

A Collaboration Framework to Advance Hispanic and Low-Income Students' Degree Completion in STEM

AHSIE 12th Annual Best Practices “Virtual” Conference
FT Lauderdale, Florida
(March 8-11, 2020)

Ali Zilouchian; Director and Professor
Florida Atlantic University; Boca Raton- FL

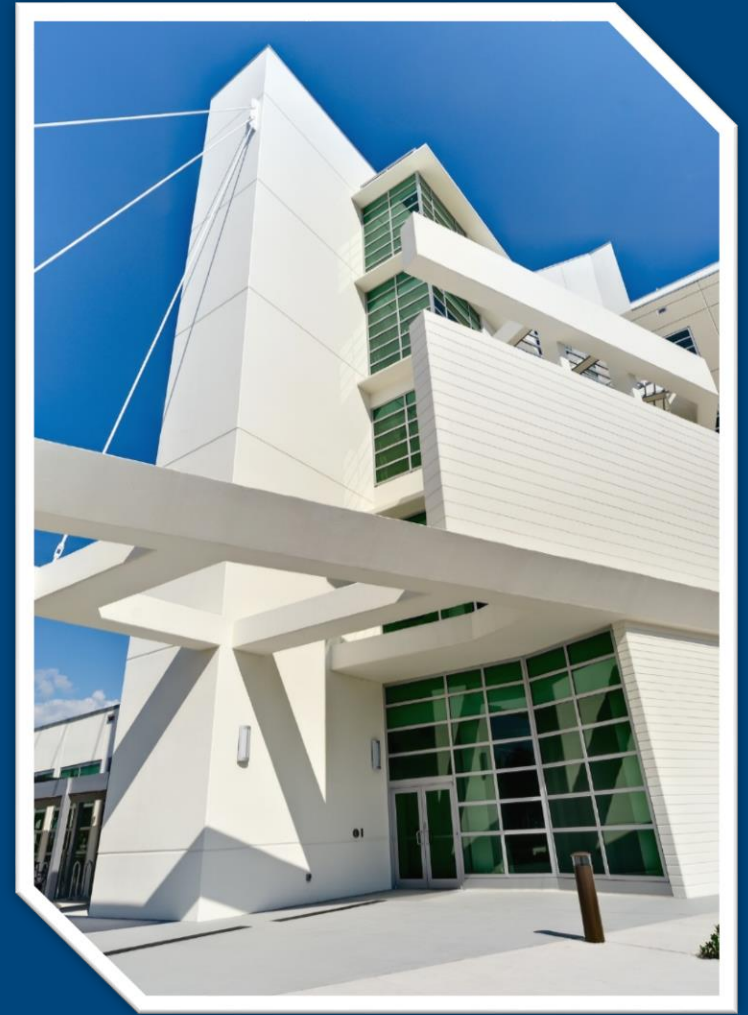
Nancy Romance, Ed.D., Professor- Florida Atlantic University

Annie Myers- Broward College, Dana Hamadeh- Palm Beach State College



Presentation Outline

- Research Team and Mentors
- Participated Schools
- A Broader Perspective
- DOE Title III- Project Components
- Project Research Framework
- Summary



Research Team



Ali Zilouchian, Ph.D.
PI & Project Dir., Assoc. Dean
for Academic Affairs, FAU




Nancy Romance, Ed.D.
Co-PI, Professor, FAU



Nurgun Erdol, Ph.D.
Dept. Chair, FAU




Hanqi Zhuang, Ph.D.
Assoc. Chair, FAU



Annie Myers, M.S.
Assoc. Dean of IT, BC



Dana Hamadeh, M.E.,
Assoc. Dean of STEM,
PBSC



Michael Vitale, Ph.D.
Professor, E. Carolina
Univ.


Program Coordinators



Jon Stong; MS
HSI Coordinator; FAU




Gerard John-Williams
Project Manager
PBSC



Candice Maharaj,
Ph.D.
Program Mgr., BC


Curriculum Refinement Team




Brittaney Amento-Adelmann,
Ph.D., Assoc. Dir. & Adjunct,
FAU



Scott Demsky, Ph.D.
Asst. Professor, & Adjunct, BC



Rainer Steinwandt, Ph.D.
Dept. Chair, FAU




Carrie Stevens, M.S.
Assoc. Professor, PBSC



Jeremy Underwood, M.S.
Asst. Professor, BC



Kyla Williams, Ph.D.
Asst. Professor, BC



Lisa Greenberg, M.S.
Instructor, FAU



Lee Klingler, Ph.D.
Professor, FAU

Not Pictured:

- Jacques Francois, Asst. Professor, BC
- Alex Opritsa, Professor I, PBSC

FAU: Five Campuses

Student Population (fall 2019): 29,820

FTIC Students: 3191

New Transfers: 3004

College of Eng. & Computer Sci

Student headcount: 2806

Fall 2019 Headcount: 617

272 (44%) Transfer Students



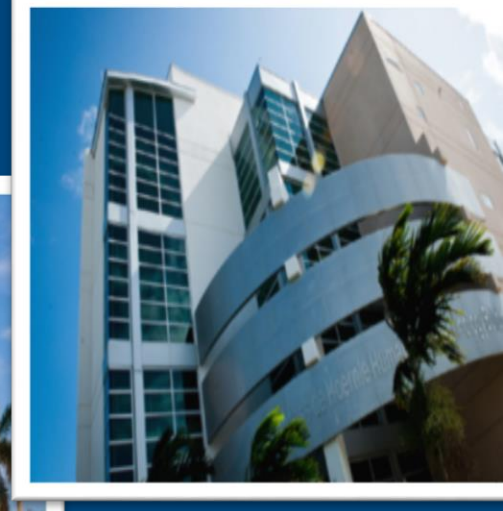
BROWARD COLLEGE

STUDENT POPULATIONN OF MORE THAN 69,000



PALM BEACH STATE COLLEGE

FIVE CAMPUSES-STUDENT POPULATION: MORE THAN 49,000



National Science Foundation

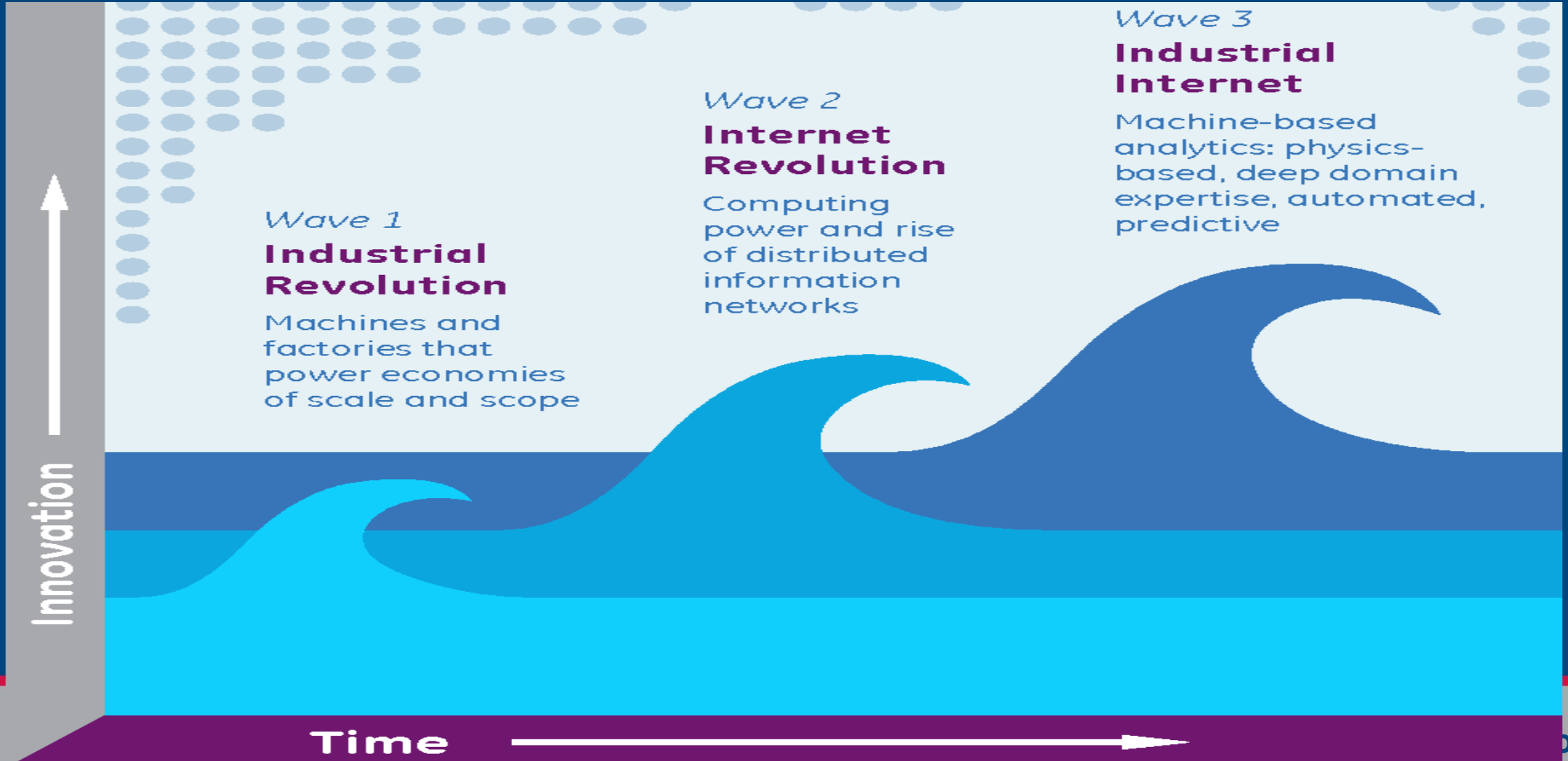
TEN BIG IDEAS: DISCOVERY, CREATIVITY & INNOVATION



Dr. France A. Córdova
Director, U.S. National Science Foundation

Science Museum, London
November 17, 2016

National Science Foundation Report



National Science Foundation

Would you leave your house or car unlocked? Why would you leave your computer unlocked?



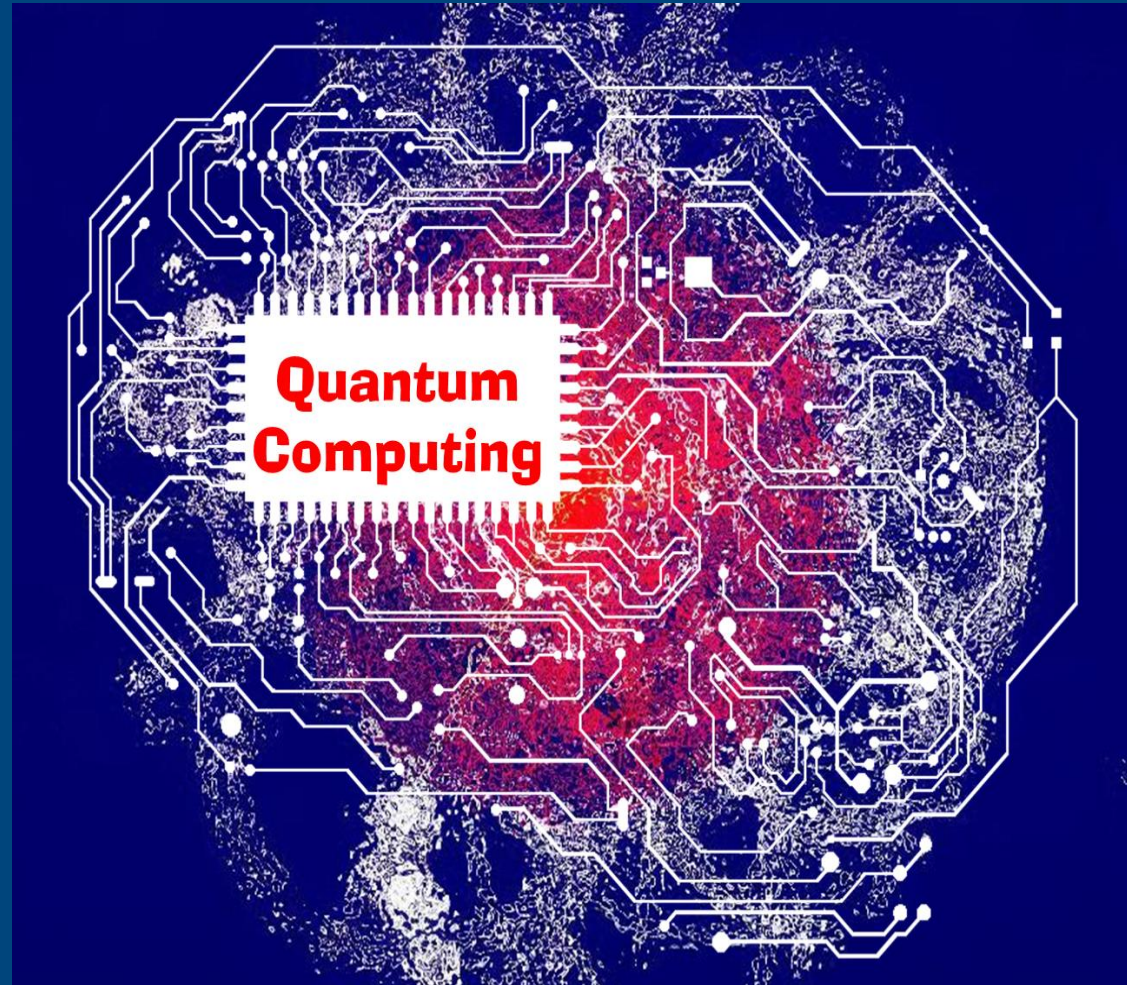
Business Continuity Awareness Week
#BCAW2017
15th - 19th May 2017

- Use strong passwords
- Keep passwords hidden
- Don't click on untrusted links
- Take care when using insecure networks
- Don't plug untrusted devices into networks

Cyber security is everyone's responsibility
Play your part in building a resilient organization

THE WORLD'S LEADING INSTITUTE FOR CONTINUITY AND RESILIENCE

Business Continuity Institute
www.thebci.org



National Science Foundation

The Future of Work at the Human-Technology Frontier



- Building the human-technology partnership
- Augmenting human performance
- Illuminating the socio-technological landscape
- Fostering lifelong learning

Information Technology Trends

- Cloud Computing
- 3D Technologies
- Augmented Reality
- High-Performance Computing
- Cyber Security
- Social Networks
- Mobile Systems and Applications
- Bioinformatics and Biotechnology
- and more . . .



They are not in cloud, they are on the 1st floor

Our Cloud Computers

Augmented Reality Technology (ART)

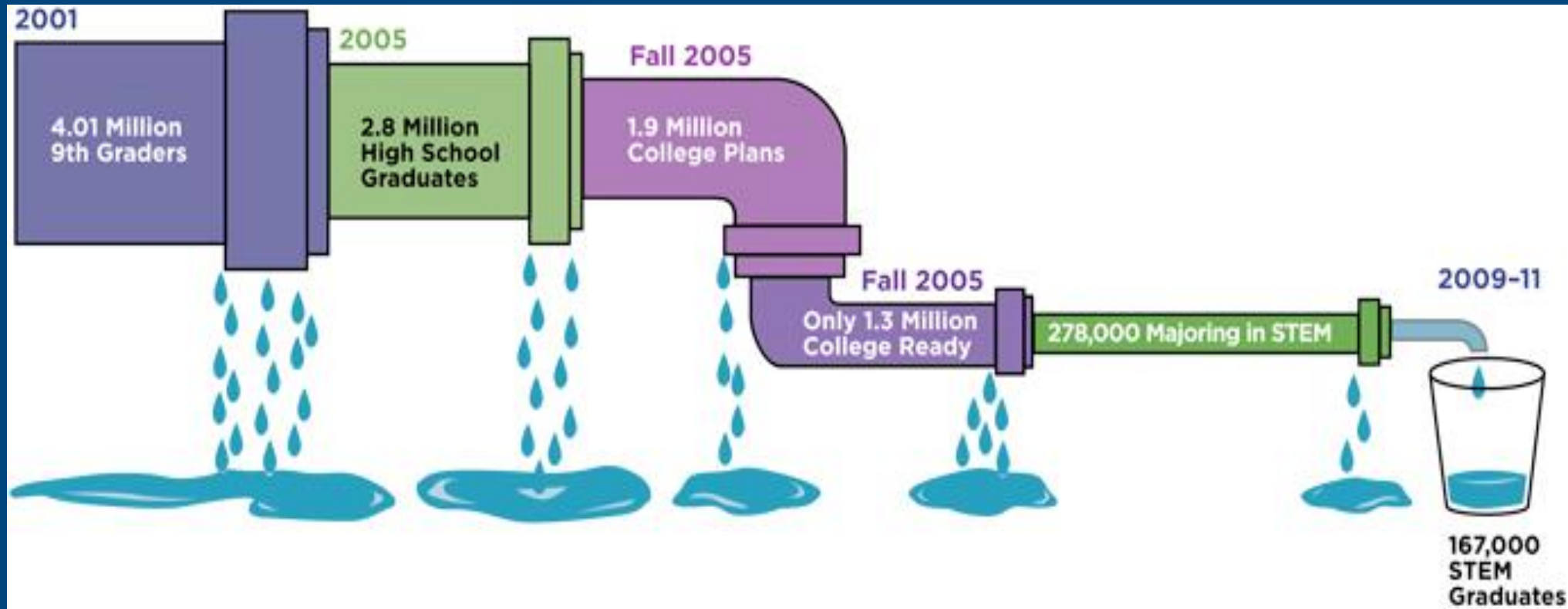
Augmented reality technology - engineering layers of digital information to expand our world. ART doesn't replace reality – It blends the real with the imaginary. This is an expanding field of engineering that fuses many academic fields.

PLEASE SEE INVITED MAGIC LEAP SESSION AHSIE TODAY



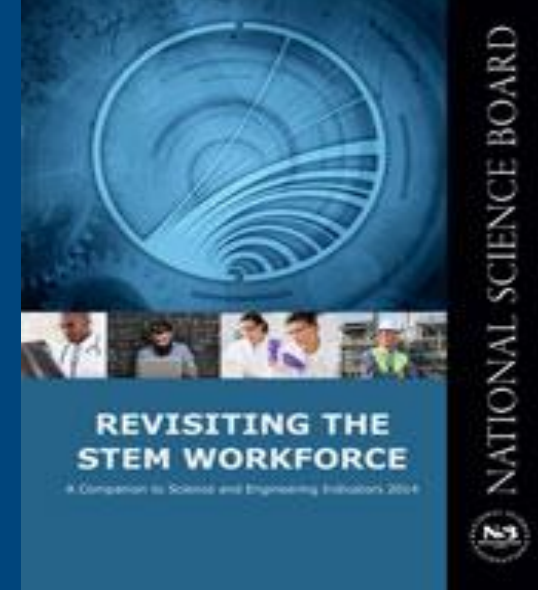
National Trends in STEM Education and Workforce

The Leaky STEM Pipeline



Targeted Occupations Gap Analysis

Board Of Governors Report

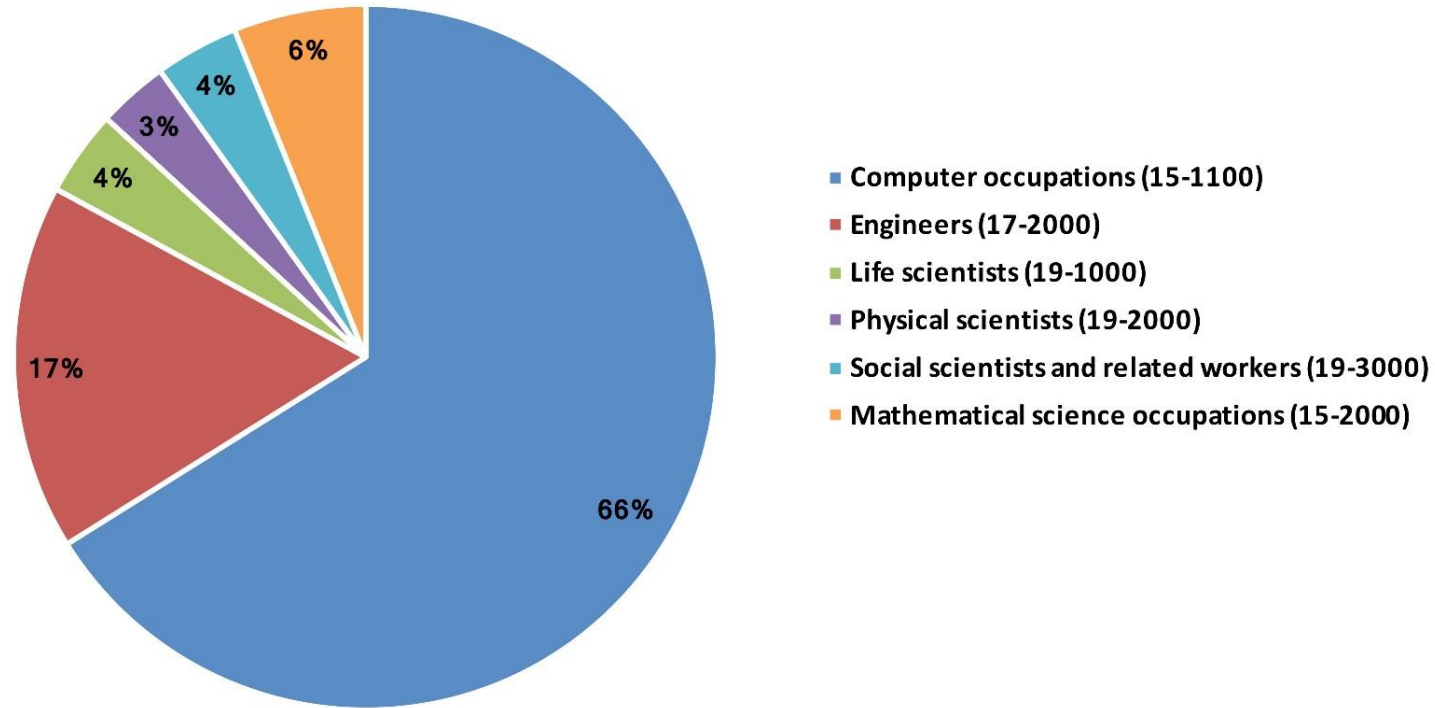


- **Engineering and Information Technology** **2,361**
- **Middle School Teachers** **1,024**
- **Accountants and Auditors** **971**

STEM JOB GROWTH PROJECTION-NATIONAL

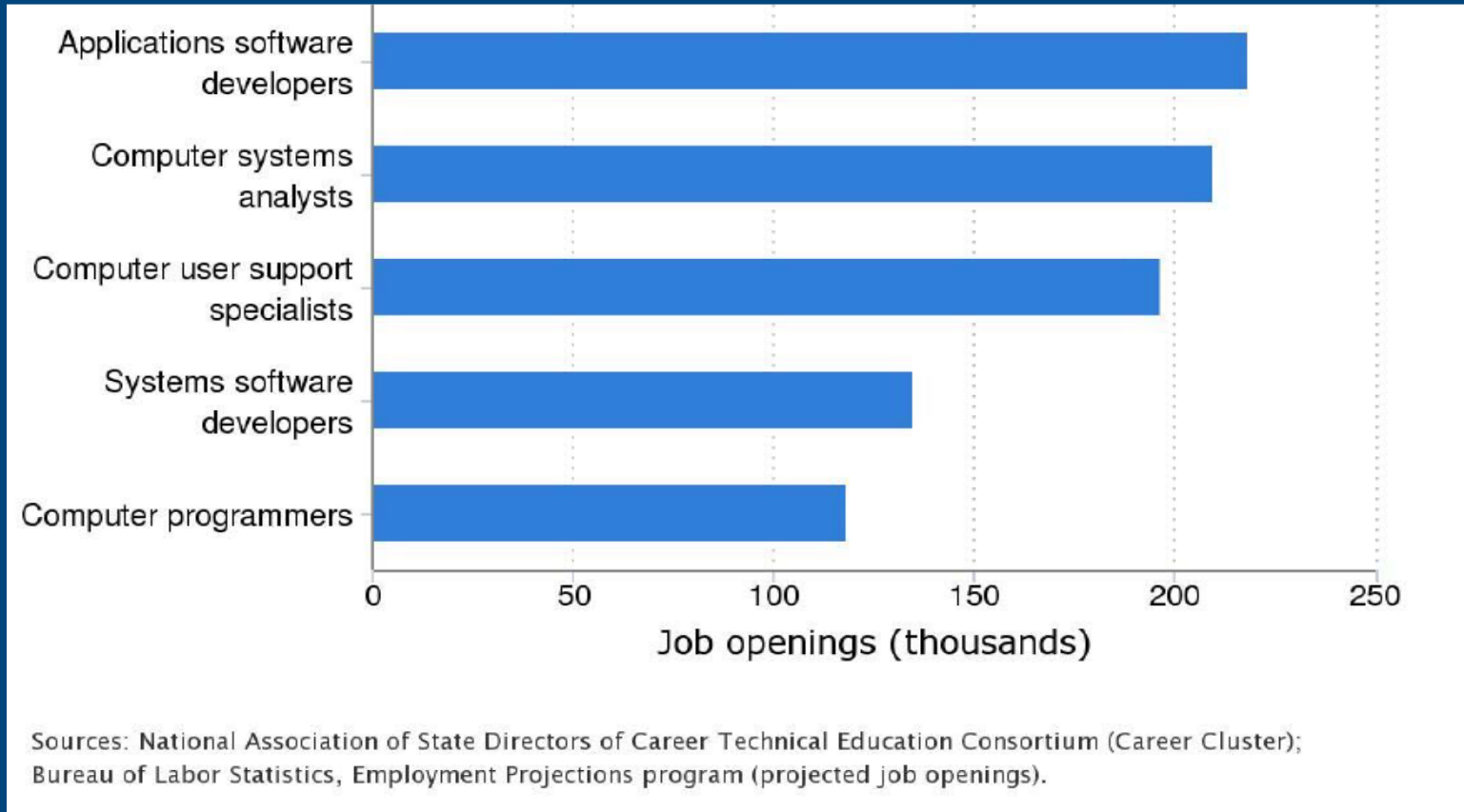
STEM Job Growth, 2016-26

U.S. Bureau of Labor Statistics



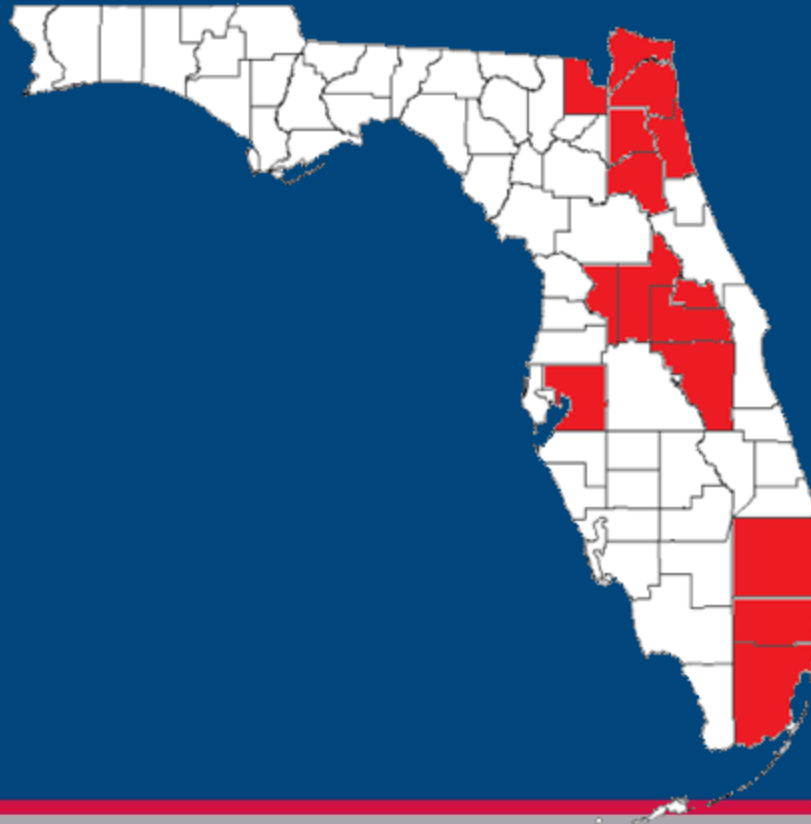
Data from the spreadsheet at <https://www.bls.gov/emp/ind-occ-matrix/occupation.xlsx>

Selected Hot Jobs 2012-2022 (National Level)



State of Florida

Highest Unfilled Workforce Demand

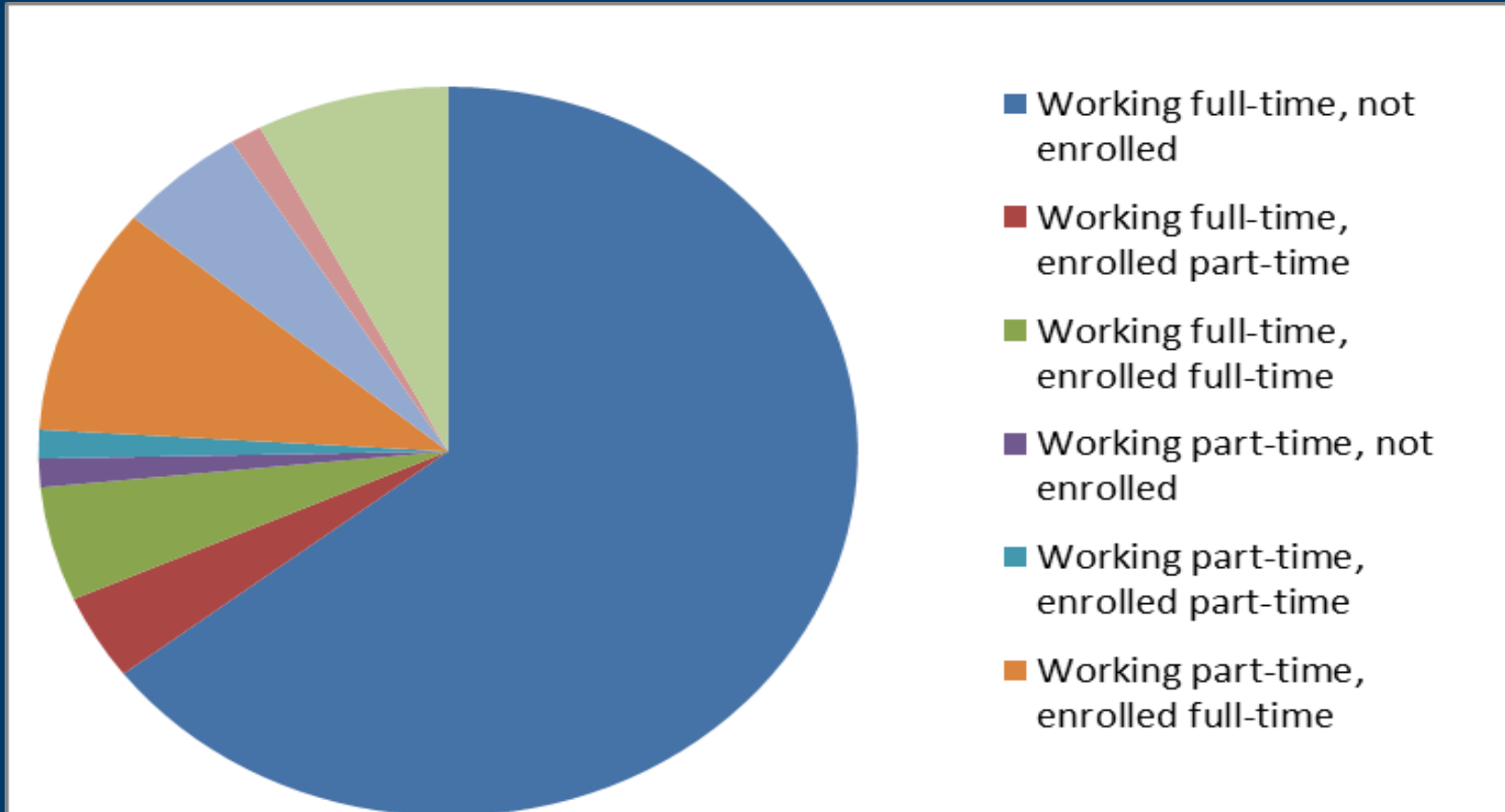


Targeted Occupations Gap Analysis(FLORIDA)

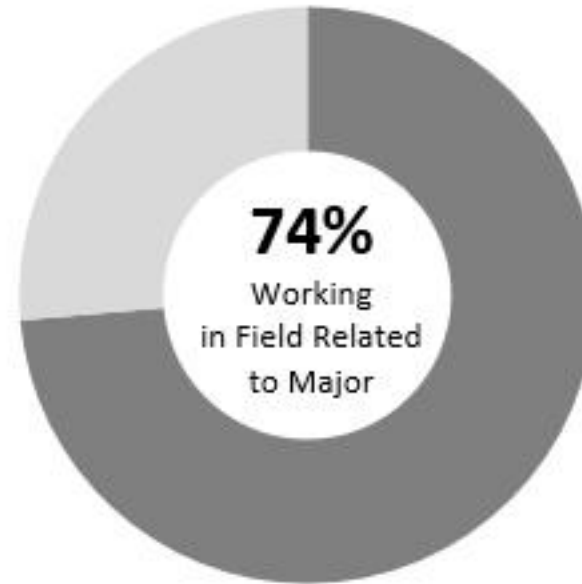
Florida BOG Report

- Information Technology 2,361
- Middle School Teachers 1,024
- Accountants and Auditors 971

Following the Graduates



Following our Graduates in CSE



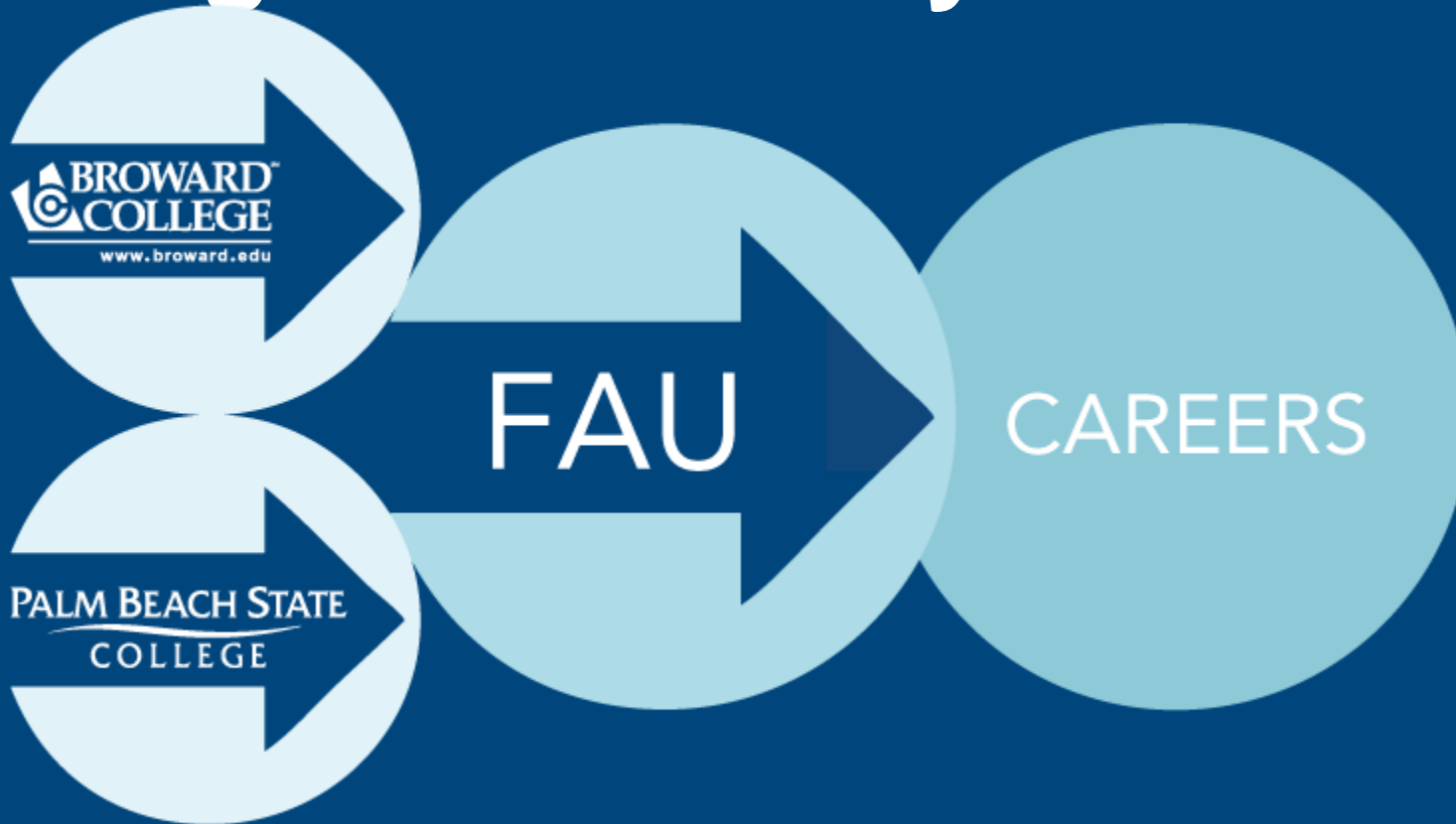
USDOE Title III HSI Framework

Overarching Purpose

Increase the number of **Hispanic and low-income** state college students who complete their AA degree, transfer to FAU, and complete their bachelor's degree in CS, CE and EE as well as post-degree employment or advanced degree attainment.



Program Pathway



HSI Title III Project



iUNO!
COMPUTER
SCIENCE

Read



iDOS!
COMPUTER
ENGINEERING

Read

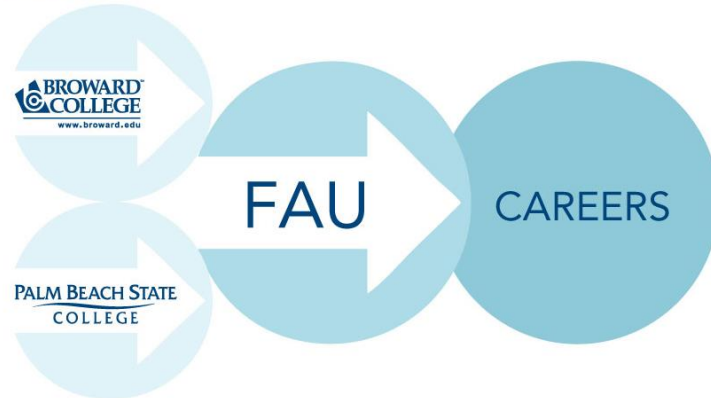


iTRES!
ELECTRICAL
ENGINEERING

Read

Florida Atlantic University (FAU), with partners Broward College (BC) and Palm Beach State College (PBSC), has been awarded a grant to provide a 5-year plan of academic and advising/mentor support, industry-related opportunities and career placement for Hispanic and low income students currently enrolled at BC and PBSC, and who are seriously interested in pursuing a bachelor's degree in computer science, computer engineering and electrical engineering at FAU.

The Pathway



Benefits

enhanced
ADVISING

math/computer
TUTORING

events
& WORKSHOPS

seamless
TRANSFERS

learning
OPTIONS

co-ops/internships/research
OPPORTUNITIES

learning
COMMUNITY

Project's Research Framework

Programmatic Challenges

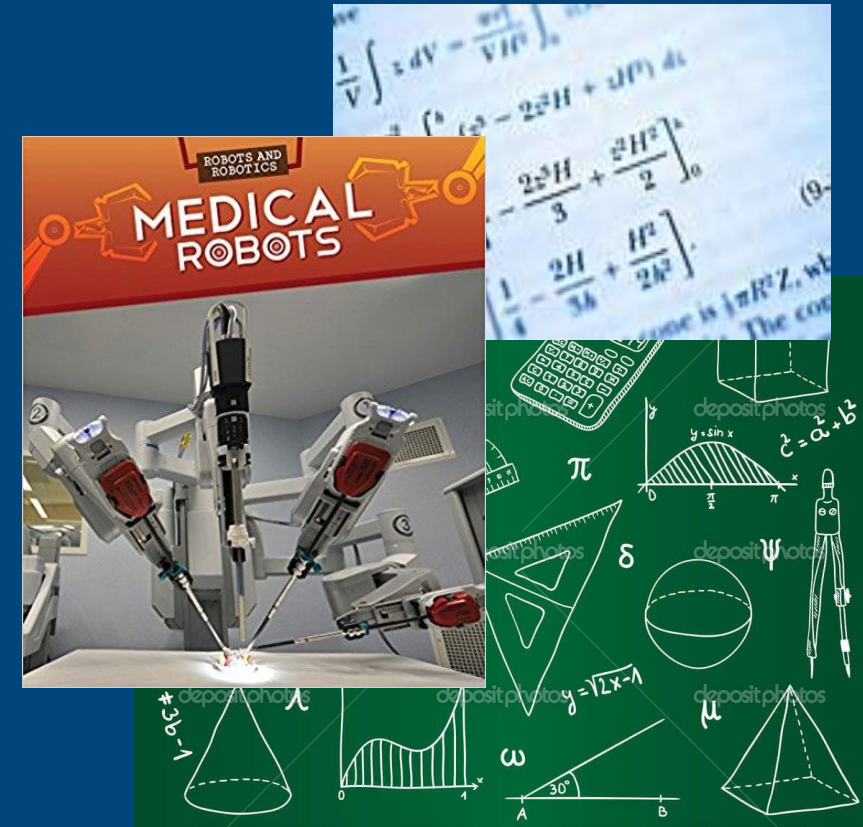
- Student Success Rate in Gateway Courses
- Issues with Retention and Withdrawal - State Colleges
 - Students from the partnering institutions (BC, PBSC) do not complete their AA degree and are unable to transfer to FAU
- Issues with Retention and Withdrawal - FAU
 - Students receiving a DFW grade in Mathematics and Computer Science do not complete their BS degree.

Research Design

- Innovative approaches to remediate learning problems in gateway courses across all institutions.
- Varied student support opportunities and CS/CE/EE career-focused events - geared toward retention and degree completion.

Title III Project Components - BC, PBSC, FAU

- Curriculum Refinement and Alignment – Gateway Courses
- Collaborating Faculty Partners - Mathematics and Computer Science Faculty
- Participant Recruitment
- Participant Support
- FAU Mentors
- Computer Science Learning Community
- Project Research Areas



Title III Project Components - BC, PBSC, FAU

- Gateway Courses
 - 4 Mathematics
 - 2 Computer Science
- Collaborating Faculty Participants
 - Group Curriculum Meetings
 - Courses – Designated for Project Participants
 - Collaborate with FAU Mentors
 - Collaborate with Project Coordinators
 - Collaborate with Associate Deans



Student Mentors



- Richard Altamore, CS/CE
- Douglas Athenosy, EE
- Alona Basko, CS
- Therry Beauge, EE/Finance
- Avatar Bhola, CE
- Paul Birns, CE
- Ayah Elshaikh, CS/CE
- Alex De Luera, ME
- Ivan Maykov, CS
- Brian Mclean, EE
- David Halle, Civ
- Abdul Hanan, EE
- Lauren Johnson, Civ
- David Patch, CE
- Juan Perez, CS
- Eric de Souza Piasentin, CS/CE
- Saad Saeed, CE
- Michael Shanker, CS
- Bryan Smith, ME
- Nicolas Valenzuela, CS

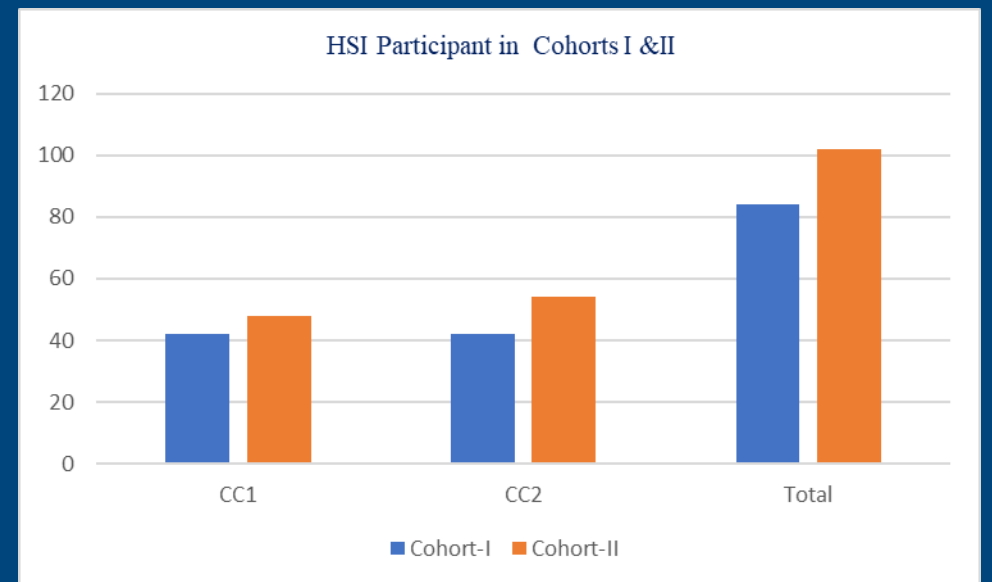
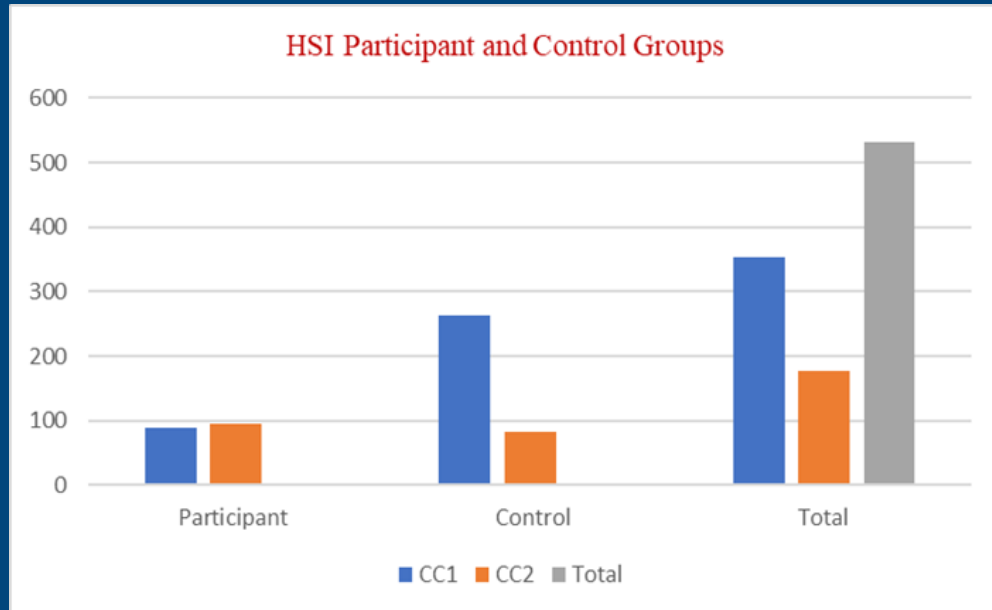
Cohorts I and II Data Analysis

Table 1. Number and Percent of HSI and Control students Used in Evaluation

College	Treatment	Number	Percent (Overall)
BC	Participants	90	16%
	Controls	264	49%
PBSC	Participants	96	18%
	Controls	82	15%
Total		532	100%

Table 2. Number of HSI Participants in Each Cohort

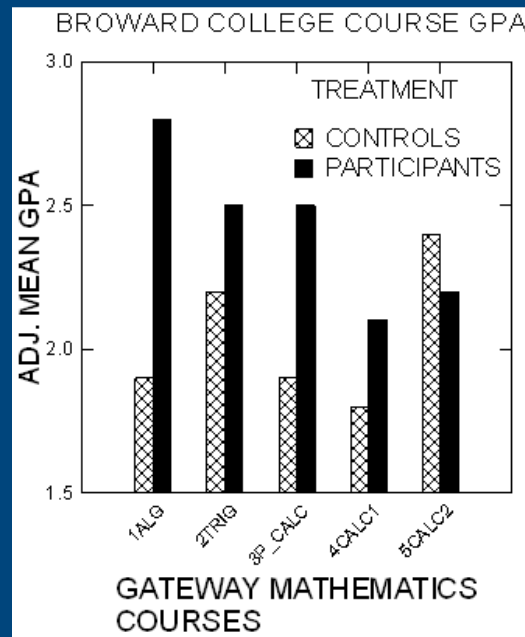
College	Cohort 1	Cohort 2
CC1	42	48
CC2	42	54



Cohorts I and II Data Analysis

Overall GPA Comparison:
0.42 higher for the participant Cohort

GATEWAY Courses



BROWARD COLLEGE PATHWAY

TO A SUCCESSFUL CAREER
HSI TITLE III GRANT



Annie Myers, Associate Dean, PMI
Dr. Candice Maharaj, Project Director

ABOUT BROWARD COLLEGE

Our mission at Broward College is *Transforming students' lives and enriching our diverse community through academic excellence, innovation, and meaningful career opportunities.*

Broward College is committed to fostering a learning-centered community that celebrates diversity and inclusion by empowering and engaging students, faculty and staff.

Broward College offers an Associate's of Arts two-year transfer degree, Associate of Science offering specialized training in high demand fields.



This program is intended to transform the lives of Hispanic and low income students by allowing them to obtain a degree in Computer Science, Computer Engineering or Electrical Engineering.



STUDENT RECRUITMENT

Marketing Strategies

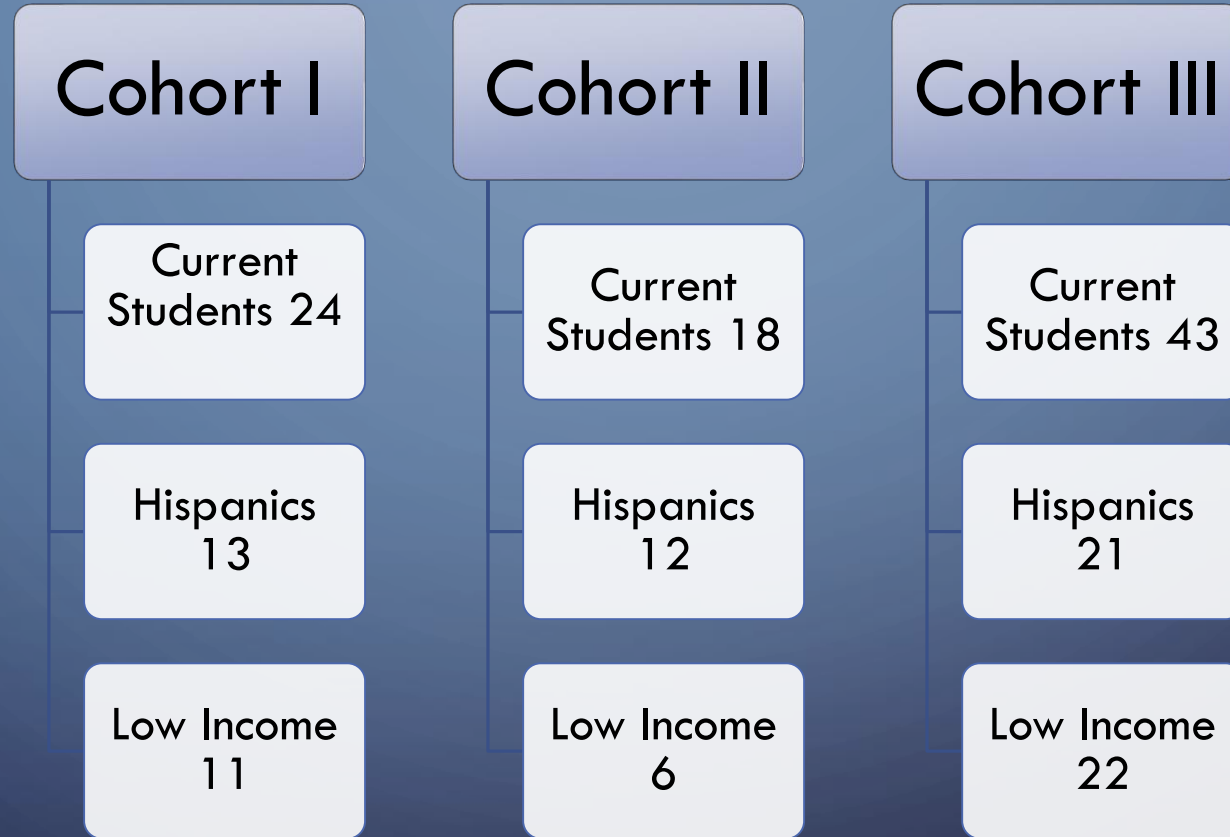
Recruitment Plan

1. Classroom Visits
2. Social Media Marketing
3. Recruitment Emails
4. Seahawk Resource Fair
5. Club Rush Event
6. College Fair
7. Welcome Back BBQ

Create Branding Materials

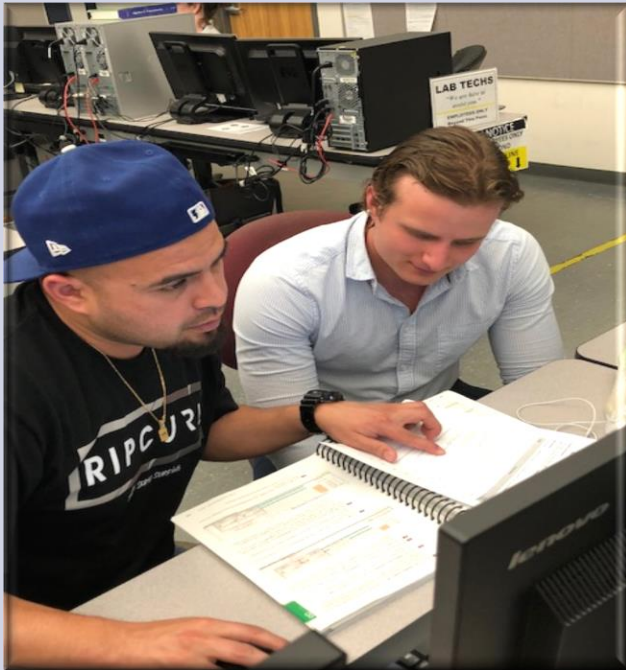
1. Pull up banners and displays
2. PATHWAY Promotional Items
3. BC PATHWAY Website
4. Table Cloths

STUDENT COHORTS



STUDENT SUPPORT ACTIVITIES

Mentoring – Information Sessions



1. Enhanced academic advising
2. Flight plans – CS, CE, EE
3. FAU Math Mentors located in BC Academic Success Center (North and Central)
4. Learning community

MARKETING/PROMOTIONAL ITEMS



STUDENT EVENTS/ACTIVITIES

1. BC Hackathon
2. Open House
3. Meet and Greet with Mentors and Mentees



UPCOMING STUDENT EVENTS/ACTIVITIES

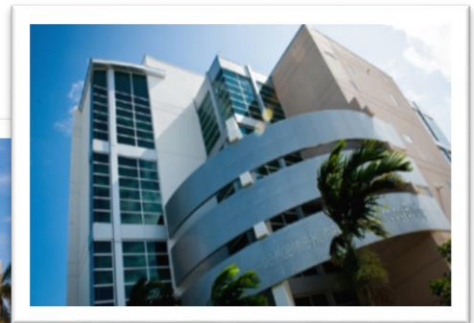
- 1. Make an Alexa w/ Raspberry Pi – Summer 2020**
- 2. A-MAZE-IN Bot Wars II – Fall 2020**
- 3. BC Hackathon Event – Fall 2020**



PALM BEACH STATE
COLLEGE

*tres*PATHS PROJECT

An HSI STEM Grant



4th Largest College of the 28 in FCS

5 Campuses Across PBC

Open-Access Institution

About 50,000 Students

Students from 160+ Countries

Student Profile:

- 35% White
- 32% Hispanic
- 27% Black
- 6% all other
- **Variety of Degrees and Certifications**



Dana Hamadeh

Associate Dean of STEM – Project Administrator

Gerard John-Williams

*tres*PATHS Program Grant Manager

Kevin Moreau

*tres*PATHS Student Development Advisor

Participating Faculty

4 Mathematics

4 Computer Science

Weekly meetings with Project Administrators

Math Faculty monthly meetings with FAU & BC Teams

PBSC and FAU Advisors collaboration & campus visits

**PBSC Project Director meetings with FAU & BC Project
Administrators and Director**

Student and Faculty access to FAU's resources

tresPATHS TARGETED COURSES

MATHEMATICS

College Algebra

Pre-Calculus

Trigonometry

Calculus I

COMPUTER SCIENCE

Intro to Engineering

Intro to Program Logic

Object C Programming

Microcomputer Applications

Programing in C++

Programing in Java



tresPATHS Project Flight Plan
ASSOCIATE IN ARTS: COMPUTER ENGINEERING

PALM BEACH STATE COLLEGE

Palm Beach State College (PBSC) and Florida Atlantic University (FAU) are committed to your success. This Flight Plan is a tool to assist you in planning the courses you should complete to earn your Associate in Arts degree at PBSC prior to transferring to FAU's Bachelor of Science in Computer Engineering program. It is our intention that you complete this planning tool in collaboration with your tresPATHS advisor to ensure good understanding of:

- Which courses you have to complete
- Which course requirements you have satisfied
- How to get the most from your academic experience
- How to effectively utilize the resources available to you

SUBJECTS

First Year, Fall	
College Comp I (Note A).....	.....M
College Algebra (Note B).....	.....C
Social Science (First).....	.....SP
Intro to Programming Logic (Note D).....	.....M
First Year, Spring	
College Comp II.....	.....M
Precalculus.....	.....PH
General Chemistry + Lab.....	.....PH
Intro to Engineering (Note E).....	.....M
First Year, Summer	
Trigonometry (12 week session).....	.....M
Second Year, Fall	
Calculus w/ Analytic Geometry I.....	.....M
Intro to Programming in C.....	.....C
Humanities (First).....	.....SP
Fundamentals of Speech.....	.....SP
Second Year, Spring	
Calculus w/Analytic Geometry II.....	.....M
Gen Physics w/Calculus 1 + Lab.....	.....PH
Humanities (Second).....	.....SP
Second Year, Summer	
Differential Equations.....	.....MA
Third Year, Fall	
Calculus w/Analytic Geometry III.....	.....MA
Gen Physics w/Calculus 2 + Lab.....	.....PH
Social Science (Second).....	.....SP

From start to finish, your tresPATHS Advisor is here to help you. For more information, contact your tresPATHS Advisor at:

Tev
 Advisor - Boc
 Office Location: BT114 (no appointment)
 Email: tev@palmbeach.edu
 Project Website: www.palmbeach.edu



tresPATHS Project Flight Plan
ASSOCIATE IN ARTS: COMPUTER SCIENCE

PALM BEACH STATE COLLEGE

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- Which courses you have to complete
- Which course requirements you have satisfied
- How to get the most from your academic experience
- How to effectively utilize the resources available to you



PALM BEACH STATE COLLEGE

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tresPATHS Project Flight Plan
ASSOCIATE IN ARTS: ELECTRICAL ENGINEERING

PALM BEACH STATE COLLEGE

Palm Beach State College (PBSC) and Florida Atlantic University (FAU) are committed to your success. This Flight Plan is a tool to assist you in planning the courses you should complete to earn your Associate in Arts degree at PBSC prior to transferring to FAU's Bachelor of Science in Electrical Engineering program. It is our intention that you complete this planning tool in collaboration with your tresPATHS advisor to ensure good understanding of:

- Which courses you have to complete
- Which course requirements you have satisfied
- How to get the most from your academic experience at PBSC
- How to effectively utilize the resources available to you as a tresPATHS Scholar

SUBJECTS

First Year, Fall	
College Comp I (Note A).....	.....M
College Algebra (Note B).....	.....C
Social Science (First).....	.....SP
Intro to Programming Logic (Note D).....	.....M
First Year, Spring	
College Comp II.....	.....M
Precalculus.....	.....PH
General Chemistry + Lab.....	.....PH
Intro to Engineering (Note E).....	.....M

COURSE ID

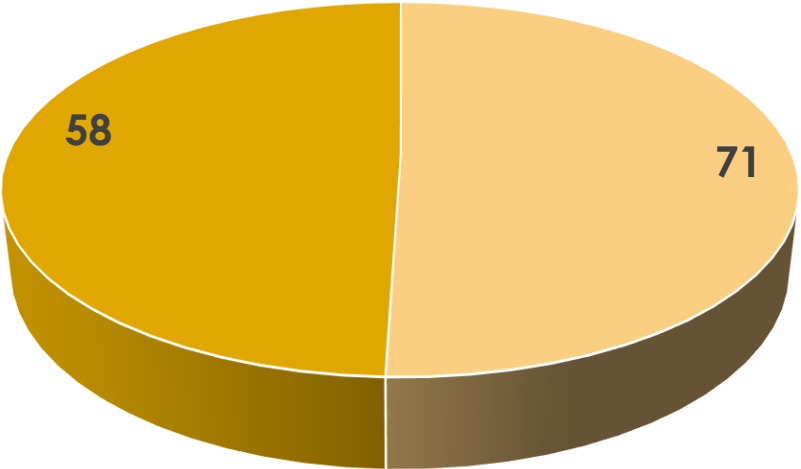
CREDITS

ENC1101.....	3
MAC1105.....	3
(Note C).....	3
COP1000.....	3
ENC1102.....	3
MAC1140.....	3
CHM1045+L.....	4
EGN1002C.....	3
(Note F).....	3

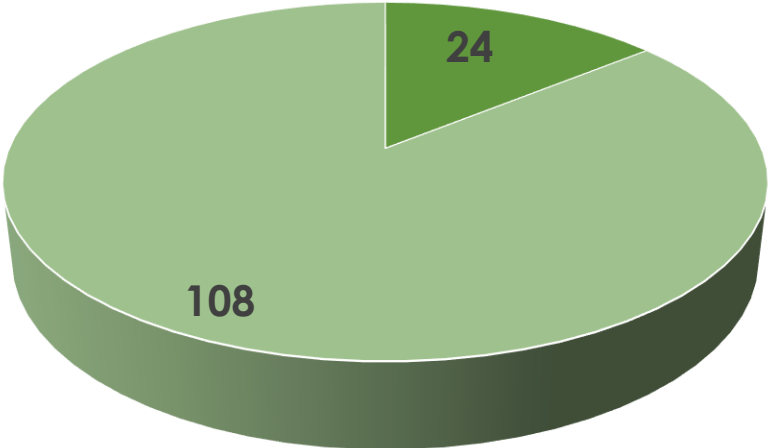


Notes:
 (A) English placement or appropriate prerequisite courses are required to take ENC1101.

tresPATHS STUDENT DATA



■ Hispanic ■ Low Income



■ Female ■ Male

TOTAL STUDENTS
(January 2017 – December 2019)
129



**Interested in Computer Science,
Computer Engineering or Electrical Engineering?**

tresPATHS Open House

Feb. 20, March 20, April 25

12:30PM – 1:30PM

Room: CA109, HT211 (April)

Boca Raton campus

Light refreshments will be provided.

For more information, contact us at:

 **561-862-4711**

hsistemprogram@palmbeachstate.edu

Join tresPATHS today!

Requirements

- PBSC student pursuing an AA degree
- Hispanic or low income (per FAFSA)
- At least 18 years of age
- Minimum GPA of 2.5
- Pursuing a B.S. degree in Computer Science, Computer Engineering and/or Electrical Engineering at Florida Atlantic University (FAU) upon completion of AA at PBSC

Benefits

- Designated advisor with enhanced academic plan/pathway
- Free Math and Computer Science Tutoring
- Special invitation to events and workshops
- Seamless transition to FAU's College of Engineering and Computer Science
- And more...







Tuesday, July 24, 2018
8:00 AM – 4:00 PM
Humanities & Technology Building
Boca Raton Campus

MORNING SESSION

- Making Sense of Numbers
- Fractions Made Easy
- Following Aunt Sally's Orders
- Slaying Linear Equations

*** **FOOD and ALL MATERIALS PROVIDED!**

REGISTER NOW!

Registration Required by **NAME and STUDENT ID NUMBER**
hsistemprogram@palmbeachstate.edu

SEATS ARE LIMITED!

Presented by: Prof. Anurag Katyal

Join Us

WOMEN EMPOWERED IN ENGINEERING AND TECHNOLOGY PANEL

OCT 24 || 1:00PM – 3:00PM || HT 103



DANIELLE DZUNG
 Engineering Director
 Motorola Solutions, Inc.



TORAL SHAH HERTZBERG
 Professional Engineer
 Kimely-Horn



MARJORIE HILAIRE
 Rail Administration Engineer
 Florida Department of Transportation



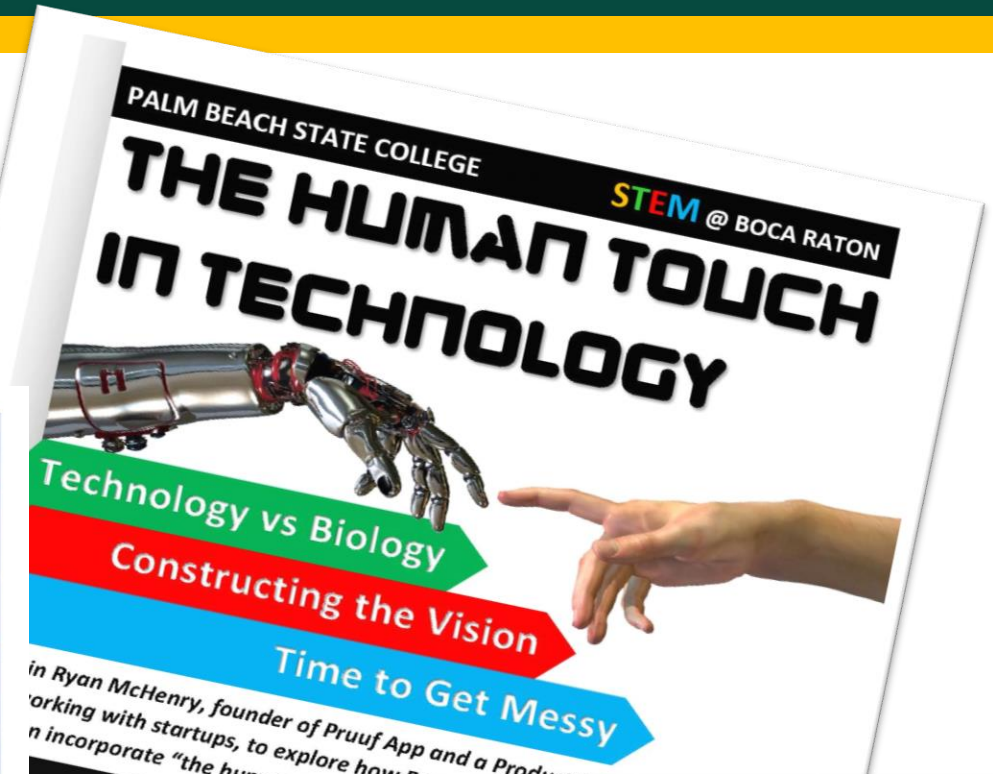
GUERLA ALTENA
 Electrical Engineering FAU Student
 (PBSC Alumni)



Moderator:
DANA HAMADEH
 PBSC Associate Dean of STEM

Lunch will be provided!

Boca Raton Campus
 Humanities & Technology Building (HT103)



Technology vs Biology
 Constructing the Vision
 Time to Get Messy

in Ryan McHenry, founder of Pruuf App and a Product...
 working with startups, to explore how Progr...
 incorporate "the human touch" into all as...

THURSDAY, SEPTEMBER 13
3:00 PM – 6:00 PM
(A 3-Part Hands-On Interactive Session)
Humanities & Technology Building
Boca Raton Campus

Registration Required by e-mailing NAME and STUDENT ID NUMBER to hsistemprogram@palmbeachstate.edu

SEATS ARE LIMITED! RSVP by September 10th

Speaker: Ryan McHenry





THANK YOU!

