Obumneme Godson Osele

obum@stanford.edu - 470.435.1425 - www.linkedin.com/in/godson-osele - https://g-osel.github.io/

EDUCATION

Stanford University, Stanford, CA — Anticipated Graduation June 2025
Doctor of Philosophy in Mechanical Engineering

Northwestern University, Evanston IL — June 2021
Master of Science in Mechanical Engineering
Bachelor of Science in Biomedical Engineering

RESEARCH INTERESTS

Developing cost-efficient mechatronic systems exploiting under-actuated, reconfigurable, and soft material designs outfitted with innovative sensors to inform autonomous systems and aid human-machine collaboration. Using devices and feedback to support humans and enhance their ability to perform activities of daily living to improve health and quality of life. Additional research interests include translating cost-efficient mechatronic systems into low-resource settings.

RESEARCH EXPERIENCE

Stanford University Collaborative Haptics and Robotics in Medicine Lab, *Graduate Researcher*
Stanford, CA
June 2021 – Present
Tip-Clutching Winch for High Tensile Force Application with Soft Growing Robots

- Co-designed a device into which vine robots can insert themselves and anchor to via powerful overlapping belt friction. This work is still under review.
- Co-Authored a submission to the 2024 IEEE International Conference on Robotics and Automation

A Lightweight, High-Extension, Planar 3-Degree-of-Freedom Manipulator Using Pinched Bistable Tapes

- Co-designed a lightweight manipulator capable of high extension ratios by locally modifying the transverse curvature of steel tape springs.
- Co-Authored an accepted paper to the 2022 IEEE International Conference on Robotics and Automation

Exploring Multi-Robot manipulation strategies with Soft Growing Inflated Beam Robots

- Designing a new class of soft growing robots capable of deploying multiple soft growing robots out of a singular base
- Developing methods to manipulate and support the human body and enable activities of daily living for individuals with movement impairments.
- Co-Authored a submission to the 2024 IEEE International Conference on Robotics and Automation

Northwestern University Rogers Research Group, *Undergraduate Research Aide*
Evanston, IL
April 2019 – June 2021
Performed preliminary flow sensing studies to support the development of wireless devices that can estimate blood flow rate underneath the skin by analyzing the skin's anisotropic properties

- Designed phantom skins resembling the epidermis utilizing Solidworks to provide a basis for the quantification of skin penetration studies and perform fluid dynamics studies for dialysis patients
- Constructed electronic sensors to exploit thermal actuators as a means of studying on-skin blood flow at high flow rates in vascular accesses
- Assembled circuit boards utilizing a voltage divider and digital multimeter to track thermal sensor resistances simultaneously over time
- Fabricated current-carrying elastomer devices for continuous monitoring of biochemical signals
- Designed and milled encapsulation molds for wireless flow sensing devices.

Northwestern University Kiser Research Lab, *Undergraduate Research Aide*
September 2017 – April 2019

- Collected in-vitro drug release data of subcutaneous implants releasing HIV/AIDS medication into the bloodstream
- Performed different sealing mechanisms in the fabrication of the polymer implants to study which best resists tears in the devices
- Executed daily lab functions (running UV/VIS spectrophotometer, assembling implants, making buffers).

PRESENTATION AND PUBLICATIONS

Refereed Conference Articles

O. Godson Osele, Kentaro Barhydt, Nicholas Cerone, Allison M. Okamura, and Harry H. Asada**.** *Tip-Clutching Winch for High Tensile Force Application with Soft Growing Robots.* IEEE International Conference on Robotics and Automation, 2024. Submitted.

O. Godson Osele, Allison M. Okamura, and Brian H. Do**.** *A Lightweight, High-Extension, Planar 3-Degree-of-Freedom Manipulator Using Pinched Bistable Tapes.* IEEE International Conference on Robotics and Automation, 2022.

Conference Presentations/Abstract

O. Godson Osele, Allison M. Okamura, and Brian H. Do**.** *A Lightweight, High-Extension, Planar 3-Degree-of-Freedom Manipulator Using Pinched Bistable Tapes.* SystemX Robotics Fall Conference, 2022.

O. Godson Osele. *Utilizing Mixed Reality Glasses as a Computer Peripheral Device for Users with Mobility Disabilities.* Stanford Medical Mixed Reality Symposium, 2021.

Invited Presentations

Allison M. Okamura and **O. Godson Osele**. *Physically Assistive Soft Robots for Healthy Aging.* NSF ERC for Connected Health and Aging-in-Place Technology (CHAPTer) Webinar, 2022.

O. Godson Osele, Allison M. Okamura, and Brian H. Do. *A Lightweight, High-Extension, Planar 3-Degree-of-Freedom Manipulator Using Pinched Bistable Tapes.* SystemX Robotics Student Seminar, 2022.

PROJECT EXPERIENCE

Stanford University ME 310 Project, *Oasis & Nomad: An Electric Construction Vehicle Support Solution*
September 2021 – June 2022

- Our team of ME 310 students from Stanford University, USA, and Blekinge Institute of Technology, Sweden, was tasked with supporting the adoption of ECVs in areas with broken or non-existent energy infrastructure. We designed an ECV support system that provides a remote construction site with temporary energy infrastructure: Oasis, a renewable energy generator, and Nomad, a mobile charging station

Stanford University, *Mahogany in Motion: Autonomous Robot for ME 210 Challenge*
January 2022 – March 2022

- Designed a robot tasked with autonomously "herding sheep" (transporting balls) from a designated loading area to a scoring area with the ability to navigate holes in the playing field without losing any sheep.

Stanford University, *Mixed Reality in Medicine Project*
November 2021 – December 2021

- Developed an approach for employing a Mixed Reality Head Mounted Display (HoloLens 2) to accomplish mouse and keyboard actions on a PC for individuals with motor disabilities. This is done by collecting Gaze and Voice input from the HMD and establishing a wireless connection with the PC to command certain actions like cursor positioning and clicking. With this approach, we intend to address common occupational injuries and soreness from body overuse.

Northwestern University, *Mechatronics Project: Autonomous Robot*
April 2021–June 2021

- Built a robot for an autonomous navigation competition.
    - The printed circuit board is designed using Eagle CAD.
    - The robot utilizes SPI and I2C for communicating with its sensors which includes a camera, microphone and IMU.
    - Its microcontroller is debugged using a SNAP debugger from MPLabs.

Northwestern University, *Mechatronics Project: Motor Controller*
January 2021–March 2021

- Built an intelligent motor driver using PI control to accept a desired motor trajectory, execute that trajectory, and send the results back to your computer for plotting.

Northwestern University, *Biomedical Engineering Design "Capstone" Project*
September 2020–March 2021

- Worked with a team to design a robot for pooled sample testing for cost-effectively monitoring the efficacy of antiretroviral therapy in South Africa utilizing barcode scanners.
    - Outfitted a microcontroller board (Arduino Mega2560) with sensors and stepper motors and their drivers to accomplish sample pooling tasks by operating a pipetting station using Computer Numerical Control (CNC). The CNC G-Code is communicated via an assembled GRBLDuino Mega Shield

Northwestern University, *Mechatronics Project: Robotic Hand*
August 2020–March 2021

- Created a low-cost silicone hand model embedded with nylon wire with joints that are adjusted using servo motors tuned by a rotary encoder. The data acquired from the rotary encoder is sent to a silicone mold hand model embedded with nylon wiring that is adjusted via tendon driven actuation.

Northwestern University, *Robotic Design Competition*
April 2020–June 2020

- Designed a robot that navigates its surrounding via sound signals using code (C) tailored in an Adafruit development board

Northwestern University, *Design, Thinking, and Communication course*
2 quarters: Fall 2017, Spring 2018

- Project 1: Worked in a team with a non-profit organization called Kids-In-Danger to design and manufacture a safe, engaging, and interactive entertainment unit for a baby.
    - The project yielded a baby bouncer with several features to promote safety including:
        - A sturdy base and strong frame to support the weight of the baby and toddler
        - Harness design that prevents hip dysplasia
        - Straps that minimize choking hazard and secure to the baby to prevent falls
        - Shielding of all parts that may cause pinching.
        - Allows an infant to recline naturally, with inclination set to any angle.
        - An adaptable and easy-to-clean feeding station.
- Project 2: Worked in a team with doctors at the Shirley Ryan Ability Labs to design a bike for a child with cerebral palsy, that gives a parent or guardian control over pushing and steering.
    - The main component of the Kayla Cycle is a cable steering system. Bike cables that attach a collar on the front wheel to a handlebar on the back of the wheelchair allow the caretaker to have full control of the tricycle from behind the rider. To steer, the caretaker holds the handlebar like a scooter and moves the handlebar like a steering wheel to turn the front wheel. The design also includes brakes on the handlebar to allow the assister to stop the tricycle and an extra wheel to reduce splaying of the rear wheels.

Northwestern University, *Hodge EXCEL Scholars Program Project*
June 2017–July 2017

- Designed an IR Motion Sensor by pairing an Arduino Uno microcontroller programmed in C with an IR sensor to communicate motion to an LED Screen

WORK EXPERIENCE

GE Healthcare

Edison Mechanical Engineering Intern, Waukesha, WI July 2020 – August 2020

- Created CAD mockups using Creo Parametric to facilitate the integration of scan room electronics into a compact MRI system in order to reduce system footprint and space claim
- Researched market available options to actualize mockup designs and handled communications with vendors
- Delivered engineering solutions in a 4-week internship program shortened due to the COVID-19 pandemic

Edison Mechanical Engineering Intern, Waukesha, WI June 2019 – September 2019

- Drafted a Design Change Verification Plan and Procedure to meet specifications with the global mobile MR Kizuna Voyager System field installations, and maintain a standard procedure approved by the Quality and Assurance division
- Orchestrated mobile MR Kizuna Voyager system testing to address discrepancy with the fluid dynamics present in the magnet cooling mechanism and updated business-wide field installation manual to save 1.5 servicing hours and $135000 in service costs
- Performed fixed MR Kizuna Voyager system testing to combat plumbing cavitation in cryogenic compressor and increase satisfaction of specification requirements by 80% which saved $165000 in compressor costs
- Coordinated communications with part suppliers to drive root cause analysis for malfunctioning Integrated System Cabinet manifold and combat RIO Integrated System Cabinet leakage

Materials Leader: Intern, Florence, SC June 2018 – September 2018

- Created and effectuated a supermarket model to improve material handling processes and reduce lead time by eliminating waste in the processes.
    - Reduced foot distance necessary to complete builds by 74% and established standard locations and implemented visual management and FIFO to enhance parts organization
    - Utilized feedback from material handling team to develop efficient, manageable, and sustainable methods
- Installed Kanban LEAN method to transition consignment parts to just-in-time manufacturing, reduce entitlement and improve manufacturing efficiency leading to reduction of company entitlement and on-hand inventory costs by $60000
- Developed a tool to make data from Shortages Tracker digestible improving support team productivity and driving root-cause analysis for recurring issues
- Served as Team Lead to supervise and orchestrate groups for efforts leading up to and during Physical Inventory

RELATED COURSEWORK

Stanford University (2021– present):
Global Engineering Design Thinking, Innovation, and Entrepreneurship, Mixed Reality in Medicine, Introduction to Mechatronics, Introduction to Sensors, Feedback Control Design

Northwestern University (2017– 2021):
Biomedical Engineering Design (Capstone), Machine Dynamics(Python), Robotic Manipulation, Introduction to Mechatronics, Advance Mechatronics, Soft Robotics and Bio-inspired Robotics, Machine Learning for Biomedical Applications, Biomedical Robotics, Robot Design Competition, Computer Integrated Manufacturing, Bioelectronics, Biomedical Systems Analysis, Biomedical Signals & Circuits, Quantitative Systems Physiology, Quantitative Experimentation & Design, Biomechanics of Movement, Linear Algebra, Differential Equations, Transport Fundamentals, Introduction to Medical Imaging, Introduction to Biomechanics, Biostatistics, Cell Biology, Introduction to Materials Science, Life Cycle Analysis

AWARDS/FELLOWSHIP

Stanford Alumni Association Community Impact Award (2023)

RAISE: Research, Action, and Impact for Strategic Engagement Doctoral Fellowship (2022)

Ford Foundation Predoctoral Fellowship (2022)

SystemX Robotics DEI Fellowship (2022)

Stanford Enhancing Diversity in Graduate Education Fellowship (2021)

GEM Associate Fellowship (2021)

Stanford Summer First Program Fellow (2021)

McCormick School Alumni Award (2021)
- The McCormick Alumni Award is made to the graduating senior who has demonstrated outstanding service to the McCormick School of Engineering, to Northwestern University, and to the community, and who also has worthy scholastic achievement.

Lyle F. Mockros Outstanding Senior Award (2020)
- This award recognizes outstanding leadership, scholarship, and service by a BME rising senior.

Northwestern University McCormick School of Engineering Dean's List 4x

Questbridge Scholar
- Awarded a Questbridge National College Match scholarship

FOCUS Scholar (2020)
- Focus is one of the nation's premier programs for raising awareness of graduate education. It is designed to attract the best and brightest underrepresented minority students and encourage them to pursue graduate degrees at Georgia Tech.

SERGE Scholar (2020)
- Competitive rising juniors and seniors from public and private accredited colleges and universities who show great potential in science, technology, engineering, and mathematics (STEM) are accepted into a two-day visit including introductions to faculty, students, research labs, and campus life, as well as workshops on application preparation.

IDeaL Foundation Scholarship (2018, 2019)
- Awarded scholarship for outstanding commitment to education and community involvement

NSBE Northwestern Chapter Male Freshman of the Year (2018)

Hodge EXCEL Program Outstanding Boeing Summer Scholar (2017)
- Awarded to a student that displays strong academic abilities in EXCEL courses, as elected by instructors

Georgia Compensatory Educational Leaders Scholarship (2017)

Secretary of State Outstanding Georgia Citizen (2017)

Gwinnett County Hometown Hero Award (2017)
- Awarded to citizens who have shown exemplary dedication to projects designed to better Gwinnett County

SERVICE AND LEADERSHIP ACTIVITIES

Stanford University Black Community Services Center
*Graduate Scholar in Residence***,** September 2023 – Present
- Develop and execute programming to engage and support members of the Stanford graduate community who identify as Black and/or of African descent.

- Serve a Teaching Assistant for the Ernest Houston Johnson Scholars program – a program that supports Stanford first-years who identify as Black and/or of African descent with guidance and resources to help transition into the college environment
- Act as liaison between the Black Community Services Center and Black Men's Guild – a student-run organization that curates programs to foster community and accountability for Stanford-affiliated individuals who identify as Black men.

Stanford Robotics Center Summer Research Program, Stanford University
Program Co-Coordinator, 2022-Present
- Designed a summer research enrichment program for underrepresented groups in STEM
- Organize applicant search and review for summer internship
- Raised $31,000 to pilot the program
- Coordinate and support mentor-student pairings
- Advocated for added resources to support exposure of program to underrepresented groups in STEM

Collaborative Haptics and Robotics in Medicine (CHARM) Lab Summer High School Internship Program, Stanford University
Program Co-Coordinator, 2022-Present
- Organize applicant search and review for summer internship
- Coordinate and support mentor-student pairings
- Advocate for added resources to support exposure of program to underrepresented groups in STEM

Biomedical Engineering Department Diversity, Equity, and Inclusion, Northwestern University
Undergraduate Committee Chair, 2020-2021
- Designed, developed, and lead DEI workshops for the Biomedical Engineering department
- Planned events to promote inclusivity in the Biomedical Engineering department
- Served as a student advocate to university leadership on DEI efforts

Alpha Phi Alpha Fraternity Inc., Alpha Mu Chapter (Northwestern University)
Vice President, April 2019 – 2021
- Directed philanthropy efforts in the greater Chicagoland area in conjunction with city chapters
- Planned and executed annual $15000 Scholarship ball aimed to celebrate the academic achievements of minority Northwestern students
- Designed, developed, and lead DEI workshops for the Northwestern community
- Planned events to support the needs and concerns of the Northwestern Black community
- Served as a student advocate to university leadership on DEI efforts

National Society of Black Engineers, Northwestern University
Pre-Collegiate Initiative Co-Chair, September 2017 – March 2019
- Led bi-weekly NSBE Jr meetings at Evanston Township High School to guide young aspiring engineers and STEM majors
- Served on the planning committee for the city-wide event called A Walk For Education aimed to expose young black students to the opportunities in higher education
- Planned out STEM-focused field trips for NSBE Jr Chapters
- Established new NSBE Jr chapter at Northside Preparatory High School
- Mentored 2 first-year Black engineering students

Black Mentorship Program, Northwestern University
Mentor, 2018-2020
- Mentored 2 first-year Black Northwestern University students outside of NSBE

National Pan-Hellenic Council, Northwestern University
Student Government Senator, 2018-2019

- Represented the interests of Northwestern University Black Greek-lettered organizations at the Associated Student Government
- Organized fundraising events for philanthropy efforts aimed at the greater Chicagoland area
- Participated in community support initiatives in Evanston, Illinois

New Student and Family Programs, Northwestern University
Peer Adviser, 2019-2020

- Served as a mentor for 11 incoming undergraduate students beginning in the Summer through the end of their first year at Northwestern.
- Lead intentional dialogues about new student experiences during orientation week
- Taught a two-quarter seminar designed to introduce them to the engineering curriculum

Georgia Secretary of State, Georgia, USA
Student Ambassador, 2016-2017

- Directed community efforts to engage and educate Georgia residents on their civic rights and duties.

Parish School of Religion, Saint Lawrence Catholic Church, Sheil Catholic Center
Teacher, 2014-2021

- Served as an educator and mentor to students in 1st to 5th grade every Sunday

SKILLS

Prototyping/Manufacturing: SolidWorks, Fusion 360, Creo, CNC Milling, Laser Cutting, Rapid Fabrication, Thermoforming, Ultrasonic Welding,
Programming/Software: Proficient with MATLAB, Python, SolidWorks, | Intermediate with C, C#, C++, ABAQUS, Creo | Beginner with GRBL Computer Numerical Control, G-Code |
Mechatronics: State Machines, Event-Driven Programming, Soldering, Motors, Sensors, Thermal Actuators, Electromagnetic Circuits
Soft: Technical Documentation, Collaboration, Root Cause Analysis, Empathy, Adaptability, Dependability, Critical Thinking

LANGUAGES

English (Native), Igbo (Native)