

Grants Awarded 2023

Doctoral New Investigator

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

- Dr. Brooks Abel**, University of California (Berkeley), Chemically Recyclable Polymers by Air-Tolerant Living Conjugate Addition Polymerization, \$110,000.
- Dr. Alison B. Altman**, Texas A&M Research Foundation, Chemical and Mechanochemical Manipulation of the Reducing Properties of Lanthanide Complexes for C–C Bond Formation, \$110,000.
- Dr. Christian Aponte-Rivera**, State University of New York (Stony Brook), Transport and rheology in Hydrodynamically Interacting Unentangled Polymer Nanocomposites, \$110,000.
- Dr. Rebeca Arevalo**, University of California (Merced), Discovery of Chemoselective Manganese Catalysts for the C-H Borylation of Unactivated Terminal Alkynes, \$110,000.
- Dr. Gwendolyn Bailey**, University of Minnesota, Towards Multimetallic-Mediated Catalysis with Atomistic Control: CO₂ Reduction via Rationally Designed Copper Chalcogenide Nanoclusters, \$110,000.
- Dr. Jeffrey Bell**, Washington State University, Cobalt-based Weyl Semimetals as Efficient Catalysts for the CO₂ Reduction Reaction, \$110,000.
- Dr. Aditi Bhattacharjee**, University of Iowa, Atom- and Orbital-Specific Investigations of Charge Transfer in Metallocene Polymerization Catalysts, \$110,000.
- Dr. Brandon Bukowski**, Johns Hopkins University, Predicting Intracrystalline and Extracrystalline Deactivation Mechanisms in Metal-Exchanged Zeolites for Shale Gas Upgrading, \$110,000.
- Dr. Lucas Caretta**, Brown University, Programmable and Efficient Catalysts Using Model Oxide Thin Films, \$110,000.
- Dr. Marie A. Charpagne**, University of Illinois (Urbana Champaign), High-throughput design of printable and damage-tolerant cryogenic steels, \$110,000.
- Dr. Ming Chen**, Purdue University, Understanding Phase Transition Mechanisms of Flexible Metal-organic Frameworks with Enhanced Sampling, Low-scaling Electronic Structure Methods, and Machine Learning, \$110,000.
- Dr. Henry Chu**, University of Florida, Diffusiophoresis of Particles and Drops in Concentrated Electrolytes, \$110,000.
- Dr. Ezra Lee Clark**, Pennsylvania State University, Discovery of Intermetallic Electrocatalysts with Enhanced Activity for CO Reduction to Multi-Carbon Products through Selective Field Stabilization, \$110,000.
- Dr. Magdalena A.E. Curry**, North Carolina State University, Thermal and Structural Reconstruction of an Eroded Hydrocarbon-bearing Foreland Basin, \$110,000.
- Dr. Chayan Dutta**, Georgia State University, Mechanistic Insights into Phase Separation of Asphaltenes at the Toluene-Water Interface Using Vibrational Sum-Frequency Generation Spectroscopy, \$110,000.
- Dr. Nathaniel Michael Eagan**, Tufts University, Understanding and Manipulating Single-Atom Alloy Metal-Support Interactions for use in Selective Catalytic Hydrogenation Reactions, \$110,000.
- Dr. Lucas Delano Ellis**, Oregon State University, Systematic Identification of Soft Reductant Descriptors to Enhance Heterogeneous Olefin Metathesis, \$110,000.
- Dr. Austin M. Evans**, University of Florida, Elucidating Structure-Property Relationships of Polymer Strands Rigidified by Macrocyclic Encapsulation, \$110,000.
- Dr. Rachael Farber**, University of Kansas, Selective Ethanol Dehydrogenation over Oxide-Supported Metal Nano-Islands, \$110,000.
- Dr. Salah Aldin Faroughi**, Texas State University-San Marcos, Probing Mesoscopic Structures in Petroleum Fluids Containing Magnetic Superquadric Particle, \$110,000.

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Dr. Zhange Feng, University of Nevada, Las Vegas, In Situ Spectroscopic Studies of the Oxidative Carbonylation Reaction at Metallic Electrodes, \$110,000.

Dr. Behrooz Ferdowsi, University of Houston, Investigating the Role of Transient Dilatancy on the Failure Mode of Subaqueous Sediment Deposits Using Fully-Coupled CFD-DEM Simulations, \$110,000.

Dr. Xiaojing Fu, California Institute of Technology, Development of a Particle-Resolved Modeling Framework to Study the Dynamics of Crystalline Particle Flows in Porous Media, \$110,000.

Dr. Victor Garcia Lopez, Louisiana State University, Molecular Cages to Access Highly Reactive Triplet States of Organic Molecules and Understand Their Reactivity in Confined Spaces, \$110,000.

Dr. Ting Ge, University of South Carolina, Controlling Equilibrium Swelling of Polyampholyte Gels Using Charge Sequence – A Study Combining Molecular Simulation and Scaling Theory, \$110,000.

Dr. Bezawit Getachew, Rice University, Understanding the Transport of Water and Ions in Organic-Inorganic Hybrid Membranes, \$110,000.

Dr. Yang Hai, University of California, Santa Barbara, Biomimetic Flavin-Enabled Alkane Hydroxylation, \$110,000.

Dr. Yimo Han, Rice University, Elucidating Structural Dynamics of Core-shell Electrocatalysts via Operando Multimodal Electron Microscopy, \$110,000.

Dr. Alyssa Hensley, Stevens Institute of Technology, Accelerating Catalyst Design for Selective Ethane Oxidative Dehydrogenation, \$110,000.

Dr. Danielle Reifsnnyder Hickey, Pennsylvania State University, Stabilizing and Visualizing Atomically Thin Catalysts on Nanocrystals Using Inorganic Ligands and In Situ Atomic-Resolution Analysis, \$110,000.

Dr. Ethan Hill, Auburn University, Metal-Ligand Cooperativity with Phosphorus-Based Ligands Bound to Co(I) for the Activation of Carbon Dioxide, \$110,000.

Dr. Megan R. Hill, Colorado State University, Controlling and Predicting Mechanical Properties in Supramolecular Polymer Networks, \$110,000.

Dr. Margaret Hilton, West Virginia University Foundation, Selectivity in α -C–H Functionalization of Alcohols: Influence of Boron-ate Complexes, \$110,000.

Dr. Michael P. Howard, Auburn University, Understanding the Effects of Polymer Architecture and Hydrophobic Association on Elastic Turbulence in Enhanced Oil Recovery, \$110,000.

Dr. Weixin Huang, University of North Dakota, Design and Understanding Single-Atom Bimetallic and High-Entropy Catalysts for Oxidative Propane Dehydrogenation, \$110,000.

Dr. Vida Jamali, Georgia Institute of Technology, Investigating Rotational and Translational Diffusion of Nanoparticles at Liquid-Liquid Interfaces via Time-Resolved Nanoscale Imaging, \$110,000.

Dr. Gilby Jepson, University of Oklahoma, Trace Element Control on Apatite Fission-Track Annealing and its Impact on Basin Paleotemperature Estimation, \$110,000.

Dr. Shaina Alysa Kelly, Columbia University, Influence of Pore-Confinement on Water-Oil Microemulsion Structures and Transport Properties, \$110,000.

Dr. Dohyung Kim, University of Pennsylvania, Janus Nanoparticles with Metal-Metal Oxide Interfaces for Electrooxidation of Light Alkanes to Value-added Oxygenates, \$110,000.

Dr. Qingyun Li, State University of New York (Stony Brook), Pore-scale Chemical Alteration in Shale Matrices after CO₂ Sequestration, \$110,000.

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- Dr. Xuefei Li**, Georgia State University, Electrochemical Pathways for Amorphous-to-Crystalline Transformations in Nanoscale Transition Metal Sulfides, \$110,000.
- Dr. Jeffrey Michael Lipshultz**, State University of New York (Stony Brook), Ansa-Titanocene Photocatalysis for Oxygen-Centered Radical-Mediated Upgrading of Light Hydrocarbons, \$110,000.
- Dr. Albert Liu**, University of Michigan, Field-assisted Conductive Microgel Assembly at the Electrode-Electrolyte Interface for Reconfigurable Electrocatalysis, \$110,000.
- Dr. Richard Liu**, Harvard College, Nonmetal Cluster Catalysis for Arene, Olefin, and Alkene Functionalization, \$110,000.
- Dr. Paul Lummis**, Duquesne University, Stabilization and Reactivity of Neutral and Cationic S-Block Metal Hydride Complexes, \$110,000.
- Dr. Danielle Jamie Mai**, Stanford University, Anthracene-Directed Reinforcement and Stabilization of Polymer Nanocomposites, \$110,000.
- Dr. Ian McCrum**, Clarkson University, Catalyst and Electrolyte Design for Room-Temperature Electrochemical Methane Functionalization, \$110,000.
- Dr. Benjamin Rebbeck McDonald**, Brown University, Structure-Activity Relationships of Aromatic Hydrocarbon-Derived Polyelectrolyte Hydrogels for Robust and Dynamic Materials, \$110,000.
- Dr. Akanksha K. Menon**, Georgia Institute of Technology, Understanding and Controlling Scale Nucleation and Adhesion on Hydrophobic and Oleophobic Polymer Surfaces, \$110,000.
- Dr. Andres Montoya-Castillo**, University of Colorado at Boulder, Harnessing the Power of Quantum Dynamics and Electronic Structure to Disentangle the Mechanisms of Charge Transport in π -Conjugated Polymers, \$110,000.
- Dr. Angelika Neitzel**, University of Florida, Self-Patterning Polyelectrolyte Layer-by-Layer Assemblies, \$110,000.
- Dr. Jens Neu**, University of North Texas, Spectroscopic and Computational Insight into the Low Energy Vibrational Modes Involved in Associated Petroleum Gas - MOF Interaction, \$110,000.
- Dr. Guangxin Ni**, Florida State University, Probing New Petroleum Reforming Catalysts via Investigation of Strain engineered 2D Materials by Scanning Nano-Optical Microscopy, \$110,000.
- Dr. Benjamin Edward Partridge**, University of Rochester, Hierarchical Supramolecular Assembly: Toward Next-Generation Fibrous Materials with Programmable Mechanical Properties, \$110,000.
- Dr. Douglas Reed**, University of Washington, Reactive Metal Sites in Hydrogen-Bonded Frameworks for Gas Separations, \$110,000.
- Dr. Liela Romero**, Baylor University, New Catalytic Methods for the Functionalization of Unsaturated Hydrocarbons, \$110,000.
- Dr. Janani Sampath**, University of Florida, Post Aging Performance of Polymer Membranes for Gas Separations from Molecular Dynamics Simulations, \$110,000.
- Dr. Alexander Schuppe**, Vanderbilt University, Boron Stitching: Conversion of Olefin Feedstocks to Enantioenriched Boronic Esters, \$110,000.
- Dr. Ciaran Paul Seath**, University of Florida, Photocatalytic Generation of Siloxycarbenes for Asymmetric Organocatalysis, \$110,000.
- Dr. James Sheehan**, University of Alabama, Supercritical Fluid Impregnation of Polyolefins with Organometallic Complexes for Fundamental Investigations of Catalytic C-C Bond Cracking, \$110,000.

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Dr. Aditya Sood, Princeton University, Understanding Surfactant-Mediated Heat Transport at Charged Interfaces During Enhanced Oil Recovery, \$110,000.

Dr. Emily M. Stewart, Florida State University, Tracking Thermogenic Hydrocarbon and CO₂ Production in Organic-rich Sediments during Emplacement of the Central Atlantic Magmatic Province, Florida, \$110,000.

Dr. Wentao Tang, North Carolina State University, Data-Driven Analysis of Hydrodynamic Stability in Multiphase Reactors, \$110,000.

Dr. Xiaoyu Tang, Northeastern University, Unveiling Interface Coalescence with Interferometry and Simulation, \$110,000.

Dr. Chengcheng Tao, Purdue University, Computational and Experimental Investigation of Rheological Behavior of Oil-Water Multiphase Flow in the Long-Distance Pipe, \$110,000.

Dr. Mercedes Taylor, University of Maryland, College Park, From Aryl to Alkyl: Installing Alkyl-Amine Linkages in Covalent Organic Frameworks to Accomplish Challenging Petroleum Separations, \$110,000.

Dr. Andy A. Thomas, Texas A&M University, Ozone Oxidation Methods for Organic Synthesis, \$110,000.

Dr. Hedieh Torabifard, University of Texas at Dallas, Molecular Modeling of the Demulsification Mechanism of Ionic Liquids, \$110,000.

Dr. Wennie Wang, University of Texas at Austin, Understanding the Role of Structural and Electronic Imperfections in CO₂RR of Transition Metal Dichalcogenides, \$110,000.

Dr. Yuanxi Wang, University of North Texas, Trends in Hydrodesulfurization Activity: Towards Realistic Surfaces and Reaction Models, \$110,000.

Dr. Yuxin Wang, West Virginia University, Selectivity Modulated Oxidative Dehydrogenation of Ethane with CO₂ Under Microwave Field, \$110,000.

Dr. Robert Warburton, Case Western Reserve University, A Proton-Coupled Electron Transfer Framework for Modeling Heterogeneous C-H Bond Activation, \$110,000.

Dr. Michael Webb, Princeton University, Elucidating Effects of Polymer Microarchitectures on Solution Viscosity with Active Learning-Directed Simulation, \$110,000.

Dr. Cory Windorff, New Mexico State University, Multimetallic Clusters Based on Titanium and Cerium for C-O Multiple Bond Activation, \$110,000.

Dr. Tingying Xu, Oklahoma State University, Roles of Iron Oxide Morphology on Hydrocarbon Reservoir Rock Wettability, \$110,000.

Dr. Qingwang (Kevin) Yuan, Texas Tech University, Elucidating Dehydrogenation of Shale Oil for Hydrogen Production on Iron Catalyst Surface by In-Situ Microwave-Assisted Catalytic Heating, \$110,000.

Dr. Shan Zhou, South Dakota School of Mines and Technology, Understanding Asphaltene Adsorption and Aggregation Behaviors at Electrified Surfaces through a Correlated Force Microscopy-Electron Microscopy Study, \$110,000.

Grants Awarded 2023

New Directions

Awards for Fundamental Research

Dr. Frank S. Bates, University of Minnesota, Hydrogenolysis of polyolefins and model saturated hydrocarbon polymers, \$110,000.

Dr. Joshua Bostwick, Clemson University, Dynamic Destabilization of Granular Rafts and Capillary Filtration of Particles at Oil--Water Interfaces, \$110,000.

Dr. Arthur Bragg, Johns Hopkins University, Photochemistry of Cavity-Modified Excited States, \$125,000.

Dr. Simon C. Brassell, Indiana University Bloomington, Paleo-pCO₂ Reconstruction for the Paleocene to Campanian Based on Biomarker Proxies in Sediments from the Transkei Basin, \$110,000.

Dr. Stacey Brenner-Moyer, Rutgers, The State University of New Jersey, A Cooperative Organo-/Cu-Catalyzed Radical Relay for Sustainable C(sp³)-H Functionalization of Hydroformylation Products, \$125,000.

Dr. Kelly A. Burke, University of Connecticut, Enabling Critical Petrochemical Separations with Liquid Crystalline Block Copolymer Membranes, \$125,000.

Dr. Shengli Chen, Louisiana State University, Effects of Fluid Pressurization Rate and Injection Section Length on Hydraulic Fracturing Breakdown Pressure: Experimental Study and Theoretical Analysis, \$110,000.

Dr. Deep Choudhuri, New Mexico Institute Of Mining And Technology, Correlation Between Bond Dynamics and Thermodynamic Factors in HfV₂O₇-based Negative Thermal Expansion Materials, \$125,000.

Dr. Jacinta C. Conrad, University of Houston, Role of Polymer Conformation in Extensional Flow of Colloid-Polymer Mixtures, \$125,000.

Dr. Anthony Frank Cozzolino, Texas Tech University, Mechanistic Investigations of Vanadium Catalyzed propane Oxidative Dehydrogenation (ODH) using MOFs as Molecularly Precise Models for Metal-Oxide Surfaces, \$125,000.

Dr. Peter Dinolfo, Rensselaer Polytechnic Institute, Evaluation of Charge-Transfer Characteristics of Photoredox Catalysts via Electroabsorption and Electrofluorescence Spectroscopy, \$125,000.

Dr. Kevin D. Dorfman, University of Minnesota, Toughening Polymer-Polymer Interfaces with Multiblock Copolymers, \$110,000.

Dr. Chuanhua Duan, Boston University, Investigating Size- and Surface-Dependent Mechanical Properties of Single Petroleum-Derived Nanoparticles Using Nanoparticle-Blocked Nanopores, \$125,000.

Dr. Helen Elaine Durand, Wayne State University, Investigating Fundamental Principles for Low-Footprint Field-Mediated Oil Recovery, \$125,000.

Dr. Eva Enkelmann, University of Calgary, Extracting Thermal History Information from Dispersed Apatite (U-Th-Sm)/He Data, \$125,000.

Dr. James Farquhar, University of Maryland, College Park, Developing and Testing Novel Strategies for Source Apportionment of Methane Based on Isotopologues and Ethane/Methane, \$110,000.

Dr. Sarah J. Feakins, University of Southern California, Unearthing Biogeochemical Evidence for Tropical Forests in Hothouse Climates of the Cenozoic, \$125,000.

Dr. Jeremy Feldblyum, State University of New York (Albany), Mechanistic Insight into the Origins of Porosity in Non-Network Metallopolymers through Simulation and Experiment, \$125,000.

Dr. John Franck, Syracuse University, Magnetic Resonance Cross-Relaxation to Explore Surfactant and Nanoparticle Interactions, \$110,000.

Dr. Fabien Gagosz, University of Ottawa, Photochemical Conversion of Sulfonyl Derivatives into Small-sized Ring Systems, \$110,000.

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New Directions

Awards for Fundamental Research

- Dr. Venkat Ganesan**, University of Texas at Austin, Co-Continuous Polymer Membranes via Solvent Annealing of Ternary Polymer Blends, \$110,000.
- Dr. Frederic Gibou**, University of California, Santa Barbara, Towards Modeling Flow and Transport in Reactive Porous Media: From Pore to Macroscopic Scale, \$110,000.
- Dr. Bing Gong**, State University of New York (University at Buffalo), Hollow Helices as Catalysts, \$110,000.
- Dr. Kenneth R. Graham**, University of Kentucky, Degradation Processes and Defect States Arising from Electrochemical Cycling of Conjugated Polymers, \$110,000.
- Dr. Willis Hames**, Auburn University, Characterization of Noble Gases, CO₂ and Light Hydrocarbons in Potential Onshore Geological Repositories for Carbon Capture and Storage Facilities in the Southeastern US, \$125,000.
- Dr. Nicholas B. Harris**, University of Alberta, New Models for Clay Minerals in Organic-rich Mudstones, \$125,000.
- Dr. M.M. Faruque Hasan**, Texas A&M University x, Exploring Quantum Computing for Electrification and Integration of Petrochemical Process Heat, \$125,000.
- Dr. Ximin He**, University of California (Los Angeles), Mechanism Study of Polymer-solvent Interactions for Porous Polymer Networks, \$110,000.
- Dr. Nicolas Holubowitch**, New Mexico Institute Of Mining And Technology, Electro(co)polymerization of Petrochemicals, \$110,000.
- Dr. Friederike C. Jentoft**, University of Massachusetts Amherst, Solid-Catalyzed Anti-Markovnikov Alkene Hydration, \$110,000.
- Dr. Karen Haley Johannesson**, University of Massachusetts Boston, Vanadium Speciation in Sulfidic Environments: Inferring the Origin of Metalliferous Source Rocks and Petroleum, \$110,000.
- Dr. Alamgir Karim**, University of Houston, Elucidating Structure-Property Relationships in Two-Dimensional Polymer Films, \$110,000.
- Dr. Jeffrey Alan Kelber**, University of North Texas, Transition-Metal Carbides for Fischer-Tropsch Catalysis: Surface Oxygen and Metal Oxophilicity, \$110,000.
- Dr. Shuhab D. Khan**, University of Houston, Hyperspectral Imaging of Rare Earth Elements in Fly Ash and Coals, \$110,000.
- Dr. Piran Ravichandran Kidambi**, Vanderbilt University, Self-assembly of 2D Covalent Organic Frameworks for Hydrocarbon Separation, \$110,000.
- Dr. Stefan M. Kilyanek**, University of Arkansas, Inorganic Proton Coupled Electron Transfer Agents as Electrocatalysts for C-H Functionalization, \$110,000.
- Dr. Byoungmoo Kim**, Clemson University, Enantioselective Titanium Multicatalysis, \$125,000.
- Dr. Wei Kong**, Oregon State University, Superfluid Helium Droplets as Microreactors for Studies of Photochemistry of Fossil Fuel Hydrocarbons: Polycyclic Aromatic Hydrocarbons and the Corresponding Endoperoxides, \$110,000.
- Dr. Satish Kumar**, University of Minnesota, Understanding the Interplay between Phase Separation, Marangoni Flow, and Solvent Evaporation in Thin Films of Polymer Blends, \$125,000.
- Dr. David Leitch**, University of Victoria, Beyond Bioisosteres: Bridged Bicyclic Heterocycles from Bicyclobutanes, \$110,000.
- Dr. Christopher Y. Li**, Drexel University, Controlling One-Dimensional Nucleation for Polyolefin Recycling, \$110,000.

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New Directions

Awards for Fundamental Research

- Dr. Hongfei Lin**, Washington State University, An External Electric Charge-Induced Natural Gas Conversion Process in Non-Conventional Ionic/Molten Salts Media, \$125,000.
- Dr. Filippo Mangolini**, University of Texas at Austin, Effect of Wavelength-Dependent Roughness on Lubricant-Infused Surfaces for Mitigating Asphaltene Deposition, \$125,000.
- Dr. Eric Masson**, Ohio University, Self-Sorting and Encapsulation Patterns of Lanthanide Cages in Water: Crude Oil as an Exploratory Tool for Host-Guest Recognition, \$125,000.
- Dr. Jesse McDaniel**, Georgia Institute of Technology, Solvation Effects at the Solid/Liquid Interface in Heterogeneous Catalysis, \$110,000.
- Dr. Siddhartha Mitra**, Virginia Institute of Marine Science, Are Microplastics a Primer for Sedimentary Organic Matter Diagenesis?, \$125,000.
- Dr. Gina Ahyun Noh**, Pennsylvania State University, Mechanochemical Gasification of Coal at Ambient Temperature, \$125,000.
- Dr. On Shun Pak**, Santa Clara University, Dynamics of Drops with Complex Interfaces Under Electric Fields, \$110,000.
- Dr. Jeremy C. Palmer**, University of Houston, Sequence-Controlled Polyampholyte Brushes for Stimuli-Responsive Surfaces, \$125,000.
- Dr. Joseph D. Paulsen**, Syracuse University, Brittle Fracture of Interfacial Sheets: Understanding the Strength of Solid Films Attached to Fluid Interfaces, \$110,000.
- Dr. Ann Pearson**, Harvard College, Implementation, Development, and Application of Hydrogen Isotope Analyses to Distinguish Sources of Archaeal Lipids on Continental Margins, \$110,000.
- Dr. David M. Perrin**, University of British Columbia, Aminoxy-P(V) Reagents for S-Imination of Thioethers and Sulfoxides, \$125,000.
- Dr. Surangi W. Punyasena**, University of Illinois (Urbana Champaign), Deep Learning and Dispersed Fossil Leaf Cuticle: Paleocological and Biostratigraphic Applications, \$125,000.
- Dr. Tong Ren**, Purdue University, Fe-Based Photo-Catalysts for C-C Bond Formation, \$110,000.
- Dr. Robert M. Rioux**, Pennsylvania State University, Dilute Transition Metal Atoms Dispersed in Supported Gallium Droplets for Endothermic Hydrocarbon Conversion Reactions, \$110,000.
- Dr. Brandon Rotavera**, University of Georgia Research Foundation, Inc., Resonance-Stabilization Effects on Hydrocarbon Radical Oxidation Pathways: A Theoretical Chemical Kinetics Approach, \$125,000.
- Dr. Ayaskanta Sahu**, New York University, Stimulating the Inactive Basal Planes of 2-D Nanocatalysts for Hydrotreating Reactions, \$110,000.
- Dr. Geoffrey Saupe**, University of Texas at El Paso, Alkane Oils as Reducing Agents in Aqueous Media, \$110,000.
- Dr. Scott G. Sayres**, Arizona State University, Designing Atomically Precise Catalysts for the Dehydrogenation of Paraffins into Olefins, \$125,000.
- Dr. Reza Soltanian**, University of Cincinnati, Accurate Methane Emissions Modeling: Bridging the Gap with Molecular Dynamics Simulation and Field-Scale Approaches, \$125,000.
- Dr. Gerilyn S. Soreghan**, University of Oklahoma, Iron Fertilization Potentials of Atmospheric Dusts and Implications for Cenozoic Carbon Cycling, \$125,000.
- Dr. Vinod Srinivasan**, University of Minnesota Duluth, Thermal Diffusivity Measurements in Dense Particle-Fluid Suspensions., \$110,000.

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New Directions

Awards for Fundamental Research

Dr. Jean-Charles Stinville, University of Illinois (Urbana Champaign), Post-instability Induced by Phase Change on Dynamic Fracture in Macroporous Materials, \$125,000.

Dr. Haoran Sun, University of South Dakota, Activating Fluoride Salts Through Anion- π Interaction for Fluorination Reactions, \$110,000.

Dr. Yujie Sun, University of Cincinnati, Electricity-Driven Asymmetric Hydrogenation of Imines and Ketones via Palladium Membrane Electrodes, \$110,000.

Dr. Radhakrishna Sureshkumar, Syracuse University, Flow-Induced Morphology Transitions in Block Copolymer Solutions, \$110,000.

Dr. James Paul Slater Walsh, University of Massachusetts Amherst, High-Pressure Synthesis of Novel Transition Metal Carbides for Heterogeneous Catalysis, \$110,000.

Dr. Patrick J. Walsh, University of Pennsylvania, Synthesis of Internal Alkynes from Petroleum Feedstocks, \$125,000.

Dr. Jeffrey J. Warren, Simon Fraser University, Investigation of Combinations of Redox Reagents and Brønsted Acids/Bases as Electrochemical Mediators of Organic Hydrogen Transfer Reactions, \$110,000.

Dr. Rory Waterman, University of Vermont, Low-Energy Preparations of Bandgap Materials for New Catalysts, \$110,000.

Dr. Wei David Wei, University of Florida, Designing MXene-Supported Single Atom Catalysts for Selective Electrocatalytic CO₂ Reduction, \$125,000.

Dr. Valerie V. Welborn, Virginia Polytechnic Institute and State University, Mitigating Product Inhibition in Enzymes with Synthetic Glycosylation: Biodesulfurization of Petroleum Products, \$110,000.

Dr. Ross A. Widenhoefer, Duke University, Transition Metal-Catalyzed Carbene Transfer Employing Diazirines, \$125,000.

Dr. Cathy Y. Wong, University of Oregon, In Situ Measurement of Asphaltene Aggregation Using Optical Probes, \$125,000.

Dr. Weitao Yang, Duke University, Modeling the Electro-Inductive Effect and Enhancing Redox Non-Innocence of Ligands in Hydrogenation Catalysts with Fractional Charge Density Functional Theory, \$125,000.

Dr. Chenjie Zeng, University of Florida, Precision Synthesis of Active Sites on Ligand-Protected Platinum Clusters, \$125,000.

Dr. Roberto Zenit, Brown University, Fragmentation of Highly Viscous Fluid Filaments, \$125,000.

Dr. Benzhong (Robin) Zhao, McMaster University, Interplay between Hydrodynamics and Nonequilibrium Compositional Effects in Multiphase Multicomponent Viscous Fingering, \$110,000.

Dr. Yuanyuan Zhu, University of Connecticut, Towards Sustainable Zero-Emission Hydrogen Production: Operando ETEM-Informed Cyclic Catalytic Methane Pyrolysis, \$110,000.

Grants Awarded 2023

Undergraduate New Investigator

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

Dr. Ali Ashraf, University of Texas Rio Grande Valley, Microscale Thermography of Reservoir Rocks- Wettability, Porosity, Thermal Diffusivity, and Chemical Functionality, \$55,000.

Dr. Meredith Barbee, The University of Tennessee at Chattanooga, Expanding Covalent Mechanochemistry to Commonly Used Polymer Materials, \$55,000.

Dr. Timothy J. Barnum, Union College, Identification and Structure Determination of Reactive Intermediates in the Reactions of NO_x and Resonance-Stabilized Hydrocarbon Radicals, \$55,000.

Dr. Gourab Bhattacharya, Tennessee Technological University, Reconstructing the Thermal History of Carboniferous Strata on the Cumberland Plateau, Tennessee: Implications for Exhumation in the Southern Appalachian Basin, \$55,000.

Dr. Nicholas Derek Chiappini, University of North Carolina at Wilmington, Oxidative Amination of C–Si Bonds: Realizing an Aza-Tamao-Fleming Reaction, \$55,000.

Dr. Graham Collier, Kennesaw State University, Non-Conjugated Electroactive Polymers with Complex Architectures, \$55,000.

Dr. Jonathan E. Dannatt, University of Dallas, Exploration of Aryne Insertions into Boron—Heteroatom Sigma Bonds, \$55,000.

Dr. Ranil Gurusinghe, Tennessee Technological University, Interrogating Carbene Chemistry using Microwave Spectroscopy and Laser Photolysis: Unambiguous Characterization of Triplet Ethylidene (3CH₃CH), \$55,000.

Dr. Rangika S. Hikkaduwa Koralege, Western Carolina University, Synthesis, Characterization, and Evaluation of β -Mannanase and α -Galactosidase Encapsulated Polymer Nanoparticles as an Efficient Viscosity Breaker in Fracturing Fluids., \$55,000.

Dr. John Kiernicki, Drury University, In Situ Tunable Hydrogen Bonds to Promote Equilibration for Improved Catalyst Efficiency, \$55,000.

Dr. Zhiyang Li, Texas A&M International University, Disentangling Causes of Rhythmic Bedding and Variations in Total Organic Carbon Content in Mixed (Siliciclastic-Carbonate) Fine-grained Marine Deposits of the Cenomanian-Turonian Western Interior Seaway, \$55,000.

Dr. John Patrick Lutz, St. Lawrence University, Poly(glyoxylate imines) as Modular Self-Immolative Polymers, \$55,000.

Dr. Ian MacKenzie, University of Wisconsin-Platteville, Structure-Property Relationships in Substituted 2,4,6-Triarylpyrylium Salts: Towards Designer Photocatalysts, \$55,000.

Dr. Megan Mohadjer Beromi, United States Naval Academy, Mechanistic Studies Toward the Homocoupling of Ethylene-Derived Metallalactones, \$33,000.

Dr. Jesus Hector Morales Espejo, Western Colorado University, Release kinetics of lubricant oils from microcracked metallic surfaces, \$55,000.

Dr. Kyle Murphy, Tennessee Technological University, Synthesis and Investigation of Porphyrin-like Macrocycles and their Interactions with Asphaltenes, \$55,000.

Dr. Fatick Nath, Texas A&M International University, Investigation of Nano-stabilized Nitrogen-foamed Stimulation Fluids to Evaluate Fracture Effectiveness for Water-sensitive Shale Formation, \$55,000.

Dr. Giovanni A. Parada, The College of New Jersey, Proton-Coupled Electron Transfer of Stabilized C–Centered Radicals, \$55,000.

Dr. Amrita Sarkar, Montclair State University, Structure-Property Relationship in Next Generation Nylon Like Polymer, \$55,000.



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Undergraduate New Investigator

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Dr. Manar Shoshani, University of Texas Rio Grande Valley, Selective C–H Functionalization of N-Heterocycles by Well-Defined Ni-Lewis Acid Architectures, \$55,000.



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Undergraduate Research

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Dr. William Amidon, Middlebury College, U-Pb Dating of Dolomite: A new Tool to Study Stratigraphy and Dolomitization, \$70,000.

Dr. Clinton Barineau, Columbus State University, Carbon Sequestration via Mineralization of Metabasalts, \$70,000.

Dr. Lina Baroudi, Manhattan College, Finite-Sized Particle Migration and Settling Characteristics in Rotating Flows, \$70,000.

Dr. Dennis D. Cao, Macalester College, Synthesis and Characterization of Novel Aromatic Dihydrazides, \$70,000.

Dr. Stephen J. Culver, East Carolina University, Foraminiferal and Sedimentologic Evidence of Hurricane-driven Sediment Transport and Deposition in an Inner Shelf/Barrier-Island System, \$70,000.

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