NIYEM M. BAWANA

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EDUCATION

Ph.D. student in Electrical Engineering, Georgia Tech, GPA:3.51/4.00 **Expected 2025**

Master of Science in Mechanical Engineering, New Mexico Tech, GPA:3.62/4.00 **2021**

Master of Science in Electrical Engineering, University of South Florida, GPA:3.75/4.00 **2019**

Bachelor of Science in Applied Physics, University de Lomé

RESEARCH INTERESTS

- Terahertz Imaging, Optical Engineering, Sensor Technology.
- Materials Characterization, Structural Health Monitoring, Sustainability.
- Data Analytics, Data Science, Computer Vision, Machine Learning, Pattern Recognition, Artificial Intelligence.

RESEARCH EXPERIENCE

Enhancing Carbon Fiber Nondestructive Evaluation via THz Imaging and AI, Ongoing **Georgia Tech, Atlanta**
Research Assistant *August 2021 to present*

- Cleaned, Explored, and Analyzed THz data and performed feature engineering.
- Developed and Trained Machine Learning Algorithm for Thickness Estimation of Materials.
- Applied advanced data cleaning techniques, conducted exploratory data analysis, and implemented feature engineering. Developed and trained a machine learning algorithm using PyTorch to estimate material thickness.
- Improved accuracy of material thickness estimation, contributing to the ongoing research in enhancing carbon fiber nondestructive evaluation.

Vehicle Image Classification on Unbalanced Dataset, Group Project **Georgia Tech, Atlanta**
Machine Learning Course *Spring 2023*

- Contributed to Cleaning, Exploring, and Analysis of unbalanced vehicle data. Data obtained from Kaggle.
- Developed and Trained Neural Network with Classmates to classify Vehicles with 98% accuracy.
- Collaborated with team members in data preprocessing, exploration, and analysis. Applied advanced techniques to handle unbalanced data. Worked with classmates to develop and train a neural network achieving 98% accuracy in classifying vehicles.
- Successfully implemented a high-accuracy vehicle image classification model, showcasing effective teamwork and contributing to the project's overall success.

Interactive Visualization of Parking Tickets in N.Y City, Group Project **Georgia Tech, Atlanta**
Data Visualization and Analytics Course *Spring 2023*

- Contributed to Cleaning, Exploring, and Analysis of Data obtained from Kaggle.
- Developed an interactive data visualization map to help stakeholders and investors in the bike-share business.
- Collaborated with team members in data cleaning, exploration, and analysis. Leveraged data visualization tools to create an interactive map, providing valuable insights for stakeholders and investors in the bike-share business.
- Successfully delivered an interactive data visualization tool, enhancing communication and collaboration skills through project development and presentation. The map provided valuable insights for stakeholders and investors.

Developed algorithms for power systems dynamic state estimation **Spring 2022** *Georgia Tech, Atlanta*

- Contributed to the development of optimized algorithms for power systems protection.

Fabrication of Smart Sensors **Fall 2019** *New Mexico Tech, Socorro, NM*

- Explored novel manufacturing processes to develop smart sensors.

Swarming Drones: Bioinspiration and Energy Saving Opportunities **Aug. 2019–June 2021** *New Mexico Tech, Socorro, NM*

- Applied Optimization Techniques for Energy-Efficient Drone Positioning in Autonomous Swarms.
- Completed a Master of Science degree in Mechanical Engineering with a thesis on the topic.

Thermal response of field oriented-controlled induction machine **Spring 2018** *University of South Florida, Tampa, FL*

- Acquired in-depth knowledge of electric machines and their design and operation processes.
- Assessed the failure of electric machines under thermal or overheating stress.

Simulation and Analysis of a Solar Water Heater Panel System **2016** *Université de Lomé, Lomé, Togo*

- Learned how to use simulation software to model and analyze complex systems.
- Gained a deep understanding of solar energy and its application in the context of a water heating system.

TEACHING EXPERIENCE

ECE 3741: Experiments in Analog Electronic **Georgia Tech, Atlanta**
Teaching Assistant *Fall 2022 and Spring 2023*
- Introduced students to Essential lab equipment and breadboard wiring and circuit troubleshooting.
- Supervised laboratory topics such as Op-Amps; Filters; Diode Circuits; PWM; Audio Amplifier; Relaxation Oscillators.

ECE 3043: Electronic & Analog Electronic Circuits **Georgia Tech, Atlanta**
Teaching Assistant *Summer 2022*
- Introduced students to Essential lab equipment and breadboard wiring and circuit troubleshooting.
- Supervised laboratory topics such as First-Order and Second-Order circuits Op-Amps; Diodes Filters; MOSFET and BJT Amplifiers; PWM; Audio Amplifier; Relaxation Oscillators.

ECE 3550: Feedback Control of Dynamic Systems **Georgia Tech, Atlanta**
Teaching Assistant *Fall 2021*
- Hold office hours; graded quizzes and exams.
- Explained topics such as PID control; digital control; Laplace Transform among others.

MENG 405L: Dynamics & Control Systems Laboratory **New Mexico Tech, Soccorro**
Teaching Assistant *Spring 2019*
- supervised students during laboratory activities that included topics such as stepper motor control, DC motor speed control; and frequency response.
- Introduced students to the ELVIS system; LabView programming and circuit simulation.

MENG 210L: Sophomore Design & Measurement Laboratory **New Mexico Tech, Soccorro**
Teaching Assistant *Fall 2020*
- Supervised students during fundamentals of mechanical engineering design and instrumentation
- Explained analog to digital conversion, binary numbers, logic gates, sensors, and data processing to students during office hours.

MENG 431L: Fluid and Thermal Systems Laboratory **New Mexico Tech, Soccorro**
Teaching Assistant *Fall 2020*
- Supervised student during aircraft aerodynamic testing using a wind tunnel.
- Administrated and graded lab quizzes and exams.

Physics & Chemistry Teacher **Government, Togo**
High School Teacher *2008 to 2014*
- Designed and taught a course curriculum at the high school level in physics and chemistry.

PUBLICATIONS

Journal
- Mostafa Hassanalian, Amir Mirzaeinia, **Niyem Bawana**, Frank Heppner. *"Energy management of echelon flying northern bald ibises with different wingspans and variable wingtip spacing".* Journal of Bionic Engineering, pages 1-18, 2022. Springer.
- KM Segbefia, K Wala, W Atakpama, **Niyem M. Bawana**,F Folega, K Akpagana, *"Comparaison de la performance de deux types de foyers ameliores traditionnels: Foyer a argile du Togo et foyer Malgache".* Journal de la Recherche Scientifique de l'Université de Lomé, 2018.
- Amou Komi Apelete, Yendoube LARE, Sagna Koffi, **Niyem M. Bawana**, *"Study and modeling of the operation of a solar water heater in Togo".* International Journal of Advanced Research, December 2018.

Conferences
- **Niyem M. Bawana**, Mostafa Hassanalian. *"Cooperative swarming fixed-wing drones with attachment capabilities: Bioinspiration and mutualism".* New Mexico Tech Research Symposium, April 2020.
- **Niyem M. Bawana**, Amir Mirzaeinia, Mostafa Hassanalian. *"Flock mutation and energy management of migratory birds".* ASEE Gulf-southwest Annual Conference, April 2020.
- Zachary Rubin, **Niyem M. Bawana**, Mostafa Hassanalian. *"Aerodynamic Analysis of V-Shaped Flight Formation of Flapping-Wing Drones: Analytical and Experimental Studies".* American Institute of Aeronautics and Astronautics, August 2020.
- Zachary Rubin, **Niyem M. Bawana**, Mostafa Hassanalian. *"Flight pattern formations and environments effect on drag: experimental study and flow visualization".* American Institute of Aeronautics and Astronautics, June 2020 Virtual Event, AIAA Aviation Forum.
- **Niyem M. Bawana**, Mostafa Hassanalian. *"Thermal-based drones control for Venus exploration".* American Institute of Aeronautics and Astronautics, August 2020.

AWARDS

- **Fulbright Scholarship:** U.S. Department of State, 2017–2019 Prestigious scholarship awarded for academic excellence and international exchange.

- **Pafroid Scholarship:** European Union funded fellowship, 2015, Merit-based scholarship recognizing innovative ideas in the field of science and engineering for developing countries. I spent a year at Stellenbosh University's Department of Mechanical Engineering.

PROFESSIONAL MEMBERSHIPS

- **IEEE:** The Institute of Electrical and Electronics Engineers.
- **ASME:** The American Society of Mechanical Engineers.
- **NSBE:** The National Society of Black Engineers.

SKILLS

- **Public Speaking:** Proficient in delivering engaging lectures and presentations, effectively conveying complex technical concepts to diverse student groups.
- **Communication:** Strong ability to communicate technical information clearly, both in writing and verbally, facilitating effective student-teacher interactions.
- **Conflict Resolution:** Skilled in managing classroom dynamics and addressing student concerns, ensuring a positive and collaborative learning environment.
- **Electronic Components:** In-depth knowledge of various electronic components, such as resistors, capacitors, diodes, transistors, and integrated circuits, and their practical applications in circuit design.
- **Analog Electronics:** Expertise in analog electronics, encompassing amplifiers, filters, and signal processing circuits, with the ability to teach theoretical principles and practical applications.
- **Troubleshooting:**Skilled in diagnosing and resolving issues in electronic circuits, using systematic problem-solving techniques, oscilloscopes, and multimeters.
- **Electronic Circuit Analysis:** Strong background in circuit theory, network theorems, and mathematical analysis for in-depth comprehension and troubleshooting.

REFERENCES

- **Professor David Citrin**, Email: *david.citrin@ece.gatech.edu*, Phone: *(404) 894-2000*, Georgia Institute of Technology.
- **Professor Wilfrido Moreno**, Email: *wmoreno@usf.edu*, Phone: *(813)-974-4775*, University of South Florida.
- **Associate Professor Mostafa Hassanalian**, Email: *mostafa.hassanalian@nmt.edu*, Phone: *(575)-449-0850*, New Mexico Institute of Mining and Technology.