

## Grants Awarded 2016

### Doctoral New Investigator

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

**Dr. Leela Mohana Reddy Arava**, Wayne State University, Three-Dimensional MoS<sub>2</sub> Nanostructures for Deep Hydrodesulfurization Catalysis, \$110,000.

**Dr. Chloe Bonamici**, New Mexico Institute of Mining and Technology, Origin of Altered Horizons beneath Nonconformities: Implications for Induced Seismicity and Basin-Scale Fluid Flow, \$110,000.

**Dr. Ioannis Bourmpakis**, University of Pittsburgh, Identifying Structure-Activity Relationships for the Dehydrogenation of Alkanes on Oxides, \$110,000.

**Dr. Keith A. Brown**, Boston University, Realizing an Electric Ferrofluid through Rational Nanoparticle Design, \$110,000.

**Dr. Benjamin J. Bythell**, University of Missouri-St. Louis, Utilizing Gas-Phase Fragmentation Chemistry for Ultra-Complex Mixture Analysis: Towards Petroleum Structural Characterization by Tandem Mass Spectrometry, \$110,000.

**Dr. Shengli Chen**, Louisiana State University, Analytical Modelling and Numerical Simulations for Hydraulic Fracturing Initiation in Porous Rock Formations, \$110,000.

**Dr. Ivan C. Christov**, Purdue University, Controlling Particle Migration Using Geometry and Hydrodynamics, \$110,000.

**Dr. Martin M. Conda-Sheridan**, University of Nebraska Medical Center, The Evolution of Self-Assembled Organic Materials, \$110,000.

**Dr. Jessica L. Conroy**, University of Illinois at Urbana-Champaign, The Role of Sulfate Reduction in Microbial Carbonate Formation across a Restricted Lagoonal Carbonate Facies: A Modern Analog Investigation, \$110,000.

**Dr. Tianning Diao**, New York University, Nickel-Mediated Bimolecular Bond Formation and the Applications in the Conversion of Petroleum Products, \$110,000.

**Dr. Cari S. Dutcher**, University of Minnesota, Polyelectrolyte-Clay Dynamics and Assembly in Taylor-Couette Flows for Applications in Improved Oil Production, \$110,000.

**Dr. Jing Fan**, City University of New York, City College, Understanding Transport of Soft Units through Porous Media by Correlating Pore-scale Dynamics and Macroscale Properties, \$110,000.

**Dr. Vivian E. Ferry**, University of Minnesota, Nanoscale Monitoring of Noble Metal Catalyst Sulfidation Using Plasmonic Nanostructures, \$110,000.

**Dr. Skye Fortier**, The University of Texas at El Paso, A Versatile Early-Metal Platform for the Activation and Dehydrogenation of C-H Bonds, \$110,000.

**Dr. Jeremiah J. Gassensmith**, The University of Texas at Dallas, Organic Single Crystal Thermochromic Materials, \$110,000.

**Dr. Rouzbeh Ghanbarnezhad-Moghanloo**, University of Oklahoma, Non-Equilibrium Effects of Fines Migration in Porous Media Saturated with Immiscible Fluids, \$110,000.

**Dr. Kenneth R. Graham**, University of Kentucky, Influence of Energy Landscapes, Charge-Carrier Mobilities, and Morphology on the Thermoelectric Properties of Pi-Conjugated Polymer Blends, \$110,000.

**Dr. Lauren F. Greenlee**, University of Arkansas, Influence of Metal Incorporation on the Organizational Structure of Sulfonated Block Copolymers in Solution, \$110,000.

**Dr. Michael Gruenwald**, University of Utah, Guiding Nucleation and Growth of Metal-Organic Frameworks, \$110,000.

**Dr. W. Hill Harman**, University of California, Riverside, Redox-Active Boranes as Ligands and Reaction Centers for the Multi-Electron Activation of Small Molecules, \$110,000.

**Dr. David D. Hibbitts**, University of Florida, Effects of Zeolite Framework Topology for Conversion of Methanol/Ethanol to Hydrocarbons: Towards Computer-Directed Synthesis, \$110,000.

**Dr. Shawna M. Hollen**, University of New Hampshire, Scanned Probe Microscopy Studies of MoS<sub>2</sub> Catalysis on Insulating Substrates: Impact of Substrate, Strain, and Defects, \$110,000.

**Dr. Ian D. Hosein**, Syracuse University, Stimulating Self-Directed Polymer Phase Evolution with Nonlinear Light Waves during Free-Radical Polymerization, \$110,000.

**Dr. Hrant P. Hratchian**, University of California, Merced, Computational Study of Fundamental Organic Transformations Catalyzed by Metal Oxides, \$110,000.

**Dr. Jier Huang**, Marquette University, Developing the Photocatalytic Properties of Zeolitic Imidazolate Frameworks, \$110,000.

**Dr. Yang Jiao**, Arizona State University, Direct Microstructure Quantification and Property Prediction of Porous Materials from X-ray Tomography Data, \$110,000.

**Dr. Dominik Konkolewicz**, Miami University, Thiol-Michael Adducts for Dynamic Materials: Polymers, Single Networks, and Interpenetrating Networks, \$110,000.

**Dr. Daniel G. Kuroda**, Louisiana State University, Structure, Dynamic, and Solvation of a New Class of Designer Solvents by Ultrafast Nonlinear Infrared Spectroscopy, \$110,000.

**Dr. William D. Leavitt**, Dartmouth College, The Inner Lives of Archaea: The Hydrogen Isotopic Composition of Archaeal Lipids as a Proxy of Metabolic State, \$110,000.

**Dr. Fernando V. Lima**, West Virginia University, Novel Operability-Based Approach for the Efficient Design and Intensification of Energy Systems, \$110,000.

**Dr. Shangchao Lin**, Florida State University, Fundamental Understanding of Anisotropic Ion Transport in Charged Block Copolymer Microdomains: Large-Scale Mesoscopic Simulations of Phase Diagrams, Ion Diffusion Pathways, and Electric-Field Effects, \$110,000.

**Dr. Shihong Lin**, Vanderbilt University, Colloidal Interaction Between Oil Droplets and Oleophobic Surfaces and its Implications for Membrane Based Oil-Water Separation, \$110,000.

**Dr. Steven J. Malcolmson**, Duke University, A Reverse Polarity Approach to Preparing Chiral Amines through Stereoselective C-C Bond Assembly, \$110,000.

**Dr. Caleb D. Martin**, Baylor University, Developing Ruthenium-Boryl Catalysts for Olefin Metathesis, \$110,000.

**Dr. David Martin**, University of California, Riverside, Direct Radical Functionalization of Alcohols Using Cobalt Photocatalysis, \$110,000.

**Dr. Matthew T. McDowell**, Georgia Institute of Technology, Understanding and Controlling Reactive Transformations in Hydrodesulfurization Catalyst Materials, \$110,000.

**Dr. Andrew McNally**, Colorado State University, A New Class of Reagents for Heterocycle Coupling Reactions, \$110,000.

**Dr. Jianguo Mei**, Purdue University, Controlled Chain-Growth Direct Arylation Polymerization of Asymmetric Push-Pull Aryl Halides, \$110,000.

**Dr. Ali Mesbah**, University of California, Berkeley, Plasma-Assisted Control of Catalytic Chemical Reaction, \$110,000.

**Dr. Nenad Miljkovic**, University of Illinois at Urbana-Champaign, Fundamental Investigation of Scale Formation and Corrosion on Hydrophobic and Oleophobic Coatings, and Their Role on Coating Degradation, \$110,000.

**Dr. Garret M. Miyake**, University of Colorado at Boulder, Organocatalyzed Atom Transfer Radical Polymerization of Petroleum-Relevant Monomers Using Perylene Dyes as Visible-Light Photocatalysts, \$110,000.

**Dr. Joachim Moortgat**, The Ohio State University, Flow and Geomechanics in Fractured Black Shale, \$110,000.

**Dr. Nurxat Nuraje**, Texas Tech University, Study of New Polybetaine's Self-Assembly and Their Effect on Paraffin Inhibition, \$110,000.

**Dr. Jeremy C. Palmer**, University of Houston, Computational Design of Growth Inhibitors for Tailoring Zeolite Catalysts, \$110,000.

**Dr. Joseph D. Paulsen**, Syracuse University, Hyperuniform Dispersal of Non-Brownian Particles in Viscous Liquids, \$110,000.

**Dr. Jacqueline E. Reber**, Iowa State University, The Effect of a Liquid Phase in a Granular System on Force Distribution During Deformation, \$110,000.

**Dr. Neil J. Reilly**, University of Massachusetts Boston, Spectroscopic Interrogation of Aromatic Fuel Combustion: Decomposition of the Benzyl Radical, \$110,000.

**Dr. Kathleen Ritterbush**, University of Utah, Determining Initiation Conditions for Glass Ramps: Case Study at the Leading Edge of the Great Permian Spiculite Belt, \$110,000.

**Dr. Xavier Roy**, Columbia University, Ordered Mesoporous Metal Phosphides for Hydroprocessing, \$110,000.

**Dr. Adrienn Ruzsinszky**, Temple University, Toward Chemical Accuracy for the Description of the Catalytic Desulfurization Process, \$110,000.

**Dr. Caroline T. Saouma**, University of Utah, Non-Innocent Heterobimetallic Scaffolds for Carbon Dioxide Reduction, \$110,000.

**Dr. David Sarlah**, University of Illinois at Urbana-Champaign, Dearomatic Functionalization with Arenophiles, \$110,000.

**Dr. Thomas J. Schwartz**, The University of Maine, Selective Hydrogenolysis of C-Cl Bonds: A Fundamental Reaction Kinetics Study, \$110,000.

**Dr. Hannah S. Shafaat**, The Ohio State University, A Macromolecular Nickel Catalyst for Carbon-Carbon Bond Formation from C<sub>1</sub> Precursors, \$110,000.

**Dr. Sumit Sharma**, Ohio University, Molecular Mechanisms of Corrosion Inhibitors Studied Using Molecular Simulations, \$110,000.

**Dr. Dante A. Simonetti**, University of California, Los Angeles, Mechanistic Studies of the Reactive Sorption of Sulfur Compounds Using Metal Oxides, \$110,000.

**Dr. Arvind Singh**, University of Central Florida, Signal Propagation from Space to Time: Implications to Modeling Stratigraphic Record, \$110,000.

**Dr. Ellen M. Sletten**, University of California, Los Angeles, Desulfurization of Crude Oil by Fluorous Extraction, \$110,000.

**Dr. Joshua Snyder**, Drexel University, Electrochemical Reformation of Methane to High Purity Hydrogen, \$110,000.

**Dr. Alexander M. Spokoyny**, University of California, Los Angeles, Metal-Free Nucleophilic Borylation Chemistry Using Boron Cluster Reagents, \$110,000.

**Dr. Ankit Srivastava**, Texas A&M University, Modeling the Collaborative Effect of Microstructure and Corrosion on Crack-Growth Resistance and Pattern, \$110,000.

**Dr. Matthew Steele-MacInnis**, University of Arizona, Fluid+Thermal History Reconstruction of Basins and Fault Zones, from Combined Fluid-Inclusion and (U-Th)/He Analyses Applied to Hematite, \$110,000.

**Dr. Kara J. Stowers**, Brigham Young University, Catalytic C-C Bond Formation to Synthesize Carboxylic Acids Using CO<sub>2</sub>, \$110,000.

**Dr. James W. Swan**, Massachusetts Institute of Technology, The Dynamics of Colloidal Healing: Restoration of Visco-Plasticity in Dispersions of Attractive Colloids, \$110,000.

**Dr. Ming Tang**, Rice University, Mesoscale Modeling of Nanoemulsion in Porous Media, \$110,000.

**Dr. Peng Tao**, Southern Methodist University, Exploring Petroleum Thermal Cracking and Coal Pyrolysis Mechanisms on Free Energy Surfaces, \$110,000.

**Dr. Hanjing Tian**, West Virginia University, Towards Ultimate Dispersion: Stable Bi-Layer Single Atom Catalyst for Methane Activation, \$110,000.

**Dr. Lyubov Titova**, Worcester Polytechnic Institute, Intermolecular Interactions in Asphaltene Aggregation: Terahertz Spectroscopic Study of Model Asphaltene Compounds, \$110,000.

**Dr. Neil Tomson**, University of Pennsylvania, Electronically Flexible Ligands for Realizing the Cluster-Surface Analogy, \$110,000.

**Dr. Joseph J. Topczewski**, University of Minnesota, Chiral  $\alpha$ ,  $\alpha$ -Disubstituted Amines via the Allylic Azide Rearrangement, \$110,000.

**Dr. Chaitanya K. Ullal**, Rensselaer Polytechnic Institute, Resolving the Impact of Mesoscopic Heterogeneities on the Mechanical and Transport Properties of Gels, \$110,000.

**Dr. Esteban E. Urena-Benavides**, The University of Mississippi, Fundamental Studies on Nanocrystal Stabilized CO<sub>2</sub> Foams and Emulsions, \$110,000.

**Dr. Brett VanVeller**, Iowa State University, Fundamental Transformation of Catechol through Modulation of Boron 'ate' Complex Reactivity, \$110,000.

**Dr. Josh Vura-Weis**, University of Illinois at Urbana-Champaign, Characterization of Intermediates in Photocatalytic Hydrocarbon Oxidation Using Tabletop Femtosecond XANES, \$110,000.

**Dr. Hailiang Wang**, Yale University, Cu-Containing Bimetallic Nanoparticles for Electrocatalytic CO<sub>2</sub> Reduction into Fuels, \$110,000.

**Dr. Weining Wang**, Virginia Commonwealth University, Facile Synthesis of Metal Organic Framework-Based Heterojunction Photocatalysts for CO<sub>2</sub> Photoconversion into Hydrocarbon Fuels, \$110,000.

**Dr. Sarah E. Wengryniuk**, Temple University, Novel Nitrogen-Substituted  $\lambda^3$ -Iodanes for the Functionalization of Chemical Feedstocks, \$110,000.

**Dr. Lindsay Lowe Worthington**, University of New Mexico, Characterizing Basin Structure with Dense Passive Seismic Arrays, \$110,000.

**Dr. Yan Xia**, Stanford University, Synthesis and Dynamic Response of Responsive Shape-Persistent Ladder Polymers, \$110,000.

**Dr. Xin Yong**, State University of New York at Binghamton, Mesoscale Modeling of Stimuli-Responsive Composite Colloids at Oil-Water Interfaces, \$110,000.

**Dr. Seth A. Young**, Florida State University, Chemostratigraphic Characterization and Correlation of Lower Silurian (Llandovery) Strata across the Baltic Basin, \$110,000.

**Dr. Cunjiang Yu**, University of Houston, Electrically Responsive and Locally Programmable Hydrogel Composites, \$110,000.

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**New Directions**  
**Awards for Fundamental Research**

**Dr. Igor V. Alabugin**, Florida State University, Reaction Cascades Initiated by Catalytic Oxidative C-H Activation via Hole Injection, \$110,000.

**Dr. Jovica D. Badjic**, The Ohio State University, The Activation of Strong C-H Bonds with Catalytic Molecular Baskets, \$110,000.

**Dr. Jake V. Bailey**, University of Minnesota, Investigating the Fossil Record of Early Eukaryotes Using Sterane-Specific Antibodies, \$110,000.

**Dr. Alan L. Balch**, University of California, Davis, A Modular, Coordination Chemistry Approach to the Isolation of Metallo-Carbohedrenes ( $Ti_8C_{12}$ ,  $V_8C_{12}$ ) in Solid Form, \$110,000.

**Dr. Jason E. Bara**, University of Alabama, Investigating Polymer-Metal Bistriflimide Interactions for Functional Materials Design, \$110,000.

**Dr. Veronica Barone**, Central Michigan University, Unraveling the Interactions between Molecular Species and Two-Dimensional Materials, \$110,000.

**Dr. Aditya Bhan**, University of Minnesota,  $ZrO_2$ -Based Alternatives to Precious Metal Catalysts for Naphtha Reforming: Kinetics, Mechanism, and Site Requirements for (cyclo)Alkane Dehydroaromatization, \$110,000.

**Dr. Katharina Billups**, University of Delaware, Establishing the Temperature Sensitivity of Amino Acid Racemization Rates in Planktonic Foraminifera, \$110,000.

**Dr. Ronald K. Castellano**, University of Florida, Paracyclophane Self-Assembly Promoted by Transannular Hydrogen Bonding, \$110,000.

**Dr. Jennifer N. Cha**, University of Colorado at Boulder, Photocatalytic Systems for  $CO_2$  Reduction, \$110,000.

**Dr. Peter Chen**, ETH Zurich Swiss Federal Institute of Technology, Variable Temperature NMR Study of Proton-Bound Dimers. Role of Dispersion in Solvatophobic Effects on Bond Strengths, \$110,000.

**Dr. David S. Corti**, Purdue University, A New Method for Determining the Hamaker Constant with Atomic Force Microscopy, \$110,000.

**Dr. Thomas R. Cundari**, University of North Texas, Activation of Light Alkanes by Earth-Abundant Metal-Oxo Catalysts, \$110,000.

**Dr. Anthony G. Dixon**, Worcester Polytechnic Institute, Understanding Local Dynamic Responses of Fixed Bed Reactors by CFD, \$110,000.

**Dr. James P. Donahue**, Tulane University, Development of the Synthesis of Mixed Oxysulfidometalates and of a New, General Methodology for the Preparation of Terminal Disulfide Complexes, \$110,000.

**Dr. Elena E. Dormidontova**, University of Connecticut, Computer Modeling of Threaded Surfactant Aggregates, \$110,000.

**Dr. David A. Fike**, Washington University in St. Louis, New Approaches to Reconstructing the Timing of Diagenesis and Porosity Evolution in Sedimentary Carbonate Strata Using Coupled X-Ray Spectromicroscopy and Secondary Ion Mass Spectrometry, \$110,000.

**Dr. Woodward W. Fischer**, California Institute of Technology, What Controls Ooid Grain Size?, \$110,000.

**Dr. Francois P. Gabbai**, Texas A&M University, Activation of Carbon Dioxide with Antimony Lewis Acids, \$110,000.

**Dr. Venkat Ganesan**, The University of Texas at Austin, Design of Brine for Wettability Alteration and Improved Spontaneous Imbibition in Reservoir Nanopores, \$110,000.

**Dr. Padma Gopalan**, University of Wisconsin-Madison, Supramolecular Polymerization Approach to the Synthesis and Dynamic Self-Assembly and Disassembly of Rod-Coil Block Copolymers, \$110,000.

**Dr. Christopher B. Gorman**, North Carolina State University, Development of New Synthetic Routes to Aromatic Ladder Polymers, \$110,000.

**Dr. Scott Gronert**, Virginia Commonwealth University, Models for Heterogeneous Single Atom and Small Cluster Catalysts on Graphene: A Novel Gas Phase Approach, \$110,000.

**Dr. Michael D. Gross**, Wake Forest University, Defining Adsorption Energetics of Light Hydrocarbons in Functionalized Metal-Organic Frameworks, \$110,000.

**Dr. Weifu Guo**, Woods Hole Oceanographic Institution, Clumped Isotope Composition of Cold Seep Carbonates: Patterns and Controls, \$110,000.

**Dr. Christopher Scott Hartley**, Miami University, Dissipative Covalent Bond Formation for Non-Equilibrium Systems Chemistry, \$110,000.

**Dr. William C. Hockaday**, Baylor University, Structure-Catagenesis Relationships: Molecular Controls on Kerogen Thermal Evolution and Hydrocarbon Formation, \$110,000.

**Dr. Mikel Holcomb**, West Virginia University, A New Ability to Study Ultrafast Spectroscopy in Natural Oxides, \$110,000.

**Dr. George W. Huber**, University of Wisconsin-Madison, Catalysts for Direct Conversion of Methane, \$110,000.

**Dr. Alexej Jerschow**, New York University, Determination of Wettability of Rock via Sodium NMR, \$110,000.

**Dr. Namwon Kim**, Texas State University-San Marcos, Computational and Experimental Investigations of Wormlike Micellar Fluids for Enhanced Oil Recovery, \$110,000.

**Dr. Bern Kohler**, The Ohio State University, Probing Elementary Photochemical Events in Cerium Oxide by Steady-State and Ultrafast Spectroscopy, \$110,000.

**Dr. LaShanda T.J. Korley**, Case Western Reserve University, Probing the Influence of the Assembly of Polymer Additives in the Reinforcement of Responsive Gels, \$110,000.

**Dr. Olga Kuksenok**, Clemson University, Multi-Scale Modeling of Dynamics of Polymer Gels in Oil-Water Mixtures, \$110,000.

**Dr. Siris O. Laursen**, The University of Tennessee, Effect of P-Block Modifier and Element Ratio in Transition Metal Intermetallic Alloy Catalysts for Semi-Hydrogenation, \$110,000.

**Dr. Cecilia Leal**, University of Illinois at Urbana-Champaign, Mixing Oil and Water by Ionic Liquids: Stability Maps of Emerging Fluids in Oil Recovery, \$110,000.

**Dr. Andrew L. Leier**, University of South Carolina, Details of Ancient Fluvial Systems: Capturing 3-D Architecture and Testing Depositional Models with UAVs, Photogrammetry, and Fieldwork, \$110,000.

**Dr. Jingyue Liu**, Arizona State University, Endotaxially Anchoring Metal/Alloy Nanoparticles for Methanol Synthesis and Steam Reforming, \$110,000.

**Dr. Connie C. Lu**, University of Minnesota, Imparting Nobility to Anionic Base-Metal Hydrides for CO<sub>2</sub> Hydrogenation, \$110,000.

**Dr. Rylan J. Lundgren**, University of Alberta, Fundamental Structure-Reactivity Relationships of Isolable Distorted Cycloallenes: New Petroleum Derived Reagents for Rapid, Strain Promoted Cycloaddition Chemistry, \$110,000.

**Dr. Timothy W. Lyons**, University of California, Riverside, Local and Regional Controls on Organic Carbon Burial: Insights from an Integrated, Novel Nitrogen Isotope Application to the Miocene Monterey Formation, \$110,000.

**Dr. Charles M. Maldarelli**, City University of New York, City College, The Electrocoalescence of Water Droplets in Oil: The Effect of Colloids Adsorbed onto the Water/Oil Interface, \$110,000.

**Dr. Vasilios I. Manousiouthakis**, University of California, Los Angeles, A Novel Pressure Swing Steam Reforming Reactor, \$110,000.

**Dr. Steven J. May**, Drexel University, Polymer-Based Processing of Lateral Anionic Superstructures in Complex Oxide Films, \$110,000.

**Dr. Josef Michl**, University of Colorado at Boulder, Superstrained C<sub>5</sub> Hydrocarbons, \$110,000.

**Dr. Julia C. Mullaney**, University of Waikato, Controls on Carbon Burial Rates in Subtropical Environments: The Role of Spatial Heterogeneity of Vegetation Density and Sediment Supply, \$110,000.

**Dr. Craig Murray**, University of California, Irvine, Vibrational Pre-Reactivity: Exploiting Complexes to Probe Reactive Resonances, \$110,000.

**Dr. Tse Nga Ng**, University of California, San Diego, Elucidating the Local Kinetics of Triboelectric Effects in Polymers by Scanning Probe Microscopy, \$110,000.

**Dr. Kirsten Ngaire Nicholson**, Ball State University, Heat Flow Map of SE Asia Including Papua New Guinea, Indonesia, Malaysia and the Philippines., \$110,000.

**Dr. Jon T. Njardarson**, University of Arizona, Development of an Aromatic C-H Bond Substitution Approach, \$110,000.

**Dr. Kevin J.T. Noonan**, Carnegie Mellon University, Controlled Polymerization Approaches to Polyelectrolytes with Resonance-Stabilized Phosphorus Cations, \$110,000.

**Dr. Mitchio Okumura**, California Institute of Technology, Spectroscopy and Kinetics of the Combustion Radical Intermediate QOOH, \$110,000.

**Dr. Christopher A. Paola**, University of Minnesota, Linking River Channel Dynamics to the Dimensions of Channel Belts, \$110,000.

**Dr. David M. Perrin**, University of British Columbia, Organotrifluoroborates as Fluoride Ion Sources in Cationic Fluorination for the Preparation of Fluorinated Organics, \$110,000.

**Dr. Robert W. Pitz**, Vanderbilt University, Measurement of Stretched and Curved Laminar Flames at Extreme Pressure, \$110,000.

**Dr. James E. Pizzuto**, University of Delaware, Alluvial Suspended Sediment Routing as a Filter of Source Area Tectonic and Climatic Signals: 3-D Stratigraphic Analysis and Modeling, \$110,000.

**Dr. Richmond Sarpong**, University of California, Berkeley, New Chemistry of Conjugated Cumulated Materials and Their Analogs, \$110,000.

**Dr. Joel E. Saylor**, University of Houston, Discriminating Sediment Supply versus Accommodation Controls on Foreland Basin Stratigraphic Architecture in the Book Cliffs, Central Utah Using Detrital Double Dating, \$110,000.

**Dr. Jonathan L. Sessler**, The University of Texas at Austin, Ligand-Functionalized Block Copolymer Materials for the Demetallization of Crude Oil, \$110,000.

**Dr. Sindee L. Simon**, Texas Tech University, The Rigid Amorphous Fraction in Semicrystalline Polymers: Investigating Open Questions with Volume Dilatometry, \$110,000.

**Dr. Brian Space**, University of South Florida, Accurate and Predictive Petroleum Molecular Modeling, \$110,000.

**Dr. Shouheng Sun**, Brown University, Enhancing Cu Nanowire Catalysis for Selective Electrochemical Reduction of CO<sub>2</sub> to Ethylene, \$110,000.

**Dr. Luyi Sun**, University of Connecticut, A New Class of Heterogeneous Catalysts Based on Single-Layer Nanosheets, \$110,000.

**Dr. Dustin E. Sweet**, Texas Tech University, Testing Carbonate Shelf Geometry as a Control on Highstand Delivery of Siliciclastics to Basin Settings, \$110,000.

**Dr. Ward H. Thompson**, University of Kansas, Understanding Host-Guest Dynamics of Supramolecular Assemblies Relevant to Potential Applications in Catalysis, \$110,000.

**Dr. Jianhua Tong**, Clemson University, Direct Conversion of Methane to Ammonia and Ethylene by a Three-Step Thermochemical Cyclic Process: Reduction, Nitridation, and Protonation, \$110,000.

**Dr. Gregory E. Tucker**, University of Colorado at Boulder, Travelling at the Speed of Light: Using Luminescence to Quantify Fluvial Sediment Transport, \$110,000.

**Dr. Christoffer Heath Turner**, University of Alabama, Mimetic Synthesis Modeling of Amorphous Carbon Adsorbents, \$110,000.

**Dr. Wei Wang**, University of New Mexico, Photocatalytic Functionalization of Arenes and Alkenes Using Visible Light, \$110,000.

**Dr. Thomas Ward**, Iowa State University, A Computational Fluid Dynamics Study of Micro-Emulsion Formation and Transport in a Porous Media, \$110,000.

**Dr. J. Douglas Way**, Colorado School of Mines, Dual Phase Membranes for High Temperature CO<sub>2</sub> Separation, Hydrogen Production, and Energy Conversion, \$110,000.

**Dr. J. Mathias Weber**, University of Colorado at Boulder, Pressure Response of Organic Photonic Materials at the Nano- and Mesoscale, \$110,000.

**Dr. Daniel J. Weix**, University of Rochester, Heterogeneous Colloid Catalysts for Visible Light Photochemistry, \$110,000.

**Dr. Karen I. Winey**, University of Pennsylvania, Influence of Strongly Attractive Polymer-Substrate Interactions on Polymer Conformations and Chain Dynamics under Rigid Confinement, \$110,000.

**Dr. Keith A. Woerpel**, New York University, Understanding and Controlling the Reactivity of Allylmagnesium Reagents in Stereoselective Synthesis, \$110,000.

**Dr. Jeremy E. Wulff**, University of Victoria, Functionalized Polydicyclopentadiene, \$110,000.

**Dr. Eui Hyeok Yang**, Stevens Institute of Technology, Rejuvenating Conjugated Polymer Membranes for Oily Water Treatment, \$110,000.

**Dr. Jacques L. Zakin**, The Ohio State University, Novel Turbulence Stimulation Techniques for Heat Transfer Enhancement, \$110,000.

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## Undergraduate New Investigator

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

**Dr. Lynna G. Avila-Bront**, College of the Holy Cross, Molecular Interactions of Alkanethiols, Aryl Thiols, and Fullerenes in Multi-Component Self-Assembled Monolayers as Probed by Scanning Tunneling Microscopy, \$55,000.

**Dr. Nicholas L. Balascio**, The College of William and Mary, Characterizing Organic Matter Accumulation in Freshwater Coastal Plain Wetlands: Implications for Understanding Hydrocarbon Systems, \$55,000.

**Dr. Brian M. Barry**, University of Wisconsin-Platteville, Bisguanidine Complexes of Pd<sup>0</sup> and Ni<sup>0</sup> Towards Catalytic Removal of Aryl-heteroatoms From Heavy Crudes, \$55,000.

**Dr. Jeffrey S. Cannon**, Occidental College, New Catalysts for Reductive Reactions of Ketones: Enantioselective Synthesis of C-C Bonds with Chiral Titanium Complexes, \$55,000.

**Dr. Dennis D. Cao**, Macalester College, Synthesis and Characterization of Naphthalene and Biphenylene Tetraimides, \$55,000.

**Dr. Joseph A. Carlin**, California State University, Fullerton, Linking Decadal-Scale Changes in Continental Shelf Sediment Accumulation to Variability in Ocean and Terrestrial Processes, \$55,000.

**Dr. Christina B. Cooley**, Trinity University, Development of Fluorogenic Atom Transfer Radical Polymerization in Aqueous Media, \$55,000.

**Dr. Brady Z. Foreman**, Western Washington University, 3-D Imaging of Experimental Stratigraphy Using Computed Tomography, \$55,000.

**Dr. Michael R. Gesinski**, Southwestern University, Development of a Novel and Versatile Method for the Synthesis of Substituted Cyclobutanes, \$55,000.

**Dr. Timothy L. Guasco**, Millikin University, Investigation of the Molecular-Level Interactions Which Control the Transition Metal Based Catalytic Conversion of CO<sub>2</sub>, \$55,000.

**Dr. Tim Kowalczyk**, Western Washington University, Simulating the Electronic Consequences of Embedding and Encapsulation of Photoactive Molecules within Porous Frameworks, \$55,000.

**Dr. Ryan McGorty**, University of San Diego, Nucleation of a Fluid Phase in a Colloid-Polymer System Studied with Light-Sheet Microscopy, \$55,000.

**Dr. Veronica R. Moorman**, Kettering University, Enzymatic Dephosphorylation in Organic Media, \$55,000.

**Dr. Kerstin Nordstrom**, Mount Holyoke College, Dense Granular Flows: Connecting Dynamics across Scales, \$55,000.

**Dr. Andrew S. Paluch**, Miami University, Using Ionic Liquid Mixtures for the Extraction of Organosulfur Compounds from Petroleum Streams, \$55,000.

**Dr. Liat Rosenfeld**, San Jose State University, Surfactant Effect on Hydrate Crystallization at Oil-Water Interface, \$55,000.

**Dr. Santimukul Santra**, Pittsburg State University, Development of New, Solvent and Catalyst-Free "Click-ene" Chemistry: One-Step, Green Chemistry Approach for the Low-Cost Synthesis of Petroleum-Based Building Blocks and Polymers for Industrial Applications, \$55,000.

**Dr. Jack W. Simonson**, Farmingdale State College, State University of New York, Synthesis and Characterization of Protective Cr-Based Aluminides, Borides, and Carbides, \$55,000.

**Dr. AnGayle K. Vasiliou**, Middlebury College, Sulfur Chemistry: Molecular Mechanisms, \$55,000.

**Dr. Lindsey A. Welch**, Cedar Crest College, Catalytic Liquid Phase Hydrogenation of Aromatic Aldehyde Compounds Using Pd/C Assisted by Metal Salt Additives, \$55,000.

**Dr. Dale J. Wilger**, Samford University, New Alkene Hydrofunctionalization Reactions: Approaches to Aldehyde Activation Using Base Metal Catalysis, \$55,000.

**Dr. Andrew Wommack**, High Point University, Merging Photoredox and Copper Catalysis: Extending the Chan-Lam Coupling Reaction Scope by Mechanistic Understanding, \$55,000.

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

**Dr. Jay C. Amicangelo**, Pennsylvania State University, The Behrend College, Spectroscopic and Theoretical Characterization of Radical Lone Pair- $\pi$  Complexes, \$70,000.

**Dr. William H. Amidon**, Middlebury College, Post-Rift Tectonism on Circum-Atlantic Margins?, \$70,000.

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