NASA’s HBCU/MI Engagement Forum at Johnson C. Smith University

Fayetteville State University

Sambit Bhattacharyya
Dept. of Math & Computer Science (DMCSC) - Curriculum

• ABET accredited CS program (B.S.)
• BS in Mathematics
• BS in Mathematics with a Teaching Licensure concentration (Secondary Education 9-12)
• Engineering 3+2 Dual Degree Programs with North Carolina State University (CSC + CEng, CSC + EE, and Math + Civ Eng)
• Cisco CCNA certification curriculum
• Cybersecurity certification curriculum
DMCSC - Recently Funded Projects

- **Implementation Project: Strengthening Student Success in STEM (S^4)**
  - Awarding Agency: National Science Foundation (NSF)
  - Strategies:
    - Professional Seminar Course Sequence.
    - Assessment-Based Adaptive Math Course.
    - Student-Centered Active Learning Environment Upside-down Pedagogies (SCALE-UP)/Flipped Learning.
    - Intrusive Peer Tutoring and Supplementary Instruction.
    - Undergraduate Research Mentoring.
    - STEM Education Research.

- **Strengthening Computer and Information Sciences Engagement and Learning (SCISEL)**
  - Awarding Agency: American Association of Colleges and University (AAC&U)
  - Strategies:
    - improve the quality and quantity of graduates for STEM workforce
    - specifically,
      - re-designed courses to include culturally responsive teaching (CRT) initiatives
      - provide professional development for faculty in CRT
      - teaching & research to improve self-efficacy of students
    - project-based learning & research activities e.g. in robotics, swarming
    - participation in the NASA Swarmathon competition over several years
DMCSC – Recently Funded Projects

- **Title:** Acquisition of a High Performance GPU Cluster and Sensing Equipment for Research and Education at Fayetteville State University in Areas of Interest to DoD
  - **Awarding Agency:** US Department of Defense (DoD), Army Research Office (ARO)

- **Title:** Developing the Geospatial Intelligence Certificate at FSU
  - **Awarding Agency:** National Geospatial-Intelligence Agency (NGA)
  - **Established GEOINT certification accredited by USGIF**
DMCSC – Intelligent Systems Lab

• Mission
  – develop intelligent and analytic tools that solve problems in
    • Cybersecurity
    • Robotics
    • AI, Data Science
  – provide an experimental environment for development, modeling and testing

• Provide support to faculty & students
  – HPC with GPUs
  – Robots & accessories (from previous NSF MRI grant, now NASA Swarmathon)
  – contracts from companies
  – financial support for students from the Collaborative Research Experiences for Undergraduates (CREU) program of the Computing Research Association (CRA)
DMCSC – current research projects

- Security of mobile communications, image transmissions and satellite phones with stream-based cryptographic algorithms and multicore distributed computing (GPUs)
- Protein model scoring
- Multi-modal deep learning, machine learning
- Joint understanding of language/text and image/video data
- Physical surveillance robotics with human partners
- Soft matters and biophysical fluid dynamics and various other projects in basic and applied mathematics research
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