

Grants Awarded 2020

Doctoral New Investigator Starter Grants Awarded to Faculty in Ph.D.-Granting Departments

Dr. Dion S. Antao, Texas A&M University, Characterization of the Temperature Dependence of Liquid-Liquid and Liquid-Solid Interfacial Interactions, \$110,000.

Dr. Eylem Asmatulu, Wichita State University, Multiphase Capillary Flow Behaviors of Oil and Water through Superhydrophobic and Superoleophobic Multifunctional Porous Membranes for Effective Separation, \$110,000.

Dr. Ann M. Bauer, University of Wisconsin-Madison, Towards Basin Reconstruction and Chronostratigraphic Correlation of the Hydrocarbon-Bearing Mesoproterozoic Nonesuch Formation, \$110,000.

Dr. M. Hassan Beyzavi, University of Arkansas, Surface Mounted Covalent Organic Frameworks (COFs) for Alkanes Metathesis by Tandem Catalysis, \$110,000.

Dr. Praveen Bollini, University of Houston, Elucidating Structure-Catalytic Property Relationships in Hydrocarbon Conversion Using Metal Organic Framework Materials, \$110,000.

Dr. William J. Bowman, University of California, Irvine, Identifying Fast Methane Partial Oxidation Pathways in Perovskite Oxides via High Spatial Resolution Vibrational Spectroscopy, \$110,000.

Dr. Konstantin Bukhryakov, Florida International University, Iron-based Catalysts for Olefin Metathesis, \$110,000.

Dr. Liheng Cai, University of Virginia, Multiscale, Multifunctional Nanostructures from Self-Assembly of Architecturally Designed Block Copolymers, \$110,000.

Dr. Pier Alexandre Champagne, New Jersey Institute of Technology, Elemental Sulfur in Organic Chemistry: Computational and Experimental Investigations of Organic Polysulfide Intermediates, \$110,000.

Dr. Wei-Shun Chang, University of Massachusetts Dartmouth, Quantifying the Performance of Single Nanoelectrocatalysts Using Single-Molecule Specific Voltammetry, \$110,000.

Dr. Shiwang Cheng, Michigan State University, Fast Flow of Entangled Polymer Melts under High Stress Shear: Experiments and Theories, \$110,000.

Dr. Scott Cushing, California Institute of Technology, Time-Dependent Measurement of Mechanochemical Ring-Opening in Benzocyclobutene by Transient Extreme Ultraviolet Spectroscopy, \$110,000.

Dr. Mackenzie Day, University of California, Los Angeles, Aeolian Interdune Scour and a New Model for Dune Stratigraphy, \$110,000.

Dr. Jeffrey E. Dick, University of North Carolina at Chapel Hill, Photogeneration of Polyaromatic Hydrocarbon Radicals and Reactivity with O₂ and H₂O by Evanescent Wave-Scanning Electrochemical Microscopy, \$110,000.

Dr. Yilin Fan, Colorado School of Mines, Experimental Investigation of Droplet Size Distribution in Water-in-Oil Emulsion in Air and Emulsion Multiphase Horizontal Pipe Flow, \$110,000.

Dr. Yue Fan, University of Michigan, A Fundamental Study on the Stability and Mechanical Behavior of Vapor-Deposited Polymer Glasses, \$110,000.

Dr. Jie Feng, University of Illinois at Urbana-Champaign, Mechanistic Study for Pore-Scale Dynamics of Oil-laden Foam Flows in Porous Media, \$110,000.

Dr. Megan E. Fieser, University of Southern California, Lanthanide Catalyst Design for the Depolymerization of Commercial Petroleum-Sourced Plastics, \$110,000.

Dr. Rebecca L.M. Gieseking, Brandeis University, Photocatalyzed Petroleum Desulfurization by Plasmonic Metal Clusters, \$110,000.

Dr. Robert J. Gilliard, University of Virginia, Molecular Main-Group Complexes for C-H Activation, \$110,000.

Dr. Matthew Ross Golder, University of Washington, Consequences of Hydrocarbon Rubiks Cubes in Rigid-Rod Polymers, \$110,000.

Dr. Bryan R. Goldsmith, University of Michigan, Impact of Amorphous Disorder on WO_x/SiO_2 Active Site Formation and Catalytic Activity for Olefin Metathesis, \$110,000.

Dr. Wendy Gu, Stanford University, Optical and Photocatalytic Properties of TiO_2 -based Nanomaterials at High Pressure, \$110,000.

Dr. Raul Hernandez Sanchez, University of Pittsburgh, Recycling Hydrocarbons at Polynuclear Reaction Sites, \$110,000.

Dr. Jiamian Hu, University of Wisconsin-Madison, Computational Understanding of Wetting in Porous Solids: Influences of Heterogeneous Wettability, \$110,000.

Dr. Kristin M. Hutchins, Texas Tech University, Incorporation of Motion-capable Functional Groups into Solid-State Materials and Impacts on Thermal Expansion, \$110,000.

Dr. Peter James, Baylor University, Characterization and Calibration of Fracture-Induced Porosity, \$110,000.

Dr. Peter K. Kang, University of Minnesota, Inertia and Three-dimensional Flow Effects on Mixing and Reaction Hotspots at Fracture Intersections, \$110,000.

Dr. Hamidreza Karami Mirazizi, University of Oklahoma, Effects of Partial Restrictions on Liquid-Gas Flow Patterns in Vertical Tubulars, \$110,000.

Dr. Mohamed Housseem Kasbaoui, Arizona State University, Elucidating the Impact of Finite-Size and Point Particles on the Near-Wall Coherent Structures Using a High Fidelity Computational Strategy, \$110,000.

Dr. C. Rose Kennedy, University of Rochester, Magnetically Modulated Radical Relay Catalysis: Stimulus-Controlled Olefin Polymerization and Alkane $C(sp^3)$ -H Functionalization, \$110,000.

Dr. Lydia Kisley, Case Western Reserve University, Single Molecule Imaging of Catalysis in Complex Petroleum Environments, \$110,000.

Dr. Abigail Knight, University of North Carolina at Chapel Hill, Evolution of Polymers To Identify Design Principles for Selective Binding to Metal Ions, \$110,000.

Dr. Sarah Lambert, University of Utah, High Temperature Experiments for Pore-Scale Investigation of a Two Fluid Phase Migration in Porous Media, \$110,000.

Dr. Ka Un Lao, Virginia Commonwealth University, Understanding and Controlling the Aggregation Behavior of Petroleum Asphaltenes, \$110,000.

Dr. Kimberly V. Lau, The Pennsylvania State University, Environmental Controls on Sedimentary Phosphorus Cycling and Organic Carbon Accumulation, \$110,000.

Dr. Mark D. Levin, University of Chicago, Azole to Azine Skeletal Editing with Alpha-Halo Diazirine Reagents, \$110,000.

Dr. Xitong Liu, George Washington University, Impact of Mineral Geochemical Heterogeneity and Surface Roughness on Asphaltene Deposition and Remobilization, \$110,000.

Dr. Piotr Mak, St. Louis University, Elucidating Factors that Control Activation of Alkanes by Heme Proteins, \$110,000.

Dr. Matthew M. Montemore, Tulane University, Combining Efficient Predictions with Kinetic Models for Designing Alkane Conversion Catalysts, \$110,000.

Dr. Svetlana Morozova, Case Western Reserve University, Effect of Confinement on Polyelectrolyte Dynamics, \$110,000.

Dr. Davoud Mozhdghi, Syracuse University, Active Macromolecular Networks: Toward the Next Generation of Adaptive Materials, \$110,000.

Dr. Andrew J. Musser, Cornell University, Plug-and-Play Heterogeneous Photocatalysis: Exploiting MOFs as a Versatile Platform for Olefin Photochemistry, \$110,000.

Dr. Vivek Narsimhan, Purdue University, Dynamics of Particles in Wall-Bound Viscoelastic Flows - Effect of Particle Shape, \$110,000.

Dr. Zahra Niroomakhsh, University of Missouri-Kansas City, Tuning the Viscoelastic Properties of Enhanced-Oil-Recovery-Relevant Bijels, \$110,000.

Dr. Jonathan T. Pham, University of Kentucky, Relating Local Capillary Suspension Morphology to Deformation Response, \$110,000.

Dr. Andrea Pickel, University of Rochester, Elucidating Thermal Contributions to Plasmonic Photocatalysis via Simultaneous Yet Separate Nanoscale Thermometry and Reaction Monitoring, \$110,000.

Dr. Pavel Petkov Popov, San Diego State University, A New Class of Probability Density Functions for Turbulent Combustion Modeling, \$110,000.

Dr. Marc D. Porosoff, University of Rochester, Novel Method for Synthesis of Tandem Catalysts, \$110,000.

Dr. Tian Qin, The University of Texas Southwestern Medical Center, Chalcogen-based Chirality Transfer - Harnessing Petroleum Byproducts in Asymmetric Synthesis, \$110,000.

Dr. Sepideh Razavi, University of Oklahoma, Harnessing Interfacial Rheology To Control Foam Stability, \$110,000.

Dr. Maxwell J. Robb, California Institute of Technology, Mechanochemically Responsive Self-Immolative Polymers, \$110,000.

Dr. Andrew G. Roberts, University of Utah, Iterative, Reductive Cleavage and Functionalization of Carbon-Nitrogen (C-N) Bonds, \$110,000.

Dr. Michael T. Ruggiero, University of Vermont, Probing Kerogen-Mineral Interactions with Low-Frequency Vibrational Spectroscopy, \$110,000.

Dr. Michael D. Schulz, Virginia Polytechnic Institute and State University, Self-Condensing Ring-Opening Metathesis Polymerization: A Novel Approach to Hyperbranched Polymers, \$110,000.

Dr. Farnaz A. Shakib, New Jersey Institute of Technology, Adsorptive Desulfurization of Petroleum using 2D and 3D Nano-Porous Metal-Organic Frameworks, \$110,000.

Dr. Amir Sheikhi, The Pennsylvania State University, Inorganic Scale Formation and Prevention in Oil-water Emulsions, \$110,000.

Dr. Wen Song, The University of Texas at Austin, On the Fluid-Solid Evolution of Nanoporous Materials: Mechanistic Delineation of Artificial Shale Maturation, \$110,000.

Dr. Sebastian A. Stoian, University of Idaho, Emulating the Zeolites' Entatic State in Molecular Iron(IV)-oxo Catalysts, \$110,000.

Dr. Wenhao Sun, University of Michigan, *Ab initio* Investigation of the Crystal Growth Kinetics and Mineral Carbonation Thermodynamics of Dolomite, $\text{CaMg}(\text{CO}_3)_2$, \$110,000.

Dr. Elizabeth J. Trower, University of Colorado at Boulder, Understanding the Distribution of Microborings and Associated Diagenetic Transformations in the Carbonate Rock Record via the Ecophysiology of Endolithic Cyanobacteria, \$110,000.

Dr. Haotian Wang, Rice University, Electrochemical CO_2 Reduction to Pure C_2 Liquid Fuel Solutions in Porous Solid Electrolyte, \$110,000.

Dr. Tuo Wang, Louisiana State University, Atomic Resolution of Kerogen Structure by Natural-Abundance 2D ^{13}C - ^{13}C Correlation Solid-State NMR Spectroscopy, \$110,000.

Dr. Yiming Wang, University of Pittsburgh, Cationic Iron Catalysis for the Functionalization of Propargylic C-H Bonds: Rationally Designed Catalysts and New Reactions for the Synthesis of Amines, \$110,000.

Dr. Andrew S. Wozniak, University of Delaware, The Composition of Organic Sulfur in Accumulating Soils of a Temperate Salt Marsh: Implications for Sulfurization in Salt Marshes, \$110,000.

Dr. Dianne J. Xiao, University of Washington, Templating Dicopper Sites in Metal-Organic Frameworks for Aerobic Oxidation Catalysis, \$110,000.

Dr. Kelvin Yu Xie, Texas A&M University, Characterization of the Cracking Behavior of Shale under Contact Loading, \$110,000.

Dr. Huiyuan Zhu, Virginia Polytechnic Institute and State University, Harnessing Strong Metal-Support Interactions for Semihydrogenation of Alkynes, \$110,000.

Dr. Yuanyuan Zhu, University of Connecticut, Structural Basis for the Optimal Promotor Concentration and Distribution of Metal-Promoted Oxide Catalysts for Selective Oxidation of Alkane, \$110,000.

New Directions

Awards for Fundamental Research

Dr. Thomas K. Allison, State University of New York at Stony Brook, Ultrafast Dynamics and Elementary Reactions of Organic Photocatalysts, \$110,000.

Dr. Lane A. Baker, Indiana University Bloomington, New Approaches to Integrated Electrochemical Synthesis and Measurement, \$110,000.

Dr. Nicholas M. Bedford, University of New South Wales, Single Atom Catalysts and Nanoclusters Supported on Nanoscale Silicon Carbide/Nitrides for the Partial Oxidation of Methane Using Tuneable Pre-ceramic Polymer Templates, \$110,000.

Dr. Heather Bedle, University of Oklahoma, Understanding and Unraveling the Seismic Waveforms Related to Low Saturation Gas Reservoirs, \$110,000.

Dr. Nicole A. Benedek, Cornell University, Exploring the Fundamental Link Between Structural Flexibility and Adsorption Capacity in Metal-organic Frameworks for Chemical Separations, \$110,000.

Dr. Jean Bouffard, Ewha Womans University, Development of Dearomative 1,2-Diamination Reactions of Arenes and Heteroarenes, \$110,000.

Dr. Ned B. Bowden, University of Iowa, Synthesis of Colorful Polymers Based on New Functional Groups in Macromolecular Science, \$110,000.

Dr. Nicholas A. Brunelli, The Ohio State University, Elucidating the Impact of Strain for Olefin Metathesis, \$110,000.

Dr. Luis M. Campos, Columbia University, Synthesis of Conjugated Polymers by Infrared Photoredox Catalysis, \$110,000.

Dr. Mark S. Chen, Lehigh University, Conjugated Molecular Materials Capable of Singlet Oxygen Sensitization, Binding, and Controlled Release under Mild Conditions, \$110,000.

Dr. Saurabh S. Chitnis, Dalhousie University, PN Cages: New Bonding Motifs and Strategies for Functionalizing Petroleum-derived Chemicals, \$110,000.

Dr. Scott R. Daly, University of Iowa, College of Pharmacy, Synthesis of Metal Complexes with Reactive Phosphorus Ligands: Orthogonal Catalysis Sites for Sequential One-Pot Reactions, \$110,000.

Dr. Emanuela Del Gado, Georgetown University, Swellable, Shrinkable and Flowable Double Networks, \$110,000.

Dr. Deepak Devegowda, University of Oklahoma, The Factors Governing Diffusiophoresis in Nanoporous Media and Its Impact on the Migration of Clay Particles and Ions, \$110,000.

Dr. Tianning Diao, New York University, Photoredox Strategies for Upgrading Petroleum Products to Valuable Chemicals, \$110,000.

Dr. Natalia Drichko, The Johns Hopkins University, Probing the Interplay of Magnetic and Structural Properties in Magnetic Metal Organic Frameworks, \$110,000.

Dr. Andreas Eckert, Missouri University of Science and Technology, Improving the Characterization and Recovery of Heterogeneous Turbidite Reservoirs Using Process-Based Depositional Modeling, \$110,000.

Dr. Emily Finzel, University of Iowa, Improving Stratigraphic Partitioning and Correlation in an Ancient Fluvial-to-Marine Transition Zone Using Facies Analysis, Carbon:Sulfur, and Biostratigraphy, \$110,000.

Dr. John T. Foster, The University of Texas at Austin, Assessing Capillary End Effects on Large Scale Tight Reservoir Drainage, \$110,000.

Dr. Francois P. Gabbai, Texas A&M University, Carbenium Ions as Z-type Ligands: Synthesis and Applications in Catalysis, \$110,000.

Dr. Randall H. Goldsmith, University of Wisconsin-Madison, Metamaterial Strategies for Stereoinduction, \$110,000.

Dr. Francisco G. Gomez, University of Missouri-Columbia, Geophysical and Geological Investigation of Quaternary Faulting in the Petroliferous Wind River Basin (Wyoming), \$110,000.

Dr. Marina G. Guenza, University of Oregon, Multiscale Modeling of Gas Permeation in High Molecular Weight Polymer Membranes, \$110,000.

Dr. Gregory A. Henkes, State University of New York at Stony Brook, Constraining Post-Depositional Fluid Flow in the Michigan Basin Using Paired Clumped Isotope Thermometry and U-Pb Geochronology, \$110,000.

Dr. John M. Herbert, The Ohio State University, Fundamental Theoretical Studies of the Redox Properties of Catalytic Metal Oxide Nanoparticles, \$110,000.

Dr. Mary S. Hubbard, Montana State University, The Origin and Timing of the Duperow Formation CO₂ Resource, Including the Thermal Evolution and Exhumation History of Kevin Dome, Montana, \$110,000.

Dr. Douglas J. Jerolmack, University of Pennsylvania, Failing Just Right: The Creation of Sustained Turbidity Currents by the Collapse of Seabed Sediments, \$110,000.

Dr. Bart E. Kahr, New York University, Punin Ripening, \$110,000.

Dr. Aditya S. Khair, Carnegie Mellon University, Chemical and Hydrodynamic Interactions between Oil Drops via Surfactant-Mediated Solubilization, \$110,000.

Dr. Lou Kondic, New Jersey Institute of Technology, Active Oil-Water Separation Using Surface Chemistry and Acoustowetting, \$110,000.

Dr. Dmitry I. Kopelevich, University of Florida, Investigation of Mechanisms of Shear-Induced Diffusion in non-Brownian Suspensions, \$110,000.

Dr. Yongsheng Leng, George Washington University, Molecular Simulation Studies of Complex Geological Fluids in Clay Confinements, \$110,000.

Dr. Lei Li, University of Pittsburgh, Engineering the In-Pore Topography of Polymer Membrane via 3D Printing: Towards More Efficient Oil-Water Separation, \$110,000.

Dr. James A. Liburdy, Oregon State University, Experimental Analysis of Two-Phase Flow Injection for Advanced Modeling Efforts, \$110,000.

Dr. Xi Ling, Boston University, A New Strategy for Ultra-long Range Ordered Two-dimensional Metal-Organic Frameworks, \$110,000.

Dr. Bin Liu, Kansas State University, Preparation and Evaluation of Liquid Metal Catalysts for Low-Temperature Methane Dry Reforming Aided by Molecular Insights, \$110,000.

Dr. Yuehan Lu, University of Alabama, A Multi-Proxy Investigation on the Role of Early Forests and Fire in the Late Devonian Marine Deoxygenation and Mass Extinction, \$110,000.

Dr. Chun Hung (Joshua) Lui, University of California, Riverside, Probing the Molecular Adsorption Dynamics on Atomically Thin 2H and 3R MoS₂ by Layer Breathing Raman Scattering, \$110,000.

Dr. Charles Machan, University of Virginia, Activation of Hydrocarbons Using Dioxide-Derived Metal Oxidants, \$110,000.

Dr. Neal P. Mankad, University of Illinois at Chicago, Electrocatalytic Oxygen Atom Transfer, \$110,000.

Dr. David A. Mazziotti, University of Chicago, Computation of Molecular Conductivity in Strongly Correlated Organometallic Compounds, \$110,000.

Dr. Amirfarhang Mehdizadeh, University of Missouri-Kansas City, Identification and Understanding of Major Underlying Mechanisms of Asphaltene Deposition Dynamics, \$110,000.

Dr. Toshikazu Miyoshi, The University of Akron, Sensitivity Enhanced Solid-State NMR Study of Chemical Reactions of Heat-treated Poly(acrylonitrile) Films, \$110,000.

Dr. Preston B. Moore, University of the Sciences in Philadelphia, Simulations of Clathrate Forming Materials to Understand their Structure, Dynamics, and Energetics, \$110,000.

Dr. Pavel Nagorny, University of Michigan, Development of New Practical and Inexpensive Methods for Photochemical Fluorination, \$110,000.

Dr. Alshakim Nelson, University of Washington, Synthesis and Characterization of Stimuli-Responsive Ionogels from ABA and ABC Triblock Copolymers, \$110,000.

Dr. Stephen Newman, University of Ottawa, A Flash Chemistry Approach to C(sp³)-H Functionalization, \$110,000.

Dr. Robert S. Paton, Colorado State University, Mechanism, Selectivity and Reaction Dynamics in Hydrogen Atom Transfer, \$110,000.

Dr. Jonas C. Peters, California Institute of Technology, Exploring New Strategies for Up-conversion of Petroleum Feedstocks via Electrochemical PCET Shuttles, \$110,000.

Dr. Kyle N. Plunkett, Southern Illinois University Carbondale, Hypervalent Iodine Based Molecular Cages, \$110,000.

Dr. Celia Reina, University of Pennsylvania, Characterizing Dissipation in Granular Media Using Fluctuation Theorems, \$110,000.

Dr. Uri Samuni, City University of New York, Queens College, Green Biodesulfurization via Enzyme Encapsulating Hybrid Nanogels in Organic Solvents, \$110,000.

Dr. Gerald J. Schneider, Louisiana State University, Study of Non-Ionic Alternating Polymers by Fast Field Cycling Relaxometry, \$110,000.

Dr. David S. Simmons, University of South Florida, Prediction and Understanding of Polymer Rheological Response in the Time-Temperature-Superposition-Breakdown Regime, \$110,000.

Dr. Charles E. Sing, University of Illinois at Urbana-Champaign, Shape-Guided Self-Assembly in Bottlebrush Block Copolymers, \$110,000.

Dr. Ronald A. Smaldone, The University of Texas at Dallas, Solution and Solid-State Assembly of Five-Fold Symmetric Polycyclic Aromatic Hydrocarbons, \$110,000.

Dr. Craig Snoeyink, University at Buffalo, State University of New York, Electric-Field Induced Capillary Condensation, \$110,000.

Dr. Laleh Tahsini, Oklahoma State University, Catalytic Acceptorless Dehydrogenation Facilitated by Molecular Nickel- and Copper-Phosphorous Complexes, \$110,000.

Dr. Salvatore Torquato, Princeton University, Time-Dependent Interphase Diffusion Processes in Multiphase Disordered Media, \$110,000.

Dr. Elisa Toulson, Michigan State University, Ignition Delay Times and Laminar Flame Speeds of Additive-Gasoline Blends, \$110,000.

Dr. Marissa M. Tremblay, Purdue University, Investigating the (U-Th)/He Systematics of Gas Scales and its Potential for Basin Thermal History Reconstruction, \$110,000.

Dr. Alan K. Van Orden, Colorado State University, Time-Resolved Super-Resolution Microscopy to Image Single Molecule Dynamics at Catalytic Interfaces, \$110,000.

Dr. John M. Vohs, University of Pennsylvania, Tailoring the Redox Properties of Metal Oxide Oxygen Carriers through Dimensional Confinement, \$110,000.

Dr. Haifeng Wang, Purdue University, Direct Numerical Simulations and First-Principle Guided Modeling of Turbulent Pre-Chamber Hot Jet Ignition, \$110,000.

Dr. Davita L. Watkins, The University of Mississippi, Elucidating the Effects of Molecular Structure on Janus Dendrimers as Ambidextrous Gelators, \$110,000.

Dr. Timothy J. White, University of Colorado at Boulder, Elastocaloric Effects via Mechanotropic Phase Transitions in Polymer Networks, \$110,000.

Dr. David R. Williams, Indiana University Bloomington, Enantioselective Cyclization of Reactive Allenes Using Chiral Gold(I)-Catalysts, \$110,000.

Dr. Michael S. Wong, Rice University, Understanding Dynamics of Chemical Reactions Using Model Single-Phase Alloy Nanoparticles with Controlled Catalytic Microenvironments, \$110,000.

Dr. Andrei K. Yudin, University of Toronto, Synthetic Half-Reactions: A New Tool for Discovery, \$110,000.

Dr. Sen Zhang, University of Virginia, Tuning Single-Atom Catalyst Structure for Direct Methane Oxidation to Methanol, \$110,000.

Dr. Lei Zhu, Florida State University, Substrate-Dependent Mechanisms of Copper-Catalyzed C-H Bond Oxidation, \$110,000.

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

Dr. Julie M. Bloxson, Stephen F. Austin State University, Identifying Salt Suture Zones and Lithological Changes of the Louann Salt across the Gulf of Mexico Basin, TX, USA, Using XRF, XRD, and Multivariate Well Log Analysis, \$55,000.

Dr. Mary Elisabeth Daub, Furman University, The Photochemical Annulation of Pyridones via [2+2] Photocycloaddition Oxidative Cyclobutane Fragmentation, \$55,000.

Dr. Ryan D. Davis, Trinity University, Interfacial Reactivity of Micro-Compartmentalized Petroleum Byproducts and Petrochemically-Derived Organics in the Presence of Reactive Oxygen Species, \$55,000.

Dr. Eli Fahrenkrug, The Colorado College, Selective Polymorph Crystallization within the Electrical Double Layer, \$55,000.

Dr. Jerome Fung, Ithaca College, Measuring Interactions and Rheology of Transparent, Thermosensitive, Core-Shell Polymer Colloidal Particles, \$55,000.

Dr. Melissa B. Gordon, Lafayette College, Fundamental Studies of CO₂-Switchable Polymer Swelling, \$55,000.

Dr. Emilie Guidez, University of Colorado, Denver, Computational Investigation of Thiolate-Protected Gold Nanoclusters for Syngas Production, \$55,000.

Dr. Erik L. Haroldson, Austin Peay State University, Using Pb and Rb-Sr Isotopes to Trace Mississippi Valley-type Brine Migration in the Nashville Dome Area Knox Group Petroleum System, \$55,000.

Dr. Mark P. Hendricks, Whitman College, Effects of Precursor Conversion Kinetics on the Crystalline Phase of Nanomaterial Catalysts, \$55,000.

Dr. Katharine Estelle Jensen, Williams College, Leaking, Pouring, Dripping, Jetting: Investigating Onset, Stability, Criticality, and Spontaneous Arrest of Fluid Flows from Constrained Geometries, \$55,000.

Dr. Allegra L. Liberman-Martin, Chapman University, Carbodiphosphoranes as Organocatalysts for Carbodiimide and Isocyanate Reduction, \$55,000.

Dr. Davide Lionetti, Franklin and Marshall College, Facilitating Expanded Multielectron Reactivity with Bidentate Cyclic(Amino)(Aryl)Carbene Ligands, \$55,000.

Dr. Konrad Meister, University of Alaska Southeast, From Understanding Biological Antifreeze to Green Gas Hydrate Inhibitors, \$55,000.

Dr. Jacob H. Olshansky, Amherst College, Tunable Quantum Dots as Sensitizers for Photocatalytic CO₂ Reduction, \$55,000.

Dr. Beverly Briggs Penland, Georgia Southern University, Bifunctional Peptides for the Synthesis of Pd Nanocatalysts for Heck Coupling in Organic Solvents, \$55,000.

Dr. Allison M. Pfeiffer, Western Washington University, Does River Channel Sediment Supply Control Temporal Variations in the Threshold for Sediment Motion?, \$55,000.

Dr. Jared A Pienkos, The University of Tennessee at Chattanooga, Exploiting Metallohedged Trans-bidentate Ligands for Suzuki Coupling, \$55,000.

Dr. Sujat Sen, University of Wisconsin-La Crosse, A Study of Particle-Electrode Impact (PEI) Events for the Catalytic Conversion of Carbon Dioxide to Hydrocarbons, \$55,000.

Dr. Hillary L Smith, Swarthmore College, Heat Capacity and Enthalpy of Amorphous Materials, \$55,000.

Dr. Alexandra E. Strom, Smith College, Cross-Dehydrogenative Coupling to Form Alpha-Aryl Carbonyl Derivatives, \$55,000.

Dr. Travis Swanson, Georgia Southern University, On the Origin of Stratigraphic Indicators of Terminal Sand Transport during Turbidity Currents, \$55,000.

Dr. Shane Yost, Texas State University-San Marcos, Optimizing Organic Dyes for the Use as a Photoorganocatalysis in C-C Bond Formation Reactions, \$55,000.

Dr. Mehdi Zanjani, Miami University, Computational Investigation of Mechanical and Thermal Behavior of Dynamically Cross-linked Polymer Composites, \$55,000.

Dr. Xu Zhang, California State University, Northridge, Tuning Interfacial Excitonic Binding in Twisted Two-Dimensional MoS₂ Bilayers, \$55,000.

Undergraduate Research

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

Dr. Claudia Adam, Kansas State University, Modelling the Stress Field along Continental Rifts from Tomography Models, \$70,000.

Dr. Daniel T. Chase, St. Mary's College of Maryland, Synthesis and Catalytic Exploration of Transition Metal Aza-Dipyrromethene Chelates, \$70,000.

Dr. Bright U. Emenike, State University of New York, College at Old Westbury, Experimental Studies of the Interactions Between Anions and Aromatic Hydrocarbons as a Function of the Local Environment, \$70,000.

Dr. Michael W. Fennie, University of Scranton, Copper-Catalyzed Imino-Alkyne Hydroamination Coupled to Aromatization-Driven Alkene Functionalization, \$70,000.

Dr. Michael N. Groves, California State University, Fullerton, Calculating Reaction Barriers for Benzene Hydroxylation to Phenol Using Graphene Based Catalysts, \$70,000.

Dr. Eric J. Kantorowski, California Polytechnic State University, Arylcyclopropanes: Preparation, Properties, and Electrophilic Ring-Opening Kinetics, \$70,000.

Dr. Farzan Kazemifar, San Jose State University, Heat Transfer in Multi-phase Flow in Porous Media: Microscopic Measurements Using Laser Induced Fluorescence, \$70,000.

Dr. Daniel S. Lambrecht, Florida Gulf Coast University, Rational Prediction of Green Solvents for Aryl-Aryl Coupling Reactions, \$70,000.

Dr. Zhihai Li, Ball State University, Molecular Detection and Adsorption of Petroleum Derivatives at Electrode-Electrolyte Interfaces, \$70,000.

Dr. Thomas G. Minehan, California State University, Northridge, Exploring the Utility of Petroleum-Derived Ynol Carbonates in Tandem Bond-forming Reactions, \$70,000.

Dr. Gustavo Moura-Letts, Rowan University, From Heterocycles to Cyclic Hydrocarbons: A Reconstructive Approach to Complex Hydrocarbons, \$70,000.

Dr. Nathaniel V. Nucci, Rowan University, Understanding Exchange Processes in Ternary Microemulsions Using Experiment and Simulation, \$70,000.

Dr. Gregory W. O'Neil, Western Washington University, Beyond Polypropylene: Advancing Propylene-Based Fine Chemical Synthesis through Diallylsilane Rearrangements, \$70,000.

Dr. Kayode D. Oshin, Creighton University, Investigating Mixed-Donor Scorpionate Complexes as Catalysts for Aziridination Reactions, \$70,000.

Dr. Frank C. Peiris, Kenyon College, Unraveling the Optical Signatures Manifested during Structural Transformations in Polymers, \$70,000.

Dr. Maysam Pournik, The University of Texas Rio Grande Valley, Development of Fluid Flow Equation for Flow through Porous Medium and Fracture Network Using Synthetic Media, \$70,000.

Dr. Arunkumar Sharma, Wagner College, Investigating Inhibitor Selectivity and Affinity to Prevent Asphaltene Aggregation, \$70,000.

Dr. Mahamud Subir, Ball State University, Molecular Adsorption and Chemical Sensing at the Nanoemulsion Oil-Water Interface - A Surface Selective Investigation, \$70,000.

Dr. Sylvestre Twagirayezu, Lamar University, Spectroscopic Studies and Chemical Dynamics of Small Polar Impurities in Petroleum Mixtures, \$70,000.

Dr. Fei Wang, Missouri State University, Exploring Base Metal Intermetallic Compounds to Substitute Platinum Catalysts in Heterogeneous Hydrogenation of Unsaturated Hydrocarbons, \$70,000.

Dr. Dale J. Wilger, Samford University, Ni-Catalyzed Reductive Coupling Strategies for Annulation Reactions, \$70,000.