2021 Early Career Research Program Awards

Program Office	PI (Last, First)	Institution	City, State	Title
BES	Abdolhosseini Qomi, Mohammad Javad	University of California, Irvine	Irvine, CA	Elucidating the Molecular Origins of Enhanced Carbon Mineralization Kinetics in Adsorbed Water Nanofilms
NP	Adams, Corey	Argonne National Laboratory	Lemont, IL	Construction of a Background Free, Normal-Ordering Neutrinoless Double Beta Decay Demonstrator
NP	Avila Coronado, Melina	Argonne National Laboratory	Lemont, IL	Measuring Key Nuclear Reactions for the Weak r-process
ASCR	Azad, Ariful	Indiana University	Bloomington, IN	Intelligent Primitives for Scalable Graph Analytics and Learning
BES	Baer, Marcel	Pacific Northwest National Laboratory	Richland, WA	Computationally Driven Design and Synthesis for Electron Transfer Materials based on Non-natural Polymers
BES	Beaux, Miles	Los Alamos National Laboratory	Los Alamos, NM	Resolving the F-Electron Challenge with Scanning Probe Microscopy/Spectroscopy
FES	Beidler, Matthew	Oak Ridge National Laboratory	Oak Ridge, TN	Hybrid Kinetic-Fluid Modeling of Tokamak Disruption Mitigation
HEP	Bleem, Lindsey	Argonne National Laboratory	Lemont, IL	Maximizing Dark Energy Constraints from Next Generation Cosmic Microwave Background Cluster Surveys
FES	Boyer, Mark	Princeton Plasma Physics Laboratory	Princeton, NJ	Machine Learning Approaches for Spherical Tokamak Scenario Optimization and Real-Time Control
BES	Cao, Penghui	University of California, Irvine	Irvine, CA	The Role of Local Chemical Order on Defect Kinetics in Alloys Under Irradiation
HEP	Chang, Chihway	The University of Chicago	Chicago, IL	Towards Robust Cosmology from Large-Scale Structure with Galaxy Surveys
BES	Chen, Si	Argonne National Laboratory	Lemont, IL	Development of PFIB-Xray System with Machine Learning Method to Realize Comprehensive Analysis from Macro- to Nano-scale
BER	Cole, Benjamin	Lawrence Berkeley National Laboratory	Berkeley, CA	Defining the Influence of Environmental Stress on Bioenergy Feedstocks at Single-cell Resolution
BES	Comin, Riccardo	Massachusetts Institute of Technology	Cambridge , MA	Resonant Coherent Diffractive Imaging of Quantum Solids
NP	Crawford, Heather	Lawrence Berkeley National Laboratory	Berkeley, CA	In Beam Gamma-Ray Spectroscopy at the Limits of FRIB
BER	Cregger, Melissa	Oak Ridge National Laboratory	Oak Ridge, TN	Understanding the Effects of Populus—Mycorrhizal Associations on Plant Productivity and Resistance to Abiotic Stress
ASCR	Das, Anup	Drexel University	Philadelphia, PA	Architecting the Hardware-Software Interface for Neuromorphic Computers
ASCR	Di, Sheng	Argonne National Laboratory	Lemont, IL	Scalable Dynamic Scientific Data Reduction
BES	Doerk, Gregory	Brookhaven National Laboratory	Upton, NY	Adaptive Synthesis of Nanoporous Membranes by Pathway Directed Self-Assembly
NP	Durham, Matthew	Los Alamos National Laboratory	Los Alamos, NM	Exotic Probes of Dense Nuclear Matter
ASCR	Endres, Manuel	California Institute of Technology	Pasadena, CA	Verification of Quantum Devices from Emergent Randomness
HEP	Engelhardt, Netta	Massachusetts Institute of Technology	Cambridge, MA	Spacetime Emergence from Quantum Gravity: Perturbative and Nonperturbative Aspects
HEP	Fahim, Farah	Fermi National Accelerator Laboratory	Batavia, IL	Frontend Implementation of AI-Machine Learning Neural Networks for On-Detector Radiation-Hard Edge Compute
NP	Gaowei, Mengjia	Brookhaven National Laboratory	Upton, NY	Cathode R&D for High Intensity Electron Source in Support of EIC
FES	Ghassemi, Mona	Virginia Polytechnic Institute and State University	Blacksburg, VA	Prediction of Breakdown in Air and Solid Dielectrics: A Complete Plasma Model from Discharge Initiation to Flashover
BES	Greenman, Loren	Kansas State University	Manhattan, KS	Theory of the Femtosecond and Attosecond Dynamics of Molecules in Complex Regions of Their Potential Landscapes
BES	Gu, Xiaodan	University of Southern Mississippi	Hattiesburg, MS	Precise Chain Conformation Control for Conjugated Polymers in Organic Electronic Thin Film Devices
HEP	Harris, Philip	Massachusetts Institute of Technology	Cambridge, MA	Harnessing the Large Hadron Collider with New Insights in Real-Time Data Processing and Artificial Intelligence
BES	He, Kai	Clemson University	Clemson, SC	Cryogenic Electron Microscopy and Spectroscopy for Topological Spin Textures in Two-Dimensional van der Waals Magnetic Materials
ASCR	Hewett, Russell	Virginia Polytechnic Institute and State University	Blacksburg, VA	Domain-Decomposition Induced Parallelism for Scientific Deep Learning at Extreme Scale
BES	Hohenstein, Edward	SLAC National Accelerator Laboratory	Stanford, CA	Controlling Photochemical Reactions with Optical Cavities
BES	Hu, Jin	University of Arkansas	Fayetteville, AR	Interacting Topological Electronic States in Group-V Network Materials
BES	Hu, Shu	Yale University	New Haven, CT	Understanding Local Coevolution at Semiconductor Photocatalysts Involving Coating Protection and Corrosion Mitigation
BER	Isaacman-VanWertz, Gabriel	Virginia Polytechnic Institute and State University	Blacksburg, VA	Parameterizing Wet Removal of Aerosol-forming Oxygenated Gases and its Regional and Global Impacts
ASCR	Isaacs, Katherine	University of Arizona	Tucson, AZ	Node-to-Code Comparison-Centered Interactive Performance Visualization

NP	Jayich, Andrew	University of California, Santa Barbara	Santa Barbara, CA	Quantum Logic Spectroscopy of Radioactive Molecules for Probing Fundamental Symmetries
BES	Johnson, Christopher	Stony Brook University	Stony Brook, NY	Tracking the Mechanisms of Catalytic Reactions on Ligand-Protected Gold Nanoclusters
BES	Kamcev, Jovan	University of Michigan	Ann Arbor, MI	Ion Transport in Highly Charged Polymer Membranes with Subnanometer Free Volume Elements
BES	King, Sarah	The University of Chicago	Chicago, IL	Drawing Electronic Structure on the Nanoscale Using Switchable Molecular Interfaces
ASCR	Kouri, Drew	Sandia National Laboratories	Albuquerque, NM	Adaptive and Fault-Tolerant Algorithms for Data-Driven Optimization, Design and Learning
BES	Kukreja, Roopali	University of California, Davis	Davis, CA	Ultrafast Coherent X-ray Scattering Studies of Quantum Materials
BES	Letts, James	University of California, Davis	Davis, CA	Characterizing Plant-Specific Features of Mitochondrial Respiratory Complexes
BES	Li, Fankang	Oak Ridge National Laboratory	Oak Ridge, TN	Resolving the Structure and Dynamics of Advanced Materials with Unprecedented Resolution
BES	Li, Mingda	Massachusetts Institute of Technology	Cambridge, MA	Machine Learning Augmented Multimodal Neutron Scattering for Emergent Topological Materials
BES	Li, Xinle	Clark Atlanta University	Atlanta, GA	When Covalent Organic Frameworks Meet Cross-coupling Reactions: Directed Synthesis, Mechanistic Investigation, and Energy Application
HEP	LIN, TONGYAN	University of California, San Diego	La Jolla, CA	Detecting Particle Dark Matter
NP	Loer, Ben	Pacific Northwest National Laboratory	Richland, WA	Improving Coherence Times for Quantum Devices Beyond the Next Decade
HEP	Lu, Xueying	Northern Illinois University	DeKalb, IL	Innovative High-Frequency Structures for High-Gradient Wakefield Acceleration
IP	Mastren, Tara	University of Utah	Salt Lake City, UT	Nanomaterials for use in Radionuclide Generator Systems for Alpha Emitting Radionuclides
FES	McBride, Emma	SLAC National Accelerator Laboratory	Stanford, CA	First Principles Measurements of Temperature and Transport Properties in Warm Dense Matter
BES	McCrory, Charles	University of Michigan	Ann Arbor, MI	Building from Discrete Molecular Electrocatalysts to Multidimensional Catalyst Architectures: the Effects of Charge Delocalization and Electronic Coupling on Electrocatalytic Activity
BES	Mundy, Julia	Harvard University	Cambridge, MA	Epitaxial Stabilization of Novel Superconductors for Energy Generation, Storage and Distribution
BES	Musser, Andrew	Cornell University	Ithaca, NY	What is the Matter Within Polaritons: Molecular Control of Collective Hybrid States
BES	Ni, Guangxin	Florida State University	Tallahassee, FL	Probing Quantum Materials with Evanescent Waves Using Advanced 4-Dimensional Scanning Near-Field Optical Microscopy
HEP	Nord, Brian	Fermi National Accelerator Laboratory	Batavia, IL	Simulation-based Inference for Cosmological Parameter Estimation and Discovery
HEP	Pagan Griso, Simone	Lawrence Berkeley National Laboratory	Berkeley, CA	Novel Data-processing Strategies for New Physics Searches and Precision Luminosity Measurements at the LHC
HEP	Parno, Diana	Carnegie Mellon University	Pittsburgh, PA	Accurate Calibration of SNS Neutrino Flux with a Heavy-water Detector for COHERENT
NP	Piarulli, Maria	Washington University	Saint Louis, MO	From Atomic Nuclei to Infinite Nucleonic Matter within Chiral Dynamics
BES	Plaisance, Craig	Louisiana State University and A&M College	Baton Rouge, LA	Development of an Integrated Multiscale Methodology for Simulating Electrocatalysis at the Metal Oxide - Electrolyte Interface
BES	Qiu, Diana	Yale University	New Haven, CT	First Principles Approach to Exciton Transport in Energy Materials
BER	Rellan-Alvarez, Ruben	North Carolina State University	Raleigh, NC	Improving Candidate Gene Discovery by Combining Multiple Genetic Mapping Datasets
HEP	Ruisard, Kiersten	Oak Ridge National Laboratory	Oak Ridge, TN	Advancing Accelerator Beam Modeling via High-dimensional Phase Space Diagnostics at a High Intensity Injector Test Stand
ASCR	Saye, Robert	Lawrence Berkeley National Laboratory	Berkeley, CA	Advanced Numerics for Atomization and Multi-Physics Interface Dynamics
FES	Schmidt, Andrea	Lawrence Livermore National Laboratory	Livermore, CA	Neutron Yield Scaling with Current in Dense Plasma Focus Z-Pinch Discharges
HEP	Scolnic, Daniel M.	Duke University	Durham, NC	Reducing Top Systematic Uncertainties in Cosmological Analyses with Type Ia Supernovae and Contaminated Photometric Samples
NP	Sen, Srimoyee	Iowa State University of Science and Technology	Ames, IA	Quantum Materials, Lattice Gauge Theory and QCD
BES	Sevov, Christo	The Ohio State University	Columbus, OH	Electrocatalytic Modification and Upcycling of Polyvinylchloride and Chloroparaffins
NP	Shen, Chun	Wayne State University	Detroit, MI	Quantitative Characterization of Emerging Quark-Gluon Plasma Properties with Dynamical Fluctuations and Small Systems
FES	Shiraki, Daisuke	Oak Ridge National Laboratory	Oak Ridge, TN	Precision Science and Control of Pellet Fueling for Optimizing Tokamak Plasma Scenarios
HEP	Suarez, Indara	Boston University	Boston, MA	Discovery in the 4th Dimension: Shining Light on the Dark Sector

ASCR	Tallent, Nathan	Pacific Northwest National Laboratory	Richland, WA	Orchestration for Distributed & Data-Intensive Scientific Exploration
ASCR	Thakur, Aditya	University of California, Davis	Davis, CA	AutoNeurify: Automatic Infusion of Learning in HPC Applications
BES	Thoi, Sara	The Johns Hopkins University	Baltimore, MD	Designing Molecular Interactions at the Electrode-Electrolyte Interface in Nitrogen Reduction
BES	Turqueti, Marcos	Lawrence Berkeley National Laboratory	Berkeley, CA	Electron Beam Magnetic Field Mapping Technology for Undulators and Magnets
FES	Tzeferacos, Petros	University of Rochester	Rochester, NY	HED Magnetized Plasma Turbulence - Simulations, Experiments and Theory
HEP	Vernieri, Caterina	SLAC National Accelerator Laboratory	Stanford, CA	Probing New Physics with Precision in the Higgs Sector at the LHC
BER	Wang, Die	Brookhaven National Laboratory	Upton, NY	Understanding Deep Convective Cloud Kinematic Processes and Their Responses to Aerosols
BES	Wang, Kun	Mississippi State University	Mississippi State, MS	Probing and Understanding the Spatial and Energy Distributions of Plasmonic Hot Carriers via Single-Molecule Quantum Transport
HEP	Wu, Hao-Yi	Boise State University	Boise, ID	Realizing the Constraining Power of Galaxy Clusters on Cosmic Acceleration: From DES to LSST
BES	Xiao, Dianne	University of Washington	Seattle, WA	New Synthetic Approaches Towards Atomically Precise p–d Conjugated Materials
BES	Xu, Jie	The University of Texas at El Paso	El Paso, TX	Building a Framework to Understand Transition Metals' Behavior in Euxinic Conditions
BER	Zheng, Xue	Lawrence Livermore National Laboratory	Livermore, CA	Better Detect Aerosol Indirect Effect on Liquid-phase Clouds in ARM Data and Multiscale Models.
BES	Zhu, Qaing	University of Nevada, Las Vegas	Las Vegas, NV	Data-driven Discovery of Inorganic Electrides for Energy Applications