



# ENGINEERING DEANS INSTITUTE 2017

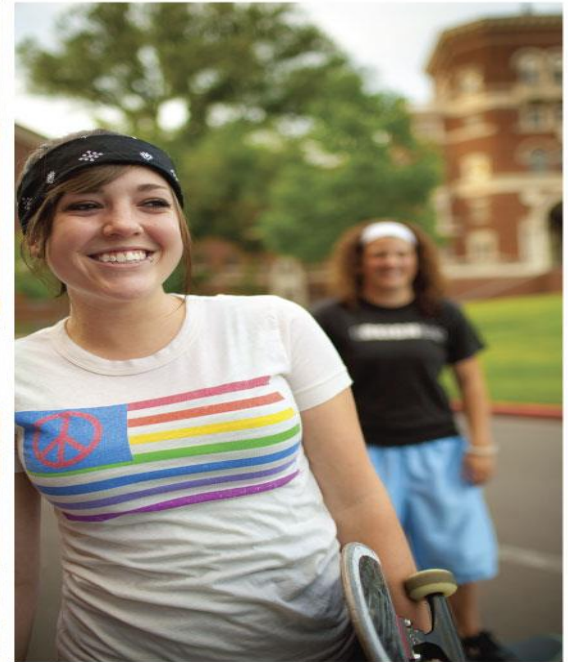
Cool Ideas Session  
April 3, 2017



University of Idaho  
College of Engineering

# 1. Change Team for Diversity, Equity, and Inclusion

Scott Ashford, Kearney Professor and Dean



## **Goal 1 in our strategic plan is to become a model of an inclusive and collaborative community**

- **Disrupted faculty hiring process for diversity**
  - Last three years over half new hires women and minorities
- **Added Associate Dean for Faculty Advancement**
  - Primarily to guide recruitment and P&T process
  - Unexpected benefit as resource for faculty in need
- **Established the “Change Team” in Fall 2016**
  - 25 faculty and staff across the college
  - Did not turn out as expected

## Change Team for College of Engineering as envisioned

- **A cohort of 25 change leaders**
  - **Original charge to become empowered to co-facilitate two 2-hour seminars on inclusivity and equity in engineering**
  - **Hired a consultant to help train and develop materials**
  - **Found we could do it ourselves, let consultant go**
- **Change Team revised original charge**
  - **Achieve foundational, working understanding of diversity, equity, inclusion, and social justice among majority of College of Engineering faculty and staff**

## Change Team for today

- **Proceeding with one seminar**
  - Necessary, but not sufficient
- **Establishing Professional Learning Communities**
- **Commissioning a “DEI Committee” in each school**
  - Pre-recruitment of faculty
  - Facilitate change of Position Descriptions for staff to empower them to participate in community building
- **Establish sounding board for Associate Dean**
- **Delivery of session at new faculty boot camp**
- **Expand disruption of hiring practices to staff**

See me at tonight's reception (drinks are on Oregon State)  
Email me at [scott.ashford@oregonstate.edu](mailto:scott.ashford@oregonstate.edu)

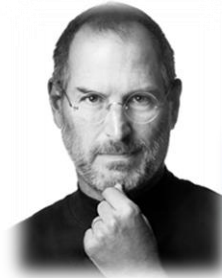
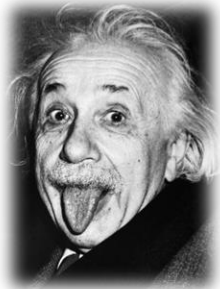


## 2. Redesigning the UG curriculum for HKU Engineering

Professor Norman Tien  
Dean of Engineering  
The University of Hong Kong



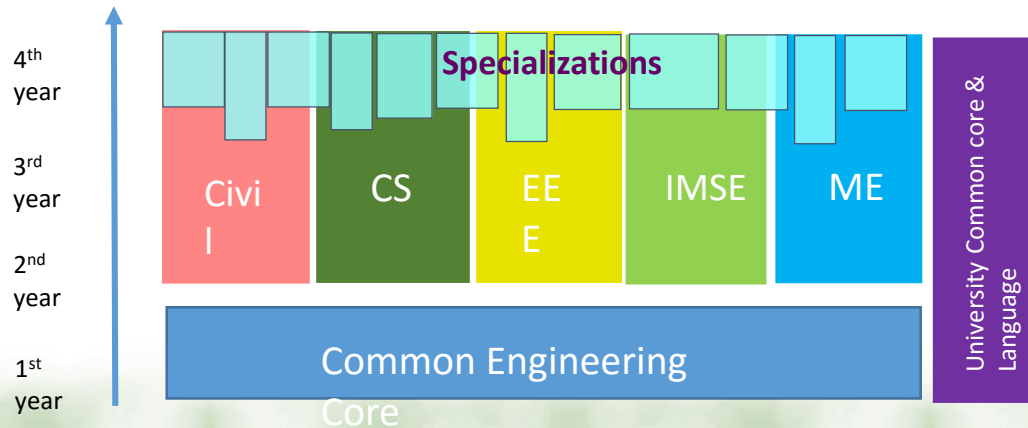
# What kind of HKU Engineering student do we want?





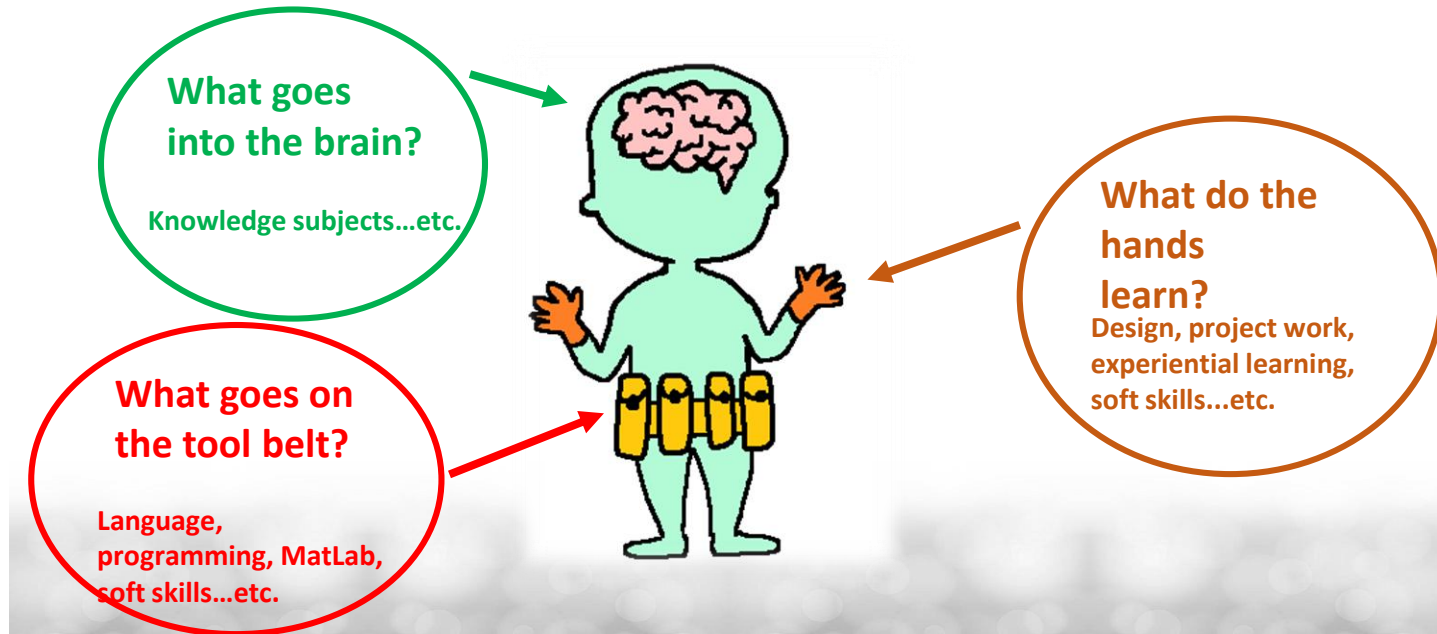
# Redesigned UG Curriculum

A structure built on a **solid core** with **flexibility** of individual study plans

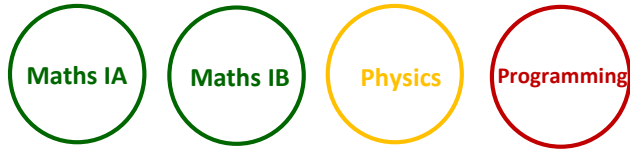


# Build a HKU Engineering Student

Your ideal first year Engineering student should possess ?



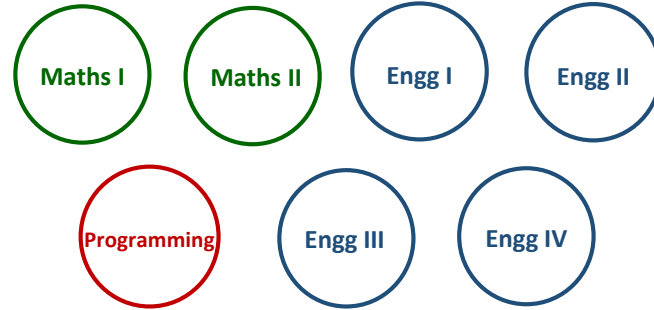
## Existing First Year's Courses (6)



Plus TWO of these (General Engineering Intro courses):



## New First Year's Courses (7)



**AND ...**

**“It is easier to change the course of history than  
it is to change a history course”**

*Change Leadership in Higher Education:  
A Practical Guide to Academic Transformation - Jeffrey L. Buller*





## 3. STEM Learning Ecosystems

*Gregory Washington, PhD  
Stacey Nicholas Dean of Engineering  
The Henry Samueli School of Engineering  
Professor, Mechanical and Aerospace Engineering*

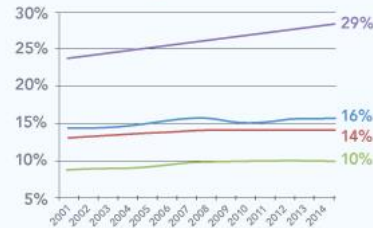


## Women have seen no improvement in STEM since 2001

Women remain as scarce as ever in engineering, computing, and advanced manufacturing.

Women as a percentage of the:	2001	2014
Engineering Workforce	13%	12%
Computing Workforce	27%	26%
Advanced Manufacturing Workforce	10%	10%

## African Americans and Latinos have lost ground in STEM

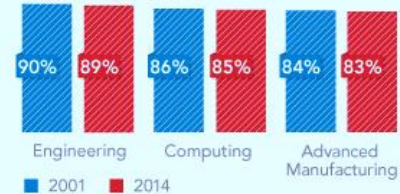


African American/Latino Percentage of:

- the U.S. working-age population
- the advanced manufacturing workforce
- the computing workforce
- the engineering workforce

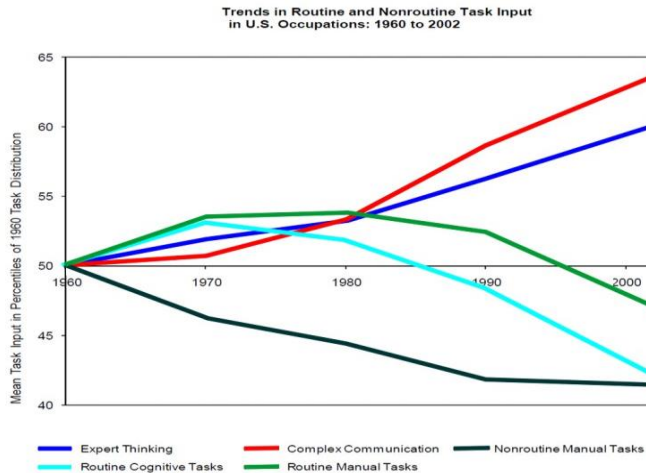
## Whites and Asians still dominate the STEM workforce

Between 2001 and 2014, whites and Asians declined from 74 to 69 percent of the working-age population. Yet their dominance in critical STEM occupations continues unabated.

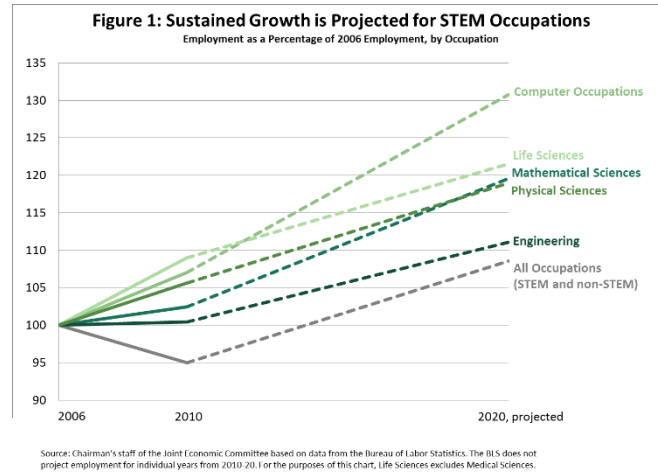


# Employment Challenge...

## Skills Gap Challenge...



Source: Autor, Levy and Murnane (2003) updated to 2002 by David Autor.





# STEM Learning Ecosystems

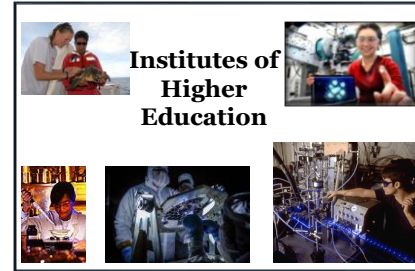
**STEM-Rich Institutions**

A collage of four images showing people in various settings: a museum exhibit with a large screen, a group of people at a table, a person in a lab coat, and a dinosaur skeleton.

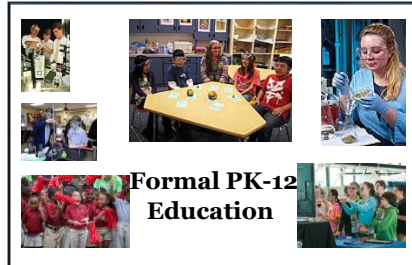
**Business Community**

A collage of six images showing people in business settings: a person at a computer, a person holding a document, a person in a lab coat, a person in a meeting, a person in a field, and a person in a meeting.

**Institutes of Higher Education**

A collage of six images showing people in higher education settings: a person in a lab coat, a person in a meeting, a person in a meeting, a person in a meeting, a person in a meeting, and a person in a meeting.

**Formal PK-12 Education**

A collage of six images showing people in formal PK-12 education settings: a person in a meeting, a person in a meeting, a person in a meeting, a person in a meeting, a person in a meeting, and a person in a meeting.

**Learner Centric**

A collage of four images showing people in learner-centric settings: a person in a meeting, a person in a meeting, a person in a meeting, and a person in a meeting.

**Out-of-School Programs**

A collage of six images showing people in out-of-school programs: a person in a meeting, a person in a meeting, a person in a meeting, a person in a meeting, a person in a meeting, and a person in a meeting.

**Family**

A collage of four images showing people in family settings: a person in a meeting, a person in a meeting, a person in a meeting, and a person in a meeting.



# STEM Funders Network Membership History

S. D. BECHTEL, JR.  
FOUNDATION  
STEPHEN BECHTEL FUND

The Pinkerton Foundation

 **MOTOROLA SOLUTIONS**

 **Human Energy™**

*Carnegie*  
CORPORATION  
OF NEW YORK

 CHARLES AND LYNN  
SCHUSTERMAN  
FAMILY FOUNDATION

THE  
*Steinman*  
FOUNDATION

 Time Warner  
Cable™

ENJOY  
BETTER

 **MERCK**  
Be well

 **DOW**

 **Samueli**  
FOUNDATION



Kern | FAMILY FOUNDATION

THE  **FOUNDATION**  
*Every child deserves a champion.*

GORDON AND BETTY  
**MOORE**  
FOUNDATION

 **UNIVERSAL  
TECHNICAL  
INSTITUTE**  
*Chosen by Industry. Ready to Work.*

*Lilly*

 **GILL FOUNDATION**

**stemonext**  
Engaging Learners Everywhere  
Generously Supported by the Noyce Foundation

 **BROADCOM**  
FOUNDATION

 **acce** ASSOCIATION OF  
CHAMBER OF COMMERCE  
EXECUTIVES

THE LEONA M. AND HARRY B.  
**HELMSLEY**  
CHARITABLE TRUST

**FCA**  
FOUNDATION

 **PISCES FOUNDATION**

 **The Harry and Jeanette Weinberg Foundation, Inc.**

**AMGEN**  
35 YEARS

**SIMONS FOUNDATION**

**KDK** *Harman*  
Foundation

 **TIGER WOODS**  
FOUNDATION

BURROUGHS  
WELLCOME  
FUND 

**Williams**

 **Overdeck Family  
Foundation**

**STEM**  
Funders  
Network

the **Lemelson** foundation  
improving lives through invention

**NOYCE**  
FOUNDATION



# OC STEM Partnership



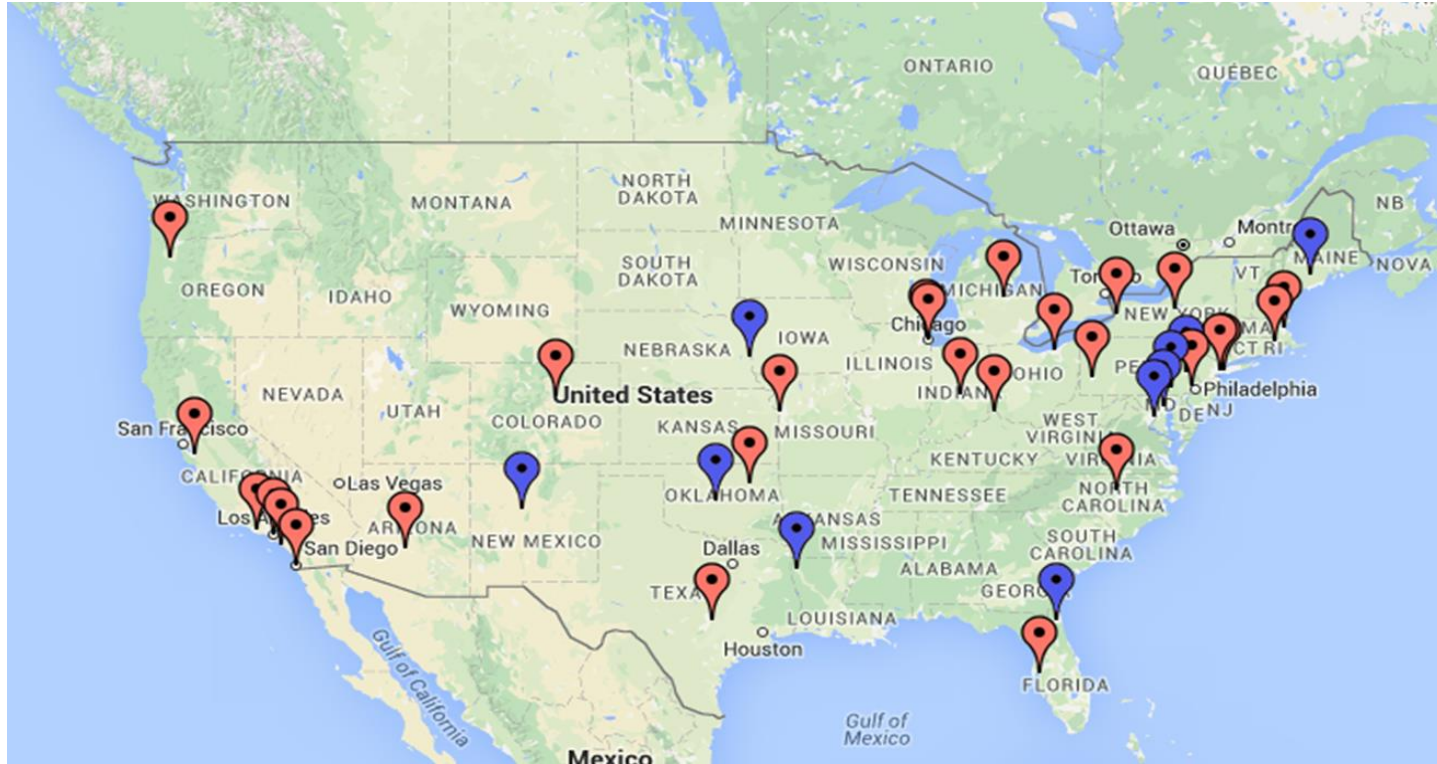
Leyla Riley  
Director of Academic Innovation

- The most comprehensive Non Government movement to improve PBL STEM Education in the Country
- Moving to UCI over the next two months
- Will strengthen our ability to implement and expand STEM education initiatives
- Puts UCI in the center of the National discussion on STEM Education



# STEM Learning Ecosystems for 2016

## 37 Communities...and Counting





## 4. Women in Engineering, Mathematics and Science Program University of Wisconsin-Platteville

Molly Gribb, PhD, PE, Fellow ASCE  
Dean, College of Engineering, Mathematics and Science (EMS)  
[gribbm@uwplatt.edu](mailto:gribbm@uwplatt.edu)

# UW-P is an access institution



- 7,793 students at UW-P; 65% men
- Nearly 1/2 enrolled in the College of EMS; now 15% women
- New freshmen:
  - 78% WI residents
  - 41% First generation
  - 26% Pell eligible
- 7 ABET accredited programs
- Math, chemistry, broad field science, and sustainable & renewable energy systems
- 21% of all BS engineering degrees awarded in WI (2015-16)





**2016 ABET Claire L.  
Felbinger Award for  
Diversity Recipient**

<https://vimeo.com/189794716>



2 0 1 6

A B E T

A W A R D S

G A L A



# How can we attract more women, underrepresented students?

Molly Gribb

Dean, College of Engineering, Mathematics and Science

UW-Platteville

1 University Plaza

Platteville, WI 53818

[gribbm@uwplatt.edu](mailto:gribbm@uwplatt.edu)





# 5. Global Engineering Field School at the Cradle of Humankind

*A partnership between the Turkana Basin Institute & The College of  
Engineering & Applied Sciences at Stony Brook University*



Fotis Sotiropoulos  
Dean, College of Engineering & Applied Sciences  
Stony Brook University  
[Fotis.sotiropoulos@stonybrook.edu](mailto:Fotis.sotiropoulos@stonybrook.edu)  
[@CEASdeanSBU](#)

# Lake Turkana, Kenya: The Cradle of Humankind



# Turkana Basin Institute: A test-bed for engineering innovation for off-grid environments



Hydroponic gardening...



Reverse osmosis system



Rain water capture & storage



Wind energy



Solar powered ground water pumping station



Experimental water purification systems

# A unique opportunity for students to experience & understand the survival challenges of local people

**DEPARTMENT OF HEALTH**  
**CITIZENS SERVICE DELIVERY CHARTER**  
**ILLERET HEALTH CENTER**

**Objectives:**  
This department for health and its staff are committed to provide quality services and promote health services to our people with dignity, professionalism and within the shortest time possible.

Services offered	Cost of each service	Targeted clients	Working time
1. Reception and customer care	None	General public	9:00 AM - 5:00 PM
2. Child health services <ul style="list-style-type: none"><li>• Immunization</li><li>• Growth Monitoring / Assessment</li><li>• Growth Monitoring / Assessment</li></ul>	None	General public	9:00 AM - 5:00 PM
3. Maternal Health Services <ul style="list-style-type: none"><li>• ANC</li><li>• PNC</li><li>• Delivery services</li><li>• Postnatal services</li><li>• Contraceptive counselling</li></ul>	None	General public	9:00 AM - 5:00 PM
4. Clinical services <ul style="list-style-type: none"><li>• Adult &amp; children over 5 years</li><li>• Children under 5 years</li><li>• Dispensing / Referral</li><li>• Dispensing / Referral</li></ul>	None	General public	9:00 AM - 5:00 PM
5. Health promotion and education services <ul style="list-style-type: none"><li>• Health promotion and education</li><li>• Health promotion and education</li></ul>	None	General public	9:00 AM - 5:00 PM
6. Specialized health services (Referral) offered by: <ul style="list-style-type: none"><li>• General Practitioner</li><li>• Clinical Officer</li><li>• Nurse</li><li>• Community Health Promoter</li><li>• Community Health Promoter</li></ul>	None	General public	9:00 AM - 5:00 PM
7. Supportive health services <ul style="list-style-type: none"><li>• Laboratory services</li><li>• Pharmacy services</li><li>• Radiology services</li><li>• Nutrition services</li><li>• Health services</li><li>• Health services</li></ul>	None	General public	9:00 AM - 5:00 PM

**HUDUMA HAKI YAKO**



# 2017 CEAS/TBI Global Engineering Field School

- Students to spend 6 weeks in rural Kenya having a unique socio-cultural experience
- Take 2 3-credit courses at TBI facilities:
  - Engineering challenges in the developing world
  - Socio-Culturally Constrained Engineering Design Innovation
- Work on projects in the field seeking to improve the lives of local people
- Develop ideas to pursue in their senior year Capstone Project

## *The Energy/Food/Water Nexus*

- **Social entrepreneurship:** Best ideas selected for seed funding



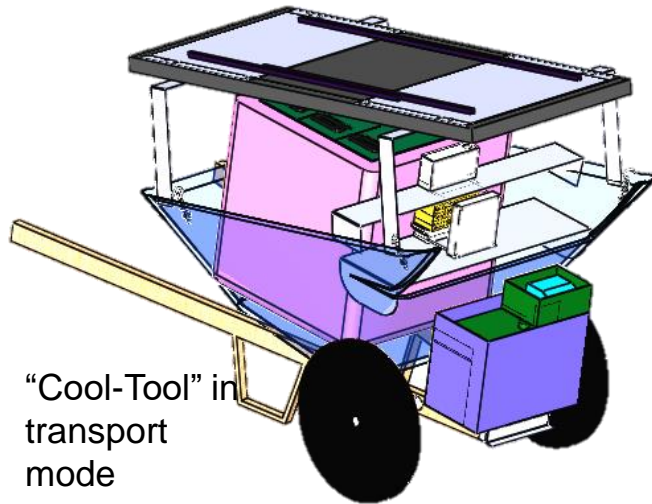
# Capstone project example: Low Maintenance, Mobile Vegetable Cooler for Off-Grid Market Applications

32% of product is lost due to waste in hot conditions.

No infrastructure or grid power for standard refrigeration.



Photo credit: Jared Nyataya/Nation Media Kenya



“Cool-Tool” in transport mode

- Combined Thermoelectric and Evaporative Cooling
- Solar Powered
- Low maintenance
- Mobile

# For more information:

Fotis Sotiropoulos

[fotis.sotiropoulos@stonybrook.edu](mailto:fotis.sotiropoulos@stonybrook.edu)

[@CEASdeanSBU](#)

[www.ceas.stonybrook.edu](http://www.ceas.stonybrook.edu)

[www.turkanabasin.org](http://www.turkanabasin.org)

We are seeking to partner with engineering colleges to expand the program in coming years



**ENGINEERING STUDY ABROAD**

Change lives this summer with your creative solutions to real problems in

**KENYA**

May 22-June 24, 2017

 TURKANA BASIN INSTITUTE

- ✓ Not just for engineers
- ✓ Earn academic credit
  - 6 Upper-division credits
  - 1 CEAS Major Requirement (check with your major)
  - 6 SBC Objectives: GLO, TECH, SPK, STAS, ESI & EXP+
- ✓ Have a positive global & local impact
- ✓ Work in interdisciplinary teams

**APPLY NOW!**



 Stony Brook University  
College of Engineering  
and Applied Sciences



**WEBER STATE**  
UNIVERSITY

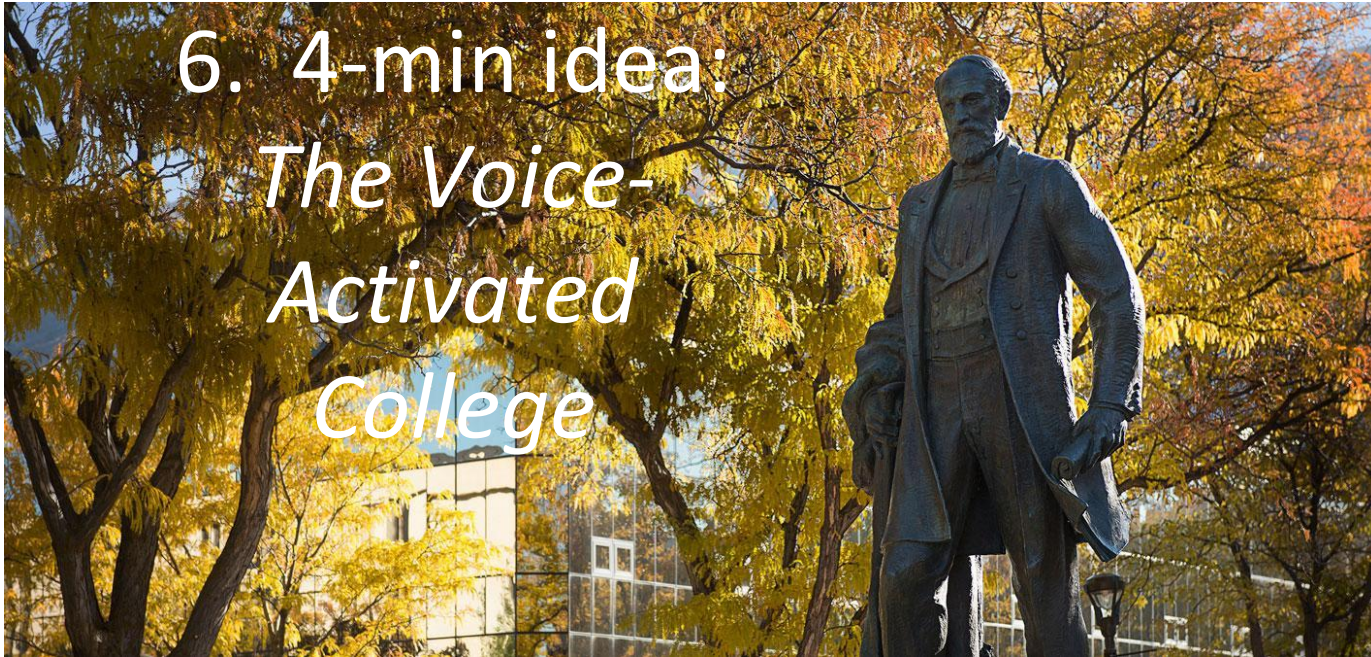
David L. Ferro -- [dferro@weber.edu](mailto:dferro@weber.edu)

Dean

College of Engineering, Applied Science &  
Technology

6. 4-min idea:

*The Voice-  
Activated  
College*







## The Voice Activated College

Utilizing Amazon Alexa by building a Skill to create a natural language interface to the college. . .

A simple and expandable connection to College Engineering using a burgeoning home (and office) oriented voice-only technology.

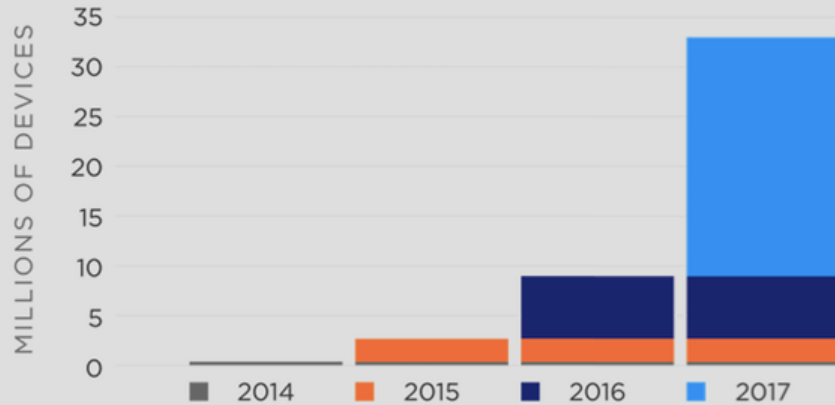


### Exhibit 32: Total Echo+Alexa Family Devices and Transactions - \$11b By 2020

	2014E	2015E	2016E	2017E	2018E	2019E	2020E
Echo Family Device Revenue (\$m)	\$24	\$384	\$1,058	\$1,345	\$2,033	\$3,019	\$4,056
Transaction Revenue (\$m)	\$0	\$0	\$279	\$877	\$2,117	\$3,596	\$7,076
<b>Total Echo Revenue (\$m)</b>	<b>\$24</b>	<b>\$384</b>	<b>\$1,336</b>	<b>\$2,222</b>	<b>\$4,150</b>	<b>\$6,615</b>	<b>\$11,132</b>

Source: MSUSA

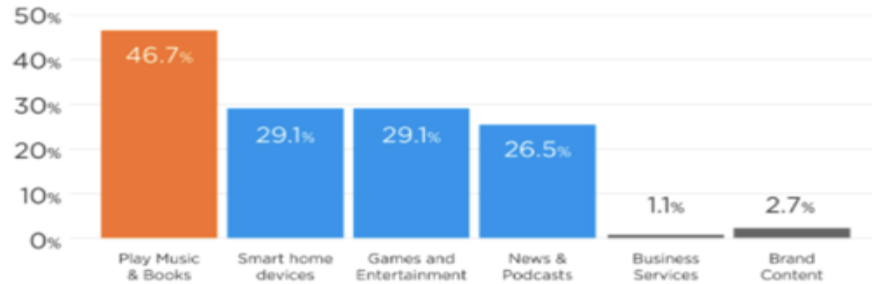
### Voice-First Device Footprint



VoiceLabs Analysis combined with research from CIRP, KPCB and InfoScout



## Why do you like your Amazon Echo or Google Home



VoiceLabs consumer survey (December 2016)

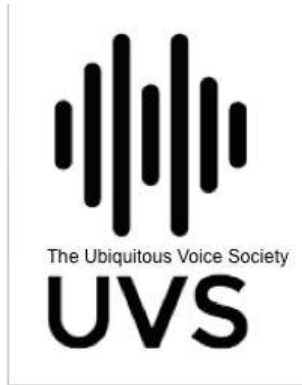
## Amazon Alexa App Store by Volume of Apps



VoiceLabs Analysis of Amazon's Alexa App Store (December 2016)



David Ferro  
dferro@weber.edu



Ahmed Bouzid  
Co-founder & President  
The Ubiquitous Voice Society  
January 20, 2017

ahmed.bouzid@gmail.com



# 7. All in the Family? Mentors in Engineering 101

Bob Kolvoord

Dean, College of Integrated  
Science and Engineering

## Motivation

Reimagined 1st year experience in order to:

- equip students for success in both the classroom and the engineering profession
- facilitate retention of engineering students, especially of underrepresented groups.



Designing from Day 1: Team presentations on class 2



Working in teams on their first design challenge

The course content focuses on:

**a) Human Centered Design & Design Thinking** - a problem solving approach that enables students to tackle design challenges in teams.

**b) Systems Thinking** - Helping students understand the world as interconnected systems.

**c) Professionalism and Ethics** - Helping students understand the role of the engineer in our department and our profession.



## Learning Communities

To facilitate the creation of communities within the first year students, the class is divided into “family” teams of approximately 10 students. Each of these teams is lead by two upperclass leaders who serve as mentors for the group.



Building community through first year “families”

A screenshot of a Twitter profile. The profile name is "1st Year Engineering" with the handle "@firstyrengr". The profile picture is a blue Twitter bird. The statistics show 260 tweets, 3 followers, and 131 followers. Below the statistics, there is a blue banner with the text "Students tweet @firstyrengr with their team #".



Students work in teams on design challenges



## Assessment

- Formal and Informal assessments (both qualitative and quantitative)
- Largely positive impacts on Freshman (motivation/growth mindset, self-efficacy, identity as an engineer, community)
- Uniformly positive impacts on Mentors (laboratory for leadership)



## Structure

~130 students

~12 “families”

~24 ENGR Leaders

*Monday's:* Classroom  
learning

*Wednesday's:*  
Breakouts in  
“families”

## Learning Activities

Design Challenges,  
Presentations, &  
Critiques

Reflective Essays

Reading Quizzes

Canvas Discussion

Small Group  
Discussions

E-Portfolio's

Video presentations

## Objectives

Connecting to our  
Community  
(Exposure)

Opportunities (Access)

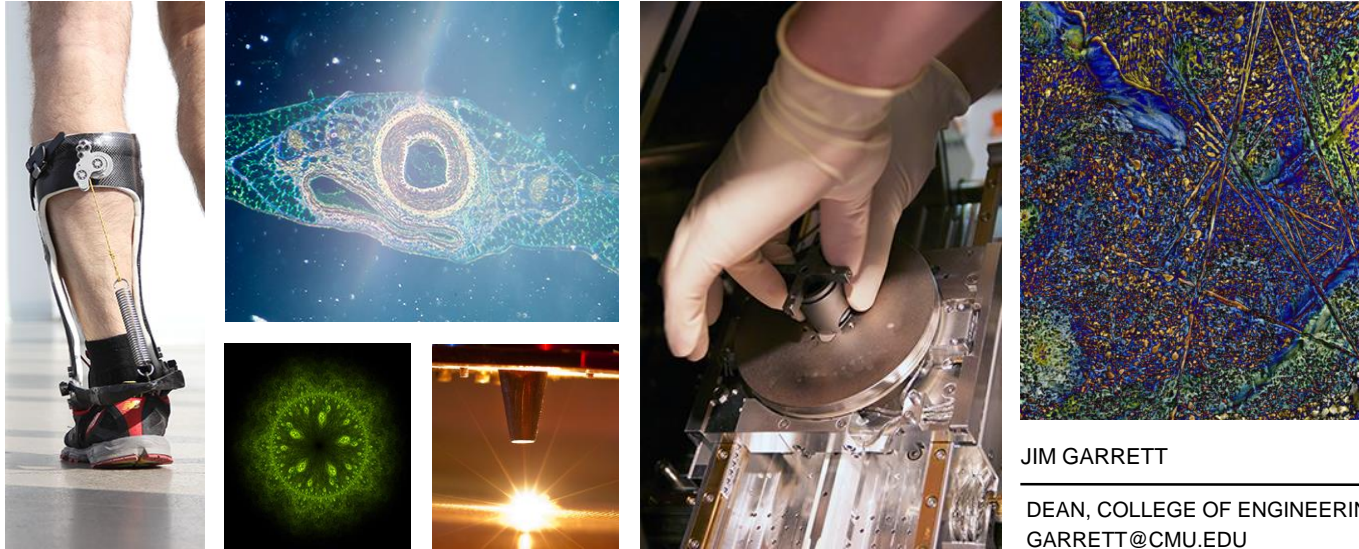
Professionalism

The brainpower for this effort comes from JMU  
Engineering Faculty: Kyle Gipson, Justin  
Henriques & Callie Johnson Miller

Gipson et al. (2015) – ASEE Conference Paper  
(Paper ID #11580)

For more information,  
please contact me  
[kolvoora@jmu.edu](mailto:kolvoora@jmu.edu)

# 9. Cool Idea from Carnegie Mellon



JIM GARRETT

DEAN, COLLEGE OF ENGINEERING  
GARRETT@CMU.EDU



# INNOVATION PALOOZA

**An annual celebration of innovation  
sponsored by CIT**

- Companies demonstrate emerging technologies
- Researchers show new technologies
- Lightning talk from industry innovators and thinkers
- Connection of technology to the arts
- Impact-a-thon



## IMPACT-A-THON

- A “hack-a-thon” for social problems
- Teams have 5 days to innovate a solution to a hard social problem
  - Temporary shelters for the homeless in winter
  - Playground access for kids with disabilities

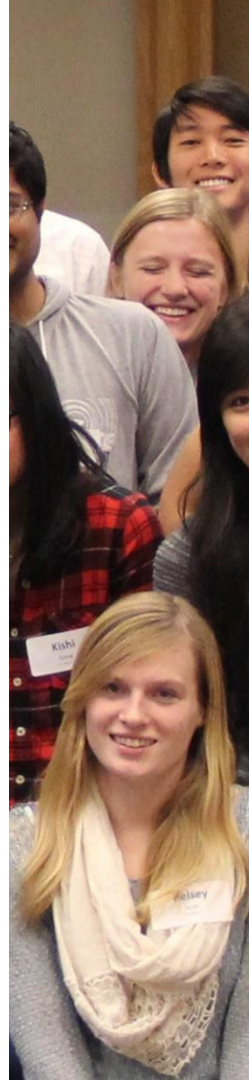




# IMPACT-A-THON

(CONTINUED)

- **Teams are judged based on:**
  - Understanding of problem
  - Solution concept
  - Demonstration of solution
  - Quality of prototype
  - Clever use of technology
- **Judged by academics, relevant social organizations, industry**
- **Top prize of \$1000 and pride of winning motivate dozens of teams to participate**



# INNOVATION EDUCATION INITIATIVES ACROSS THE COLLEGE

## Integrated Innovation Institute

- Graduate education in integrated product, service and software innovation and management

## MS in Technology Ventures

- Bi-coastal (dual option) that explores world class technology and innovation and Silicon Valley entrepreneurship education and ecosystem

## Engineering and Technology Innovation Management

- MS degree in technology R&D innovation management

## Swartz Center for Entrepreneurship

- New integration of entrepreneurship education, programming, and acceleration across CMU

## Innovation Palooza...





# 10. Freshman Engineering Honors Experience

**John R. English, PhD, PE**

Dean and Irma F. and Raymond F. Giffels Endowed Chair in Engineering

[jre@uark.edu](mailto:jre@uark.edu)



# Freshman Engineering Honors Experience

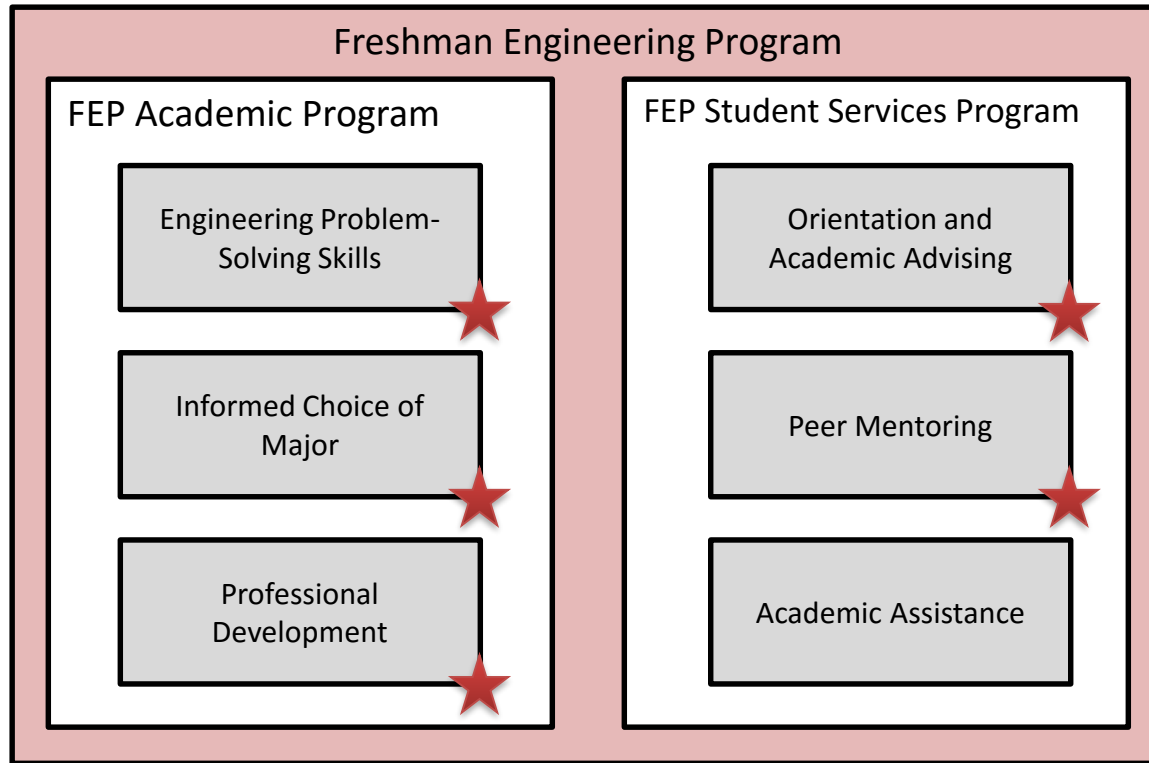
**John R. English, PhD, PE**

Dean and Irma F. and Raymond F. Giffels Endowed Chair in Engineering

**[jre@uark.edu](mailto:jre@uark.edu)**



In 2007, we implemented the Freshman Engineering Program (FEP), a common first-year experience for engineering students.



part of the Introduction to Engineering course sequence taught by FEP

For 9 years, FEP students in our Honors College with advanced placement in mathematics have had the option to participate in a first-year research experience.

The experience begins with a seminar series featuring a variety of faculty research in the College of Engineering.

Students then spend about six months working in teams of two on a research project mentored by a College of Engineering faculty member.

The experience includes all the content of the regular Introduction to Engineering course sequence.

In addition to the research, we emphasize written and oral communication, as well as the use of library research resources.

The experience culminates in mid-April with the annual, Honors Engineering Symposium.



This year, we are piloting a first-year innovation experience for the same population of students.

The experience begins with a seminar series featuring a variety of experts in innovation, invention, and entrepreneurship.

Students then spend about six months working in teams of three or four on an innovation project mentored by a College of Engineering faculty member.

We typically have about 60 students in the research experience, and our innovation pilot includes 15 students. Our long-term goal is 40-40.

# 11. Developing an Entrepreneurial Mindset through Integrated E-Learning Modules

Ron Harichandran, Dean  
rharichandran@newhaven.edu



University of  
New Haven

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TAGLIATELA  
COLLEGE OF ENGINEERING

Generating new ideas based on societal needs

Developing customer awareness

Thinking creatively to drive innovation

Learning from failure

Cost of production

Determining market risks

Resolving difficult ethical issues

Designing innovatively under constraints

Marketing a product

Financing a business

Developing a business plan

Building and leading effective teams

Adapting a business to a changing climate

Protecting intellectual property

Building relationships with corporations

Financing a business

Delivering an elevator pitch

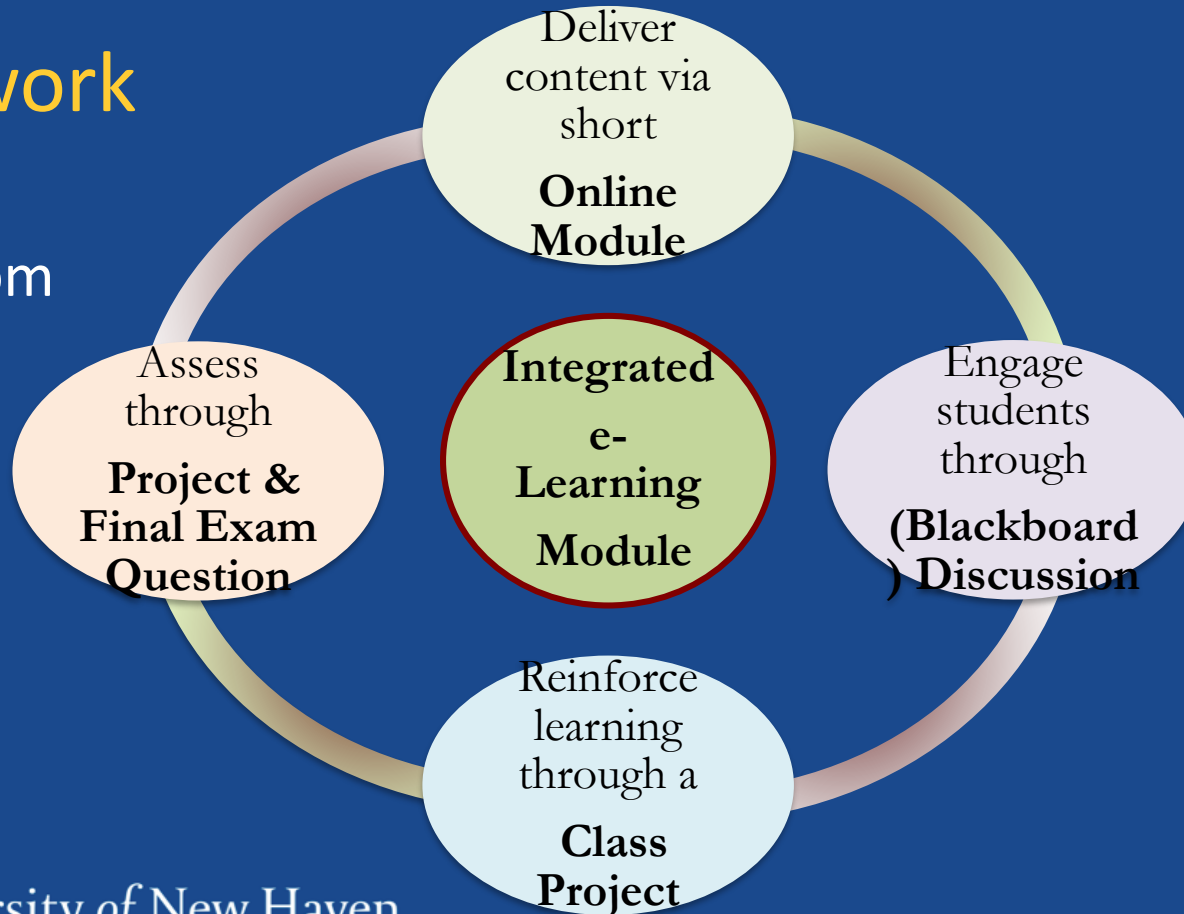


University of New Haven



# Framework

- Flipped classroom model



# Other Universities using E-Learning Modules

Santa Clara

Rose Hulman

Embry Riddle

Ohio Northern

U. Alabama, Birmingham

Wichita State

Tulane

Lawrence Tech

Penn State

Manhattan College

Michigan Tech

Cal State, Chico

Western New England

Villanova

James Madison

Marquette

U. of the Pacific

U. Connecticut

U. Cincinnati

San Francisco State

U. Virginia

Clarkson

Lafayette College

U. Of Dayton



University of New Haven

# THANK YOU!

## CONTACT US

[KEEN@newhaven.edu](mailto:KEEN@newhaven.edu)

[www.newhaven.edu/KEEN](http://www.newhaven.edu/KEEN)



| University of New Haven

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TAGLIATELA COLLEGE OF ENGINEERING

## Jianmin Qu

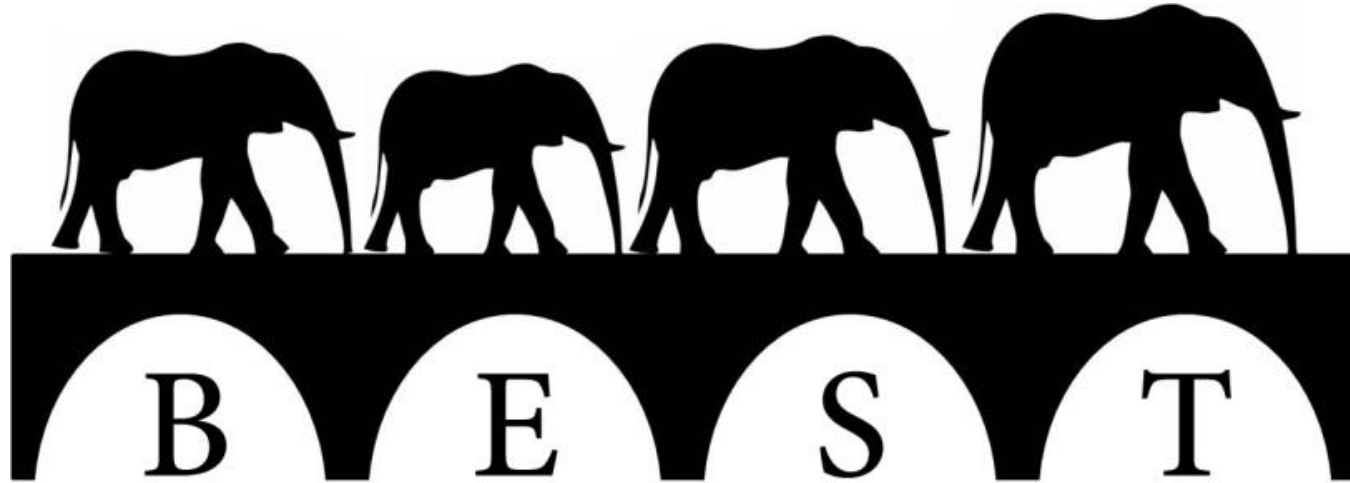
12. School of Engineering

Tufts University

Medford, MA 02155

Phone: 617-627-3237

E-Mail: [Jianmin.Qu@Tufts.edu](mailto:Jianmin.Qu@Tufts.edu)



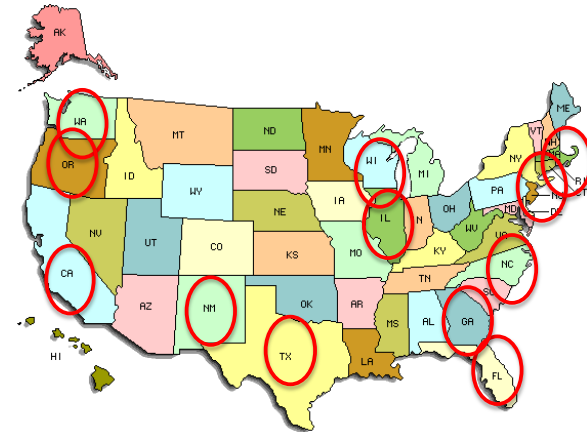
Bridge to Engineering Success at Tufts

## Program Model

- Six week bridge program during the summer before freshman year begins.
- Obtain college credits for Physics & Calculus I.
- Beyond the first summer, cohort model scaffolds 4 year experience.

## Student Profile

- Low income, first generation
- Rank top 5% in high school



# Scaffolding Success



1<sup>st</sup> yr

Academic & Social  
Integration



2<sup>nd</sup> yr

Major/Degree Focus



3<sup>rd</sup> yr

Honing Career Goals

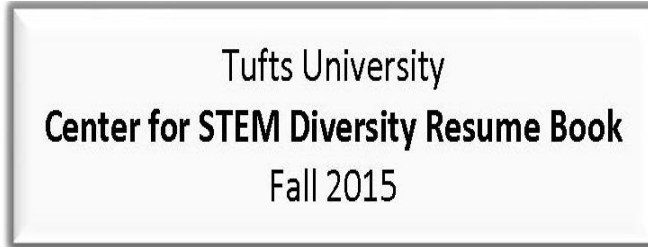


4<sup>th</sup> yr

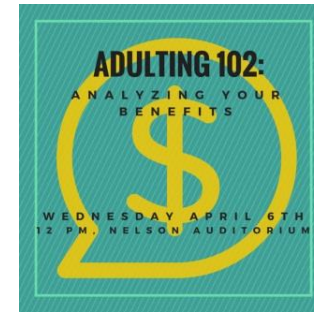
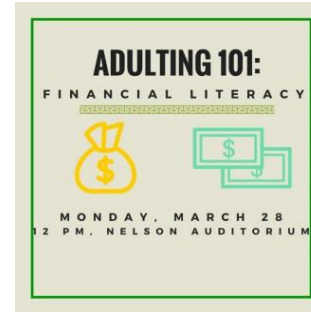
Secure Job or Grad  
School

# Example Programming (4<sup>th</sup> yr)

## Fall Semester



## Spring Semester





**Want to know more?**

**Please visit**

**[www.stemdiversity.tufts.edu](http://www.stemdiversity.tufts.edu)**

# 13. Synthesizing Maker Spaces with Corporate Partnership to Transform Undergraduate Interdisciplinary Design Education

Kenneth Lutchen, Dean (klutch@bu.edu)

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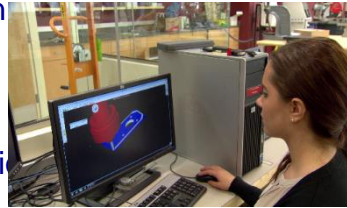
- In 2015 Boston University Opened a new 15,000 sq. ft. **E**ngineering **P**roduct **I**nnovation **C**enter (**EPIC**), a large maker space combined with design and collaboration studios.
- **EPIC** is Directed by Prof. of Practice, Gerry Fine, former CEO of Schott, Inc and Executive-VP for Product Development, Corning, Inc.
- **EPIC** Engages a set of key industry partners at the forefront of advanced product design and manufacturing innovation.
- **EPIC** & Industry used to transform engineering curriculum and to catalyze and sustain a new culture of design/creation/innovation for all of BU
  - new required courses for all engineering students in students
  - expose students to the technical, innovation and design skills they feel are needed in the modern day workforce
  - Innovation / Creative Space for students from all majors at BU to “play” and prototype during non-class times

# Engineering Product Innovation Center: EPIC



## Facility Includes:

- Computer Aided Design
- 3-D Printing
- Robotics
- Laser Processing
- Materials Characterization
- Supply chain management
- CNC, etc



A Unique 15,000 sq. ft.  
Hands-On Maker-Space Facility  
To **Educate All** Engineers On  
Product Design-to-Deployment-to-  
Sustainability



Rolls-Royce



SAINT-GOBAIN  
GE Aviation

Schlumberger

P&G  
Procter & Gamble

PTC® the product development company

# The Impact of the EPIC Industrial Advisory Board

## Help Grow Physical Infrastructure:

- Donations of equipment (eg. lathes, specialized 3D printers, Introns, etc)
- Guiding & advising on purchases (eg., advanced collaborative robots)
- Providing engineering resources for equipment installation.

## Sponsorship of Special “Design/Professional” Events:

- Nine day design challenges.
- Panel discussions with both undergraduate and graduate students.
- Leadership training sessions.

## Active Engagement in Student Projects (from sophomores to masters).

## Actively Advised & Engaged re Curriculum Enhancements:

- New Masters in “Product Design and Manufacture.”
- Modification of our Undergraduate Design Course Sequences.
- Introduction of a New **Required** Sophomore Course: “Introduction to Engineering Design.”



# “Introduction to Engineering Design”

## ~250 Students Each Semester, utilizing:

- 4 Faculty (2 sections each)
- 2 Teaching Engineers (4 sections each)
- 8 Undergrad Assistants (1 section each)

## Focus of the Class is:

- Interdisciplinary Teamwork
- Reverse Engineering & Building Prototypes
- Rudimentary Engineering Design
- Oral and Written Communications
- Flipped Classroom Pedagogy

## Projects have included:

- Mechanical Testers (w/ P&G)
- Hazardous Material Detectors
- Tape Dispensers for the Cognitively Disabled (w/ Perkins School)
- Low-Cost Baby Incubators
- MEMS Test Chambers
- IOT Pill Dispensers (w/ Intel)

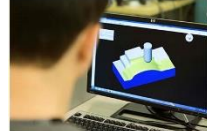
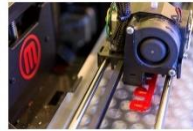


Feedback has been excellent from both faculty and students.

## An **EPIC** Way to Connect Engineering Education to Design and Industry



- The Lorraine A. Tegan Design Studio
- Hardware and software for computer-assisted design,
- Rapid 3-D prototyping and additive manufacturing tools
- Machine shop, featuring multi-axis CNC machines, mills, lathes, etc
- Electronics design and fabrication: PCB fabrication, surface mount soldering.
- An automated, robotic manufacturing line
- A materials characterization laboratory
- Robotics and “autonomous” systems research & design facility
- A metals foundry
- A complete carpentry shop



<http://www.bu.edu/eng/current-students/epic/>

# COOL IDEAS WRAP-UP

