



**GRAMBLING**  
STATE UNIVERSITY  
WHERE EVERYBODY IS SOMEBODY

# **GRAMBLING STATE UNIVERSITY RESEARCH CAPABILITIES**

September 2016

Otto Meyers  
Connie Walton



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# GRAMBLING STATE UNIVERSITY

- Established 1901
- Mr. Richard Gallot Jr., President
- Located in Grambling Louisiana
- Accredited by the Southern Association of Colleges and Schools – Commission on Colleges
- 4863 students
- Student body represents 43 states and 25 countries
- Offer bachelors, masters, doctoral degree programs





# MISSION

Grambling State University prepares graduates

- to compete and succeed in careers
- to contribute to the advancement of knowledge
- to lead productive lives as informed citizens
- to be committed to improving the quality of life of others





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## COLLEGE OF BUSINESS

- Accounting
- Computer Information System
- Economics
- Management
- Marketing



**Accredited by Association to Advance Collegiate Schools of Business**



## **COLLEGE OF EDUCATION & PROFESSIONAL STUDIES**

- Social Work, BSW,MSW
- Nursing, MSN, Nurse Practitioner
- Mass Communication, BA, MA
- Criminal Justice, BS, MS
- Teacher Preparation, BA, MA, Ed.D.
- Kinesiology, BS
- Leisure Studies, BS
- Sports Administration MS



### **ACCREDITATIONS**

Accreditation Council of National Recreation and Park Association

Council on Social Work Education

Accreditation Commission for Education in Nursing

Accrediting Council on Education in Journalism and Mass Communications

Council for the Accreditation of Educator Preparation (formerly NCATE)

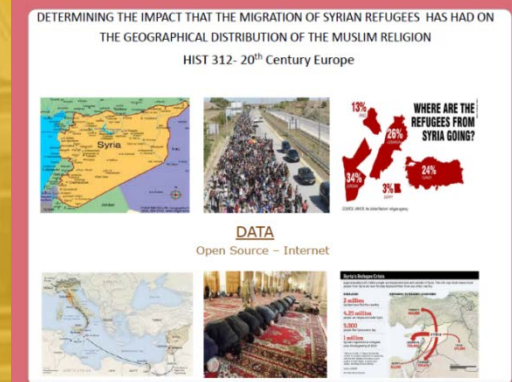
National Recreation and Park Association



## COLLEGE OF ARTS & SCIENCES

### LIBERAL ARTS

- Child Development
- English
- History
- Music
- Political Science
- Psychology
- Visual and Performing Arts
- Social Sciences- MA
- Public Administration -MPA



### ACCREDITATIONS

Network of Schools of Public Policy, Affairs, and Administration  
National Association of Schools of Music  
National Association of Schools of Theater



## COLLEGE OF ARTS & SCIENCES

### STEM (BS Level)

- Biology
  - Environmental
- Chemistry
  - Forensic
  - Professional
- Computer Science
- Engineering Technology
  - Drafting Design
  - Electronics
- Mathematics/Physics
  - Material Science
  - Biomedical



### ACCREDITATIONS

Accreditation Board for Engineering & Technology-ETAC

Accreditation Board for Engineering & Technology-CAC

Committee on Professional Training-American Chemical Society



## CENTERS & INSTITUTES

- Entrepreneurship and Innovation Institute
- Center for Mathematical Achievement In Science & Technology





## ENTREPRENEURSHIP AND INNOVATION INSTITUTE

The mission of the Entrepreneurship and Innovation Institute is to proactively promote an entrepreneurial spirit and innovative culture at Grambling State University and the communities it serves. Hence, empowering GSU students to become business leaders who drive positive impact in their communities as entrepreneurs, both for-profit and social entrepreneurship.

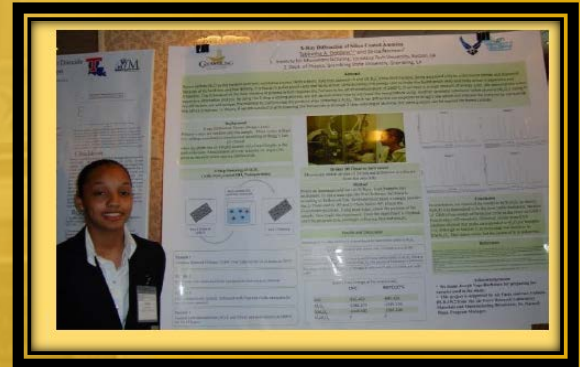
Selected to participate in  
Delta Regional Authority's  
Entrepreneurship Ecosystem  
Program





## **CENTER FOR MATHEMATICAL ACHIEVEMENT IN SCIENCE & TECHNOLOGY**

- 2<sup>nd</sup> cycle of funding from National Science Foundation (NSF) HBCU-Undergraduate Participation Program
- Mission of increasing STEM majors and graduates at undergraduate level by implementing creative strategies that address STEM education at GSU and K-12
- Increase research opportunities for faculty and students



**\$4.4 million in funding received from NSF for this Center, 2005-2017**



## **CONTRACT/GRANT FUNDING RECEIVED 2012-2015**

	<b>2012/2013</b>	<b>2013/2014</b>	<b>2014/2015</b>
Federal Research Funding	\$8.2M	\$6.4M	\$6.6M
State, Industry & Private Research	\$433K	\$717K	\$591K
Total Funding	\$8.65M	\$7.1M	\$7.2M



## CORE COMPETENCIES

236118, 512290

541711, 541712

711120



## BIOMEDICAL

- Toxicogenomics
- Gene Interactions
- Genetic and electrophysiological techniques to *Drosophila* photoreceptors and synaptic transmission
- Pharmacognosy
- DNA Replication, Damage and Repair
- Mechanisms of Cancer Repair





## CYBERSECURITY/BIG DATA

- Cognitive Radio Network Security
- High Performance GP-GPU Computing in Federated Hadoop Systems
- Deep Learning & Anomaly Detection
- Game Models
- Backpropagation Models-Neural Networks
- Cloud Data Security
- R-Hadoop





## MATERIAL SCIENCE

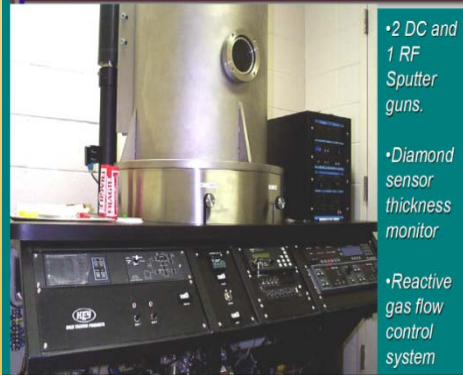
- High Performance Polymer Synthesis
- Synthesis of Liquid Crystalline Materials
- Preparation of Composites
- Characterization of Nanoporosity in Polymers
- Vacancy defects in Metals
- Micro-hardness Analysis
- Magnetization Studies
- Crystal Phase Composition



# MATERIAL SCIENCE INSTRUMENTATION

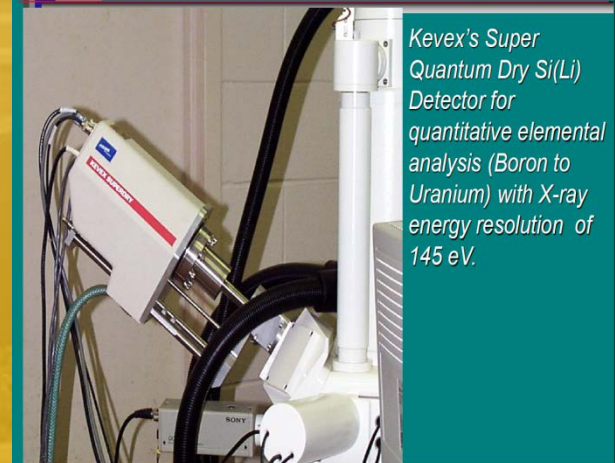
Positron Lifetime Spectroscopy, Differential Scanning Calorimeter/Thermal Gravimetric Instrument, Thermomechanical Analysis Instrument, FTIR's, UV Visible Spectrophotometer, Atomic Absorption Spectrometer, Gas Chromatography/Mass Spectrometer, Continuum FTIR Microscope

*Magneto-Sputter Coater  
- Multilayer Thin Film Preparation*



Continuum FTIR Microscope

*Energy Dispersive X-ray Spectrometer (EDXS)*





# MATERIAL SCIENCE INSTRUMENTATION



FTIR, UV Vis, AA, GC/Mass Spectrometer



Polarizing Optical Microscope  
Equipped with Hot Stage



Vibrating Sample Magnetometer

Scanning Electron Microscope (SEM)  
Energy Dispersive X-ray Spectrometer (EDXS)  
for Elemental Spot Analysis





## **MATHEMATICAL BIOLOGY**

Deterministic Mathematical and Stochastics  
Models to Study the Spread of Infectious Diseases

- Malaria
- Typhoid
- Zika Virus

## **ENGINEERING TECHNOLOGY**

Construction Management  
Computer-Aided Drafting Design  
Architectural Drafting Design  
Electronics Engineering Technology





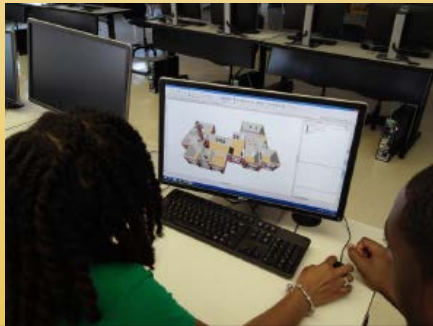
# ENGINEERING TECHNOLOGY FACILITIES



3 D Printers



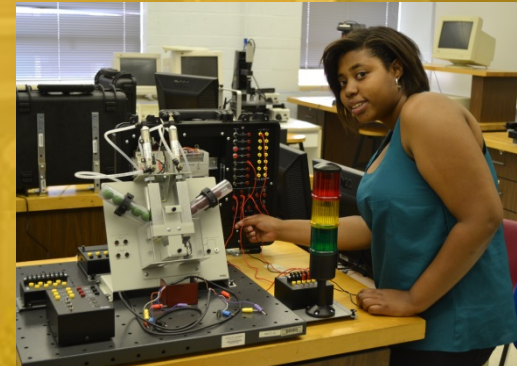
Cisco Academy Lab



Architectural Design Lab



Circuit Analysis/Design Lab



Programmable Logic Control Lab



## MOLECULAR MODELING

- Quantum Mechanics and Monte Carlo Based Computational methods to Study Charge Transport and Impact on Structural Properties of Polymers
- Study of Molecular Transport in Nanostructures using Stochastic Models





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## **PAST AND CURRENT PERFORMANCE**



## NATIONAL SCIENCE FOUNDATION

- NSF-Experimental Program to Stimulate Competitive Research (EPSCoR): Consortium for Innovation in Manufacturing and Materials 2015 – 2020, \$400,000, Dr. N. Seetala, Dr. P. Derosa, Co-PI's
- NSF HBCU- Undergraduate Participation (UP): Center for Mathematical Achievement In Science & Technology 2005- 2017, \$4.4 Million, Dr. C. Walton PI
- NSF S-STEM: Increasing the number of STEM graduates, 2007-2011, \$460,000, Dr. C. Walton PI
- NSF-EPSCoR: Louisiana Alliance for Simulation Guided Materials Application (LA-Sigma): Materials for Energy Storage and Conversion -Catalytic Reactions Involving Metal Oxides, 2012-2014, \$30K, Dr. N. Seetala, PI



## NASA

- NASA Minority University Research and Education Project (MUREP) Educator Program Participant - Minority participation for future NASA workforce: Curriculum improvement, 2-year to 4-year colleges bridge, University-NASA research centers collaboration  
2009-2014, \$400,000, Dr. N. Seetala, PI
- Polymerizable Monomer Reactant (subcontract with Clark Atlanta University, John Glenn Research Center)  
2003-2008, \$244,000, Dr. D. Hubbard, PI
- Synthesis of Materials that Exhibit Nonlinear Optic Behavior, Subcontract with University of New Mexico-Highlands  
2000-2003, \$30,000, Dr. C. Walton, PI
- Synthesis of a thermally stable polyamide for Nonlinear Optic Applications  
1998-2000, \$240,000, Dr. C. Walton, PI



## DEPARTMENT OF ENERGY

- DOE-Energy Frontier Research Center (EFRC): Center for Atomic Level Catalyst Design of Nano-Catalysts, 2009-2014, \$100,000, Dr. N. Seetala ,PI

Role of microstructure/nanoporosity and atomic structure in activation, deactivation, and temporal stability of catalyst/support systems for fuel conversion.

- Development of low cost membranes for  $H_2/CO_2$  separation in WGS reactors 2007-2011, \$200,000, Dr. N. Seetala, PI

Synthesis of low temperature bimetallic nanocatalysts for Water Gas Shift reaction (WGS) for hydrogen production from CO and steam mixture; and develop low-cost metal (Nb/Ta)/ceramic membranes for  $H_2$  separation and Cellulose Acetate membranes for  $CO_2$  separation



## LOUISIANA BIOMEDICAL RESEARCH NETWORK

2015-2017- Award Period, \$205,137

- **Project I** - Research focuses on the toxicity of PCP to the extent that it may alter gene expressions in hepatocyte culture. The goal is to identify stress-response genes that contribute to cell proliferation and programmed cell death in PCP-treated TIB-73 mouse hepatocytes. Dr. W. Dorsey P.I.
- **Project II** - Research is in collaboration with Colorado State University and the Pennington Biomedical Research Center in Baton Rouge Louisiana. The team is trying to better understand the cellular mechanisms that lead to Non-alcoholic fatty liver disease development and progression, Dr. P. Kim P.I.





## **AIR FORCE RESEARCH LABORATORY**

2005- 2020- Award Period  
\$3.8 Million

- Design and Implementation of a Cognitive Radio Cloud Network,  
Dr. Y. Reddy, PI
- Robotics Training for High School Students & Teachers,  
Dr. Y. Reddy, PI
- High Performance GP-GPU Computing in Federated Hadoop Systems,  
Dr. Y. Reddy, PI
- Advanced Ceramic Materials Processing and Characterization Using Position Lifetime Spectroscopy, SEM, Micro-hardness, and FT-IR,  
Dr. N. Seetala





## AIR FORCE

- Advanced Nano-Reinforced Composite Materials- Air Force Research Laboratory, 2010-2012, \$120,000, Dr. N. Seetala, PI

Developed and validated structural protection systems that incorporated nanomaterials in polymers; and developed nanocomposites for body armor protection material

- Synthesis of Polyimides to be used in the Fabrication of a Low Driving Voltage Electro-optic Modulator, USAF, Office of Scientific Research 2001-2004, \$260,000, Dr. C. Walton, PI

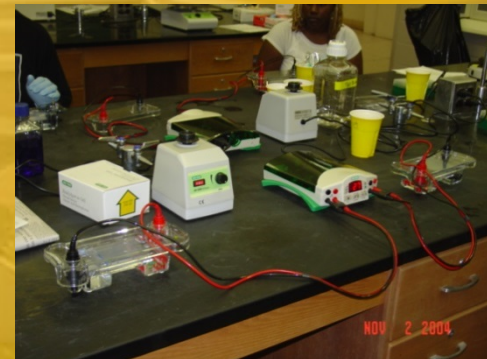
Synthesized monomers/polyimides, characterization of structure & thermal behavior, characterization of electro-optic behavior



## US DEPARTMENT OF EDUCATION

Enhancement of Biomedical Research Infrastructure at Grambling State University, Congressional Directed Funding (Managed by U.S. Dept. of Education), 2003-2004, \$149,015, Dr. C. Walton PI

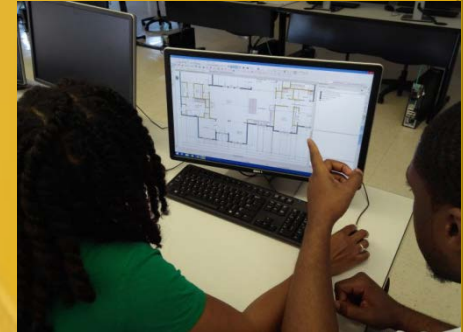
Curriculum Development and Equipment Upgrades





## USDA-RURAL DEVELOPMENT

- Grambling Housing Development Program  
2006-2007 , \$192,705.00, Dr. B. Nwokolo, PI
- Grambling Housing Development Program  
2007-2008, \$273,799, Dr. B. Nwokolo, PI
- Simsboro/Grambling Housing Rehabilitation Program  
2009-2010, \$275,255, Dr. B. Nwokolo, PI
- Village of Simsboro Housing Preservation Project  
2013-2014, \$200,000, Dr. B. Nwokolo, PI



Projects renovated single family homes for low income residents



## **US DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT**

Grambling Neighborhood Development Program  
2006-2008, \$1,173,876, Dr. B. Nwokolo, PI

Completed community development projects that  
included providing special programs for Hurricane  
Katrina and Hurricane Rita Evacuees



## NATIONAL INSTITUTES OF HEALTH

- Minority Access for Research Careers (MARC), \$1,652,570, 2013-2018, Dr. M. Himaya, PI
- Research Initiative for Scientific Enhancement (RISE) Program \$ 1,997,697, 2004-2015, Dr. F. Ifeanyi, PI



Training opportunities for STEM Students to enhance preparedness for success in a Ph.D. program in Biomedical Sciences- MARC(Juniors & Seniors)  
RISE (Sophomores)

MARC funded continuously since 1998



## FUTURE DIRECTION

- Expand contracts obtained (build upon the success we have had with Air Force Contracts)
- Expand our Cybersecurity/Big Data Footprint
- Complete an application with National Geospatial Intelligence Agency to obtain recognition as a Geospatial Sciences academic center of excellence



## POINT OF CONTACT

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