

Gateway University Research Park

Your Partners In Innovation



JSNN
Joint School of
Nanoscience and Nanoengineering





Gateway University Research Park



"The Gateway University Research Park is an outstanding collaborative venture between North Carolina Agricultural and Technical State University and the University of North Carolina at Greensboro that

will provide an excellent economic boost to our community and state. This exceptional collaboration between these two outstanding public universities creates a unique win-win partnership that builds on their commitment to being more externally engaged.

The exciting focus of the Gateway University Research Park on science, nanoscience, technology, engineering, and mathematics takes full advantage of some of the remarkable strengths of both institutions. The involvement of our outstanding faculty, staff, and students in this collaborative venture builds confidence about the expected economic impact the Park will have on this region for years to come. This research enterprise will lure high-tech scientists plus high paying jobs, new companies, spin-offs, research opportunities and innovation. Our collaborative results will truly affect the future of economic development and the viability and sustainability of the Piedmont Triad Region and beyond."

Chancellor Harold L. Martin, Sr.
North Carolina A&T State University



"The exciting development of Gateway University Research Park and our collaboration with North Carolina A&T provides a unique platform on which to build. Interdisciplinary research

in both basic and applied fields will develop the intellectual capital needed to improve the quality of life of individuals and our communities.

As two research universities with high research activity, our goal is to leverage existing and emerging strengths in the sciences, education, business, and the allied health professions to expand our research portfolios in areas in which our faculty is likely to have a significant impact."

Chancellor Linda P. Brady
University of North Carolina at Greensboro



For information about partnering opportunities contact Gateway.

About the Park

John Merrill, Executive Director, is leading the development of Gateway University Research Park (Gateway) as a premier center for basic and applied research in Greensboro and North Carolina's Piedmont Triad region. Gateway was formed as a collaboration between North Carolina A&T State University and The University of North Carolina Greensboro. Gateway has two 75-acre campuses and is developing state-of-the-art research facilities for work in areas of life and physical science, engineering and other applied sciences. Facilities will feature highly specialized equipment to both enhance ongoing University-based research, and to attract companies who will benefit from the opportunity to affordably access the equipment in a collaborative research environment.



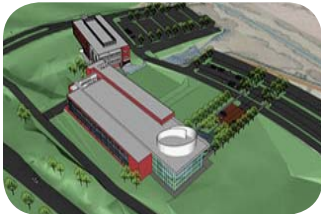
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South Campus

Gateway's South Campus is situated on 75 acres next to the pristine pastures of the North Carolina A&T State University Research farm. The campus is located near the I-40/I-85 corridor that runs from Washington, D.C. and Atlanta, GA. The South Campus Master Plan calls for the development of 12 buildings for a total of 550,000 square feet of space. It will offer scenic landscaping, pedestrian-friendly walkways, sculpture gardens, an amphitheatre, auditorium, and a roof top garden and patio.



Artist rendering of South Campus and current construction

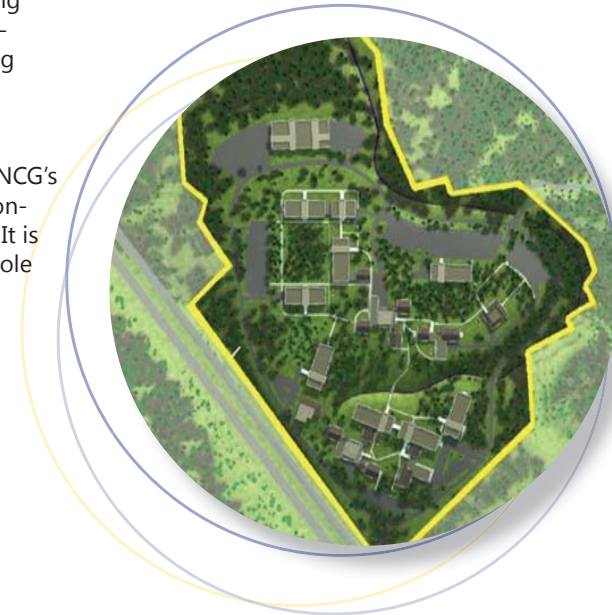


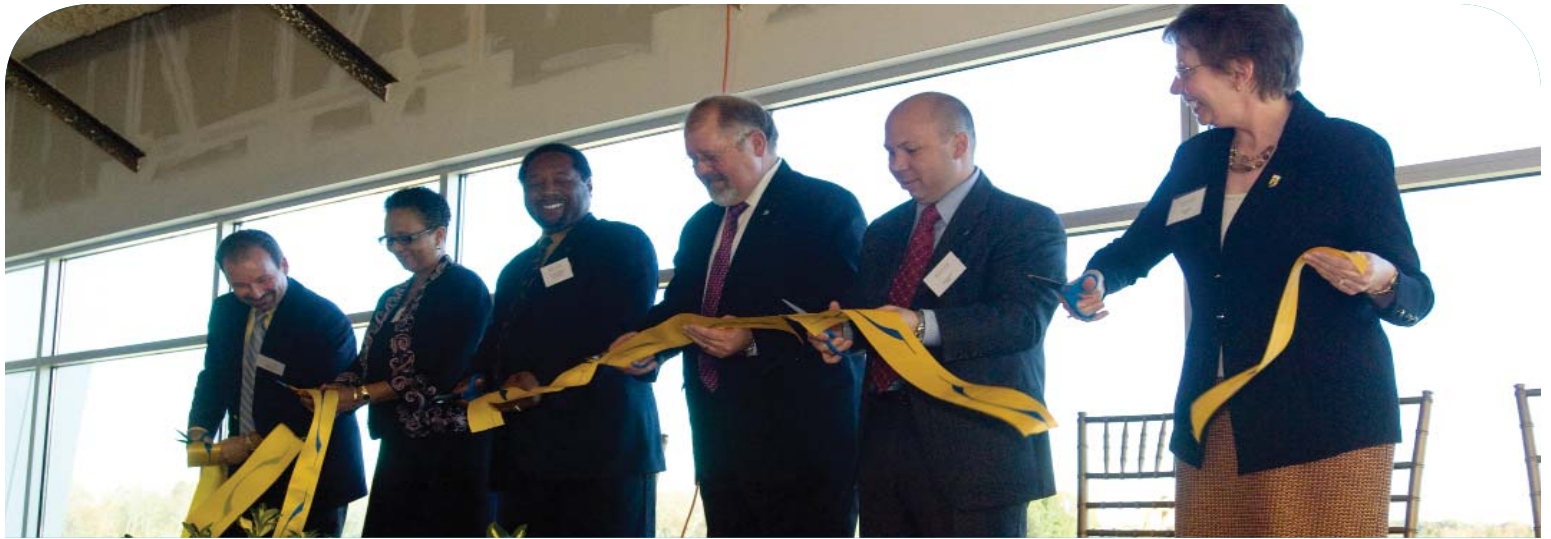
North Campus

The North Campus is located in the northeast quadrant of Greensboro, NC, along the U.S. Highway 29 corridor (future Interstate 73/74). It is a beautiful, scenic 75-acre campus-like setting with approximately 140,000 square feet in eight existing buildings, and the potential to add nine more buildings, for up to 450,000 total square feet.

The North Campus is home to eight research and business entities, including UNCG's largest educational research program, SERVE Center. The campus features two on-site training rooms equipped with state-of-the-art video and audio technology. It is conveniently located near Greensboro's Bryan Park complex, featuring two 18-hole golf courses, meeting facilities, soccer fields, and trails along Lake Townsend.

Facilities at North Campus





Doing Business in North Carolina

North Carolina and the Piedmont Triad region are premier locations for nanobiotechnology and emerging technology companies because of the state's landmark investments in education and workforce development. These investments have been leveraged to create the third largest cluster of biotechnology, pharmaceutical and life sciences companies in the nation. With Gateway University Research Park and the Joint School for Nanoscience and Nanoengineering, the State of North Carolina is poised to extend its prominence in these new fields.

EDUCATION

- Nine North Carolina universities conduct over \$1 billion of sponsored research per year
- Eleven colleges and universities are in the Piedmont Triad region, three which are research-intensive
- Almost 8,000 undergraduate and over 1,500 graduate students are enrolling in biology, chemistry and engineering programs in public universities throughout the state each year
- North Carolina is graduating over 5,500 students in engineering, biology and chemistry each year

WORKFORCE DEVELOPMENT

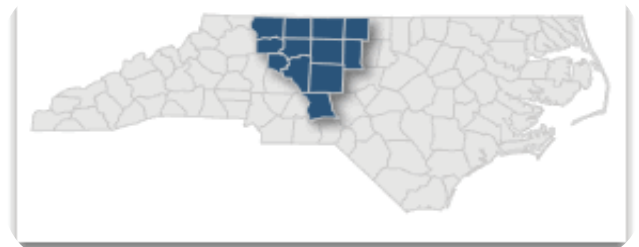
- More than 56,000 workers with relevant scientific skill sets are employed in the state
- More than 5,000 university scientists and technicians are working in nanobiotechnology-related research
- Over \$1.2 billion has been allocated to university research, facilities, worker training, incentives and infrastructure in last 10 years
- The Piedmont Triad region has a nationally recognized community college system for training knowledge-industry workers with a particular focus on nanobiotechnology

BUSINESS CLIMATE

- North Carolina was ranked 4th in CNBC's 2010 ranking of American's Top States for Business
- The state's nanobiotechnology industry is growing more rapidly than that of its leading competitors
- North Carolina has a lower cost of doing business than its leading competitors in nanobiotechnology
- North Carolina has a very favorable tax structure and incentives packages
- Low construction and utility costs contribute to this overall low cost of doing business
- The Piedmont Triad region is favorably located halfway between Atlanta and Washington D.C.
- The region has four major interstates and an international airport

LIFESTYLE

- The cost-of-living in the Piedmont Triad region has consistently been one of its strengths
- The Piedmont Triad is a top 40 United States metro region with a population of 1.6 million
- The Piedmont Triad region has a pleasant mild-to-moderate climate with all four seasons
- The Piedmont Triad region has a rich assortment of cultural amenities
- Central location provides easy access to several other major metropolitan centers



Twelve county Piedmont Triad region of North Carolina





Joint School of Nanoscience and Nanoengineering

Founding Dean, Jim Ryan, is leading creation of the Joint School of Nanoscience and Nanoengineering (JSNN), Gateway's flagship research institution. It has been established as a collaboration of North Carolina Agricultural and Technical State University and the University of North Carolina at Greensboro. Both Universities are classified by the Carnegie Foundation as "research universities with high research activity." JSNN builds on the strengths of the universities to offer an innovative, cross-disciplinary graduate program that will train scientists in various emerging areas of nanoscience and nanoengineering.



Dr. James G. Ryan
Founding Dean, JSNN

DEGREE PROGRAMS

JSNN offers a Professional Science Master's (PSM) in Nanoscience and a Ph.D. in Nanoscience awarded by UNCG. An M.S. in Nanoengineering and a Ph.D. in Nanoengineering awarded by NC A&T. Distance learning options are in development.

RESEARCH FOCUS

Initially, JSNN will have six research focus areas: NanoBiology, NanoMetrology, NanoMaterials (with a special emphasis on NanoComposite materials), NanoBioelectronics, Nanoenergy and Computational Nanotechnology. These technical areas will afford numerous opportunities for collaboration with industrial partners.

FACILITIES

The JSNN facility is a 105,000 square foot two-story research building located on the Gateway's South Campus. This facility includes: partner labs, cleanrooms, wet lab space, fermentation

lab, thermochemical lab, tissue culture and cell culture space, biophysics lab, bioscience open lab, and shared microscopes.

TOOLS

A suite of analytical tools has been purchased, including a Carl Zeiss SMT® Orion Helium Ion microscope. This microscope is the only one of its kind in the Southeastern U.S. These tools are now operational and ready for use by corporate and research partners. A detailed list of the current equipment available to Gateway and JSNN partners is provided in the pages that follow.





JSNN Facility

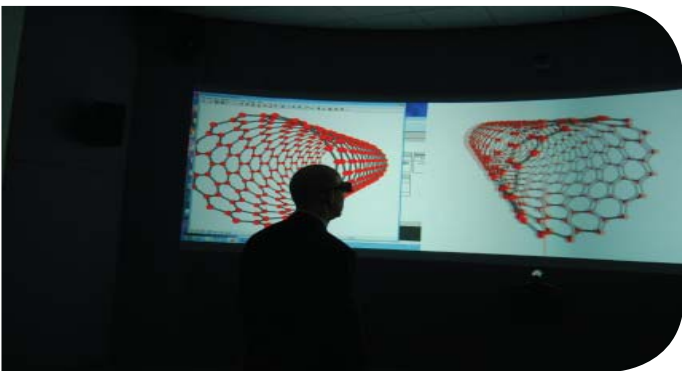
The JSNN facility is a 105,000 square foot interdisciplinary research facility dedicated to academic and industrial research and development activities. The building is located on Gateway's South Campus and has specialized nanotechnology resources, such as a nanobioelectronics cleanroom, nanocharacterization labs a computation and visualization facility and conventional science and engineering facilities, all under one roof.

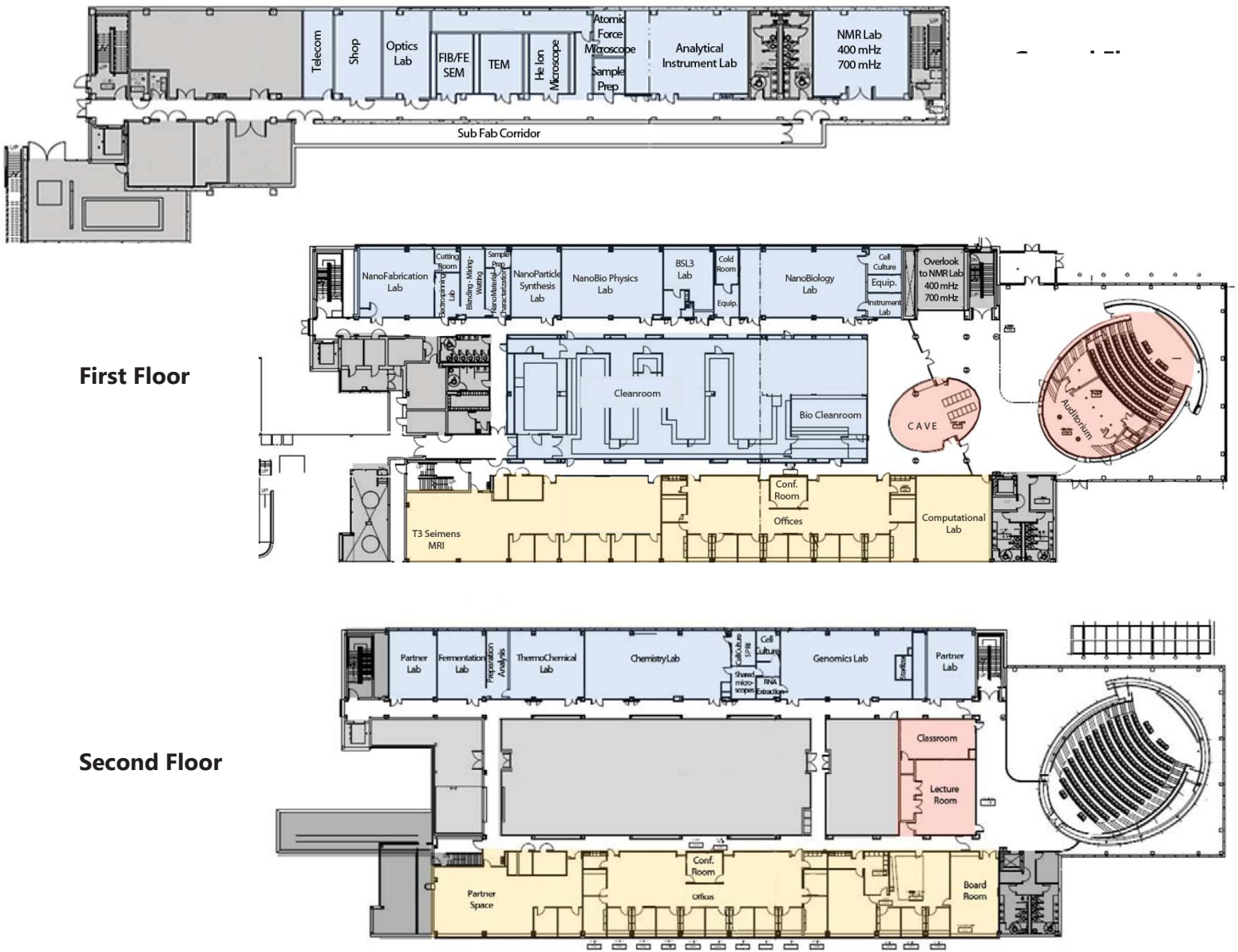
JSNN strives to provide an ideal teaming environment to facilitate interdisciplinary research in areas of nanobioelectronics, nanobiology, including nanopharmacology, and nanomaterials and nanocomputing.

The major JSNN resources are:

- Nanoelectronics and Nanobioelectronics Cleanroom
- Nanofabrication facility with nanoparticle synthesis, characterization, mixing and scale-up facilities
- Characterization suite, including NMR facility, Analytical facility and Microscopy Lab
- Shared Nanoscience labs, including Nanobiology, BSL-3, Nanobiophysics, and Nanochemistry
- Visualization and Computing facility
- 232-seat auditorium
- Faculty, staff and graduate student offices
- Partner office and laboratory space
- Collaboration spaces, including small conference rooms and huddle spaces

****Partner space available.**







Research Facility One

The first facility at Gateway University Research Park's Gateway South Campus opened in September 2008. The building is 2½ stories and comprises 63,000 square feet. The U.S. Department of Agriculture, Natural Resource Conservation Service, occupies the largest percentage of the building, occupying about 30,000 square feet.

Gateway University Research Park occupies more than 5,000 square feet in Research Facility One. Additional tenants include Advaero Technologies, Inc., and Barton Malow Samet SRS.

Amenities include:

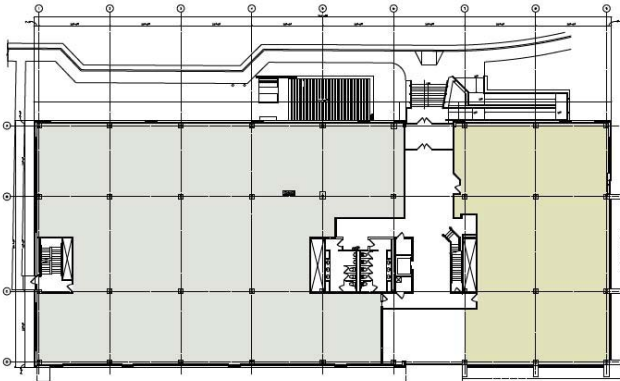
- Affiliations with NC A&T State University and University of North Carolina Greensboro faculty and research personnel
- State-of-the-art data and telecom service options
- Conference / training room
- High speed Internet and wireless

****Partner space available.**



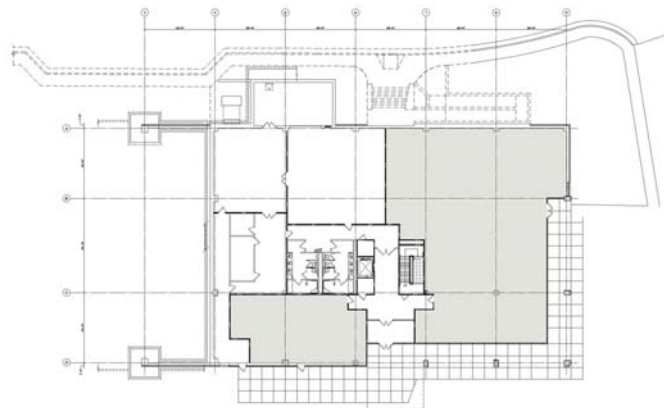
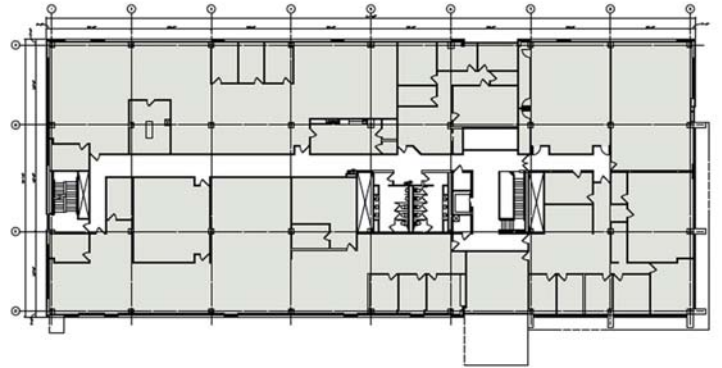
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First Floor | Available SF = 8,100SF (approx.)

Second Floor | Available SF = 5,000 SF (approx.)



Ground Floor | Available SF = 2,000 SF (approx.)



JSNN Research Focus

NANOMATERIALS

JSNN focuses on synthesis, processing, manufacturing and characterization of nanostructures. Specifically:

- Fundamental physics and chemistry of both inorganic and organic nanostructures.
- Bottom-up synthesis strategies and top-down approaches.
- Synthesis and nanomaterial placement for a broad range of applications.
- Scale-up and advanced processing of nanocomposites.

NANOBIOELECTRONICS

JSNN will apply Nanoelectronics and Nanomagnetism in new functional application areas beyond CMOS technology. Specifically:

- NEMS/MEMS, microfluidics, nanotechnology tools for personalized medicine.
- Integrated micro/nanosystems with 3D nanoscale interconnect and flexible electronics
- Carbon-based electronic and electrochemical sensors and devices.
- Molecular beam epitaxial (MBE) growth, characterization and device applications of the narrow band gap III-V compound semiconductors.

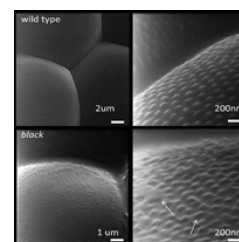
NANOBIOLOGY

JSNN's goal is to investigate disease at the nano-bio interface using engineered nanomaterials to enable diagnosis, imaging and therapy. Specifically:

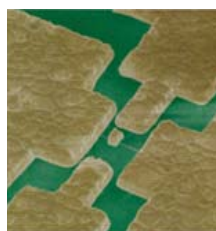
- Point-of-care nanodevices and systems for early diagnosis and therapeutic response monitoring.
- Single molecule detection and analysis.
- Molecular modeling for cardiac dysfunction, nanomedicine and therapeutics.
- Nanoparticles to probe tumors for recognition and/or drug release.
- Reliable neural interfaces and tools for tissue engineering.



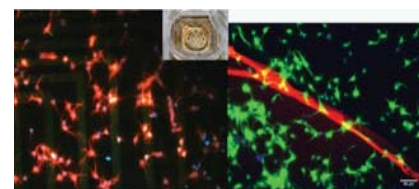
Fractograph of Nanoengineered Fiber Composites. (Prof. Kelkar)



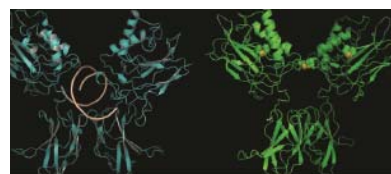
Helium Ion Micrograph of corneal nanostructures in wild type and black mutant *Drosophila melanogaster* (Prof. Lajeunesse)



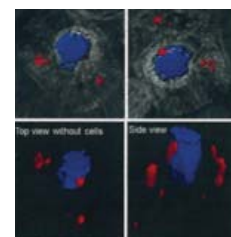
Paddle oscillators for biological and chemical sensing (Prof. Hall)



Nanobioelectronics-neural cells cultured on an electronic interface platform. (Prof. Aravamudan)



"On" (reduced, left) vs. "off" (oxidized, right) states of the DNA-binding protein NF- κ B, a redox-regulated molecular switch. (Prof. Taylor)



3D image of multifunctional nanoparticle for gene delivery (Prof. Sandros)





JSNN Research Focus

NANOENERGY

This research theme explores leading edge knowledge gaps associated with energy harvesting, scavenging and storage. It emphasizes the foundational science associated with understanding the theory and correlations between a nanomaterial's structure and its nanoscopic properties, chemistry, relevant reaction mechanisms, and overall performance. Initial fundamental studies will elucidate and compare the dynamics and nanoscopic pathways for photovoltaic, scavenging, and chemical energy conversion and storage. A key long term goal is to understand and predict the performance potential and limits of sustainable and deterministically designed photocatalysts for photovoltaic and fuel applications.

COMPUTATIONAL NANOTECHNOLOGY

JSNN performs modeling and simulation of devices, structures, and systems, including composite materials, computational biology, and materials modeling. Computational nanotechnology is a highly interdisciplinary field with significant potential to contribute across a range of applications including nanoengineered materials; nanobio sensors, nanoelectronics; and nanobiology. Thrust areas include:

1. Multi-Scale Modeling and Mechanics of Nanoengineered Material Systems
2. Computational Modeling of Nano and Bio Systems and Interfaces
3. Material Interactions and Interfaces in Nanoengineered Polymeric Composites
4. Deformation Behavior of Nanoscale Material Systems

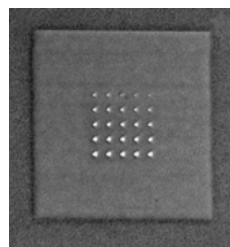
Specific current research projects focus on the nano to continuum modeling of cementitious materials to understand the cause and effects of material genetics on their behavior; modeling and simulation in the processing and mechanics of hybrid and nanocomposites;

deformation behavior of nanoscale multilayer metallic systems; nanoscale diffusion; computational modeling and analysis of protein biomarker–aptamer systems. Emphasis is being placed on building the overall computational infrastructure and modeling capabilities to facilitate a broad range of projects across JSNN's nanoengineering and nanoscience programs.

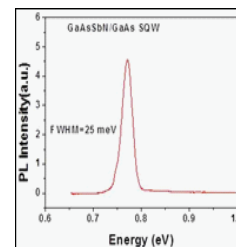
NANOMETROLOGY

JSNN will advance investigational and modeling tools to fundamentally understand and characterize nanoscale phenomena for novel applications. Specifically:

- Atomic , molecular, structural, chemical, and electronic phenomena of nanostructures and devices.
- Characterization of dynamic processes with high spatial and temporal resolution.
- Metrology tools for nanomanufacturing.
- Multiscale simulation from ab initio methods, to atomistic molecular dynamics.
- Predictive design of nanomaterials, devices and systems.



An array of nanopores fabricated in the center of a silicon nitride membrane that has been milled to a local thickness of ~6nm. (Prof. Hall)



Photoluminescence spectrum of a GaAsSbN/GaAs SQW at room temperature with the peak position at 1.63 μm for LED device application (Prof. Iyer)



Partnership Model

The Executive Director of Gateway, John Merrill and the founding Dean of JSNN, Jim Ryan, with the support of the Chancellors, have created an exciting model to the benefit of partnering companies, equipment vendors, faculty and students. The model is designed to explore the leading edge of technological frontiers and commercialize the results through collaborative partnerships. Partner companies are attracted by the ability to access advanced facilities and tools while collaborating with world-class faculty. Gateway and JSNN work with corporate partners and academic units to create joint R&D projects and spin-off opportunities that are co-located with the academic units on the Gateway campuses. These partnerships have as a common theme the application of enabling technological advances rather than a focus on any particular market segment. Gateway is business friendly. Partnership arrangements are captured in a variety of agreements including, but not limited to:

NONDISCLOSURE AGREEMENTS

Prior to entering into sensitive discussions we execute non-disclosure agreements to provide mutual assurances that confidential information will be safeguarded.

LEASE AGREEMENTS

Both office and laboratory space are available at Gateway. Space can be outfitted to suit the partner's specific needs. Lease rates for this space are market competitive. Prospective tenants must have synergies with JSNN, NCA&T or UNCG. Criteria that will be evaluated for synergy include: collaboration with faculty and students, lab sharing, equipment sharing, sponsored research, co-development of intellectual property, patents, licenses, curriculum input, and adjunct faculty status. Initially, smaller startup ventures may choose to obtain office space and utilize common laboratory space for a majority of their needs.

FACILITIES AND EQUIPMENT USE AGREEMENTS

This agreement lays the framework for partners to access the facilities and equipment. It includes items such as the types of facilities and equipment subject to the agreement, the hourly usage rates, an understanding about how usage will be scheduled, adherence to the Gateway Lab Safety Plan guidelines, equipment-specific training which may be required, maintenance and repair guidelines, and more. Laying out these

ground rules helps to guarantee that all stakeholders in the facilities are treated equitably.

JOINT RESEARCH & DEVELOPMENT AGREEMENTS

This agreement outlines the essential purposes of the collaboration, who will be on the project team, how decisions will be made, how costs will be allocated, procedures for pursuing intellectual property protection, ownership rights in resulting inventions and intellectual property, the procedures for handling publication of results etc.

EQUIPMENT PROVIDER AGREEMENTS

We encourage and facilitate mutually beneficial relationships with our equipment partners. These partnerships are focused on establishing the core capabilities at Gateway and JSNN and offering those capabilities to our other partners. We will explore new applications for advanced tools with these providers.

For information about partnering opportunities contact Gateway.



Facilities & Equipment Access Program

NANOBIOLOGY

BD Sciences FACS Aria III Flow Cytometer System
 Biotek 1536 Microflo Select Microplate Dispenser
 Biotek 384 Microflo Select Microplate Dispenser
 Biotek PRC384 Microplate Sample Processor
 Biotek Synergy MS/Mono Microplate Reader Haz-Mat
 Biotek Synergy MX Mono-based Multi-Function Microplate Reader
 Biotek MWX200R Power Wave XS
 Branson Ultrasonics S450A Cell Disrupter
 Eppendorf 5418 Microcentrifuge
 Fisher Scientific Isotemp 282A Oven w/ Vacuum Pump
 Labconco A2 Logic Bio Safety Cabinet 5' w/stand (2)
 Labconco A2 Logic Bio Safety Cabinet 6' w/stand
 Labconco A2 Logic w/canopy Bio Safety Cabinet 6' with stand
 Labconco B2 Logic Bio Safety Cabinet 6' w/stand (2)
 Labconco Class II A Bio Safety Cabinet 4' (2)
 Lab-Line Instruments Inc. Imperial II CO2 Incubator
 Malvern Instruments ZEN3600 Zetasizer Nano-ZX
 MSE Mistral 3000i Centrifuge
 Nanosight LM10-HSBF Nanopartical Characterization
 New Brunswick Sci. Excella E24 Incubator Shaker
 Nexcelom Bioscience Cellometer Vision Cell Profiling System
 NuAire NTS Autoflow CO2 Water-Jacketed Incubator
 Olympus IX51 Inverted Microscope w/Fluorescence
 Precision Thelco Lab Oven
 Precision Thelco 130 Lab Oven
 Quantum Design Magnetic Property Measuring System 3 Squid VSM 7.0
 TESLA Magnet
 Revco 20C Freezer
 Revco ValuePlus 86 Freezer
 TA Instr. DSC Refrigerated Cooling System
 TA. Instr. Q200 Differential Scanning Calorimeter w/Mass Flow
 TA Instr. Q200 Modulated Differential Calorimeter w/Mass Flow and
 Thermogravimetric Analyzer w/High Resolution & Modulation Modes
 TA Instr. Q500 Thermogravimetric Analyzer

NANOCHEMISTRY

CEM 908005 Microwave Reactor Discovery System
 Horiba SPRI-LAB+ Surface Plasma Resonance System
 Innovative Tech. Inc. PureLab HE Four Glove Box
 Labconco A2 Logic w/canopy Bio Safety Cabinet 6' w/Stand
 Labconco Free Zone 6 Freezer Dryer
 Microtrac Inc. NPA152-31A-0000-000-11M Zetatrax
 Sorvall Legend XFR Floor Model Centrifuge (2)
 Sorvall Legend Micro 21R Centrifuge



Instron 3384 Materials Test System



PerkinElmer DMA 8000
Dynamic Mechanical Analyzer



Agilent/Varian 320 MS Triple
Quad GC/LC



Instron 9250G Impact Test System



Agilent/Oxford Gemini Diffractometer

MATERIALS TESTING

Instron 3384 Materials Testing System, floor mounted with
 Environmental Chamber
 Instron 8802 Dynamic Test System
 Instron 9250G Impact Test System
 LR Technologies ST867TUL240V90KW Walk-in with cart Oven
 PerkinElmer DMA 8000 Dynamic Mechanical Analyzer
 PerkinElmer DSC 6000 Differential Scanning Calorimeter
 South Bay Technologies. 650 HC Low Speed Diamond Saw
 ThermTest Inc TPS2500S Thermal Property System w/Anisotropy
 and Slab modules

NANOFABRICATION

BioRad TC10 Cell Counter - Automated (4)
 Brutus 61024 24" Professional Tile Saw w/10" Diamond Blade
 Fisher 250A Isotemp Vacuum Oven
 Flow Int'l M2-1313b Mach2 Water jet Cutting Table
 Labconco Glove Box 11 Protector SS w/base stand0
 TBJ Incorporated 60-10-BD-CT Countertop Backdraft
 TBJ Incorporated 36-61-DD-BD Dual Draft workbench (5)



BD Biosciences FACS Aria III Flow
Cytometry System



Quantum Design Magnetic
Property Measuring System



Horiba SPRI Surface Plasma
Resonance System

Facilities & Equipment Access Program - Clean Room

PHOTOLITHOGRAPHY

Brewer Science CEE 100 Spin Coat System
Newport Corporation R-31425 Laser HeNe
OAI 8808 Mask Aligner w/DUV upgrade
Ultron Systems UH102-8 Ultron UV Curing System
Yield Engineering Systems (YES) Vapor Prime HMDS

DRY ETCHING

Lam Research Corp. 4400 Series Etch System (2)
Plasma Etch Inc. PE-100-RIE Plasma Etch System
STS Multiplex Etch System ICP STS
Ulvac NLD-6000 Demo ICP Etch System

THERMAL PROCESSING

SemiTherm VTP1500 LPCVD Reactor Furnace

WET PROCESSING

Air Control Wet Bench with carboy (2)
Americhem Eng Srvs Polypro Wet Bench 60" x 30"
Hamo LS-1000 Glassware Washer
Reynolds Tech Wet Bench
Santa Clara Plastics Stainless Steel Wet Bench 60" x 40"

CHEMICAL VAPOR DEPOSITION

Novellus Concept II Plasma Chemical Vapor Deposition System

PHYSICAL VAPOR DEPOSITION

Kurt Lesker PVD75 E-beam Evaporator System
MRC 603 Vertical Sputtering System

METROLOGY

Carl Zeiss Imager Z2m Axio Imager Microscope
Carl Zeiss Microscope with photo micrographic camera
Creative Design Engineering RESMAP168 4 Point Probe Resistivity Mapping System
Gaertner LSE-WS Ellipsometer
KLA-Tencor P-10 Profilometer w/airtable
Nanometrics Nanospec 6100 Film Analysis System

POST-PROCESSING

IPEC 472 Chemical Mechanical Polishing System
Lam Research Corp DSS-200 Series II CMP Brush Cleaner
Reynolds Tech Gold Plating Bench and Retrofit
Tousimis Research Corporation Critical Point Dryer

BIO-LITHOGRAPHY

Carl Zeiss EVO LS SEM Microscope w/patterning
Eppendorf 5810 Benchtop Centrifuge
Laurell Technologies Spin Processor in WS-1000M Wet Station
Tektronix 11801A Digital Sampling Oscilloscope
VWR/Shel-Lab 2310 CO2 Incubator

SAMPLE PREPARATION

Denton Vacuum Inc. Desk II Sputter Coater
Nikon Metaphot Optical Microscope Super High Pressure Lamp with power supply



OAI 8808 Mask Aligner w/DUV upgrade



LAM Research Corp. 4400 Plasma Etch System-Mask



Carl Zeiss EVO LS SEM



Facilities & Equipment Access Program

ANALYTICAL CHEMISTRY

Agilent/Varian 240 MS Ion Trap GC/MS Mass Spectrometer
 Agilent/Varian 320 MS Triple Quad GC/LC Mass Spectrometer
 Agilent/Varian 500 MS LCMS Ion Trap Mass Spectrometer
 Agilent/Varian 400NMR 400 MHz NMR Spectrometer
 Agilent/Varian 700 NMR 700 MHz NMR Spectrometer
 Agilent/Varian Cary 6000i UV-Vis Spectrophotometer
 Agilent/Varian 920 LC Liquid Chromatography System
 Agilent/Varian BIO-DIS III Dissolution System Testing Station
 Agilent/Varian Cary Eclipse Fluorescence Spectrophotometer (2)
 Agilent/Varian 710 ES Axial ICP Spectrometer
 Agilent/Varian 670 FTIR Spectrometer w/Microscope 610 & Raman Module
 Agilent/Varian 670 Mid-Near FTIR Spectrometer
 Agilent/Varian Intelliflash 310 Chromatography System
 Agilent/Oxford Gemini Diffractometer
 Denver Instruments SI-234 Analytical Balance
 Memmert IPP500 Incubator



Agilent/Varian 6000 UV/Vis Spectrophotometer



Agilent/Varian 920 LC Liquid Chromatography



Agilent/Varian 700 MHz NMR



Agilent/Varian 320 MS Triple Quad GC/LC



Agilent/Oxford Gemini Diffractometer

BIOPHYSICS

590 Tripod Polisher, TEM
 Agilent 4294A Impedance Analyzer
 Agilent 54624A Oscilloscope w/Gpib Interface
 Boekel Microcooler II Benchtop Refrigerated Bath
 DNR MiniLumi Bio Imaging System
 DNR MF ChemiBIS Image Analysis System
 Fisher Scientific AMPSD/TS3-LED Binocular Microscope with integrated digital video
 FisherBiotech Ultraviolet Transilluminators
 GE Medical Systems CASE "Performance" ECG Stress Testing System
 GE Medical Systems Treadmill
 Kiethley 2400 Digital Source Meter
 Kiethley 2602A Dual Channel Source Meter
 LabNet Int'l Spectrafuge 24D Mini Centrifuge
 Labconco A2 Logic w/canopy Bio Safety cabinet 6' w/ stand
 Molecular Devices 200B Axopatch Clamp (2)
 Oakton pH 2100 Benchtop pH/Ion Meter
 Princeton Applied Research VersaStat4 w/FRA Potentiostat/Galvanostat
 Thermo Scientific Multisegment Tube Furnace
 Thermo Scientific Nanodrop 2000c Spectrophotometer



Kiethley 2400 Source Meter



Princeton Applied Research VersaStat4 with FRA Potentiostat/Galvanostat



DNR MF ChemiBIS Image Analysis System



Kiethley 2602A Source Meter



Agilent 4294A Impedance Analyzer

MICROSCOPY

Agilent 5600 LS Atomic Force Microscope
 Burkert AXS Inc. 400EDS Energy Dispersive X-Ray Spectrometer for Auriga
 Carl Zeiss Auriga-BU FIB FESEM Microscope
 Carl Zeiss Axio Observer A1 Microscope
 Carl Zeiss Axio Observer Z1, Microscope-Spinning Disc Confocal
 Carl Zeiss Libra 120 Plus TEM Microscope
 Carl Zeiss Auriga-BU FIB FESEM
 Carl Zeiss Orion Helium Ion Microscope
 Fisher Scientific FS30D-4QT Digital Ultrasonic Unit (Sonicator)
 Fisher Scientific Isotemp 2.5cf Forced Air Oven
 Harrick Scientific SEA-D18 Variable Angle Reflection Accy w/wire grid polarizer & Sample holder
 Hitachi S-4800-I FESEM w/Backscattered Detector INCA Energy 250 EDX Microanalysis System
 South Bay Tech PC2000 Plasma Cleaner

MAGNETIC RESONANCE IMAGING

Siemens Magnetom Verio 3T MRI System



Siemens Magnetom Verio 3T MRI System



Carl Zeiss Orion Helium Ion Microscope



Hitachi S-4800 I FESEM w/Backscattered



Carl Zeiss Auriga-BU FIB FESEM



Agilent 5600 LS Atomic Force Microscope

Andrew L. Wooten, M.S.T, M.T.M.
Director of Outreach & Commercialization

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