



**Next Generation STEM  
Learning for All:**

**Changing the Variables  
of Resources & Time**

**An Overview of the Memphis Virtual  
STEM Academy at East High School**



Alfred Hall, Ph.D. – The University of Memphis





# Innovative Technology Experiences for Students and Teachers (ITEST)

- NSF grant awarded to support the Memphis Virtual STEM Academy at East High School
- Awarded to the University of Memphis in partnership with Shelby County Schools
- October 1, 2013 - September 30, 2016



# Virtual STEM Academy

- Online Engineering Curriculum Program (STEM Academy, Inc.) - approved as C&T program
- Self-paced, interactive modules with built in assessments
- Concepts are applied in Engineering Laboratory with activities and PBL modules at East C&T Center (Single Investment w/ District RTT Funds)
- Students must attend lab 1 day per week (after school or on Saturdays)



# VSA Faculty

- 4 core teachers with engineering work experience
  - Civil/Architectural
  - Biotechnology
  - Manufacturing
  - Energy
- Shared Work Schedule: 10 am - 6 pm (M-F)  
9 am - 2 pm (Sat)
- Career and Technology Budget Allocation

# VSA Demographic Data

- 387 students from 25 different high schools
- 57% males and 43% females
- 64% African American  
19% White  
13% Asian  
2% Hispanic/Latino  
1% Pacific Islander  
1% Biracial





# VSA Program of Study

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Civil /Architectural	Biotechnology	Manufacturing	Energy
Introduction to Engineering	Introduction to Engineering	Introduction to Engineering	Introduction to Engineering
Principles of Engineering	Principles of Engineering	Principles of Engineering	Principles of Engineering
General Fabrication Methods	Green Methods	Design for Manufacturing	Engineering Technology
Architecture and Construction	Foundations in Biotechnology	Materials Science	Green Methods
Green Methods	Materials Science	3D Solid Modeling	EPICS Capstone



# ITEST Strategies

- STEM Student Support
- STEM Teacher Support
- STEM Interest Development and Program Recruitment
- STEM Partnership Development



# STEM Student Support

- Laptop Computers
- Home School STEM Advocates
- University of Memphis Student Tutors/Mentors from Herff College of Engineering
- Advancement Via Individual Determination (AVID) - Persistence Habits and Study Skills



# STEM Teacher Support

- STEM Curriculum Alignment and Articulation Agreements
- Professional Development for Academy Faculty and Other STEM Teachers Across the District
- Orientation/Training for Home School STEM Advocates



# STEM Interest Development and Program Recruitment

- Saturday Academies for Middle School Students (Grades 7&8)
- Virtual STEM Academy Summer Bridge Program for Entering Academy Participants



# STEM Partnership Development

- Provide Real-world Experiences
  - Site visits (real and virtual)
  - STEM Problems or Project Challenges
  - Student Internships
  - Teacher Externships
- Dual Enrollment Opportunities & Initial Course Credit Waivers w/ UM
- Sharing Best Practices w/ TN STEM Innovation Network (TSIN)



# Contact Information

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