

EBENEZER A. AMARE

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571-635-2546

EDUCATION

University of North Carolina – Chapel Hill (Joint BME with/ NC State)

Aug 2023 – May 2027

Bachelor of Science in Biomedical Engineering (BME) and Neuroscience; Minor in Chemistry GPA: 3.733

Relevant Coursework –Writing in Medicine, Mechatronics, Foundations in Leadership, Materials Science, BME

Design and Manufacturing I, Biomedical Electronics, Scientific Programming, BME Anatomy: Mechanical Analysis

HONORS & AWARDS

Abrams Scholars – UNC-funded research award for research in transcriptional metabolic regulators of intestinal stem cells

NC Fellows – Cohort-based leadership development program with community service components

Honors Carolina - Highly selective academic program

Ron Brown Captains Program – Top 5% of high school applicants; Ruth-Norman Rales Leader Network member

PROFESSIONAL EXPERIENCE

UNC Center for Gastrointestinal Biology and Disease - Chapel Hill, NC

Oct 2024 – Present

Abrams Research Scholar/ Magness Lab

- ◆ Researched the relationship between mitochondrial health and the transcription factor Sox9 in intestinal stem cells (ISCs) under the guidance of Dr. Joseph Burclaff, investigating how Sox9 overexpression correlates with mitochondrial health/mitophagy/oxidative respiration. Following Joseph's multi-omics analyses, to identify 38 transcription factors with significantly altered expression, I made genetically engineered ISC lines with EGR1 (upregulated) and HNR4-G (downregulated), alongside Mito-TagRFP for live-cell mitochondrial imaging. Validated their successful electroporation through immunostaining and quantifying fluorescence intensity. Optimized platform for Seahorse, and other bioenergetics assays, and post-experiment normalization using a DNA quantification assay – all to validate the Sox9-mitochondria relationship and effect of other downstream TFs on mitochondria in ISCs, gaining skill in passaging organoids in 3 μ L of Matrigel, fluorescence imaging, and metabolic data analysis. Presented work at the BME poster symposium.

Center for Environmental Medicine, Asthma and Lung Biology –Chapel Hill, NC

Aug 2024 – Oct 2024

Work Study/ Jaspers Lab

- ◆ Conducted comprehensive research on environmental and demographic factors affecting respiratory health at CEMALB, focusing on a 26-year-old patient dataset. Key projects include a demographic stratification & time-based analysis of 750 patients using R Studio and a time-based analysis to assess the correlation between global warming and allergy severity. Additionally, designed and 3D printed a 12-well plate using OnShape, utilizing an expandable, breathable resin to optimize material properties for advanced respiratory research.

National Institutes of Health –Rockville, MD

May 2024 – Aug 2024

National Center for Advancing Translational Sciences/ Stem Cell Translation Laboratory/ Summer Research Intern [SIP]

- ◆ Researched mechanisms of chronic pain with Dr. David Castellano in the premier NIH Stem Cell Lab as part of the Regenerative Medicine Program HEAL Initiative by learning and optimizing hPSC-derived sensory neuron differentiation (improving differentiation efficiency while maintaining cell viability) and assisting with MEA and patch clamp EEG recordings. I then validated high-value proteins from mass spectrometry using a machine learning pain genes database and characterized proteins up/downregulated in response to a 4-part inflammatory cocktail – particularly the plasma membrane receptor DCC, which binds to netrin-1, an axonal guidance molecule, and is critical for axonal elongation, which has previously been shown to cause inflammatory sensitization in mice - using Western Blot and Immunocytochemistry [2 poster days]; lastly, I mined DCC's downstream signaling pathways and found two proposed inflammatory pathways that were utilized in an August grant application. I completed coursework in Preclinical Translational Science, Bioinformatics (Multi-Omics Analysis) and participated in the Building Resilience as a Research Scientist Seminar Series.

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Oceanography Senior Research Lab –Alexandria, VA

Research Assistant

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Aug 2022 - May 2023

- ◆ I conducted literature review, presented my research proposal to lab director, Dr. Shawn Stickler, began/maintained the lab's *C. Vulgaris* cell culture (used for multiple lab projects), ran conductance assay on algae tank for secondary research question (among others to ensure tank conditions remain optimal), made thin films of starch-based plastic w/ polyurethane-like properties, wrote a potential article submission, and presented my findings at the **TJ STAR symposium**. The project's purpose was to explore maleic acid's implementation in our lab-made bioreactor to enhance tensile strength of *C. Vulgaris*-derived bioplastic can be used to help industries outside of plastic wrapping produce biodegradable plastic bags, clothes, etc. My lab responsibilities also included hydroponics maintenance and water quality assessment of a tilapia fish farm.

CLINICAL EXPERIENCE

UNC Hospitals Ambulatory Care Center –Chapel Hill, NC

Apr 2025 – Present

Neurosurgery Clinic

- ◆ Following UNC's application process, I was accepted to shadow neurosurgeons as they discussed diagnoses, evaluated imaging to determine if surgery was necessary, and followed up with patients post-operation. Having experienced the adrenaline of the OR, I formed a more holistic understanding of surgery and found an approach to patient interaction I aim to imitate from Dr. Upadhyaya. Through Dr. Vibhor Krishna and Dr. Dominique Higgins, I gained insight into balancing surgery and research that I will aim to maintain as a physician-scientist.

Children's National Hospital – Washington, DC

May 2024 – Jun 2024

Department of Pain Medicine and Anesthesiology Observership

- ◆ Facilitated by Dr. Tamanda Douglas, I was accepted to shadow (cardiac) pediatric anesthesiologists in urology, neurosurgery, ENT, general, and cardiac surgery, attending lectures by attendings like Dr. Andrew Waberski and Dr. Jeremy Deer. Gained hands-on insights into procedures from biopsies to cranioplasties, solidifying my commitment to a medical career. More in "An Ultimate Confirmation" on my blog site.

Sentara Northern Virginia Medical Center – Woodbridge, VA

Mar 2022 – Jun 2023

Emergency Department Junior Auxiliary

- ◆ Assisted medical staff and patients through supply management, addressing patient requests, stretcher transport, developing composure in high-pressure situations and commitment to patient-facing work. By request, I shadowed diverse healthcare professionals, e.g., Medical Lab Technicians, Pathologists, nurses in all departments.

POSTERS & PRESENTATIONS

Lampe Joint Biomedical Engineering (BME) Poster Symposium – Durham, NC

April 2025

Poster: *Identifying Novel Transcriptional Regulators of Mitochondria in Human Intestinal Stem Cells*

National Institutes of Health (NIH) Summer Poster Day – Bethesda, MD

June 2024

Poster: *Characterization of Netrin-1 Receptor DCC in Human Pluripotent Stem Cell-Derived Sensory Neurons During Inflammatory Sensitization*

TJ Science and Technology Research (STAR) Symposium – Alexandria, VA

May 2022

Presentation: *Optimization of Durability and Biodegradability of C. Vulgaris Starch-Based Bioplastic*

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LEADERSHIP & COMMUNITY INVOLVEMENT

American Physician Scientist Association – Virtual

Jan 2025 - Present

Premedical Ad Hoc Committee Member

- ◆ Interview physician-scientists in all sectors as a founding member of the Innovators in Medicine initiative
- ◆ Dispense information on lesser-known scholarships and premedical opportunities to UNC premedical orgs

Student National Medical Association: UNC Chapter – Chapel Hill, NC

May 2024 – Present

Minority Association for Premedical Students' SNMA Liaison

- ◆ Organize joint MAPS-SNMA events which facilitate mentorship, premedical workshops, & med school tours
- ◆ Collect UNC medical school opportunities and local health equity volunteer work to provide to members
- ◆ Work with volunteer physicians to establish MAPS' inaugural shadowing program for members who lack access

North Carolina Fellows – Chapel Hill, NC

Apr 2024 - Present

Recruitment Committee

- ◆ Develop and engage UNC freshmen to apply for the NC Fellows Program through tabling and outreach
- ◆ Employing strategic leadership practices to initialize the East African Student Org (EASO) Executive Board

Helping Hand Project – Research Triangle, NC

Aug 2023 - Present

Innovation Team and Carleigh's Case [One HHP inquirer]

- ◆ CAD designing and printing out custom-made prosthetic arms/hands for low-income inquirers
- ◆ Developing a model for autonomous hand prosthetics using OpenSCAD on Innovation Team

Voices of Praise: Gospel Choir – Chapel Hill, NC

Aug 2023 - Present

Executive Assistant

- ◆ Reaching out to churches for community engagement and hosting worship in nearby counties
- ◆ Coordinating efforts to get choir members transportation, reserve spaces for practices, and lead prayer

Ethiopian Eritrean Student Association – Chapel Hill, NC

Aug 2023 – Dec 2024

Community Outreach Chair – Pre-professional Events Coordinator

- ◆ Reach out to Habeshas/Africans on campus, alumni, and grad schools for community and opportunities
- ◆ Partner with Table NC to organize, fundraise for, and maintain supplies at the new Carrboro warehouse

SKILLS & CERTIFICATIONS

Languages: Amharic, Spanish

Technical Skills: MATLAB, ODE modeling, CSS, HTML, VS Code, Wordpress, Arduino (C/C++), Processing, Python, Java, Linux Commands, Qiskit, Mathematica, ArcGIS, 3D CAD design (OnShape & AutoCAD), OpenSCAD, 3D Printing, Laser Cutting, Technical Writing, Linear Algebra, Prism, Jupyter Notebook

Laboratory Skills: Cell Culture, hPSC Differentiation, Western Blot, Immunocytochemistry, R, R Studio, Multi-omics Data Analysis, Electroporation, CRISPR Gene Editing, ELISAs, Assays (myriad), qRT-PCR, Gel Electrophoresis, Multi-Electrode Array, Plastic Film Production & Testing, Water Quality Testing

Certifications: IBM Qiskit Quantum Computing; Recognizing Signs of Child Mistreatment; First Aid, CPR and AED usage; Preventing Bloodborne & Airborne Pathogens; ABAB-ANSI Handling Food & Alcohol, NIH Principles of Preclinical Translational Science, NIH Fundamentals of Omics Data Analysis

Projects: Implantable Bioartificial Kidney (CAD model), Early-Stage Pressure Ulcer Detection (Lit Review & Gap Analysis), Three-Compartment Propofol Pharmacokinetic Model (MATLAB ODE model)