

## Grants Awarded 2014

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### Doctoral New Investigator

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

- Dr. Kareem A. Ahmed**, Old Dominion University, Interaction Physics of Deflagrated Methane Flame with Fluidic Flow for Pressure Gain Combustion, \$110,000.
- Dr. Clint Aichele**, Oklahoma State University, Advanced Characterization of Hydrate and Emulsion Formation in Flowing Systems for Flow Assurance Applications, \$110,000.
- Dr. Placidus B. Amama**, Kansas State University, Size-Controlled Catalyst Nanoparticles Supported on Superacid-Derived Carbon Nanotube Foams for Synthesis of Clean Fuels, \$110,000.
- Dr. Trisha L. Andrew**, University of Wisconsin-Madison, Probing Spin-Exciton and Spin-Charge Interactions in Open-Shell Organic Semiconductors, \$110,000.
- Dr. Vaibhav Bahadur**, The University of Texas at Austin, Role of Surfaces and Surface Charge on Hydrate Nucleation and Adhesion, \$110,000.
- Dr. M. Kevin Brown**, Indiana University Bloomington, Cu-Catalyzed Vicinal Dicarbofunctionalization of Simple Alkenes, \$110,000.
- Dr. Matthew F. Bush**, University of Washington, Fundamental Interactions Between Petroleum Ions and Gases, \$110,000.
- Dr. Luis M. Campos**, Columbia University, Oxygen Transfer Chemistry with Conjugated Polymers, \$110,000.
- Dr. Anthony Chappaz**, Central Michigan University, Chromium Speciation and Distribution in Modern and Ancient Anoxic Settings: Advancing the Paleoproxy, \$110,000.
- Dr. Xiang Cheng**, University of Minnesota, Using Confocal Rheometry to Study Single Particle Dynamics in Shear Thickening Suspensions, \$110,000.
- Dr. Shelley A. Claridge**, Purdue University, Direct Structural Characterization of Individual Asphaltenes Using Scanning Probe Microscopy and Interface-Sensitive Techniques, \$110,000.
- Dr. Brandi M. Cossairt**, University of Washington, Homogeneous Bimetallic Systems for Syngas Conversion, \$110,000.
- Dr. Mingji Dai**, Purdue University, Catalytic Carbonylative Macrocyclization of Olefins and Cyclopropanes, \$110,000.
- Dr. A. Eugene DePrince**, Florida State University, Fundamental Investigations of Plasmons and Electron Dynamics in Petroleum-Derived Polycyclic Aromatic Hydrocarbons, \$110,000.
- Dr. Loi H. Do**, University of Houston, Upgrading Polyethylene: Copolymerization of Ethylene and Polar Vinyl Monomers Facilitated by Lewis Acid Appended Ni and Pd Catalysts, \$110,000.
- Dr. Kendra A. Erk**, Purdue University, Design and Characterization of Hydrogel-Based Internal Curing Agents for Oil Well Cementing Applications, \$110,000.
- Dr. Elif Ertekin**, University of Illinois at Urbana-Champaign, Design of Green, Switchable Oxide Catalysts for Steam Methane Reforming by Quantum Mechanical Simulation, \$110,000.
- Dr. Majie Fan**, The University of Texas at Arlington, Influence of Mantle Processes on the Formation of Petroleum-Bearing Basins in the Central Rocky Mountains, Western U.S.A., \$110,000.
- Dr. Lei Fang**, Texas A&M University, Bottom-Up Synthesis of Freestanding Two-Dimensional Polymers with Long-Range Order, \$110,000.
- Dr. Andrew L. Ferguson**, University of Illinois at Urbana-Champaign, Mesoscale Simulation and Machine Learning of Asphaltene Aggregation, \$110,000.
- Dr. Alison R. Fout**, University of Illinois at Urbana-Champaign, Development of Sustainable Co(I) Catalyst Toward C-N Bond Coupling, \$110,000.
- Dr. Qi Fu**, University of Houston, Experimental Study of Carbon and Hydrogen Isotope Equilibria among CO<sub>2</sub> and Hydrocarbons in Sedimentary Basins, \$110,000.
- Dr. Haifeng Gao**, University of Notre Dame, Mechanistic Study on Synthesis of Hyperbranched Polymer with Uniform Structure, \$110,000.

**Dr. Michael Gonsior**, University of Maryland Center for Environmental Science, Hydrosulfurization of Dissolved Organic Matter in Sediments - Linking Sulfate Reduction and Dissolved Organic Sulfur Formation, \$110,000.

**Dr. Rajamani Gounder**, Purdue University, Ethene-to-Propene Metathesis on Nickel-Exchanged Zeolites: A Fundamental Kinetic Study of the Effects of Pore Size and Nickel Structure on Ethene Dimerization Rates, \$110,000.

**Dr. P. Alex Greaney**, Oregon State University, Control of Thermal Transport across Interfaces in Metal-Organic-Frameworks, \$110,000.

**Dr. Jason R. Green**, University of Massachusetts Boston, Emergence of Entropy From the Mixing Dynamics of Complex Liquids, \$110,000.

**Dr. Stanislav Groysman**, Wayne State University, Preparation of Low-Coordinate Bis(Alkoxide) Metal Complexes and Their Reactivity in Bond Formation and Bond Activation Reactions Involving Azide Precursors, \$110,000.

**Dr. Kenneth Hanson**, Florida State University, Absolute Stereocontrol of Prochiral Substrates with Chiral Excited State Proton Transfer Dyes, \$110,000.

**Dr. Wenyu Huang**, Iowa State University, Inorganic Capping Synthesis of Pure Phase Intermetallic Nanoparticles for Non-Oxidative Propane Dehydrogenation, \$110,000.

**Dr. Prashant K. Jain**, University of Illinois at Urbana-Champaign, Discovery of Active Sites on Nanostructured Oxides for Desulfurization, \$110,000.

**Dr. David Jassby**, University of California, Riverside, Enhanced Oil Recovery from Oil-in-Water Emulsions through the Coupling of Magnetic Amphiphilic Nanoparticles with Electrofiltration, \$110,000.

**Dr. Junha Jeon**, The University of Texas at Arlington, Divergent Access to Hydrosilylation and Dehydrogenative Silylation Reactions Exploiting Grubbs-Type Ruthenium Benzylidene Complexes, \$110,000.

**Dr. Daniel R. Killelea**, Loyola University of Chicago, Scanning Tunneling Microscopy Study of Subsurface Oxygen on Rh(111), \$110,000.

**Dr. Hojong Kim**, The Pennsylvania State University, Corrosion in Extreme Environments, \$110,000.

**Dr. Jing Kong**, Middle Tennessee State University, Study of the Support to Active Site Interaction in Catalysts of Oil Hydrocracking and Hydrodesulfurization Using New Density Functional Theory Methods, \$110,000.

**Dr. Kirill Kovnir**, University of California, Davis, Fundamental Investigation of Inorganic Metal Borophosphides, \$110,000.

**Dr. Kyle M. Lancaster**, Cornell University, Chemically Targeted X-ray Spectroscopic Studies of Chromium-Catalyzed Ethylene Trimerization Reactions, \$110,000.

**Dr. Lei Li**, University of Pittsburgh, Understanding the Solid-Confined Ionic Liquid Nanofilms, \$110,000.

**Dr. Ryan P. Lively**, Georgia Institute of Technology, Probing Relationships between Carbon Nanostructure and Binary Molecular Mobility in 'Crowded' Nanoporous Spaces, \$110,000.

**Dr. Brice Loose**, University of Rhode Island, Rates and Controls on Methane Oxidation Beneath Sea Ice, \$110,000.

**Dr. Sharon M. Loverde**, College of Staten Island, CUNY, Molecular Modeling of Shape Transformations in Polystyrene Vesicles, \$110,000.

**Dr. Patrick T. Lynch**, University of Michigan-Dearborn, High Pressure Studies of Aromatic and Aliphatic Soot Formation Behind Reflected Shock Waves, \$110,000.

**Dr. John B. Matson**, Virginia Polytechnic Institute and State University, Tapered Bottlebrush Polymers: A New Polymer Topology, \$110,000.

**Dr. Brandon McElroy**, University of Wyoming, Morphologic Prediction of Reservoir Quality in Deltaic Stratigraphy, \$110,000.

**Dr. Michael M. McGlue**, University of Kentucky, Petroleum Generation in Geologically-Young Lacustrine Rift Basins: Integrated Stratigraphy, Experimental Geochemistry, and Basin Modeling, \$110,000.

**Dr. Dmitry V. Peryshkov**, University of South Carolina, Electron-Donating Carboranyl Ligands for Iron-Catalyzed Hydrocarbon Oxidation, \$110,000.

**Dr. William A. Phillip**, University of Notre Dame, Systems Level Design of Osmotically Driven Membrane Processes for Process Water Reuse, \$110,000.

**Dr. Sally L. Potter-McIntyre**, Southern Illinois University Carbondale, Middle to Late Jurassic Paleogeography, Western Colorado, \$110,000.

**Dr. Sean T. Roberts**, The University of Texas at Austin, Visualizing Molecular Organization and Energy Transport Dynamics at Organic Surfaces and Heterojunctions with Interface Specific Femtosecond Spectroscopy, \$110,000.

**Dr. Jennifer Lyn Roizen**, Duke University, Site- and Enantioselective Electrophilic Halogen-Transfer Processes, \$110,000.

**Dr. Mark F. Roll**, University of Idaho, Diamondoid Block Copolymers for Microporous Membranes, \$110,000.

**Dr. Paul A. Rugar**, University of Alabama, The Living Anionic Polymerization of Functionalized Aziridines, \$110,000.

**Dr. Sapna Sarupria**, Clemson University, Tackling the 'Fire-In-Ice' Problem in the Petroleum Industry: A Molecular Approach, \$110,000.

**Dr. Corinna Stefanie Schindler**, University of Michigan, New Avenues for Iron-Catalyzed Dehydrogenative Cross-Coupling Reactions, \$110,000.

**Dr. Kelly M. Schultz**, Lehigh University, Fundamental Studies of Material Properties of Chemically Cross-Linked Gels Concentrated above the Overlap Concentration, \$110,000.

**Dr. Timothy F. Scott**, University of Michigan, Reaction Kinetic Elucidation and Gas Transport Characterization of Interfacially Photopolymerized, Intrinsically Microporous Membranes, \$110,000.

**Dr. Mohammad Shahvali**, University of Tulsa, A Fundamental Study on Efficient Resolution of the Inherent Nonlinearity of Compositional Formulations for Flow in Porous Media, \$110,000.

**Dr. Stefan Stoll**, University of Washington, High-Resolution EPR Characterization of the Ligand Structure in Vanadium Porphyrin Complexes, \$110,000.

**Dr. David R. Stuart**, Portland State University, Direct Carbon-Carbon Bond Forming Reactions with Hypervalent Iodine Reagents: Redefining Formal S<sub>N</sub>Ar Reactivity with Carbon Nucleophiles, \$110,000.

**Dr. Jin Suntivich**, Cornell University, In Situ Characterization of Small Organic Molecule Oxidation Using Stimulated Raman Spectroscopy, \$110,000.

**Dr. Thomas S. Teets**, University of Houston, Two-Stage Catalytic Aerobic Oxidation of Alkanes with Iridium Pincer Complexes, \$110,000.

**Dr. Fei Tian**, Stevens Institute of Technology, In-Situ SERS Study of Au-Catalyzed Oxidation of Propene Using Multifunctional Microstructured Optical Fiber Platform, \$110,000.

**Dr. Michael T. Timko**, Worcester Polytechnic Institute, The Role of Phase Behavior in Fischer-Tropsch Product Distributions: Supercritical Fluid Studies, \$110,000.

**Dr. Ian A. Tonks**, University of Minnesota, Fundamental Studies toward the Copolymerization of Ethylene with Carbon Dioxide: Bimetallic Group 10/Main Group Catalyst Synthesis and Reactivity, \$110,000.

**Dr. Vincent Chunchih Tung**, University of California, Merced, Electrohydrodynamically Assisted Dimensional Transition of Crumpled Graphene Balls at Interfaces: Toward Selective Removal of Aromatic and Organosulfur Contaminants, \$110,000.

**Dr. Christopher Uyeda**, Purdue University, Light-Driven Dehydrogenative Carbon-Carbon Coupling Reactions, \$110,000.

**Dr. Venkatasubramanian Viswanathan**, Carnegie Mellon University, Identification of Electrocatalysts and Reaction Mechanisms for Electrochemical Conversion of Methane to Methanol Using Density Functional Theory, \$110,000.

**Dr. Christopher R. Weinberger**, Drexel University, Understanding the Interfaces Between Iron and Iron-Carbides, \$110,000.

**Dr. Ding-Shyue Yang**, University of Houston, Direct Visualization of Interfacial Energy-Transfer and Charge-Transfer Dynamics of Thin Ionic Liquid Films by Ultrafast Electron Imaging, \$110,000.

**Dr. Ke Zhang**, Northeastern University, Controlling Polymerization Reactions at the Nanoscale, \$110,000.

**Dr. Yu Zhong**, Florida International University, A Novel Integrated Design for the Mixed Ionic-Electronic Conducting (MIEC) Perovskites, \$110,000.

**Dr. Yu Zhu**, The University of Akron, Investigating Polymer Templated Graphene Scaffold for Heterogeneous Gold Nanoparticle Catalyst in Selective Oxidation Reactions, \$110,000.

**Dr. Paul M. Zimmerman**, University of Michigan, Characterization and Screening of Al-based Olefin Polymerization Catalysts Using Automated Reaction Discovery Approaches, \$110,000.

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## New Directions

### Awards for Fundamental Research

- Dr. Pinar Akcora**, Stevens Institute of Technology, Flow-Induced Organization of Bimodal-Sized Particles in Drying Polymer Droplets, \$110,000.
- Dr. Erik J. Alexanian**, University of North Carolina at Chapel Hill, Intermolecular Aliphatic C-H Functionalization Using Heteroatom-Centered Radicals, \$110,000.
- Dr. Zhenan Bao**, Stanford University, Synthesis, Functionalization, and Processing of Conjugated Microporous Polymers for Refinery Stream Separation and Purification, \$110,000.
- Dr. Ali Beskok**, Southern Methodist University, Nanometer-Scale Gas Transport in Shale Reservoirs, \$110,000.
- Dr. Tanja Bosak**, Massachusetts Institute of Technology, Biogeochemical and Lithification Patterns in Microbial Carbonates through Interactions of Sedimentary Bed Forms and Fluid Flow, \$110,000.
- Dr. Uwe Burghaus**, North Dakota State University, Fundamental Properties of Two-Dimensional Zeolites, \$110,000.
- Dr. Ilya V. Buynevich**, Temple University, Geophysical Characterization of Biogenic Structures in Siliciclastic and Carbonate Media, \$110,000.
- Dr. William J. Chain**, University of Hawaii at Manoa, Metal-Free Functionalization of Aromatic Rings - Remarkably Mild Carbon-Heteroatom and Carbon-Carbon Bond Formations, and Dehydrogenative Cross-Coupling Reactions, \$110,000.
- Dr. Donna A. Chen**, University of South Carolina, Metal-Organic Frameworks as Gas-Phase Heterogeneous Catalysts: Understanding Active Sites for Oxidation and Hydrogenation Reactions, \$110,000.
- Dr. Peng Chen**, Cornell University, Mechano-Catalysis Coupling within a Single Growing Polymer, \$110,000.
- Dr. John D. Chisholm**, Syracuse University, Acid Catalyzed Alkylation Reactions of Trichloroacetimidates, \$110,000.
- Dr. Nicholas Christie-Blick**, Columbia University, U/Pb-<sup>40</sup>Ar/<sup>39</sup>Ar Coupling Approach for the Reconstruction of Paleo-River Systems: A Case Study of the Siluro-Devonian Old Red Sandstone, \$110,000.
- Dr. Matthew E. Clapham**, University of California, Santa Cruz, Oceanographic Causes of Anoxia and Organic-Matter Accumulation: Testing Models in the Toarcian Ocean Anoxic Event, \$110,000.
- Dr. John C. Crocker**, University of Pennsylvania, A Microrheological Study of Interfacial Nanoparticle Layers: Understanding Glassy Rheology, Aging and Stability, \$110,000.
- Dr. Shanti Deemyad**, University of Utah, Kinetic and Isotope Effects in P-T Phase Diagram of Polycyclic Aromatic Hydrocarbons, \$110,000.
- Dr. Rafael Delgado Buscalioni**, Universidad Autonoma de Madrid, Hydrodynamics of Colloidal Clustering in Different Dynamic Regimes, \$110,000.
- Dr. Jerome Delhommelle**, University of North Dakota, Molecular Mechanisms Underlying the Adsorption of Alkanes and their Mixtures in Metal-Organic Frameworks, \$110,000.
- Dr. Douglas A. Edmonds**, Indiana University Bloomington, A Theoretical and Field-Based Study on the Formation and Shape of Fluvial Levees, \$110,000.
- Dr. Eva Enkelmann**, University of Cincinnati, Triggering a Tectonic-Climate Feedback: The Sedimentary Record of Tectonic-Surface Processes Interactions in the St. Elias Range, Alaska, \$110,000.
- Dr. Fernando A. Escobedo**, Cornell University, Molecular Simulation of Vapor-Phase Nucleation of Alkanes, \$110,000.
- Dr. Ulrich W. Fekl**, University of Toronto Mississauga, Metals at Tripodal Sites of Adamantane and Graphane-Like Surfaces of Nano-Diamonds: A Unified Strategy for Petroleum-Derived Materials from the Molecular to the Nano-Scale, \$110,000.
- Dr. Katherine H. Freeman**, The Pennsylvania State University, CoEnzyme F430: A Gateway to Anaerobic Methane Oxidation, \$110,000.
- Dr. Lev D. Gelb**, University of Texas at Dallas, Thermodynamics of Acid-Base Equilibria in Protic Ionic Liquids, \$110,000.
- Dr. David S. Glueck**, Dartmouth College, Chiral Iridium Pincer Complexes for Catalytic Asymmetric Hydrogen Transfer Processes, \$110,000.
- Dr. Ksenija D. Glusac**, Bowling Green State University, Concerted Excited-State Hydride Transfer from Organic Models, \$110,000.

**Dr. Gregory M. Grason**, University of Massachusetts Amherst, Mechanics and Stability of Surface-Confined Assemblies, \$110,000.

**Dr. Gordon W. Gribble**, Dartmouth College, Novel Interrupted Polyacenes, \$110,000.

**Dr. Elizabeth M. Griffith**, The University of Texas at Arlington, Formation and Early Diagenesis of Microbialites in Storr's Lake, San Salvador, Bahamas: An Alkaline Earth Metal Isotope Investigation, \$110,000.

**Dr. Robert B. Grubbs**, State University of New York at Stony Brook, Synthesis, Functionalization, and Characterization of Crosslinked Porous Elastomers, \$110,000.

**Dr. Keith E. Gubbins**, North Carolina State University, Confinement Effect on Solubility of Oilfield Fluids in Sub-Micron Pores, \$110,000.

**Dr. Sidney R. Hemming**, Columbia University, Uranium-Lead Dating and Correlation of Lacustrine Carbonates of the Green River Formation: Context for Paleo-Environmental Architecture of Lake Types, \$110,000.

**Dr. Jacob L. Jones**, North Carolina State University, Electrode Stability in High Temperature Sensors for Petroleum Applications, \$110,000.

**Dr. Linda C. Kah**, The University of Tennessee, Ocean Ventilation in the Ordovician: Potential Impact on Marine Strontium Isotope Compositions, \$110,000.

**Dr. Peter G. Khalifah**, State University of New York at Stony Brook, Understanding a Novel Class of Highly Thermostable Liquids, \$110,000.

**Dr. James T. Kindt**, Emory University, Molecular Simulation Studies of Clathrate Hydrate Phase Nucleation, \$110,000.

**Dr. Jacob Klein**, The Weizmann Institute of Science, Energy Dissipation and Transport Properties in Polymer-Based Nano-Vector/Hydrogel Complexes, \$110,000.

**Dr. David E. Kranbuehl**, The College of William and Mary, Understanding the Effect of Graphene Oxide's C:O Ratio on Particle Polymer Intermolecular Forces and Resulting Macroscopic Properties, \$110,000.

**Dr. Christy F. Landes**, Rice University, Spectro-Electrochemical Microscopy of Single Nanoparticle Electrocatalysts, \$110,000.

**Dr. Nancy E. Levinger**, Colorado State University, Developing a Metal-Ion Burst Technique to Explore Ionic Strength Jump Dynamics, \$110,000.

**Dr. Christopher Y. Li**, Drexel University, Crystal Engineering for High Performance Solid Polymer Electrolytes, \$110,000.

**Dr. Marjorie L. Longo**, University of California, Davis, Mechanical and Adhesive Properties of Crude Oil Droplets: Contributions of Interfacial Components, \$110,000.

**Dr. George F. Majetich**, University of Georgia, A Metathesis-based Synthesis of Dodecahedrane, Isomers and Analogues Thereof, \$110,000.

**Dr. Ashlie Martini**, University of California, Merced, Understanding the Relationship between Fluid Molecular Structure and Pressure-Viscosity Behavior, \$110,000.

**Dr. Lisa McElwee-White**, University of Florida, Synthesis and Surface Reactions of Organometallic Precursors Tailored for Electron Beam Induced Deposition, \$110,000.

**Dr. Eckart H. Meiburg**, University of California, Santa Barbara, High-Resolution, Massively Parallel, Three-Dimensional, Grain-Resolving Simulation Tools for High-Concentration Particulate Flows, \$110,000.

**Dr. Michael D. Morse**, University of Utah, Electronic Spectroscopy of Organic and Organometallic Ions, \$110,000.

**Dr. Manashi Nath**, Missouri University of Science and Technology, Study of Transition Metal Chalcogenide Nanostructures as Efficient Oxygen Reduction Catalysts, \$110,000.

**Dr. Evgueni E. Nesterov**, Louisiana State University, Photochemistry in Liquid Crystalline Media - A Novel Way to Control Selectivity of Photoreactions, \$110,000.

**Dr. Christopher K. Ober**, Cornell University, Sequence Controlled Polymers Using Solid Supported Chemistry, \$110,000.

**Dr. Thomas D. Olszewski**, Texas A&M University, Using Postmortem Shell Ages to Reconstruct Sediment Burial Pathways, \$110,000.

**Dr. Benjamin H. Passey**, The Johns Hopkins University, Oxygen-17 in Sedimentary and Diagenetic Carbonates, \$110,000.

**Dr. Marina A. Petrukhina**, State University of New York at Albany, New Class of Organometallic Single-Ion Lanthanide Molecular Magnets, \$110,000.

**Dr. Lin Pu**, University of Virginia, New Catalysts for Stereoselective Polymerization of Functional Alpha-Olefins, \$110,000.

**Dr. Alejandro D. Rey**, McGill University, Atomistic-to-Continuum Modeling of Gas Hydrates Mechanics: Elasticity, Acoustics, and Phase Nucleation, \$110,000.

**Dr. Eric Rivard**, University of Alberta, *N*-Heterocyclic Olefins (NHOs) as Tunable Ligands for Metal-Mediated Catalysis, \$110,000.

**Dr. Mark A. Rizzacasa**, University of Melbourne, Catalytic Asymmetric Hydration of Alkenes with Chiral *cis*- $\beta$  Metallosalen Complexes, \$110,000.

**Dr. Antoni Rosell-Mele**, Universitat Autònoma de Barcelona, Appraisal of the Postdepositional Diagenetic Alteration of Nitrogen Isotopic Signatures of Sedimentary Chlorins, \$110,000.

**Dr. Joseph P. Sadighi**, Georgia Institute of Technology, New Ligands for Catalysis Through Elaboration of the Phosphatriptycene Framework, \$110,000.

**Dr. R. Mohan Sankaran**, Case Western Reserve University, Non-Equilibrium, Atmospheric-Pressure Microplasmas for Hydrocarbon Gas Conversion, \$110,000.

**Dr. Eli Sloutskin**, Bar-Ilan University, Polyhedral Oil Droplets: Nanoscale Elasticity in Emulsions, \$110,000.

**Dr. David M. Stanbury**, Auburn University, One-Electron Oxidation of Alkylsulfonic Acids, \$110,000.

**Dr. Jeffrey A. Sutton**, The Ohio State University, Investigation of Auto-Ignition Dynamics of Turbulent *n*-Heptane Fuel Jets in High-Temperature, Vitiated Environments Using Time-Resolved, Multi-Scalar Imaging, \$110,000.

**Dr. E. Charles H. Sykes**, Tufts University, Advancing Radioactive Material Design by Understanding Nanoscale Nuclear Decay Effects in 2-D Films, \$110,000.

**Dr. Steven L. Tait**, Indiana University Bloomington, Anion and Voltage Responsive Crystal Switching at Liquid-Graphite Interfaces for Ion Management in Non-Aqueous Solutions, \$110,000.

**Dr. Mark C. Thies**, Clemson University, Graphenic Materials from Polycyclic Aromatic Hydrocarbon Oligomers, \$110,000.

**Dr. Mesfin Tsige**, The University of Akron, Surfactant Induced Ordering at the Oil-Water Interface: Thermodynamic, Kinetic, and Viscoelastic Considerations, \$110,000.

**Dr. Aleksey M. Vishnyakov**, Rutgers, The State University of New Jersey, Mechanisms of Asphaltene Precipitation From Oil: a Multiscale Simulation Study, \$110,000.

**Dr. Rory Waterman**, University of Vermont, Reductive Elimination at Group 14 Elements: A Pathway Toward Catalysis, \$110,000.

**Dr. Frederick G. West**, University of Alberta, Strained Cyclic Allenes: Novel Methods for Generation, New Trapping Reactions, and Domino/Cascade Processes, \$110,000.

**Dr. B. Erik Ydstie**, Carnegie Mellon University, Closed Loop Reservoir Management Using Optimal Control Theory, \$110,000.

**Dr. Choong-Shik Yoo**, Washington State University, Thermomechanical Reactions of Volatiles in Deep Earth Environments: Formation and Evolution of Abiotic Hydrocarbons, \$110,000.

**Dr. Edward D. Young**, University of California, Los Angeles, Rare Isotopologues as Tracers of Methane Provenance, \$110,000.

**Dr. Wendy Wei Zhang**, University of Chicago, Miscible Displacement Fronts, \$110,000.

**Dr. Junrong Zheng**, Rice University, Reaction Mechanism of C-H Activation of Fe-Catalysts, \$110,000.

**Dr. Timothy S. Zwier**, Purdue University, Broadband Microwave Characterization of Pyrolysis Intermediates Formed by Oxygenated Fuels, \$110,000.

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

- Dr. Heather L. Abbott-Lyon**, Kennesaw State University, Investigation of Methane Direct Dissociation and Partial Oxidation on Vanadium Surfaces, \$55,000.
- Dr. Nicholas D. Ball**, Amherst College, Mechanistic Investigations of Aryl-SO<sub>2</sub>-Heteroatom Bond Formation from Palladium Using Bench-Stable SO<sub>2</sub> Sources, \$55,000.
- Dr. Nahid D.S. Gani**, Western Kentucky University, Timing of Incision of the Ethiopian Plateau, East African Rift System: Integration of Apatite (U-Th)/He and <sup>4</sup>He/<sup>3</sup>He Thermochronometry, \$55,000.
- Dr. Elizabeth Glogowski**, University of Wisconsin-Eau Claire, Designing 'Smart' Polymer Self-Assembling Systems by Tuning Polymer Functionality and Architecture, \$55,000.
- Dr. Michael L. Griffiths**, The William Paterson University of New Jersey, Late Phanerozoic Evolution of Seawater Temperature and Sr/Ca: New Insights from Clumped Isotope Thermometry in Biogenic Apatite, \$55,000.
- Dr. Patrick Huang**, California State University, East Bay, Structure and Energetics of Calcium Carbonate Pre-Nucleation Clusters from Atomic-Scale Simulations: Development of a Novel Interatomic Potential, \$55,000.
- Dr. Andrew J. Huisman**, Union College, A Physicochemical Exploration of the Diffusion of Small Molecules in Glassy and Highly-Viscous Materials, \$55,000.
- Dr. Elizabeth C. Landis**, College of the Holy Cross, Impact of Molecular Ligands on Nanoparticle Electrocatalysis, \$55,000.
- Dr. Sheri Lense**, University of Wisconsin-Oshkosh, Multifunctional Bipyridine Ligands for the Catalytic Reduction of CO<sub>2</sub> to CO, \$55,000.
- Dr. Xiaopeng Li**, Texas State University-San Marcos, Self-Assembly of Three-Dimensional Metallo-Supramolecules Using Adamantane-Based Terpyridine Ligands, \$55,000.
- Dr. Yu Liu**, Northern Michigan University, Supramolecular Catalyst Assembled through Aromatic Donor-Acceptor Interaction and Its Application in Hydrolytic Kinetic Resolution of Epoxides, \$55,000.
- Dr. Sanela Martic**, Oakland University, Structure-Oxidation Potential Relationship of Antioxidants and Peroxide Formation in Gasoline, \$55,000.
- Dr. Jeni A. McDermott**, University of St. Thomas, Cenozoic Evolution of the Southwestern Norwegian Passive Margin, \$55,000.
- Dr. Tyler K. Meldrum**, The College of William and Mary, Investigating the Development of Intermolecular Networks in Coatings with Single-Sided NMR, \$55,000.
- Dr. Gustavo Moura-Letts**, Rowan University, Chiral Diaziridines as Synthetic Building Blocks for the Systematic Synthesis of Nitrogen-Containing Heterocycles, \$55,000.
- Dr. Seann P. Mulcahy**, Providence College, Synthesis of Heterocycles by Palladium-Catalyzed [2+2+2] Cyclizations, \$55,000.
- Dr. Brittany B. Nelson-Cheeseman**, University of St. Thomas, Engineering Superior Oxide Catalysts via Electrostatic Strain, \$55,000.
- Dr. Dipendu Saha**, Widener University, Methane Adsorption in Dry and Wet Micro-Mesoporous Carbon, \$55,000.
- Dr. John D. Sivey**, Towson University, Kinetics of Electrophilic Aromatic Substitution by Aqueous BrCl, BrOCl, and Br<sub>2</sub>O: Catalysis of Alkylbenzene Bromination, \$55,000.
- Dr. Craig N. Streu**, St. Mary's College of Maryland, Investigating Novel Transition Metal Complexes for Use in Asymmetric Catalysis, \$55,000.
- Dr. Patrick H. Willoughby**, Ripon College, Alkene Acylation by Photoredox Catalysis, \$55,000.
- Dr. Guoqi Zhang**, John Jay College of Criminal Justice, CUNY, Non-Precious Metal Catalytic Asymmetric Reduction of Unsaturated Bonds: A Supramolecular Approach, \$55,000.

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

- Dr. Joseph L. Allen**, Concord University, Influence of Anisotropy on Dynamic Rupture During Incipient Fault Zone Development, \$70,000.
- Dr. Julie K. Bartley**, Gustavus Adolphus College, Stromatolites in Atypical Environments: From Mesoproterozoic to Modern, \$70,000.
- Dr. Timothy B. Clark**, University of San Diego, Phosphine-Directed C-H Borylation of Arenes: Facile Access to Ambiphilic Phosphine Boronate Esters, \$70,000.
- Dr. Benjamin F. Dattilo**, Indiana University-Purdue University Fort Wayne, Do Cincinnatian (Ordovician) Phosphorites Result from Intrinsic Organic Burial Processes or Extrinsic Conditions?, \$70,000.
- Dr. Stephen Drucker**, University of Wisconsin-Eau Claire, Spectroscopic Characterization of Acrolein in Its Lowest Triplet ( $n,\pi^*$ ) State, \$70,000.
- Dr. Edyta M. Greer**, Baruch College, CUNY, Determining the Significance of Thermally-Activated Heavy-Atom Tunneling in Diradical-Forming Concerted Reactions (Cycloaromatizations) of Pertinence to Organic and Physical Chemistry, \$70,000.
- Dr. Timothy W. Hanks**, Furman University, Surface Modification of Polyaniline Films and Nanofibers with Polymer Brushes, \$70,000.
- Dr. Hongshan He**, Eastern Illinois University, BODIPY-Pd Complexes for Photocatalytic C-C Coupling Reactions, \$70,000.
- Dr. Thomas A. Hickson**, University of St. Thomas, Reservoir Heterogeneity and Facies Characterization of Rift Basin Microbial Carbonate Lakes: Insights from the Miocene Horse Spring Formation and the Modern Lower Pahranaagat Lake, \$70,000.
- Dr. Todd W. Hudnall**, Texas State University-San Marcos, Antimony(V) Cations as Lewis Acid Catalysts for C-F Activation, \$70,000.
- Dr. Peter L. Kelly-Zion**, Trinity University, Deciphering the Coupled Diffusive and Naturally Convective Transport during Hydrocarbon Evaporation, \$70,000.
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