National Aeronautics and Space Administration

NASA's HBCU/MI Engagement Forum at Johnson C. Smith University

Virginia State University

Dale Wesson, Ph.D., P.E.
Vice President for Research & Economic Development

www.nasa.gov

Virginia State University

- 1890-Land Grant Institution
- Historically Black College or University (HBCU)
- Accessible to I-95 and I-85
- <30 min from I-64
- Approx. 2 hrs from DC

Office of Small Business Mentor-Protégé Program

Enrollment/Academics

- Enrollment – 4,600
- Academics
  - 31 Undergraduate degree programs
  - 17 Master's programs
  - 2 Doctoral Programs

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STEM Degree Programs

- Computer Science (BS,MS)
- Computer Engineering (BS)
- Manufacturing Engineering/ Technology (BS)

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STEM Degree Programs

- Electrical and Electronic Engineering Technology (BS)
- Information and Logistics Technology (BS)
- Mathematics (BS, MS)

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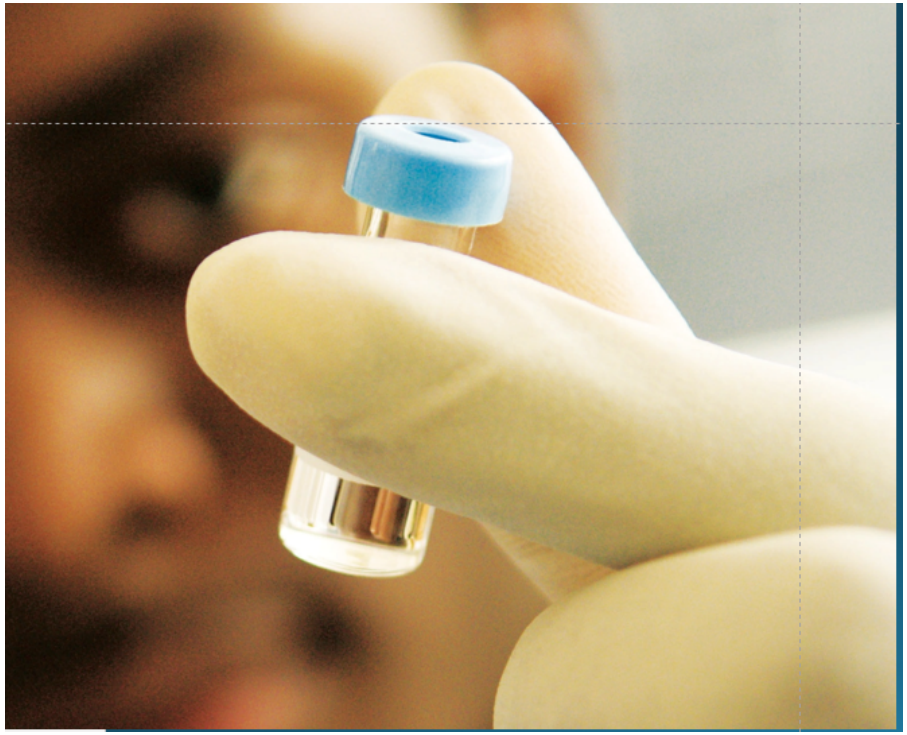
STEM Degree Programs (con't)

- Biology (BS, MS)
- Chemistry (BS)
- Psychology (BS, MS, PhD)



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Research Capabilities

- Advanced manufacturing (3D & Friction stir welding)
- Surface engineering using nanotechnology
- Unmanned aerial & terrestrial vehicles

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Research Capabilities

- Autonomous controls (embedded wireless sensor networks)
- Process control and logistics
- Applied game theory/ dynamic systems

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Other relevant capabilities

- Growth spaces
- Indoor agriculture
- Robotics

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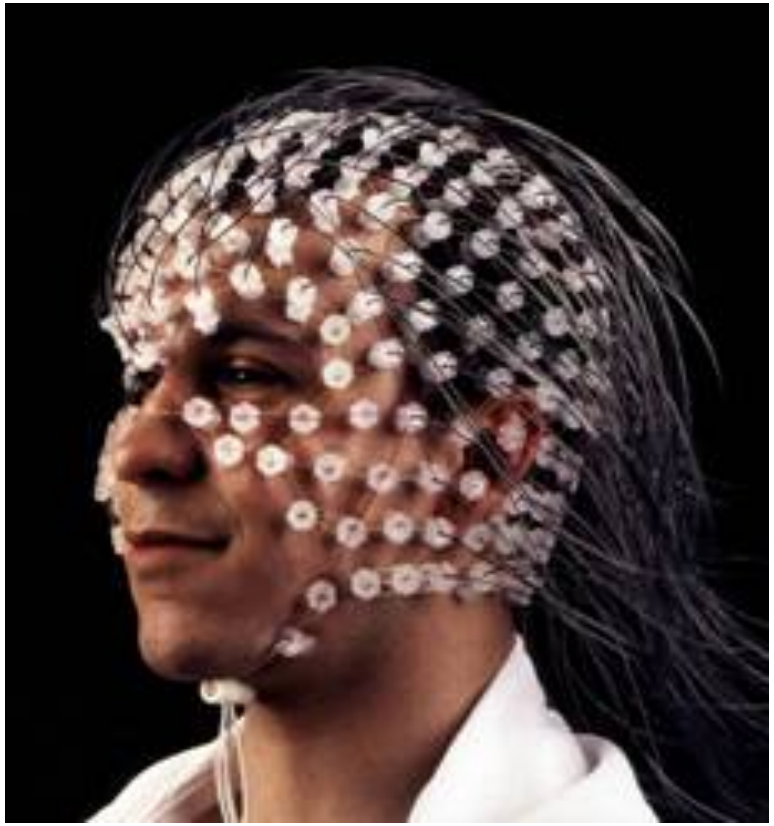
Specialized instrumentation

- Electroencephalogram (EEG)
- Specialized microscopes (scanning electron & fluorescent)
- Milling Machines



Specialized instrumentation

- DNA microarray
- Plasma spray coating cell
- 3D Metal Printer (EOS M290)
- 3D visualization lab

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Partnerships
Commonwealth Center for Advanced Logistics Systems (CCALS)

- Partnership between universities, industries, & government
- Focuses on development of transformational improvements (logistics).
- Website: www.ccals.com

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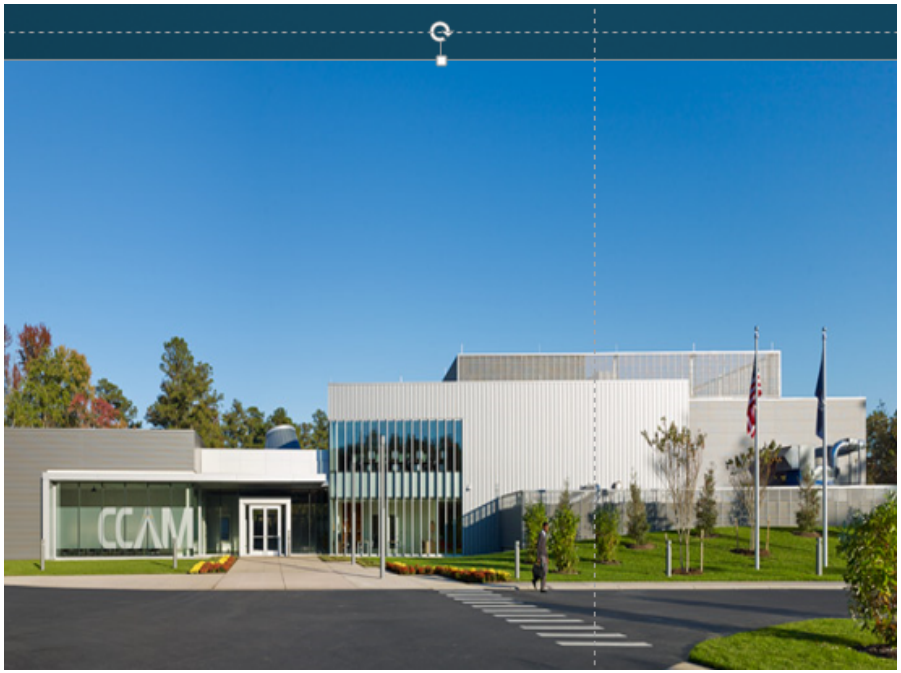
Partnerships
Commonwealth Center for Advanced Manufacturing (CCAM)



- University/industry partnership
- Focuses development/ facilitation of advanced manufacturing solutions.
- Website: www.ccam-va.com/

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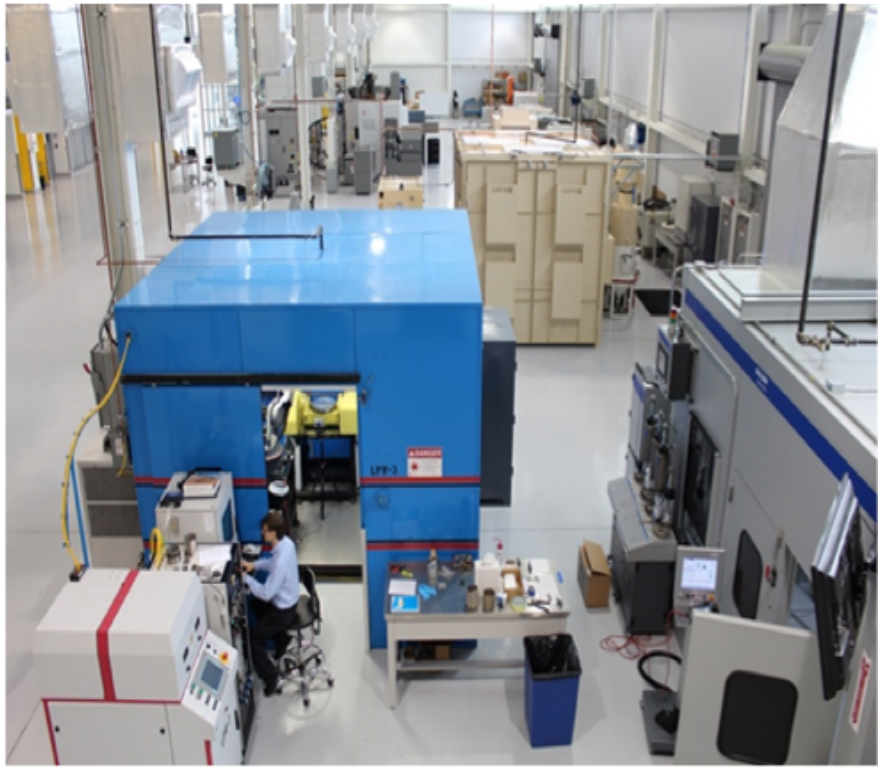
CCAM Capabilities

Strategic Research Areas:

- Adaptive Automation Systems
- Surface Engineering
- Additive Manufacturing



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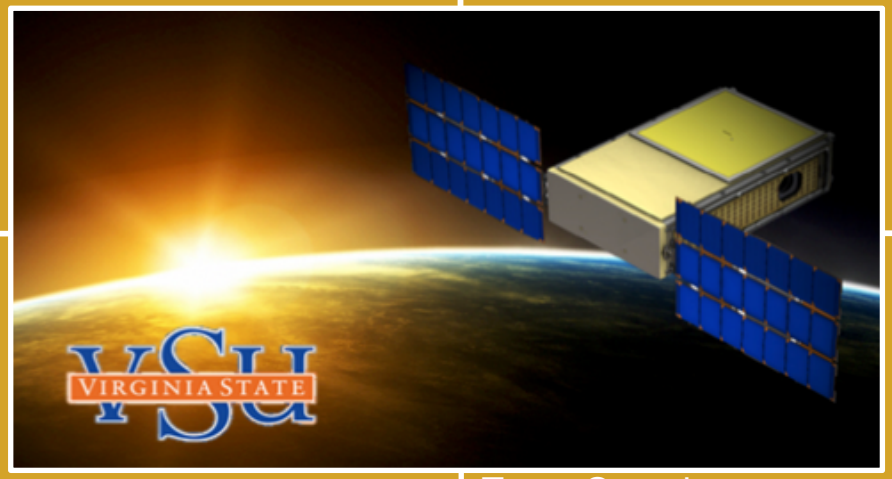
3-D Printed CubeSat Structure with Integrate Thermal Control

Potential Impact

- Improved Heat Management
- No Thermal Control Heaters
- No Multi-layer Insulation
- Lowered-cost and Rapid Development of SmallSats
- Increase the lifetime of spacecraft electronics by operating at a constant temperature versus the stress of orbital thermal cycles
- Provide a similar design for all CubeSats which reduces multiple thermal control systems design, fabrication, and thermal test costs
- Increase the operational capabiilities with less thermal restrictions

Project Objectives

- Circumferential Thermal Gradient < 6 degrees Celsius
- 3-D Print Three Seamless Aluminum Structures
- Develop Orientation Independent Thermal Control
- Simplifiy and Lessen the Design, Test, Fabricatiion, and Cost of Small Spacecraft
- Initiate the training of Spacecraft Thermal Engineeers at VSU



Technology Overview

- 3-D Aluminum Printing
- Rapid Prototying
- Advanced Manufacturing
- Starting TRL = 3
- Projected TRL = 6

Team Overview

- Dale Wesson, PhD, Virginia State University
- Zhenhua Wu, PhD, Virginia State University
- Erick Kindred, Engineer, Virginia State University
- Manufacturing Engineering Students, Virginia State University
- Hawk Institute for Space Sciences
- NASA Wallops Flight Facility
- Commonwealth Center for Advanced Manufacturing

Other CCAM's Industry Partnerships

Point of Contact

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