

## Doctoral New Investigator

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

**Dr. Theodor Agapie**, California Institute of Technology, Trinuclear Copper Complexes for Dioxygen Activation and Reduction, \$100,000.

**Dr. Mustafa Akbulut**, Texas A&M University, Adaptable and Smart Amphiphilic Systems in Enhanced Oil Recovery, \$100,000.

**Dr. Faisal M. Alamgir**, Georgia Institute of Technology, Effect of Surface-to-Bulk Atomic Structure on Surface Electronic Structure in Multicomponent Catalysts, \$100,000.

**Dr. Erik John Alexanian**, University of North Carolina at Chapel Hill, Transition Metal Catalyzed [2+2+2] Cycloadditions for Carbocycle Synthesis, \$100,000.

**Dr. Laura Lindsay Anderson**, University of Illinois at Chicago, [3,3]-Rearrangements of *O*-Vinyl Oximes: Stereoselective Synthesis of 1,4-Dicarbonyl Compounds, \$100,000.

**Dr. Sarbajit Banerjee**, University at Buffalo, State University of New York, Fundamental Studies of Lithiation/Delithiation Processes in  $V_2O_5$  and  $M_xV_2O_5$  Nanostructures, \$100,000.

**Dr. Suzanne C. Bart**, Purdue University, Low-Valent Uranium Complexes with Redox-Active Ligands for C-O Bond Activation, \$100,000.

**Dr. Mark R. Biscoe**, City University of New York, City College, Fluorophobic Effects in Homogeneous Catalysis, \$100,000.

**Dr. Christopher T. Burns**, University of Louisville, Periodic Mesoporous Silicas as Supports for Late Metal Olefin Polymerization, \$100,000.

**Dr. Angelo Cacciuto**, Columbia University, Density Driven Ordering of Non-Spherical and Deformable Particles, \$100,000.

**Dr. Anthony N. Caruso**, University of Missouri-Kansas City, Investigating Electron-Hole Pair Creation and Lifetimes in Amorphous Hydrogenated Boron Carbide, \$100,000.

**Dr. Andres F. Clarens**, University of Virginia, Gas Expanded Lubricants - Improving Energy Efficiency Using 'Smart' Fluids, \$100,000.

**Dr. Daniel A. Clark**, Syracuse University, Transformations Utilizing Ruthenium Hydrides for the Synthesis of Conjugated Systems, \$100,000.

**Dr. Benjamin Davidovitch**, University of Massachusetts Amherst, Instabilities and Morphologies of Stressed Elastic Films, \$100,000.

**Dr. Serena DeBeer George**, Cornell University, Molecular Mechanism of Methane to Methanol Conversion in Soluble Methane Monooxygenase, \$100,000.

**Dr. Yifu Ding**, University of Colorado, Phase Separations and Morphological Evolutions of Polymer Blends under Two Dimensional Confinements, \$100,000.

**Dr. Zvonimir Dogic**, Brandeis University, Self-Assembly of Inorganic Rodlike Colloids, \$100,000.

**Dr. Gary E. Douberly**, University of Georgia, Vibrational Spectroscopy of Transient Combustion Intermediates Trapped in Helium Nanodroplets, \$100,000.

**Dr. Alberto Fernandez-Nieves**, Georgia Institute of Technology, Local Elasticity and Colloidal Phase Behavior Using Microgel Particles, \$100,000.

**Dr. M. Royhan Gani**, University of New Orleans, Sequence Stratigraphic Architecture Along Depositional-Strike in Shallow-Marine Outcrops, Wasatch Plateau, Utah, \$100,000.

**Dr. Silvina M. Gatica**, Howard University, Theoretical Study of the Adsorption and Separation of Gases in Metal-Organic-Frameworks, \$100,000.

**Dr. Wesley A. Henderson**, North Carolina State University, Linking Ion Structure with Aromatic Solubility in Ionic Liquids, \$100,000.

**Dr. Richard J. Hooley**, University of California, Riverside, Regioselective Catalytic C-H Oxidation of Hydrocarbons in Aqueous Solution, \$100,000.

**Dr. Timothy A. Jackson**, University of Kansas, Physical Properties and Reactivities of Peroxomanganese(III) Complexes, \$100,000.

**Dr. Seung Soon Jang**, Georgia Institute of Technology, Molecular Dynamics Simulation of Surfactant-Driven Wettability Alteration of Calcium Carbonate for Enhanced Oil Recovery, \$100,000.

**Dr. Janarthanan Jayawickramarajah**, Tulane University, Self-Assembly of Directional Porphyrin Arrays in Water via Cyclodextrin-Based Host-Guest Interactions, \$100,000.

**Dr. Feng Jiao**, University of Delaware, Novel CO<sub>2</sub> Reduction Catalysts Driven by Visible Light, \$100,000.

**Dr. Joel P.L. Johnson**, The University of Texas at Austin, Evaluating Why Flash Floods are Different: An Experimental Investigation of Sediment Transport and Sorting by Rapidly Changing Hydrographs, \$100,000.

**Dr. Eunsuk Kim**, Brown University, Bio-inspired Inorganic Catalysts for CO<sub>2</sub> Reconversion, \$100,000.

**Dr. Wonsuck Kim**, The University of Texas at Austin, Decoupling Tectonic and Autogenic Controls on the Development of Cyclic Fluvial Strata: Flume Experiments, \$100,000.

**Dr. Jesse H. Kroll**, Massachusetts Institute of Technology, Experimental Study of Oxidation Mechanisms of Large Hydrocarbons by the Photolytic Formation of Key Radical Intermediates, \$100,000.

**Dr. Michael P. Lamb**, California Institute of Technology, Backwater Controls on Fluvial Morphodynamics near River Mouths, \$100,000.

**Dr. Wenzhen Li**, Michigan Technological University, High Performance One Dimensional Nanocable Catalysts for Fuel Cells, \$100,000.

**Dr. Ying Li**, University of Wisconsin-Milwaukee, Novel Nanocomposite Materials for Efficient Photocatalytic Reduction of CO<sub>2</sub> to Fuels, \$100,000.

**Dr. Stephan Link**, Rice University, Identification of Low-Level Sulfur Contaminants by Amplitude and Phase-Sensitive Detection of Single Particle Surface Plasmon Scattering, \$100,000.

**Dr. Connie C. Lu**, University of Minnesota, Strategies for the Reduction of Carbon Dioxide to Methanol, \$100,000.

**Dr. Zhaolin Lu**, Rochester Institute of Technology, Plasmon-Enhanced Light-Trapping for Thin-Film Solar Cells, \$100,000.

**Dr. Ognjen S. Miljanic**, University of Houston, Control of Interpenetration in Metal-Organic Frameworks via Spatial Protecting Groups, \$100,000.

**Dr. Chongzheng Na**, University of Notre Dame, Nanostructures Formation by Aromatic Hydrocarbons on Calcite, \$100,000.

**Dr. Brian Hale Northrop**, Wesleyan University, Dynamic Assembly of Porous Boronate Ester Macromolecules, \$100,000.

**Dr. Zhengwei Pan**, University of Georgia, Novel Long-Persistent Near Infrared Phosphors for Efficient Solar Energy Absorption and Conversion, \$100,000.

**Dr. Benjamin H. Passey**, The Johns Hopkins University, Carbonate 'Clumped Isotope' Thermometry: Constraining Closure Temperatures for the <sup>13</sup>C-<sup>18</sup>O Order/Disorder Process in Carbonate Minerals, \$100,000.

**Dr. Vitaly V. Podzorov**, Rutgers, The State University of New Jersey, Development of Single-Crystalline Organic Solar Cells for the Fundamental Studies of Photo-Voltaic Effect in Highly Ordered Organic Semiconductors, \$100,000.

**Dr. Justin Baker Ries**, University of North Carolina at Chapel Hill, Geochemical and Petrographic Investigation of a Novel Calcite-Aragonite Sea Transition in Terminal Proterozoic Time (549 - 548 Ma), \$100,000.

**Dr. Robert M. Rioux**, The Pennsylvania State University, Intermetallic Base-Metal Catalysts for the Selective Hydrogenation of Acetylene and Multifunctional Organic Compounds, \$100,000.

**Dr. Jennifer M. Schomaker**, University of Wisconsin-Madison, Development of New Homogeneous Catalysts for the Activation of N<sub>2</sub>O, \$100,000.

**Dr. Reza H. Sheikhi**, Northeastern University, Large-Scale Simulation of Turbulent Flames with Detailed Chemistry, \$100,000.

**Dr. M. Scott Shell**, University of California, Santa Barbara, A Systematic, Multiscale Approach to Simple Liquid-State Property Models, \$100,000.

**Dr. Mark A. Snyder**, Lehigh University, Fundamental Insight into the Hierarchical Engineering of Nanoparticulate and Templated Porous Films for Molecular Separations, \$100,000.

**Dr. Srinivasan G. Srivilliputhur**, University of North Texas, Atomistic Simulations of the Chemistry of Environmentally Assisted Cracking in Nickel-Chromium Alloys, \$100,000.

**Dr. Dario J. Stacchiola**, Michigan Technological University, The Nano-Interface Between Material Science and Organometallic Chemistry, \$100,000.

**Dr. Kyle M. Straub**, Tulane University, Quantifying the Morphology and Composition of Thin-bed Levee Deposits in Deep-water Settings, \$100,000.

**Dr. Jeffrey A. Sutton**, The Ohio State University, Characterization of Turbulent Combustion Processes in Dimethyl Ether Flames Using Advanced Laser Diagnostics, \$100,000.

**Dr. Steven L. Tait**, Indiana University, Tuning Dihydrogen Adsorption at Metal Centers of Surface-supported Supramolecular Networks, \$100,000.

**Dr. Marina Tsianou**, University at Buffalo, State University of New York, Reversibility and Kinetic Trapping in Polymeric Nanostructures, \$100,000.

**Dr. Siva A. Vanapalli**, Texas Tech University, Bounds on Energy Dissipation Due to Polymer-Induced Purely Elastic Instabilities in Curved Channel Flows, \$100,000.

**Dr. YuHuang Wang**, University of Maryland, Interfacial Chemistry of Carbon-Based Photovoltaics, \$100,000.

**Dr. Mary Pavan Watson**, University of Delaware, Arylalkoxylation of Alkynes and Olefins via Transition Metal-Catalyzed C-O Activation, \$100,000.

**Dr. Karl W. Wegmann**, North Carolina State University, Active Outer Forearc Basin Formation by Syn-convergent Extension above the Hellenic Subduction Zone, Crete, Greece, \$100,000.

**Dr. Steven E. Wheeler**, Texas A&M University, Intermolecular Non-Covalent Interactions in  $\pi$ -Conjugated Heterocyclic Oligomers, \$100,000.

**Dr. Reika okochi**, University of Illinois at Chicago, Determination of Subsurface Residence Time, Migration Rate, and Extent of Fluid-Rock Reaction for Carbon-Rich Fluids Using Noble Gas Radionuclides, \$100,000.

**Dr. Chongli Yuan**, Purdue University, The Effect of a Polyelectrolyte on the Oppositely Charged Colloidal Suspension, \$100,000.

**Dr. Hui Zhao**, University of Kansas, Hot Carrier Transport in Graphene, \$100,000.

**Dr. Junmin Zhu**, Case Western Reserve University, Solvent-Assisted Coalescent Assembly of Amphiphilic Core-Shell Nanoparticles, \$100,000.

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**New Directions  
Awards for Fundamental Research**

**Dr. Andre Martin Beauchemin**, University of Ottawa, Organocatalytic Tether Formation, \$100,000.

**Dr. John F. Berry**, University of Wisconsin-Madison, Dimetal Nitrido Chemistry, \$100,000.

**Dr. Nancye H. Dawers**, Tulane University, Predicting Channel Geometry in Faulted Hydrocarbon Reservoirs, \$100,000.

**Dr. Eric R. Dufresne**, Yale University, Random Laser Spectroscopy of Turbid Media, \$100,000.

**Dr. Robert W. Field**, Massachusetts Institute of Technology, Chirped-Pulse Millimeter-Wave Spectroscopy: A Universal Probe of Photofragmentation and Pyrolysis Mechanisms via Species and Vibrational Population Distributions, \$100,000.

**Dr. Galen P. Halverson**, McGill University, Mercury Isotopes as a Novel Tool for Reconstructing the Evolution of the Ancient Atmosphere and Oceans, \$100,000.

**Dr. Michael D. Heagy**, New Mexico Institute of Mining and Technology, Development of N-Aryl-2,3-Naphthalimide Dyes for White-Light Emission with Applications Toward White Organic Light-Emitting (WOLEDs), \$100,000.

**Dr. George Earl Hilley**, Stanford University, A Numerical Investigation of the Coupled Roles of Tectonics and Erosion on the Isolation, Recapture, and Persistence of Intermontane Basins in Fold-and-thrust Belts and High-angle Reverse Faulting Environments, \$100,000.

**Dr. Christian Hilty**, Texas A&M University, Metallocene Catalyzed Polymerization Investigated by Hyperpolarized NMR, \$100,000.

**Dr. Keith L. Hohn**, Kansas State University, Single Molecule Spectroscopy for Characterization of Mesoporous Acid Catalysts, \$100,000.

**Dr. Christine M. Hrenya**, University of Colorado, Toward the Quantitative Prediction of Instabilities in Solids Flows, \$100,000.

**Dr. William P. Johnson**, University of Utah, Influence of Cell Surface Properties and Structures on Microbial Deposition in Porous Media in the Absence and Presence of Energy Barriers, \$100,000.

**Dr. Rajeswari M. Kasi**, University of Connecticut, Ion Gels from Block Copolymers Composed of Liquid Crystalline Units and Brush-Like Moieties in Ionic Liquids, \$100,000.

**Dr. Christine D. Keating**, The Pennsylvania State University, Versatile Bottom-Up Approach to Nanostructured Solar Cells, \$100,000.

**Dr. Sang-Tae Kim**, McMaster University, Boron Isotope Effects in Synthetic Calcium Carbonates: For a Better Reconstruction of Paleo-Ocean pH, \$100,000.

**Dr. Satish Kumar**, University of Minnesota, Wetting Failure in Fluid-Fluid Displacement, \$100,000.

**Dr. Thomas C. Lectka**, The Johns Hopkins University, New Studies in Alkene 'Pseudohalogen' Difunctionalization, \$100,000.

**Dr. Jeehiun Katherine Lee**, Rutgers, The State University of New Jersey, Gas Phase Studies of Stable Carbenes and Triazoles, \$100,000.

**Dr. Jerry Y. S. Lin**, Arizona State University, Synthesis and High Pressure Gas Separation Properties of Thin Metal-Organic Framework Membranes, \$100,000.

**Dr. Gang-yu Liu**, University of California, Davis, Surface Supported Rare Earth Element Based Nanomaterials as a Composite in Solar Cell Electrodes, \$100,000.

**Dr. Douglas A. Loy**, University of Arizona, Tetrazines for Hydrogen Storage, \$100,000.

**Dr. Lisa McElwee-White**, University of Florida, Targeted Delivery of Organometallic Complexes to Low-Coordination Sites on Oxide Surfaces, \$100,000.

**Dr. Brian Christopher Regan**, University of California, Los Angeles, Carbon Nanoelectrodes: Generating Hydrogen from Water, \$100,000.

**Dr. Glenn Martin Sammis**, University of British Columbia, Reactivity of Vinyl Boronates in Enantioselective Ene and Hetero-Ene Reactions, \$100,000.

**Dr. Webster L. Santos**, Virginia Polytechnic Institute and State University, Development of Unsymmetrical Diboron Compounds for Regioselective Diboration and Chemoselective Cross-Coupling Reactions, \$100,000.

**Dr. Preston Todd Snee**, University of Illinois at Chicago, Colloidal Synthesis of Zinc Phosphide and Tantalum Oxynitride Nanocrystals for Solar Energy Generation, \$100,000.

**Dr. H. Henning Winter**, University of Massachusetts Amherst, Macromolecular Peeling Mechanism for Clay/Polymer Nanocomposites, \$100,000.

**Dr. Shu Yang**, University of Pennsylvania, Reworkable Dry 'Superglue': A Shape Memory Chemical Velcro Approach to Sustainable Bonding/Debonding, \$100,000.

**Dr. Qiuming Yu**, University of Washington, Energy Conversion from New Environmentally Benign and Low-Cost Photovoltaic Nanomaterials, \$100,000.

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**Undergraduate New Investigator  
Starter Grants Awarded to Faculty in Non-Ph.D.-Granting Departments**

**Dr. Yohannes Abate**, California State University, Long Beach, Plasmonics of Metals and Conducting Polymers in the Nano-Scale for High Efficiency Photovoltaics, \$50,000.

**Dr. Kelly E. Anderson**, Roanoke College, Exploring Lubricants: Investigating the Solid-Liquid Interface Using Molecular Simulation, \$30,000.

**Dr. Lauren Benz**, University of San Diego, The Role of Defects in Sulfur Removal Over Titanium Dioxide, \$50,000.

**Dr. Diana L. Boyer**, State University of New York, College at Oswego, Testing the Extent of Anoxia in Late Devonian Aged Black Shales: A Multi-proxy Approach, \$50,000.

**Dr. Gordon G. Brown**, Coker College, Rotational Spectroscopy Investigation of Interactions between Carbon Dioxide and N-containing Cyclic Compounds, \$50,000.

**Dr. Dora Carrico-Moniz**, Wellesley College, Development of a Facile Tandem Asymmetric Epoxidation/Ring-Opening Protocol: An Efficient Entry to Enantiomerically Enriched Tertiary Naphthoquinols, \$50,000.

**Dr. Aaron Joseph Celestian**, Western Kentucky University, Characterizing Synthesis and Ion Transport in Microporous Mixed-Polyhedral Frameworks, \$50,000.

**Dr. Benjamin F. Dattilo**, Indiana University-Purdue University at Fort Wayne, Testing Depositional Models Across an Upper Ordovician Facies Transition in Kentucky, Ohio, and Indiana, \$50,000.

**Dr. Petra S. Dekens**, San Francisco State University, Changes in Productivity Along the California Margin Through the Last 5 Million Years, \$50,000.

**Dr. Richard V. Heermance**, California State University, Northridge, Diachronous Miocene and Pliocene Deposition Along the Southern Tian Shan Foreland, W. China: Implications on Facies Architecture, Chronostratigraphy, Paleogeography, and Structural Style, \$50,000.

**Dr. Jeffrey B. Johnson**, Hope College, Toward Greater Understanding and Expanded Utility of the Palladium-Catalyzed Activation of Carbon-Carbon Single Bonds, \$50,000.

**Dr. William D. Kerber**, Bucknell University, Iron(III) Oxidation of Carboxylic Acids and Phenols as Models for the Abiotic Transformation of Natural Organic Matter, \$50,000.

**Dr. Elizabeth Dawn Kochly**, Mills College, Novel Nucleophilic Trapping Reactions of Carbocations in Ionic Liquids, \$50,000.

**Dr. Charles Assoua Mebi**, Arkansas Tech University, Exploration of Molecular Designs for Energy Conversion, \$50,000.

**Dr. Jeremy B. Morgan**, University of North Carolina at Wilmington, Synthesis and Borate-Catalyzed Kinetic Resolution of Terminal Aziridines, \$50,000.

**Dr. Katsu Ogawa**, California State University, Northridge, Controlling Morphology and Electronic Properties of Two-Dimensional Organometallic Conjugated Polymers via Orthogonal Polymerization Methods, \$50,000.

**Dr. Jared Joseph Paul**, Villanova University, Ruthenium and Osmium Complexes with Ligands Capable of Proton Coupled Electron Transfer, \$50,000.

**Dr. Jennifer Kreft Pearce**, The University of Texas at Tyler, Thermophoresis of a Dye-Labeled Polyelectrolyte: Experiment and Simulations, \$50,000.

**Dr. Jonathan Richard Scheerer**, The College of William and Mary, Chiral Non-racemic Bicyclic Diketopiperazines: A Common Precursor to Explore Diverse Asymmetric Reactions, \$50,000.

**Dr. Yann Schrodi**, California State University, Northridge, Toward the Development of Iron-Based Olefin Metathesis Catalysts, \$50,000.

**Dr. Bipin K. Shah**, Pittsburg State University, Novel Tunable Heterojunction Polymers with High Charge Carrier Mobility, \$50,000.\*

**Dr. Kathryn E. Splan**, Macalester College, Photophysical Characterization of Free-base Bis(arylethynyl)porphyrin Diacids and Aggregates, \$50,000.

**Dr. Peng Sun**, East Tennessee State University, Studies of Charge Transfer Across the Interface Between a Small Aqueous Phase (<1 femto liter) and a Bulk Organic Phase, \$50,000.

**Dr. Collin D. Wick**, Louisiana Tech University, Computational Design of CO<sub>2</sub>-philic Hydrocarbon Polymers to Promote More Efficient Oil Recovery, \$50,000.

**Dr. Kristin L. Wustholz**, The College of William and Mary, Probing Heterogeneous Electron Transfer Processes in Next-Generation Photovoltaics Using Single-Molecule Spectroscopy, \$50,000.

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\*Grant declined.

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**Undergraduate Research**  
**Awarded to Faculty in Non-Ph.D.-Granting Departments**

**Dr. Colin D. Abernethy**, Sarah Lawrence College, The Synthesis and Characterization of Early Transition-Metal Complexes with Terminal Nitrido Ligands, \$65,000.

**Dr. Xianhui Bu**, California State University, Long Beach, Synthesis of Crystalline Porous Materials with Functional Open Metal Sites, \$65,000.

**Dr. Michelle M. Bushey**, Trinity University, Fundamental Studies of Diffusion and Retention on Porous Polymer Monolith Stationary Phases Used in Capillary Electrochromatography, \$65,000.

**Dr. David L. Cedeno**, Illinois State University, Experimental Determination and Bond Energy Decomposition Analysis of Metal-Olefin Bonding Interactions: Towards a Quantitative Metal-Olefin Bonding Model, \$65,000.

**Dr. Daniel M. Deocampo**, Georgia State University, Experimental Synthesis of Authigenic Clay Minerals: Implications for Lacustrine Deposition and Diagenesis, \$65,000.

**Dr. Debra D. Dolliver**, Southeastern Louisiana University, New Synthetic Methodology to Prepare Imine Derivatives in Single, Predictable Geometric Configurations, \$65,000.

**Dr. Brian C. Goess**, Furman University, Regioselective Semihydrogenation of Dienes, \$65,000.

**Dr. Felix E. Goodson**, West Chester University, Synthesis of Diarylnorbornadiene Derivatives and their Potential Use in Solar to Thermal Energy Conversion, \$65,000.

**Dr. John R. Groves**, University of Northern Iowa, Tests for the Possibility of Photosymbiosis in Late Paleozoic Fusuline Foraminifera, \$65,000.

**Dr. Monte L. Helm**, Fort Lewis College, Multidentate Cyclic Phosphines: Synthesis of the Novel 1,4,7-Triphosphacyclone and Linear Alpha Olefin Catalysis Studies Using 1,4-Diphosphacyclohexane, \$65,000.

**Dr. Geoffrey C. Klein**, Christopher Newport University, Petroleomics: Elucidation of Chemical Composition and Functionality of Compounds Resistant to Asphaltene Inhibitors, \$65,000.

**Dr. Kenneth E. Maly**, Wilfrid Laurier University, Synthesis of Novel Polycyclic Aromatic Hydrocarbons Derived from Benzotriphenylene, \$65,000.

**Dr. Robert S. Paley**, Swarthmore College, Planar Chiral Sulfinyl Diene Iron(0) Tricarbonyl Complexes as a Platform for Diastereoselective Synthesis of Spiroketal, \$65,000.

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