

**2012 MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE (MURI) – SELECTED PROJECTS**

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<b>MURI TOPIC #1: Quantized Chemical Reactions of Ultracold Molecules</b>				
<b>ARO</b>	<b>High-Resolution Quantum Control of Chemical Reactions</b>	<b>Yale University</b> Harvard University Massachusetts Institute of Technology Stanford University University of California, Los Angeles University of Colorado University of Connecticut University of Washington	<b>David DeMille</b>	<b>CT</b> <b>MA</b> <b>MA</b> <b>CA</b> <b>CA</b> <b>CO</b> <b>CT</b> <b>WA</b>
<b>MURI TOPIC #2: 3D Topological Insulators with Interactions</b>				
<b>ARO</b>	<b>The Physics of Surface States with Interactions mediated by Bulk Properties, Defects and Surface Chemistry</b>	<b>Princeton University</b> Pennsylvania State University University of California, Berkeley	<b>Robert Cava</b>	<b>NJ</b> <b>PA</b> <b>CA</b>
<b>MURI TOPIC #3: Translating Biochemical Pathways to Non-Cellular Environments</b>				
<b>ARO</b>	<b>Translating Biochemical Pathways to Non-Cellular Environments</b>	<b>Arizona State University</b> Massachusetts Institute of Technology Harvard Medical School University of Michigan	<b>Hao Yan</b>	<b>AZ</b> <b>MA</b> <b>MA</b> <b>MI</b>

1. Team member institutions are those included in the lead institution's research proposal. They are subject to change at the discretion of the lead institution (e.g., if the final negotiated amount of the award is less than the amount proposed).

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<b>MURI TOPIC #4: Multivariate Heavy-Tailed Statistics: Foundations and Modeling</b>				
<b>ARO</b>	<b>Multivariate Heavy -Tail Phenomena: Modeling and Diagnostics</b>	<b>Cornell University</b> University of Massachusetts Columbia University American University Ohio State University University of Illinois University of Minnesota	<b>Sidney Resnick</b>	NY MA NY DC OH IL MN
<b>MURI TOPIC #5: Simultaneous Multi-Synaptic Imaging of Interneuron</b>				
<b>ARO</b>	<b>Imaging how a neuron computes</b>	<b>Columbia University</b> Harvard University Massachusetts Institute of Technology	<b>Rafael Yuste</b>	NY MA MA
<b>MURI TOPIC #6: Revolutionizing High-Dimensional Microbial Data Integration</b>				
<b>ARO</b>	<b>Title: Associating growth conditions with cellular composition in Gram-negative bacteria</b>	<b>University of Texas at Austin</b> Boston University Harvard University	<b>Claus O. Wilke</b>	TX MA MA
<b>MURI TOPIC #7: Novel Nanostructures for the Controlled Propagation of Electromagnetic Energy</b>				
<b>ARO</b>	<b>Coherent effects in hybrid nanostructures for lineshape engineering of electromagnetic media</b>	<b>Rice University</b> University of Michigan University of Minnesota Ohio State University	<b>Naomi J. Halas</b>	TX MI MN OH

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<b>MURI TOPIC #8: Predictive Models of Cultural and Behavioral Effects on Societal Stability</b>				
<b>ARO</b>	<b>Evolution of Cultural Norms and Dynamics of Socio-Political Change</b>	<b>University of Pennsylvania</b> Cornell University Massachusetts Institute of Technology Stanford University Georgia Institute of Technology	<b>Ali Jadbabaie</b>	<b>PA</b> NY MA CA GA
<b>MURI TOPIC #9: Directional Eutectic Structures: Self-Assembly for Metamaterials and Photonics</b>				
<b>AFOSR</b>	<b>Template-Directed Directionally Solidified Eutectic Metamaterials</b>	<b>University of Illinois at Urbana-Champaign</b> Stanford University University of Michigan University of Tennessee	<b>Paul V. Braun</b>	<b>IL</b> CA MI TN
<b>MURI TOPIC #10: Smart, Functional, Nanoenergetics Design from the Atomistic/Molecular Scale through the Mesoscale</b>				
<b>AFOSR</b>	<b>Smart Functional Nanoenergetic Materials</b>	<b>Pennsylvania State University</b> University of Maryland, College Park Princeton University Purdue University Georgia Institute of Technology	<b>Richard A. Yetter</b>	<b>PA</b> MD NJ IN GA

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<b>MURI TOPIC #11: Managing Informational Complexity in Predictive Materials Science</b>				
<b>AFOSR</b>	<b>Managing the Mosaic of Microstructure</b>	<b>Carnegie Mellon University</b> California Institute of Technology Drexel University University of Michigan University of Minnesota Northwestern University Purdue University	<b>Marc De Graef</b>	<b>PA</b> CA PA MI MN IL IN
<b>MURI TOPIC #12: Deep Atmospheric Optical Turbulence Physics and Predictive Modeling</b>				
<b>AFOSR</b>	<b>Wave Optics of Deep Atmospheric Turbulence: From Underlying Physics towards Predictive Modeling, Mitigation and Exploitation</b>	<b>University of Dayton</b> Air Force Institute of Technology Michigan Technological University North Carolina State University New Mexico State University University of Miami	<b>Mikhail A. Vorontsov</b>	<b>OH</b> CO MI NC NM FL
<b>MURI TOPIC #13: Quantum Metaphotonics/Metamaterials</b>				
<b>AFOSR</b>	<b>Quantum Metaphotonics and Metamaterials: From Single Emitters to Strongly Correlated Systems</b>	<b>Brown University</b> California Institute of Technology University of Texas, Austin Stanford University University of Pennsylvania Massachusetts Institute of Technology University of California, Berkeley	<b>Rashid Zia</b>	<b>RI</b> CA TX CA PA MA CA

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<b>MURI TOPIC #14: High Power, Low-Loss, Artificial Materials for Transformational Electromagnetics</b>				
<b>AFOSR</b>	<b>Innovative use of Metamaterials in Confining, Controlling, and Radiating Intense Microwave Pulses</b>	<b>University of New Mexico</b> Massachusetts Institute of Technology Ohio State University University of California, Irvine Louisiana State University	<b>Edl Schamiloglu</b>	<b>NM</b> <b>MA</b> <b>OH</b> <b>CA</b> <b>LA</b>
<b>MURI TOPIC #15: Morphable Dynamic Information Processing</b>				
<b>ONR</b>	<b>Dynamics of Multifunction Brain Networks</b>	<b>University of California, San Diego</b> University of California, Berkeley University of Chicago	<b>Henry Abarbanel</b>	<b>CA</b> <b>CA</b> <b>IL</b>
<b>MURI TOPIC #16: Extended-Range Environmental Prediction Using Low-Dimensional Dynamic Modes</b>				
<b>ONR</b>	<b>Physics Constrained Stochastic-Statistical Models for Extended Range Environmental Prediction</b>	<b>New York University</b> North Carolina State University University of Wisconsin, Madison University of California, Los Angeles	<b>Andrew Majda</b>	<b>NY</b> <b>NC</b> <b>WI</b> <b>CA</b>

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<b>MURI TOPIC #16: Extended-Range Environmental Prediction Using Low-Dimensional Dynamic Modes</b>				
<b>ONR</b>	<b>Extended-Range Prediction with Low-Dimensional, Stochastic-Dynamic Models: A Data-driven Approach</b>	<b>University of California, Los Angeles</b> Columbia University	<b>Michael Ghil</b>	<b>CA</b> <b>NY</b>
<b>MURI TOPIC #17: A New Way to Dissipate Shock Wave Energy from Detonations</b>				
<b>ONR</b>	<b>Shock Wave Energy Dissipation by Mechanochemically-active Nanoporous Materials</b>	<b>University of Illinois at Urbana-Champaign</b> Stanford University Purdue University	<b>Dana Dlott</b>	<b>IL</b> <b>CA</b> <b>IN</b>
<b>MURI TOPIC #18: Programming Biology to Attain Non-Natural Functions</b>				
<b>ONR</b>	<b>Next-generation Devices; Model-guided Discovery and Optimization of Cell-based Sensors</b>	<b>Massachusetts Institute of Technology</b> Pennsylvania State University Rice University Rutgers University California Institute of Technology University of Minnesota	<b>Christopher Voigt</b>	<b>MA</b> <b>PA</b> <b>TX</b> <b>NJ</b> <b>CA</b> <b>MN</b>
<b>MURI TOPIC #19: Predicting the Behavior of Complex, Non-Deterministic Autonomous Systems and Mixed Autonomous/Manned Teams under Realistic Assumptions</b>				
<b>ONR</b>	<b>Embedded Humans: Provably Correct Decision Making for Networks of Humans and Unmanned Systems</b>	<b>University of California, Berkeley</b> Stanford University University of California, Los Angeles	<b>S. Shankar Sastry</b>	<b>CA</b> <b>CA</b> <b>CA</b>

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<b>MURI TOPIC #20: Extreme Electron Concentration Materials and Devices</b>				
<b>ONR</b>	<b>Extreme Electron Concentration Oxide Devices</b>	<b>University of California, Santa Barbara</b> Ohio State University University Notre Dame Stanford University Yale University	<b>Susanne Stemmer</b>	<b>CA</b> <b>OH</b> <b>IN</b> <b>CA</b> <b>CT</b>
<b>MURI TOPIC #21: Super-hydrophobic Surface for Skin Friction Drag Reduction in High Reynolds Number Turbulent Flow</b>				
<b>ONR</b>	<b>Passive &amp; Active Friction Drag Reduction of Turbulent Flows Over Super-Hydrophobic Surfaces</b>	<b>Naval Architectural &amp; Marine Engineering</b> <b>University of Michigan</b> John Hopkins Massachusetts Institute of Technology Stanford University University of Minnesota University of Texas at Dallas	<b>Steven L. Ceccio</b>	<b>MI</b> <b>MD</b> <b>MA</b> <b>CA</b> <b>MN</b> <b>TX</b>
<b>ONR</b>	<b>Slippery Liquid-Infused Porous Surfaces for Turbulent Drag Reduction at High Reynolds Number</b>	<b>Princeton University</b> Harvard University University of Puerto Rico at Mayaguez	<b>Alexander Smits</b>	<b>NJ</b> <b>MA</b> <b>PR</b>