

Physics Department

Vision

The vision of the Physics Department is to prepare students for graduate studies by providing quality instruction and research education leading to the B. S. degree. We seek for our students to accept the challenges of the 21st century successfully. To achieve this vision we provide advanced level instruction and research training to prepare students for creating, analyzing and propagating new knowledge.

Mission

The Mission and Purpose of the Physics Department is achieved through the following three elements:

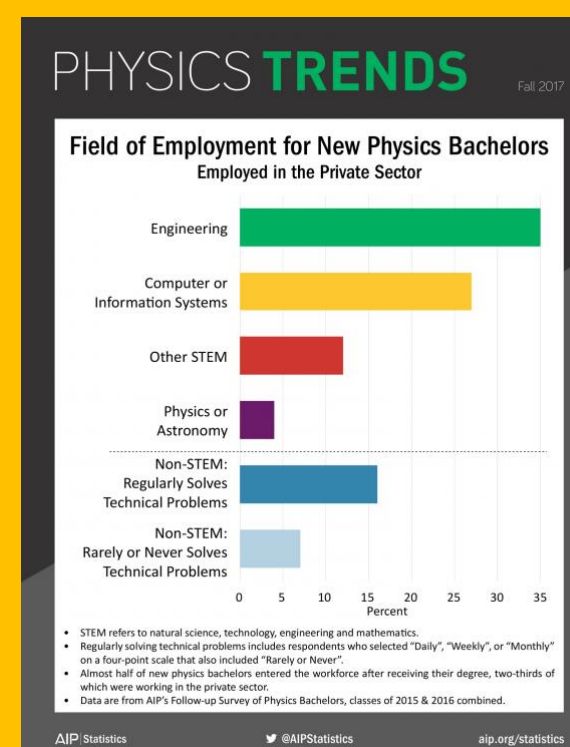
- Instruction:** To develop basic scientific education among science, engineering and non-science majors and promote the value of education as a continuous process and lifelong endeavor.
- Research:** To inculcate aptitude for research and related training among physics majors: Tuskegee physics students are encouraged to create and propagate new knowledge through required presentations in regional and national conferences.
- Service:** To develop compassion for others and provide service to the educational and social communities through outreach activities. We prepare students to serve the global society as well as the regional and campus community

Fulfillment of this mission entails to furnish them with the necessary background and intellectual skills to explain, apply, and hence recognize the significance of the fundamental universal laws that govern the behavior of matter, energy, and thus everything around us.

Research: We perform and disseminate cutting-edge research in various areas of physics so that (a) our undergraduate students can participate, (b) we can nurture research collaboration with other departments and institutions and (c) we can create industrial partnership for mutual benefit and career opportunities for our students.

Why an Under-graduate Degree in Physics

- Physics will let you see the world through a brand new lens: You will never see the world the same way again!
- If your 3-year-old curiosity, imagination, and creativity has not stopped skyrocketing, physics is your next stop because physics re-trains you to ask and trains you to answer all those “whys” and “why not’s”
- If you dream of social and environmental betterment, physics will be your best ally because physics is the science of predicting and modifying the world around us



- Physics Majors have enhanced and better paid job and scholarship opportunities
- Physics Majors from HBCUs are supported to success in Graduate School by the National Science Foundation via PhD Bridge programs in California, Florida, Indiana and Ohio.
- Undergraduate Research opportunities in National Labs
- Undergraduate teaching and mentor assistantships

The Department of Physics at Tuskegee University has a student to mentor ratio of 2:1, facilitating the individual attention needed to master physics.

Research Opportunities

Department of physics has advanced research opportunities that will allow our undergraduate students to participate in cutting edge-research resulting in high quality research papers and explore their area of interest for graduate school. Our students consistently receive numerous student research awards.

Experimental research

- Characterization of wide bandgap semiconductor materials (4H-SiC, GaN, etc) and Synthesis of low-dimensional Nano-materials.
- Laser Induced Breakdown Spectroscopy, Laser Induced Fluorescence Spectroscopy, Multi-photon Spectroscopy.
- Sustainable Energy - Solar Energy, Phonon Interactions, Theoretical Condensed Matter Physics Lattice & Superconductivity.

Theoretical /computational Research

- Atom scale simulations, Chemical and thermodynamic stability of surfaces and nanoparticles .
- Lattice Thermal conductivity of solids at extreme conditions First Principles modeling of Lattice thermal conductivity of Earth's Lower Mantle Electro- and heterogeneous catalysis, Materials rational design, Magnetic properties of nanoparticles and their dipolar interactions.
- Homo- and hetero-epitaxy.
- Topological Insulators.
- Bacterial Biophysics, immunology.
- Nonlinear dynamics : instability of fluid flows and formation of spatiotemporal patterns

Physics Education Research

- Use of innovative learning technologies to enhance instruction, and address that students learn physics differently.
- Concept map based active learning methodology in teaching and learning.



Gas Sorption Analyzer



Centrifuge



1700C Chamber Furnace

Funding agencies/Collaborations

- National Science Foundation
- Department of Transportation
- Florida Solar Energy Center
- Auburn University
- Lehigh University
- Penn State University
- University of Central Florida



Faculty and Staff

Dr. Akshaya Kumar
Associate Professor and Head

Dr. Moses Ntam
Assistant Professor

Dr. Chitra Nayak
Associate Professor

Dr. Marisol Alcántara-Ortigoza
Assistant Professor

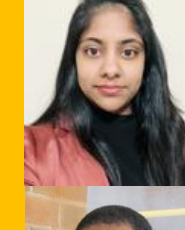
Dr. Walter Malone
Assistant Professor

Dr. Dimitar Dimitrov
Assistant Professor

Dr. Sharvare Palwai
Assistant Professor

Mr. Elvert Colvert
Laboratory Manager

Ms. Felicia Windham
Department Secretary



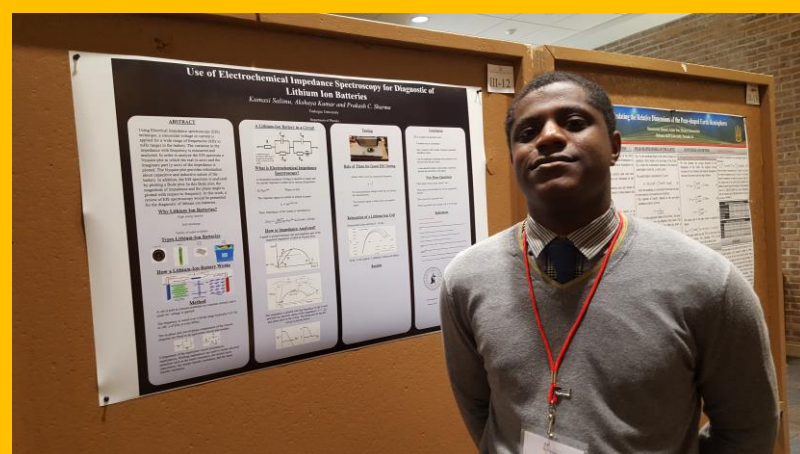
Research Labs



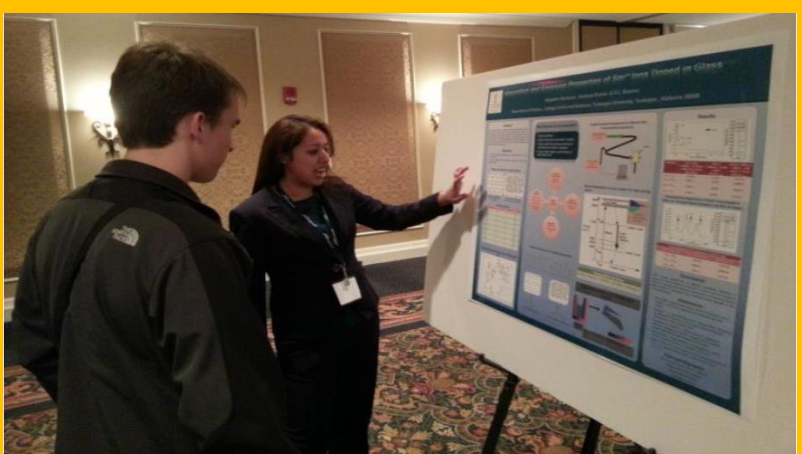
Dr. Kumar in the spectroscopy lab



Student working at a furnace system



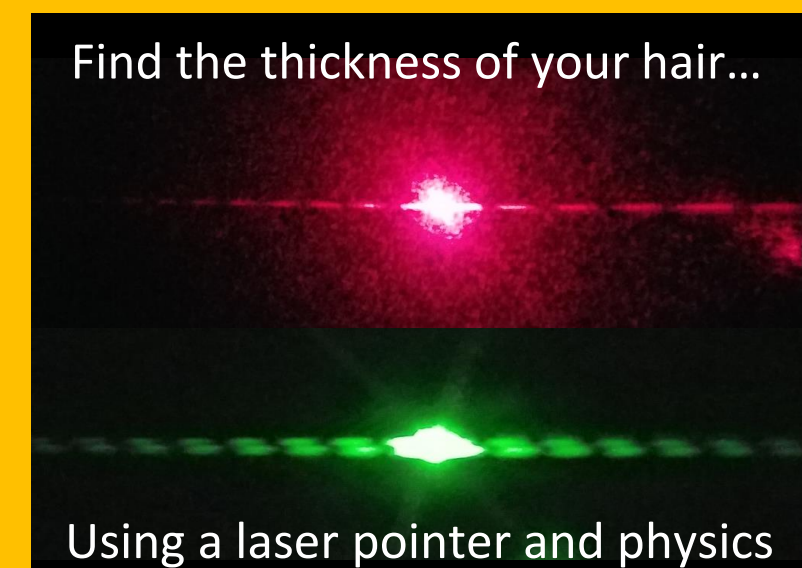
Our students are award winners in prestigious science conferences



Learn in our labs



how magnifying lenses work



Using a laser pointer and physics



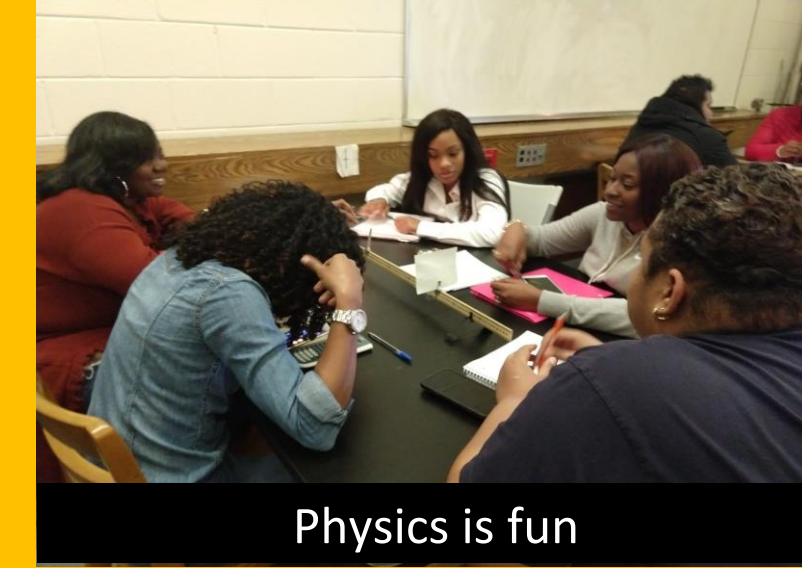
Newton's laws made fun



how atoms arrange in a crystal



to witness the light reflection law



Physics is fun

Our Students

Kumasi Salimu
Salah Elafandi
Terrance Glover
Imani Jermany
Joseph Pollard
Genevieve Antoine

Torius Moore
Nicholas Townsend
Jevante Dewberry
Jaleel Shaw
Joshua Gaston



Outreach

Physics department aims to serve regional community by engaging in outreach activities that improve science and technology education at any level and increase public scientific literacy and public engagement with science and technology as part of the well-being plan for individuals in society.



Visit to Booker T Washington High School



Electric Vehicle Day

Visit to Tuskegee school