



# CAPABILITIES STATEMENT

## College of Engineering

**Contact Person:**

**Dr. Habib P. Mohamadian**  
**Professor & Dean**

**Email:** [mohamad@engr.subr.edu](mailto:mohamad@engr.subr.edu)

**Phone:** (225) 771-5290      **Fax:** (225) 771-5721

**Website:** <http://www.subr.edu/engr>

P.B.S. Pinchback Engineering Building  
Southern University and A&M College  
Baton Rouge, LA 70813

# Capabilities Statement

## Purpose

The purpose of this document is to give you an overview of the College of Engineering. We trust that you will find the material informative and that it may ultimately encourage you to avail yourself of services to the benefit of your own operation. We sincerely believe in the Win-Win principle where you get what you need on terms that are agreeable to us. Once you have read it through, please contact us if you have further questions about our programs and services and how they might benefit your business.

## Program Offerings

The College of Engineering provides students with technological skills and opportunities that stimulate professional, educational, and personal growth. The college provides this growth through a diverse faculty and staff that is committed to teaching, research, and service. Students are encouraged to participate in laboratory research and cooperative education programs that enhance career confidence. They also are encouraged to participate in ongoing research with faculty members that contribute to engineering innovations. The college maintains an atmosphere that enhances the student's ability to achieve the optimum learning experience.

Undergraduate program offerings in the college consist of four-year programs in civil engineering, electrical engineering, and mechanical engineering leading to a Bachelor of Science degree. In addition, a four-year program is offered in electronics engineering technology leading to a Bachelor of Science degree. Through the Department of Chemistry, students may pursue a dual degree in chemistry and chemical engineering in collaboration with Louisiana State University.

Graduate program offering consist of a Master of Engineering program with three specialty areas; a Letter of Intent has been submitted for a Corroborative PhD degree program in Materials Science and Engineering. The Master of Engineering specialty areas are:

- Materials Science and Engineering
- Sustainable Engineering Systems
- Engineering Management

The civil, electrical, and mechanical engineering programs are accredited by the Engineering Accreditation Commission (EAC) of ABET Inc.

# Department of Civil & Environmental Engineering

Dr. Emmanuel Nzewi, Professor and Chair  
P.O. Box 9969

Baton Rouge, LA 70813

**Phone:** (225) 771-5870

**Fax:** (225) 771-4877

**Email:** [emmanuel@engr.subr.edu](mailto:emmanuel@engr.subr.edu)

**Website:** <http://www.subr.edu/engr/cee>

## Introduction

The department of Civil Engineering offers a four-year program, consisting of 135 hours, leading to a Bachelor of Science Degree in Civil Engineering. The civil engineering program is designed to give students a meaningful educational experience in the humanities, social studies, English, economics, basic sciences, and suitable training in applying the fundamental principles in the analysis, design, and maintenance of engineering works, and inspire continuous learning throughout their professional life. In addition, the department also offers a concentration in environmental engineering where students pursuing the civil engineering degree may select electives from the environmental engineering electives or other related environmental programs.

The Civil Engineering Department has a faculty of 11 members, where 7 of them are registered as professional engineers and 8 are tenured faculty. The curriculum is traditional, with courses covering the areas of geotechnical, structures, transportation, water resources, and environmental engineering. Civil engineers work with problems such as solid waste disposal, environmental pollution, water supply and distribution, highway design, buildings, and transportation systems that directly impact the health and economic vitality of people and communities.

The Department of Civil Engineering is the home of the Samuel Massie Chair of Excellence and the Safety of Dams Training programs. These programs create a model research atmosphere in the field of environmental Engineering and water resources to complement the academic program in Civil Engineering and to promote scholarly advancement through research and publications. The Department has a state-of-art environmental laboratory to perform air, soil, and water analyses for both organic and inorganic compounds on a wide range of materials. In addition, the environmental laboratory can support research in water and wastewater analysis, solid and hazardous waste, air quality and bioremediation. The Department has the necessary equipment and the laboratory space to perform most fundamental laboratory experiments in construction materials, environmental, hydraulics, soil mechanics, and surveying; however, additional equipment is needed to enhance the capabilities of these laboratories. Other needs include funds for laboratory maintenance, for software, for courseware development, and for faculty/staff development.

## Focus Research Areas

The Faculty members conduct research and projects in five major areas:

Environmental engineering which includes solid/hazardous waste management, bioremediation of soil and water contaminated with chlorinated solvents and hydrocarbons, in situ treatment of municipal landfill leachate, water supply and treatment, wastewater collection and treatment, air pollution control, air quality monitoring, and atmospheric dispersion modeling.

Geotechnical engineering: which involves the subsurface exploration that will lead to proper design and analysis of shallow and deep foundations, retaining structures, tunnels, and dams.

Structural engineering which involves work in structural mechanics and computational methods, analysis and design of reinforced concrete, timber, and steel structures.

Transportation engineering which includes pavement design and microstructure characterization, modeling, simulation and visualization for pavement materials and geomaterials, and composite geomaterials.

Water Resources engineering which includes safety of dams, streamflow modeling, groundwater pollution and control, runoff calculation using GIS.

## Faculty

*For contract work or research assistance in these areas, please contact the following researcher(s):*

### **Al-Raoush, Riyadh, Ph.D., P.E., Assistant Professor**

**Areas of Interest:** fate and transport of contaminants in subsurface systems, environmental fluid dynamics, multiphase flow through porous media and environmental soil physics.

### **Alshibli, Khalid, Ph.D., P.E., Joint Associate Professor**

**Areas of Interest:** Experimental Soil Mechanics, Soils Constitutive Modeling, Geomechanics, Foundation Engineering, Behavior of Granular Materials under very Low Effective Stresses, Utilizing Digital Imaging Techniques and Computed Tomography (CT) to study the Behavior of Geotechnical Materials.

[Alshibli@engr.subr.edu](mailto:Alshibli@engr.subr.edu); URL: <http://www.ce.lsu.edu/~alshibli/>

### **Azene, Muluneh , Ph.D., P.E., Professor**

**Areas of Interest:** Structural Mechanics and Computational Methods, Analysis and Design of Reinforced Concrete, Timber, and Steel structures.

[azene@engr.subr.edu](mailto:azene@engr.subr.edu)

**Carriere, Patrick Ph.D., P.E, Professor and Associate Dean**

**Areas of Interest:** Water Supply and Treatment, Wastewater Collection and Treatment, Remediation of Contaminated Soils, and Water Resources Management.

[carriere@engr.subr.edu](mailto:carriere@engr.subr.edu)

**Lawson, Huey, Assistant Professor and Director of Technology & Network Services**

Areas of Interest: Structures, Multimedia in Civil Engineering

[lawson@subr.edu](mailto:lawson@subr.edu)

**Nzewi, Emmanuel, Professor and Chair**

**Areas of Interest :** Water resources systems analysis and mathematical modeling, optimal multi-purpose reservoir operation including hydropower production; gravity sewer network modeling; hydrologic characterization of watersheds using LiDAR-derived digital elevation models (DEMs) in Geographic Information Systems (GIS) framework.

[emmanuel@engr.subr.edu](mailto:emmanuel@engr.subr.edu)

**Onu, Chukwu, Ph.D., Professor**

**Areas of Interest:** Biochemical Processes, Biomass Energy Recovery, Landfill Treatment, and Solid/hazardous Waste Management, Wastewater Treatment Design and Optimization.

[onu@engr.subr.edu](mailto:onu@engr.subr.edu)

**Hak-Chul Shin, Ph.D., P.E., Joint Assistant Professor**

**Areas of Interest:** Microstructure Characterization, Modeling, Simulation and Visualization for Pavement Materials, Geomaterials and Composite Materials.

[shin@engr.subr.edu](mailto:shin@engr.subr.edu)

## Laboratory Facilities

The Civil & Environmental Engineering department has 11 fully equipped laboratories that support both instruction and ongoing research projects. The laboratories are located in the P.B.S. Pinchback Engineering building on the SUBR Campus.

### Instructional Laboratories

Room No.	Title	Number/Rubric	Coordinator
	Surveying	CIEN 201	Dr. Riyadh Al-Raoush
PEB 145	<a href="#">Construction Materials</a>	CIEN 327	Dr. Hak-Chul Shin
PEB 392	<a href="#">Water Resources Engr. (Hydraulics)</a>	CIEN 323	Dr. Riyadh Al-Raoush
PEB 386	<a href="#">Water/Wastewater Analysis</a>	CIEN 421	Dr. Chukwu Onu
PEB 391	<a href="#">Soil Mechanics</a>	CIEN 424	Dr. Khalid Alshibli

### Research & Support Laboratories

Room No.	Laboratory	Professor(s) In-Charge
PEB 116	CAD in CE	Dr. Riyadh Al-Raoush
PEB 141	Structures	Dr. Muluneh Azene
PEB 384	Environmental Testing	Dr. Chukwu Onu
PEB 387	Environmental Analytical	Dr. Patrick Carriere
PEB 386	Environmental Water Chemistry	Dr. Chukwu Onu

# Department of Electrical Engineering

Dr. Pradeep K. Bhattacharya, Professor and Chair  
P.O. Box 9969

Baton Rouge, LA 70813

**Phone:** (225) 771-5294

**Fax:** (225) 771-4877

**Email:** [bhattach@enr.subr.edu](mailto:bhattach@enr.subr.edu)

**Website:** <http://www.subr.edu/enr/ee>

## Introduction

The department of Electrical Engineering is contained in two buildings on the Baton Rouge campus: a new four-story engineering complex (Pinchback Eng Building) and Moore Hall. Departmental Offices and five laboratories are located on the fourth floor of Pinchback Eng Building. Five classrooms and thirteen laboratories are located in Moore Hall. Ten faculty and two staff members, a secretary and a laboratory technician, are employed by the department.

The department offers a Bachelor of Science degree in Electrical Engineering. Through the Graduate School, the department offers the Master of Engineering degree with options in Telecommunications and Computer Networking and Electronic Materials and Processing Engineering.

## Focus Research Areas

Airborne Radar Modeling and Simulation : Geo-location and simulation of enemy positions and two-dimensional beam steering and adaptive optics in developing the electronic system

Solid State Devices & Microelectronics Fabrication: Field of solid state devices and micro-electromechanical devices and systems; cutting edge study of MOSFETs and miniaturization of sensors for adhoc networks using a class 100 Clean Room; miniaturization of Li-Ion battery and dry processing.

Telecommunications & Networking: Stochastic modeling and data-compression for various air force applications such as cognitive radio; efficient numerical algorithms and experimental simulations to help improve complex systems including ad-hoc sensor networks and networked robotics.

### High Performance Computing & Visualization

Ultra modern CAVE experimental setup to compute and visualize algorithms requiring less time and computer memory than conventional algorithms and hurricane in non-turbulent weather and then using the analysis to real world problems.

## Faculty

*For contract work or research assistance in these areas, please contact the following researcher(s):*

### **Bhattacharya, Pradeep K., Ph.D. Professor and Chair**

**Areas of Interest:** Dr. Bhattacharya's teaching and research interests are in the areas of Electronic Materials, Sensors, Nano-particles and nanostructures, Polymer applications, Semiconductor device physics, Processing & Process Modeling, Device Measurement & Characterization, Reliability, Interactions of Electrons, Ions & X-rays with Microelectronic Structures, Bonding, Oxidation, Ion Implantation, Materials modification, Ion beam analysis, Ion Micro-beams, CW & Pulsed Laser Processing, X-ray lithography & micro-machining of electro-mechanical systems.

[bhattach@engr.subr.edu](mailto:bhattach@engr.subr.edu)

### **Lacy, Fred, Ph.D., Associate Professor**

**Areas of Interest:** Dr. Lacy's research interests are in the areas of electronics and biosensors and the development of such devices for various applications (such as bacteria detection and oxygen free radical measurements). He develops these electronic sensors using IC (integrated circuit) technology and MEMS (Micro-Electro-Mechanical Systems) processing. Dr. Lacy's teaching interests are in the areas of electronics, biosensors, solid state physics, electromagnetic field theory, and AC/DC circuits, various biomedical applications of sensors.

[fredlacy@engr.subr.edu](mailto:fredlacy@engr.subr.edu)

### **Luo, Jiecai, Ph.D., Associate Professor**

**Areas of Interest:** Dr. Luo's teaching interests are areas of control, signal processing and microelectronics; and research topics are : (1) New algorithms for moving objects estimation; (2) Data compression effect on (RF) Signal Geolocation; (3) Data Fusion and collaborative signal processing; (4) Sensor network; (5) Image processing and applied computer vision; (6) Large scale image retrieval; (7) Generalized optimal control (with mixed control actions: impulse control action and continuous control action); (8) Disturbance rejection; (9) UAV cooperative control; (10) Content-based large scale image segmentation; (11) Content-based large scale image features analysis and retrieval; (12) Stressful disturbance generating and testing for dynamical systems. [jluo@engr.subr.edu](mailto:jluo@engr.subr.edu)

### **Majlesien, Hamid, Ph.D., Professor**

**Areas of Interest:** Dr. Majleseini's research interests are in the areas of Electric Power Systems, Computer Networks, and Digital Signal Processing. Dr. Majleseini's teaching interests are in the areas of Network Analysis, Machinery, Signals and Systems, Digital Signal Processing, Control Systems, Power Systems, Probability and Random Signals, and Computer Networks. [hamid@engr.subr.edu](mailto:hamid@engr.subr.edu)

### **McFarland, Wanda, Assistant Professor and Director of Retention Center**

**Areas of Interest:** Power and Engineering Education.

[wandaf@engr.subr.edu](mailto:wandaf@engr.subr.edu)



**Shaban, Elhag, Ph.D., Associate Professor**

**Areas of Interest:** X . ray detectors, Circuit Theory, Electronics, Physical Electronics, and Digital Logic.

[eshaban@cluster.engr.subr.edu](mailto:eshaban@cluster.engr.subr.edu)

**Singleton, Charles, Ph.D., Associate Professor**

**Areas of Interest:** Dr. Singleton's teaching and research interests are in the areas of Electrical Machinery, Power, Network Theory, and Engineering

Mathematics. [charless@cluster.engr.subr.edu](mailto:charless@cluster.engr.subr.edu)

**Smith II, Raife, Ph.D., Professor**

**Areas of Interest:** Dr. Smith's teaching and research interests are in the areas of Communications Signals and Systems, Broadband Telecommunications Network Design and Optimization, and Stochastic Modeling. Dr. Smith's consulting interests are in enterprise network and public switched network modeling, design and

optimization. [rsmith@engr.subr.edu](mailto:rsmith@engr.subr.edu)

**Walker, Ernest L., Ph.D., P.E., Research Professor**

**Areas of Interest:** Dr. Walker's teaching and research interests are in the areas of telecommunications system design and stochastic modeling. Dr. Walker is a Registered Professional Engineer in the states of North Carolina and West Virginia. Dr. Walker's current research are in the areas of sensor networks, cognitive radio, and MIMO

systems. [ewalker@engr.subr.edu](mailto:ewalker@engr.subr.edu)

**Dr. Zhengmao Ye, Ph.D, Assistant Professor**

**Areas of Interest:** Dr. Ye's teaching and research interests include modeling, control and optimization with diverse applications on automotive, electrical, mechanical and biomedical systems, as well as signal processing and image processing. Dr. Ye is the Founder and Director of Systems and Controls Laboratory at Southern University. Dr.

Ye is a Senior Member of IEEE. [zhengmaoye@engr.subr.edu](mailto:zhengmaoye@engr.subr.edu)

## Laboratory Facilities

The Electrical Engineering Department maintains instructional and research laboratories in Pinchback Engineering Building and Moore Hall. The following list includes instructional labs that are required for EE majors. Each lab and its primary contact person are listed below.

Room	Title	Number/Rubric	Coordinator
JBM 321	<a href="#">Electrical Networks Lab I</a>	ELEN 210	Dr. Hamid Majlesein
JBM 321	<a href="#">Electrical Networks Lab II</a>	ELEN 211	Dr. Pradeep Bhattacharya
PEB 438	<a href="#">Digital Logic Design Lab</a>	ELEN 305	Prof. Wanda McFarland
JBM 315	<a href="#">Engineering Electronics Lab I</a>	ELEN 314	Dr. Fred Lacy
JBM 315	<a href="#">Engineering Electronics Lab II</a>	ELEN 315	Dr. Fred Lacy
JBM 134	<a href="#">Electrical Machines Lab I</a>	ELEN 344	Dr. Charles Singleton
PEB 438	<a href="#">Microprocessor Lab</a>	ELEN 306	Prof. Wanda McFarland
<b>Elective Labs</b>			
PEB 435	<a href="#">Communication Systems Lab</a>	ELEN 415	Dr. Anitra Wilson
PEB 436	<a href="#">Control Systems Lab</a>	ELEN 433	Dr. Zhengmao Ye
PEB 436	<a href="#">Digital Signal Processing Lab</a>	ELEN 406	Dr. Hamid Majlesein
PEB 435	<a href="#">Computer Systems Lab</a>	ELEN 474	Dr. Raife Smith
PEB134	<a href="#">Electrical Design Lab</a>	ELEN 490	Dr. Pradeep Bhattacharya

# Department of Mechanical Engineering

Dr. Samuel Ibekwe, Professor and Chair  
P.O. Box 9969

Baton Rouge, LA 70813

**Phone:** (225) 771-4701

**Fax:** (225) 771-4877

**Email:** [ibekwe@enr.subr.edu](mailto:ibekwe@enr.subr.edu)

**Website:** <http://www.enr.subr.edu/me>

## Introduction

The Department has eighteen (18) instructional and research laboratories as listed in Table 1. The labs are equipped with state-of-the-art equipment, instrumentation, and computing facilities. The department's material testing capabilities in the area of materials science and engineering consist of an Instron 1230, a 55 kips rated MTS 810 Servo-hydraulic Universal Testing Machine equipped with numerical controlled hardware and software for mechanical testing up to 1000° C, a Dynatup Model 8250HV High Velocity Impact equipment integrated with an environment conditioning system for testing temperature range of -50° to 175° C and fully computer control and data acquisition system, a multi-specimen fatigue machine, Solartron SI 1280 electro-chemical measurement equipment and corrosion monitoring interface, an in-house microscopic image processor, and a Scanning Electron Microscope (Hitachi S-2460N) for fractography and microstructure analysis. Also, a complete set of equipment for light microscopy and metallography is available. In design and manufacturing area a CAD/CAM laboratory coupled with a computer-integrated manufacturing (CIM) laboratory provide hands-on experience and an understanding of the design to manufacturing concept. The department's model shop is used by the students to construct their design prototypes or prepare experimental research setups. The aerodynamic and fluid mechanics laboratories with a 0-140 fps wind tunnel, a water tunnel, and a 3-D Laser Doppler Anemometer provide research and instructional capabilities for the faculty and students alike. Computer hardware and software equipment includes SUN/SPARCHII-1PC workstations running on a UNIX platform and Pentium microcomputers running on an XP platform with high-resolution graphics capabilities. A Stereo-lithography apparatus (SLA-250/50) and a ThermoJet 3D printer are available for rapid-prototyping. Commercial versions of software packages such as ALGOR, COSMOS, Unigraphics NX, FLUENT, and others are available for both teaching and research applications.

## Focus Research Areas

Manufacturing: Computer Integrated Manufacturing, Data Dependent systems, Machine Vision/Image Processing, Manufacturing, Mechatronics, Metrology, Robotics and Statistical Data Processing

Materials: High Temperature Testing, Industrial Metallurgy and Materials Engineering, Materials Processing, Mechanical Behavior of Materials/Microstructure and Nanocrystalline Materials

Thermal Science/Fluids: Combustion and Reacting Flows, Computational Fluid Dynamics and Heat Transfer, High Heat Flux Applications and Multi-phase Transport Processes and Phase change in Porous Media and in Manufacturing Processes

Energy Conservation: HVAC, Solar Energy System Design, Alternative Energy, Computer-based Preventative Maintenance, Energy Management Control System Analysis, and Computer Simulation of Buildings

Composite Materials: Chemical Characterization and Surface Analysis, Composites Manufacturing, Mechanical and Impact Testing, Thermal Analysis

Experimental Solid Mechanics: Thermal Stresses, Mechanics of Materials and Material Properties

Failure Criteria and Stress analysis: Solid Modeling & Finite Element Analysis

## Faculty

*For contract work or research assistance in these areas, please contact the following researcher(s):*

### **Blevins, Edgar R., Ph.D. Associate Professor**

**Areas of Interest:** Project/Engineering Management, Automotive Technology, Computer-Aided Design and Drafting & Computer Integrated Manufacturing Systems.

[blevins@engr.subr.edu](mailto:blevins@engr.subr.edu)

### **Crosby, Karen, Ph.D., Associate Professor**

**Areas of Interest:** Materials science and mechanics, including mechanical property and microstructural characterization and deformation and fracture of engineering materials. She has been active in materials research including various projects dealing with advanced metal alloys and composite materials for several years.

[karenc@engr.subr.edu](mailto:karenc@engr.subr.edu)

### **Diwan, Ravinder , Ph.D., Professor**

**Areas of Interest:** Advanced materials, metallurgy, structure-property relations, quantitative microscopy, fractography, failure analysis, corrosion engineering, materials modeling and computer applications in manufacturing and engineering. His current and recent research projects have been in the areas of aluminum lithium alloys, titanium aluminides, material weldability, corrosion, fractography, manufacturing laboratory development and deformation dynamic material modeling.

[diwan@engr.subr.edu](mailto:diwan@engr.subr.edu)

**Huang, Chun-Ling, Ph.D., Professor**

**Areas of Interest:** Numerical Simulation in Fluids/ Thermal Science and Computer Software/Graphics in Engineering.

[huang@engr.subr.edu](mailto:huang@engr.subr.edu)

**Ibekwe, Samuel, Ph.D., P.E., Professor and Chair**

**Areas of Interest:** Design, Manufacturing, and Engineering mechanics.

[ibekwe@engr.subr.edu](mailto:ibekwe@engr.subr.edu)

**Jana, Amitava, Ph.D., Professor**

**Areas of Interest:** Software Development, Manufacturing, Automation and Product Development for several years in industry. He has developed various microcomputer-based laboratories like Robotics, Instrumentation and Control, Mechatronics, and Computer Integrated Manufacturing.

[jana@engr.subr.edu](mailto:jana@engr.subr.edu)

**Jerro, H. Dwayne, Ph.D., Associate Professor**

**Areas of Interest:** Composite materials and mechanics of materials. He has worked extensively in the integration of design, manufacture, and affordability of marine composite structures utilizing knowledge-based software, primarily funded by ONR. Currently, his research also includes the development of the next generation of composite pipe that incorporates smart (i.e., sensing) capabilities.

[Jerro@engr.subr.edu](mailto:Jerro@engr.subr.edu)

**Joshi, Ghanashyam, Ph.D., Professor**

**Areas of Interest:** Manufacturing and design; modeling, sensing, and control of manufacturing processes; Spiral Notch Torsion Testing (SNTT) fracture toughness measurement; CAD/CAM/CIM; automation; robotics and machine vision; metrology; statistical signal processing; data dependent systems (DDS) methodology; scanning probe microscopy; and integration of design and manufacturing.

[joshi1@engr.subr.edu](mailto:joshi1@engr.subr.edu)

**Li, Guoqiang, Ph.D., Joint Professor**

**Areas of Interest:** Carbon nanocomposites materials, low velocity impact of laminated composite materials, repair of damaged concrete structures using FRP composite materials, joining and repair of composite structures, recycle of waste materials in infrastructure construction, high pressure composite piping system, cement based composite materials, and polymer modified asphalt.

[guoqiangli@engr.subr.edu](mailto:guoqiangli@engr.subr.edu)

**Mensah, Patrick, Ph.D., Professor**

**Areas of Interest:** Thermo - mechanical characterization and processing of advanced composite materials, computational fluid dynamics and heat transfer of thermal systems and design of control systems. His current research activities involve thermo-mechanical characterization of yttria stabilized zirconia (YSZ) thermal barrier coatings (TBCs). This research involves thermal conductivity measurements as a function temperature and transient environmental conditions. Work on simulation of in-service thermo- mechanical performance of TBCs using CFD is also on-going. He is also working on the study of autonomous smart material thermal switches for thermal

management under cryogenic conditions which is funded by NASA/KSC. He has worked actively on thermo-elastic analysis of composite materials and also on two-phase flow pressure drop associated with jet impingement heat transfer. He recently completed projects on heat-activated joining of FRP composite-to-alloy pipe+- funded by NASA/MSFC.

[mensah@engr.subr.edu](mailto:mensah@engr.subr.edu)

**Mohamadian, Habib P., Ph.D., Professor**

**Areas of Interest:** Material characterization, solid modeling, failure analysis, and assessment. He participated in the development of CADD, Mechatronics and Robotics Laboratories. He has worked on the fatigue failure of the wind turbine blades made of E-glass composite materials, and has been involved with crack propagation and high temperature testing of Al-Li alloys research. He has been involved in engineering design and material characterization research and laboratory development.

[mohamad@engr.subr.edu](mailto:mohamad@engr.subr.edu)

**Razi, Parviz S., Ph.D. Associate Professor**

**Areas of Interest:** Materials and thermal science areas including thermal and mechanical properties of materials, process and development of new composite materials and fracture and strength analysis. He has been involved in engineering design and material characterization research and laboratory development including energy studies and conservation and alternative fuel systems.

[razi@engr.subr.edu](mailto:razi@engr.subr.edu)

**Stubblefield, Michael, Ph.D. Associate Professor**

**Areas of Interest:** Fire and thermal material characterization of composite materials, as well as innovative joining and manufacturing techniques of composite materials. His other interests include undergraduate and pre-college outreach programs.

[mastub@bellsouth.net](mailto:mastub@bellsouth.net)

**Wang, Cheng Shung, Ph.D., Professor**

**Areas of Interest:** Solid mechanics area, including buckling/vibration analysis and optimization design/analysis of structural and mechanical systems.

[wang@engr.subr.edu](mailto:wang@engr.subr.edu)

**Woldesenbet, Eyassu, Ph.D. Joint Professor**

**Areas of Interest:** High Strain Rate Properties and Mechanics & Design of Composite Materials, Development of Composite Sucker Rods for the Oil Industry, Manufacturing and Rehabilitation of Structures using Composites, Self Healing Materials, Functionally Gradient Syntactic Foams and Sandwich Composites, and Mechanics of Materials.

[woldesen@engr.subr.edu](mailto:woldesen@engr.subr.edu)

## Laboratory Facilities

The Mechanical Engineering department has 16 fully equipped laboratories that support both instruction and ongoing research projects. The laboratories are located in the P.B.S. Pinchback Engineering building on the SUBR Campus.

### ***Instructional Laboratories***

Room No.	Title	Number/Rubric	Coordinator
PEB 121	<a href="#">Intro to CADD</a>	MEEN 252	Dr. Wang
PEB 392	<a href="#">Fluid Mechanics</a>	MEEN 312	Dr. Huang
PEB 163	<a href="#">Materials Processing</a>	MEEN 335	Dr. Diwan
PEB 398	Measurements	MEEN 356	Dr. Razi
PEB 397	<a href="#">Heat Transfer</a>	MEEN 444	Dr. Mensah

### **Research Laboratories**

Room No.	Laboratory	Professor(s) In-Charge
PEB 399	<a href="#">Aeronautical</a>	Dr. Jerro Dr. Mensah
PEB 157	<a href="#">CAVE</a>	Dr. Jana Dr. Joshi Dr. Li
PEB 131	Energy Conversion	Dr. Mensah
PEB 137	Composite	Dr. Woldesenbet Dr. Jerro Dr. Li
PEB 156	Computer Aided Manufacturing	Dr. Joshi Dr. Jana
PEB 159	Corrosion	Dr. Diwan Dr. Crosby
PEB 150	<a href="#">Manufacturing</a>	Dr. Joshi Dr. Jana
PEB 396	<a href="#">Mechatronics</a>	Dr. Jana Dr. Joshi
PEB 134	Machine Shop	Dr. Joshi Dr. Razi
PEB 448	Model Shop	Dr. Wang Dr. Razi
PEB 148	Structures/Mechanics	Dr. Crosby Dr. Woldesenbet Dr. Li

## Department of Electronics Engineering Technology

Dr. Manjit Randhawa, Professor and Chair

P.O. Box 9969

Southern University

Baton Rouge, LA 70813

**Phone:** (225) 771-3797

**Fax:** (225) 775-9828

**Email:** [randhawa@engr.subr.edu](mailto:randhawa@engr.subr.edu)

**Website:** <http://www.engr.subr.edu/eet>

### Introduction

The department of Electronics Engineering Technology is contained in two buildings on the Baton Rouge campus: a new four-story engineering complex (Pinchback Eng Building) and Moore Hall. Departmental Offices, one classroom, and three laboratories are located on the fourth floor of Pinchback Engineering Building. One classroom and three laboratories are located in Moore Hall. Five faculty and two staff members, a secretary and a laboratory technician, are employed by the department.

The department offers a Bachelor of Science degree in Electronics Engineering Technology.

### Faculty

*For research work in these areas, please contact the following researcher(s):*

#### **Amini, Abolfazl, Ph.D., Professor**

**Areas of Interest:** Signal Processing; Image Enhancement and Restoration, Digital Filtering, Spectral Estimation, Signal Recovery, and Super Resolution. Vibrational Energy Relaxation rate Modeling using Real Time Feynman Path Integral Monte Carlo Methods; and Quantum Statistical Simulations.

[amini@engr.subr.edu](mailto:amini@engr.subr.edu)

#### **Arasteh, Davoud, Ph.D., Associate Professor**

**Areas of Interest:** Computational intelligence, complex systems, dependable and secure communication, mobile and wireless networks.

[davouda@engr.subr.edu](mailto:davouda@engr.subr.edu)

#### **Randhawa, Manjit, Ph.D., Professor and Chair**

**Areas of Interest:** Modified Sawyer-Tower Circuit for Characterizing Ferroelectric Film Samples; Thin Film Growth, Patterning and Characterization; High Temperature Superconductivity; Physics of p-n Junction Devices; Band Theory of Ferromagnetic Metals; Electronic Communications: Systems & Circuits; Feedback Control Systems.

[randhawa@engr.subr.edu](mailto:randhawa@engr.subr.edu)



**Craig III, Walter O., Assistant Professor**

**Areas of Teaching Interests:** Analysis of DC and Electronic Circuits and. Research in Magnetic Materials and Engineering Education.

[craig@engr.subr.edu](mailto:craig@engr.subr.edu)

**Henton, Raynaud, Assistant Professor**

**Areas of Teaching Interests:** Microprocessors, Computer Architecture and Programming, C++ Applications, Senior Project Design, Programmable Logic Controllers (PLC).

[rhenton@engr.subr.edu](mailto:rhenton@engr.subr.edu)

## Laboratory Facilities

The Electronics Engineering Technology department has 15 fully equipped laboratories that support both instruction and ongoing research projects. The laboratories are located in the P.B.S. Pinchback Engineering building and James B Moore Hall on the SUBR Campus

Laboratory	Course No.	Location	Lab Coordinator
<a href="#">DC Circuit</a>	EENT 111	PEB, 444	Walter Craig
<a href="#">AC Circuit</a>	EENT 211	PEB 444	Raynaud Henton
<a href="#">Electronic Ckt I</a>	EENT 213	JBM 325	Walter Craig
<a href="#">Electronic Ckt II</a>	EENT 217	PEB 439	Walter Craig
<a href="#">Digital Logic Design</a>	EENT 221	JBM 325	Davoud Arasteh
<a href="#">Analog Communications</a>	EENT 311	JBM 316	Davoud Arasteh
<a href="#">Linear Integrated Circuits</a>	EENT 315	PEB 439	Abolfazl Amini
<a href="#">Microprocessor</a>	EENT 317	PEB 439	Raynaud Henton
<a href="#">Electrical Machinery</a>	EENT 361	PEB 444	Abolfazl Amini
<a href="#">Fund. Signal &amp; Data Processing</a>	EENT 371	PEB, 117	Abolfazl Amini
<a href="#">Computer Assembly, Maintenance, and Repair</a>	EENT 381	JBM 312	Raynaud Henton
<a href="#">Digital Communications</a>	EENT 391	JBM 316	Davoud Arasteh
<a href="#">Computer Networking</a>	EENT 481	PEB 435	Davoud Arasteh
<a href="#">Senior Electronic Design</a>	EENT 496	PEB 439	Raynaud Henton
<a href="#">Programmable Logic Controller (Elective)</a>	EENT 460	PEB 444	Raynaud Henton

## College of Engineering Computing Facilities

**Network-** The Computer Aided Engineering Network (CAEN) provides the College of Engineering with the latest computing environments for engineering-related research and education. CAEN's integrated network spans more than 100 faculty and staff offices, laboratories and classrooms. The network in the Pinchback Engineering building provides connectivity to more than 600 workstations and servers, 200 of which are dedicated to student use to include Dell, Gateway, IBM, and Hewlett Packard computers. The backbone of CAEN's network consists of an Extreme Networks Black Diamond 6808 chassis with Gigabit copper and fiber line cards. 10GB blades will be installed to facilitate large data transfers, research on Internet2, and the Louisiana Optical Network Initiative (LONI). All servers are connected directly to the backbone of the network, thus eliminating network bottlenecks. The College of Engineering was one of the first universities to establish a wide rollout of Gigabit to the desktop. Ten of Extreme Network's Summit48si layer 3 10/100Mb switches connect student computer laboratories and faculty offices via 1000Mb multimode fiber optic cable to the Black Diamond 6808 chassis. The only protocol in use is TCP/IP; all other protocols have been disabled including NetBIOS over TCP/IP. This allows us to have a pure TCP/IP network with minimal network chatter.

**3D Virtual Laboratory-** The College of Engineering has a Windows XP CAVE (Computer Automated Virtual Environment). This is only one of two CAVEs in the state of Louisiana, 1 of 4 Windows XP CAVEs in the country and 1 of 5 Windows XP CAVEs in the world. The CAVE is the most widely used walk-in visualization environment in the world. What makes this CAVE even more unique is the fact that it is a Windows XP based CAVE. Most CAVEs are SGI based systems that are often difficult for inexperienced end-users to use. The Windows XP interface provides drag and drop capability and a much smaller learning curve for users. Data from any of our engineering programs (NX, Matlab, Fluent, AutoCAD, Algor, Adams, etc.) can be viewed in the CAVE. Faculty and students can visually interact with their data in real time 3D by wearing stereo glasses and using interactive gloves while viewing the data. Various programs are used in the CAVE to view data, these include: VRScene, VGeo, CAVELib, Inventor, and various other 3D visual applications.

**Computer Laboratories-** The General Engineering Laboratory contains 40 computers, 3 network printers and 2 scanners that are available 24-hours a day, 7 days a week. The ClearCube blade PCs contains 3GHz CPUs, 160GB hard drives, 1GB RAM, and 19+ monitors. The latest releases of the following applications are installed for student use: Windows XP SP2, Office Suite, Matlab, Algor, AutoCAD Suite, NX (Unigraphics), SPSS, Acrobat Reader, Internet Explorer, QuickTime, Cadence Suite, Electronics Workbench Suite, National Instruments LabView Suite, Fluent, Java, Macromedia Suite, Norton Antivirus Corporate Edition, Visual Studio.Net Suite, SAP, and Windows Media Player.

**CAD Laboratories-** Three CAD laboratories contain a total of 60 computers (20 in each lab) for student use. These CAD labs contain Dell Optiplex GX755 computers which

contain dual core 3.0GHz CPUs, 120GB hard drives, 4GB RAM, and 19+ digital flat panel monitors. The latest releases of the following applications are installed for student use: Windows XP SP2, Office Suite, Matlab, Algor, AutoCAD Suite, NX (Unigraphics), SPSS, Acrobat Reader, Internet Explorer, QuickTime, Cadence Suite, Electronics Workbench Suite, National Instruments LabView Suite, Fluent, Java, Macromedia Suite, Norton Antivirus Corporate Edition, Visual Studio.Net Suite, SAP, and Windows Media Player.

**3D Printers-** CAEN is also unique in that it has three 3D printers, which allow rapid prototyping. Instead of printing models on a piece of paper, the models are actually physically made within the 3D printers. Faculty and students can print physical 3D representations of their models on these printers. The Thermojet 3D and SLA 250 printers are located in the Computer Integrated Manufacturing (CIM) lab so that students can watch as their model is being built. The Thermojet uses a thermoplastic build material that is very durable to construct objects. The SLA 250 is a stereolithography solid object printer that uses a liquid polymer resin in conjunction with a laser to produce 3D objects. The printers are accurate to six thousandths of an inch. Faculty and students can benefit from these solid object printers to facilitate communication of design intent, refine designs more quickly, improve product quality, identify design issues, and reduce design cycle time and costs. The final 3D printer is a Z-Corp color printer. This printer allows 3D models to be printed in vibrant colors.

**Courseware Studio-** The Courseware Studio offers a multitude of equipment that allows faculty and students to work with various forms of media. A Dell Precision 530 workstation with 3 36GB, 15,000 RPM SCSI hard drives, multiple Wildcat 6110 digital video cards, and two 20+flat panel monitors is the heart of the Courseware Studio. A Sony TRV900 and Cannon XL2 digital camcorders are available to record classes, labs, presentations, and etc. The footage is then imported to the Dell workstation and edited with Adobe Premiere Pro editing software. The resulting video can be exported to any or all of the following: CD, DVD, VCR, LAN, or web site (at various connection speeds: 56k, 100k, and 300k). A CD/DVD duplicator/printer is used to mass produce and print material onto the appropriate format (CD and/or DVD). Wide format color printers (HP Designjet 50 and Epson 4000) are used for color output, while a HP LaserJet 2200 is used for monochrome material. Other devices offered are a Nikon D100, 6.1 mega pixel digital camera with standard and wide angle lenses and a HP 5450 wide format scanner. The latest releases of the following applications are installed for student use: Windows XP SP2, Office Suite, Matlab, Algor, AutoCAD Suite, Unigraphics, SPSS, Acrobat Reader, Internet Explorer, QuickTime, Cadence Suite, Electronics Workbench Suite, National Instruments LabView Suite, Fluent, Java, Macromedia Suite, Norton Antivirus Corporate Edition, Visual Studio.Net Suite, SAP, and Windows Media Player.

**Remote Access-** The College of Engineering allows remote access to application via the Internet. The Netilla platform allows secure remote access to all of your files and applications. This allows faculty and students that don't have specific (and expensive) engineering programs installed on their home computers to access the programs remotely as if they were on their home computer.

**Servers-** All servers are located in a server room. The server room has a dedicated UPS that powers all servers. The UPS is connected to the building backup generator to

provide uninterrupted service in the event of a power outage. The server room also contains auxiliary air conditioning units that work in conjunction with the buildings HVAC. If for some reason the main units can't cool efficiently or fail the auxiliary units automatically compensate and keep the server room at a constant cool temperature. The server room provides for ample future expansion and also houses a 42+plotter and the Z Corp color 3D printer.

**File Servers-** The faculty and staff have separate file servers (Dell PowerEdge 2600) to store their personal files. The servers have two 2GHz CPU, 3GB RAM, a 1Gb network card and several terabytes of storage space. Each server is also connected to a Dell PowerVault 221S which contains 14 146GB hard drives for 2TB of additional storage space. Each person has their own folder to save files in which they are the only person that has access to it. Users have unlimited storage space in their folder and their accounts are never deleted or expire. Thus, student data is kept indefinitely and will be present if they return in the future to further their education. Data is backed up nightly via a Dell 136T 3 drive, 60 tape, dlt tape library with 20TB of compressed capacity. One set of tapes is rotated off-site for disaster recovery purposes. Data is also replicated offsite to another building on campus for faster disaster recovery purposes. The servers are in the process of being updated to Windows Server 2008.

**Email Server-** Three Exchange 2003 (currently being upgraded to Exchange 2007) email servers provide email functionality to the College of Engineering. The Exchange servers are Dell PowerEdge 2600 servers with two 2GHz CPU, 3GB RAM, a 1Gb network card, and several terabytes of storage. Each user has an email address automatically created for them when their user account is created. There is no limit on the amount of email a user can have and it is never deleted, unless by the user. Outlook Web Access (OWA) can be used to access email over the Internet so that users can check their email from anywhere in the world with an Internet connection.

**Web Servers-**Each department has their own dedicated web site (for a total of four) to serve the needs of their users. A Dell PowerEdge 2600 with two 2GHz CPU, 3GB RAM, a 1Gb network card, and 500GB of storage space hosts the department web sites. Another identical Dell PowerEdge 2600 also hosts faculty and student web sites. Both web servers are tied into a backend video server. All video files from classes, labs and etc. are located on this backend server (Dell PowerEdge 2600) from which the other web servers pull from.

**SQL Server-**SQL 2000 provides database functionality and is the data management platform for the College of Engineering. A Dell PowerEdge 2600 with two 2GHz CPU, 3GB RAM, a 1Gb network card, and 500GB of storage space with SQL 2000 standard edition is currently used. Numerous databases host backend services for programs such as faculty/student surveys, inventory, grade recording and record keeping that are accessed through web sites. The SQL server will also be upgraded to the latest version (2008).

**Share Point Portal Server-**SharePoint Portal Server 2007 resides on a Dell PowerEdge 2600 and provides college wide document management, search, and sharing capabilities. SPPS allows the college to establish a central point of access to existing key information and applications, as well as share information across file

servers, databases, public folders, Internet sites, and SharePoint Team Services-based web sites. Seamless integration with Office and Internet Explorer allows for a very easy to use user interface.

**Project Server**-Microsoft Project Server 2007 is used to help create and track project plans, manage schedules and resources, and analyze project information. Professors can keep track of student progress on assigned group projects. Team members can collaborate with each other through a web browser by using Microsoft Project Web Access. Microsoft Project can also be used with SharePoint to link documents to projects and tasks, share documents, and track issues on individual projects.

**Internet Security and Acceleration Server (ISA) 2004**-Internet Security and Acceleration Server is an extensible, multilayer enterprise firewall and web cache that helps provide secure, fast, and manageable Internet connectivity. ISA server works as a firewall at the network, session, and application layers. We can use these features to provide secure, granular access to internal and external resources. The web cache feature allows Internet content to be saved or cached to the local hard drive of the server. This greatly decreased the amount of time it takes to view web sites, download files, and watch media files.

**Wireless**-A wireless network is currently installed in the Pinchback Engineering Complex. A combination of Cisco 1200 access points, Cisco Secure Access Control Server software, and media access control (MAC) authorization will allow us to provide granular, secure access to our network from anywhere within the Pinchback Engineering Complex. The 802.11b/g 54Mb wireless network will be implemented as a mesh overlay of the existing local area network. 50 Dell Latitude C840 notebooks with Cisco wireless access cards will be available to students to use in the hi-tech room or to check out during the day. The notebooks will have the same applications as desktops computers and students can access their data via the wireless network.

**Cluster**-A Windows 2003 cluster is used to solve complex scientific problems. The cluster is made up of 8 Dell PowerEdge 2650 servers. Each server has dual 2.4GHz Xeon processors and 1GB of RAM for a total of 16 processors and 8GB of RAM. It is also a dual-boot cluster in that the cluster can boot to a parallel or serial configuration depending on the needed applications. Various engineering programs are used on the cluster to solve complex problems quickly versus a regular desktop computer. The Windows 2003 cluster has a very easy to use web interface that allows users to enter data without having to know the complex intricacies of the cluster itself. Once the cluster is through running a job it notifies the end user via an email and places the data in their personal folder. Data from the cluster can also be brought into the CAVE to visually interpret complex data sets.

**Networking Lab**-The Networking Lab allows the College of Engineering to have state-of-the-art network testing facility. Two 84" racks are full of networking equipment from the major vendors such as: Cisco, Extreme Networks, Nortel Networks, Juniper, and 3Com. We can simulate, test, and deploy every type of network topology. ATM, Ethernet, Frame Relay, VoIP, and ISDN are just a few of the technologies that can be implemented in our networking lab. IPv4 to IPv6 is currently being tested in the lab and will be implemented in our production network in the near future. There is also network

monitoring/simulation software from Cisco, Fluke, HP Openview, ClearSight, OpNet, and QualNet. The software is used to monitor networks and provide entire network simulations/training on one computer. The College of Engineering is in the process of becoming a Cisco Networking Academy. Once approved, we anticipate offering classes for CCNA/CCNP certifications.

**Access Cards**-Custom security solutions have been implemented in the College of Engineering. Access cards with embedded chips and magnetic strips are distributed to faculty and students to provide secure, granular access to the facilities. Custom programming allows each card to be tailored for the individual or common groups. Biometric scanners to include iris, hand, and face recognition are used in the College of Engineering. These types of scanners offer additional levels of security on top of the common access cards.

**Storage Area Network (SAN)**-The College of Engineering has a Storage Area Network (SAN) from Pillar Data Systems. The SAN has a storage capacity of 26TB. It allows for storage expansion and is highly fault tolerant. Presently, the file and email servers are connected to the SAN. The remaining servers will be moved to the SAN shortly.

**Virtual Servers**-The College of Engineering is in the process of moving to a virtual environment via VMware virtualization technology. This will allow us to consolidate over 40 physical servers down to three physical servers. The technology also has the benefit of high availability. If a virtual server is overloaded or the physical hardware it is hosted on goes down, it is immediately (and without intervention) moved to another working physical server.

### **Distance Learning Capabilities**

*eLearning Unit*- The eLearning Unit provides services to faculty, students, and staff from the various academic departments at SUBR to assist them in building multi-media rich internet- connected courses as well as tutorials, workshops, seminars, and other electronically delivered activities. Additionally, it is a community resource as well. Members from the community are invited to be assisted in building electronically delivered activities.

*eLearning Unit Online Faculty Resources*-Faculty members have access to the following resources: Avacast, Horizon, Wimba, PalTalk, Tegrity, and Customized Instructional Materials.

*eLearning Unit Services*- The University encourages faculty members and instructors to expand the learning opportunities for students by designing, creating, and developing courses, seminars, workshops, and webinars for electronic delivery. To that end, these services are provided: Southern University Online, Southern University Coursesites, Webinars hosted by SUBR Online, College Knowledge Station, and SUBR Freshmen Online.

## **Equipment**

### **Characterization equipment:**

- Accelerated Weathering Tester (Q-Panel Lab Products Model QUV/Spray) - Specifications: Adjustable Light intensity, Irradiance monitored and maintained by

Solar eye UV and Condensation environments controlled by microprocessor, Automatic Fault recognition and Alarms, Programmable water spray.

- Dynatup® Model 8250 Instrumented Impact Test System- Specifications: Industry standard impact testing machine for a wide range of impact energies and velocities Performs impact simulation, penetration and rebound testing for energies up to 816 joules. Power hoist motor for adjusting the drop weight. Protective doors with safety interlocks contain shattered specimens Applications include testing of ceramics, composites, Windshield, dashboard, bumper etc.
- Ultrasonic NDE System- Specifications: Used for non-destructive evaluation of composite panels, metal plates and other parts. Tests for voids, cracks, on materials without damaging the material.
- 810 Material Testing System and Qtest150 System- Specifications: Performs a variety of static and dynamic analysis. With integral base plate actuator for very high stiffness, exceptional side load resistance and excellent force train alignment. Factory laser alignment improves axial alignment and reduces specimen bending at all crosshead heights. Has wide range of applications.
- Rheometric Solid Analyzer Model 3 (RSA) - Specifications: Used for controlled strain solids testing of films, fibers, foams, composites, ceramics, and others. Capabilities include testing at cryogenic temperatures.
- Split Hopkinson Pressure Bar (SHPB) - Specifications: A prototype high strain rate testing of composites and other materials. Achieve up to  $10^4$ . Bars are made of Inconel and Maraging steel, and aluminum for use to test different materials.
- Hitachi S-2460N Scanning Electron Microscope - Conventional high vacuum plus "Variable Pressure" scanning electron microscopy in low vacuum conditions with or without specimen preparation. Thermo Noran System Six provides digital imaging, spectral imaging, and full qualitative and quantitative x-ray analysis. Specification: Resolution (high vacuum mode): 4 nm; Resolution (low vacuum mode): 6 nm; Magnification: x20 ~ 200,000 (41 steps); \* Accelerating voltage: 0.5 ~ 25 kV (39 steps); Sample size: 150 mm in diameter (max); EDS detector for X-ray microanalysis; SE/BSE detector selection: Automatic (Menu Control) Operating vacuum in V.P. mode: 1.0 ~ 270 Pa (0.01 ~ 2 Torr) in sample chamber
- Flashline Thermo-Physical Property Analyzer System- Specifications: The Flashline unit can be used in measuring thermophysical properties at high temperature RT-1600°C, variable pressure testing environment, and small sample size. It is also modular in components so that as more funds become available its furnace can be upgraded for even higher testing temperatures. In addition, because of the modularized components such as the infrared measurement system it gives the ability to design experiments around its instrumentation
- Differential Scanning Calorimetry- Specification: This unit can be used in measuring energy release rates and specific heat capacities of specimens from RT to 500°C under various heating and temperature ramp conditions.

### **Other Characterization Tools**

- A multi-specimen fatigue machine.
- Solartron SI 1280 electro-chemical measurement equipment and corrosion



monitoring interface.

- Ultrasonic Joining Equipment.
- Cooper Instrument & System 12-channel digital force recorder and LVDTs for displacement measurement;
- A Yokogawa 100 data acquisition system for strain measurement;
- An Instron 3200 series internal pressure tester

#### **Fabrication:**

- Compression Molding Press-Specifications: 50 ton press with 2 platens; Platen Size 12 1/2"x19"; weight 925
- Resin Transfer Molding Extrusion System- Specifications: Easy-To-Clean Nozzle, Continuous Precise Mixing, Simple to Operate and Maintain, Pump Direct From 5-Gallon Container, Air-Solvent Purge
- A WLH two-axis filament winder for fabricating composite tubes;
- RTM-resin transfer molding equipment for composite structures;
- NETZSCH type 50 three-roll mill for nanocomposite manufacturing;
- Two-stage light gas gun device for high velocity impact test;
- A high speed imaging system (up to 1.5 million frames per second)

#### **Machining:**

- 3-D Precision Automatic Cutter- Specifications: 3-Axes Auto movement, Hydraulic table and electronic cross-feed, Auto increment down feed, Auto Lubricator, Rapid elevation, Working Capacity 12"x24", Use Diamond Cutting Blades.
- Panel Saw- Specifications: Professionally engineered high torque AC motor. Permanently lubricated, dual-sealed heavy-duty blade shaft duty blade shaft bearings. Two-position cutting head for cutting head for cutting various tile sizes. Linear guide bar system provides precise cutting.
- Core Drills and Drill Presses- Specifications: Used for drilling. Modified to core-drill composite panels to produce cylindrical specimens. Attached to water source.
- Other Machining Tools-Rotary Power Tool; Lathe Machine dedicated to machining composites; Water-cooled band saw machine for rough composite panel cutting; CNC Milling Machine; Computer Integrated Manufacturing laboratory

#### **Class 100 Cleanroom Equipment List**

- RF and DC Sputtering/Deposition System- Model . CVC 601; used to deposit thin films on samples film thickness
- Ellipsometer-Model . Gaertner L115B ; used to measure step heights, and thicknesses of samples
- Microscope-Model . Olympus BHMJL; used to visually inspect devices after processing
- UV Exposure Station / Mask Aligner-Model . OAI 2004-077148; used to place patterns on substrates
- Wet Bench/Fume Hood-Model. Air control CS-31DW/VLF; used for chemical processing of samples

- Photoresist Spin Coater-Model . Solitec SCP-5100; used to deposit photoresist on samples
- Convection Oven-Model . Oven Technology; used to dry samples after processing

### **Nanoscale Wireless Sensor Systems and Networks**

- Two (2) Inspiron 8600 Intel M Processor 715 (1,50A GHz/400 MHz FSB) 15,4 WUXGA
- Two (2) Precision Workstation 370 Desktop, Pentium 4 Processor, 3.40 GHz, Intel EM64T, IM L2 Cache, 800FSB (221-6196)
- Four (4) Precision Workstation 370 Minitower, Intel Pentium 4 Processor 3.4 GHz, Intel EM64T, IMB/800
- Two (2) iB-5109EK-50 Adhoc, Self Organizing, Multihop iBean Neetwork Evaluation Kit (5 endpoints, 3 routers, 1 gateway) 916 MHz
- One (1) MOTE-KIT5040 Commercial Developers Kit; including 8 MICAz processor/radio boards (MPR2400CA), 4 light/temp/acoustic/seismic/magnetometer boards (MTS310CA), 3 light/temp/acoustic boards (MTS300CA), 1 data acquisition board with temp/humidity sensor (MDA300CA), 1 Ethernet interface board (MIB600CA) and PC I/F board (MIB510CA)
- Two (2) SP-KIT400 Basic Stargate Developers Kit
- Fourteen (14) MPR400CB FM Multi-channel MICA2 Processor Radio Board (868/916 MHz)
- Six (6) MPR500CA FM Multi-channel MICA2 DOT Processor Radio Board (868/916 MHz)
- Two (2) Advanced Stargate Developers Kit (SP-KIT20CB)
- Two (2) Basic Stargate Developers Kit (SP-KIT20CB)
- Two (2) MICA Ethernet Interface Board (MIB600CA)
- Six (6) MICA/MICA2 Sensor Board with light, thermistor, acoustic, actuator, accelerometer, magnetometer

## Ongoing Funded Projects 2008-2009

1. Blevins, B., **La** Space Mechanical Engineering Senior Design Projects+, NASA student design contest to compete in the Great MoonBuggy Race, (2007-2008), \$10,000.
2. Carriere, P, **Enhancing** The Quality of NSF Proposals from Engineering and Computer Science Accredited Minority Serving Colleges and Universities+, NSF, (2007-2008), \$205,673.
3. Carriere, P, **Improving** Proposal Submissions to NSF through the S-STEM Program+, NSF, (2007-2008), \$99,991.
4. Diwan, R., Mensah, P., and Li G., **A** Study of Advanced Materials for Gas Turbines at Elevated Temperatures Using Selected Microstructures and Characteristic Environments for Syngas Combustion+, DOE NETL, 2/11-08-2/10/11, \$ 200,000.
5. Ibekwe, S. **Towards** Miniaturization of the Naval Nuclear Propulsion Reactors: Novel Processing Routes of Fabricating Microstructures on pressurized Water Reactors+, DOE, NNSA, 9/1/2005-8/31/2008, \$ 1.5 million.
6. Iyengar, S. Pang, S., Chen, P. (LSU) R. Kannan, R. and Phoha, V. (Louisiana Tech), Stubblefield, M., Li, G., and Jerro, H.D., (Southern University), **Collaborative Project: Faculty Development -- Multi University Research and Training in Information Assurance and Computer Security+**, National Science Foundation, 01/01/07 - 12/31/08, \$407,533 (SU Portion: \$60,000),
7. Li, G., Woldesenbet, E. S.I. Ibekwe, Cheng, J. Q., and Lei, Z., **Testing and Modeling of Blast Response of Functionally Graded Composite Armor+**, Department of Defense, 10/01/06-09/30/09, \$300,000.
8. Li, G., and Alam, M. A., **Molecular Dynamic Simulation of Impact on Composite Material+**, NASA-BoR LaSPACE/REA, 03/01/07-02/28/08, \$32,576.
9. Li, G., Pang, S., Wahab, M, Stubblefield, M., Cheng, J., and Lian, K., **Smart Adhesively Bonded High-Performance Joints for Composite Structures+**, NASA-BoR/EPSCoR, 10/01/07-09/30/10, \$1,434,000.
10. Li, G., Saber, A., **Elimination of Deck Joints Using a Corrosion Resistant FRP Approach+**, Louisiana Transportation Research Center, 03/01/06-08/31/08, \$119,873.
11. Li, G. **Development of Advanced Grid Stiffened FRP Tube-Encased Concrete Columns+**, Federal Highway Administration/Louisiana Transportation Research Center, 9/1/05-08/31/08, \$225,000.
12. Li, G., and Ram, Y., **Composite Columns and Poles for Infrastructure and Homeland Security Applications+**, Louisiana Board of Regents and EDO Fiber Science, 06/01/04-06/30/08, \$195,000.
13. Li, G., **FRP grid tube encased concrete columns+**, Louisiana Board of Regents/Economic Development Assistantship (EDA), 08/04 . 07/08, \$100,000.
14. Li, G., **Energy Initiative Project-Advanced Materials Research Laboratory+**, Louisiana Board of Regents 06/08/08-06/30/09, \$78,118.
15. Li, G., **Smart Syntactic Foams+**, Louisiana Board of Regents PhD Fellowship in Engineering/LSU College of Engineering, 08/07-07/11, \$112,000 (\$92,000 from the BoR and \$20,000 match from research grant).
16. Mensah, P., **PA Assignment Agreement+**, National Science Foundation, 07/01/07-06/30/08, \$134,483.
17. Onu, C **Instrumentation for Enhancing Instructions in Environmental Science and Engineering+**, Department of Army, \$307,267.
18. Stubblefield, M., Washington, S., Carriere, P., Namwamba, F., and Li, G. **Lower Atchafalaya Basin Floodway System, Louisiana Project (ABFS) Development of Water**

- Management Unit: Preliminary Planning Investigation,+U.S. Army Corps of Engineers, New Orleans District, 08/01/06-07/31/08, \$450,000.
19. Mensah, P., Diwan, R., %Clean Power and Energy Research Consortium+, Louisiana Board of Regents, 9/1/07- 8/31/08, \$78,118.
  20. Mohamadian, H., Ibekwe, S., Blevins, E., Jana, A., %Engineering S & M Verification and Assembly Analysis+The Boeing Company, October 2007 to September 2008, \$35,000
  21. Mohamadian, H., Ibekwe, S., Blevins, E., Jana, A., %CAD Modeling Tools Task Order+ The Boeing Company- 01/04/2008- 31/12/2008, \$50,000.
  22. Mohamadian, H., Stubblefield, M., Khosravi, E., and Jerro, H.D., (Southern University), Seidel, E. (LSU), %The LONI Institute: Advancing Biology, Materials, and Computational Sciences for Research, Education, and Economic Development,+ 07/01/07 . 06/30/12, \$7,000,000 (SU Portion: \$1,081,259), Louisiana Board of Regents.
  23. Mohamadian, H. %Expanding Engineering Outreach Activities+, Halliburton Company, 09/01/07 . 09/30/09, \$15,000.
  24. Mohamadian, H. %Advancing Scholarship in Engineering Education+, National Academy of Science, 10/30/07 . 09/30/09, \$12,000.
  25. Mohamadian, H., Ibekwe, S., %Shuttle Software Error Code Database-Boeing Intern,+ 07/01/07-06/30/08, \$35,000
  26. Pang, S.S., Wahab, M., Cheng, J., and Li, G., %Effective and Efficient Smart Composite Joints for Coupling Composite Pipes,+Louisiana Board of Regents and SMI Companies, 06/01/07-06/30/10, \$224,516.
  27. Shin, H and Ishak, S.; %Characterization and Development of Truck Load Spectra and Growth Factors for Current and Future Pavement Practices in LA+, LTRC, \$119,986.
  28. Smith, R., Lacy, F., Bhattacharya, P., Lou, J., and Walker, E. %Sensors Technical Thrust Research+, Clarkson Aerospace Corp, 07/01/07-06/30/08, \$110,000,
  29. Smith, R. %Sensors Technical Thrust Research, H.S. Component+, Clarkson Aerospace Corp, 07/01/07-06/30/08, \$50,000,
  30. Woldesenbet, E., Matthews, K., Cai, S., Li, G. and Mylavarapu, P., %Enhancement of Research in Materials Science and Physics through the Acquisition of Non-Destructive Investigative Equipment+, *Louisiana Board of Regents*, (07/01/07-06/31/08) \$112,429.
  31. Woldesenbet, E. Ibekwe, S. Li, G., and Ryder, E. C. %BCU-RISE Advanced Infrastructure Composites (AIC),+National Science Foundation, \$996,612.
  32. Woldesenbet, E., Li, G., and Cai, S., %Enhancement of Research in Materials Science and Physics Through the Acquisition of Non-Destructive Investigative Equipment,+ Louisiana Board of Regents, 06/01/07-06/30/08, \$112,429.
  33. Ye, Z., %Cyber Information Extraction+, Louisiana State University, 06/01/07-06/30/08, \$5,000.
  34. Walker, E., Carriere, P., Smith, R., Lacy, F., Bhattacharya, and P., and Lou, J., %Detection and Sensing of Environmental and Chemical Substances using Ad-hoc Wireless Networks+, DoE/NNSA, 2005-2010, \$2,010,000.