coherence and Dynamics in Biological Processes: Molecular Isomerization in Vision	Prof. Paul Brumer Department of Chemistry University of Toronto
1130-1200	Quantum correlation microscopy: progressing nanoscopy	Prof. Andrew Greentree ARC Centre of Excellence for NanoBiophotonics Royal Melbourne Institute of Technology University
1200-1230	Microwave and nano diamonds to dialogue with astrocytes	Dr. Andrea Candini Institute of Synthesis and Photoreactivity National Research Council of Italy
1230-1330	LUNCH	
1330-1400	Opportunities for creating Japan-US research collaboration	Prof. Larry Nagahara Vice Dean for Research and Translation Whiting School of Engineering Johns Hopkins University Dr. Takeshi Usami Director, Washington, D.C. Office Japan Science and Technology Agency

		Ms. Yuko Tsuda Deputy Director, Washington, D.C. Office Japan Science and Technology Agency
1400-1500	Label-free, high-speed quantitative imaging of astrocyte-neuron networks with optical diffraction tomography and machine learning	Prof. Ishan Barman Department of Mechanical Engineering Johns Hopkins University Dr. Emanuela Saracino Institute of Synthesis and Photoreactivity National Research Council of Italy
1500-1530	Investigation on co-cultured astrocyte and neuron populations by recording ultra-low signals with nanostructured electrodes	Dr. Annalisa Convertino Institute for Microelectronics and Microsystems National Research Council of Italy
1530-1600	Reconstruction of neuron potentials with convolutional neural networks trained on nanoelectrode recordings	Prof. Zeinab Jahed Department of Nanoengineering University of California, San Diego
1600-1630	BREAK	
1630-1700	Strategic Foresight - Helping Aviation Find Problems Worth Solving	Dr. Vikram Shyam Futurist Aeronautics Research Mission Directorate National Aeronautics & Space Administration
1700-1730	Entangled Quantum Sensors in Biology	Prof. Peter Burke Department of Integrated Nanosystem Research University of California, Irvine
1730-1800	Engineering nanodiamonds for superior sensing performance and future scalability	Prof. Philip Hemmer Department of Electrical and Computer Engineering Texas A&M University
1800	MEETING ADJOURNED	

2024 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | November 18-22, 2024 | Washington, DC

Johns Hopkins University
Bloomberg Center
555 Pennsylvania Avenue NW, Washington, DC 20001

Day 3 - Wednesday, 20 November 2024

TIME	TOPIC	SPEAKER
0830-0900	REGISTRATION	
0900-0930	Universal Quantum Standards for Stochastic Biophysics	Prof. James Brozik Department of Chemistry Washington State University
0930-1000	Stochastic Biophysical Interactions within Aquaporin-4 Assemblies	Prof. Grazia Paola Nicchia Department of Bioscience, Biotechnology and Biopharmaceutics University of Bari
1000-1030	Label-free, sub-diffraction identification of biomolecules	Prof. Somin Lee Department of Electrical Engineering and Computer Science University of Michigan
1030-1100	BREAK	
1100-1130	Bio-imaging, Bio-sensing, and Quantum Sensing at ORNL	Dr. Ali Passian Senior Research Staff Computational Sciences and Engineering Division Oak Ridge National Laboratory
1130-1200	Oxygen controlled hydrogel to uncover cellular responses to rapid hypoxia	Prof. Larry Nagahara Whiting School of Engineering Johns Hopkins University Prof. Sharon Gerecht Department of Biomedical Engineering Duke University
1200-1230	Applying Artificial Intelligence Techniques to Biophysics in the Air Domain	Mr. George Hellstern Senior Manager of the Artificial Intelligence Pillar Lockheed Martin Corporation
1230-1330	LUNCH	

1330-1400	Biomolecular condensates as mediators of non-classical sensing at the molecular scale: The microtubule +TIP network	Prof. Holly Goodson Department of Chemistry and Biochemistry University of Notre Dame
1400-1430	Hybrid quantum biosensing platforms	Prof. Brant Gibson ARC Centre of Excellence for NanoBiophotonics Royal Melbourne Institute of Technology University
1430-1500	Exploring New Biophysical Processes with Quantum Entanglement	Prof. Theodore Goodson Department of Chemistry University of Michigan
1500-1530	Fundamental Biophysics Investigations on Upconversion Nanoparticles Modified Photoreceptive Composite Architectures for Enhanced Quantum Optoelectronics	Prof. Bed Poudel Department of Materials Science and Engineering Pennsylvania State University
1530-1600	BREAK	
1600-1630	Investigating Quantum Techniques for Breakthrough Solutions in Aerospace and Defence	Dr. Massimiliano Dispenza Head of Quantum Technology, Optronics and Advanced Materials Labs Leonardo SpA
1630-1700	Investigating Novel Materials and Processes for Breakthrough Solutions in Aerospace and Defence	Dr. Abhishek Kumar Advanced Materials Labs Leonardo SpA
1700-1730	Quantum biotechnologies	Dr. Nicolas Mauranyapin Department of Physics University of Queensland
1730-1800	Understanding Cell Morphology Using Neural Radiance Fields and Optical Diffraction Tomography	Dr. Orlando Avila Garcia ARQUIMEA Research Center
1800	MEETING ADJOURNED	

2024 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | November 18-22, 2024 | Washington, DC

Johns Hopkins University
 Bloomberg Center
 555 Pennsylvania Avenue NW, Washington, DC 20001

Day 4 - Thursday, 21 November 2024

TIME	TOPIC	SPEAKER
0830-0900	REGISTRATION	
0900-0930	Photothermal label-free dynamic probing and modulation of astrocytes and fibroblast cell models	Prof. Michelle Sander Electrical and Computer Engineering Boston University
0930-1000	Astrocytes neural network multiscale response to extracellular sensing cues	Dr. Valentina Benfenati Institute of Synthesis and Photoreactivity National Research Council of Italy
1000-1030	Radiation Research Program	Dr. Jeffrey Buchsbaum Program Director National Cancer Institute National Institutes of Health
1030-1100	BREAK	
1100-1130	Aquaporin-4 as intelligent system in astrocytes to sense extracellular environmental clues	Prof. Grazia Paola Nicchia Department of Bioscience, Biotechnology and Biopharmaceutics University of Bari
1130-1200	Sensing extracellular matrix analogues to modulate astrocytes response	Prof. Luigi Ambrosio Institute of Polymers, Composites and Biomaterials National Research Council of Italy
1200-1230	Italy-US bilateral cooperation in Science & Technology	Prof. Maurizio Biasini Science Attaché Embassy of Italy Mr. Giulio Busulini Scientific Advisor Italian Institute of Technology
1230-1330	LUNCH	
1330-1400	Computing with Controllable Neuro-Glial Networks	Prof. Wolfgang Losert Department of Physics University of Maryland

1400-1430	Collective Information Processing of Astrocytes	Dr. Kate O'Neill Department of Physics University of Maryland
1430-1530	Astrocyte Augmented Machine Learning	Dr. Corey Hart Advanced Development Programs Lockheed Martin Corporation Dr. Christopher Yang Advanced Technology Laboratories Lockheed Martin Corporation
1530-1600	BREAK	
1600-1630	Real-time monitoring of aquaporin-4 dependent astrocyte biophysical parameters using multi-dimensional optical imaging and deep learning	Prof. Bahram Javidi Department of Electrical and Computer Engineering University of Connecticut
1630-1700	Lensless Computational Microendoscopy for Minimally-Invasive Hyperspectral Bio-imaging	Prof. Mark Foster Department of Electrical and Computer Engineering Johns Hopkins University
1700-1730	DISCUSSION	
1730	MEETING ADJOURNED	

2024 AFOSR Biophysics Program Review

Dr. Sofi Bin-Salamon | November 18-22, 2024 | Washington, DC

Johns Hopkins University
 Bloomberg Center
 555 Pennsylvania Avenue NW, Washington, DC 20001

Day 5 - Friday, 22 November 2024

TIME	TOPIC	SPEAKER
0830-0900	REGISTRATION	
0900-0930	Measurement of Cellular Viscosity and Mitochondrial Dynamics using Ultrasensitive Imaging Methods	Prof. Yun Chen Department of Mechanical Engineering Johns Hopkins University
0930-1000	Imaging the living activity of cells	Prof. Warwick Bowen Department of Physics University of Queensland
1000-1030	Biotransfer Printing of Nanopatterns on Tissue and Single Cells	Prof. Luo Gu Department of Materials Science and Engineering Johns Hopkins University
1030-1100	BREAK	
1100-1130	Investigations of Cell Responses to Extreme Environments Created by 3D Printing	Prof. Zhijian Pei Department of Industrial and Systems Engineering Texas A&M University
1130-1200	Biophysical responses of lung cells to extreme environments created by 3D printing	Prof. Hongmin Qin Department of Biology Texas A&M University
1200-1230	Biophysical responses of brain cells to extreme environments created by 3D printing	Dr. Ana Pêgo Institute of Biomedical Engineering i3S/University of Porto
1230-1300	Biophysical responses of brain cells to extreme environments created by 3D printing	Prof. Vladislav Yakovlev Department of Biomedical Engineering Texas A&M University
1300-1400	LUNCH	
1400-1430	Measuring Plasticity in Integrated Quantum-Enabled Neural Networks (IQ-NNs)	Prof. Wolfgang Losert Department of Physics University of Maryland
1430-1500	Biological Control of IQ-NNs	Prof. Kan Cao Dept. of Cell Biology and Molecular Genetics University of Maryland

1500-1530	Engineering IQ-NN topologies	Prof. John Fourkas Department of Chemistry and Biochemistry University of Maryland
1530-1600	Harnessing IQ-NNs as a Quantum Biosensing Testbed	Prof. Cheng Gong Department of Electrical and Computer Engineering University of Maryland
1600-1630	BREAK	
1630-1700	NIH quantum opportunities	Dr. Geetha Senthil Deputy Director, Office of Special Initiatives National Center for Advancing Translational Sciences National Institutes of Health
1700-1730	Quantum Signatures in Redox Cell Biology	Prof. Robert Usselman Department of Chemistry and Chemical Engineering Florida Institute of Technology
1730-1800	Multiscale Electrical Mapping of Biosystems	Prof. Jinglei Ping Department of Mechanical and Industrial Engineering University of Massachusetts Amherst
1800-1830	Scalable nanophotonic source of squeezed light towards quantum- and bio-sensing	Prof. Avik Dutt Department of Mechanical Engineering University of Maryland
1830	MEETING CONCLUSION	