Bowie State University the first historically black public university in the State of Maryland empowers a diverse population of students to reach their potential by providing innovative academic programs and transformational experiences as they prepare for careers, lifelong learning, and civic responsibility.
Mission Statement

As Maryland’s first historically black public university, Bowie State University empowers a diverse population of students to reach their potential by providing innovative academic programs and transformational experiences as they prepare for careers, lifelong learning, and civic responsibility. Bowie State University supports Maryland’s workforce and economy by engaging in strategic partnerships, research, and public service to benefit our local, state, national, and global communities.

Vision

Bowie State University will be widely recognized as one of the nation’s best public comprehensive universities that is a model for academic excellence, innovation, and student success.
Fall 2021 Enrollment
6,250 Total

5,354 Undergraduate students (1,851 students in the College of Arts & Science)
957 First-time, full-time freshmen

896 Graduate students (147 students in the College of Arts & Science)

32 states represented
27 countries represented
Tuition & Fees
2020-2021 Academic Year

Undergraduate
In-state – $4,222.60 per semester
Out-of-state – $9,568.10 per semester

Graduate
In-state – $553.33 per credit hour
Out-of-state – $839.36 per credit hour
Department Overview

• BS (ABET-Accredited, MS, Doctoral programs in Computer Science
• Program validation & re-designation National Center for Academic Excellence (April 2022).
• Five research labs - $13,5M - research and workforce development
• Home of a CRAY supercomputer.
• Over 25 partners (experiential learning opportunities, gift funds, guest speakers
• Three new BS programs (Data Science, Cyber Operations Engineering, Software Engineering)
Research Labs

• Autonomous Technologies lab
• Center for High-Performance Information Processing
• Computational Perception and Animation Lab
• Cyber Security Applications Lab
• Virtual Reality Lab
Dr. Bo Yang | $450,000 NASA grant – “Small Bodies of NASA”

Dr. Sharma | $13 M NSF grant – NSF HDR Institute for Harnessing Data and Model Revolution in the Polar region’s Project

Dr. El-Sayed | $1 M NSF grant – High-Performance Intelligent Data Science Institute
Research Grants Highlights

- **Dr. Yan** | $750,000 NSF grant – Detecting Vulnerabilities in IoT using Deep Learning
- **Dr. Harvey** | $75,000 NSA grant – Novel Secure Communications
- **Dr. De-Melo** | $9.9 M PHIT grant – Public Health Informatics and Technology Workforce Development Grant (Nursing Department)
Research Projects in Progress

• Development and clinical trial of the bright IDEAS intelligent agent for caregivers of child cancer patients.
• Data visualization of COVID-19 pandemic in the US.
• Virtual reality instructional training for improving quality of care and patient safety.
Research Projects in Progress

• Use of ensemble classifier to develop an intelligent computational system to predict the risk of heart disease.

• Use of object detection technology to detect breast cancer tumors, lung cancer, and brain cancer.

• Use of hybrid machine learning algorithms and deep learning for modeling and predicting vulnerabilities in IoMT healthcare data.
Research Projects in Progress

- Identifying seizures by analyzing EEG utilizing wavelet transform.
- Identifying abnormal behaviors of autism (ASD) by analyzing multimodal data.
- Monitoring the change of stress over time by analyzing physiological signals.
- Determining social determinants of dementia risk and designing a predictive model to identify dementia risk utilizing deep learning.
Howard University
College of Engineering and Architecture

Overview

Dr. Ahmed Rubaai, Fellow IEEE
Professor and Chair
Department of Electrical Engineering and Computer Science
Email: arubaai@howard.edu

CRA’s Flagship Conference
Snowbird, Utah
July 19-22, 2022
Howard University Overview

• Private, research university founded in 1867
• Comprised of 14 schools and colleges
• Students pursue studies in more than 140 areas
• Awarded more than 120,000 degrees in the arts, the sciences, and the humanities
• More on-campus African-American Ph.D. recipients than any other university in the United States
• Ranked by National Science Foundation (NSF) as the top producer of African-American undergraduates who later earn science and engineering doctoral degrees
• Produced one Schwarzman Scholar, three Marshall Scholars, four Rhodes Scholars, 12 Truman Scholars, 25 Pickering Fellows and more than 165 Fulbright recipients
Overview---College of Engineering and Architecture

- Total undergraduate enrollment is approaching 1200 students
- Total graduate enrollment (masters and doctoral) is approaching 120 students
- All engineering and computer science programs are accredited by the Accreditation Board for Engineering and Technology
- The architecture program is accredited by the National Architectural Accreditation Board
- In its 2018 report titled Engineering by the Numbers, the American Society for Engineering Education (ASEE) lists Howard University in the top ten in terms of the percentage of engineering bachelor's degrees that are awarded to women
- In the same report, the ASEE also lists Howard University in the top fifteen in terms of the number of engineering bachelor's degrees that are awarded to Blacks or African Americans
Academic Departments

- Architecture
- Chemical Engineering
- Civil and Environmental Engineering
- Electrical Engineering and Computer Science
  - Computer Science Program
  - Computer Engineering program
  - Electrical engineering Program
- Mechanical Engineering
Our graduates work for a variety of private and public firms and agencies. They also pursue advanced degrees. Graduates who are Registered/Licensed engineers and Architects

- US Department of State
- General Services Administration
- Local and State/Public Agencies
- Many start their own firms

PARTIAL LIST OF UNIVERSITIES:

- Columbia University
- Cornell University
- Harvard University
- MIT
- University of Pennsylvania
- Penn State University
- Stanford University
- University of California at Berkeley
- UCLA
- University of Illinois
• Address the Research & Engineering (R&E) challenges to building safe, robust, and trustworthy AI to support DoD’s modernization priorities.

• Applications include AI/ML for the battlefield internet of things, electronic warfare, counterterrorism, cybersecurity, and machine vision.
Big Data Analytics and Machine Learning for

- Cyber-security & Cyber-defense
- 5G & Beyond Wireless Networking
- Cyber Physical Systems (UAV, Autonomous Driving)

Funding Agencies (> $6 Millions)

Danda B. Rawat, PhD, IET Fellow, SMIEEE, SMACM
Director, DoD Center of Excellence in AI & Machine Learning
Director, Data Science and Cybersecurity Center (DSC2)
www.Rawat.info
Kathy Kanemoto, Professor of Computer Science & Drone Technology
About Merced College and the CS Department

A little background on Merced College and a little background on Merced College and the CS department.

We also have websites that highlight some of the things we are doing to create Computing and Computer Science pathways for our students:

https://cspathways.us/

http://stem4me.com/

https://cspathways.us/news/
CS Department Mission, Vision and Goals

A. Increase Enrollment
B. Continue to grow our student success numbers.
C. Get students internships and jobs in the CS industry.
D. Have more students graduate with a degree or certificate.
E. Grow are enrollment and graduate number of Hispanic and Women students.
F. Create more pathways for our CS and Drone Technology classes. Including Ag and GIS pathways.
G. Implement transfer pathways.
H. Implement online classes that effectively teach CS.

Vision & Mission
CAHSI projects that by 2030, Hispanics will represent 20 percent or more of those who earn credentials in computing.
CAHSI’s mission is to grow and sustain a networked community committed to recruiting, retaining, and accelerating the progress of Hispanics in computing.
Merced College CS Department Teaching & Research

Using CAHSI ARG model to develop project based, team learning activities and projects for our CS classes.

— Offering REUs to our students. —

Implementing good teaching pedagogy, using simulators, cloud, and online tools to implement team learning in online classes.

Made Industry standards and CS Habits of Mind as Student Learning Outcomes in our classes.

Impleentening Industry and Research Career pathways as a Student Learning Outcomes in our classes.

Certificates as a pathway; Computer Programmer, Drone Technology, Drone Media, Computer Technology and Information Systems. As well as Industry Certificates.

Outreach, professional development and articulation with our local K-12 schools.
Merced College CS Department Teaching & Research

Annual Science Fair
CS CAHSI Club
CAHSI Advocate

Career Fairs and Events
Alliances and Partnerships

K-12 Outreach
Activities & Events

Girls Who Code
Grow with Google
UAS Collegiate Training Initiative
National Center for Autonomous Technologies
Merced College CS Department Teaching & Research

CAHSI Local REUs

Collaboration with Agronomists and USDA Ag Research Services
Collaborations with UC Merced and Stanislaus State

CAHSI CS4Me Day

Google ExploreCSR

Drone Safety Day

Cal-Bridge a pathway to research

IoT4Ag outreach kits
Questions, Comments, Ideas

Kathy Kanemoto

Kanemoto.k@mccd.edu
Software Engineering @
Morehouse College

Kinnis Gosha, PhD
Hortinious I. Chenault Endowed Professor
Academic Program Director
Morehouse at-a-Glance

- All male, Liberal Arts College
- All undergraduate
- Historically Black College
- Approximately 2,200 students
- Member of the Atlanta University Center
  - Morehouse College
  - Spelman College
  - Clark Atlanta University
  - Morehouse School of Medicine
Computing at Morehouse

- Morehouse College has a Computer Science and a Software Engineering Degree Programs
- SWE degree program started in 2019
- First at an HBCU
- Created to focus on students who specifically want to go into entry level SWE roles immediately after graduation
- CS Students = around 140
- SWE Students = around 30
- Only 1 FT faculty for SWE
Culturally Relevant Computing Lab (CRCL)

● Broadening Participation in Computing
● CS Education & Outreach
● Conversational Agents
● Socially Relevant Computing
● Fairness, Ethics, Accountability, and Transparency in Computing
Culturally Relevant Computing Lab (CRCL)

- Experience with NSF, DoE, Federal Contracting, Foundation, Private
- Affiliation with AUC and ARCHE
- Relatively well staffed
- Strong & efficient sponsored research office
IAAMCS

- Institute for African American Mentoring in Computer Sciences
- CISE BPC Alliance
- Completed our Reverse Site Visit for a renewal in June 2022 (fingers crossed)
kinnis.gosha@morehouse.edu
Current enrollments:
- CS = 367, CC= 20,
- AC = 40, BI = 12

BS in Computer Science with focus areas:
- Software engineering
- Artificial Intelligence and Data science
- Cybersecurity
- Robotics/Gaming
- HCI
Research (R2 → R1)

- NSF grants: Dillon, Rahman, Sharker, Dabaghchian, Mack, Wang
- Google: Stojkovic
- Meta: Chouchane
- Other: Private sector: Sakk, Org: Wang
- Two books and a number of publications

- AI/ML related funding (current): $2.6m

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Environmental Justice Massive Data Collaborative ML Technical Infrastructure, Bezos Earth Fund, $1,500,000, 2022-23, PI: Wang</td>
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<td>Deep Learning Based Automated Concept and Caption Generation of Medical Images, NSF 440K, 2022-24, PI: Rahman</td>
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<td>Cyber Assessment of AI/ML Tools, DoD, $150,000, 2020-2022, PI: Wang</td>
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<td>Using Machine Learning for Healthcare Cyber Threat Analysis, Private Sector, $25,000.00, 2021-22, PI: Wang</td>
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<td>Deep Learning Algorithm Study and Course Development, Meta, $50,000, 2022-23, PI: Chouchane</td>
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<td>Tensor Flow Study and Course Development, Google, $20,000, 2021-2022, PI: Stojkovic</td>
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<tr>
<td>User Navigation ML Predictive Model, $7,500, Private Sector, PI: Sakk</td>
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<td>Natural Language Processing of Government Issued Proposal Documentation, $7,500, Private Sector, PI: Sakk</td>
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<td><strong>Total Funding</strong></td>
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Students Success

- Dillon: ATT competition
- Rahman: Conference for graduate students
- Sharker: IBM awards
- Stojkovic and Sharker: ACM competition
- Mack: LFG

- Google: $5m
- Oracle: $30,000, Cisco: $10,000, RISE: $10,000
- More than $200,000 awarded to students (TA, RA, LA, scholarships, etc.)
Look Ahead

- Three POS
  - Computer Science
  - Cloud Computing
  - Advanced computing
- Six new faculty positions
- Ph.D. in Advanced Computing is expected in 2023
- Center for Equitable AI/ML Systems
Chair’s Observations

- Survive in the first two-years is key to success in CS
- Research and internship experiences are important
- Transfer to/from CS
  - In: Most students with better GPAs
  - Out: Students with low GRAs
- Graduate scholarship and support
- New courses and updated curriculum
  - Cloud computing, mobile computing, quantum computing, cryptography
  - Networks with cloud and SDN, computer architecture with security and FPGA tape out
  - Senior project class with current research topics: SearX, RSA, trustworthy AI, eVote, etc.
## Advising

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Email 1:
Initiatives

• Establish the quantum computing and quantum cryptography lab
  - One photon capture device
  - Commercial level QKD devices

• Center for equitable AI and Machine Learning Systems
  - Computer science will play an important role for the center.
  - There will be resources for all related research
Quantum Computing in Adversarial ML Algorithms

- “Attack” the AI/ML algorithms to cause abnormality
- Stealth ware technologies with adversarial patterns
  - Evasion
  - Poisoning
  - Model stealing

Cyber Threat Analysis with ML

- Unsupervised Learning (K-mean)
- Label estimation
  \[ \arg\min_{\mu} \sum_{i=1}^{k} \sum_{x_i \in C_{i}} ||x_i - \mu_i||^2 \]
  s.t. \( A(u,v) = 0 \lor 1 \), \( \sum_{v} A(u,v) = 1 \)
- Supervised Learning
- 822,226 healthcare IT data
- Python

Research Projects

GAN – Generative Adversarial Network – QC approach

Cognito for authentication
Naive Bayes algorithm

Higgin: Using ML to Fight for Social Justice

- Natural Language Processing
- Cosine similarity

GAN
- Generative Adversarial Network
- QC approach

G loss:
\[ \text{tf.reduce_mean}(\text{sigmoid} \_\text{cross} \_\text{entropy} \_\text{with} \_\text{logits}(\text{self} \_\text{D} \_\text{logits}, \text{tf} \_\text{ones} \_\text{like} \_\text{(self} \_\text{D}))) \]

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CRA Can help

- **BPC**
  - Help for making a BPC plan
  - Prepare a proposal

- **Advisory**
  - Programs and courses advises and support

- **Involvement**
  - Info and resources for CRA and related computing events
  - Engage more with Morgan (and other HBCUs) on CRA initiatives