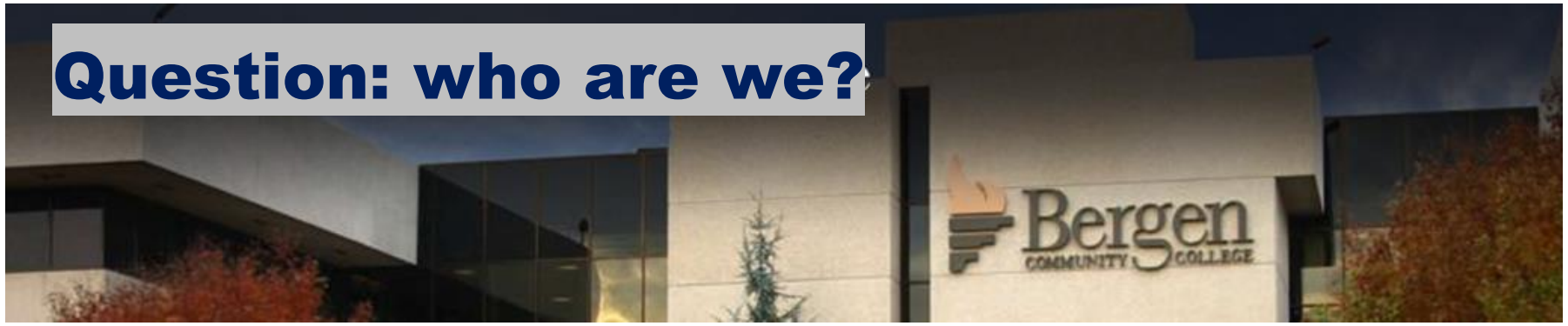
Extending STEM Learning Opportunities to Students Beyond the Classroom

presented at 2019 Tri-State Best Practices Conference

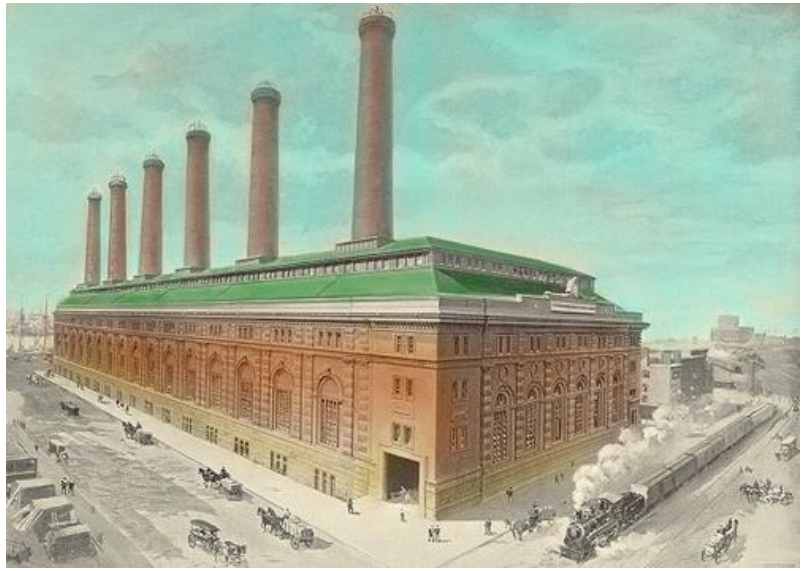
by Professors Emily Vandalovsky, Alan Eliscu, and David Beesley

Bergen Community College, Paramus NJ

March 2nd, 2019



Answer: the technology powerhouse -- CSEIT



The Department of Computer Science, Engineering and Information Technologies

- House 15 degree program and 10 certificate program
- use 9 dedicated labs

Image Sources: http://images.huffingtonpost.com/2009-10-29-IRT_Powerhouse.JPG
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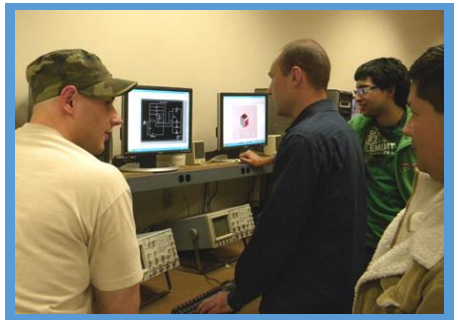
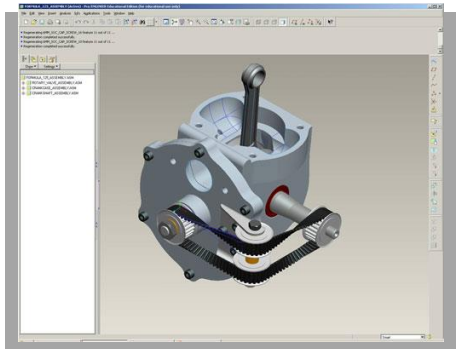
CSEIT -- the Department of Computer Science, Engineering and Information Technologies



Electronics



Manufacturing

Image Sources: https://bergen.edu/wp-content/uploads/prog_aviation.jpg
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Educate students in the following areas:

- **Computer science**
- **Aviation technology**
- **Drafting and design**
- **Manufacturing technology**
- **Electronics and engineering technology**
- **Database development and administration**
- **Web Development and management**
- **Network administration**
- **Information technology**
- **Game development**
- **Medical informatics**
- **Information systems**
- **Office technology**

Question: what makes us one?

Answer: dedication to students and passion for sharing knowledge

Question: how do we do it?

Answer: by expanding the classroom beyond its physical boundaries

Professor Alan Eliscu, Computer Science

Professor David Beesley, Civil Engineering

Image Sources: https://developer.ibm.com/predictiveanalytics/wp-content/uploads/sites/48/2016/05/academicInitiative.jpeg
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Bergen Community College

Broadening Student Learning Experiences at BCC

Bergen Community College

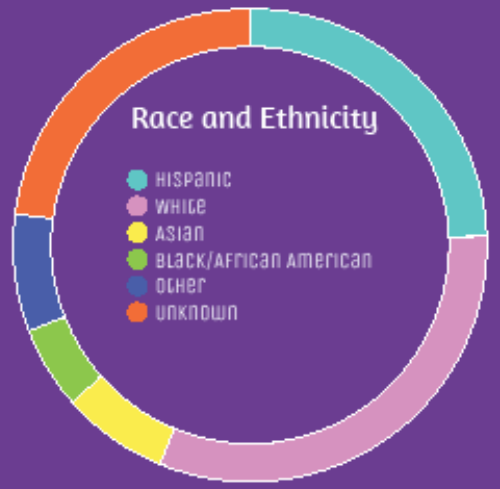
Meet Bergen Community College's Fall 2017 STEM Majors

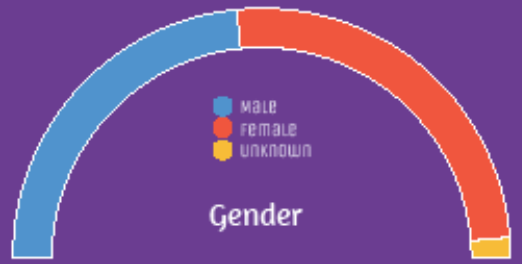
Head Count
14,062

STEM Head Count
2,521

Percentage STEM
18%

Number of STEM Offerings
39





Top STEM Majors

Computer Science
General Natural Science and Math
Engineering Science
Biology
Information Technology

70.5% of STEM majors had a GPA ≥ 2.5

77.9% of STEM majors were ages 24 or under

79.6% of new STEM majors were full-time

80.9% of new STEM majors persisted to Spring 2018

Race and Ethnicity data as well as Gender data is presented institutionally; it is not specific to STEM students.
'Other' includes Hawaiian/Pacific Islander, American Indian/Alaska Native, Two or More Races, and Non-Resident Alien.

In a 2017 community college rating report, Bergen Community College was rated in the top 30% of all community colleges with respect to "Career Outcomes", among 728 schools.

Despite our nearly balanced population by gender, very few female students choose "Computer Science" or "Information Technology" as their major.

How Do Expanded Educational Opportunities Contribute to the Learning Experience?

- ✓ Students are introduced to new concepts not directly incorporated in the syllabus
- ✓ Professors are able to provide one-on-one mentorship to highly motivated students
- ✓ Learning can be more closely correlated to industry-related internships or co-op programs
- ✓ Additional topics can be introduced in the classroom where appropriate
- ✓ “Going the extra mile” contributes to student retention and helping students to find their way

WHAT HAVE WE DONE TO DATE?

Teaching Students About the IBM Mainframe

- Incorporate IBM's Master the Mainframe Into Our Curriculum
- Establish an MTM Club for Students to Work Collaboratively
- Sponsor a Mainframe Hackathon Within Our STEM C^2 Conference

Independent Research Opportunities

- Introduce a Mini-Course for STEM Scholars Program
- Mentor Students in Application Development on the Mainframe

Industry-Sponsored Events

- Participate in the Providence SHARE Student Day, 2017
- Participate in the ECC Conference, 2016 & 2017
- Student Presentation at ECC Conference, 2017
- Two Trips With Students to IBM Mainframe Headquarters in Poughkeepsie

Bergen Community College

Every Friday: C304 / 10am – 12pm

Before the meetup:

- Register for the contest at masterthemainframe.com
- Install the pre-req software on your laptop

Bergen Community College Paramus

Bring your laptop!

MTM Club

- ✓ Encourages Comraderie
- ✓ Students Help One Another
- ✓ Some Students Opt to Complete Part 3
- ✓ Professor Offers Help & Explanations
- ✓ Club Stipend Supports Our Other Activities
- ✓ Opportunity for Ad Hoc Tutoring of Class Content

Bergen Community College

Student Participation in MTM

- **Spring 2017 - 3 students completed Part 2**
- **Fall 2017 - 14 students completed Part 2**
  3 students completed Part 3
- **Spring 2018 - 21 students completed Part 2**
  3 students completed Part 3

Some students from prior semester opted to do the 2017 MTM

- Fall 2017 was the first offering of the newly revamped Computer Organization & Assembly Language course
- Two hybrid sections and one face-to-face section
- Total of 120 students enrolled

Bergen Community College

SHARE Summer 2017 – Student Career Day
Providence, Rhode Island

- Over 60 contestants from various 2 & 4-year schools competed
- Five students accompanied me for an overnight trip
- All five students finished among the top 10 contestants
- Jonny Lazarte won the entire competition
- Students participated in special sessions
- Students were able to meet with industry professionals

SHARE Providence 2017

Student Career Day

On Tuesday, August 8, 60+ students from 16 colleges and universities from around the country participated in Student Career Day and competed in the Master the Mainframe Hackathon. With fun challenges to experience the power of z Systems in Application Development, competitors earned points towards prizes and had the opportunity to connect with IBM and Rocket Software experts. Congratulations to the Hackathon winners: Jonny Lazarte from Bergen Community College, Akeem Brooks from North Carolina A&T and Dan Synder from New Brunswick College.

2017 Enterprise Computing Conference

SC3104/3105 **Sadik Erisen, Tamar Tokman, Arnav Lohe, Tristan Draper, Ross Kernez, Bergen Community College**

Grace AI & Search Engine

Visits to IBM Mainframe Headquarters

Jeff Bisti:Cognitive AI Solutions Architect for IBM

Fall 2017 – 9 students

Spring 2018 – 42 students (72 sign-ups)

Fall 2018 – next scheduled trip

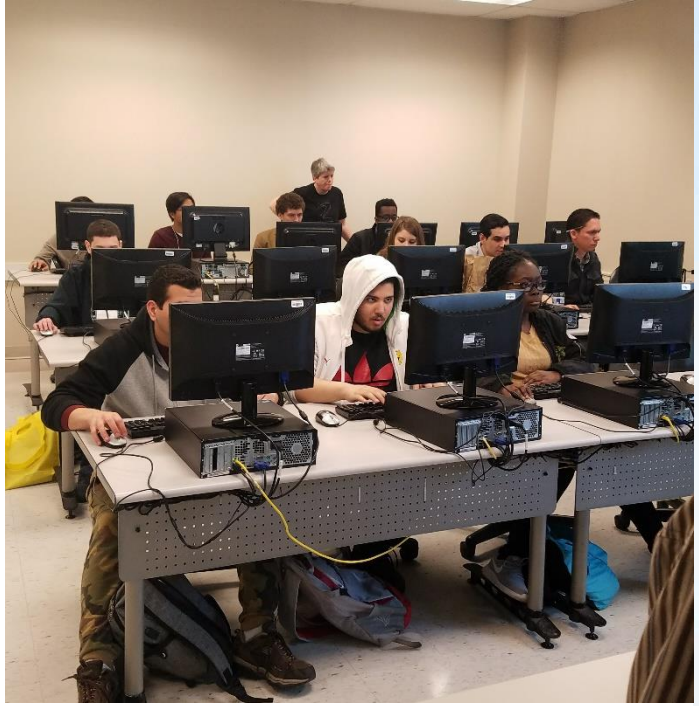
Bergen Community College

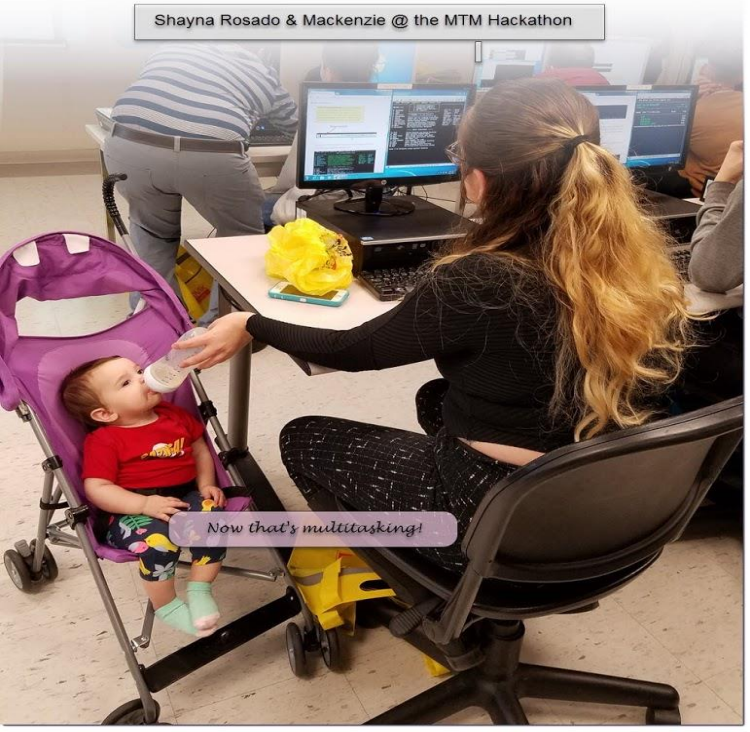
STEM C^2 Research Summit - April 13th, 2018

Kudos to our IBM Support Team, Both On-Site and via Remote Assist

Luis De Abreu
BCC STEMatics Grant Program Director
STEM C² Research Summit *Conference Coordinator*

Frank de Gilio
IBM Corporation
Distinguished Engineer, Cloud Architect
Keynote Speaker





Master the Mainframe Hackathon

when?

Friday,
April 13th
1 - 3 PM

where?

TEC-107
Paramus campus

at the STEM C²
Research Summit

Master the Mainframe is the world's largest student mainframe competition and it has returned for its 13th year in a row with new prizes and new challenges for students around the world.
NOW IN BERGEN COMMUNITY COLLEGE!

You must register prior to the event:
tinyurl.com/2018BCCHackathon

WIN A $200 GIFT CARD

while gaining unique skills that can land you a career in Fortune 500 companies around the world!

NO EXPERIENCE NEEDED

Learn more at
ibm.com/it-infrastructure/z/education/master-the-mainframe

Bergen COMMUNITY COLLEGE
IBM
STEMatics

***The content of this informational sheet was developed under a grant from the U.S. Department of Education. However, the content do not necessarily represents the policy of the U.S. Department of Education, and you should not assume endorsement by the U.S. Federal Government.

BCC Mainframe Education Timeline

Summer 2016

Initial Roundtable Meeting With IBM, Major Local Corporations, BCC Administrators And Staff

BCC Attends Marist/IBM ECC Conference

Spring 2017

3 Students Complete MTM Part 2

Summer 2017

5 Students Attend SHARE Providence Student Career Day

Bergen Student Wins SHARE Hackathon

Fall 2017

9 Students Visit IBM

14 Students Complete MTM Part 2

3 Students Complete MTM Part 3

First Offering of revamped Computer Organization & Assembly Language Course with Mainframe Emphasis

Spring 2018

42 Students Visit IBM

21 Students Complete MTM Part 2

3 Students Complete MTM Part 3

Computer Organization & Assembly Language Course Runs 3 Sections (72 Students)

Master the Mainframe Becomes a Recognized Club on Campus

Hackathon Incorporated in STEM C^2 Research Summit (35 Students)

Summer/Fall 2018

Standalone Mainframe Hackathon (Anticipate 70+ Participants)

IBM Trip Scheduled Early November

BCC Professor Presents at Marist/IBM ECC Conference

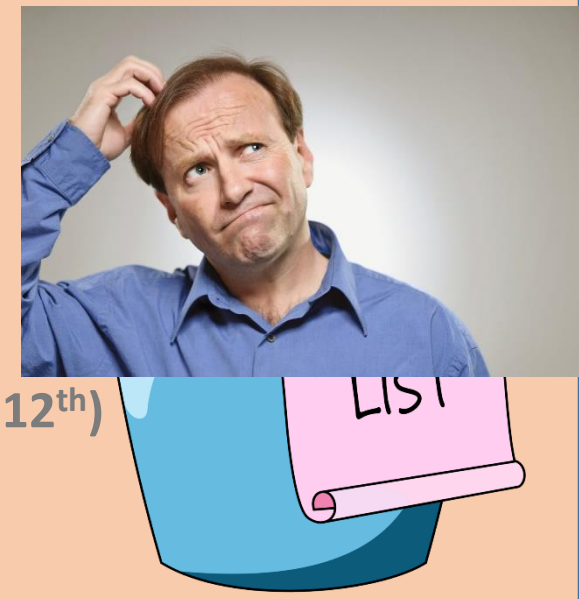
BCC Professor Presents at IBM NYC Z-Council

STEM Scholars Work on Mainframe-Based BlockChain Application

Second Roundtable Meeting With IBM, Major Local Corporations, BCC Administrators And Staff

Bergen Community College

HOW DO WE BROADEN OUR EXPOSURE?



Extracurricular Activities

- dic visits to IBM Mainframe Headquarters in Poughkeepsie
- ticipate in industry-sponsored activities (Z Council, ECC, SHARE)
- day mainframe hackathon for students in the northeast (October 12th)
- ents to continue independent development using mainframe
- ur annual STEM C2 conference

Grow Our Relationships

- Seek corporate partners to offer internships, scholarships or apprenticeships
- Seek four-year college partners to offer scholarships to study mainframe
- Consider offering courses through our Continuing Education department

What are the Takeaways?

- Opportunities for enriched learning experiences exist in **every discipline**
- Professors need to **be creative** in developing approaches to attract student interest
- When some students become excited about opportunities, **it becomes contagious**
- Students are **more apt to be successful** if they enjoy learning
- Broadened learning can lead to **mentoring**, **guidance** toward a major, **retention**

You Can Make a Difference!

THANKS FOR WATCHING!!

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000100 IDENTIFICATION DIVISION.
000200 PROGRAM-ID.     HELLOWORLD.
000300
000400*
000500 ENVIRONMENT DIVISION.
000600 CONFIGURATION SECTION.
000700 SOURCE-COMPUTER. RM-COBOL.
000800 OBJECT-COMPUTER. RM-COBOL.
000900
001000 DATA DIVISION.
001100 FILE SECTION.
001200
100000 PROCEDURE DIVISION.
100100
100200 MAIN-LOGIC SECTION.
100300 BEGIN.
100400     DISPLAY " " LINE 1 POSITION 1 ERASE EOS.
100500     DISPLAY "Hello world!" LINE 15 POSITION 10.
100600     STOP RUN.
100700 MAIN-LOGIC-EXIT.
100800     EXIT.
```

IBM MASTER
THE MAINFRAME

Image Sources: https://www.njlm.org/ImageRepository/Document?documentID=7043
https://www.njlm.org/ImageRepository/Document?documentID=339
https://www.njlm.org/ImageRepository/Document?documentID=380
https://www.njlm.org/ImageRepository/Document?documentID=927

STATE OF NEW JERSEY
CONTRACT HOLDER
create
create
create

NJLM
AISLE
1500
1600
1700
NAP

Thank you for watching!

CSEIT -- the Department of Computer Science, Engineering and Information Technologies

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