

FY2021 MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE (MURI) - SELECTED PROJECTS

Topic Number	Topic Name	Project Name	Sponsoring Office	Primary University Subaward Universities (1)	University Location (state)	Principal Investigator
1	Molecular Qubits for Synthetic Electronics	Topological Spin Qubits Based on Graphene Nanoribbons	ONR	University of Pittsburgh Michigan State University University of Wisconsin-Madison Harvard University University of Nebraska-Lincoln	PA MI WI MA NE	Jeremy Levy
2	A Brain-based Compositional Framework for Robust Computer Vision	Self-Supervised Scene Understanding with Object-Centric Dorso-Ventral Neural Networks	ONR	University of California Berkeley Massachusetts Institute of Technology Stanford University	CA MA CA	Jitendra Malik
3	Littoral Ocean Dynamics off Rocky Coasts and Shorelines	ROXSI: ROcky shores eXperiments and Simulations	ONR	Naval Postgraduate School Oregon State University University of California, San Diego (Scripps Institution of Oceanography) University of Delaware University of North Carolina at Chapel Hill University of North Carolina Wilmington	CA OR CA DE NC NC	James MacMahan
4	Fog and Turbulence	Fatima: Fog and turbulence interactions in the marine atmosphere	ONR	University of Notre Dame Naval Postgraduate School University of California, San Diego (Scripps Institution of Oceanography) University of Utah University of Minnesota	IN CA CA UT MN	Harindra Joseph S. Fernando
5	Dynamic Tuning of Thermal Transport	Extraordinary Electronic Switching of Thermal Transport	ONR	University of Texas at Austin Harvard University The Ohio State University Stanford University University of Oregon	TX MA OH CA OR	Li Shi
6	Chemically and Thermally Insensitive Super/Ultra-Hard Materials	SPICES: Spinodal-hardened high-entropy ceramics	ONR	Duke University Pennsylvania State University North Carolina State University Missouri University of Science & Technology State University of New York at Buffalo	NC PA NC MO NY	Stefano Curtarolo

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7	Narrative, Moral and Social Foundations of Social Cyber-Attack in Social Media	Persuasion, Identity, & Morality in Social-Cyber Environments	ONR	Carnegie Mellon University University of Southern California State University of New York at Buffalo United States Military Academy	PA CA NY NY	Kathleen Carley
8	A Dynamics and Control Theory of Safe, Cognitive and Learning Systems	Control and Learning Enabled Verifiable Robust AI (CLEVR-AI)	ONR	Northeastern University University of California, Berkeley Johns Hopkins University University of Michigan	MA CA MD MI	Mario Sznaier
9	Understanding Turbulence-Chemistry Interactions in Non-Equilibrium, High-Speed Flows	Discovering & Modeling Turbulence and Chemistry Interactions in High Speed Reactive Flows	ONR	University of Michigan University of Illinois Urbana-Champaign University of Southern California Purdue University Stanford University	MI IL CA IN CA	Venkat Raman
10	Predicting Organic Molecular Decomposition	An Informatics Paradigm for Predicting Organic Chemical Stability	ONR	Purdue University University of Pittsburgh Carnegie Mellon University	IN PA PA	Brett Savoie
11	Anomalous Dipole Textures in Engineered Ferroelectric Materials	Emergent Topological and Hierarchical Ordered Structures (ETHOS)	ARO	University of California, Berkeley Cornell University The Pennsylvania State University University of Arkansas	CA NY PA AK	Ramamoorthy Ramesh
12	Cyber Autonomy through Robust Learning and Effective Human/Bot Teaming	Cohesive and Robust Human-Bot Cybersecurity Teams	ARO	University of Wisconsin Carnegie Mellon University University of California San Diego Pennsylvania State University University of Melbourne (2) Macquarie University (2) University of Newcastle (2)	WI PA CA PA AUS AUS AUS	Somesh Jha
13	Highly Heterogeneous Meta-macrostructures Created via Fine-particle Interactions	Understanding and Engineering Transient Mechanical Responses in Nanoparticle-Reinforced Heterogeneous Particulate Systems	ARO	Harvard University University of Illinois Urbana-Champaign The University of Chicago	MA IL IL	Jennifer Lewis

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14	Non-Silica Inorganic Material Phases Synthesized from Genetically Modified Diatoms	NO SELECTION	ARO			
15	Novel Mechanisms of Neuro-Glio Bio-Computation and Reinforcement Learning	Rethinking Reinforcement Learning with Astrocyte-Neuron Computations	ARO	Massachusetts Institute of Technology University of Minnesota California Institute of Technology	MA MN CA	Mriganka Sur
16	Quantum Network Science	Theory and Engineering of Large-Scale Distributed Entanglement	ARO	University of Arizona University of Massachusetts Amherst University of Chicago Northwestern University Massachusetts Institute of Technology Yale University	AZ MA IL IL MA CT	Saikat Guha
17	The Same is Different: Integrating Multiple Phenomena in Single Materials	Multi-functional devices in precisely engineered van der Waals homojunctions	ARO	Harvard University Columbia University Massachusetts Institute of Technology Princeton University	MA NY MA NJ	Philip Kim
18	Tunable Dilute Anion III-Nitride Nanostructures for Stable Photocatalysis	Tunable III-Nitride Nanostructures for N=N and C-H Bond Activation	ARO	University of Michigan - Ann Arbor Yale University University of California, Santa Barbara University of Illinois Urbana-Champaign	MI CT CA IL	Zetian Mi
19	Mechanisms of Novel Reactivity in Aqueous Microdroplets	Mechanistic Studies of Microdroplet Chemistry	AFOSR	Stanford University Yale University Purdue University Columbia University University of Southern California University of California, Berkeley	CA CT IN NY CA CA	Richard Zare
20	Topological Plasma Electromagnetics	Topological Phenomena in Magnetized Plasma Structures and their Applications for Extreme Control of Electromagnetic Waves	AFOSR	Stanford University Cornell University City University of New York University of Illinois Urbana-Champaign University of California San Diego	CA NY NY IL CA	Mark Cappelli

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21	Interfacial Engineering of Superconductors	Tunneling Phenomena in Interface Superconductors	AFOSR	Harvard University Cornell University University of Maryland	MA NY MD	Jennifer Hoffman
22	Targeted Optical Stimulation of Individual Retinal Photoreceptors	Probing, Modeling & Reprogramming Visual Perception at the Level of Individual Photoreceptors	AFOSR	University of California, Berkeley University of Washington University of Alabama at Birmingham	CA WA AL	Ren Ng
23	Quantum Random Access Memory	Towards Robust Scalable Quantum Random Access Memories	AFOSR	University of Chicago Yale University University of Maryland	IL CT MD	Liang Jiang
24	Metasurface Edge Sensing, Processing and Computing	Meta-imaging: Sensing, Processing and Computing with Dynamic Metasurfaces	AFOSR	Duke University California Institute of Technology City University of New York Harvard University Stanford University University of Pennsylvania	NC CA NY MA CA PA	Maiken Mikkelsen
25	Non-Hermitian Programmable Materials at Exceptional Points	Programmable Systems with Non-Hermitian Quantum Dynamics	AFOSR	Pennsylvania State University Yale University Michigan Technological University University of Central Florida Washington University in St. Louis University of California, Berkeley University of Southern California	PA CT MI FL MO CA CA	Sahin Ozdemir
26	Mathematical Foundations for Enabling Robust Optimal Design of Hypersonic Systems	A Robust Multi-Physics Design Analysis and Optimization Framework for Hypersonic Systems Grounded in Rigorous Model Reduction	AFOSR	Stanford University University of Minnesota Rice University University of Notre Dame	CA MN TX IN	Charbel Farhat

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