MICHAEL HOTOR

Graduate Research Assistant

Department of Chemistry

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EXECUTIVE SUMMARY

- Medicinal and synthetic organic chemist with experience in organic synthesis, carbohydrate chemistry, computational and analytical methods, spectroscopy, and biological studies. Action-oriented with excellent communication skills and experience in research and teaching, analytical skills and leadership roles.

EXPERTISE

- **Organic synthesis:** Experimental design, Organic catalysis, Synthesis and characterization.
- **Biological studies:** *In vitro* TRE-FRET assay, Cross bioactivity studies, Cell culture
- **Computational studies:** Molecular docking, Molecular dynamics simulations, DFT Calculations
- **Tools/Techniques:** NMR spectroscopy, FTIR, UV-VIS spectroscopy, HRMS, Mass Spectrometry, LC-MS, Chromatography, Laboratory equipment, Microwave reactor (Biotage), HTRF, BLI, Absorbance assay, Docking, Computer simulations, YASARA, GausView, Avogadro, SPARTAN, Chem3D, Warrior (Wayne State Grid), Amber, VMD, Jupyter notebook, Python

EDUCATION

Wayne State University

Ph.D. (2022 – present)
(Chemistry)

M.A. (2022 – 2025)
(Chemistry)

Kwame Nkrumah University of Science and Technology (KNUST)

B.Sc. (2015 – 2019)
(Chemistry)

Relevant Coursework

- **Graduate:** Organic Spectroscopy, Organic Synthesis, Organic Reactions and Mechanisms, Advance Bioorganic Chemistry and Drug Design, Tools of Molecular Biology, Computational Chemistry.
- **Undergraduate:** Physical Chemistry, Analytical Chemistry, Organic Chemistry, Inorganic Chemistry, Environmental Chemistry, Computational Chemistry, Medicinal Chemistry, Mathematical Methods, Introductory Physics, Visual Basics Programming, Entrepreneurship.

PROFESSIONAL EXPERIENCE

Research/Teaching Assistant August 2022 – Present
Wayne State University, USA

Chemistry and Biology Teacher January 2021 – May 2022
Supreme International College, Ghana

National Service Personnel September 2019 – October 2020

Accra Digital Center, Ghana

RESEARCH EXPERIENCE

Doctoral Research May 2023 – present
Department of Chemistry, Wayne State University
Advisor: Dr. Hien Nguyen

Principal area of study: Structure-activity relationship studies of specific heparin/heparan sulfate-binding proteins using aminoglycoside-based heparan sulfate mimetics.

- Developed a novel approach to rapidly synthesize and characterize a library of aminoglycoside-based HS mimetics as heparanase inhibitors in 7-12 steps.
- Developed a protocol to investigate the activity of a new library of compounds against growth factors FGF2 and VEGF165, and cell adhesion proteins P-selectin and L-selectin.

Undergraduate Research, May 2018-June 2019

Department of Chemistry, KNUST

- Investigated through a mechanistic study the transition metal-catalyzed cycloisomerization of dienynes using the SPARTAN 10 V.1.1.0 and Gaussian 09 Molecular Modelling programs at the DFT M06/6-31G*/LANL2DZ levels of theory. I used the Lengau software package (Center for High Performance Computing in South Africa) for executing jobs.
- Computed the energetics of Pt and Ni-catalyzed reactions to determine the activity and selectivity of the two catalysts in forming complex bicyclic molecular systems.

TEACHING EXPERIENCE

Graduate Teaching Assistant August 2022 – December 2024

Courses Taught: Organic Chemistry II Discussion, Organic Chemistry II Laboratory, Organic Chemistry I Discussion.

- Pre-run experiments and demonstrated to students how to use laboratory equipment such as NMR spectrometer, FTIR spectrometer, rotovaps, melting point devices and fume hoods.
- Graded laboratory reports, exams, and quizzes.
- Held weekly discussion sections and office hours to explain and assist students with difficult topics or concepts.
- Administered weekly quizzes to test students' knowledge and understanding of the course

PUBLICATIONS

- **Hotor, M.**; Wakpal, J.; Effah, S.; Alom, N.-E.; Walker A.; Nguyen, H.M. "Could Hydrophobicity of Sulfated Pseudo-Trisaccharides Derived from Repurposing Aminoglycoside Tobramycin Modulate the Enzymatic Activity of Heparanase?" *J. Med. Chem.* ***2025****, 68, 12708-12732.*
- **Hotor, M.**; Wakpal, J.; Yost-Slinker, D.; Abdulsalam, H.; Nguyen, H.M. "Systematic Design and Synthesis of 50-Membered *N*- and *O*-Sulfated HS Mimetics from Natural Aminoglycosides for Studying the Interactions of Cell Surface Heparin Binding Proteins." (*In preparation*)
- **Hotor, M.**; Abdulsalam, H.; Nguyen, H.M. "Targeting the Hallmarks of Cancer Progression using a Novel Class of Heparanase Inhibitors from Aminoglycoside Antibiotics" (*In preparation*)
- Effah, S.; **Hotor, M.**; Nguyen, H.M. "Beyond Hydrophobic Landscapes: The Complete Computational Atlas of Tobramycin-Based Heparanase Inhibitors with Selectivity over PF4 - Integrating Molecular Docking, Molecular Dynamics, Boltz-2, and Machine Learning." (*In preparation*).

CONFERENCES AND PRESENTATIONS

Graduate **August 2023 – June 2025**

- Gordon Research Seminar 06/14 - 06/15/2025
  (Holderness School, New Hampshire, USA)
  Michael H., Joseph W., Effah S., Nur-E A., Alice R. W., and Hien M. N. "Could Hydrophobicity of Sulfated Pseudo-Trisaccharides Derived from Repurposing Aminoglycoside Tobramycin Modulate the Enzymatic Activity of Heparanase?" (Poster).
- Gordon Research Conference 06/15 - 06/20/2025
  (Holderness School, New Hampshire, USA)
  Michael H., Joseph W., Effah S., Nur-E A., Alice R. W., and Hien M. N. "Could Hydrophobicity of Sulfated Pseudo-Trisaccharides Derived from Repurposing Aminoglycoside Tobramycin Modulate the Enzymatic Activity of Heparanase?" (Poster and Oral).
- NOBCChE Lectureship Series 02/03 - 02/10/2025
  (Wayne State University, Michigan)
  Michael H., Joseph W., Effah S., Nur-E A., Alice R. W., and Hien M. N. "Could Hydrophobicity of Sulfated Pseudo-Trisaccharides Derived from Repurposing Aminoglycoside Tobramycin Modulate the Enzymatic Activity of Heparanase?" (Oral)
- NOBCChE Midwest Regional Symposium, 06/22 - 06/23/2024
  (Wayne State University, Michigan)
  Michael H., Joseph W., Vishaka P., Alice R. W., and Hien M. N. "Development of aminoglycoside-based HS mimetics as heparanase inhibitors." (Poster).
- Midwest Carbohydrate and Glycobiology Symposium (MCGS) 09/19 - 09/22/2024
  (Washington University, Missouri, USA)
- 24th Chemistry Graduate Research Symposium (CGRS) 10/14/2023
  (Wayne State University, Michigan, USA)

Undergraduate: **March 2019 – June 2019**

- Final Oral Thesis Defense May 2019
  (Kwame Nkrumah University of Science and Technology, Ghana)
  Michael H., Evans A., and Richard T. "DFT mechanistic study of transition metal-catalyzed cycloisomerization of dienynes." (Oral).

ACADEMIC SERVICE AND ROLES

- **2027 Gordon Research Seminar Chair** June 2027

Responsible for organizing and chairing the Gordon research seminar on carbohydrates for the year 2027.

- **International Chair** April 2024 – Present
(Graduate Employees Organizing Committee (GEOC)), Wayne State University
    - Served as a lead member of the Bargaining Team during the contract negotiation in the 2024/2025 academic year.
    - Represented the unique and valuable voice of international student employees including attending meetings and presenting reports on international issues.
    - Addressed international students-related issues including housing, contract-related issues, and student-advisor related issues.

- **Volunteering:**

NOBCChE (K-12) **January 2023 – Present**

- Participate in and conduct STEM experiments and enrichment sessions such as making traffic lights, elephant toothpaste, and various lab demonstrations to teach K-12 students fundamental principles in STEM.
- Help in the organization of the K-12 initiative grand finale and award ceremony to celebrate students, teachers, and organizers who made the program a success.

Chemistry Graduate Research Symposium, **June – October 2023**

- Participated in the search and selection of speakers for the 24th Annual Chemistry Graduate Research Symposium.
- Helped in the organization of the symposium.

Metro Detroit Youth Fair **July 2023**

- Participated in and represented the Wayne State Department of Chemistry at the Metro Detroit youth fair held at Belle Isle in Detroit, Michigan.
- Conducted demonstrations including colored slime, baking soda volcano and balloon gloves to teach the children about chemistry and its significance in their lives.

Neinas Dual Language Learning Academy Chemistry Day, **March 2023**

- Served as a group leader and a lab demonstrator for the Neinas Chem Day held at the Chemistry Department, Wayne State University.

2022 Midwest Carbohydrate and

Glycobiology Symposium (MCGS), September – October 2022

- Helped in the organization of the 17th Annual Midwest Carbohydrate and Glycobiology Symposium held at the Chemistry Department of Wayne State University.

PROFESSIONAL AFFILIATIONS

- **International Chair** April 2024 – Present
  (Graduate Employees Organizing Committee (GEOC), Wayne State University, USA)
- **Executive Member** September 2022 – Present
  (National Organization for the Advancement of Black Chemists and Chemical Engineers (NOBCChE), Wayne State University, USA)
- **Member** October 2024 – Present
  (American Chemical Society (ACS), Wayne State University, USA)
- **Member** October 2024 – Present
  (Young African Leaders Initiative Network (YALI), Worldwide) July 2020 – Present

AWARDS AND RECOGNITION

Graduate:

- Dr. Cal Stevens Memorial Scholarship for 2025

Undergraduate:

- Dean of Students Scholarship Award
- Unibank Scholarship Award
- Kingdom Books International Scholarship Award

REFERENCES

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https://s.wayne.edu/nguyengroup

Hien Nguyen

Carl Johnson/Pfizer Professor of Chemistry

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