A. PERSONAL STATEMENT

The glycocode, or combinatorial patterns of glycosylation that relay biological information, functions in essential roles that govern human health and myriad diseases (e.g., cancer, infectious diseases, autoimmune diseases). However, we lack fundamental insights into how the glycocode contributes to biological function at a molecular level. Our perspectives on the glycocode remain deficient because the non-template complexity of glycosylation creates analytical challenges that have severely limited our ability to study glycoconjugates. My group aims to solve these challenges. We leverage state-of-the-art mass spectrometry and chemical glycobiology to develop innovative technologies for investigating essential principles of glycocode regulation and dysregulation. Specifically, we are interested in understanding how altered cell surface phenotypes (i.e., glycocalyx status) manifest in cancer progression and drive metastasis. Through a combination of MS-based multi-omics, bioinformatics, and chemical biology, our goal is to use a systems-level approach to glycobiology to further our understanding of human health/disease and advance therapeutic glycoscience.

B. SELECTED HONORS AND AWARDS (Full list available below)

- 2022 – 2023 NIH Pathway to Independence Award (K99/R00)
- 2016 – 2022 NIH National Cancer Institute Predoctoral to Postdoctoral Fellow Transition Award (F99/K00)
- 2024 ASMS Research Award
- 2024 Scialog Fellow
- 2023 HUPO Rising Star Award
- 2021 Rising Star in Proteomics and Metabolomics (40 under 40), Journal of Proteome Research
- 2020 Emerging Talent in Academia, American Society for Mass Spectrometry
- 2019 ASMS Postdoctoral Career Development Award, American Society for Mass Spectrometry
- 2018 Richard and Joan Hartl Award for Research Excellence in Analytical Chemistry, UW-Madison
- 2017 FACSS Student Award, Federation of Analytical Chemistry and Spectroscopy Societies
- 2017 Roger J. Carlson Memorial Award for Research Excellence, Dept. of Chemistry, UW-Madison
- 2015 ASMS Graduate Student Award, American Society for Mass Spectrometry
- 2014 – 2016 National Science Foundation (NSF) Graduate Research Fellow
- 2012 Algernon Sydney Sullivan Award (top undergraduate student), USC
- 2010 Phi Beta Kappa

C. SELECTED PUBLICATIONS (Full list available below and on PubMed)


D. RESEARCH SUPPORT

K99/R00 NIH/NIGMS Pathway to Independence Award (GM147304)
Capturing the Holistic Glycocode through Systems Glycobiology 09/01/2022-08/31/2023
1 K99 GM147304 K99 Postdoctoral Fellow 09/01/2022-08/31/2023
Role: Principal Investigator
This proposal introduces novel technologies to capture glycoprotein features across the cell surface proteome, where glycan and protein components contribute holistically to unique molecular surfaces that relay biological information (i.e., the glycocode). Using these developments, we will generate a human glycocode atlas across multiple cell types to explore the role of glycocode heterogeneity in specialized cellular functions, and we will study dynamic glycocode reprogramming as cells transition from sedentary to migratory phenotypes known to drive numerous pathologies.

Completed Research Support:
F99/K00 (CA212454) NIH/NCI
Uniting Mass Spectrometry and Glycoscience to Investigate Cancer Biology 09/15/2016-08/31/2022
1F99CA212454 F99 Graduate Fellow 09/15/2016-08/26/2018
4K00CA212454 K00 Postdoctoral Fellow 08/31/2018-08/31/2022
Role: Principal Investigator
The graduate phase (F99) aims to develop mass spectrometry tools to enable global glycoproteome characterization and apply it to study cancer progression, and the postdoctoral phase (K00) focuses on training in cancer glycobiology, mainly using chemical tools to engineer the glycocalyx to understand glycosignatures of cancer aggressiveness.

NSF Graduate Research Fellowship (DGE-1256259)
New Technology to Monitor Histidine Phosphorylation in Mammalian Mitochondria 06/01/2014-09/14/2016
The major goal of this project was to develop negative electron transfer dissociation mass spectrometry instrumentation and methodologies to enable high-throughput proteomic analyses of peptide anions, with the goal of characterizing the unknown role(s) of phosphohistidine in mammalian systems.
E. RESEARCH PRESENTATIONS (ordered by most recent)

2024  Conference Talk, 72nd ASMS Conference on Mass Spectrometry and Allied Topics, Anaheim, CA
2024  Invited Talk, QBI-Rezo MS Symposium on Emerging Proteomic Technologies, SF, CA, invited by D Swaney
2024  Invited Talk, Pacific Northwest Mass Spectrometry Discussion Group Spring Meeting, invited by M Sadilek
2024  Invited Seminar, University of Georgia Dept. of Biochem. and Mol. Bio., invited by R Haltiwanger
2024  Conference Poster, Scialog Automating Chemical Laboratories, Tucson, AZ
2024  Invited Conference Talk, US HUPO Annual Meeting, Portland, OR, invited by D Schweppe
2024  Mentorship Seminar, US HUPO Early Career Research Workshop, Portland, OR, invited by A Smythers
2024  Conference Poster, Volcano Conference on Chemical Biology, Pack Forest Conference Center, WA
2024  Exciting Applications of Orbitrap Mass Spectrometers Seminar, Thermo MS Seminars, invited by J Chang
2023  Faculty Lunch Seminar, Dept. of Chemistry, Univ. of Washington
2023  Conference Poster, Society for Glycobiology Annual Meeting, Big Island, HI
2023  Faculty Lunch Seminar, Dept. of Biochemistry, Univ. of Washington, invited by T Davis
2023  Invited Seminar, New England BioLabs, Ipswich, MA, invited by E Escobar
2023  Invited Seminar, Dept. of Genome Sciences, Univ. of Washington, invited by D Schweppe
2023  Invited Talk, Translational Glycomics Symposium, Rising Stars in Glycoscience, Milwaukee, WI
2023  Award Lecture, 22nd Congress of the Human Proteome Organization, Busan, South Korea
2023  Invited Lunch Seminar, 22nd Congress of the Human Proteome Organization, Busan, South Korea
2023  Conference Poster, 22nd Congress of the Human Proteome Organization, Busan, South Korea
2023  Invited Conference Talk, 16th Uppsala Conference on ECD and ETD, Corvallis, OR, invited by J Beckman
2023  Conference Talk, Cascadia Proteomics Symposium, Seattle, WA
2023  Invited Lecture, Thermo Fisher Scientific ASMS Users Meeting, Houston, TX
2023  Conference Talk, 71st ASMS Conference on Mass Spectrometry and Allied Topics, Houston, TX

Prior to independent career: 45 Oral Presentations and 37 Poster Presentations

F. UNIVERSITY OF WASHINGTON TEACHING, LEADERSHIP, AND SERVICE ACTIVITIES

UW Affiliations

Assistant Professor, Dept. of Chemistry, appointment/home department, 2023-present
Adjunct Assistant Professor, Dept. of Biochemistry (beginning Jan. 16, 2024)
Adjunct Assistant Professor, Dept. of Genome Sciences (beginning Jan. 16, 2024)
Member, UW Biological Physics, Structure, and Design (BPSD) Graduate Program, 2023-present
Member, Cancer Consortium (between UW, the Hutch, and Seattle Children's), 2023-present
Member, Molecular Engineering and Sciences Institute (MoIES), 2023-present

Riley Research Group Advisees/Mentees

Graduate Students in Ph.D. Program (5):
  Anna G. Dubof, UW Chemistry, 2023-present
  Kayla A. Markuson, UW Chemistry, 2023-present
  Kathryn Kothlow, UW Chemistry, 2023-present
  Jacob H. Russell, UW Chemistry, 2023-present
  Ruby Zhang, UW Chemistry, 2023-present

Postdocs (2):
  Dr. Emmajay Sutherland, 2023-present
  Dr. Tim S. Veth, 2023-present

Courses Taught

CHEM 321, Quantitative Analysis, Winter 2024
CHEM 428/528, Biomolecular Analysis, Spring 2024
CHEM 196, Chemistry Frontiers, Spring 2024
CHEM 600, Independent Research

Admissions and Recruiting Committee, UW Chemistry, 2023-present

Responsible for recruiting and admissions into the PhD program, and orientation of new graduate students.

Research Infrastructure Committee, UW Chemistry, 2023-present

Responsible for reviewing and recommending changes to the department's research infrastructure: computing, shared instrumentation, staff support, etc.
**Cross-Department Crosslinker Program**, UW MCB and BPSD, 2023-present
Connect faculty with students and postdocs across departments as a way to strengthen connections and mentorship across UW research and STEM fields.

**Graduate Committee Membership** (outside of my group)
*UW Chemistry Students*
Addison E. Roush, UW Chemistry, Bush Group, on committee since 2023
AnneClaire Wageman, UW Chemistry, Bush Group, on committee since 2023
Bruce Feng, UW Chemistry, Bush Group on committee since 2023
Alice Martynova, UW Chemistry, Bush Group, on committee since 2023
Adilijiang Ali, UW Chemistry, Vaughan Group, on committee since 2023
Caitlin Cain, UW Chemistry, Synovec Group, on committee since 2024
Lindsey Ulmer, UW Chemistry, Bush Group, on committee since 2024
Doria Unrau, UW Chemistry, Maly Group (appointed by dept.), on committee since 2023
Natalie Rutz, UW Chemistry, Rajakovich Group (appointed by dept.), on committee since 2023
May Constabel, UW Chem. MSACST, Bush Group, on committee since 2023, Masters Defense 2024

*Students with other UW Affiliations*
Christopher D. McGann, UW Genome Sciences, Schwepp Group, on committee since 2023
Elizabeth Plender, UW Genome Sciences, Eichler and Bloom Groups, on committee since 2023
Bo Wen, UW Genome Sciences, MacCoss Group, on committee since 2023
Kelsey Woodruff, MCB Program, Termini Group (Fred Hutch), on committee since 2024
Alex Doan, MSTP Graduate Student, MacPherson Group (Fred Hutch), on committee since 2024

**Other Activities**
2024 Speaker at UW Chemistry Awards Dinner;
2023 Speaker at UW Chemistry Undergraduate Welcome Event; UW Chemistry Autumn Poster Session; ad hoc reviewer for CHEM 500 (Grant Proposal and Scientific Writing); ad hoc reviewer for faculty search

**G. EXTRAMURAL LEADERSHIP, MENTORING, AND SERVICE ACTIVITIES**

*Mentor*, FeMS Small Group Mentorship Program, 2020-present
Serve as a mentor for 12-15 mentees from around the country as part of a discussion group and support network. As a mentor, I support group members on their diverse paths in science and share my STEM experiences to provide perspectives and resources for their career development.

*Co-Chair*, Human Glycoproteomics Initiative (HGI) Community-wide Study, HUPO, 2021-present
This second study focuses on teams of software developers only, with the goal to identify strengths and weaknesses of the very latest glycoproteomics software for glycopeptide identification and quantitation. As co-chair, I design experiments, coordinate with participants, analyze data, and work with the advisory committee to carry out this community wide study with 20 developer teams.

*ECR Mentor*, US HUPO Early Career Researcher (ECR) Committee, 2023-present
Support the US HUPO ECR and its Executive Committee in all aspects of education, training, networking and activities being carried out by the ECR; attend monthly ECR executive committee meetings and other ECR-based meetings activities; represent the ECR’s interests at executive committee meetings and board meetings.

*Member*, HUPO Early Career Researcher (ECR) Committee, 2023-present
Promote transmission of HUPO ideals to the next generation of proteomic leaders, who are involved in many of the varied HUPO initiatives and activities; support HUPO ECR initiatives that include the ECR Manuscript Competition, the 3-minute Thesis Competition, the Poster competition, the Rising Star award, mentoring sessions, and an ECR Networking Night event

*ACS Division of Analytical Chemistry Education Committee*, 2022-present
Administer Graduate Research Fellowships, Undergraduate Awards in Analytical Chemistry, and travel funding: plan regular opportunities for networking and teaching/learning through ACS national meetings and stand-alone virtual events; undertake special short-term and long-term projects related to analytical chemistry education.
Activities:  Chair I. M. Kolthoff Undergraduate Award Selection Committee (2023-2024), Speakers Bureau Initiative (2023); Co-Organizer of ChatGPT in Chemistry Discussion Panel (2023)

Assistant Program Chair, Pacific Northwest Mass Spectrometry Discussion Group (PacMass), 2023-present
Coordinate quarterly meetings that include presentations by invited speakers and a preceding informal social hour. PacMass exists to provide a local forum for the free exchange of ideas and information about mass spectrometry and related fields.

Interviewer for ASMS Mock Interviews for Students and Postdocs, Fall 2022, Spring 2023, Fall 2023
Serve as an interviewer for graduate students to conduct mock interviews for what it is like to look for an academic postdoctoral scholar position. This includes reviewing each student’s curriculum vitae to offer suggestions and conducting a ~30 minute virtual interview to help coach them through how to prepare.

Grant Review Activities
2024, Reviewer, National Science Foundation
2024, Expert Reviewer for European Research Council (ERC) Starting Grant Proposals

Poster Session Judge
2023, Human Proteome Organization, Early Career Researcher Poster Competition
2022, ASMS Annual Conference, Undergraduate Poster Session
2020, ASMS Annual Conference, Undergraduate Poster Session
2019, ASMS Annual Conference, Undergraduate Poster Session

Conference Events and Related Activities
• Oral Session Chair, Instrumentation: New Hybrid and Multimodal Approaches, ASMS 2024
• Co-Chair, Glycobioscience Gordon Research Seminar, 2023-2025
• Discussion Leader, Glycobiology Gordon Research Seminar, Ventura, CA, March 2023
• Organizer, HGI Workshop on Glycoproteomics and Glycoinformatics, US HUPO, Chicago, IL, March 2023
• 2023 ASMS Abstract Program Review Committee

Leadership and Service Experience as a Postdoc: Stanford Science Penpals; Stanford ADVANCE Summer Institute Mentor; Stanford Summer Research Program (SSRP) - Amgen Scholars Program; Stanford Omics Mass Spectrometry Group

Leadership and Service Experience as a Graduate Student: Graduate Student Faculty Liaison Committee; John L. Schrag Fund Committee (Co-Founder, Co-President); Junior Science Café; Wisconsin Science Festival; Wisconsin Saturday Science; Chemistry Opportunities (CHOPs) at UW-Madison

Leadership and Service Experience as an Undergraduate Student: University Ambassador (President, Captain of Mentor Program, Presidential Ambassador); Pillars for Carolina (Co-Founder, Director of Programs); Honors Council (President, Vice President); Orientation Leader (President, Vice President); Resident Mentor; Men’s Club Rugby (Team Captain)

H. EXTRAMURAL AND PRIOR TEACHING EXPERIENCE

Instructor, North American Mass Spectrometry Summer School, 2023, 2024
Presented lectures, participated in training events, and served on panels for a four-day in-person course that provides training from world-leading experts in mass spectrometry and scientific and professional development. 2023, Data Acquisition Strategies; 2024, Post-Translational Modifications (PTMs)

Instructor, Skyline Online Course, Introduction to Targeted Proteomics: SRM/MRM and PRM, 2021-present
Presented a lecture and led a tutorial session of 50+ attendees on indexed retention time and how to process data within the Skyline ecosystem. Also contributed to live question and answer sessions. Sessions taught: April 2021, April 2022, October 2022, October 2023.

Lecturer, BIOS 227, Mass Spectrometry & Proteomics: Opening the Black Box, Stanford Univ., Winter 2021, 2023
Developed and presented lectures on post-translational modifications and the combination of glycobiology and mass spectrometry at the invitation of course instructors Prof. Sharon Pitteri and Prof. Parag Mallick.
Lecturer, *Stanford University Mass Spectrometry Seminar Series*, Fall 2020
Designed and presented two lectures on fundamentals and cutting-edge research in glycoproteomics. These are recorded and used by many as introductions to the field.
*Seminar 2: Reasons to be excited about current efforts in glycoproteomics*, Oct 1, 2020

**Graduate and Undergraduate Experience:** Graduate Lecturer for Biochemistry 660 at UW-Madison (3 semesters); Guest Lecturer for The Data Revolution in Science and Medicine at UW-Madison; Graduate Facilitator for Food, Fasting, and Fitness at UW-Madison; Teaching Assistant for CHEM 104 and 329 at UW-Madison; Peer Leader and Peer Leader Captain for University 101 at the University of South Carolina; Tutor and Mentor through the Waverly After School Program at the University of South Carolina.

### I. PEER-REVIEW PARTICIPATION

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### J. PROFESSIONAL SOCIETIES AND AFFILIATIONS

American Society for Mass Spectrometry, 2013-present
American Chemical Society, 2013-present
Human Proteome Organization, 2022-present (US HUPO 2015-present)
Society for Glycobiology, 2017-present
American Society for Biochemistry and Molecular Biology, 2020-present
American Association for Cancer Research, Associate Member, 2020-present
Pacific Northwest Mass Spectrometry Discussion Group, Member, 2023-present
Tegmine Therapeutics, Inc., Scientific Advisor, 2020-present
Cartography Biosciences, Scientific Consultant, 2023-present
Augment Biologics, Scientific Consultant, 2023-present

### K. FULL LIST OF PUBLICATIONS (Also available on [PubMed](https://pubmed.ncbi.nlm.nih.gov/))

Reverse chronological order, ‡ indicates studies led or co-led by the Riley Research Group


Prior to the University of Washington

Reverse chronological order, ‡ indicates first, co-first, or co-submitting author (25 total prior to UW)


**Highlighted on Genome Web: https://www.genomeweb.com/proteomics-protein-research/new-massspec-fragmentation-technique-could-boost-shotgun-mass-spec**


Book Chapters

(1)‡ Riley NM*, Malaker SA. O-glycoproteomics: methods, challenges, and new opportunities. Glycoprotein Analysis, 2022 (in review), Editor: WB Struwe. Publisher: Royal Society of Chemistry. *co-submitting authors

Other publications


Pre-prints and Manuscripts in Review


L. HONORS AND AWARDS FULL LIST

Independent Career

2024 ASMS Research Award
2024 Scialog Fellow, Automating Chemical Laboratories, Research Corporation for Science Advancement
2023 NUPO Rising Star Award
2023 Rising Star in Glycoscience, Translational Glycomics Center
2023 Distinguished Young Honors Alumni Award, South Carolina Honors College

Postdoctoral

2022 – 2023 NIH Pathway to Independence Award (K99/R00)
2018 – 2022 NIH National Cancer Institute K00 Postdoctoral Fellow (K00CA212454)
2022 NUPO World Congress Travel Award (combined award from NUPO and US NUPO)
2022 24th International Mass Spectrometry Conference Young Mass Spectrometrist Keynote Lecture
2021 Rising Star in Proteomics and Metabolomics, Journal of Proteome Research
2021 ASBMB Postdoctoral Researcher Award
2021
US HUPO Postdoctoral Award Honorable Mention
2021
Society for Glycobiology Travel Award
2020
Emerging Talent in Academia, American Society for Mass Spectrometry
2020
Keystone Symposia Scholarship (Symposium: Proteomics in Cell Biology and Disease)
2020
Stanford University Mass Spectrometry Research Applications Symposium Poster Award
2019
ASMS Postdoctoral Career Development Award, American Society for Mass Spectrometry

Graduate
2018
Human Proteomics Symposium Rising Star
2018
Student Research Grants Competition Conference Award, Graduate School, UW-Madison
2018
Richard and Joan Hartl Award for Research Excellence in Analytical Chemistry, UW-Madison
2017
Society for Glycobiology Travel Award
2017
Outstanding Oral Presentation Award, Midwest Carbohydrate and Glycobiology Symposium
2017
FACSS Student Award, Federation of Analytical Chemistry and Spectroscopy Societies
2017
Dept. of Biomolecular Chemistry Travel Award, UW-Madison
2017
Roger J. Carlson Memorial Award for Research Excellence, Dept. of Chemistry, UW-Madison
2017
1st Place in Poster Competition, Dept. of Chemistry Poster Session, UW-Madison
2017
Graduate Student Travel Award, Dept. of Chemistry, UW-Madison
2016
Marg Northcott Student Award, Lake Louise Tandem MS Workshop
2016 – 2022 NIH National Cancer Institute Predoctoral to Postdoctoral Fellow Transition Award (F99/K00)
2015
1st Place in Poster Competition, Human Proteomics Symposium
2015
ASMS Graduate Student Award, American Society for Mass Spectrometry
2014
Richard A. Schaeffer ASMS Travel Award
2014
Asilomar Conference Travel Grant, ASMS
2014 – 2016 National Science Foundation (NSF) Graduate Research Fellow
2012
Pei Wang Graduate Fellowship, Department of Chemistry, UW-Madison
2012
Louise McBee Graduate Fellowship, Alpha Lambda Delta Honors Society

Undergraduate
2012
Algernon Sydney Sullivan Award (top undergraduate student), USC
2012
ODK Leader of the Year, Omicron Delta Kappa Honors Society Chi Circle, USC
2012
Outstanding Senior Award, USC
2012
Joseph H. Gibbons Outstanding Senior Award, Omicron Delta Kappa Honors Society
2011, 2012 American Institute of Chemists Foundation Award, USC
2011
Presidential Volunteer Service Award, Gold Level (250+ hours), Office of President Barack Obama
2011
Student Body President’s Award, USC
2011
Wilson-Kibler Bicentennial Leadership Award, USC
2011
Leadership Scholar Award, USC
2010
Rising Senior Award, Dept. of Chemistry and Biochemistry, USC
2010
Phi Beta Kappa
2009 – 2010 Cultural Ambassadorial Scholar, Rotary International
2009
University of South Carolina Homecoming King
2009
Outstanding Freshman Advocate, USC (first undergraduate to win the award)
2009
Jo Anne J. Trow Academic Scholar, Alpha Lambda Delta Honors Society
2008 – 2010 Magellan Undergraduate Research Grant, USC
2007 – 2011 Jamie and Cory Foundation Academic Scholar
2007 – 2011 Robert C. Byrd Academic Scholar
2007 – 2011 Robert C. McNair Scholar, USC (full tuition scholarship awarded for academic merit)