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College of Engineering

Workforce Development

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Team

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BU College of Engineering

CEDO Center for Engineering Diversity & Outreach

FIU

Sarah Hokanson, BU

Norman Munroe, FIU

Stormy Attaway, BU

Lyonel Milton, Michigan

Stephanie Strange, FIU

Stacey Freeman, BU

Engineering Workforce Development Vision

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Online Modules Prepare & Educate Diverse Learners

Nanopatterning Metaglues

Mechanical 3D Metamaterials

Cell Engineering

Optical Engineering

Applications Improve Lives

Competency-based training

Alignment University & STEM standards

Prior Knowledge Concepts & Applications

Implementation videos, interactive presentations

EXTERNAL EVALUATION – EDUCATIONAL AND RESEARCH EXPERIENCES

BU College of Engineering

CEDO Center for Engineering Diversity & Outreach

FIU

Museum of Science

Opportunities for learners K-postdoc

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Objectives	Programs to Leverage/NEW PROGRAMS	NSF Analogs, Instruments
Middle school students Math. Preparation for college	TISP (BU) Miami Precollege Prep (FIU) FLAME (FL Action for Min. in Eng.) (FIU) Engineering Expo. (FIU) Engineers on Wheels (FIU) Wolverine Pathways (UM)	
High School students & teachers inspired CELL MET research	TISP, STEEP (BU: COE & School of Ed.) M-Engin, Detroit-area PCEP (UM)	RET (Research for Teachers) Young Scholars(BU: RISE, UM:CHPOM)
University students ready for Further Education and Workforce	Community College Transfers (FIU) LEAP, TISP, STEEP (BU) CEDO (UM) Center for Entrepreneurship (UM) **Freshman Intro to Engineering Module** **Undergraduate concentration**	REU (Research for UG) **International Research** **Industrial Partner Rotation** Nano-databases (NanoHub) AWE Surveys
Graduate Students & Postdocs developing workforce related skills	**PDPA programming (BU)** Center for Entrepreneurship (UM)	**Industrial internships**
Diverse and strong workforce	**Test beds exhibits Boston Museum Science and Miami and Detroit**	

CELL-MET Impact on Workforce

Over 10 years, we will train and propel:

- 120 Post Docs
- 205 PhD students
- 170 Masters students
- 60 Undergrads in REUs
- 100s Undergrads in courses & concentrations
- 10 Teachers in RETs
- 100s Teachers as partners/hosts/learners
- 300 Industry Internships/Rotations
- 1,000s of precollege students
- General public through Science Museums

Strategic plan designed with PIs, stakeholders and resources at the forefront

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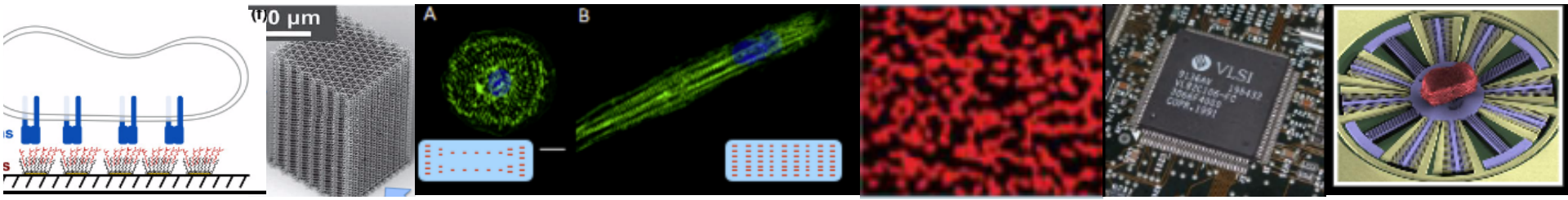

Learners drive entry:

- What do I know already?
- Care about?
- What do I need to teach? Learn?
- Where do I want to go in STEM?
- What do I need next?

Context: State of the Art Blended with New Research:

- Microelectronics
- Nanomfg./Glues
- Scaffolds
- Tissue assembly
- Imaging and actuation

Explore Existing Resources:

- What exists?
- Are they feasible, effective?
- Do they teach similar content?
- Who will use these resources? Where?
- Align ABET and national Math and Science Standards?

Workforce Skills and Activities to Attain

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Leadership

- Student Leadership Council from all 3 Institutions
- Pilot, teach, and mentor younger students

Teamwork

- Work in research teams
- Teams to develop and teach educational materials
- Collaborate with pre-and in-service teachers

Communication and Presentation

- Interact with public at museum exhibits
- Present science at recruitment venues

Entrepreneurship

- Utilize UM Entrepreneurship program

Globally Competitive

- Conduct research in Argentina or Switzerland

Evaluation and Assessment with External evaluator impact all stakeholders

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External Evaluator Outreach and K-12 opportunities

- Undergraduate, Graduate, and Postdoctoral training through rubrics / surveys / interviews

Using data to drive improvement – collaboration between our teams

- Leverage reliability- and validity-tested instruments
  - Changes in learning, awareness/perceptions, attitudes
  - Concept inventories & databases: OERL and AWE
- Measure project implementation and progress
- Track research participants

Data Collection

- Program evaluation and training rubrics
- Workforce outcomes
- Train-the-trainer – facilitator and learner outcomes

Educational Development planned for wide dissemination and continuous improvement

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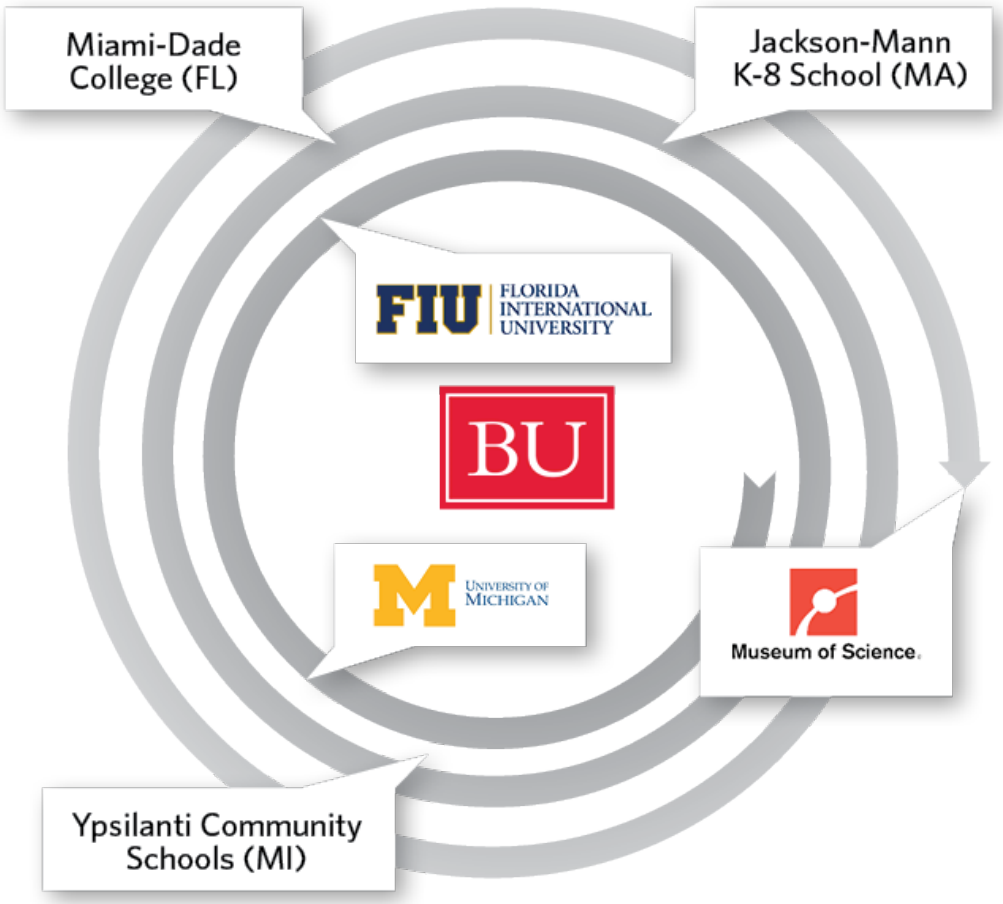
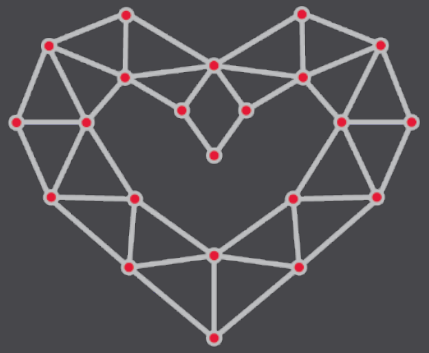
- Education based on research and evidence, refined with evaluation
- Keep stakeholders on pathways to STEM success and focus on greatest impact
- Precollege partners have wide reach AND UR groups
- Disseminate and scale with more partners and Science Museum
- Diverse groups motivated by Improving Lives and Heart Health and Entrepreneurship





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Questions