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## Grants Awarded 2012

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### Doctoral New Investigator

#### Starter Grants Awarded to Faculty in Ph.D.-Granting Departments

**Benjamin Akih-Kumgeh**, Syracuse University, Investigation of Ignition and Soot Formation Trends During High-Temperature Oxidation of Gasoline and Furan Blends, \$100,000.

**Ryan A. Altman**, University of Kansas, School of Pharmacy, Development of Novel, Stable and User-Friendly Trifluoromethylation Reagents, \$100,000.

**Indika U. Arachchige**, Virginia Commonwealth University, Sol-Gel Assembly of Hollow Metal Particles Into a New Class of Porous Nanostructures and Their Application in Heterogeneous Catalysis, \$100,000.

**Michael Baldea**, The University of Texas at Austin, Tuning the Performance of Microchannel Steam Methane Reforming Reactors via Modular Design and Phase Change Temperature Control, \$100,000.

**Jason Edward Bara**, University of Alabama, Linking Fractional Free Volume to Gas Solubility and Membrane Permeability in Ionic Liquids, \$100,000.

**Wesley H. Bernskoetter**, Brown University, Cobalt Mediated C-C Bond Transformations toward Small Molecule Synthesis, \$100,000.

**Bradley J. Berron**, University of Kentucky, Gas-Phase UV Grafting on Surface-Initiated ROMP Coatings for Improved Stability, \$100,000.

**Arthur E. Bragg**, The Johns Hopkins University, Non-adiabatic Dynamics of Small Polyphenyls Studied with Time-Resolved Spectroscopies, \$100,000.

**Arindam Chakraborty**, Syracuse University, Development of Electron-Hole Functional for Investigation of Electronically Excited States, \$100,000.

**Candace K. Chan**, Arizona State University, Synthesis and Electrochemical Characterization of Novel Polyanion Materials for High Capacity Li-Ion Cathodes, \$100,000.

**Qianli Chu**, University of North Dakota, Novel Polymeric Architectures from Monomers with Multiple Reactive Centers, \$100,000.

**Jacinta C. Conrad**, University of Houston, Effects of Confinement on Phase Behavior, Structure, and Dynamics of Attractive Colloidal Suspensions, \$100,000.

**Silas P. Cook**, Indiana University, A New, Reductive-Heck Approach towards Csp<sup>2</sup>-Csp<sup>3</sup> Bond Formation, \$100,000.

**Mitchell P. Croatt**, University of North Carolina at Greensboro, Formation of Cyano-Carbenes from Alkynes and Azides Using Hypervalent Iodine, \$100,000.

**Andrew B. Croll**, North Dakota State University, Biomimetic Soft Colloidal Materials, \$100,000.

**Guangbin Dong**, The University of Texas at Austin, Direct Access of Chemically Differentiated 1,2-Diols from Oxime-Masked Mono-Alcohols, \$100,000.

**Christopher G. Elles**, University of Kansas, Ultrafast Dynamics of Organic and Molecular Electronics Components, \$100,000.

**Marion H. Emmert**, Worcester Polytechnic Institute, Acylation of Arenes via Catalytic C-H Bond Functionalization and Aerobic Alcohol Oxidation, \$100,000.

**Felix R. Fischer**, University of California, Berkeley, Ruthenium and Osmium Alkylidyne Complexes as Catalysts/Initiators for the Ring-Opening Alkyne Metathesis Polymerization, \$100,000.

**John D. Fortner**, Washington University in St. Louis, Stabilized Nanoparticle Partitioning and Interfacial Behavior in Oil-Brine Systems, \$100,000.

**Randall H. Goldsmith**, University of Wisconsin-Madison, Watching Single Catalyst Molecules in Action, \$100,000.

**Lars C. Grabow**, University of Houston, Rapid Prediction of Sulfide and Oxide Catalyst Surface Structures Using Insight from Density Functional Theory, \$100,000.

**Carlos A. Guerrero**, University of California, San Diego, Catalytic, Enantioselective Arene Amination, \$100,000.

**Malancha Gupta**, University of Southern California, Green Solventless Fabrication of Ionic Liquid/Polymer Composites Using Vapor Phase Polymerization, \$100,000.

**Matthew E. Helgeson**, University of California, Santa Barbara, Multi-Scale Investigation of Viscoelastic Micellar Fluids in Complex Flows, \$100,000.

**Gregory D. Hoke**, Syracuse University, Evaluating the Mechanisms for Episodic Filling and Erosion in Wedge-Top and Proximal Foreland Environments in the Precordillera, San Juan Province, Argentina, \$100,000.

**Jeremiah A. Johnson**, Massachusetts Institute of Technology, Flower-Mimetic Hydrogels: Materials that Grow Towards Light, \$100,000.

**Sunghwan Jung**, Virginia Polytechnic Institute and State University, Multi-Scale Hydrodynamics of Bubble-Particle Interaction, \$100,000.

**Christopher K. Junium**, Syracuse University, Nitrogen Isotopes of Porphyrins from Source Rocks, \$100,000.

**Yosuke Kanai**, University of North Carolina at Chapel Hill, Dynamics and Kinetics of Carbon Dioxide in Nano-Porous Materials Environment from Quantum Molecular Dynamics Simulations, \$100,000.

**Kristina M. Keating**, Rutgers, The State University of New Jersey (Newark), The Use of Low-Field Nuclear Magnetic Resonance Measurements to Monitor Microbial Growth, \$100,000.

**Robert R. Knowles**, Princeton University, Remodeling C-H Bonds: Selective Catalysis of Hydrogen Atom Transfer, \$100,000.

**Laura L. Lapham**, University of Maryland Center for Environmental Science, Understanding Factors that Control Gas Hydrate Stability: Does Microbial Activity Induce Gas Hydrate Dissolution?, \$100,000.

**Vincent Lavallo**, University of California, Riverside, Armor Plated Ligands: Synthesis and Applications in Catalytic Alkane Functionalization, \$100,000.

**Naomi E. Levin**, The Johns Hopkins University, Variations in  $^{17}\text{O}/^{16}\text{O}$  and  $^{18}\text{O}/^{16}\text{O}$  of Meteoric Waters from the Conterminous USA, \$100,000.

**Tianshu Li**, George Washington University, Understand Methane Hydrates Formation through Accelerated Molecular Simulations, \$100,000.

**Mary Laura Lind**, Arizona State University, The Relationship Between the Supercooled Liquid Region, Elemental Enthalpy of Hydride Formation, and Hydrogen Embrittlement in Amorphous Metallic Thin Films, \$100,000.

**Dongxia Liu**, University of Maryland, Metal Clusters Sequestered in Micropores of Hierarchical Lamellar Zeolites: Protected Active Sites and Enhanced Mass Transport for Heteroatom-Tolerant Catalysts, \$100,000.

**Jenny V. Lockard**, Rutgers, The State University of New Jersey (Camden), Investigation of Host-Guest Interactions in Metal-Organic Framework Materials Using Spectroscopic Methods, \$100,000.

**Anita E. Mattson**, The Ohio State University, Sustainable Catalysts for Feedstock Chemical Functionalization, \$100,000.

**Silvina Matysiak**, University of Maryland, Characterization of Micelle Formation and Stability Under Extreme Conditions, \$100,000.

**Jean-Sabin McEwen**, Washington State University, Electric Field-Induced Reactions in Fuel Cells From First Principles, \$100,000.

**Tyrel McQueen**, The Johns Hopkins University, Synthesis of Metastable Solid State Materials Using Organometallic Reagents, \$100,000.

**Simon J. Meek**, University of North Carolina at Chapel Hill, Metal Catalyzed C-H Bond Activation and Allyl Addition: Development of New Transition Metal Catalysis for Practical and Uniquely Efficient Carbon-Carbon Bond Forming Reactions, \$100,000.

**Ashish Mhadeshwar**, University of Connecticut, Modeling Catalyst Deactivation Due To Sulfation During Emissions-Oxidation From Diesel Engine Exhaust, \$100,000.

**Alexander J.M. Miller**, University of North Carolina at Chapel Hill, Cation-Crown Ether Interactions to Control Ligand Hemilability and Catalyst Function, \$100,000.

**Leslie J. Murray**, University of Florida, Designing Multifunctional Complexes for Chemical Catalysis, \$100,000.

**Georgy V. Nazin**, University of Oregon, Atomic-Scale Visualization of Excitonic States in Individual Polymer Molecules, \$100,000.

**Sune G. Nielsen**, Woods Hole Oceanographic Institution, Stable Vanadium Isotopes in Crude Oils and Their Source Rocks: A New Tool to Understand the Processes Governing Petroleum Generation, \$100,000.

**John Oakey**, University of Wyoming, Direct Investigations of Enhanced Oil Recovery by Sequential Waterflooding with Microscale Models, \$100,000.

**Peter J. Pauzauskie**, University of Washington, Optoelectronic Investigation of Fundamental Mass Transport Mechanisms in Metallic Solid-Solution Nanocrystals, \$100,000.

**Daniel J. Peppe**, Baylor University, Climate, Tectonics and the Ecosystem Impact: Exploring the Relationship Between Extrinsic Controls and Cyclic Alluvial Stratal Accumulations within the Paleocene Nacimiento Formation, San Juan Basin, New Mexico, \$100,000.

**Poul B. Petersen**, Cornell University, Direct Characterization of the Structure and Dynamics of Catalytic Monolayers by Coherent Surface-Specific 2D-IR Spectroscopy, \$100,000.

**Louis Piper**, State University of New York at Binghamton, Elucidating the Electronic Structure and Chemistry of Layered Vanadium Oxides for Next-Generation Energy Storage, \$100,000.

**Masa Prodanovic**, The University of Texas at Austin, Coupled Fluid and Solid Mechanics Study for Improved Permeability Estimation of Damaged Formations Near Wellbore, \$100,000.

**Jingjing Qiu**, Texas Tech University, Graphene-Integrated Durable Rubber Sealants for Petroleum Exploration, \$100,000.

**Alexander T. Radosevich**, The Pennsylvania State University, A Nonmetal Platform for Inner Sphere Two-Electron Redox Catalysis, \$100,000.

**Jeffrey D. Rimer**, University of Houston, Design of Zeolite Growth Modifiers: A Hierarchical Approach to Optimize Nanoporous Catalysts, \$100,000.

**James M. Rondinelli**, Drexel University, Toward Efficient Design of Noncentrosymmetric Oxyfluorides: *ab initio* Crystal Engineering of Next-Generation Catalysts, \$100,000.

**Genevieve Sauve**, Case Western Reserve University, Synthesis and Structure-Property Relationship Studies of Polymers Containing Core-Substituted Naphthalene Diimides, \$100,000.

**Tongye Shen**, The University of Tennessee, Organic Solvent-Specific Gating Motions of an Extremophilic Lipase, \$100,000.

**Nima Shokri**, Boston University, Fundamental Studies of the Morphology and Dynamics of the Phase Entrapment in Immiscible Two-Phase Flow through Porous Media, \$100,000.

**Mark E. Siemens**, University of Denver, Quantized Phonon Dynamics for Thermoelectrics, \$100,000.

**Ronald A. Smaldone**, The University of Texas at Dallas, Dynamic Synthesis and Assembly of Nanoporous Materials, \$100,000.

**Christopher D. Snow**, Colorado State University, Validating Computational Design Principles for Crystalline Enzyme Assemblies, \$100,000.

**Chuanbing Tang**, University of South Carolina, Square Arrays of Cylinders in Thin Films of Symmetric ABC Triblock Copolymers, \$100,000.

**Franklin (Feng) Tao**, University of Notre Dame, Effects of Oxygen Vacancies of Catalyst Surfaces on Reactivity and Selectivity of Carbon Dioxide Reduction with Hydrogen, \$100,000.

**Rafael Verduzco**, Rice University, Elucidating the Structure and Properties of Model Bottlebrush Polymers, \$100,000.

**Yongan Yang**, Colorado School of Mines, Improving the Cyclability of Iron Pyrite (p-FeS<sub>2</sub>) Cathodes in Lithium Ion Batteries Through Carbon Nanotube Encapsulation, \$100,000.

**Xiaolong Yin**, Colorado School of Mines, Direct Simulation of Slip and Transitional Flows of Gas in Nanoporous Media using Lattice Boltzmann and DSMC, \$100,000.

**Likun Zhu**, Indiana University-Purdue University at Indianapolis, Identification of Lithium Ion Battery Electrode Structural Inhomogeneity and Its Effect on Battery Performance, \$100,000.

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## New Directions

### Awards for Fundamental Research

**Mikhail A. Anisimov**, University of Maryland, Cold Water: A Novel Supercritical-Fluid Solvent, \$100,000.

**Gaurav Arya**, University of California, San Diego, Interactions, Phase Behavior, and Clustering Dynamics of Polymer-Grafted, Shaped Nanoparticles, \$100,000.

**Brandon L. Ashfeld**, University of Notre Dame, Chemical and Conformationally Driven Switches in Covalent Gas Separation Materials, \$100,000.

**Matthew T. Balhoff**, The University of Texas at Austin, Investigation of Fundamental Dynamic Petrophysical Properties of Gas-Bearing Shales, \$100,000.

**Uwe Balthasar**, University of Glasgow, Calcification in Calcite Seas, \$100,000.

**Osman A. Basaran**, Purdue University, Drop Coalescence, \$100,000.

**Bharat Bhushan**, The Ohio State University, Nanoscale Tribocharging Mechanism and Mechanical Properties Investigation of Novel Organic and Inorganic Nano-Object-Petroleum Hybrid Lubricants, \$100,000.

**Neal E. Blair**, Northwestern University, A Potential Fungal Contribution to the Selective Preservation of Long-chain Hydrocarbon Functionality in Soils and Sediments, \$100,000.

**Gary J. Blanchard**, Michigan State University, Vibrational Energy Dissipation in Fluid Systems and the Influence of Molecular Scale Organization, \$100,000.

**Antonio Bobet**, Purdue University, Geophysical Monitoring of Mechanical and Chemical Alteration of Frictional Discontinuities, \$100,000.

**Gabriel J. Bowen**, University of Utah, Linking Coastal Terrestrial Ecosystems and Eustatic Sea-Level Changes: A Case Study in the Tornillo Group (Big Bend National Park, TX), \$100,000.

**C. Russell Bowers**, University of Florida, Application of Parahydrogen Enhanced NMR to Heterogeneous Hydrogenation on Supported Metal Catalysts, \$100,000.

**John G. Brennan**, Rutgers, The State University of New Jersey (New Brunswick), Nanoscale Actinide Clusters, \$100,000.

**Rich G. Carter**, Oregon State University, Organocatalytic Routes to Stereogenic, *a,a*-Disubstituted Cycloalkanones, \$100,000.

**George Christou**, University of Florida, Polynuclear Manganese-Oxo Clusters as New Types of Homogeneous Electrocatalysts for Water Oxidation, \$100,000.

**Steven A. Corcelli**, University of Notre Dame, Solvation Dynamics in Ionic Liquids, \$100,000.

**Lenore L. Dai**, Arizona State University, 'Intelligence' of Heterogeneous Materials/Structures, \$100,000.

**Nicolas Dauphas**, University of Chicago,  $^{238}\text{U}/^{235}\text{U}$  Ratio as a Tracer of Paleoredox Conditions: Application to the Oxygenation of the Global Ocean Throughout Earth History, \$100,000.

**Mattanah S. de Vries**, University of California, Santa Barbara, PAH Excited State Dynamics, \$100,000.

**Evgeny V. Dikarev**, State University of New York at Albany, Volatile Heterometallic Molecular Precursors for Oxide, Fluoride, and Silicate Cathode Materials of Thin Film Lithium Ion Batteries, \$100,000.

**Anthony G. Dixon**, Worcester Polytechnic Institute, Realizing the Selectivity of Exothermic Partial Oxidation Reactions, \$100,000.

**Tai-Hsi Fan**, University of Connecticut, Multiphase Flow Dynamics and Evaporation Kinetics of Energetic Nanofuels, \$100,000.

**Tomislav Friscic**, McGill University, Structure and Dynamic Studies in Metal-Organic Materials, \$100,000.

**Gerald G. Fuller**, Stanford University, Interfacial Viscoelasticity of Crude Oils: The Role of Asphaltenes, \$100,000.

**Jayne C. Garno**, Louisiana State University, Visualization of Hydrocarbon-Surfactant Interactions at the Molecular Level, \$100,000.

**Grazia Gonella**, Temple University, Nonlinear Light Scattering from Micelles and Emulsion: Development of a Versatile Probe of Structure and Kinetics, \$100,000.

**Marcus Herrmann**, Arizona State University, Direct Numerical Simulation and Experiment of Gas-Liquid Flow in Horizontal Pipelines: A New Approach, \$100,000.

**Yousef Behnam Jafarpour**, University of Southern California, Prediction of the Stimulated Reservoir Volume and Production Performance in Unconventional Reservoirs from Monitoring Observations of Coupled Thermal, Geomechanical and Transport Processes, \$100,000.

**Peng Jiang**, University of Florida, In-situ Monitoring of Heterogeneous Catalytic Reactions Under Realistic Conditions, \$100,000.

**Joel E. Johnson**, University of New Hampshire, Developing a New Proxy Approach for Reconstructing Paleo-Methane and Sulfate Fluxes in Gas Hydrate Bearing Stratigraphy, \$100,000.

**Richard A. Jones**, The University of Texas at Austin, Low Temperature Synthesis and Characterization of Earth Abundant Metal Borates for Energy Storage, \$100,000.

**Teresa E. Jordan**, Cornell University, Relationships of Primary Sedimentary Facies to Physical and Chemical Properties of the Marcellus Shale in Central New York State, \$100,000.

**Alamgir Karim**, The University of Akron, Oil Water Separations from Zone Annealed Block Copolymer Films, \$100,000.

**Steven R. Kass**, University of Minnesota, Hydrogen Bond Catalysis and Anion Molecular Recognition, \$100,000.

**Alan Jay Kaufman**, University of Maryland, Pressurized Hydraulic Fracturing of the Devonian Marcellus Shale with Liquid CO<sub>2</sub>: Impact on Enhanced Gas Recovery, \$100,000.

**LaShanda T. J. Korley**, Case Western Reserve University, Biomimetic IPNs - Harnessing the Power of Phase Interactions, \$100,000.

**Petr Kral**, University of Illinois at Chicago, Multiscale Modeling of Nanoparticle Membranes: Structure, Mechanical Properties, and Molecular Filtration, \$100,000.

**Tonya Lynn Kuhl**, University of California, Davis, Hydrophobic Interactions Between Surfaces, \$100,000.

**Roderic S. Lakes**, University of Wisconsin-Madison, Giant Enhancement in Effective Piezoelectric Sensitivity of Piezoelectric Polymers, \$100,000.

**R. Mark Leckie**, University of Massachusetts Amherst, Multi-proxy Paleooceanographic Study of the Turonian-Campanian Niobrara Formation of the U.S. Western Interior, \$100,000.

**Robin T. Macaluso**, University of Northern Colorado, Exploratory Synthesis and Characterization of Pyrochlore Oxynitrides for Solid State Lighting, \$100,000.

**Joshua A. Maurer**, Washington University in St. Louis, A Macromolecular Synthon Approach to Defined Functional Group Arrays on the Nanoscale, \$100,000.

**Erik Menke**, University of California, Merced, Metal Oxide Cathodes and High-Conductivity Ionic Liquids for Next-Generation Batteries, \$100,000.

**Gellert Mezei**, Western Michigan University, Large 'Molecular Panel' Based Metal-Organic Architectures for Gas Storage and Catalysis, \$100,000.

**Liviu M. Mirica**, Washington University in St. Louis, Aerobic Oxidative C-C and C-Heteroatom Bond Formation Reactions Catalyzed by Novel Pd(III) and Pd(IV) Complexes, \$100,000.

**Janice L. Musfeldt**, The University of Tennessee, High Pressure Properties of Materials, \$100,000.

**William G. Noid**, The Pennsylvania State University, Multiscale Investigation of Asphaltene Self-Assembly, \$100,000.

**Shuhei Ono**, Massachusetts Institute of Technology, Multiple Sulfur Isotope Tests for Sulfur Radical Chemistry During Petroleum Formation and Degradation, \$100,000.

**Jonathan L. Payne**, Stanford University, Examining Evidence for a Dynamic Sulfur Cycle During the Early Triassic with Isotopic Measurements of Carbonate Associated Sulfate, \$100,000.

**Pierre Ferdinand P. Poudeu**, University of Michigan, Mixed Transition-Metal Sulfides and Sulfo-Fluorides for Rechargeable Li-ion Batteries, \$100,000.

**Rodney D. Priestley**, Princeton University, Dynamics of Confined Polymer Liquids and Glasses under Positive and Negative Pressures, \$100,000.

**Byron W. Purse**, University of Denver, Mechanical Control of Molecular Encapsulation, \$100,000.

**Regina Ragan**, University of California, Irvine, Tailoring Surface Electronic Structure: Probing the Effect on Chemical Activity, \$100,000.

**Arun Ramchandran**, University of Toronto, Fundamental Studies of the Removal of Particulate Fines From Solvents Using Water Droplets as Collector Particles, \$100,000.

**Edwin A. Schauble**, University of California, Los Angeles, Evolution of Seawater Mg/Ca Ratios: New Constraints from the Carbonate 'Clumped Isotope' Thermometer, \$100,000.

**Joseph A.R. Schmidt**, University of Toledo, New Homoleptic Rare-Earth Metal Complexes for Catalytic Hydrophosphination, \$100,000.

**Alexander R. Simms**, University of California, Santa Barbara, Hyperpycnal Subaqueous Fans of the Northern Santa Barbara Channel, Central California, \$100,000.

**Sindee L. Simon**, Texas Tech University, Thermodynamics of Nanoconfined Equilibrium Polymerizations, \$100,000.

**Gerilyn S. Soreghan**, University of Oklahoma, Characterizing Quartz Microtextures in a Proglacial and Nonglacial Fluvial System as a Means Toward Improved Paleoenvironmental Analysis: A Pilot Study, \$100,000.

**Venkat R. Subramanian**, Washington University in St. Louis, Elucidating Competing Transport and Kinetic Mechanisms for Understanding Material Durability of Carbon Felt Electrodes, \$100,000.

**Peter K. Swart**, University of Miami, RSMAS, Testing the 'Clumped Isotope Method' Under Conditions of Well-Constrained Diagenesis, \$100,000.

**Dean J. Tantillo**, University of California, Davis, The Fundamental Nature of Sulfur-Lone Pair Interactions, \$100,000.

**Qing Wang**, The Pennsylvania State University, Self-Assembly Approach to Multiferroic Polymer Nanocomposites, \$100,000.

**Rudolf J. Wehmschulte**, Florida Institute of Technology, Stabilization of Low-Oxidation State Main Group Complexes with  $\sigma$ -Acceptor Z-Type Ligands, \$100,000.

**Qi-Huo Wei**, Kent State University, Experimental and Numerical Studies of Liquid Crystal Defects in Confined Geometries, \$100,000.

**Carlos Wexler**, University of Missouri-Columbia, Two-Dimensional Nanoporous Self-Assembled Molecular Layers: New Structures for Selective Adsorption and Catalysis, \$100,000.

**Christian Wolf**, Georgetown University, Catalytic Asymmetric Carbon-Carbon Bond Formation with Fluoroenolates Generated Detylated Prenucleophiles, \$100,000.

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## Type SE

### ACS PRF Grants for Scientific Education

**Robert J. Hughes**, American Chemical Society, ACS Scholars Program, \$50,000.

**Mary M. Kirchoff**, American Chemical Society, 2012 ACS Summer School on Green Chemistry and Sustainable Energy, \$100,000.

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## Undergraduate New Investigator

### Starter Grants Awarded to Faculty in Non-Ph.D.-Granting Departments

**David J. Gorin**, Smith College, Catalytic Methylation of Oxygen Nucleophiles with Safe, Stable Methylating Agents, \$50,000.

**Benjamin C. Gorske**, Bowdoin College, Foldameric Catalysts for Enantioselective Trifluoromethylations of Ketones and Enones, \$50,000.

**Christopher R. Graves**, Albright College, Redox-Active Aluminum Complexes for Application in Carbonyl Reduction, \$50,000.

**W. Ashley Griffith**, The University of Texas at Arlington, A Field-Based Geomechanical Study of the Formation, Deformation, and Internal Structure of Reservoir-Scale Sandstone Dikes, Sheep Mountain Anticline, WY, \$50,000.

**Katrina H. Jensen**, Black Hills State University, Development of Copper(I) Catalysts for Photoredox Catalysis, \$50,000.

**Dipannita Kalyani**, Saint Olaf College, Nickel Catalyzed C-H Arylation Using C-O Electrophiles, \$50,000.

**Xiangyang Lei**, Lamar University, Incorporation of Calix[4]crowns Into Metal-Organic Frameworks for Hydrogen Storage, \$50,000.

**T. Andrew Mitchell**, Illinois State University, Stereoselective *N*-Heterocyclic Carbene (NHC) Catalyzed Oxidopyrylium-Enolate [5+2] Cycloadditions Towards Bridged, Polycyclic Ethers, \$50,000.

**Nicholas J. Robertson**, Northland College, Synthesis of Ester and Amide Functionalized Polyethylene: New Polyolefin Architectures, Their Resulting Thermal and Mechanical Properties, and Controllable Depolymerization, \$50,000.

**Jesse W. Tye**, Ball State University, Alternative Clean Energy Production with Reusable Iron Catalysts: Development of Design Parameters for Future, Durable Green Energy Catalysts, \$50,000.

**Jay Wm. Wackerly**, Central College, The Synthesis of C<sub>4</sub> Symmetric Oxacalix[4]arenes and Related Macrocycles, \$50,000.

**Ruigang Wang**, Youngstown State University, Morphology-Controllable Synthesis and Characterization of Low-Temperature Active Rare-Earth Oxide Nanocatalysts, \$50,000.

**Jonathan Evar Wenzel**, Kettering University, Non-Catalytic Reactions Producing Phenols from Aromatic Hydrocarbons Using Hydrogen Peroxide and Supercritical and Subcritical Water, \$50,000.

**Elizabeth R. Young**, Amherst College, Proton-Coupled Electron Transfer in Ground-State Charge Transfer Reactions: Bi-molecular PCET and Intervalent Charge Transfer, \$50,000.

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## Undergraduate Research

### Awarded to Faculty in Non-Ph.D.-Granting Departments

**Christopher J. Abelt**, The College of William and Mary, Hydrogen-Bonding Control of Solvatochromism and Non-Radiative Decay in the Fluorescence of PRODAN Derivatives, \$65,000.

**Edward Bormashenko**, Ariel University Center of Samaria, Manufacturing and Study of the Properties of Liquid Marbles Obtained with Crude Oil and Liquid Petroleum Products, \$65,000.

**Cristian E. Botez**, The University of Texas at El Paso, X-ray and Neutron Scattering Studies of Proton Conduction Pathways and Dynamics in Doped Pyrophosphates, \$65,000.

**Philip J. Costanzo**, California Polytechnic State University, Novel Polymer Coupling via Thiazolidine Chemistry, \$65,000.

**Roman Dembinski**, Oakland University, Effective, Catalyzed and Electrophilic Cyclization Reactions Leading to Highly and Diversely Substituted Fluoroheterocycles, \$65,000.

**James T. Fletcher**, Creighton University, Triazole-Containing Tridentate Anionic Chelators for Lanthanide and Group VIII Organometallic Complexes, \$65,000.

**Timothy W. Funk**, Gettysburg College, Development and Application of Air-Stable, Shvo-Type Iron Catalysts, \$65,000.

**Daniel I. Hembree**, Ohio University, Vertical and Lateral Variability of Pennsylvanian and Permian Paleosols and Continental Ichnofossils of the Dunkard Basin: Resolving Local Complexity and Regional Patterns to Reconstruct Landscapes, \$65,000.

**Vladimir V. Kitaev**, Wilfrid Laurier University, Synthesis of Ruthenium Dioxide Nanoparticles and Clusters with Tailored Size-and Surface-Dependent Properties for Enhanced Catalytic Applications, \$65,000.

**Timothy D. Lash**, Illinois State University, Synthesis of Azaannulenes Related to the Porphyrins, \$65,000.

**Weining Man**, San Francisco State University, Experimental Study on Nonlinear Optics and Wave Dynamics in Colloidal Suspensions with Negative Polarizability, \$65,000.

**Anderson L. Marsh**, Lebanon Valley College, Selectivity Control in Aqueous Phenol Hydrogenation Using Palladium Nanocatalysts, \$65,000.

**Adam McCubbin**, University of Winnipeg, Boron-Based Directing Groups for Directed Lithiation Reactions, \$65,000.

**Laura R. McCunn**, Marshall University, FTIR Analysis of the Radical and Molecular Products of Thermal Decomposition of Aldehydes and Nitrite Esters, \$65,000.

**Chriss E. McDonald**, Lycoming College, The Characterization and Synthetic Utility of Complexes Made from Samarium Diiodide and Anionic Phosphoramides, \$65,000.

**Dina C. Merrer**, Barnard College, Mechanisms and Dynamics of Carbene Additions to Anti-Bredt Olefins, \$65,000.

**William H. Miles**, Lafayette College, Synthetic Applications of  $\gamma$ -Hydroxybutenolides, \$65,000.



**James A. Phillips**, University of Wisconsin-Eau Claire, Continued Studies of the Structure, Bonding, and Energetic Properties of Friedel-Crafts Intermediates, \$65,000.

**Rongson Pongdee**, Sewanee: The University of the South, Development and Mechanistic Studies of New Applications for the Mitsunobu Reaction, \$65,000.

**Ronny Priefer**, Western New England University, Synthesis and Multilayering of Poly(4-vinylphenol) Derivatives for Future Applications as Proton Exchange Membranes in Fuel Cells, \$65,000.

**Joseph J. Reczek**, Denison University, Aromatic Donor-Acceptor Organocatalysis: Noncovalent Activation of Aryl Halides in Green Palladium Cross-Coupling Reactions, \$65,000.

**Thomas Sommerfeld**, Southeastern Louisiana University, Electron-Induced Reactions: From Methods for Characterization of Intermediates to Mechanisms, \$65,000.

**Trent P. Vorlicek**, Minnesota State University, Mankato, Speciation and Sequestration of Rhenium in Sulfidic and Polysulfidic Natural Waters, \$65,000.

**James W. Westgate**, Lamar University, Biostratigraphic and Paleoecologic Analysis of the First Micro-Mammal Community from the Type Location of the Middle Eocene, Late Uintan North American Land Mammal Age, \$65,000.