

LEILA ALMOUNAJED

DOCTORAL CANDIDATE | MEDICINAL & ORGANIC CHEMIST

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EDUCATION

Expected May 2027	Ph.D. in Organic Chemistry Thesis: Development, synthesis and evaluation of saponin vaccine adjuvants to investigate the mechanism and structure-activity relationship for application toward cancer therapy.	<u>Wayne State University</u>
December 2021	Bachelor of Science in Chemistry with Honors <i>Minor in Computer Science</i> Thesis: Synthesis of a Water-Soluble Fluorescent Probe for the Detection of Pb ²⁺ in Water	<u>University of Michigan-Flint</u>

PROFESSIONAL EXPERIENCE

2022-2025	Doctoral Research Developed protonated phenanthroline salt as a stereoselective catalyst in 1,2- <i>trans</i> glycosylation, exploring the mechanism and kinetics of the reaction. Applied the methodology in the efficient synthesis of a variety of lablaboside F derivatives, exploring the effect of sugar pattern and stereochemistry on adjuvant activity. <u>Advisor: Dr. Hien Nguyen</u>	<u>Wayne State University</u>
2021-2022	Research Assistant Synthesized a ¹⁹ F magnetic resonance probe that is responsive towards formaldehyde over other reactive carbonyl species and an alternate trifluoromethylated probe, determined the limit of detection and the exclusivity of the probes. <u>Advisor: Dr. Justin Massing</u> .	<u>University of Michigan-Flint</u>

TEACHING EXPERIENCE

2022-2025	Graduate Teaching Assistant Lead discussion sections for students to help them practice their chemistry skills. Taught students laboratory skills and monitored the experiments they performed. Proctored and graded exams, lab reports, and quizzes.	<u>Wayne State University</u>
2019-2020	Supplemental Instruction Leader Lead students in study sessions and practice exercises. Assisted students in understanding homework assignments. Prepared the students for exams and proctored.	<u>University of Michigan-Flint</u>
2019-2020	Chemistry Tutor Worked with students individually to help develop their skills in chemistry and improve their confidence in solving problems on their own.	<u>University of Michigan-Flint</u>

KEY STRENGTHS & SKILLS

- **Synthesis:** Skilled in methodology, glycosylation, multi-step synthesis, large scale reactions, Schlenk line techniques, preparing synthetic plans, experimental design, and developing synthetic derivatives
- **Mechanistic:** Skilled in transition state modeling, quantitative kinetic NMR experiments and analysis for mechanistic investigation
- **Biological:** Proficient in cell culturing, cytotoxicity assays, and solubility testing
- **Technical:** Skilled in NMR (Manual and Automatic), FT-IR, UV-Vis, LCMS, HPLC, HRMS, chromatography (normal, size-exclusion), and crystallization
- **Professional Skills:** Excel in manuscript preparation, manuscript writing and editing, designing simple and informative figures, and presentation of scientific ideas based on audience's level. Proficient in grant

writing, manuscript review, inventory management, ordering, ensuring safety standards are met, problem solving, and taking initiative.

- **Computer programs:** Experienced with Slurm, Microsoft Office suite, Topspin, Mestrenova, Reaxys, Scifinder, LabSpend, Mathematica, Gaussian, Yasara, Avagadro, AutoDock, and PyMOL.
- **Languages:** Proficient in Arabic, C++, Python, and Bash

PUBLICATIONS

- Almounajed, L.[†]; Noori, S.[†]; Ghorai, J.; Nguyen, H. M.* Kinetic Investigation to Elucidate the Mechanism of Protonated Phenanthroline Catalyzed and Self-Promoted Glycosylation Pathways: Towards the Late-Stage Assembly of C2 Branched β -Glycoconjugates. (manuscript submitted)
- Ghorai, J.[†]; Santhin, A. B.[†]; Almounajed, L.; Hartwig, S. M.; Varga, S. M.; Nguyen, H. M.* Protonated Phenanthroline Catalyzed Stereoselective Glycosylation: Synthesis and Evaluation of Saponin Adjuvant Lablaboside F and Variants Leading to Simplified Vaccine Adjuvants. *JACS AU* **2025** (ASAP)
- Ghorai, J.; Almounajed, L.[†]; Noori, S.[†]; Nguyen, H. M.* Cooperative Catalysis in Stereoselective *O*- and *N*-Glycosylations with Glycosyl Trichloroacetimidates Mediated by Singly Protonated Phenanthroline Salt and Trichloroacetamide. *J. Am. Chem. Soc.* **2024**, *146*, 34413-34426.
- Massing, J. O.; Almounajed, L.; Minder, K. A.; Lange, J. D.; Eltahir, L. A.; Kelts, J. L. ¹⁹F magnetic resonance probes for detecting formaldehyde. *Tetrahedron Letters* **2022**, *98*, 153796.

CONFERENCE PRESENTATIONS

- Ghorai, J.; Santhin, A. B.; Almounajed, L.; Hartwig, S. M.; Varga, S. M.; Nguyen, H. M. Total Synthesis of Lablaboside F and Structural Derivatives: Application Toward Vaccine Adjuvants. *Gordon Research Conference- Carbohydrate*. **June 2025** (Selected for talk based on poster presentation)
- Ghorai, J.; Santhin, A. B.; Almounajed, L.; Hartwig, S. M.; Varga, S. M.; Nguyen, H. M. Lablaboside F Derivatives as Carbohydrate Vaccine Adjuvants. *19th Midwest Carbohydrate & Glycobiology Symposium*. **October 2024**
- Ghorai, J.; Santhin, A.; Almounajed, L.; Varga, S.; Nguyen, H. M. Carbohydrate Vaccine Adjuvants. *Kenneth V. Honn Memorial Symposium*. **November 2023**
- Almounajed, L.; Noori, S.; Ghorai, J.; Khalil, Z.; Nguyen, H. M. Protonated Phenanthroline in the Stereoselective Synthesis of β -Glycosyl Esters. *Wayne State Chemistry Graduate Research Symposium*. **October 2023**
- Ghorai, J.; Santhin, A.; Almounajed, L.; Varga, S.; Nguyen, H. M. Carbohydrate Vaccine Adjuvants. *18th Midwest Carbohydrate & Glycobiology Symposium*. **October 2023**

ACADEMIC SERVICE

- **Organizing Committee**, Chemistry Graduate Research Symposium, Wayne State University, October 2023
- **Presider**, Honors 252 Colloquium, University of Michigan-Flint, April 2019
- **Discussant**, Honors 156 Colloquium, University of Michigan-Flint, April 2018
- **Student Grader**, University of Michigan-Flint, 2018
- **Honors Competition Interviewer**, University of Michigan-Flint, 2018

HONORS & AWARDS

- Advanced Training Through Research and Collaborative Teamwork CBI Award, 2024
- Midwest Carbohydrate and Glycobiology Symposium Poster Award, 2024
- Departmental Citations for Excellence in Teaching Service, 2024
- Dr. Cal Stevens Memorial Scholarship, 2024
- Outstanding Graduating Senior in Chemistry, 2021
- Maize and Blue Distinguished Scholar, Winter 2021
- Dean's List, University of Michigan-Flint, Winter and Fall 2017-2021
- William J. Branstrom Freshman Prize, Winter 2018
- Mary Kay Olson Memorial Scholarship, 2017
- Michigan Scholar Award Scholarship, University of Michigan-Flint, 2017