# Nicholas M. Riley, Ph.D.

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EDUCATION/TRAINING

| INSTITUTION | DEGREE | YEAR(s) | FIELD OF STUDY |
|---|---|---|---|
| Stanford University | Postdoctoral (mentor: CR Bertozzi) | 2018-2023 | Chemistry/Chemical (Glyco)Biology |
| University of Wisconsin-Madison | Ph.D. (advisor: JJ Coon) | 2012-2018 | Analytical Chemistry |
| University of South Carolina | B.S., with Honors from the South Carolina Honors College | 2007-2012 | Chemistry and Psychology |

## 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-templated 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 below)

2022 – 2023 **NIH Pathway to Independence Award (K99/R00)**
2016 – 2022 **NIH National Cancer Institute Predoctoral to Postdoctoral Fellow Transition Award (F99/K00)**
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
2011 Presidential Volunteer Service Award, Gold Level (250+ hours), Office of President Barack Obama
2010 Phi Beta Kappa

## C. PUBLICATIONS (ordered by most recent within each section, full list on PubMed available here)

### First Author and Submitting Author Publications

(1) Wei W*, **Riley NM***, Lyu X*, Shen X, Guo J, Zhao M, Moya-Garzon MD, Basu H, Tung A, Li VL, Huang W, Svensson KJ, Snyder MP, Bertozzi CR, Long JZ. *Organism-wide secretome mapping uncovers pathways of tissue crosstalk in exercise.* Cell Metabolism, **2023**, S1550-4131(23)00138-9. doi: 10.1016/j.cmet.2023.04.011. ***authors contributed equally**

(2) **Riley NM***, Wu R, Bertozzi CR, Brooks JD, Pitteri SJ*. *Measuring the multifaceted roles of mucin-domain glycoproteins in cancer.* Advances in Cancer Research, **2023**, 157, 83-121. doi: 10.1016/bs.acr.2022.09.001. ***co-submitting authors**

(3) **Riley NM***, Bertozzi CR*. *Deciphering O-glycoprotease substrate preferences with O-Pair Search.* Molecular Omics, **2022**, 18: 908-922. doi: 10.1039/D2MO00244B. ***co-submitting authors**

(4) Bagdonaite I*, Malaker SA*, Polasky DA*, **Riley NM***, Schjoldager K, Vakhrushev SY, Halim A, Aoki-Kinoshita KF, Nesvizhskii AI, Bertozzi CR, Wandall H, Parker BL, Thaysen-Andersen M, Scott NE. *Glycoproteomics*. Nature Reviews Method Primers, **2022**, 2: 48. doi: 10.1038/s43586-022-00128-4. ***authors contributed equally**

(5) Malaker SA*, **Riley NM***, Shon DJ, Pedram K, Krishnan V, Dorigo O, Bertozzi CR. *Revealing the human mucinome*. Nature Communications, **2022**, 13: 3542. doi: 10.1038/s41467-022-31062-4. ***authors contributed equally**

(6) Wei W*, **Riley NM***, Yang AC, Kim JT, Terrell SM, Li VL, Garcia Contreras M, Bertozzi CR, Long JZ. *Cell type-selective secretome profiling in vivo*. Nature Chemical Biology, **2021**, 17: 326-334. doi: 10.1038/s41589-020-00698-y. ***authors contributed equally**

(7) Wei W*, **Riley NM***, Lyu X, Bertozzi CR, Long JZ. *Protocol for labeling, enrichment, and proteomic profiling of cell type-specific plasma proteins in mice.* STAR Protocols, **2021**, 2(4): 101014. doi: 10.1016/j.xpro.2021.101014, ***authors contributed equally**

(8) Lu L*, **Riley NM***, Shortreed MR, Bertozzi CR, Smith LM. *O-Pair Search with MetaMorpheus for O-glycopeptide Characterization.* Nature Methods, **2020**, 17: 1133-1138. doi: 10.1038/s41592-020-00985-5. ***authors contributed equally**

(9) **Riley NM***, Bertozzi CR, Pitteri SJ*. *A Pragmatic Guide to Enrichment Strategies for Mass Spectrometry-based Glycoproteomics.* Molecular & Cellular Proteomics, **2021**, 20: 100029. doi: 10.1074/ mcp.R120.002277. ***co-submitting authors**

(10) **Riley NM**, Malaker SA, Driessen MD, Bertozzi CR. *Optimal Dissociation Methods Differ for N- and O-glycopeptides*. Journal of Proteome Research, **2020**, 19(8): 3286-3301. doi: 10.1021/ acs.jproteome.0c00218. ****selected for ACS Editors' Choice** ****Top 5 most read articles in JPR in 2020****

(11) **Riley NM**, Malaker SA, Bertozzi CR. *Electron-based dissociation is needed for O-glycopeptides derived from OpeRATOR proteolysis*. Analytical Chemistry **2020**, 92(22): 14878-14884. doi: 10.1021/acs.analchem.0c02950

(12) **Riley NM**, Hebert AS, Westphall MS, Coon JJ. *Capturing site-specific heterogeneity with large-scale N-glycoproteome analysis*. Nature Communications, **2019**, 10: 1311. doi: 10.1038/s41467-019-09222-w.

(13) **Riley NM**, Sikora JW, Seckler HS, Greer JB, Fellers RT, LeDuc RD, Westphall MS, Thomas PM, Kelleher NL, Coon JJ. *The Value of Activated Ion Electron Transfer Dissociation for High-Throughput Top-Down Characterization of Intact Proteins*. Analytical Chemistry, **2018**, 90(14): 8553-8560. doi: 10.1021/acs.analchem.8b01638.

(14) **Riley NM**, Coon JJ. *The Role of Electron Transfer Dissociation in Modern Proteomics*. Analytical Chemistry, **2018,** 90(1): 40-64. doi: 10.1021/acs.analchem.7b04810.

(15) **Riley NM**, Westphall MS, Coon JJ. *Sequencing Larger Intact Proteins (30-70 kDa) with Activated Ion Electron Transfer Dissociation*. Journal of the American Society of Mass Spectrometry, **2018,** 29(1): 140-149. doi: 10.1007/s13361-017-1808-7. ****Selected in 2020 as high impact research by JASMS Editor-in-Chief****

(16) **Riley NM**, Westphall MS, Coon JJ. *Activated Ion Electron Transfer Dissociation Enables Comprehensive Top-Down Protein Fragmentation*. Journal of Proteome Research, **2017**, 16(7): 2653-2659. doi: 10.1021/acs.jproteome.7b00249.

(17) **Riley NM**, Westphall MS, Hebert AS, Coon JJ. *Implementation of Activated Ion Electron Transfer Dissociation on a quadrupole-Orbitrap-linear ion trap hybrid mass spectrometer*. Analytical Chemistry, **2017,** 89(12): 6358-6366. doi: 10.1021/acs.analchem.7b00213. ****featured on the journal cover****
****Highlighted on Genome Web**: https://www.genomeweb.com/proteomics-protein-research/new-mass-spec-fragmentation-technique-could-boost-shotgun-mass-spec****

(18) **Riley NM**, Hebert AS, Durnberger G, Stanek F, Mechtler K, Westphall MS, Coon, JJ. *Phosphoproteomics with Activated Ion Electron Transfer Dissociation*. Analytical Chemistry, **2017,** 89(12): 6367-6376. doi: 10.1021/acs.analchem.7b00212. ****featured on the journal cover** **Highlighted on Genome Web**: https://www.genomeweb.com/proteomics-protein-research/new-mass-spec-fragmentation-technique-could-boost-shotgun-mass-spec******

(19) **Riley NM**, Bern M, Westphall MS, Coon JJ. *A Full-Featured Search Algorithm for Negative Electron Transfer Dissociation*. Journal of Proteome Research, **2016**, 15(8): 2768-2776. doi: 10.1021/acs.jproteome.6b00319.

(20) **Riley NM**, Hebert AS, Coon JJ. *Proteomics Moves into the Fast Lane*. Cell Systems, **2016,** 2(3): 142-143. doi: 10.1016/j.cels.2016.03.002.

(21) **Riley NM**, Coon JJ. *Phosphoproteomics in the Age of Rapid and Deep Proteome Profiling*. Analytical Chemistry, **2016,** 88(1): 74–94. doi: 10.1021/acs.analchem.5b04123. ****featured on the journal cover****

(22) **Riley NM**, Mullen C, Weisbrod CR, Sharma S, Senko MW, Westphall MS, Syka JEP, Coon JJ. *Enhanced Dissociation of Intact Proteins with High Capacity Electron Transfer Dissociation*. Journal of the American Society of Mass Spectrometry, **2016**, 27(3): 520-531. doi: 10.1007/s13361-015-1306-8.

(23) **Riley NM**, Rush MJP, Rose CM, Richards AL, Kwiecien NW, Bailey DJ, Hebert AS, Westphall MS, Coon JJ. *The Negative Mode Proteome with Activated Ion Negative Electron Transfer Dissociation*. Molecular & Cellular Proteomics, **2015**, 14(10): 2644-60. doi: 10.1074/mcp.M115.049726.
****Highlighted in Nature Methods**: http://www.nature.com/nmeth/journal/v12/n9/full/nmeth.3573.html******

(24) **Riley NM**, Westphall MS, Coon JJ. *Activated Ion Electron Transfer Dissociation for Improved Fragmentation of Intact Proteins*. Analytical Chemistry, **2015**, 87(14): 7109-7116. doi: 10.1021/acs.analchem.5b00881.

(25) Zhao Y*, **Riley NM***, Sun L, Hebert AS, Yan X, Westphall MW, Rush MJP, Zhu G, Champion MM, Champion PAD, Coon JJ, Dovichi NJ. *Coupling Capillary Zone Electrophoresis with Electron Transfer Dissociation and Activated Ion Electron Transfer Dissociation for Top-Down Proteomics*. Analytical Chemistry, **2015**, 87(10): 5422-5429. doi: 10.1021/acs.analchem.5b00883. ***authors contributed equally**

**Contributing Author Publications**

(26) Ahn G, **Riley NM**, Kamber R, Wisnovsky S, Bassik MC, Banik SM*, Bertozzi CR*. *Elucidating cellular determinants of targeted membrane protein degradation by lysosome targeting chimeras.* Science, **2023**, *in press*.

(27) Peltan EL, **Riley NM**, Flynn RA, Bertozzi CR. *Galectin-3 does not interact wth RNA directly.* Glycobiology, **2023**, *in press*.

(28) Pedram K*, Shon DJ*, Tender GS*, Mantuano NR, Northey JJ, Metcalf KJ, Wisnovsky SP, **Riley NM**, Forcina GC, Malaker SA, Kuo A, George BM, Miller CL, Casey KM, Vilches-Moure JG, Huang D, Weaver VM, Laübli H, Bertozzi CR. *Design of a mucin-selective protease for targeted degradation of cancer-associated mucins.* Nature Biotechnology, **2023**, *in press*. doi: 10.1038/s41587-023-01840-6.

(29) Hollander MJ, Malaker SA, **Riley NM**, Perez I, Abney NM, Gray MA, Maxson JE, Cochran JR, Bertozzi, CR. *Mutational screens highlight glycosylation as a modulator of colony-stimulating factor 3 receptor (CSF3R) activity*. Journal of Biological Chemistry, **2023**, 299(6): 104755. doi: 10.1016/j.jbc.2023.104755.

(30) Boyce M, Malaker SA, **Riley NM**, Kohler JJ. *The 2022 Nobel Prize in Chemistry – sweet!.* Glycobiology, **2023**, 33(3): 178-181. doi: 10.1093/glycob/cwad016.

(31) Smith BAH*, Deutzmann A*, Correa KM, Delaveris CS, Dhanasekaran R, Dove CG, Sullivan DK, Wisnovsky SP, Stark JC, Pluvinage JV, Swaminathan S, **Riley NM**, Rajan A, Majeti R, Felsher DW, Bertozzi CR. *MYC driven synthesis of Siglec ligands is a novel glyco-immune checkpoint.* Proc. Natl. Acad. Sci. USA, **2023**, 120 (11): e2215376120. doi: 10.1073/pnas.2215376120.

(32) Richards CM*, Jabs S*, Qiao W*, Varanese LD, Schweizer M, Mosen PR, **Riley NM**, Zengel JR, Flynn RA, Rustagi A, Widen JC, Peters CE, Ooi YS, Shi PY, Bartenschlager R, Bogyo M, Bertozzi CR, Blish CA, Winter D, Nagamine CM, Braulke T#, Carette J#. *The Human Disease Gene LYSET is Essential for Lysosomal Enzyme*

*Transport and Viral Infection.* Science, **2022**, 378(6615): eabn5648. doi: 10.1126/science.abn5648. ****featured on journal cover****

(33) Shon DJ, Fernandez D, **Riley NM**, Ferracane MJ, Bertozzi CR. *Structure-guided mutagenesis of a mucin-selective metalloprotease from Akkermansia muciniphila alters substrate preferences.* Journal of Biological Chemistry, **2022**, 298(5): 101917. doi: 10.1016/j.jbc.2022.101917.

(34) Pedram K, Laqtom NN, Shon DJ, Di Spiezio A, **Riley NM**, Saftig P, Abu-Remaileh M, Bertozzi CR. *Lysosomal cathepsin D mediates endogenous mucin glycodomain catabolism in mammals.* Proc. Natl. Acad. Sci. USA, **2022**, 119(39): e2117105119. doi: 10.1073/PNAS.2117105119.

(35) Daly J, Sarkar S, Natoni A, Stark JC, **Riley NM**, Bertozzi CR, Carlsten M, O'Dwyer M. *Targeting hypersialylation in Multiple Myeloma represents a novel approach to enhance NK cell-mediated tumor responses.* Blood Advances, **2022**, 6(11): 3352-2266. doi: 10.1182/bloodadvances.2021006805.

(36) Bouchard G, Garcia-Marques FJ, Karacosta LG, Zhang W, Bermudez A, **Riley NM**, Varma S, Mehl LC, Benson JA, Shrager JB, Bertozzi CR, Pitteri SJ, Giaccia AJ, Plevritis S. *Multi-Omics Analysis of Fibroblasts from the Invasive Tumor Edge Reveals that Tumor-Stroma Crosstalk Induces O-Glycosylation of the CDK4-pRB Axis.* Cancer Research, **2022**, 82(4): 648-664. doi: 10.1158/0008-5472.CAN-21-1705.

(37) Pluvinage JV, Sun J, Claes C, Flynn RA, Haney MS, Iram T, Meng X, Lindemann R, **Riley NM**, Danhash E, Chaderevian JP, Tapp E, Gate D, Kondapavulur S, Cobos I, Chetty S, Pasca S, Berry-Kravis E, Bertozzi CR, Blurton-Jones M, Wyss-Coray T. *The CD22-IGF2R interaction is a therapeutic target for microglial lysosome dysfunction in Niemann-Pick Type C.* Science Translational Medicine, **2021**, 13(622): eabg2919. doi: 10.1126/scitranslmed.abg2919.

(38) Peters-Clarke TM, **Riley NM**, Westphall MS, Syka JEP, Coon JJ. *Practical Effects of Intramolecular Hydrogen Rearrangement in Electron Transfer Dissociation-Based Proteomics.* Journal of the American Society of Mass Spectrometry, **2021**, 33(1): 100-110. doi: 10.1021/jasms.1c00284.

(39) Delaveris CS, Wilk AJ, **Riley NM**, Stark JC, Yang SS, Rogers AJ, Ranganath T, Nadeau KC, Stanford COVID-19 Biobank, Blish CA, Bertozzi CR. *Synthetic Siglec-9 Agonists Inhibit Neutrophil Activation Associated with COVID-19*. ACS Central Science. **2021**, 7(4): 650-657. doi: 10.1021/acscentsci.0c01669.

(40) Ahn, G, Banik SM, Miller CL, **Riley NM**, Cochran JR, Bertozzi CR. *LYTACs that engage the asialoglycoprotein receptor for targeted protein degradation.* Nature Chemical Biology, **2021**, 17, 937–946. doi: 10.1038/s41589-021-00770-1.

(41) Wisnovsky S, Moeckl L, Malaker SA, Pedram K, Hess G, **Riley NM**, Gray MA, Smith BAH, Bassik MC, Moerner WE, Bertozzi CR. *Genome-wide CRISPR screens reveal a specific ligand for the glycan-binding immune checkpoint receptor Siglec-7.* Proc. Natl. Acad. Sci. USA, **2021**, 118(5): e2015024118. doi:10.1073/pnas.2015024118.

(42) Delaveris CS, Chiu SH, **Riley NM**, Bertozzi CR. *Modulation of immune cell reactivity with cis-binding Siglec agonists.* Proc. Natl. Acad. Sci. USA, **2021**, 118 (3): e2012408118. doi: 10.1073/pnas.2012408118.

(43) Banik SM, Pedram K, Wisnovsky S, Ahn G, **Riley NM**, Bertozzi CR. *Lysosome targeting chimeras for the degradation of extracellular proteins*. Nature, **2020**, 584, 291–297. doi: 10.1038/s41586-020-2545-9.

(44) Peters-Clarke TM, Schauer KL, **Riley NM**, Lodge JM, Westphall MS, Coon JJ. *Optical Fiber-Enabled Photoactivation of Peptides and Proteins.* Analytical Chemistry, **2020**, 92, 12363-12370. doi: 10.1021/acs.analchem.0c02087

(45) Lodge JM, Schauer KL, Brademan DR, **Riley NM**, Shishkova E, Westphall MS, Coon JJ. *Top-Down Characterization of an Intact Monoclonal Antibody using Activated Ion-Electron Transfer Dissociation*. Analytical Chemistry, **2020**, 92, 10246-10251. doi: 10.1021/acs.analchem.0c00705.

(46) Leung KK, Wilson GM, Kirkemo LL, **Riley NM**, Coon JJ, Wells JA. *Broad and thematic remodeling of the surface glycoproteome on isogenic cells transformed with driving proliferative oncogenes*. Proc. Natl. Acad. Sci. USA, **2020**, 117(14): 7764-7775. doi: 10.1073/pnas.1917947117.

(47) Brademan DR, **Riley NM**, Kwiecien NW, Coon JJ. *Interactive Peptide Spectral Annotator: A Versatile Web-Based Tool for Proteomic Applications*. Molecular & Cellular Proteomics, **2019**, 18(8): S193-S201. doi: 10.1074/mcp.TIR118.001209.

(48) Wagner E, Myers KS, **Riley NM**, Coon JJ, Gasch AP. *PKA and HOG signaling contribute separable roles to anaerobic xylose fermentation in yeast engineered for biofuel production*. PLOS One, **2019**, 14(5): e0212389. doi: 10.1371/journal.pone.0212389.

(49) Myers KS, **Riley NM**, MacGilvray ME, Sato TK, McGee M, Heilberger J, Coon JJ, Gasch AP. *Rewired cellular signaling coordinates sugar and hypoxic responses for anaerobic xylose fermentation in yeast*. PLOS Genetics, **2019**, 15(3): e1008037. doi: 10.1371/journal.pgen.100803.

(50) Rush MJP, **Riley NM**, Westsphall MS, Coon JJ. *Top-Down Characterization of Proteins with Intact Disulfide Bonds Using Activated-Ion Electron Transfer Dissociation*. Analytical Chemistry, **2018**, 90(15): 8946-8953. doi: 10.1021/acs.analchem.8b01113.

(51) Hebert AS, Thoing C, **Riley NM**, Kwiecien NW, Shishkova E, Huguet R, Cardasis HL, Kuehn A, Eliuk S, Zabrouskov V, Westphall MS, McAlister GC, Coon JJ. *Improved Precursor Characterization for Data-Dependent Mass Spectrometry*. Analytical Chemistry, **2018**, 90(3): 2333-2340. doi: 10.1021/acs.analchem.7b04808.

(52) Leach III FE, **Riley NM**, Westphall, Coon JJ, Amster IJ. *Negative electron transfer dissociation sequencing of increasingly sulfated glycosaminoglycan oligosaccharides on an Orbitrap mass spectrometer*. Journal of the American Society of Mass Spectrometry, **2017,** 28(9): 1844-1854. doi: 10.1007/s13361-017-1709-9.

(53) Rush MJP, **Riley NM**, Westphall MS, Syka JEP, Coon JJ. *Sulfur Pentafluoride is a Preferred Reagent for Negative Electron Transfer Dissociation*. Journal of the American Society of Mass Spectrometry, **2017**, 28(7): 1324-1332. doi: 10.1007/s13361-017-1600-8.

(54) Horton JL, Martin OJ, Lai L, **Riley NM**, Richards AL, Vega RB, Leone TC, Pagliarini DJ, Coon JJ, Muoio DM, Bedi KC, Margulies KB, Kelly DP. *Mitochondrial Protein Hyperacetylation in the Failing Heart*. Journal of Clinical Investigation Insights, **2016**, 1(2): e84897. doi:10.1172/jci.insight.84897.

(55) McIlwain S, Peris D, Sardi M, Moskvin O, Zhan F, Myers K, **Riley NM**, Buzzell A, Parreiras LS, Ong IM, Landick R, Coon JJ, Gasch AP, Sato TK, Hittinger CT. *Genome Sequence and Analysis of a Stress-Tolerant, Wild-Derived Strain of Saccharomyces cerevisiae used in Biofuels Research*. G3: Genes | Genomes | Genetics, **2016**, 6(6): 1757-1766. doi: 10.1534/g3.116.029389.

(56) Weisenhorn EMM, van't Erve TJ, **Riley NM**, Hess JR, Raife TJ, Coon JJ. *Multi-omics Evidence for Inheritance of Energy Pathways in Red Blood Cells*. Molecular & Cellular Proteomics, **2016**, 15(12): 3614-23. doi: 10.1074/mcp.M116.062349.

(57) Rose CM, Rush MJP, **Riley NM**, Merrill AE, Kwiecien NW, Westphall MS, Coon JJ. *A calibration routine for efficient ETD in large-scale proteomics*. Journal of the American Society of Mass Spectrometry, **2015**, 26(11): 1848-57. doi: 10.1007/s13361-015-1183-1.

(58) Rhoads TW, Rose CM, Bailey DJ, **Riley NM**, Molden RC, Nestler AJ, Merrill AE, Smith LM, Hebert AS, Westphall MS, Pagliarini DJ, Garcia BA, Coon JJ. *Neutron-encoded mass signatures for quantitative top down proteomics*. Analytical Chemistry, **2014**, 86(5): 2314-2319. doi: 10.1021/ac403579s.

**Book Chapters**

(59) **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**

**Riley NM**. *The day my supervisor won the Nobel prize in chemistry.* Chemistry World, **2023**, Editorial/Opinion. https://www.chemistryworld.com/opinion/the-day-my-supervisor-won-the-nobel-prize-in-chemistry/4018124.article.

**Pre-prints and Manuscripts in Review**

(1) Stark JC, Gray MA, Wisnovsky SP, Ibarlucea-Benitez I, **Riley NM**, Ribi MK, Lustig M, Errington WJ, Bruncsics B, Sarkar CA, Valerius T, Ravetch JV, Bertozzi CR. *Antibody-lectin chimeras for glyco-immune checkpoint blockade.* Submitted. 2022. Pre-print available at bioRxiv: 10.1101/2022.10.26.513931.

(2) Ducoli L, Zarnegar B, Porter DF, Meyers R, Miao W, **Riley NM**, Bertozzi CR, Flynn RA, Khavari P. *SupirCLIP-MS identifies RNA-dependent protein associations in living cells.* Submitted. 2023.

(3) Stewart N, Daly J, Krishnamoorthy V, Stark JC, **Riley NM**, Bertozzi CR, Wisnovsky S. *The glyco-immune checkpoint receptor Siglec-7 interacts with T-cell ligands to regulate T-cell activation and signaling.* Submitted. 2023.

(4) Tharp KM, Park S, Timblin GA, Richards AL, Berg JA, Twells NM, **Riley NM**, Peltan EL, Shon DJ, Stevenson E, Tsui K, Palomba F, Lefebvre AEYT, Soens RW, Ayad NME, ten Hoeve-Scott J, Healy K, Digman M, Dillin A, Bertozzi CR, Mahal LK, Swaney DL, Cantor JR, Paszek MJ, Weaver WM. *The microenvironment dictates glycocalyx construction and immune surveillance.* Submitted. 2023. Pre-print available at bioRxiv: 10.1101/2023.06.23.546317

(5) Jiang Y, Schuster D, Neely BA, Rosano GL, Volkmar N, Rex DAB, Egbert SB, Peters-Clarke TM, Kreimer S, Doud EH, Crook OM, Yadav AK, Vanuopadath M, Mayta ML, Duboff AG, **Riley NM**, Meyer JG. *A Comprehensive Overview of Modern Proteomics*. https://jessegmeyerlab.github.io/proteomics-tutorial/

(6) Delaveris, CS, Wang CL, **Riley NM**, Kulkarni RU, Bertozzi CR. *Microglia mediate contact-independent neuronal pruning via secreted Neuraminidase-3 associated with extracellular vesicles.* Submitted. 2023. Pre-print available at bioRxiv: 10.1101/2023.08.21.554214

## D. RESEARCH SUPPORT

**K99/R00 NIH/NIGMS Pathway to Independence Award (GM147304)**
**Capturing the Holistic Glycocode through Systems Glycobiology** **09/01/2022-present**
1 K99 GM147304 K99 Postdoctoral Fellow 09/01/2022-present
**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 08/27/2018-08/31/2022
**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)

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
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:* **43 Oral Presentataions** and **37 Poster Presentations**

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

**Riley Research Group Advisees/Mentees**

**Graduate Students in Ph.D. Program (1):** Anna G. Duboff (summer 2023)
**Postdocs (2):** Emmajay Sutherland (2023-present), Tim Veth (2023-present)

**Courses Taught**

CHEM 321A, Quantitative Analysis, Winter 2024 (upcoming)
CHEM 428/528A, Biomolecular Anayslis, Spring 2024 (upcoming)

**Graduate Admissions 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.

**Graduate Committee Membership** (outside of my group)

Addison E. Roush, UW Chemistry, Bush Group
AnneClaire Wageman, UW Chemistry, Bush Group
Christopher D. McGann, UW Genome Sciences, Schweppe Group

**Other Activities**

2023, Speaker at UW Chemistry Undergraduate Welcome Event

## 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.

**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: **Speakers Bureau Initiative** (2023); **ChatGPT in Chemistry Discussion Panel** (2023); **I. M. Kolthoff Undergraduate Award** (2023).

**Assistant Program Chair**, Pacific Northwest Mass Spectrometry Discussion Group (PacMass), 2023-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.

**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**

- **Co-Chair**, Glycobiology 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

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

**Graduate Leadership and Service Experience**: 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

**Undergraduate Leadership and Service Experience**: 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
Presented a lecture, participated in training events, and served on a panel for a three-day in-person course that provides training from world-leading experts in mass spectrometry and scientific and professional development.

**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.

**Lecturer**, BIOS 227, Mass Spectrometry & Proteomics: Opening the Black Box, Stanford Univ., Winter 2021, 2023
Developed and presented lectures on post-translational mofidications 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 1*: Fundamentals: An introduction to MS-based glycoproteomics, Sept 3, 2020
*Seminar 2*: Reasons to be excited about current efforts in glycoproteomics, Oct 1, 2020

**Graduate and Undergraduate Experience**: Graduate Lecturuer 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 Caorlina.

## I. PEER-REVIEW PARTICIPATION

| | Number of Reviews Completed | | | | |
|---|---|---|---|---|---|
| **Publisher (Example Journals)** | **2019** | **2020** | **2021** | **2022** | **2023** |
| American Chemical Society (An. Chem., JPR, JASMS) | 3 | | 3 | 5 | 5 |
| Nature Pub.Group, Cell Press (Nature Methods/Comms.) | 2 | 3 | 4 | 6 | 5 |
| Other (Mol. & Cell. Proteomics, Molecular Omics, JCB) | 2 | 2 | 3 | 3 | 2 |
| **Total** | **7** | **5** | **10** | **14** | **12** |

## 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
Tegmine Therapeutics, Inc., Scientific Advisor, 2020-present
Cartography Biosciences, Scientific Consultant, 2023-present
Augment Biologics, Scientifc Consultant, 2023-present

## K. HONORS AND AWARDS FULL LIST

*Independent Career*

2023 HUPO Rising Star Award
2023 Rising Star in Glycoscience, Translational Glycomics Center
2023 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 HUPO World Congress Travel Award (combined award from HUPO and US HUPO)
2022 24th International Mass Spectrometry Conference Young Mass Spectometrist 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)