



HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

NASA TECHNOLOGY INFUSION ROAD TOUR



AND MINORITY-SERVING INSTITUTIONS

Fayetteville State University

Daryush ILA, Ph.D.

**Associate Vice President for
Research and Technology
Transfer**



Office of
Small Business
Mentor-Protégé Program

FSU Background

- Over 6000 students
- All programs are accredited by SACCS
- Advanced degrees in computer sciences, Chemistry, Physics, Biology and Chemistry with Materials track
- 3/2 Engineering program with NCSU;
 - Chemical Engineering,
 - Computer Engineering,
 - Electrical Engineering, and
 - Civil Engineering



Outline Relevant to NASA



- STEM Degrees and Outreach
- Basic and Applied Research
- Robotics – NASA Swarmathon
- **Advanced Materials Research**
- Nano materials: sensors, and radiation detection, thermoelectric, agriculture in space, & Prototyping
- **Innovation and Tech Transfer**
- **Services** (Edu, IT, & more)

Innovation & Technology Transfer

Focus Areas:

- Innovation & Invention
- Patenting (IP)
- Technology Transfer
- Start-ups
- Commercialization
- Licensing



Current Projects/Sponsors:

Innovation Fund NC
iMatSci
Fayetteville State University

Current Start-ups:

Next Generation Biomedical LLC

Patent licensing discussion in progress:

Three patents

Description:

To provide. Outlets for Innovation and Inventions, Through, Intellectual Property Protection (Patents, Copyrights & etc.), Technology Transfer (Commercialization and Licensing) and promoting University Start-ups.

Current Patents:

- High Efficiency Thermoelectric Device
- Silica-Based Plant Growth Medium (2 patents)
- Novel Wound Care Recovery Device
- Pest Control Composition
- Method for production of High Figure of Merit Thermoelectric Materials
- Agro-Tiling for Extreme Environment

Collaborative Research Ideas/ Potential Sponsors:

- Industry
- Department of Energy
- Department of Defense
- National Science Foundation
- Department of Education
- Universities
- Small Businesses

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Basic and Applied Research

- Machine Learning
- Analysis of Environmental Signatures of Chemical, Biological & Explosives in Trapped Air
- Agriculture and Energy
- Immune Protection through Biosuperior Vaccines and Early Embryonic Specification of Immune Components

Services

(Relevant to LARC)

- Mentor Protégé
- Electron Microscopy and Microprobe Analysis
- Innovation and Technology Transfer
- Online Course on Demand – Anytime, anywhere
- Prototyping, Validation and Verification Initiative

Materials Research

(Relevant to LARC)

- Core Facility for STEM Related Research and Services
- Development of High-Sensitivity Radiation Detectors using Vertically Aligned Nanowire Arrays
- Smart Materials
- Surface-Enhanced Raman Spectroscopy (SERS) for the Rapid Detection and Identification of Blood-borne Pathogens
- Thermoelectric Materials (Quantum Dot Pseudo-Lattice)

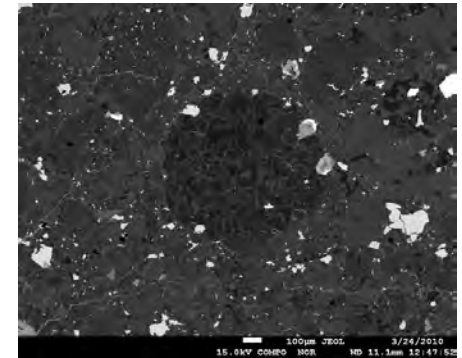
Materials Capabilities

- Surface and interface processing, study and investigation (damage, cracks, corrosion, stress, forensic)
- Ultra high resolution Electron Microprobe GC-Mass spectroscopy Laboratories
- Analytical Chemistry Research,
- Training and Services
- Scanning Electron Microscopy Laboratory
Visualize and measure microscopic features and microstructures to nano-scale dimensions, including nano-cracks



Capabilities (Continued)

- **Chromatography, Surface** tension measurement
- **Densitometry, Fluorescence** spectrophotometer, Infrared spectrophotometry
- **NMR** and Elemental analysis
- **Separate**, isolate, & quantify complex mixtures compounds
- **Surface** morphology
- **Surface** contamination and analysis
(before crack, after crack formation or after explosion)
- **Forensics** (Res., Serv. and edu. degree)
- **Microwave** for surface treatment (study)

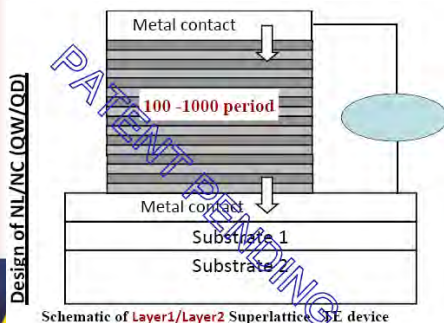


Capabilities (Continued)

Research and Development

➤ Energy:

- Bio-Fuel Research (Bio-Chem) (Research and Development)
- Thermoelectric Research Capability* (Chem/Phys) Patent – Conformal, ultra-light & Highest ZT reported. (Research and Development)



Available Energy in Engine Exhaust



Fayetteville State University

**An Emerging Research Institution
Inventions and Patents put
Fayetteville State University on
the Research Map**

<http://www.uncfsu.edu/Research>

Thank you.

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