Clark Atlanta University Multidisciplinary Research Centers and Capabilities

Clark Atlanta University has the standard school and department structure that is the norm in higher education in America. However, to encourage multidisciplinary research and development CAU has organized and developed several multidisciplinary research centers. Below we have briefly described some of these centers that have the potential to support external contract research, development, and testing services. Laborites described below in many cases support more than one research center and faculty, staff, and students are in many cases active members of more than one center. All research carried out at CAU is subject to export control as described the CAU Export Control Policy, attached.

CAU Multidisciplinary Research Centers

The **CAU High Performance Polymers and Composites** (HiPPAC) **Center** has made significant contributions in the synthesis and characterization of polyimides; synthesis and characterization of nonlinear optical polymeric materials; and fabrication and mechanical characterization of composites and increasing the participation of minority students in polymers and composites research. The center's research, development, and education activities focus on the development of high performance polymers and composites supporting the safety, environmental compatibility, and productivity of air transportation and space systems, and continue to provide an environment where undergraduate and graduate students can learn and participate in cutting edge polymers and composites research. Since 1992, over 100 undergraduate and graduate students from various departments have been supported by projects in HiPPAC. Further, the center collaborates with NASA, DOD and aerospace companies to conduct a range of research and development activities in the following areas: Methods for dispersion of nanoparticles in polymer resins; Rheology, cure kinetics and resin processability Inorganic-polymer nanocomposites; Development of structure-property relationships in nanocomposites; Mechanical characterization and modeling of polymeric nanocomposites, polymeric matrix composites and laminated materials; Multiscale modeling of nanostructured composites; Characterization of aerogels, and polyimide foams; Fabrication of composites by resin transfer molding (RTM), vacuum-assisted resin transfer molding (VARTM), and resin infusion. The center has access to an array of equipment and instrumentation infrastructure to support these initiatives including axial and axial-torsion servohydraulic test frames, ultrasonic NDI and environmental chambers, resin and VARTM equipment, and elevated temperature creep frames.

The **Center for Functional Nanoscale Materials (CFNM)** was established at CAU on November 1, 2006. The programs and activities of the Center are designed to meet the dual goals of advancing human understanding in the area of nanoscale materials and of increasing the capacity of Clark Atlanta University to train talented scientists in the physical sciences. The Center, though residing at Clark Atlanta University, is multi-institutional and brings into a mutually beneficial and cooperative relationship two-year and four-year colleges, research universities and the K-12 community. Furthermore, the Center brings together researchers and educators from different disciplines with demonstrated and complementary strengths in quality research and training students. The Center has several important tasks: To conduct beneficial and innovative research with the objective of realizing the potential of nanotechnology for the

benefit of the Nation and all humanity. To increase the number of students pursuing graduate and undergraduate degrees in the natural and physical sciences by increasing the number of students, in the precollege and two-year college pipeline, who will pursue degrees in the natural and physical sciences. To enhance the productivity of participating researchers by a program of infrastructure enrichment. Included among the Center's expanding list of institutional partners are the Atlanta area school systems, Cornell University, Emory University, Perimeter College and iThemba Labs in South Africa.

The **Center for Cancer Research and Therapeutic Development** (CCRTD) was developed as a vehicle of communication and collaboration for scientists at CAU who are interested in any aspect of cancer research. The CCRTD is one of the nation's leading prostate cancer research centers. The CCRTD is currently supported by the Research Center in Minority Institutions (RCMI) program of the National Center for Research Resources at the National Institutes of Health along with several other grants from NIH and DOD. The biomedical research projects range from studies on signal transduction mechanisms to the development of better drug delivery systems. This core group collaborates with other scientists at the University who are involved in projects that complement and enhance the center. CCRTD is currently working to recruit social and behavioral scientists who will explore the ethical, legal and social implications of biomedical research in general and cancer research in particular. In addition, the CCRTD recently established a Cancer Genomics Center at CAU working in collaboration with Georgia Tech and St. Joseph's Health System. It is the goal of the CCRTD to significantly increase the body of knowledge on cancer research, particularly as these diseases disproportionately impact the population mainly served by Clark Atlanta University, African-Americans.

The **Center for Theoretical Studies of Physical Systems** (CTSPS) was established in 1991 by a multi-million dollar grant through the NSF CREST program, although the center has received funding from other federal and state agencies, and the private sector. Research at the CTSPS is conducted through a dynamic clustering of researchers in the areas of atomic and molecular theory, and condensed matter, mathematical physics/applied mathematics, and wavelet analysis and multidimensional signal processing. Some of the strengths of this center include simulation and modeling, low-energy scattering theory, solid-state theory, image processing, and mathematical physics theory.

CTSPS has extensive research partnerships and collaborations to conduct cutting edge research at CAU, and has established a mechanism to educate and produce African-American M.S. and Ph.D. students in STEM fields. Several CSTPS graduate students have completed Ph.D.s at major research universities such as Rice University, Georgia Tech, University of Michigan and University of Maryland. CSTPS has numerous collaborations domestically and abroad with premier research institutions such as Harvard University, University of California-Berkeley, MIT, Stanford, University of Benin, ICTP (Italy), the African Laser Centre (Pretoria), and iThemba Labs (South Africa). CSTPS is an active member of the African Laser Centre which is a virtual center of excellence and one of the strongest combinations of human and physical infrastructure for science in Africa that links scientists and laser facilities in six African nations. In addition, CSTPS attracts noteworthy visiting scientists and graduate students globally to strengthen and impact its diverse research capability, and further strengthen these partnerships. Recently, CSTPS co-organized with Caltech and African Laser Centre, the first US-African

Institute on Photon Interactions (Durban) and with iThemba Labs, the Nanosciences Workshop (Cape Town). CTSPS also collaborates with the National Energy Research Scientific Computing Center (NERSC) facility at Lawrence Berkeley National Lab, which is supported by the U.S. DOE, and the Queen's University of Belfast, UK for access to supercomputers for simulation and modeling research activities. High school minority students and teachers have been impacted by the outreach activities of CTSPS such as Peer Tutorial program, Summer Research Apprenticeship program, and the Summer Enrichment and Summer Transportation Institute programs. CTSPS, characterized by excellent researchers, continues to publish in peer reviewed journals and attract funding for basic research.

Center of Academic Excellence in National Security Studies (CAENS)

The importance of analytical skills that apply across a variety of disciplines has become increasingly evident in recent years. Numerous studies have indicated the need for larger numbers of intelligence analysts with diverse backgrounds and ethnicities. The existing infrastructure for training is limited by the difficulty of scaling up from previous levels to the new demands for analysts. Academic institutions have an important role to play in fulfilling these requirements. As the challenges of the new century unfolds government agencies, private industry, consulting companies, and think tanks will increasingly rely on this new cadre of employees in formulating policies, and developing business strategies who are responsible global citizens, while at the same time are protecting the competitive interests of the U.S. Government and organizations. The Center for Academic Excellence in National Security Studies (CAENS) at Clark Atlanta University (CAU) was established in 2005 under funding provided by the Office of the Director of National Intelligence (ODNI) with the specific purpose of developing a new cadre of students capable of fulfilling this role. CAU was one of the first four centers funded in the Intelligence Community Centers of Academic Excellence (IC-CAE) Program. To fulfill this mission, CAENS has developed an innovative, interdisciplinary program of study, research, and outreach. This program has attracted faculty from disciplines across CAU, encompassing multiple schools and departments. Faculty members from the departments of History, English, Computer and Information Science (CIS), Public Administration, Psychology, Physics, Political Science, Business, and Sociology among others have participated in this program. The CAENS program includes the following key components: 1. Intelligence Community (IC) Scholar Program; 2. Curriculum Development; 3. High School Outreach; and 4. Faculty/Student Research in areas of interest to the IC community. The IC Scholars include high achieving students from CAU, Spelman and Morehouse colleges and Georgia Tech. Included in the weekly sessions were scholarly lectures, writing and research, and leadership and professional development. Since its inception in 2005, CAENS Studies has had a total of 49 active IC scholars.

An allied activity conducted by the Department of Computer and Information Science (CIS) under CAENS has curriculum activity focused on the incorporation of Information Assurance (IA) organically into the CIS course of study and IA related research. The CIS IA curriculum, course of study, and facilities has been recognized as conforming to IA national educational standards by the Department of Defense/National Security Agency (DoD/NSA). DoD/NSA certified the CAU/CIS Department as a Center of Academic Excellence (CAE) in Information Assurance in 2005, and re-certified in 2008 (CAU was the first HBCU to be recognized as an IA CAE).

The **Center of Excellence in Supply Chain Management** is the newest center of excellence at CAU having been approved in 2015. The demand for professionals in Supply Chain Management (SCM) is rapidly growing as firms are realizing improved efficiency, lower costs and increased profitability, resulting from strong supply chain practices. With this in mind, the SCM program at CAU is designed to constantly challenge students by exposing them to knowledge and learning inside and outside of the classroom. CAU offers students business degrees in Supply Chain Management at both the undergraduate and graduate level (MBA). Since the program's inception in 2003, our vision has been to focus on the intellectual and personal development of each student and to prepare graduates to excel in their chosen endeavors our goal is to be the Industries' Preferred Long-term Supplier of Highly Qualified Professional Hires.

To achieve our objective, we remain committed to developing high achieving, critical thinking SCM graduates who innovative ideas and practices, with a disposition to serve. Our applied cross-functional curriculum is taught by faculty and business professionals with expertise in supply chain management. We continuously update our curriculum to maintain a leading-edge focus.

Clark Atlanta Major University Laboratory Facilities

The following laboratories and facilities are housed in the 200,000 sq. ft. Cole Research Center for Science and Technology and the adjacent 30,000 sq. ft. Environmental Science and Engineering Research Building.

INNOVATION LAB 3D PRINTER/ADDITIVE MANUFACTURING (AM)

The CAU innovation lab is designed to support students and faculty as well as facilitate technology transfer to the market place. As part of CAUs Innovation Lab we are in the process of developing a 3D printing/additive manufacturing laboratory. When completed in October 2016 the Innovation Lab will have fifteen (15) 3D printers with the capabilities listed in the table below. The lab is designed with room for further expansion in the future. The importance of 3D printing and AM to future NASA missions is evidenced by the deployment of a 3D printer to the ISS to carry out AM in a low gravity, closed environment. AM, is a key technology for rapid prototyping, new product development, and production of low volume parts for a variety of applications. For long duration space flights and NASA missions, recycling of plastics and 3D printing for replacement parts, tools, components, and habitat construction will be a key enabling technology.

#	Model	Features/Capabilities
4	**AFINIA**H800	• Build area: 8 x 8 x 8 inches • Fully automated platform leaving and height sensing • 100-micron print resolution • Polymers: PLA and ABS
4	Zortrax M200	• Build area: 7.8 x 7.8 x 7.2 inches • Heated build plate • Polymers: ABS, ABS/polycarbonate, Nylon, PETG/Fiberglass
4	UP mini 2 UPM-002	• Build area: 8 x 8 x 10 inches • Polymers: ABS
1	uPrint SE Plus	• Build area: 8 x 6 x 6 inches • 0.254 mm (.010 in) or .330 mm (.013 in) • Polymers: ABS
1	ZPrint 650	• Build area: 10 x 15 x 8 inches • Layer Thickness: 0.0035-0.004 inches • Polymers: PLA and ABS
1	Printrbot Simple-Metal	• Build area: 6 x 6 x 8 inches • Auto Leveling • Layer Thickness: 0.4 mm • Polymers: PLA

COMPOSITES PROCESSING

Processing capabilities include autoclave processing, Resin Transfer Molding (RTM), Vacuum Assisted Resin Transfer Molding (VARTM), Thermoforming and Compression Molding techniques. The labs also have polymer processing capabilities, including extrusion, batch mixing, blending and alloying.

Composites Processing Capabilities	
Instrument	**Specific Processes**
Wabash Press - Model G30H-15-CPX • 30 Ton • 450°C • 15” x 15” platens	• Compression Molding • Resin Transfer Molding • Powder Coated Textiles
Autoclave - Mini Bonder I • 600 psi • 1000°F • 18” diameter x 40”	• Hand Lay-up • VARTM with A/C
Thermoforming - Hydrotrim Labformer	• Thermoforming • Powder Coated Textiles
Resin Injector – • 550°F • 2000 cc 500 cc/min	• Resin Transfer Molding
Walk-In Oven – Wisconsin • 800°F • 6’x6’x6’	• RTM • VARTM • Vacuum Bag Oven Curing
Haake Extruder / Mixer • 500°C	• Nano-composites • Sheet and Rod

THERMAL ANALYSIS

The Thermal Analysis Laboratory provides Differential Scanning Calorimeter (DSC), Thermo-gravimetric Analysis (TGA), Dynamic Mechanical Analysis (DMA/DMS) and Thermo-mechanical Analysis (TMA). The Thermal Analysis Laboratory allows determination of degree of cure, heat of reaction, cure kinetics, and glass transition temperature (Tg).

Thermal Analysis Capabilities		
Instrument	**Specific Tests**	
Differential Scanning Calorimeter TA instruments Q 2000 DSC	• Glass Transition Temperature (T_g) • Melting Temperature (T_m) • Crystallization time and temperature • Percent crystalline • Heats of fusion and reaction • Specific heat and heat capacity • Oxidative stability • Cure kinetics	
Thermogravimetric Analysis TA instruments Q50 TGA	• Thermal Stability • Thermo-oxidative stability • Decomposition temperature • Degradation kinetics	
Thermomechanical Analysis TA instruments Q400 TMA	• CTE • Glass Transition (T_g)	
Dynamic Mechanical Analysis TA instruments AGRS II DMTA	• Modulus (E) • Tan delta • Glass Transition (T_g)	

MECHANICAL CHARACTERIZATION

Capabilities include ASTM, SACMA, CMC, and MIL-STD tensile, compression, torsion, flexural, and shear quasi-static as well as high cycle dynamic (fatigue) testing. Digitally controlled convection ovens capable of elevated/sub-zero (-129°C to 600°C) temperatures along with high temperature capacitance extensometers allow experiments to be conducted at extreme temperatures. Long focal length microscope allows for the observation and measurement of cracks and damage in monolithic and composite materials.

Mechanical Characterization Capabilities		
Instrument	**Specific Tests**	
• MTS 810 axial and axial-torsional 100 kN servo-hydraulic test frames • 100 kN Instron electro-mechanical test frames • MTS Testar II Controllers • MTS 647 Hydraulic Grips • High Temperature Grips • Surfalloy Wedges • MTS 601 Temp Chamber • Vishay 2100 Conditioners • Capacitance Extensometer • MTT 605 IITRI Fixture • MTT 642.1 Bend Fixture • Wyoming WTF-2R Fixture • Wyoming 605.26A-21 • SACM.00388.30 Fixture • SACM.00188.12 Fixture • BOEI.07260.2 Fixture • Boeing IMP.0011 Impact • Questar QRMS-II/670 • Shimadzu CM227-083 • Tenney Benchmaster • SDI-2454 Flaw Detector	• Un-Notched Tension • Un-Notched Compression • Open Hole Compression • Filled Hole Compression • IITRI Compression • Open Hole Tension • Tension-Tension Fatigue • Tension-Compression Fatigue • Torsion Fatigue • Flexural (Bending) Properties • Fracture Toughness Testing • Crack Growth Measurement • Interlaminar (Short-Beam) Shear • In-and-Out of plane Shear • IOSIPESCU Shear • Elevated Temperature Testing • Sub-Zero Testing • Low Velocity Impact Testing • Compression After Impact • Vickers Hardness Testing • Damage Detection/Monitoring • Temperature/Humidity Condition • Ultrasonic (Non-Destructive) Testing	  
• SATEC Model D 20kN • SATEC DL 2 kN • TCC Chamber • TCS1200 Controller	• High Temperature Creep Testing • Accelerated Testing • Durability Testing • Viscoelastic Properties	

RHEOLOGY

The Rheology lab functions in parallel with the thermal analysis laboratory. The rheology equipment allows determination of the viscoelastic properties of polymeric materials as it relates to molecular structure, processibility, physical properties and end use performance. Thermal imaging equipment can be used to determine the thermal profiles of processing molds and polymer melts.

Rheology and Thermal Imaging		
Instrument	**Specific Tests**	
Rheology TA instruments : AGRS II DMTA	• Melt Rheology • Cure Modeling • Solid State Rheology • Cure Kinetics	
Haake Rheocord 90	• Cure Modeling • Mixing	
Rosand Capillary Rheometer	• Melt Rheology • Cure Modeling • Solid State Rheology	
Kayness Model D7051	• Melt Index	

CHEMICAL ANALYSIS

The Chemical Analysis laboratories have the ability to analyze chemical compounds using Infrared spectroscopy, Raman spectroscopy and/or Nuclear Magnetic Resonance. These labs are important for allowing determination of the chemical make-up of polymer resins used in polymer matrix composites, the determination of side or by-products generated during cure, and miscellaneous trouble shooting into chemistry related problems.

Chemical Analysis Capabilities	
Instrument	**Specific Tests**
FT-IR • Solids • Powders • Fibers • Polymers • Liquids • Thin Films • Gases	• KBr Pellet • Nujol Mull • Ambient Diffuse Reflectance
Ramman Bruker; SENTERRA Raman Microscope; • Powders • Fibers • Polymers • Liquids • Thin Films	• Standard Raman Scattering • 2D and 3D mapping
NMR Bruker 500 ADVANCE III with solid and liquid probes Bruker 400 ADVANCE • Solutions • Multinuclear • Solid State	• 1D & Double resonance • 2-D NMR • Magic Angle Spinning
X-Ray diffraction Panalytical Empyrean XRD • Powders and Thin Films • Polycrystalline and Nanoporous materials • Nancomposites • Colloidal dispersions • Polymers	• WAXS in reflection and transmission geometry • SAXS in transmission geometry • WAXS and SAXS at non ambient temperature • 2D- SAXS with 3D area detector XRD, SAX, and WAXS • Hot Stage
Surface Analyses Micromeritics ASAP 2020	• BET surface area and Pore size analysis. • Chemisorption

Agilent Chromatography and Mass Spectrometry GC 6890N /MSD 5973N Agilent HPLC with UV and Refractive Index Detectors	• QC/QA • Analysis of complex mixtures of organic components • Analysis of complex mixtures of volatile, semi- and non-volatile organic components	
Perkin Elmer DRC-e ICP/MS Elemental(metals) analysis	• Metals analysis to ppb and ppt levels.	
Bruker Dimension FastScan® AFM	• AFM Imaging techniques for fluids • Imaging of polymer latexes and biological samples • Imaging of extremely soft and delicate samples • Quantitative nanomechanical property mapping: • Electrical property including surface potential: Topography, Mechanical property information (deformation, adhesion, DMT modulus, and dissipation). • Variable temperature stage (-35° to 250°C)	
Horiba LA550 Particle size analyzer	• Particle size from 1 nm to 6 µm and a concentration range from ppm up to 40% solids	

CENTER FOR CANCER RESEARCH AND THERAPEUTICS DEVELOPMENT (CCRTD) CORE FACILITIES

Molecular Biology Core: The core offers polymerase chain reaction (PCR) instruments including **Real-Time PCR** machine (Bio-Rad), **Liquid Scintillation Counter** (Beckman Coulter), *Lyophilizer* and *Freeze-Dryer* for biological samples, **Cell Electroporator**, high-speed and ultra-high-speed Centrifuges, ultra-sensitive **Balances**, and other supporting equipment. DNA and RNA quantification is carried out on **Spectrophotometers** such as single-cuvette (DU650, Beckman Coulter), 96-well plate based and nano-drop. DNA, RNA and protein is visualized, digitized, and quantified using **Gel Documentation** system (Bio-Rad), **Multi-Mode Imager** Typhoon 9410, in fluorescent, luminescent, UV, or visible wavelengths; time-resolved fluorescence option is available on BioTek **Plate Imager** and Fuji LAS3000 (chemi-luminescence). For X-Ray imaging, an **Automated X-Ray processor** and **Dark Room is available**; radioisotope imaging is also supported on Typhoon 9410. The core also has a Laser Capture micro-dissection system (Leica) to enable micro-dissection of specific regions of fixed/ frozen tissue for subsequent DNA/RNA/Protein analysis. Additional equipment include: Sonicator (Misonix 3000), speedvac (Thermosavant SPD11V), UV stratalinker.

Collaborative Center for Cancer Genomics (CCGC): The CCGC established in Clark Atlanta University is a collaborative effort between the CCRTD and the Ovarian Cancer Institute at Georgia Tech University (OCIGT). The operation is based on Next-Generation sequencing technology for global genome composition, inter-individual variation, and global gene

expression. Next-Generation sequencing technology is based on SOLiDTM4 (Applied Biosystems) at CCRTD. This facility is fully functional and is used for genomic analysis of ovarian, prostate and pancreatic cancer patients. Additional equipment include: DNA hydroshear, EZ bead system, PCR machine, Covaris sonicator, Bioanalyzer (Agilent) and Data storage server.

Prostate Cancer Bio-repository: The prostate cancer bio-repository at CCRTD currently has more than 300 prostate cancer and normal prostate core biopsies, serum, buffy coat and purified DNA from Caucasian and African American subjects. When possible, serum, urine and blood are also collected as follow up visits and stored appropriately. All samples have DOB, PSA and stage and Gleason grade for cancer patients. The samples are collected in collaboration with Piedmont Hospital, Atlanta by Drs. Nikhil Shah, MD and Rajesh Laungani, MD. These samples will be made available for this study.

Cell Biology: Cell Biology core have complete facilities for cell growth, handling, and storage. Cell Culture Facility maintains *Cell Storage Cryo Tanks* with uninterruptable liquid nitrogen supply and two separate *Cell Culture rooms* fully equipped with eight temperature and CO_2-controlled *Cell Growth Incubators*, two *Biological Safety Cabinets*, two late model *Inverted Digitized Microscope (Zeiss)*, one of which is fluorescence-enabled and possesses Z-stacking and live cell imaging capabilities, automated *Cell Counter* (Nexcelom Bioscience), and refrigerated storage for media and cell culture reagents. The core also recently acquired Accuri flow cytometer, BD JAZZ FACS (Fluorescence assisted cell sorter) and ZEISS confocal microscope.

Proteomics: The core facilitates Cell and protein Fractionation using Ultracentrifuges (Beckman Coulter), Fast Protein Liquid Chromatography (FPLC), Two-Dimensional Protein Electrophoresis (Protean II, Biorad), Gel Documentation Systems (one Bio-Rad and one Fuji Medical) and HPLS (Shimadzu).

Histology Core Laboratory: CCRTD houses several major instruments to support Histological studies and support cell, and molecular visualization applications. The core has Inverted Digitized Microscope (Zeiss) of general use, plus an advanced Fluorescence-enabled Inverted Digitized Microscope with Z-stacking and Live Cell Imaging modules (Zeiss) for advanced applications including In Situ Hybridization (ISH) and Immunohistochemistry (IHC), in addition to Zeiss microscope above. Additional equipment include: Tissue Embedding and slicing (LKB), Microtome and ultra-microtome, equipments for tissue and slide processing, Automoate slide stainer (DAKO).

Bioinformatics Core: The core provides many crucial applications for in silico research. They include general bioinformatics programs intended for ***sequence analysis of nucleic acids and proteins (Vector NTI Advance)*** and more specialized programs including Gene Expression Analysis software (Gene spring and real-time PCR primer design program; Beacon Designer, by Premier Biosoft). The core also houses a High-End Computer Workstation intended exclusively for bioinformatics support.

The computational systems are networked with workstations and **CCRTD data storage server** supported by CAU Office of Information Technology. The server is used for storage, backup, and retrieval of whole genome sequence data, Affymetrix data files, real-time PCR data, image data from Typhoon and Bio-Rad Imagers, micro plate readers, etc. Furthermore, it is used for data sharing and transfer both within CCRTD, external collaborators, and granting agencies housing an ftp site with supplementary experimental data generated within CCRTD.

Biostatistics Core: The Biostatistics unit is the component of the Center for Cancer Research and Therapeutic Development (CCRTD), and is engaged in a large quantity of statistical computing and simulation for research and teaching purposes. The statistical computing consists of designing experiments and statistical analysis using equipment that are spread over various networks and one computer lab that are interconnected via the campus backbone. Windows 7 and Windows XP are the supported Operating Systems with a wide range of computing equipment from Dell, HP and other manufacturers. The University's Office of Information and Technology Center maintains the hardware, security environment and software builds of computing systems.

The Biostatistics unit owns and maintains about 7 computers and networked peripherals, and uses a range of statistical, imaging, GIS and genetics applications used to analyze data. The list of applications consists of Arcview GIS, Mathematica, Systat, SPSS, Stata, and NCSS.

Animal Housing: The local shared animal facility at Morehouse school of Medicine and Animal facility at Mercer University are routinely used for mice studies.

Clark Atlanta University GIS Program

Geographic Information Systems (GIS) and satellite remote sensing have been identified as important aspects of most academic disciplines in both curriculum design, research and community service. Interest in remote sensing and GIS is widespread in the academic community. Advanced GIS and remove sensing technologies are central to the immediate and long term needs of the society. Both research and education in this challenging area is a critical endeavor.

The general goal of the CAU GIS Program is advancing geo-information technology education at Clark Atlanta University, including geographic information systems (GIS), satellite remote sensing, digital remote sensing image processing, image pattern recognition, analysis models, integration of remote sensing and GIS, computer assisted cartography, and global positioning systems (GPS). While these technologies have become widely used, corresponding education programs need to be updated and new programs need to be developed. Specifically, offering a credential in geospatial technologies and methods will set CAU apart from other HBCUs and institutions.

GIS Laboratory

The CAU GIS Laboratory is located in the Thomas Cole Science and Research Center, and is administered through the Department of Sociology and Criminal Justice and a full-time GIS Coordinator. The lab consists of a single, secure classroom with 14 Dell Precision desktop computers in a network environment, one large-format scanner, one color laser printer, a large-format laminator, and one 36" HP Plotter. A portable Wacom Cintiq tablet is also available for digitizing instruction. The instructor's station is configured with a Dell Precision machine, a SmartBoard system, and a whiteboard wall.

Student computers are equipped with:

ArcGIS Desktop 10.3.1 (14 machines): the leading GIS software, used by institutions and organizations world-wide

Microsoft Office 10 (14 machines)

Adobe Suite 2015 software (42 machines): includes Acrobat, Dreamweaver, Illustrator, InDesign, Lightroom, Muse, Photoshop, and Premier.

SPSS 23 (14 machines): statistical software for the social sciences

Atlas.Ti 7 (5 machines): Quantitative Data Analysis software

ArcGIS Server 10.3.1 (1 machine): for publishing geospatial services to the internet.

The laboratory is open for student use Monday – Friday, 10 am – 4 pm, and by prior arrangement with the GIS Coordinator.