Fayetteville State University
Capability Statement

Institution: **Fayetteville State University**

DUNS: **067188979** Cage Code: **0KT18** **SIC**: **8221** Federal EIN: **56-1238736**
NIACS: **541380, 541512, 541611, 541690, 541714, 541715, 541720, 611310, 611420, 611699, 611710**
SAM.GOV registered GSA Schedule #: **47QRAA19D0032**
Certificates, Registrations, Accreditations: ***SACSCOC, ABET, IFSAC, AACSB, FEPAC, CCNE, NCATE/CAEP***

POC Information: **Dr. Daryush ILA, Associate Vice Chancellor for Research & Technology Transfer**
Address: 1200 Murchison Road, The Research Office, Fayetteville, NC 28301
Tel: 910.672.2417 **E-mail: dila@uncfsu.edu**

OVERVIEW

Fayetteville State University (FSU) is an HBCU located in Fayetteville, NC, adjacent to Fort Bragg, NC, over 6,500 students, 68% female, 63% black and over 26% military affiliated. FSU is an emerging research institution specializing in materials research, computer science, cybersecurity, and intelligence studies. FSU is an emerging research institution, with a newly developed materials research facility, a prototyping lab, a Center of Excellence in Geospatial Intelligence, the Center for Defense and Homeland Security, a robotics lab, and materials for radiation detection and detectors prototyping. FSU's recent relevant patents to NASA are materials for growing plants in zero gravity, agro-tiling for extreme environment, and highly efficient thermoelectric devices.

RESEARCH CAPABILITIES

Materials: Testing, synthesis and characterization, nanomaterials, nanowire and nanodot? synthesis and analysis, novel materials development, 3D sensor detector/scintillation for X-ray and Gamma-ray detection, and high temp materials. Hydrogen and methane sensors, (radiation and chemical), nanomaterials for drug delivery, smart materials, shape alloy nanowires, thermoelectric materials, and phase transformations.
Propulsion and Power Systems, high efficiency thermoelectric materials, hydrogen fuel storage, high temperature carbon composites, crystal growth at high and low gravity, microwave and continuous flow reactions.
Chemistry/Physics: Chemical sensor, energy harvesting, organics, micelles for drug delivery.
Mathematics/Computer Science: Machine learning, data analytics, robotics, swarming, human robotic trust interactions, anomaly detection, detection of failures in human robotic communication, mathematical modeling, algorithm development, model and algorithm simulations, computational modeling, parallel computing, applied harmonic analysis frame theory, wavelet analysis, image recognition and signal processing, error correction codes, variation and non-smooth analysis.
Geospatial Intelligence: Certified training, teaching and research labs, National Geospatial Center of Excellence.
Intelligence Studies: International security and threats, government, military and industry intelligence.
recombinant DNA and RNA tech, toxicology, environmental science and biology, microbiology.

FACILITIES

Materials Research Facility, Major & Specialized Instrumentation: Mechanical testing: Tensile and hardness testers; Electron microscopy, Ultra-high-resolution electron microprobe, Shimazu Prominence HPLC, Perkin Elmer ultra-High sensitivity LC-MS/MS, Bruker 400MHz NMR, NT-MDT Atomic Tunneling Microscope (ATM); Luminescence spectroscopy; UV/VIS/IR photo-spectrometry; Ultra-high resolution Mass-Mass spectrometry; Triple Quadrupole LC/Mass spectrometry; X-ray diffraction; Analytical chemistry; Forensics; High performance computing; Atomic Absorption Spectrometry; Capillary Electrophoresis; Gas Chromatography; High Performance Liquid Chromatography; Fourier Transform Infrared Spectroscopy; electro-spinners, SPEX (8000M) Mixer/Mill, Customized Torr coater for High-Field materials synthesis, Geospatial Intelligence Center of Excellence-fully equipped lab for training and geospatial research, Center for Defense and Homeland Security-Cybersecurity training and research, STEM outreach.
Prototyping Laboratory: 3D printing, 3D digitizing, electrical prototyping, mechanical prototyping, LASERs and photovoltaics, DNA analysis and genomics, environmental testing, medical device prototyping.
Relevant Patents: Agro-tiling to grow plants in extreme environments, Silica based plant growth for low gravity, High Efficiency Thermoelectric Devices, Method for synthesis of thermoelectric materials.

PAST PERFORMANCE (Selected)

DoD: High Efficiency Radiation Detectors and Nanostructured Sensors and Materials.

High Performance GPU Cluster and Sensing for high resolution aerial thermal signature analysis.
Analysis of environmental signatures of chemical, biological and high energy explosive products,
NSF: High performance Cathodoluminescence Spectrometer for structural characterization of nano materials, & Partnership for Research and Education in Materials – PREM (Partner **NIST**)
NASA, NSF, DoD: Efficient Thermoelectric Materials and Devices R&D
ORAU: Synthesis of Nanomaterials for radiation detection
Combat Capabilities Development Command/Weapons Materials Research Directorate - US Army RL: Nanomaterials synthesis and applications