

150 YEARS of Excellence



**RESEARCH, TECHNOLOGY TRANSFER,
PARTNERSHIPS, GRANTS, & CONTRACTS**



OFFICE OF RESEARCH & TECHNOLOGY TRANSFER
FAYETTEVILLE STATE UNIVERSITY
SESQUICENTENNIAL COMMEMORATIVE ISSUE

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HISTORY OF FAYETTEVILLE STATE UNIVERSITY

Fayetteville State University was founded in 1867 as the Howard School. Seven prominent African-Americans pooled \$136 to purchase two lots on which to build the school. In 1877, a legislative act provided for the establishment of a teacher training institute for Black North Carolinians, The Howard School was chosen. In 1877, it became the first state sponsored institution of higher education for African Americans in North Carolina, and was renamed the State Colored Normal School. In 1939, FSU became the Fayetteville State Teachers College, in 1963 Fayetteville State College and in 1969 became Fayetteville State University. The university is a constituent of the University of North Carolina System and is the second oldest member.



For most of its history the university was a teachers college, a proud heritage that is continued to this day. As time progressed, the university started conducting research, in the social sciences and in the Science, Technology, Engineering and Mathematics (STEM) areas. In 2008, the scope of the university broadened and a greater focus was placed on research.

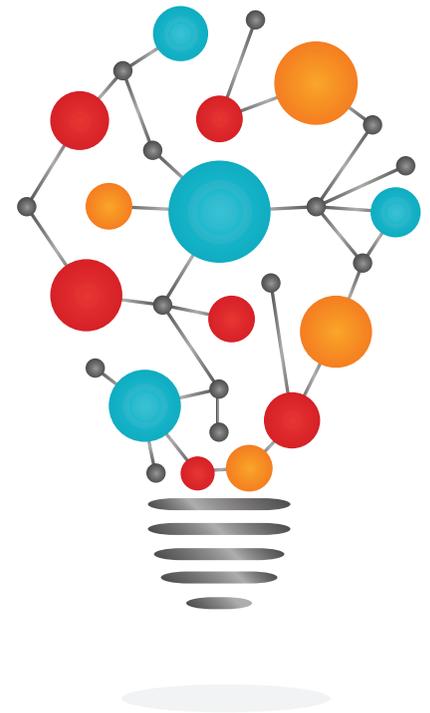


In 1877, a legislative act provided for the establishment of a teacher training institute for Black North Carolinian The Howard School was chosen.



This atmosphere of excitement, arising from imaginative consideration, transforms knowledge. A fact is no longer a bare fact: it is invested with all its possibilities. It is no longer a burden on the memory: it is energizing as the poet of our dreams, and as the architect of our purposes. Imagination is not to be divorced from the facts: it is a way of illuminating the facts.”

-Alfred North Whitehead



The Visionary Leaders of Research at FSU

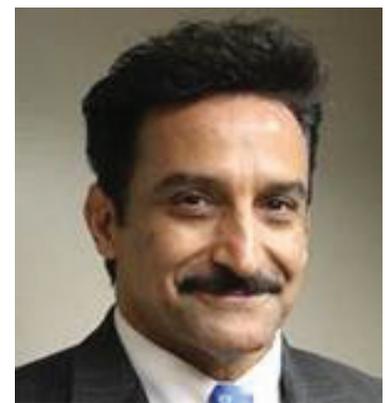
The Research Leadership of Fayetteville State University welcomes you to view this compilation of the work of the creative minds of the University. Through independent thought acted out in a collective environment, the faculty and staff of FSU are broaching micro-level problems that are leading to macro-level solutions. From postulate, to proof, to product, to patent, FSU is a small institution that is making a major impact on the world of research and development.



Dr. James A. Anderson,
Chancellor



Dr. Jon M. Young, Provost and
Senior Vice Chancellor for
Academic Affairs



Dr. Daryush ILA , Associate
Vice Chancellor for Research
and Technology Transfer

Innovation and Technology Transfer

CURRENT PATENTS



Silica Plant Based Growth Medium represents the first patent issued to Fayetteville State University.

Silica Based Plant Growth Medium

Silica Plant Based Growth Medium represents the first patent issued to Fayetteville State University. Patent number 8,516,741 was issued 27 August 2013. Its inventor, Dr. Steven Singletary was formerly a member of the Department of Biological Sciences. His idea was to create a medium that could be used to germinate seeds and grow seedling in space. He succeeded!

The patent is for a method and associated composition for growing plants in an unconventional media. This was done by creating a gel precursor that becomes extremely viscous and is capable of holding water. The composition can be varied to add nutrients to the gel. The purpose of the gel is to offer an alternative to soil and other substances from which water can drain via gravity or in space by simply holding water in place.

The gel with nutrients can then be used to germinate seeds and to support the growth of seedlings, which can then later be transplanted to allow the growth of crops and other plants on other planets.

High Efficiency Thermoelectric Device

What if you could charge your phone simply by holding it in your hand?

What if you could charge your phone simply by holding it in your hand? Dr. Daryush ILA has invented and patented a truly unique metamaterial that allows just this, and much, much more.

The thermoelectric multi-layer nanostructured device converts any amount of heat to electricity!

The new material has a high figure of merit, is extremely pliable, and can be cut, shaped and sewn, allowing for the creation of wearable, formable, comfortable, electricity generating fabrics and materials.

Imagine a tent that generates electricity... a blanket for your car engine that creates power... the applications are endless.



Imagine a tent that generates electricity...
a blanket for your car engine that creates power...



With ViVex-Cel, Fayetteville State University won third place in the International Innovations in Material Science (iMatSci) Competition sponsored by the Materials Research Society.



ViVex-Cel Advanced Wound Recovery Device

ViVex-Cel is a patented advanced wound care recovery device. The device is designed for chronic wounds (those that take 3 or more weeks to heal) and supplies the necessary environment for enhanced wound care recovery. The customizable device provides hydration, electrolytes, and a stable and selectable pH directly to the wound site. It can also deliver analgesics and anesthetics directly to the wound. Device removal does not damage the healing wound and the device can stay in place up to 10 days, thereby reducing medical staff costs. It is also available in a desiccated battle-field ready form.

With ViVex-Cel, Fayetteville State University won third place in the International Innovations in Material Science (iMatSci) Competition sponsored by the Materials Research Society. The inventor of ViVex-Cel, Dr. Carla Raineri Padilla, represented the university.

The iMatSci competition is designed to demonstrate the latest and greatest innovations in materials science. There were 2 rounds of competition and the top 26 international finalists, were allowed to demonstrate their inventions at the MRS meeting. Finalists included entrants from the United States, Ireland, Korea, Mexico, France and Brazil.

Agro-Tiling for Extreme Environments

While the global population increases and while deserts are rapidly increasing in size, crop production is decreasing. Unfortunately, increased desertification is not the only extreme environment that impedes food crop production. The world is still dependent on outdated farming techniques, most of which require high amounts of water for irrigation. While attempts have been made to advance sustainable farming in extreme environments, there has been little success and the success there has been is too costly for the world's poorest people and nations to employ.



The inventors, Dr. Daryush ILA and Dr. Carla Padilla, are addressing these problems with the development of agro-tiles. Agro-tiles are portable and can be used immediately for farming. They require little water and are easily installed and are extremely economical. The agro-tile provides a matrix for plant growth, along with the needed nutrients and can be made to the specific needs of each environment and crop type. The agro-tiles are lightweight, and extremely economical and can be installed easily by hand.



METHOD FOR PRODUCTION OF

High Figure of Merit Thermoelectric Materials

Fayetteville State University has patented a completely unique method for producing nanomaterials with High Figure of Merit Thermoelectric properties. Figures of Merit quantify the performance of devices. The inventor Dr. Daryush ILA, first invented the material and then invented a method for producing the metamaterials to scale up the synthesis of such materials.

Around the world people are trying to understand the physical properties of metamaterials consisting of selected regimented quantum dot super lattices with extraordinary optical, thermal, electrical, and Seebeck properties and use this knowledge to address the present and future needs. This in-house-developed technique, as indicated in several patents by Dr. Daryush, addresses the strategic energy need by taking advantage of the otherwise impossible-to-achieve improved physical properties of such materials, like generating electricity from heat at as high an efficiency as possible, by, using a heat source, like a human body (37 °C, 98.6 °F), or car engine, and a cold source such as air or any source under 27 °C (53.6 °F) to generate large amounts of electrical energy by these materials. Using the same materials in Peltier mode produces an addressable material (a blanket), pixel by pixel (few nanometers each), to become invisible in the ultraviolet-visible-infrared range.

In most cases metamaterials are created in very small sizes; although able to create multiple batches, the material size is restrictively small. Dr. ILA's method allows for the creation of large metamaterials composed of Quantum Dot Super Lattices that, can be cut, folded, bent and sewn; thereby, leaving the uses up to the imagination of the user, without the restrictions imposed by the size of the material. The entire superdome could then be covered and generate massive amounts of electricity.

**The entire Superdome
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of electricity.**

Cannamix

Dr. Shirley Chao has a unique interest in the effect insects have on crops. Insect pests cause substantial damage to stored food products, especially grains and vegetables, throughout the world. Some of the principal pests that cause damage are the adult and larval stages of beetles and the larval stages of moths. All may be problematic by their presence, either alive or dead, in grain that is to be processed for food. Due to the toxicity of current synthetic pesticides to human/animal health, there was a need to develop a safer, more effective insecticide that targets insect pests, specifically without harming non-target animals and humans.

Plants of the Family Cannabaceae have been shown to alter the development of insects. The unique properties of Cannabaceae include its toxicity toward insect pests and, at the same time, its beneficial characteristics toward humans and other vertebrates. The product, called CannabixMix disrupts reproduction and the normal development of insects at the larval stage. Dr. Chao has a provisional patent and is currently preparing a full patent.



Pollution Remediation Product



The Pollution Remediation Product (Patent Pending) is a highly effective method for cleaning oil on water and on land. The product was invented by Mr. Tommy Hall of Fayetteville, NC. Mr. Hall approached FSU to validate and test his product. This has resulted in the first patent shared between a community member, Mr. Tommy Hall, and the University.

The product, called “Plashtic” by Mr. Hall, absorbs oil, floats on water, is extremely light weight, with a high oil absorption capacity and can be compressed for storage and transport. More importantly, the oil absorbed by the “Plashtic” can be recovered for reuse, by simple mechanical pressing of the material and after use the “Plashtic” can be recycled into more usable “Plashtic”

The “Plashtic” is composed of completely recycled materials, thermoplastics and coal combustion products (coal ash and fly ash). Plastics disposed in the environment are extremely persistent and hard to degrade, while coal combustion products are both persistent and toxic. This new product uses both to clean the environment. It is literally the best of both worlds, it gets rid of toxic waste products and cleans the environment, while releasing usable oil.

METAMATERIALS

RESEARCH

What are metamaterials?

Metamaterials are engineered materials that do not have properties that are found in nature. Imagine a material that can become invisible to light or sound by bending the waves... a functional cloaking device. Welcome to a whole new world!

Around the world people are trying to understand the physical properties of metamaterials consisting of selected regimented quantum dot super lattices with extraordinary optical, thermal, electrical, and Seebeck properties and use this knowledge to address the present and future needs.

Imagine a material that can become invisible to light or sound by bending the waves... a functional cloaking device.

Size and Composition Controllable Nanowires

Dr. Zhiping Luo of the Research Office and Director of the Southeastern NC Regional Microanalytical and Imaging Consortium, is creating and growing new size-controllable nanowire compositions.

Nanowires have a diameter of 10^{-9} meters, or 1 billion of them could fit in one meter. These amazing meta-materials can be used for a myriad of applications, including the detection of extremely low amounts of radiation.

Regimented Quantum Dots

Dr. Daryush ILA the Associate Vice Chancellor for Research and Technology Transfer Officer has created new methods to produce regimented quantum dots. Quantum dots are nanocrystals (10^{-9} meters) that are semiconductors that mimic the properties of an atom, but that are wholly engineered. This allows for the bending of electromagnetic waves, items can become invisible to wavelengths of light, or bend sound around them. The materials are super thin, and ultra-lightweight.



Advanced Fuel Cells

Dr. Weigang Lu of the Research Office is developing new fuel cell materials. The newly created materials have an extremely high affinity for hydrogen. Hydrogen fuel cells generate power and have zero emissions except clean, pure water. These new fuel cells are important to our national security, our energy independence and to global environmental protection.



Dr. Shubo Han's Work

- ✓ Protein Interactions in Neurodegenerative Diseases
- ✓ Nanomaterials
- ✓ Biosensors
- ✓ Electrochemistry

ADVANCED SENSORS RESEARCH

Radiation Sensors

The negative effects of radiation pose a threat to our citizens, our military and our astronauts. Conventional detectors require relatively high and dangerous amounts of radiation. This is often due to the naturally occurring background gamma radiation produced by our sun, or other stars. Imagine detecting damaging radiation at the microscale, before it becomes damaging or even life threatening.

The two innovators from FSU are Dr. Daryush ILA and Dr. Zhiping Luo, who are developing these sensors. Dr. Luo is working on synthesis of arrays of nanowires. Dr. ILA and his partners at ORAU and the U.S. Army Research Laboratory are synthesizing and prototyping a triangulating detection system which will allow precision three-dimensional mapping of the radiation from long distance with no to minimum interference from cosmic or background radiation. These tiny arrays of detectors will be life-savers.



Chemical Sensors

This is a broad area of research for the university and is being conducted by the Department of Biological Sciences, the Department of Chemistry and Physics and by Materials Scientists at FSU. Researchers are developing sensors for detection of hazardous chemicals in the environment, chemicals released by radiation damaged cells, chemicals released by crops and a variety of other types of chemicals.

Explosive Sensors

Dr. Shubo Han of the Department of Chemistry and Physics is developing a portable nanomaterials based detector for explosives, especially Trinitrotoluene (TNT) and its most explosive derivatives. The detector is based on the construction of novel biosensors from nano-shells and spheres bound with enzymes to detect explosives via volumetric method. The use of these highly sensitive detectors will help reduce injury due to explosives to our troops abroad, and if used in this country, reduce the threat posed from terrorists.



Threat Detection in Trapped Air

Dr. Daryush ILA and his team are working on detecting, biological, chemical and explosive threats entering our nation by analyzing the air trapped in planes. Through the rapid detection of threat signatures, this unique potential will allow the nation to determine if a biological agent has entered the nation through an infected person, or if individuals who have created chemical or explosive weapons have entered.

AGRICULTURAL RESEARCH AND SERVICE

Research into Crop Pests

Crop loss to insect pests globally amounts to billions of dollars and decreases the amount of food available for both humans and animals. Dr. Lieceng Zhu of the Department of Biological Sciences has been investigating how heat stress compromises a plants resistance to parasites. Specifically she has been working with wheat and the Hessian Wheat Fly. She is examining the interactions, the effects of heat on the plants resistance and better methods to control the pests.

Soybean Genetics

Soybeans are a critical food crop and are an excellent source of plant created protein. Dr. Abdelmajid Kassem has been investigating the genetics of various subspecies and cultivars of soybeans. The goal is to determine which types will grow best where, and how to increase production of this important food crop.



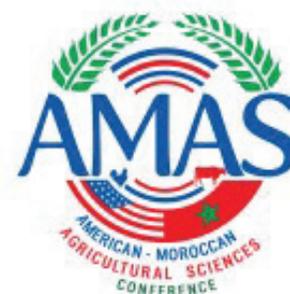
Providing Fresh Food in a Desert

Food deserts are urban areas where it is difficult to get fresh foods. Food deserts are often found in low income areas. Fayetteville State University is located in one of the oldest sections of Fayetteville NC and is surrounded by low income housing. There are no stores that provide fresh food, especially fruits, vegetables and meats in the immediate area and many of the area's residents do not have personal transportation. To help alleviate this need the School of Business, headed by Dr. Pam Jackson, sponsor a weekly farmers market directly across the street from the university. Local farmers from the surrounding areas bring in local products. This is a win-win situation. Local farmers are supported and fresh food is provided to residents.



International American Moroccan Agricultural Sciences Conference

Agriculture is a major source of income and the largest industry and employer in the Kingdom of Morocco. Morocco was the first nation to recognize the United States independence and U.S. - Moroccan diplomatic ties continue to be excellent. Thus, it was fitting that the US serve as an organizer for the first International American Moroccan Agricultural Sciences Conference – AMAS Conference.



The establishment of this conference, was spearheaded by Dr. Abdelmajid Kassem, Chair of FSU's Biology department. The conference was produced with the hope that it would lead to greater involvement by the U.S., not only in Moroccan agriculture, but also in other sectors of the economy. Over 120 experts in Agricultural Sciences, scientists, faculty, and students from the United States, Germany, France, Algeria, Turkey, the Netherlands, United Arab Emirates, Senegal, and India.

The Conference has benefitted both U.S. and Moroccan students and scientists, and will certainly have an impact on the economic transformation of the agriculture sector in Morocco, opening a market with tremendous opportunities for U.S. companies and investors in that country.



MEDICAL

RESEARCH AND SERVICE

Post-Traumatic Stress Disorder (PTSD) in the Military

F SU, because of its close ties with the military and the concern for their wellbeing, has been extremely active in PTSD research and treatment. The effort has been interdisciplinary and has included the Departments of Communication, Nursing, Psychology and Social Work.

Dr. Alexandru Stana of the Department of Communication conducted research on social support of combat veterans with PTSD. In “Battling the Stigma: Combat Veteran’s Use of Social Support in an Online PTSD Forum”, Dr. Stana examined posts from 63 combat veterans and found the most common types of support for PTSD that they were seeking were informational support, along with to a lesser degree social support and a new area of conflict resolution.

Dr. Afua Arhin and Dr. Sheila Cannon both of the Department of Nursing, along with Dr. Kimberly Tran, of the Department of Psychology have been actively studying the effects of acupuncture as part of a holistic treatment of PTSD in combat veterans. “Acupuncture as a Treatment

Option in Treating Post-Traumatic Stress Disorder-Related Tinnitus in War Veterans: A Case Presentation.”

Dr. Mark Marquez of the Department of Social Work, has been actively involved in PTSD research and the treatment of PTSD in our service members for for a number of years. Publications on his research on the subject includes, “Not Just about Posttraumatic Stress Disorder: A Call for Military-Centric Social Work”, and “The Military and Intimate Partner Violence- A Call for Open Discussion.”



Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Disease (AIDS) Research & Treatment

HIV and AIDS continue to plague the nation and the world. HIV/AIDS rates are especially high in minority communities. Fayetteville State University has undertaken several multiyear National Institutes of Health funded HIV and AIDS research and education programs, aimed to decrease the infection rates and to treat the infected.

Dr. Maurice Mongkuo, a Professor of Political Science in the Department of Government and History heads the “Minority Serving Institutions Partnership with Community-Based Organizations (CBOs)” program. The goals of the project are to: provide SA, HIV, and HVC awareness to statistically high-risk populations: African American, Hispanics/Latino, Asian American/Pacific Islanders (AA/PI) in young adults (ages 18-24) in Cumberland County, North Carolina. The project provides comprehensive integrated substance abuse (SA), HCV, and HIV prevention strategies, including education & awareness programs, social marketing campaigns, along with testing services. The goals of the project are to: prevent SA, HIV and HVC infection and at-risk persons; interrupt HIV transmission through prompt diagnosis, and adequate counseling and treatment; ensure access to high-quality, culturally appropriate services and key messages for our at-risk focus populations; monitor infections in the population of interest; ensure that healthcare system maintain patient confidentiality, manage and reduce stigma associated with SA, HIV and HCV to those accessing services and to those providing them; increase access to care and improving health outcomes for people living with HIV; reduce HIV-related disparities and health inequities; and achieve a coordinated national response to the HIV epidemic through intensive research and education.

Dr. Karen McElrath of the Department of Criminal Justice heads the “Integrated multilevel HIV prevention program for African-American Young Adults.” The purpose of the project is to implement a multilevel approach to HIV prevention that includes individual-, group-, community-, and structural-level interventions. Reducing risk of HIV infection is a major component of HIV prevention. The comprehensive project involves a strategy that addresses 1) increased access to and use of condoms, 2) decreased substance use, and 3) increased HIV testing, along with community analysis. This strategy is delivered alongside an approach that will develop new and strengthen existing referral mechanisms to provide a strong comprehensive system of care. The research and education team is multidisciplinary and culturally diverse. The goal is prevention geared for African-Americans aged 18-24 who attend a historically black college or reside in surrounding communities. It primarily addresses risk behaviors (namely unprotected sex and substance use that contributes to sexual risk taking) for HIV/HCV transmission among two groups: 1) men who have sex with men, and 2) heterosexual females. It seeks to encourage HIV testing among young adults through the implementation of a multilevel prevention strategy that incorporates interventions at the individual, group, and community levels. Peer health educators on campus will promote condom use and encourage students to undergo testing for HIV. This is a comprehensive care system for young African-American adults who experience problems with substance abuse, who are HIV negative but at high risk for transmission, or who are HIV positive and in need of treatment and support.

Improved Doctor/Patient Communication

Dr. Alexandru Stana and Dr. Alanna Miller of the Department of Communication have been conducting research with medical centers on how to improve doctor/patient communication. The study entitled “Uncertainty in Cardiac Position during Deep Inspiration Breath Hold Radio Therapy for Left-Sided Breast Cancer Patients,” examines how better to explain the risks of the therapy to the cancer patients and how to calm the patients, as well as the medical doctors providing the treatment.



Mammalian Reproduction and Fertilization

Dr. Subir Nagdas of the Department of Chemistry and Physics is actively researching the role of the sperm acrosome in reproduction and is focused on identifying the mechanisms regulating the release of acrosomal hydrolases during the egg-induced acrosome reaction and elucidating the role of the epididymis in maintaining sperm viability.

Identification of Individual Humans through DNA from Hematophagous Insects

Dr. Khalid Lodhi, Director of the Forensics Sciences Program is currently researching and has been successful in extracting DNA from the blood diet of bed bugs and mosquitos and then creating a DNA profile and identifying the human individual that it came from. Dr. Lodhi is currently expanding his research into other hematophagous insects and in developing timelines from blood meal to human DNA individual identification.



Traumatic Brain Injury (TBI) and Alzheimer's

Dr. Shubo Han of the Department of Chemistry and Physics is investigating the links between TBI, the aggregation of amyloid β peptide with heavy metal ions associated with Alzheimer's disease (AD) to better understand the progression of the disease. Currently, AD is the most common neurodegenerative disease, affecting millions of people in the United States. With the increasing rates of TBI in the military, the number of individuals with Alzheimer's will increase greatly in the upcoming decades.



Vaccine Development

Dr. Eid Haddad of the Department of Biological Sciences is working on a multivalent vaccine for influenza. The new vaccine would provide protection against the majority of forms of influenza. This would prevent "flu" vaccine providers from using the best guess of what strain of flu would appear the next year.

Medical Devices

Dr. Carla Raineri Padilla of the Office of Sponsored Research and Programs is actively involved in developing medical devices for wound recovery and treatment and for patient treatment. She currently has one patent and is working on others.



GRANTS & CONTRACTS

Geospatial Intelligence

*Military Social Work Program
at Fort Sam Houston, TX*

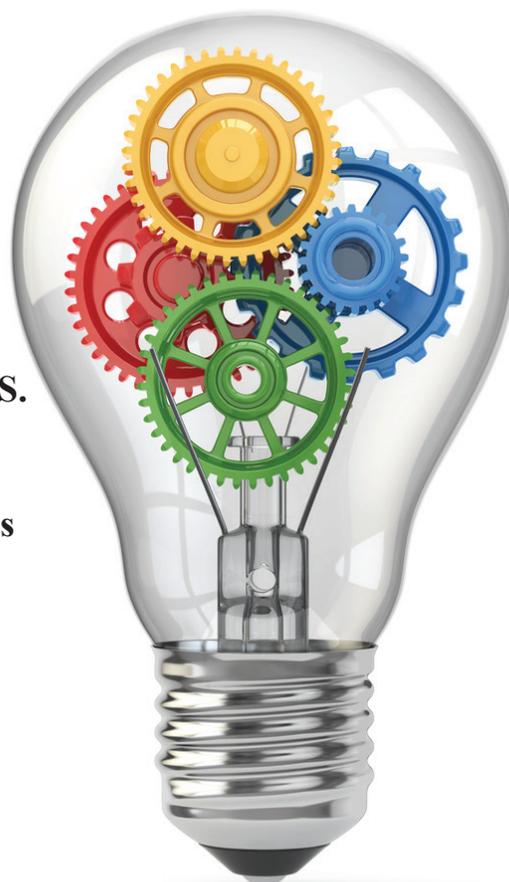
Bill and Melinda Gates Foundation

*Special Operations Forces
Training Contract*

SELECTED

PARTNERSHIPS AND AGREEMENTS

- ✓ **Cooperative Research and Development with U. S. Army Medical Command (CRADA)**
- ✓ **Space Act Agreement with NASA (SAA)**
- ✓ **Mentor-Protégé Agreement with Oak Ridge Associated Universities (ORAU)**
- ✓ **Education Partnership Agreement with the U. S. Army Research Laboratory (ARL) - EPA**
- ✓ **Partnership with the Global Special Operations Forces Foundation 2016**
- ✓ **Research and Development Agreement with INGATEYGEN (IGG), LLC**
- ✓ **Mentor-Protégé Program at FSU**



CENTERS and FACILITIES

Center for Defense and Homeland Security

FSU's Center for Defense and Homeland security hosted its 2nd Annual Military Affiliates Cybersecurity Education Symposium and Job Fair. The symposium brought together national and regional cybersecurity experts who engaged military affiliates, industry partners, federal contracting agencies, national laboratory cyber experts, military leaders, legislatures, UNC system faculty and FSU Alumni.

Over 300 people attended to gain and share information, as well as to network and collaborate with regard to resources. Attendees included high school and college educators, private industry representatives, scientists, and military personnel.

Panel discussions addressed cybersecurity related topics in Employment, Federal Contracting and Entrepreneurship, Research and Technical Training, and the Capabilities of Military Affiliates. As one of the few historically black colleges and universities (HBCUs) with a cybersecurity curriculum, FSU has proudly taken a leadership position in showcasing how HBCUs can play an important role in this expanding industry.

Visit www.cdhs.uncfsu.edu

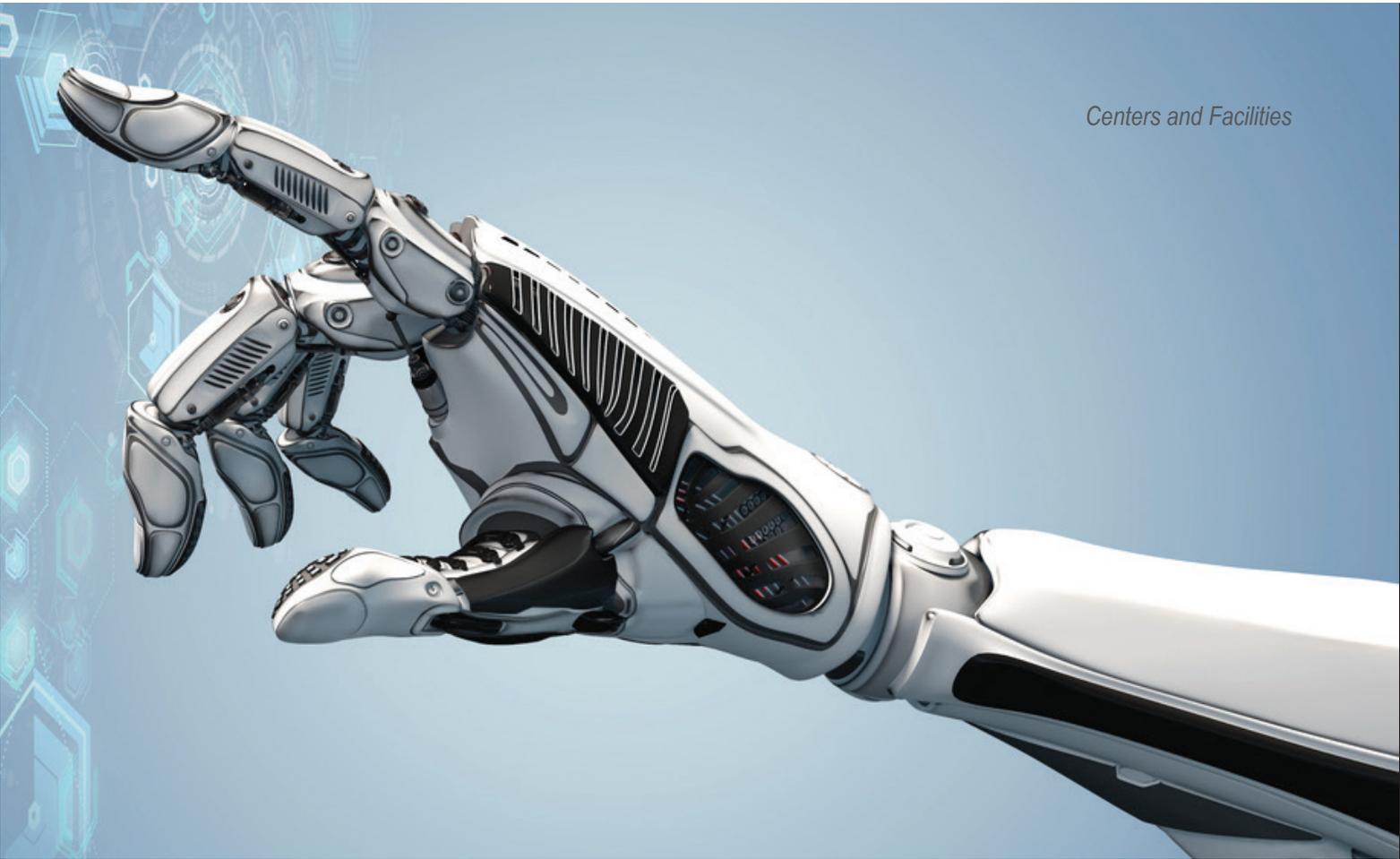


Facility for Advanced Science Technology & Research

The university has recently started the Facility for Advanced Science and Technology Research (FASTeR).

The facility is committed to supporting cutting-edge, research, transformative hands-on education and technical development. FASTeR is headed by Dr. Daryush ILA, the Associate Vice Chancellor for Research. The facility is well equipped with a variety of materials testing and production equipment.

The FASTeR Analytical Facility will provide state-of-the-art materials processing and characterization capabilities and professional service for faculty, staff, and students at Fayetteville State University and external agencies in the southeastern North Carolina region and beyond, to support cutting-edge research, transformative hands-on education, and technical development.

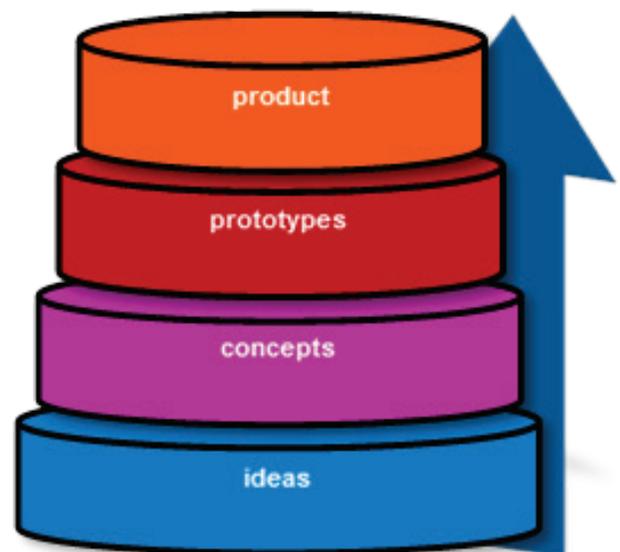


Prototyping, Validation and Verification Laboratory

Where imagination becomes Reality!

“It’s fun to imagine the impossible”, Walt Disney

The Prototyping Facility, or more properly the Prototyping, Validation and Verification Facility founded in 2016 is headed by Dr. Daryush ILA and run by Dr. Carla Padilla. The facility provides space, equipment and technical expertise to inventors both inside and outside of the university. The well-equipped facility has a vast variety of equipment, supplies and capabilities, including additive manufacturing, electrical work, lasers and optics, mechanical shop, glass working, environmental testing and monitoring equipment, and biomedical device creation capabilities.



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FSU & ORAU

MENTOR PROTEGE COLLABORATION

What does FSU & ORAU Mentor Protege program offer?

Further the development of a mature STEM business model.

Assist in the development of faculty and students toward research and internship opportunities.

Enhance FSU's ability to successfully compete for government contracts.

Expand FSU's diversity of partnerships.

www.UNCFSU.EDU/RESEARCH



STEM

EDUCATIONAL PROGRAMS & PARTNERSHIPS



STEM Educational Programs & Partnerships

- ★ **U.S. Army Research Lab Educational Partnership Agreement**
- ★ **AGORA- Navy Next-Generation Outreach and Recruitment Initiative**
- ★ **AmeriCorps VISTA- Volunteers in Service to America**
- ★ **Bronco STAR- Supporting Transition, Access & Retention**
- ★ **GEAR-UP- Gaining Early Awareness Readiness for Undergraduate Program**
- ★ **McNair- McNair Scholars**
- ★ **NASA Space Act Agreement**
- ★ **NASA Swarmathon**
- ★ **Planetarium**
- ★ **RISE- Research Initiative for Scientific Enhancement**
- ★ **REEF- Research Education Enrichment Facility**
- ★ **STEAM- Science, Technology, Engineering, Advocacy and Mathematics**
- ★ **TRIO**
- ★ **Upward Bound**
- ★ **U.S. Army Medical Command CRADA- Cooperative Research and Development Agreement**



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