

**Kentucky Space Grant Consortium and NASA EPSCoR Programs  
Funded Projects 2016-2024**

**Program Key:**

**SPACE GRANT PROGRAMS**

EMG - Enhanced Mini-Grant  
GF - Graduate Fellowship  
MG - Mini-Grant  
RIA - Research Initiation Award  
REU - Research Experience for Undergraduates  
TP/TF - Team Projects / Team Fellowships  
UF - Undergraduate Fellowship

**NASA EPSCoR PROGRAMS**

ISS - International Space Station Flight Opportunities  
R3 - Rapid Response Research  
RIDG - Research Infrastructure Development Grant  
WCS - Workshop / Conference / Seminar  
RA - Research Award

**Project Leads 2016-2024:**

ACTC - Ashland Community and Technical College  
Asbury - Asbury University  
BCTC - Bluegrass Community and Technical College  
EKU - Eastern Kentucky University  
HCC - Hopkinsville Community and Technical College  
KSU - Kentucky State University  
OCTC - Owensboro Community and Technical College  
MoST - Morehead State University  
MuST - Murray State University  
NKU - Northern Kentucky University  
TMU - Thomas More University  
UL/UofL - University of Louisville  
UK - University of Kentucky  
UK-Pad - University of Kentucky, Paducah Campus  
WKCTC - Western Kentucky Community and Technical College / Challenger Learning Center  
WKU - Western Kentucky University

AMK - Aviation Museum of Kentucky  
KYFR - Kentucky FIRST Robotics  
KSC - Kentucky Science Center / Challenger Learning Center  
LASC - Living Arts and Science Center  
ST - Space Tango



## NASA Kentucky Space Grant Consortium and EPSCoR Programs

Funded Projects: 2024-2025

Program	PI FirstName	PI LastName	School/Org	Dept	Project Title
EMG	Kelli	Gowan	KY FIRST Robotics, Inc.		Capacity Building and Growing Forward
EMG	Scott	Stephens	UK	MAE	STEM Outreach: High School Experience in NASA Propulsion Technology
EMG	Mellisa	Duncan	WKCTC	CLC	Projecting into the Future
GF	James	Lumpp	UK	ECE	Real-time attitude and trajectory measurement for small hypersonic reentry vehicles
GF	John	Caruso	UoFL	H&S Sci	Aerobic Capacity Changes from a Chronic Training Intervention done on Gravity-Independent Hardware
GF	Jason	Jaggers	UoFL	H&S Sci	Aerobic Capacity Changes from a Chronic Training Intervention done on Gravity-Independent Hardware
GF	Jinjun	Liu	UoFL	C&P	High-Resolution Mid-Infrared Spectroscopy of CH4 and CH4...NO Complex
MG	Mike	Norman	Kentucky Science Center		Eclipse 2024
MG	Shawn	Payne	OCTC		Adv Manuf Eclipse 2024 - OCTC and Owensboro Museum of Science and History
REU	Laura	Rowe	EKU	C&F Sci	Analyzing the Stability of Unnatural Proteins and Amino Acids in Mars Surface Conditions and Assessing Kentucky Acid Mine Drainage Sites for Use as Mars Terrestrial Analogue Sites
REU	Austin	Hinkel	TMU	P&A	Visualizing Disequilibrium and Substructure: Preparing for Data from the Roman Space Telescope
REU	Jesse	Hoagg	UK	MAE	Optimal Trajectory Design and Control for Rendezvous and Proximity Operations with Uncooperative Targets
REU	Dan	Ionel	UK	ECE	Wireless Electric Power Transfer with Special Single and Polyphase Coils
REU	Dan	Ionel	UK	ECE	Electric Propulsion Motors with Stator Current Excitation and Reluctance Rotors
REU	Xingsheng	Sun	UK	MAE	Optimal Design and Uncertainty Quantification of Lattice Structures for Lightweight Landing Systems
REU	Madhav	Baral	UK-Pad	MAE	Acoustic emission techniques in characterization of deformation and failure of aerospace materials
REU	Young Hoon	Kim	UoFL	C&E Engr	In-situ Microwave-Radiated CNT-Coated Regolith: Feasibility Study and Synthesis
REU	Michael	Menze	UoFL	Biology	Dry-Preservation Of Red Blood Cells for Long-Duration Space Missions
RIA	Sourav	Chatterjee	MuST	Chem	3D printed shape healing polymeric materials for Space and planetary mission
RIA	Andrea	Darracq	MuST	Bio	Leveraging NASA Earth Science Data to Assess Biodiversity Responses to Urban Greening
RIA	Huayi	Li	UK-Pad	MAE	Set-Theoretic and Optimal Control for Guaranteed-Safe Mobility
RIA	Luis	Segura-Sangucho	UoFL	Ind Engr	An Integrated Physics and Machine Learning Framework for Defect Forming Mechanism Understanding in Multi-Stage Manufacturing of Flexible Electronics
TP	Gang	Sun	NKU	PG&ET	An Innovative MISL-enabled MIL-STD 1553 Communication Board for Enhanced Interconnectivity Across International Space Station Equipment
TP	James	Lumpp	UK	ECE	UK AUVSI Competition Team
TP	Savio	Poovathingal	UK	MAE	Development of Novel Active Control and Additive Manufacturing for High Powered Rocketry
TP	Y. C.	Lu	UK-Pad	MAE	Design of Big Blue Rover for NASA Space Exploration
RIDG	Muhao	Chen	UK	MAE	Space Drilling Rig with Intelligent, Lightweight, and Low-volume, Based on Origami and Tensegrity Systems (Space-DRILLBOTS)
RIDG	Hasan	Poonawala	UK	MAE	In-Space Servicing and Assembly with Electromagnetic Small Satellites
RIDG	Savio	Poovathingal	UK	MAE	Development of SPECTR: A stratospheric particulate characterization apparatus
RIDG	Young Hoon	Kim	UoFL	C&E Engr	Lunar regolith infrastructure materials using microwave-induced net-zero water consumption
RIDG	Jinjun	Liu	UoFL	C&P	Jet-Cooled Mid-Infrared (MIR) Cavity Ring-Down (CRD) Spectroscopy of Astrochemical Molecules
R3	Lance	Bollinger	UK	K&HP	R3 SOMD RFA-070: Use of Velocity Monitoring to Prescribe Appropriate Flywheel-based Inertial Training (FIT) workloads for Exercise in Space Flight
R3	Michael	Renfro	UK	MAE	R3 STMD RFA-067: Unsteady measurements of ultra-low permeability for TPS samples
R3	Thomas	Berfield	UoFL	ME	R3 STMD/ARMD RFA-013: Development of Refractory High Entropy Alloys Structures Produced via Additive Manufacturing for Extreme Temperature NASA Applications
R3	Yanyu	Chen	UoFL	ME	R3 ARMD RFA-006: Multiscale Modeling of Heterogeneous Architected Materials under Impact
R3	Jinjun	Liu	UoFL	C&P	R3 SMD RFA-023: High-Resolution, High-Precision Laboratory Spectroscopy of Organic Astrochemical Molecules

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# NASA Kentucky Space Grant Consortium and EPSCoR Programs

## Funded Projects: 2023-2024

Program	PI FirstName	PI LastName	School/Org	Dept	Project Title
EMG	Kelli	Gowan	KY FIRST Robotics		GROW Kentucky FTC - Growth (of) robotics opportunities within Kentucky FTC
EMG	Bryant	Harrison	MuST	Engr	Murray State FRC Robotics Team
EMG	Elizabeth	Koch	NKU	CINSAM	Kentucky FIRST LEGO League
EMG	Austin	Hinkel	MuST	Phys	A Data-Intensive, Introductory Astronomy Course: Inspiring & Preparing Students of All Backgrounds with Real Astronomy Data
GF	Paul	Rottmann	UK	CME	Investigating the Influence of Scan Strategy on the Fatigue Resistance of Additively Manufactured Thin-Wall Inconel 718
GF	Paul	Rottmann	UK	CME	In Situ 3D Characterization of Damage Accumulation Mechanisms in FiberForm
GF	John	Caruso	UofL	H&S Sci	Musculoskeletal Changes from a High-speed High-impact Hip Exercise Intervention
GF	Benne	Holwerda	UofL	P&A	Mapping the Mean Attenuation Law Pixel-by-Pixel for Extragalactic Astronomy by Method of Occulting Galaxy Pairs
GF	Vance	Jaeger	UofL	ChemE	Titration Effects on the Formation and Stability of Biofilms in Confined Spaces
MG	Melissa	Murray	MoST	Ctr STEM+	SpacePrep: A Space Science Engineering Program for Young Women
MG	Philip	Lee	UK	ET	3M Mars STEM outreach and community engagement in energy conversion, renewable energy, and powering robotic rovers
MG	John	Maddox	UK	MAE	2023-2024 McCracken County Rocket Club
MG	Mellisa	Duncan	WKCTC	CLC	Robotics Refresh
REU	Minchul	Shin	NKU		Robust Design of Dynamic Control System in Compliant Terrestrial Origami-Robots
REU	Wesley	Ryle	TMU	P&A	Determining Precise Stellar Parameters of Eclipsing Binary Systems at The Thomas More University Observatory
REU	Wesley	Ryle	TMU	P&A	Course-Based Undergraduate Research Experiences: A Study of Eclipsing Cataclysmic Variables
REU	Doo Young	Kim	UK	Chem	REU Renewal: Layer-by-layer Deposition of Catalysts on Gas Diffusion Electrode for Electrochemical CO2 Conversion
REU	Madhav	Baral	UK-Pad	MAE	Mechanical characterization and modeling of AA2024-T3 aerospace aluminum alloy
RIA	Xingsheng	Sun	UK	MAE	Characterizing Hydrogen Sorption and Storage in One-Dimensional Nanomaterials
RIA	Yash	Chitalia	UofL	ME	LIGHTWEIGHT AND COLLAPSIBLE SEMI-AUTONOMOUS SOFT ROBOTS FOR INJURED ASTRONAUTS
TP	Tracy	Knowles	BCTC	Nat Sci	BCTC BalloonSat Eclipse Project
TP	Aleck	Leedy	MuST	Engr	Autonomous Robot Competition (cont. of Autonomous CAT5 Hurricane Recovery Robot)
TP	Sean	Bailey	UK	MAE	Support for UK National Eclipse Ballooning Project Team
TP	Regina	Hannemann	UK	ECE	Kentucky Organization of Robotics and Automation (KORA)
TP	Savio	Poovathingal	UK	MAE	Development of Active Fin Control for High Powered Rocketry
TP	Savio	Poovathingal	UK	MAE	KRUPS: Enhancing Instrumentation Suite
TP	Andre	Faul	UofL	ECE	Forward Pass
ISS	Alexandre	Martin	UK	MAE	KRUPS: ISS Flight for Telemetry and Recovery
R3	Ambrose	Seo	UK	Chem	NASA EPSCoR R3 (E-007): Optical Transmissivity of Windows Coated by Laser-Ablation Products
R3	John	Maddox	UK-Pad	MAE	NASA EPSCoR R3 (E-006): Modal Isolation of Porous Media Thermal Transport Properties
RA	Hailong	Chen	UK	MAE	Investigation of Material Surface Erosion and Failure due to High-Velocity Particle Impact
WCS	Savio	Poovathingal	UK	MAE	13th Ablation Workshop

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# NASA Kentucky Space Grant Consortium and EPSCoR Programs

Funded Projects: 2022-2023

Program	PI FirstName	PI LastName	School/Org	Dept	Project Title
EMG	Duk-Hyung	Lee	Asbury	Math	Aeronautic Workshops with Walkalong Gliders, Tumbling Wings, and Paper Airplanes
EMG	Kelli	Gowan	KY FIRST	Robotics	Scaling up FIRST Tech Challenge Competitions in KY (SFTCC-KY)
EMG	Aleck	Leedy	MuST	Engr	An Engineers-Day Promoting Women in Engineering
EMG	Elizabeth	Koch	NKU	CINSM	FIRST LEGO League
EMG	Steven	Lugauer	UK	Econ	Developing a Course on the "Economics of Space Exploration"
EMG	Vance	Jaeger	UofL	ChemE	Enhancing STEM Education: Science and Technology Education Innovation Lab (STEIL)
GF	Dan	Ionel	UK	ECE	Spatio-temporal Planning of Sustainable Future Electric Power System and Synergistic Transportation Infrastructure for Kentucky Employing Green Hydrogen and NASA Technologies
GF	Savio	Poovathingal	UK	ME	Development of a Novel Computational Framework to Investigate Thermochemistry of Melt Flow in Aerothermal Entry Physics
GF	Savio	Poovathingal	UK	MAE	Development of an artificial neural network to transfer microstructural information of thermal protection systems (TPS) into vehicle-scale simulations
GF	Michael	Renfro	UK	MAE	Measurement of permeability and tortuosity for charred TPS samples
GF	Paul	Rottmann	UK	CME	Quantification of Directionally Dependent Mechanical Properties and Damage Tolerance of FiberForm
GF	Thomas	Seigler	UK	MAE	Satellite Formation Control using Alternating Magnetic Fields
GF	Jinjun	Liu	UofL	C&P	Cavity-Enhanced Double Resonance Spectroscopy of Astrochemical Molecules (Year 2)
GF	Mahendra	Sunkara	UofL	ME	Investigation of High Nickel content NMC Cathodes for Lithium-Ion Batteries
GF	Daniela	Terson de Palevill	UofL	H&SS	Autogenic Feedback Exercise Training (AFTE) with Virtual Reality for People with Spinal Cord Injury
MG	Ed	Murphy	AMK	Edu	Aerospace Motivates Kids: A Context for STEM
MG	Scott	Stephens	UK	MAE	KY EPSCoR: STEM Outreach: High School Experience in NASA Propulsion Technology
MG	Mellisa	Duncan	WKCTC	CLC	A Year of Robotics
REU	Minchul	Shin	NKU	PG&ET	SWARM Applications of origami robots in Space
REU	Wesley	Ryle	TMU	M&P	A Continuing Investigation of Eclipsing Binary Systems at The Thomas More University Observatory
REU	Wesley	Ryle	TMU	M&P	Course-Based Undergraduate Research Experiences: Supporting NASA Exoplanet Watch
REU	JiangBiao	He	UK	ECE	Hardware Implementation and Testing of an Advanced Electric Propulsion Inverter
REU	Doo Young	Kim	UK	Chem	Investigating carbon-dot-assisted metal chelation and pyrolysis for catalyst formation towards CO2 reduction
REU	John	Caruso	UofL	H&HS	The impact of palm cooling on thermal flux
REU	Benne	Holwerda	UofL	P&A	Independent Development of Isolated Galaxies
REU	Young Hoon	Kim	UofL	CEE	Exploring Resilient Structural Materials for Space Habitats in Harsh Environments
REU	Stuart	Williams	UofL	ME	REU: Nano Halo software development
REU	Gerard	Williger	UofL	P&A	Electronic Music of the Planets: Organizing Dopplergrams and Polarimetry of Planetary Oscillations
REU	Michael	Carini	WKU	P&A	TESS Light curves of blazars: Probing the most rapid variability timescales and relativistic jet physics
REU	Steven	Gibson	WKU	P&A	Galactic Weather: Forecasting Future Star Formation
REU	Ting-Hui	Lee	WKU	P&A	Galactic Archaeology with Planetary Nebulae
RIA	Lance	Bollinger	UK	K&HP	Interaction of Sleep Restriction and Unloading on Neuromuscular Control of Strength
RIA	Hana	Khamfroush	UK	CS	Research Initiation Project: Federated Learning-based Communication Channel Prediction for Autonomous Distributed Robotic Explorers in Moon, Mars, and Beyond
RIA	Vance	Jaeger	UofL	ChemE	Data-Driven Models to Predict Colloid Dynamics and Structuring from Digital Video Microscopy
TP	Aleck	Leedy	MuST	Engr	Autonomous CAT5 Hurricane Recovery Robot
TP	Gang	Sun	NKU	ET	Development of a MISL-based CubeSat Instrumentation System for Microgravity Scientific Research
TP	Shawn	Payne	OCTC	AM	OCTC Rover Team
TP	Sean	Bailey	UK	MAE	Support for formation of a UK team to participate in NEBP
TP	Regina	Hannemann	UK	ECE	Kentucky Organization of Robotics and Automation (KORA)
TP	Savio	Poovathingal	UK	MAE	Kentucky Re-entry Universal Payload System: Enhancing Instrumentation Suite
RIDG	Biyun	Xie	UK	ECE	Developing a Demonstration-Based Motion Planner for Space Telerobots
RIDG	Madhav	Baral	UK-Pad	ME	Damage Tolerance Assessments and Fracture processes of Additively Manufactured Aerospace Materials
RIDG	Thomas	Berfield	UofL	ME	High-Throughput Screening of Additive Manufactured Extreme Temperature Materials for Space Propulsion Applications
RIDG	Steven	Gibson	WKU	P&A	Dust Signatures of the Dark Neutral Medium
R3	Haluk	Cetin	MuST	E&ES	NASA EPSCoR FY22 R3 Appendix J (SMD/ESD): Assessment of the Effects of Algal Blooms and Storms on Mangrove
R3	Alexandre	Martin	UK	MAE	NASA EPSCoR FY22 R3 Appendix I (CSC): A recovery system for the KRUPS re-entry capsule
R3	Savio	Poovathingal	UK	MAE	NASA EPSCoR FY22 R3 Appendix B (ARC): Wavelength-dependent micro and meso scale measurements of radiative properties
RA	Savio	Poovathingal	UK	MAE	Multi-scale data-driven modeling of radiative transport through thermal protection systems

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**NASA Kentucky Space Grant Consortium and EPSCoR Programs**  
**Funded Projects: 2021-2022**

Program	PI FirstName	PI LastName	School/Org	Dept	Project Title
GF	Sundar	Atre	UofL	ME	In-Space Additive Manufacturing of Aluminum Alloys
GF	Sean	Bailey	UK	ME	Development of a Lightweight Sonic Anemometer Array for the Measurement of Turbulent Fluxes from Rotorcraft UAS
GF	Matthew	Beck	UK	ME	Incorporating computed distributions of micro-/mesoscale properties into meso-/macroscale material response models
GF	John	Caruso	UofL	H&SS	GF: Musculoskeletal changes from a high-speed high-impact hip exercise intervention
GF	Timothy	Dowling	UofL	P&A	Graduate Fellowship Proposal: Mach and Froude Numbers on Mars: The Lower Atmosphere
GF	Jinjun	Liu	UofL	Chem	Cavity-Enhanced Double Resonance Spectroscopy of Astrochemical Molecules
GF	John	Maddox	UK-Pad	ME	Characterizing Thermal Conductivity of Flexible Insulation Materials Through Modal Contribution Measurements
GF	Savio	Poovathingal	UK	ME	Development of a Novel Computational Framework to Investigate Thermochemistry of Melt Flow in Aerothermal Entry Physics
GF	Savio	Poovathingal	UK	ME	Development of an artificial neural network to transfer microstructural information of thermal protection systems (TPS) into vehicle-scale simulations
GF	Paul	Rottmann	UK	CME	Multiscale Mechanical Evaluation of the Deformation Pathways in Porous Materials
GF	Mahendra	Sunkara	UofL	ME	A Silicon Anode Technology for Lithium Ion Batteries
GF	Daniela	Terson de Palevill	UofL	H&SS	Autogenic Feedback Training Exercise- AFTE to improve autonomic function in people with spinal cord injuries
GF	Fuqian	Yang	UK	CME	Mechanical behavior of bonded PDMS for microfluidics in microgravity
MG	Jessica	Byassee	LASC	Education	Using Planetarium Presentations to Reinforce Classroom Learning
EMG	Jessica	Byassee	LASC	Education	Bridging Gaps in STEAM Education: Community Learning, Engagement and Development at the Living Arts and Science Center
EMG	Mellisa	Duncan	WKCTC	CLC	NASA and STEM: On the Move
EMG	Vance	Jaeger	UofL	ChemE	Enhancing STEM Education for the Visually Impaired through a Design and Prototyping Course
EMG	Beth	Koch	NKU	CINSM	Kentucky FIRST LEGO League
EMG	Jessica	Lair	EKU	P&A	Live, Interactive Shows for the Hummel Planetarium
TP	Aleck	Leedy	MuST	IE	Autonomous Mardi Gras Robot
TP	Y. Charles	Lu	UK-Pad	ME	Design of Big Blue Rover for NASA Human Exploration Challenge
TP	Sergiy	Markutsya	UK-Pad	ME	2022 AIAA Design, Build, Fly Competition
REU	Michael	Carini	WKU	P&A	TESS Light curves of blazars: Probing the most rapid variability timescales and relativistic jet physics
REU	John	Caruso	UofL	H&SS	REU: Musculoskeletal changes from a high-speed high-impact hip exercise intervention
REU	JiangBiao	He	UK	ECE	Fault-Tolerant Electric Propulsion Drive System
REU	Benne	Holwerda	UofL	P&A	Diffuse UV haloes around the flattest galaxies
REU	Dan	Ionel	UK	ECE	Artificial Intelligence and Data Science Analysis for Battery and Solar PV Systems
REU	John	Maddox	UK-Pad	ME	Inductive Heating System for Comparative Cut-Bar Apparatus
REU	Wesley	Ryle	TMU	M&P	Stellar Properties from Eclipsing Binaries: A Key Foundation to Cutting Edge Astrophysics
REU	Wesley	Ryle	TMU	M&P	Course-Based Undergraduate Research Experiences: A Variable Star Project
REU	Minchul	Shin	NKU	P,G&ET	Origami Robot Development and its Applications in Space
RIDG	Hailong	Chen	UK	ME	Microstructure-Based Thermomechanical Homogenization Using a Meshfree Framework
RIDG	Michael	Renfro	UK	ME	A stochastic approach to permeability and tortuosity modeling using experimental flow tube measurements
ISS	Alexandre	Martin	UK	ME	KRUPS: ISS Flight for Instrument Testing
R3	Joe	Chappell	UK	Pharm	NASA EPSCoR R3 Appendix D (BPS): Comparison of stress-inducible sesquiterpene lactone profiles of lettuce cultivars
R3	Alexandre	Martin	UK	ME	NASA EPSCoR R3 Appendix A (SMD): Material response of woven heat shield material in Venusian atmosphere
R3	Hui	Wang	UofL	ME	NASA EPSCoR R3 Appendix G (ARMG): Composite Solid Electrolytes for High Safety Lithium Metal Batteries
RA	Gordon	Emslie	WKU	P&A	Solar Activity and Space Weather

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**NASA Kentucky Space Grant Consortium and EPSCoR Programs**  
**Funded Projects: 2020-2021**

Program	PI FirstName	PI LastName	School/Org	Dept	Project Title
GF	Sean	Bailey	UK	ME	Spallation Particle Characterization for Ablative Thermal Protection Systems
GF	Matthew	Beck	UK	CME & ME	Connecting stochastically computed effective properties to experimentally measured mechanical behavior of fibrous TPS materials
GF	Lindsey	Bryson	UK	Civil	Research Leading to Forecasting of Sinkholes using Satellite Data
GF	Timothy	Dowling	UofL	P&A	Seasonal Dependence of Froude and Mach numbers in the OpenMARS Reanalysis
GF	Beth	Guiton	UK	Chemistry	Predicting the Structure and Stability of Thermoelectric Composite Interfaces in Deep-Space using In Situ Microscopy
GF	Dan	Ionel	UK	ECE	Electric Aircraft Propulsion Concepts with Axial Flux PM Machines, Integrated Condition Sensing, and HIL Enabled WBG Power Electronic Drives
GF	Doo Young	Kim	UK	Chemistry	Formation of Single Metal Atoms Coordinated with Four Nitrogen Atoms in Carbon Nano-Onions for Efficient and Selective CO2 Conversion into Fuels
GF	John	Maddox	UK-Pad	ME	Isolating Modal Contributions to Thermal Conductivity in Porous Insulation Materials
GF	Savio	Poovathingal	UK	ME	Development of a Novel Computational Framework to Investigate Thermochemistry of Melt Flow in Aerothermal Entry Physics
GF	Savio	Poovathingal	UK	ME	Development of an artificial neural network to transfer microstructural information of thermal protection systems (TPS) into vehicle-scale simulations
GF	Michael	Sama	UK	Bio & Ag	Performance of Real-Time Kinematic Global Navigation Satellite System Receivers on Unmanned Aircraft Systems for Precision Meteorology
GF	Hui	Wang	UofL	ME	NASICON-type Composite Solid Electrolytes in Solid-State Li Batteries for Cold Environments
GF	Howard	Whiteman	MuST	Bio Sciences	AMERICAN CHESTNUT RESTORATION ON PUBLIC LANDS: A REMOTE SENSING APPROACH
RIA	Bikram	Bhatia	UofL	ME	Barocaloric Materials for Solid-State Cooling at Cryogenic Temperatures
RIA	Yanyu	Chen	UofL	ME	Multi-Scale Optimization of Damping Composite Structures for Additive Manufacturing
RIA	Xu	Jin	UK	ME	Autonomous Multi-UAV System for COVID-19 Body Temperature Monitoring of Crowds
RIA	Jinjun	Liu	UofL	Chemistry	High-Resolution Laser Spectroscopy of Trace Gases in the Lower Atmosphere of Venus in Support of NASA's Exploration Missions
MG	Mellisa	Duncan	WKCTC	CLC	NASA and STEM: Virtual Reality
MG	Ed	Murphy	AMK	Education	Aerospace Motivates Kids: A Context for STEM
EMG	Jessica	Byassee	LASC	Education	Advancing STEAM Engagement
EMG	Haluk	Cetin	MuST		Mapping invasive plant species in Kentucky using LiDAR, UAS and satellite imagery, and GIS
EMG	Veronica	Greenwell	KSC	CLC	Kentucky Science Center Challenger Learning Center Immersion Program
EMG	Benne	Holwerda	UofL	P&A	Galaxy Populations Identified by Machine Learning
EMG	Elizabeth	Koch	NKU	CINSAM	Kentucky FIRST LEGO League
TP	Regina	Hannemann	UK	ECE	Kentucky Organization of Robotics and Automation (KORA)
TP	Aleck	Leedy	MuST	Engineering	Autonomous Pac-Man Robot
TP	Y. Charles	Lu	UK-Pad	ME	Design of Big Blue Rover for NASA Human Exploration Challenge
TP	Sergiy	Markutsya	UK-Pad	ME	2021 Design/Build/Fly
TP	Shawn	Payne	OCTC	AMT	OCTC NASA Human Exploration Rover Teams
TP	Savio	Poovathingal	UK	ME/ECE	Kentucky Re-entry Universal Payload System: Enhancing instrumentation Suite
REU	Matthew	Beck	UK	CE & ME	Contact overlap effects on thermal and mechanical properties of fibrous TPS materials
REU	Lutz	Haberzettl	UofL	P&A	How to teach a machine to find cosmic smileys
REU	Lutz	Haberzettl	UofL	P&A	Machine Learning Search for the Earliest Galaxies
REU	Benne	Holwerda	UofL	P&A	The Full Size of the Milky Way using the Smallest Stars
REU	Dan	Ionel	UK	ECE	Markov Theory based Optimization of Reliable and Highly Efficient All-electric Aircrafts
REU	Jonathan	Kopechek	UofL	Bioengineering	Evaluation of a Dual Chamber Bag System for Rehydration of Dried Blood under Reduced Gravity
REU	John	Maddox	UK-Pad	ME	Control System Development for Space Environment Simulation Chamber
REU	Sergiy	Markutsya	UK-Pad	ME	Simulation of Ionic Liquids Confined Between Electrodes Using Coarse-Graining Approach
RIDG	Bassil	El Masri	MuST	E&ES	Assessing the Impacts of Physiological and Environmental controls on the Accuracy of WUE: Linking Field Observations, Satellite Imagery, and Land Surface Model
RIDG	Biyun	Xie	UK	ECE	Fault-Tolerant Workspace Analysis for Redundant Space Robots Experiencing Locked Joint Failures
RIDG	Jiangbiao	He	UK	ECE	High-Reliability Aircraft Propulsion Drives based on Digital Twin Technology
ISS	Stuart	Williams	UofL	ME	Electrokinetic assembly of stable nanoparticle haloing suspensions
R3	Doo Young	Kim	UK	Chemistry	R3 Task E19: Atomically Dispersed Metal Electrocatalysts Supported on Nitrogen-Doped Carbon Nano-Onions for Efficient and Selective CO2 Conversion into Fuels
R3	Martha	Grady	UK	ME	R3 Task D15: Microgravity Effects On Biofilm Stiffness

## NASA Kentucky Space Grant Consortium and EPSCoR Programs

### Funded Projects: 2019-2020

Program	PI FirstName	PI LastName	School/Org	Dept	Project Title
GF	Robert	Adams	UK	ECE	Preconditioned Sparse Direct Solvers for Large-Scale Electromagnetic Modeling
GF	Sean	Bailey	UK	ME	Analysis of Spallation Products using Arc-Jet Experiments
GF	Marcelo	Guzman	UK	Chem	Air Quality Measurements with Small Unmanned Aerial Systems
GF	Jesse	Hoagg	UK	ME	Sampled-Data Formation Control of Fixed-Wing UAVs for Measuring Atmospheric Turbulence
GF	Jesse	Hoagg	UK	ME	Autonomous Aerial Robot Formations for Imaging Livestock for Health Monitoring
GF	Dan	Ionel	UK	ECE	Model and Graph Theory-based Differential-evolution Optimization Framework for Power, Propulsion and Energy Storage Systems of Electric Aircraft
GF	John	Kielkopf	UL	P&A	Hunting for Dark Matter in Spheroidal Galaxies
GF	John	Maddox	UK-Pad	ME	Characterization of the Effect of Mechanical Loading on the Thermal Conductivity of Porous Insulation Materials
GF	Sergiy	Markutsya	UK-Pad	ME	A Computational Study of the Interfacial Structure of Ionic Liquids at Mesoscale
GF	Alexandre	Martin	UK	ME/CME	Mesoscale analysis of inhomogeneities in ablative materials using statistical distribution of properties
GF	Christopher	Richards	UL	ME	Combined Static and Dynamic Anti-Windup Architecture for Landers and Ascent Vehicles Experiencing Large Disturbances
GF	Hui	Wang	UL	ME	LATP Solid Electrolyte in All-solid-state batteries for Cold Environments Applications
GF	Hui	Wang	UL	ME	Sulfide-Electrolyte-based All-Solid-State Batteries with High Safety and Performance
GF	Howard	Whiteman	MuST	Biol/WSI	AMERICAN CHESTNUT RESTORATION ON PUBLIC LANDS: A REMOTE SENSING APPROACH
RIA	Christoph	Brehm	UK	ME/CE/Chem	Development of a RANS-Based Wall-Model for Cartesian Grid Navier-Stokes Solvers
RIA	Lindsey	Bryson	UK	CE/KGS	Using Satellite Data to Develop Rainfall-Induced Landslide Susceptibility and Forecasting Models
RIA	Alexandre	Martin	UK	ME/CME	Thermal conductivity characterization of low-density volumetric ablators using a cut-bar apparatus
RIA	Wei	Ren	UK	P&SS/CE/CS	Integrating Multi-scale Remotely Sensed Data and Ecosystem Modelling to Assess Agroecosystem Carbon Dynamics and Greenhouse Gas Emissions
RIA	Wesley	Ryle	TM	M&P	Determination of Fundamental Parameters for Massive Eclipsing Binary Systems
RIA	Michael	Sama	UK	BAE	ENABLING A CITIZEN SCIENCE CONTRIBUTION TO METEOROLOGY USING SMALL UNMANNED AIRCRAFT SYSTEMS
RIA	Thomas	Seigler	UK	ME	Control of Eddy-Current Actuation Systems for Noncontact Space Robotics
RIA	Ambrose	Seo	UK	P&A	Investigating Optical Properties of Oxide Materials at High Temperature
MG	Aida	Bermudez	EKU	HP	Leggo My Science
MG	Edward	Murphy	AMK	ED	Aerospace Motivates Kids; A Context for STEM
MG	George	Pantalos	UL		Student travel MG - flight campaign
MG	Joshua	Ridley	MuST	IoE	BRINGING THE CLASSROOM TO PHYSICS
MG	Thomas	Tretter	UL	M&S Ed	Immersing K-12 Students in Foundational Astronomy Concepts and Practices
EMG	Katherine	Bullock	LASC	ED	Bridging Gaps in STEAM Education: Community Engagement and Informal Learning in Earth and Space Sciences
EMG	Katherine	Bullock	LASC	ED	Earth and Space Explorers: Expanding Summer Learning Opportunities in STEAM
EMG	Haluk	Cetin	MuST	EES	Workshop for the next generation pre- and in-service teachers: A satellite remote sensing and Geographic Information Systems approach
EMG	Micaha	Dean	UK	CoE	Science Olympiad
EMG	Mellisa	Duncan	WKCTC	CLC	NASA and STEM: On the Move
EMG	Derrick	Gilmore	KSU		Kentucky State University Minority Male STEM Conference
EMG	Beth	Koch	NKU	CINSAM	Kentucky First Lego League
EMG	Aleck	Leedy	MuST	IoE	An E-Day for Girl Scouts Focused on Activities for Earning STEM Badges
EMG	George	Pantalos	UL		HE-EMG - Student flight campaign
EMG	Michael	Renfro	UK	ME	HE-EMG - Curriculum Dev 3210001425
EMG	Thomas	Tretter	UL	M&S Ed	Astronomy Modeling Workshop for High School Teachers
TF	Regina	Hannemann	UK	ECE	Kentucky AstroRobotic Terrain Systems (KATS) Student Club
TF	Regina	Hannemann	UK	ECE	NASA Robotic Mining Competition ME Senior Capstone Projects
TF	Aleck	Leedy	MuST	IoE	Autonomous Orbital Space Debris Removal Robot
TF	Yongsheng	Lian	UL	ME	High Power Rocket Design and Competition at Intercollegiate Rocket Engineering Competition
TF	Y. Charles	Lu	UK-Pad	ME	Design of Big Blue Rover for Future Space Exploration
TF	Sergiy	Markutsya	UK-Pad	ME	2019 Design/Build/Fly
TF	Alexandre	Martin	UK	ME/ECE	Kentucky Re-entry Universal Payload System: recovery system and training
TF	Shawn	Payne	OCTC	AMT	OCTC NASA Human Exploration Rover Teams
UF	Matthew	Beck	UK	CME	Calculating distributions of local thermal conductivities in ablative materials: Mesoscale modeling of the effects of structural randomness on materials properties
UF	Vladimir	Dobrokhotov	WKU	P&A	Graphene Oxide Colloids as Inks and Additives for Additive Manufacturing
UF	Vladimir	Dobrokhotov	WKU	P&A	Development of Engineered Graphene-Polymer Nanocomposites through Embedding Smaller Nanoparticulates and Interfacial Dynamics
UF	Jonathan	Kopechek	UL	BE	Assessment of RBC Quality after Rehydration of Dried Blood under Reduced Gravity
UF	Jonathan	Kopechek	UL	BE	Development of Prototype for Rehydration of Dried Blood under Reduced Gravity
UF	Y. Charles	Lu	UK-Pad	ME	Optimal Design and Processing of 3D-Printed Products by Using Laminate Composite Theory
UF	John	Maddox	UK-Pad	ME	Instrumentation of Comparative Cut-Bar Thermal Conductivity Measurement Apparatus
UF	Sergiy	Markutsya	UK-Pad	ME	Computational Modeling and Simulation of Aqueous Solution of Ionic Liquids at Mesoscale

# NASA Kentucky Space Grant Consortium and EPSCoR Programs

Funded Projects: 2017-2018

Program	PI FirstName	PI LastName	Project Title	School/Org	Dept
GF	Twyman	Clements	Microgravity Tank Design Toolbox	ST	
GF	Aaron	Cramer	Market-Based Control and Optimal Simulation Techniques for Small Orbital Satellite Power Systems	UK	ECE
GF	Dan	Ionel	Bi-directional DC/DC Three Port Converter, WBG DC/AC Drive and Distributed Controls for Electric and Hybrid Airplanes	UK	ECE
GF	John	Kielkopf	Hunting for Dark Matter in Spheroidal Galaxies	UofL	P&A
GF	John	Maddox	Physics-Based Characterization of Fibrous Rigid Insulation Materials	UK-Pad	ME
GF	Alexandre	Martin	Material Interface Boundry Condition for Atmospheric Reentry Material Response Implementation into KATS	UK	ME
GF	Daniel	Pack	Genetic Engineering for Production of Curcumin in Human Cells	UK	CME
GF	Christopher	Richards	Resolving Discontinuities in SLS LTV Model Simulation	UofL	ME
RIA	Kathleen	Carter	The physiological adaptations while exercising on a robotic exoskeleton as compared to exercising using free weights	UofL	CEHD
RIA	Sergiy	Markutsya	Computational Study of Coarse-Grained Aqueous Ionic Liquid Solutions	UK-Pad	ME
RIA	Kaveh	Tagavi	Meteorite Reentry Melting and Fluid Flow	UK	ME
MG	Krista	Barton	MSU's Middle School Aerospace Challenge for Engineering	MoST	
MG	Mellisa	Duncan	NASA and STEM: Making Local Connections	WKCTC	CLCP
MG	Ed	Murphy	Aerospace Motivates Kids - A Context for STEM	AMK	
EMG	Krista	Barton	MSU's High School Aerospace Challenge for Engineering	MoST	
EMG	Katherine	Bullock	Public Engagement and Informal Education in Earth and Space Sciences	LASC	Ed
EMG	Aleck	Leedy	A Robotics Outreach Program for 3rd Graders at Murray Elementary	MuST	IoE
TF	Martha	Grady	University of Kentucky Speedfest Design, Build, Fly Competition	UK	ME
TF	Aleck	Leedy	Autonomous Pirate Robot	MuST	IE
TF	Sergiy	Markutsya	2018 Design/Build/Fly	UK-Pad	ME
TF	Shawn	Payne	OCTC NASA Rover Team 2018	OCTC	AMT
UF	Kathy	Carter	Comparative responses to exercise done with free weights and with a robotic exoskeleton	UofL	CEHD
UF	Alexandre	Martin	A porous media approach to parachute modeling	UK	ME



# NASA Kentucky Space Grant Consortium and EPSCoR Programs

Funded Projects: 2016-2017

Program	PI FirstName	PI LastName	Project Title	School/Org	Dept
GF	Michael	Carini	Characterization and threat assessment of eight potentially hazardous near earth asteroids	WKU	P&A
GF	Jesse	Hoagg	Fixed-Wing UAV Formations for Measuring Atmospheric Turbulence	UK	ME
GF	Alexandre	Martin	Development of a kinetic modeling scheme to capture phenolformaldehyde resin degradation	UK	ME
GF	Alexandre	Martin	Arc-jet validation of material response solvers	UK	ME
GF	Karla	Welch	Algorithmic Predictions of Sensorimotor Outcomes & Feature Identification Using Shrinkage Estimator & Classification Methods	UL	ECE
GF	Stuart	Williams	Acoustic Mixing of Sealed Microfluidic wells in support of NASA ACE missions	UL	ME
RIA	Michael	Fultz	Effect of Microgravity on the Contraction and Cytoskeletal Remodeling in the A7r5 smooth muscle cell	MoSU	Bio
RIA	Christopher	Hughes	Satellite Data Fusion to Better Understand Martian Structure and Volcanics	EKU	Geosc
RIA	Hongxiang	Li	A New Transceiver Design for Unmanned Aircraft System	UL	ECE
MG	Katherine	Bullock	STEM Education Program Development	LASC	
MG	Michael	Carini	Supporting the participation of the Cave Area Rocket Scientists in the Team America Rocket Competition	WKU	P&A
MG	Sherry	McCormack	High Altitude Ballooning Summer Research Project	HCC	Math
MG	Edward	Murphy	Aerospace Motivates Kids-A Context for STEM	AMK	
EMG	Katherine	Bullock	STEM Programs - Informal Science	LASC	
EMG	Ashley	Cox	The Sky's the Limit: Pre- & Inservice Faculty PD with Middle School Hands-on Learning	ACTC	A&S
EMG	Richard	Gelderman	Preparing the Public for the 2017 August 21 Eclipse	WKU	P&A
EMG	Richard	Gelderman	Supporting K-12 Students Ability to View Totality	WKU	P&A
EMG	Veronica	Greenwell	Solar Eclipse Viewing Logan County, Kentucky	KSC	
EMG	Tracy	Knowles	BCTC Eclipse Outreach Ambassador Project	BCTC	Health
TF	Kevin	Donohue	NASA Robotic Mining Competition	UK	ECE
TF	Aleck	Leedy	Autonomous Star Wars Themed Robot	MuSU	Engr
TF	John	Maddox	2017 Design/Build/Fly	UK-Pad	ME
TF	Alexandre	Martin	Kentucky Re-entry Universal Payload System: system integration and training	UK	ME
TF	Shawn	Payne	OCTC NASA Human Exploration Rover Team	OCTC	Manuf
UF	Haluk	Cetin	An integrated study using LiDAR, satellite imagery & GIS to map invasive plant species in Kentucky	MuSU	Geosc
UF	Charles	Lu	Analysis of mechanical properties of 2D layered graphene-polymer nanocomposites	UK-Pad	ME
UF	Charles	Lu	Statistical, Micromechanics-based Computational Modeling for Accelerating the Design of Aerospace Composites	UK-Pad	ME
UF	John	Maddox	Heat Shield Thermal Conductivity Measurement with Comparative Cut Bar Apparatus	UK-Pad	ME
RIDG	Christoph	Brehm	A new numerical method for fluid-structure interaction with large deformations	UK	ME
RIDG	Bassil	El Masri	A long-term monitoring network in Kentucky: linking climate change to carbon and water use efficiency, and soil properties	MuSt	Geosc
RIDG	Beth	Guiton	Determining the structure of thermoelectric materials in real-time using single-atom resolution and in situ imaging	UK	Chem
RIDG	Sanju	Gupta	Power generation from low-temperature waste heat: carbon-based aerogels as thermo-electrochemical energy harvesters	WKU	P&A
RIDG	Jesse	Hoagg	Data-driven adaptive reynolds-averaged navier-stokes k-omega models for unsteady turbulent flow	UK	ME
RIDG	Victor	Marek	Raising Cyber-awareness at the University of Kentucky	UK	CS
RIDG	Susan	Odom	A low temperature flow battery prototype for space applications	UK	Chem
WCS	Huacheng	Zeng	Jamming-resilient wireless communications via blind interference cancellation	UL	ECE