

# 2019 AFOSR Natural Materials and Systems Annual Program Review

Dr. Aura Gimm | December 9-13, 2019 | Niceville, FL

Shangri La Auditorium, Doolittle Institute  
1140 E John Sims Pkwy #1, Niceville, FL 32578  
Niceville, FL 32578

## Day 1 | Monday, December 9, 2019

Time	Title of Project	Speaker
830-900	<b>Registration</b>	
900-910	Brief Introduction and Welcome	<b>J. Aura Gimm</b> AF Office of Scientific Research
910-945	New sensing modalities based on designed self-assembling protein nanomaterials	<b>David Baker</b> U Washington
945-1020	Self-Assembly of Conductive Fibers from Bioinspired Peptides	<b>Allon Hochbaum</b> UC-Irvine
1020-1055	Controlled assembly and patterning of multifunctional biomaterials on ultrastable protein scaffolds	<b>Douglas Clark</b> UC-Berkeley
1055-1120	<b>BREAK</b>	
1120-1155	Novel Stress Resistance Mechanisms in Extremely Thermoacidophilic Archaea	<b>Kelly Robert</b> NC State
1155-1230	Towards Advanced Functional Biopolymer Materials	<b>Paul Trulove</b> Naval Academy
1230-1345	<b>LUNCH</b>	
1345-1420	(YIP) Robust Conductance and Force Measurements of Single DNA Molecules to Quantify Nucleosome Unwinding	<b>Masha Kamenetska</b> Boston University
1420-1455	(YIP) Structural studies to elucidate the mechanisms of biobased nanoparticle synthesis	<b>Brent Nannenga</b> Arizona State
1455-1520	<b>BREAK</b>	
1520-1555	(YIP) DNA-Programmed Epitaxy of Nanoparticle Superlattices	<b>Robert MacFarlane</b> MIT
1555-1630	(YIP) PNA-Driven Remote Actuation of DNA Nanospring Strain Sensors	<b>Rebecca Taylor</b> Carnegie Mellon
	<b>MEETING ADJORNED</b>	

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## Day 2 | Tuesday, December 10, 2019

Time	Title of Project	Speaker
830-900	<b>Registration</b>	
900-950	(BRI) Theory-based design of synthetic genetic circuits incorporating biophysical models, stochastic dynamics, and evolutionary robustness	<b>Hal Alper</b> UT-Austin
950-1040	(MURI) Electrochemical Imaging and Mechanistic Studies on the Nanometer Scale	<b>George Schatz</b> Northwestern
1040-1105	<b>BREAK</b>	
1105-1140	Active, Multi-functional Biopolymer Interfacial Constructs-Beyond Structural Nanocomposites	<b>Vladimir Tsukruk</b> Georgia Tech
1140-1215	Reconfigurable Matter from Programmable Atom Equivalents	<b>Chad Mirkin</b> Northwestern
1215-1330	<b>LUNCH</b>	
1330-1405	Mechanisms of Polyurethane Biodeterioration Across Multiple Length-Scales: From Chemistry to Communities	<b>Wendy Goodson</b> AFRL
1405-1440	Optical, biochemical, and molecular characterization of new light producing systems from marine and terrestrial organisms, with emphasis on violet/blue	<b>Dimitri Deheyn</b> UC-San Diego
1440-1505	<b>BREAK</b>	
1505-1540	Mapping molecular-level dynamics to mesoscale mechanics in composite DNA-based biomaterials	<b>Rae Robertson-Anderson</b> U of San Diego
1540-1615	Development and Characterization of Novel Bioluminescence Sources	<b>Bruce Branchini</b> Connecticut College
1615-1650	Regulatory Mechanisms of Radioresistance under Differential Levels of Ionizing Irradiation	<b>Lydia Contreras</b> UT-Austin
	<b>ADJOURNED FOR THE DAY</b>	

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## Day 3 | Wednesday, December 11, 2019

Time	Title of Project	Speaker
830-900	<b>Registration</b>	
900-950	(MURI) Convergent Evolution to Engineering- Multiscale Structures and Mechanics in Damage Tolerant Functional Biocomposite and Biomimetic Materials	<b>David Kisailus</b> UC-Riverside
950-1040	(Guest Speaker) Chiral Inorganic Nanostructures	<b>Nicholas Kotov (confirmed)</b> U Michigan
1040-1105	<b>BREAK</b>	
1105-1155	(MURI) A 4D Nanoprinter for Making and Manipulating Macroscopic Material	<b>Chad Mirkin</b> Northwestern
1155-1215	State of the NMS Program	<b>J. Aura Gimm</b> AF Office of Scientific Research
1215-1330	<b>LUNCH</b>	
1330-1400	(NSF) Biomaterials research within NSF DMR	<b>Randy Duran (confirmed)</b> NSF
1400-1415	<b>BREAK</b>	
1415-1700	<b>SIDEBAR with PO (prior sign-up required)</b>	
	<b>ADJOURNED FOR THE DAY</b>	

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## Day 4 | Thursday, December 12, 2019

Time	Title of Project	Speaker
830-900	<b>Registration</b>	
900-950	(MURI) Unraveling the Biology, Chemistry and Nanoscience of Natural and Synthetic Melanins	<b>Nathan Gianneschi</b> Northwestern
950-1025	Biomimetic optical nanostructures from melanin and melanin composites	<b>Matthew Shawkey</b> Gent
1025-1100	Macromolecular Modeling of Biomimetic Assembly	<b>Murugapan Muthukumar</b> UMass-Amherst
1100-1125	<b>BREAK</b>	
1125-1200	Exploitation of Natural Processes and Materials – Understanding Biointerfacial Properties and Structure-Function Studies of Biopolymers	<b>Patrick Dennis</b> AFRL
1200-1235	Peptide-driven Exfoliation and Organization of Multi-compositional 2D Nanomaterial	<b>Marc Knecht</b> University of Miami
1235-1400	<b>LUNCH</b>	
1400-1435	(EOARD/ONR-G) Re-Configurable Biocomputing Circuits	<b>Francesc Posas Garriga</b> Universitat Pompeu Fabra
1435-1510	(AOARD) Investigation on the Tuneable Optical Properties of Reformatted Bacterial Cellulose	<b>Sierin Lim</b> Nanyang
1510-1535	<b>BREAK</b>	
1535-1610	Silk Modifications for Tunable Materials	<b>David Kaplan</b> Tufts
1610-1645	Probing Mechanisms of Biological-Material interaction; towards realizing biomimetic materials by understanding molecular-level interactions	<b>Carole Perry</b> Nottingham Trent
	<b>ADJOURNED FOR THE DAY</b>	

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**Day 5 | Friday, December 13, 2019**

Time	Title of Project	Speaker
830-900	<b>Registration</b>	
900-935	Shape-changing, metabolite consuming peptide nanostructures	<b>Rein Ulijn</b> CUNY
935-1010	(YIP) Peptide-DNA tiles as building blocks for complex nanostructures	<b>Nicholas Stephanopoulos</b> Arizona State
1010-1045	The Molecular Mechanisms Responsible for the Assembly of Spider Silk Fibers	<b>Gregory Holland</b> San Diego State
1045-1110	<b>BREAK</b>	
1110-1145	Transcriptional Riboswitch Mechanism Elucidation for Biosensor Prototyping	<b>Jorge Chavez-Benavides</b> AFRL
1145-1220	Synthetic Mucins – a versatile new responsive material	<b>Adam Braunschweig</b> CUNY
	<b>ADJOURNED</b>	