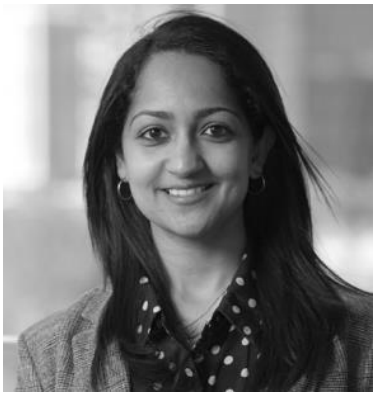
IGNIITE 2025

Inspiring **G**enerations of **N**ew **I**nnovators to **I**mpact **T**echnologies in **E**nergy **2025**

IGNIITE SELECTEE DESCRIPTIONS

Paul Slezak
Idaho National Laboratory – Idaho Falls, ID
Paul Slezak is a geochemist with a background in economic geology at the Idaho National Laboratory. Slezak's project will chemically characterize small, common, and often discarded electronic products to establish standardized estimates of the critical materials they contain. This data approach expands the supply of potential critical resources as it enables more downstream critical materials recovery.
Project: Higher Standards: Whole Unit Recovery of Metals from Individual Electronic Devices – Award Amount: $500,000



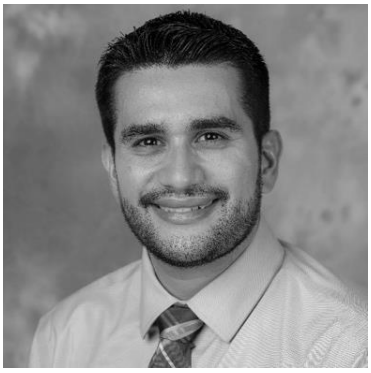
Akanksha Menon
Georgia Institute of Technology – Atlanta, GA
Akanksha Menon is an Assistant Professor in the Woodruff School of Mechanical Engineering at Georgia Institute of Technology, where she directs the Water-Energy Research Lab. Menon will develop a desalination system based on air gap diffusion distillation (AGDD) that transforms brine into clean water and minerals. This system will avoid common problems like clogging or rust because it avoids traditional filters or pipes in its design, and it will save energy by recycling heat.
Project: A hybrid desalination system for clean water and mineral recovery – Award Amount: $500,000

Xian Shi
University Of California – Irvine, CA
Xian Shi is an Assistant Professor in mechanical and aerospace engineering at the University of California, Irvine. Shi will develop a novel "hot-plasma-cold-spray" process to convert natural gas directly into nano-graphene thin films for battery electrodes. This will be accomplished by combining two manufacturing steps into one, replacing old processes that are energy intensive. If successful, it will make it easier and cheaper to produce the materials needed for batteries and other energy storage technologies.
Project: Natural Gas to Battery Electrode via Plasma Reforming and Cold Spray – Award Amount: $500,000

Anna Staerz
Colorado School Of Mines – Golden, CO
Anna Friederike Staerz is an Assistant Professor in metallurgical and materials engineering at the Colorado School of Mines. Staerz will develop a system to monitor mineral impurities based on Differential Optical Absorption Spectroscopy (DOAS) that will improve the reliability of American energy infrastructure and expand the potential for domestic enhanced oil recovery. Quantitative monitoring of impurities in both gaseous and supercritical CO_2 will reduce purification costs by enabling smart, source-stream blending and minimizing purification steps.
Project: SCOPE CO_2 - Spectroscopic CO_2 Pipeline Evaluation-Enabling Safe, Cost-Effective Transport, Storage and Use – Award Amount: $500,000

Samantha Coday
Massachusetts Institute of Technology – Cambridge, MA
Samantha Coday is an Assistant Professor of electrical engineering and computer science at the Massachusetts Institute of Technology. Coday's project will develop next-generation, buck-boost converters with advanced, multi-level designs, monolithic bidirectional switches, and built-in EMI filters that reduce electromagnetic interference and improve power quality. If successful, the technology will result in smaller, lighter, and more capable power electronics.
Project: Ultra-dense Buck-Boost Bidirectional Converters Utilizing Monolithic Bidirectional Switches – Award Amount: $500,000

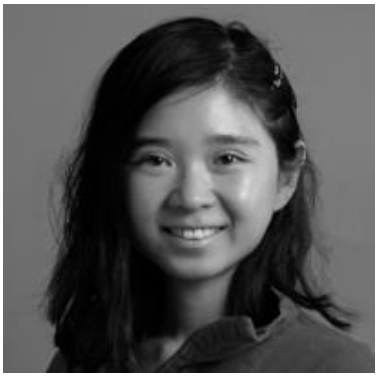
Daniel Sun
Sunchem – Berkeley, CA
Daniel T. Sun, Co-Founder & CEO of Sunchem, will focus on validating a precision leaching technology that selectively liberates copper from heavily contaminated mining ores and concentrates, helping miners and U.S. processors recover more usable copper from difficult-to-treat domestic resources.
Project: Precision Separation of Critical Metals from Contaminated Mining Inputs – Award Amount: $500,000



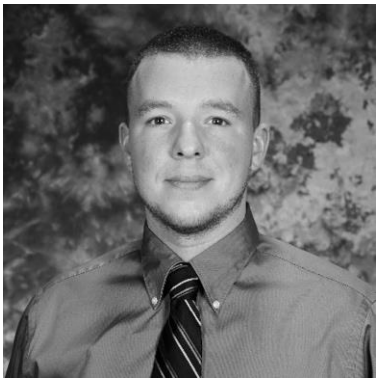
Corey Oses
Johns Hopkins University – Baltimore, MD
Corey Oses is an Assistant Professor at the Department of Materials Science and Engineering at Johns Hopkins University. Corey seeks to address longstanding material challenges associated with negative hydrogen ion sources in fusion reactors, focusing on improving the durability and stability of surfaces for neutral beam injection. By developing and evaluating new solutions to replace conventional cesium-based coatings, the research aims to advance the efficiency and reliability of fusion energy systems.
Project: Addressing the Cesium Problem for Negative Hydrogen Ion Sources – Award Amount: $500,000

Benjamin Woolston
Northeastern University – Boston, MA
Ben is an Assistant Professor in the Department of Chemical Engineering at Northeastern University. Woolston aims to develop fermentation technology based on a microbial co-culture approach to efficiently produce biofuels from various feedstocks, with performance metrics surpassing those achievable with approaches relying on a single microbe.
Project: Combining aerobic and anaerobic metabolism in a single bioreactor for transformative biofuel production metrics from C1 feedstocks – Award Amount: $500,000

Qiaobei Dong
GTI Energy – Des Plaines, IL
Qiaobei Dong is a Principal Engineer at GTI Energy. Dong is developing carbon-doped titanium oxide membranes for the in-situ retention of catalysts. These membranes can efficiently recover organic solvents, minimize catalyst loss, reduce energy consumption, and lower overall process costs in various industrial applications.
Project: Robust Carbon-Doped Titanium Oxide (CDTO) Membrane with Tuned Nanopores for In-situ Catalyst Retention and Organic Solvent Recovery in Suzuki Reaction – Award Amount: $500,000



Shanna Chu
Fervo Energy – Houston, TX
Shanna Chu is a Senior Seismologist at Fervo Energy, an enhanced geothermal company. Chu's project is developing an end-to-end seismic monitoring solution that leverages fiber optic sensors and high-performance computing to characterize subsurface fractures and seismic risk in real time. The project will be deployed and trialed at one of Fervo Energy's operating sites and if successful, will reduce both operating costs and risks involved in geothermal operations.
Project: Microseismic Monitoring for the health of Enhanced Geothermal Systems – Award Amount: $500,000



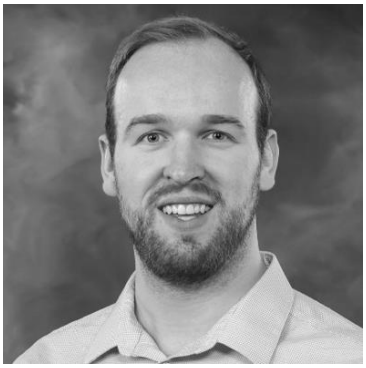
Jason Malizia
Idaho National Laboratory – Idaho Falls, ID
Jason Malizia is a Research Scientist at the Idaho National Laboratory with a background in physical chemistry and catalysis. Malizia is developing a new method of methanol production that orchestrates chemical reactions on a catalyst surface using modulated light. This approach aims to achieve superior yields and efficiency in chemical manufacturing relative to conventional methodologies.
Project: Revolutionizing Methanol Production with Dynamic Modulation of a Multistate Photocatalyst – Award Amount: $500,000

Qi Dong
Purdue University – West Lafayette, IN
Qi (Tony) Dong is an Assistant Professor in the Tarpo Department of Chemistry at Purdue University. Dong will develop a novel platform technology to synthesize value-added commodity chemicals, such as ammonia and ethylene, under non-equilibrium conditions. If successful, this approach will enable improved synthesis rates and energy efficiency, supporting distributed and modular-scale chemical manufacturing.
Project: High-efficiency and Distributed Ammonia and Ethylene Manufacturing via AI/ML-guided, Plasma-assisted Dynamic Heating – Award Amount: $500,000

Christopher Cooper
Washington University in St. Louis – St. Louis, MO
Christopher Cooper is an Assistant Professor at Washington University in St. Louis in the energy, environmental, and chemical engineering department as well as the mechanical engineering and materials science department. Chris is developing a process to recycle single-stream and mixed polyolefin waste into mechanically recyclable plastics. This technology will improve the ability to reuse polyolefin waste, which currently accounts for 50% of all plastics with over 200 million tons of polyolefins produced every year in the U.S.
Project: Kg-scale, solvent-free upcycling of pure and mixed polyolefin waste – Award Amount: $500,000

Sean You
GVD Corporation – Cambridge, MA
Sean You is a Senior Scientist at GVD Corporation. You is developing solvent-free methods for manufacturing high-selectivity flow battery membranes using chemical vapor deposition. These membranes have the potential to significantly reduce costs and improve performance of redox flow batteries for utility scale grid storage and can have additional potential applications for metals separation and desalination.
Project: High-stability PFAS-free membranes using chemical vapor deposition to advance flow battery technologies – Award Amount: $500,000

Suraj Cheema
Massachusetts Institute of Technology – Cambridge, MA
Suraj Cheema is an Assistant Professor in electrical engineering and materials science & engineering at Massachusetts Institute of Technology. Cheema will explore a new class of energy storage devices based on ferroelectric materials that exhibit the negative capacitance effect. Harnessing this can enable order-of-magnitude improvements in energy and power density compared to conventional electrostatic capacitors. This technology aims to deliver scalable, high-density capacitors to advance power delivery infrastructure for next-generation data centers.
Project: Negative Capacitance Electrostatic Energy Storage Technology for Powering Data Centers – Award Amount: $500,000



Nathan Petersen
Motibera, Inc. – Madison, WI
Nathan Petersen is the CEO and Founder of Motibera, Inc., a start-up company commercializing advanced, levitating electric motor and drive technology. This project's objective is to develop a sensorless, bearingless electric motor and drive system capable of high-speed operation in compressor applications. If successful, this project will drastically reduce barriers to deploy friction-free and oil-free drive systems, improving reliability and efficiency of critical machines.
Project: Self-Supporting Motors for Mass Adoption of Efficient Drive Technology – Award Amount: $500,000

Qingxu Jin
Michigan State University – East Lansing, MI
Qingxu "Bill" Jin is an Assistant Professor in the Department of Civil and Environmental Engineering at Michigan State University. Jin will develop Ultra-Flexible Concrete (UFC) for critical energy infrastructure exposed to extreme thermal conditions, from cryogenic to elevated temperatures. This innovation helps protect energy infrastructure by using a tough material that survives extreme temperatures and “heals” small cracks on its own, preventing damage from spreading and improving reliability.
Project: Transformative Ultra-Flexible Concrete for Extreme Environments – Award Amount: $500,000

Saman Farhangdoust
Embry-Riddle Aeronautical University (ERAU) – Daytona Beach, FL
Dr. Saman Farhangdoust is an Assistant Professor in the Department of Aerospace Engineering at Embry-Riddle Aeronautical University and director of the Smart and Multifunctional Meta-Structures (SAMM) research group. Farhangdoust is developing smart multifunctional structural batteries by integrating energy storage directly into load-bearing aircraft structural components using 4D printing. This approach aims to enhance aeronautical design.
Project: 4D printing smart multifunctional structural batteries for aerospace applications: An advancement in gantrifying – Award Amount: $500,000