

National Aeronautics and Space Administration



Office of  
**Small Business**  
Mentor-Protégé Program

Historically Black Colleges and Universities

# TECHNOLOGY INFUSION ROAD TOUR

and Minority-Serving Institutions

[www.nasa.gov](http://www.nasa.gov)

University of Maryland Eastern Shore

# Technology Infusion Road Tour Presentation Outline

- Each University/Institution will have the platform to present capabilities for :10 minutes and the remaining :5 minutes for Q&A from NASA OSBP, Technical POCs and Large Prime Contractors
- At a minimum, please include the following in the HBCU/MSI Technology Infusion Road Tour:
  - University Curriculum
  - University Programs and Degrees
  - Past Performance (Contracts & Subcontracts)
  - University Points of Contacts

# University of Maryland Eastern Shore

- 1890 Land-grant institution
- Carnegie Doctoral University (Moderate Research Activity) - 2016
- University curriculum:
  - To provide individuals, including first generation students, access to a holistic learning environment that fosters multicultural diversity, academic success, and intellectual and social growth
  - To prepare graduates to address challenges in a global knowledge-based economy

# University of Maryland Eastern Shore

- University Programs and Degrees
  - 46 (Academic Year 2007)
    - 26 Bachelor's
    - 11 Master's
    - 6 Doctorate
  - 60 (Academic Year 2015)
    - 37 Bachelor's
    - 14 Master's
    - 8 Doctorate



# New Academic Programs

- Engineering Program, Golf Management, Rehabilitation Psychology (Bachelor's)
- Chemistry and Pharmaceutical Sciences (Master's)
- Pharmacy and Pharmaceutical Sciences (Doctorate)

# UMES Engineering Program

- 2+2 Engineering Program
- Four-Year Degree Program with four specializations in (2007)
  - Electrical Engineering
  - Aerospace Engineering
  - Computer Engineering
  - Mechanical Engineering
- ABET Accreditation (2012)
- UMES-Salisbury University 3+2 Physics/Engineering Dual-Degree Program (2016)

# Selected New Engineering Labs

- Robotics Lab
  - design and test of robotics, autonomous navigation systems for control, guidance, and navigation
- Electromagnetic Anechoic Chamber
  - Antenna testing and radar cross section measurement
- Aerospace Lab
  - A 15 feet long educational wind tunnel to study aerodynamics
- Statics/Materials Lab
  - testing, stress and strain measurement and analysis for various materials
- MEMs Lab
  - design, produce, and test microelectromechanical systems and small devices at micro/nano-level
- Unmanned Systems Lab
  - design and testing of small unmanned aerial systems for operation and engineering.

# Grant and Contract Management

- **Office of Sponsored Research and Programs (OSRP)**
- **Management Structure:**
  - Principal Investigator (PI)
  - Director of OSRP (Ms. Catherine Bolek)
  - Vice President for Research
- **Grant/Contract Submission Process**
  - Pre-Award: Internal routing and approval, final submission through OSRP
  - Post-Award: PI, Director of OSRP, Account Manager



# Overview of Selected Research Projects

- Research focus: Multi-Disciplinary and Internationally Collaborated Research and Innovation
- Overview of Selected Research Projects
  - UAV Remote Sensing for Precision Agriculture (NASA grant)
  - Cooperative Optimal Control for Unmanned Systems (AirForce Academy Fellowship)
  - AEROKATS and ROVER Education Network (NASA subcontract)
  - Structural Health Monitoring (NSF grant)



# AIRSPACES<sup>2</sup> :Aerial Imaging and Remote Sensing for Precision Agriculture and Environmental Stewardship

- Researchers: Dr. Abhijit Nagchudhuri (Engineering), Mr. Chris Hartman (Aviation)
- Funding: NASA/Maryland Space Grant Consortium (2015 – 2016)
- Objective: Aerial Imagery provides users with insight into crop health, yield estimates, land use patterns.



Introductory Trainer



Primary Trainer



Remote Sensing  
(Visible-Video) UAV



Remote Sensing (Vis/NIR) and  
Atmospheric Profiling (T/RH/P) UAV



Advanced Trainer

# Cooperative Optimal Control

- Researcher: Dr. Rajnish Sharma (Aerospace)
- Funding: Air Force Academy Fellowship (2016)
- Topics
  - Autonomous Control of Robotic Vehicles (e.g., guidance, navigation, and control)
  - Cooperative Control of Multiple Autonomous Vehicles (e.g., swarms of multiple unmanned air/ground vehicles, multi-robot coordination, spacecraft formation flying)
- Goal: to build co-operative optimal control applications in unmanned systems and the lab facilities for ground testing

# AEROKATS and ROVER Education Network (AREN)

- Researcher: Mr. Willie Brown (Aviation), Mr. Chris Hartman (Aviation)
- Funding: NASA Science Education Cooperative Agreement (2016- 2020)
- Goal: to train the next generation scientists to observe and understand our planet Earth through experiential learning using NASA technology and data in real-world settings.



Advancing Earth Research  
Observation Kites for  
Atmospheric Terrestrial  
Science (AEROKATS)

# Structural Health Monitoring

- Researchers: Dr. Yuanwei Jin (Electrical), Dr. Payam Matin (Mechanical)
- Funding: NSF-CMMI (Civil, Mechanical, Manufacturing Innovation grant) 2011 - 2013
- Outcome: US Patent 9,413,571 awarded to UMES “System and method for time reversal data communications using guided elastic waves” (2016)
- Applications: Spacecraft/aircraft structural health monitoring by wireless technology



# Point of Contact

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