JACOB B. HATVANY

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EDUCATION

Ph.D. Baylor University, Waco, TX, Analytical Chemistry August 2024
Advisor: Dr. Elyssia S. Gallagher
GPA: 4.0/4.0

Bachelor of Science Harding University, Searcy, AR, Chemistry May 2017
GPA: 3.3/4.0

RESEARCH EXPERIENCE

Graduate Research Assistant, Baylor University 2019 - 2024
Advisor: Dr. Elyssia S. Gallagher

- Focus of Research: Glycans, biologically relevant carbohydrates, are vital to biological processes and are important biomarkers for various disease states. This class of molecules is difficult to analyze due to high amounts of isomerism and challenges in preserving relevant conformations during analysis. Our lab focuses on establishing methods for the analysis of glycans and glycoconjugates.
- Created and designed experiments to analyze carbohydrates in a biologically relevant context as well as distinguish carbohydrate isomers.
- Investigated qualities of capillaries for establishing ideal spray needles for generating microdroplet reactions.
- Analyzed data using MATLAB statistical software and Excel.
- Visualized data using Excel, Python, and R.
- Utilized mass spectrometry, electrospray ionization, nano-electrospray ionization, hydrogen/deuterium exchange, theta-tip capillaries, microdroplet reactions, scanning electron microscopy, micropipette puller, gravity column purification, tandem mass spectrometry, electron transfer dissociation, and collision induced dissociation.

Harding University College of Pharmacy, Harding University 2017 - 2019
Lab Technician

- Focus of Research: Aromatase inhibitor (AI) therapy has shown to be effective with a large portion (~75%) of patients with breast cancer. One common side effect of AI therapy in postmenopausal women is osteoporosis. Towards understanding the mechanism of AI induced osteoporosis, our lab evaluated the relationship between the presence of AIs and the osteoclast regulator osteoprotegerin.
- Quantified osteoprotegerin (pharmacodynamics), exemestane, and 17-hydroexemestane (pharmacokinetics) from urine samples.
- Utilized liquid chromatography, UV spectroscopy, mass spectrometry, tandem mass spectrometry, collision induced dissociation, fluorescence spectroscopy, ELISA, plate reader, and biosafety 2 lab techniques.

Undergraduate Research, Harding University 2015 - 2017
Advisor: Dr. Edmond Wilson

- Focus of Research: Human breath has been used as an indicator for illness throughout history. With modern instrumentation, breath analysis for biomarkers has become a popular route due to the non-invasive nature of sample collection. Our work uses pentane as a model compound for detection in the ppb and ppm range within human breath.
- Designed methodologies for the detection of pentane in human breath.
- Created sample collection and condensing apparatus for human breath.
- Utilized gas chromatography, mass spectrometry, manifold chemistry, and machining equipment.

TEACHING EXPERIENCE

Courses Taught

CHEM 1040: College Chemistry I Fall 2024

This course serves as an introduction to chemistry for students pursuing a degree within the Sciences

CHEM 1040L: College Chemistry I Laboratory Fall 2024

This course is the lab component of CHEM 1040 and allows students to gain experience with common lab techniques including measurement, spectroscopy, gravimetric analysis, and chromatography.

CHE 2416: Laboratory Measurements and Techniques Spring 2024

Created and delivered lecture material, created and graded assessments, and coordinated with teaching assistants for the lab component.

Single Lectures

CHE 4334: Organic Spectroscopy Fall 2023

Lectured on the use of mass spectrometry in organic chemistry.

CHE 4316: Instrumental Analysis Spring 2023

Lectured on the fundamentals of Fourier transforms in instrumentation design.

STEM Education Faculty Interest Group 2022- 2024

Biweekly meeting to discuss publications concerning scholarship of teaching and learning (SoTL) and discipline-based education research (DBER). My involvement in this group includes:

- Learned about and discussed active learning techniques and common outcomes across various course levels and sizes.
- Examined assessment methods including ungrading, rubrics, and traditional exams.
- Learned about evidence-based practices aimed towards STEM classrooms.
- Co-led semester session on *Student Learning and Experiences* (Fall 2023).

Teaching Capstone in Higher Education 2022

Instructed several elements of teaching in Higher Education techniques including

- Gained practical experience in pedagogical practices including lecturing and active learning techniques such as utilizing community-based learning strategies like think-pair-share, peer-led team learning, and concept mapping.
- Designed and refined assessments to accurately measure student understanding in basic knowledge retention and application in lecture courses as well as skill comprehension and application in laboratory courses.
- Created course syllabi including elements such as learning goals, learning objectives, assignments, and classroom policy.

- Designed course curriculum for an Analytical Chemistry and a Mass Spectrometry course including generating modules, selected lectures, assignments, and assessments.
- Developed a teaching philosophy statement.

Designing for Online Teaching Success 2022

Taught and refined aspects of virtual teaching including

- Active Learning Strategies including the use of synchronous and asynchronous tools to engage students with course material.
- Canvas course development, organization, and community
- Use of virtual tools such as Curiki, Kaltura, and CidiLab

Baylor University, Waco, TX 2022 - 2024

Graduate Student Mentor, Dept. of Chemistry and Biochemistry

Mentored one undergraduate student, Ms. Emma-Le Olsen, working in Dr. Elyssia Gallagher's research lab.

- Taught laboratory safety and experimental design for working in an analytical lab and with shared instrumentation.
- Worked to develop competency in assessing primary literature, building professional communication skills, and gaining experience in preparing different formats of scientific communication including papers, posters, and oral presentations.

Baylor University, Waco, TX 2019 – 2020, 2024

Teaching Assistant, Dept. of Chemistry and Biochemistry

- Taught undergraduate general chemistry lab courses including lab techniques such as utilizing general chemical equipment including balances, glassware, and ovens as well as lab skills such as safe chemical handling.
- Coordinated grading and lab preparation with other teaching assistants.

Harding University College of Pharmacy, Searcy, AR 2017 - 2019

Teaching Assistant, Dept. of Pharmaceutical Sciences

- Taught Pharmaceutics Laboratory, a 5000-level laboratory course, including giving lab lectures on the mathematical skills involved with compounding and assisting in various compounding pharmacy lab experiments such as creation of IV bags, altered dosage capsules, and altering application methods.
- Performed as Supplemental Instructor for Principles of Pharmaceutical Science a 5000-level lecture course.

Harding University, Searcy, AR 2016 - 2017

Teaching Assistant, Dept. of Chemistry and Biochemistry

- Worked as Laboratory Assistant for Inorganic Chemistry and Physical Chemistry two 4000-level laboratory courses.
- Served as Supplemental Instructor for Inorganic Chemistry a 4000-level lecture course.

PUBLICATIONS

Hatvany, J.B.; Olsen, E.P.; Gallagher, E.S., "Characterizing Theta-Emitter Generation for Use in Microdroplet Reactions" *J. Am. Soc. Mass Spectrom*. 2024 (accepted)

Hatvany, J.B.; Liyanage, O.T.; Gallagher, E.S., "Effect of pH on in-electrospray hydrogen/deuterium exchange of carbohydrates" *J. Am. Soc. Mass Spectrom*. 2024, 35, 3, 441-448. https://doi.org/10.1021/jasms.3c00341

Hatvany, J.B.; Gallagher, E. S., "Hydrogen/Deuterium Exchange for the Analysis of Carbohydrates" *Carbohydrate Research*, 530(2023), 108859. https://doi.org/10.1016/j.carres.2023.108859

Gass, D.T.; Quintero, A.V.; **Hatvany, J.B.**; Gallagher, E.S., "Metal adduction in mass spectrometric analyses of carbohydrates and glycoconjugates" *Mass Spectrom. Rev.*, 2022; e21801 https://doi.org/10.1002/mas.21801

Liyanage, O. T.; Quintero, A. V.; **Hatvany, J. B.**; Gallagher, E. S., "Distinguishing Carbohydrate Isomers with Rapid Hydrogen/Deuterium Exchange-Mass Spectrometry". *J. Am. Soc. Mass Spectrom.* 2021, 32, 152-156. https://doi.org/10.1021/jasms.0c00314

Garcia, A. P.; **Hatvany, J. B.**; Murphy, M. A.; Atchley, D. H.; Gurley, B. J.; Kamdem, L. K., "Effect of Aromatase Inhibition (Exemestane) on Urine Concentration of Osteoprotegerin in Healthy Postmenopausal Women". *J. of Clinical Pharmacology* 2020, 60, 209-217. https://doi.org/10.1002/jcph.1519

PRESENTATIONS

* Indicates presenting author

"Characterization and comparison of theta-capillary and single-channel capillary tip generation for use in nano-electrospray ionization" (Poster) **Jacob B. Hatvany**, Emma-Le Olsen Elyssia S. Gallagher 71st ASMS Conference on Mass Spectrometry and Allied Topics, June 2023. *

"Effect of PEG-modification to capillary surfaces for analysis of carbohydrates and carbohydrate-containing molecules using nano-electrospray ionization-mass spectrometry," (Poster) Emma-Le Olsen, **Jacob B. Hatvany**, Elyssia S. Gallagher 71st ASMS Conference on Mass Spectrometry and Allied Topics, June 2023.

"Studying Glycans Utilizing In-Electrospray Ionization Hydrogen/Deuterium Exchange Mass Spectrometry" **Jacob B. Hatvany,** Elyssia S. Gallagher (Invited Oral) Harding University, Searcy, AR, October 2022. *

"Observing the effect of pH on H/D exchange during in-ESI HDX of carbohydrate-metal adducts" (Poster) **Jacob B. Hatvany**, Ana Quintero, Elyssia S. Gallagher 2022 Graduate Research Showcase, Baylor University, Waco, TX, October 2022. *

"Observing Effects of Charge Carrier on In-electrospray H/D Exchange of Component Moieties in Glycopeptides" (Poster) **Jacob B. Hatvany**, Elyssia S. Gallagher 70th ASMS Conference on Mass Spectrometry and Allied Topics, June 2022. *

"Observing the effect of pH on H/D exchange during in-ESI HDX of carbohydrate-metal adducts" (Poster) **Jacob B. Hatvany**, Ana Quintero, Elyssia S. Gallagher 69th ASMS Conference on Mass Spectrometry and Allied Topics, November 2021. *

"In-ESI HDX of Carbohydrate-metal Adducts in Solvated ESI Droplets: Effects of Metal Ions and Counter Ions" (Poster) O. Tara Liyanage, Emvia I. Calixte, Ana V. Quintero, **Jacob B. Hatvany**, Elyssia S. Gallagher 68th ASMS Conference 'Reboot' Online Only, June 2020.

"Human Breath as a Medical Diagnostic for Space Missions" (Oral) **Jacob Hatvany**, Edmond V. Wilson, Jr. Arkansas Space Grant Consortium April 2017. *

"Methodology for Measuring Pentane in Human Breath." (Poster) **Jacob Hatvany**, Edmond V. Wilson, Jr. Arkansas INBRE November 2015. *

HONORS AND AWARDS

Graduate Research Productivity Award 2023
Award issued by the Baylor University Department of Chemistry and Biochemistry to recognize graduate students performing excellent research.

RAMM Graduate Scholar 2023
Program of students selected from the Baylor Graduate School and Truett Seminary to discuss the intersection of science and religion.

Outstanding Graduate Research Award 2022
Award issued by the Baylor Graduate School to recognize graduate students performing excellent research. The award is given for STEM research once annually.

Certificate of Excellence in Mentoring Undergraduate Research 2022
Recognition was given by Baylor University for leadership and responsibility in mentoring undergraduate students.

Conyers Graduate Scholar 2022
Program of selected Baylor graduate students to encourage the study and discussion of how faith, learning, and vocation intersect through selected readings, meetings, and presentations.

ASMS Ron Hites Award 2022
Award recognizing an outstanding publication of original research in *Journal of the American Society for Mass Spectrometry*

Baylor Data Scholar 2022
Completed program increasing data skills: specialties include Data Scripting (Python), Data Visualization, and Research Data Management

Baylor University Travel Award 2021-2023
An award to support travel for presentations.

Baylor Graduate School Fellowship 2019 - 2024
Non-service award for top 4-5% of applicants

COMMUNITY SERVICE

Advanced Instrumentation Workshop (AIW) 2019 - 2022
This event is a workshop to expose undergraduate students from smaller colleges to research instrumentation to which they would typically not have access. Codesigned and taught a lecture and lab lesson covering mass spectrometry and an introduction to proteomics.

Present Your PhD. 2022

Spoke at local high schools and community events about STEM professions, going to college, what science is, and my research.

Baylor Undergraduate Research Student Association Judge 2020 - 2023
Served as poster judge for undergraduate research.

Mentoring 2022 – 2024
Served as academic mentor for undergraduate students in research including designing and performing experiments, analyzing and presenting data, and searching through and comprehending research literature.

Science Educators Symposium 2023

Co-led breakout sessions concerning easy-to-implement lab designs for high school STEM courses.

Baylor University Mental Health Ally 2023
Completed trainings on how to support mental health needs and destigmatize mental health issues. This includes a certification in QPR as well as Mental Health First Aid.
