

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

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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

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Funded Projects: 2015-2016

Program	PI FirstName	PI LastName	Project Title	School/Org	Dept
GF	Charles	Lu	Development of Carbon Nanotube-Graphene Hybrid Polymer Composites for Multifunctional Applications	UK	ME
GF	Howard	Whiteman	USING REMOTE SENSING TO EVALUATE DISEASE TRANSMISSION	MuST	WSI
GF	Lutz	Haberzettl	The GALEUS Survey: Dust properties and morphologies of UV-selected Galaxies at $z \sim 2$	UL	P&A
GF	Susan	Odom	Exploring Space with Non-Aqueous Redox Flow Batteries: Synthesis and Characterization of New Electrolytes	UK	Chem
GF	Alexandre	Martin	Transport model for condensing pyrolyzing species within porous material	UK	ME
GF	Alexandre	Martin	Investigation of Low Enthalpy Surface Chemistry Anomalous Behavior in Ablative Modeling	UK	ME
RIA	Jason	Jaggers	Musculoskeletal outcomes to chronic high-speed resistive exercise	UL	H&S
RIA	Susan	Odom	Electron Transfer at Low Temperatures: Determining How Electronic Structure and Molecular Shape Affect Reaction Rates	UK	Chem
MG	Michael	Carini	Supporting the participation of the Cave Area Rocket Scientists in the Team America Rocket Competition	WKU	P&A
MG	Ed	Murphy	Aerospace Motivates Kids; A Context for STEM	AMK	
MG	Katherine	Bullock	Living Arts & Science Center Planetarium Program	LASC	
MG	Jessica	Lair	Messages from the Sky: Astronomy Workshop for High School Students	EKU	P&A
MG	Kimberly	Haverkos	Engaging and Transforming the World: Girls' Continuing STEM Experience	TM	Ed
TF	Kevin	Donohue	NASA Robotic Mining Competition	UK	ECE
TF	Aleck	Leedy	Autonomous Shipping and Transporting Robot	MuST	Engr
TF	Alexandre	Martin	Kentucky Re-entry Universal Payload System: heat shield material selection, sizing and design	UK	ME
UF	Hemali	Rathnayake	Fabrication and Characterization of Solar Cells for Space Applications in LILT Environments	WKU	Chem
UF	Stuart	Williams	Dielectrophoresis in air for autonomous dust manipulation and analysis	UL	ME
UF	Stuart	Williams	Self-assembly of colloids for enhanced solar cells	UL	ME
UF	Sean	Bailey	Investigation of the Flow Structure Within an Ablative Thermal Protection System	UK	ME
UF	Michael	Carini	Rapid optical variability in optical and infrared Bright blazars	WKU	P&A
UF	Sanju	Gupta	Development of Rechargeable Lithium-Air Battery and In-situ Redox Chemistry Studies	WKU	P&A
UF	Alexandre	Martin	Coupling of Free and Porous Medium Flow with Material Recession for NASA Flow Tube Experiment	UK	ME
RIDG	John	Maddox	Experimental Characterization of Heat Shield Insulation Materials	UK-Pad	ME
RIDG	Li	Yang	Investigation of an electrochemical-based surface treatment of additively manufactured metal components via electrolyte flow optimization	UL	IE
RIDG	Steven	Gibson	Exploring the Dark Neutral Medium	WKU	P&A

NASA Kentucky Space Grant Consortium and EPSCoR Programs

Funded Projects: 2014-2015

Program	PI FirstName	PI LastName	Project Title	School/Org	Dept
CDR	Troy	Messina	Redesign of Berea College's Advanced Physics Laboratory for Improved Skill Building	Berea	Physics
GF	Beth	Guiton	High resolution and high temperature microscopy of skutterudite thermoelectrics	UK	Chemistry
GF	Howard	Whiteman	Using Remote Sensing to Evaluate Disease Transmission	MuSt	Bio Sci
GF	Aaron	Cramer	A Modular Electrical Power System Architecture for Small Spacecraft	UK	ECE
GF	Michael	Winter	Methodology for Reliable Emissivity Measurements at High Temperatures to support NASA Free-Flight Experiments	UK	ME
GF	Alexandre	Martin	Development of a high-fidelity thermal conductivity model including the effects of H2O	UK	ME
GF	Michael	Winter	Remote Recession Measurements of Ablative Heat Shield Materials	UK	ME
GF	Jesse	Hoagg	Formation Flying for a Dense Cluster of Autonomous Spacecraft	UK	ME
RIA	Christine	Trinkle	High Precision Micromolding of Freestanding Heterogeneous 3D Microstructures for Sensing and Detection Applications	UK	ME
RIA	Beth	Guiton	Fabrication of thermoelectric skutterudite samples for in situ transmission electron microscopy	UK	Chemistry
RIA	Jesse	Hoagg	An Experimental Demonstration of Flocking with Multiple Autonomous Air Vehicles	UK	ME
RIA	Hongxiang	Li	Single-Carrier Frequency-Domain Equalization for Unmanned Aircraft System	UL	ECE
MG	Ed	Murphy	Aerospace Motivates Kids - A Context for STEM	Aviation Museum of KY	
MG	Katherine	Bullock	LASC Planetarium And Professional Development 2014	Living Arts & Science Center	
MG	Dirk	Grupe	SpaceTrek	MoSt	EASS
MG	Karen	Coburn	Robotics Adventures Camp for FIVCO Students	ACTC	Workforce
MG	Robin	Zhang	A Mobile and Web-Based Geospatial Technology Workshop for K-12 STEM Teachers	MuSt	Geosciences
MG	Michael	Carini	Supporting the participation of the Cave Area Rocket Scientists in the Team America Rocket Competition	WKU	Phys & Astr
MG	Thomas	Tretter	Engaging and Exciting K-12 Students With Visually Immersive Astronomy Experiences	UL	Ed
TP	Tracy	Knowles	Bluegrass Community and Technical College BalloonSat Project	BCTC	Nat Sciences
TP	Aleck	Leedy	Autonomous Road Trip Game Robot	MuSt	Engr
TP	James	Lumpp	NASA ICESat-2 Hexacopter Engineering Challenge Undergraduate Team	UK	ECE
TP	Alexandre	Martin	KRUPS: Qualification & Testing	UK	ME
TP	Yongsheng	Lian	NASA Student Launch	UL	ME
US	Alexandre	Martin	Flux matching scheme for the computation of accurate boundary conditions on moving meshes	UK	ME
US	Michael	Carini	The character of the power spectral density of II ZW 229.015 from Kepler Observations	WKU	Phys & Astr
US	Charles	Lu	Computational Design of High Strength, Multifunctional, Continuously Reinforced Carbon Nanotube-Polymer Composites	UK	ME
US	Alexandre	Martin	Effect of fiber reactivity and permeability on mass loss and surface recession in ablative thermal protection systems	UK	ME
US	Gerard	Williger	The GALEUS Survey: Dust properties and morphologies of UV-selected Galaxies at $z \sim 2$	UL	Phys & Astr
RIDG	Karla	Welch	Wavelet Method for EMG Analysis, Motor Classification, and Observation of Muscular Development/Recovery	UL	ECE
RIDG	Thomas	Seigler	Frictionless Attitude Control Technologies for Next-Generation Nanosatellites	UK	ME
RIDG	Ali	Er	Smart Surface Creation by Laser Shock Wave Assisted Direct Imprinting on NiTi Shape Memory Alloys	WKU	Phys & Astr
RIDG	Jose	Grana-Otero	Fundamental Studies on Boiling: Gas Entrapment in Microcavities	UK	ME
RIDG	Michael	Winter	Experimental Investigation of Gas-surface Interactions of Ablative Materials in Low Power Plasma Facilities	UK	ME
WCS	Jessica	Lair	Organization Meeting for the newly formed Kentucky Professional Astronomical Society	EKU	Phys & Astr

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Program	PI FirstName	PI LastName	Project Title	School/Org	Dept
CDR	Jesse	Hoagg	Discrete-Time Linear-Quadratic Control: An Algebraic Approach	UK	ME
GF	Aaron	Cramer	A Modular Electrical Power System Architecture for Small Spacecraft	UK	ECE
GF	Beth	Guiton	In Situ Transmission Electron Microscopy of Solid State Li-ion Nanobatteries	UK	Chem
GF	Thomas	Seigler	Attitude Control of Satellites using Noncommutative Rotations	UK	ME
GF	Mahendra	Sunkara	Transition Metal Chalcogenide Nanostructures for Solar Energy Conversion	UofL	CE
RIA	Haluk	Cetin	Land Cover Change Mapping in Western Kentucky using Multi-Temporal Remote Sensing: Analysis of Effects of Global Environmental Change on a Regional Scale	Murray	GeoSci
RIA	Beth	Guiton	Fabrication and Characterization of Electron-Transparent Nanobatteries for In Situ Microscopy	UK	Chem
RIA	Thomas	Pannuti	A Continuing Multi-Frequency Monitoring Campaign of Radio Emission from Blazars with the Morehead State University 21-Meter Space Tracking Antenna	Morehead	E&SS
RIA	Ronald	Wilhelm	Stellar Parameter Determinations for Spectral Type A-Stars Using Full Spectral Energy Distribution Information	UK	P&A
RIA	Gerard	Williger	Multi-Wavelength Studies of Galaxies in the Francis Cluster and other Large Scale Structures at High z	UofL	P&A
MG	Michael	Carini	Supporting the Participation of the Cave Area Rocket Scientists in the Team America Rocket Competition	WKU	P&A
MG	Jesse	Hoagg	Annual IAE Kentucky Wing Design Competition	UK	ME
MG	Eric	Jerde	Continuing our STEM Initiative Space Trek: A Space Engineering Workshop for High School Girls	Morehead	E&SS
MG	Janis	Kidd	GSUSA Imagine Your STEM Future Camp	KSGC/Girl Scouts of KY	
MG	Katharine	Ott	Outreach Activities to Increase Interest in Mathematics Among K-12 Students	UK	Math
MG	Tim	Smith	Increasing Gender Equity in Aerospace	IAE	
MG	William	Vander Meer	Student Spaceflight Experiments Program - National Conference Travel Support	KSGC/Academy Shawnee	
TP	Aleck	Leedy	Autonomous Projectile Robot	Murray	E&P
TP	Michael	Sama	Wildlife Conservation UAV Challenge	UK	Bio&Ag
US	Sean	Bailey	Precision Guided Return of High-Altitude Payloads	UK	ME
US	Beth	Guiton	Synthesis of Li-ion Nanobattery Electrode Materials for In Situ Investigation	UK	Chem
US	Kate	He	Prediction the Spatial Distribution of Invasive Species Using Multi-Year NASA MODIS Data and Bioclimatic Variables	Murray	Bio Sci
US	Alexandre	Martin	Computational Platform for the Analysis of Micro-Topography Images of Porous Material	UK	ME
US	Samir	Rawashdeh	Integration of the Stellar Gyroscope	UK	ECE
US	Valdis	Zeps	Simulator for On-Orbit Solar Irradiation of CubeSats	BCTC	P&A
RIDG	Robert	Adams	Efficient Linear Solution Libraries for GEMINI	UK	ECE
RIDG	Marcelo	Guzman	Heterogeneous Ozonolysis of the Model Aromatic Fraction of Atmospheric Hulis	UK	Chem
RIDG	Hongxiang	Li	Broadcast and Unicast Hybrid Wireless Network for Aeronautical and Space Communications	UofL	ECE
RIDG	Thomas	Seigler	Reaction Beams for Orientation Control of Small Satellites	UK	ME
RIDG	Stuart	Williams	Development of an Electrokinetic Self-Cleaning Air Filter (ESCAF) to Support NASA Missions	UofL	ME
RA	Stuart	Williams	Influence of Gravity on Electrokinetic and Electrochemical Colloidal Self-Assembly for Future Materials	UofL / WKU	ME

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Program	PI FirstName	PI LastName	Project Title	School/Org	Dept
CDR	Jesse	Hoagg	Curriculum Development: An Algebraic Approach to Linear-Quadratic Control	UK	ME
CDR	Qingzhou	Xu	Develop New Instructional Materials for the Course of Materials Science for Space Applications in the Space Science Program at Morehead State University	Morehead	MS
GF	John	Kielkopf	Precision Ground-Based Photometry for Determining Properties of Exoplanets	UofL	P&A
GF	Thomas	Seigler	A Novel MEMs Actuator for Attitude Control of Miniature Satellites	UK	ME
GF	Vincent	Capece	Axial Compressor Flow Behavior Near the Aerodynamic Stability Limit	UK	ME
GF	Beth	Guiton	In Situ TEM Imaging of Solid State Li-ion Nanobatteries	UK	Chem
GF	Gerard	Williger	Planet Formation in Transitional Disks: The Impact of Water Ice	UofL	P&A
RIA	Matthew	Beck	Designing "Phonon-glass" Mixed Oxide Nanocomposites for Thermoelectric Energy Conversion	UK	CE
RIA	Y. Charles	Lu	Integrated Computational Material Engineering for Developing 3D Carbon Nanomaterials for Space Exploration Applications	UK	ME
RIA	Thomas	Pannuti	A continuing Multi-Frequency Monitoring Campaign of Radio Emission from Blazars with the Morehead State University 21-Meter Space Tracking System	Morehead	E&SS
RIA	Matthew	Nee	The Effect of Ionic Strength on Symmetry Breaking in Aqueous Nitrate Ion	WKU	Chem
RIA	Jennifer	Wilhelm	Research to Compare Informal and Formal Environments Toward Understanding How Middle Level Students Learn Math and Science: A Realistic Exploration in Astronomical Learning (REAL) Project	UK	STEM Ed
MG	Mike	Carini	Supporting the Participation of the Cave Area Rocket Scientists in the American Rocket Competition	WKU	P&A
MG	Eric	Jerde	Tapping an Underrepresented Resource in STEM Through Space Trek: A Space Engineering Workshop for High School Girls	Morehead	E&SS
TP	Keith	Andrew	NASA University Student Launch Initiative at Western Kentucky University	WKU	P&A
TP	Sean	Bailey	The BLUE CAT Undergraduate Design Challenge	UK	ME
TP	Aleck	Leedy	Autonomous Classification Robot	Murray	EE
TP	Yongsheng	Lian	University Student Launch Initiative	UofL	ME
TP	Alexandre	Martin	WildCATS: Wildcats Cubesat Ablator Testing System	UK	ME
US	Yinan	Wei	Protein Engineering toward the Production of Biomimetic Membrane Systems of Sensing and Separation	UK	Chem
US	Alexandre	Martin	The Accuracy and Efficiency of Viscosity Models for High Temperature Gas: Application to a Charring Ablation	UK	ME
US	Alexandre	Martin	Development of a Reduced Model of Homogeneous Kinetic Reactions for the Decomposition of Phenol	UK	ME
US	Beth	Guiton	Li-ion Nanobattery Fabrication for In Situ Transmission Electron Microscopy	UK	Chem
RIDG	Marcelo	Guzman	Heterogeneous Reactions of Ozone Depletion in the Atmosphere	UK	Chem
RIDG	Hongxiang	Li	Delay-sensitive and Prioritized Data Multicasting VIA Random Network Coding	UofL	ECE
RIDG	Beth	Guiton	Direct Imaging of Li-ion Nanobattery Cycling at Ambient and Elevated Temperatures	UK	Chem
RIDG	Sean	Bailey	Investigation of Wall Shear Stress Modifications Occurring Due to Turbulent Flow Over an Ablative Thermal Protection System	UK	ME
RA	Alexandre	Martin	Improving Heat Shields for Atmospheric Entry: Numerical and Experimental Investigations for Modeling Ablative Thermal Protection System Surface Degradation Effects on Near-Wall Flow	UK / KSU	ME
WD	Tim	Smith	KIAE Workforce Development	IAE	

Program Key:

CDR - Curriculum Development / Revision (Space Grant)

GF - Graduate Fellowship (Space Grant)

MG - Mini-Grant (Space Grant)

RIA - Research Initiation Award (Space Grant)

TF - Team Fellowship (Space Grant)

TP - Team Project (Space Grant)

UF - Undergraduate Fellowship (Space Grant)

US - Undergraduate Scholarship (Space Grant)

WD - Workforce Development (Space Grant)

RIDG - Research Infrastructure Development Grant (EPSCoR)

WCS - Workshop / Conference / Seminar (EPSCoR)

RA - Research Area award (EPSCoR)