Brandon Mark Gassaway, PhD
Assistant Professor
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Education

Doctor of Philosophy in Cellular and Molecular Physiology *May 2018*
***Yale University**, New Haven, CT*
- Thesis Accepted with Distinction
- Certificate of Completion, Medical Research Scholars Program

B.S. Degree in Biochemistry *April 2011*
***Brigham Young University**, Provo, UT*
- *Magna Cum Laude* with University Honors

Research Experience

Assistant Professor *Jan 2024-current*
Brigham Young University Department of Chemistry & Biochemistry
- Research Focus: Functionalizing protein post-translational modifications using thermal stability proteomics and phospho-amino acid orthogonal translation systems

Post-Doctoral Fellow, Dr. Marcia Haigis *Sept 2021-Dec 2023*
Harvard Medical School Department of Cell Biology
- Research Focus: Applying novel proteomics methods to the investigation of T cell activation and function
- Techniques: Phosphorylation Integrated Thermal Shift Assay, Primary murine T cell isolation and culture

Post-Doctoral Fellow, Dr. Steven Gygi *July 2018-Dec 2023*
Harvard Medical School Department of Cell Biology
- Research Focus: Developing experimental methods and bioinformatics analyses to functionalize proteins and protein phosphorylation
- Techniques: TMT-based quantitative proteomics and phosphoproteomics, protein thermal stability, affinity-purification mass spectrometry

Ph.D. Candidate, Dr. Jesse Rinehart *Aug 2012–May 2018*
Yale Department of Cellular and Molecular Physiology, Systems Biology Institute
- Project: investigating the mechanisms of hepatic insulin resistance by phosphoproteomic analysis
- Techniques: quantitative proteomics and phosphoproteomics, systems analysis, enzyme activity, protein purification and analysis, phosphoserine protein production using orthogonal translation systems

Research Intern, Dr. Lisa Elkin *June 2012-Aug 2012*
Bristol-Myers-Squibb Pharmaceuticals
- Project: development of mass spectrometry based assays for assessment of transporter inhibition
- Techniques: LC-MS/MS (Agilent RapidFire® platform), small molecule lead evaluation, radioactive substrate uptake assays

Research Assistant, Dr. Emily Bates *June 2009–April 2011*
BYU Department of Chemistry and Biochemistry
- Project: the role of inwardly rectifying potassium channels in *Drosophila* embryonic and adult development
- Techniques: phenotypic analysis, *Drosophila* genetics, immunohistochemistry

Teaching Experience

Certificate of College Teaching Preparation/CIRTL Associate *Spring 2018*

Instructor, Dr. Jesse Rinehart and Dr. Terrence Wu — *Spring 2018*
Yale West Campus Analytical Core Proteomics Bootcamp 2018
- Developed and presented curriculum for the design, execution, and data analysis of proteomics experiments
- Designed and carried out hands-on instruction on mass spectrometer instrument maintenance

Teaching Fellow 2, Dr. Emile Boulpaep — *Winter 2014*
Cellular and Molecular Physiology 560
- Designed and presented review material
- Graded homework and exams

Teaching Fellow 2, Dr. Stuart Campbell, Dr. W. Mark Saltzman — *Fall 2012*
Cellular and Molecular Physiology 550 — *Fall 2013*
- Designed and presented weekly review sessions using outside material and review activities
- Helped write exam questions
- Graded homework and exams

Awards, Honors, and Fellowships

Gruber Fellow, Gruber Foundation — *Sept 2011*

Graduate Research Fellow, National Science Foundation — *April 2011*

Kagel and Blessing Scholarship, Blessing Family Foundation — *Jan 2010*
- For non-dance majors in performing groups

Heritage Scholarship, Brigham Young University — *Aug 2005*
- Four years, full tuition

Most Valuable Student Scholarship, National Elks Foundation — *April 2005*

Meetings and Presentations

Speaker. 70th Annual Conference of the American Society of Mass Spectrometry. Rigorous Benchmarking and Improvement of Phosphopeptide Identification and False Localization Rates using a Proteome-scale Synthetic Human Phosphoserine Library. Philadelphia, PA — *Nov 3, 2021*

Poster. Harvard Cell Biology Department Retreat 2019. Investigating Phosphorylation-dependent Protein-protein Interactions in the Bioplex Network. Falmouth, MA — *Oct 9, 2019*

Poster. Harvard Cell Biology Department Retreat 2018. Investigating Phosphorylation-dependent Protein-protein Interactions in the Bioplex Network. Falmouth, MA — *Oct 15, 2018*

Poster. Yale West Campus 10th Anniversary Symposium. Proteomics methods applied to cultural heritage: Identifying proteins in an ancient Roman Shield. West Haven, CT — *Oct 26, 2017*
- Awarded Best Poster

Poster. Yale Cellular and Molecular Physiology Department Annual Retreat. Pyruvate Kinase Phosphorylation is Regulated by Cell Cycle and Nutrient Status with an Unexpected Effect on Enzyme Activity. West Haven, CT — *Sep 22, 2017*
- Awarded Best Poster

Poster. 76th Scientific Sessions of the American Diabetes Association. PKCε and CDKs Regulate Insulin Signaling in Response to a 3-day High Fat Diet. New Orleans, LA — *June 10-14, 2016*

Poster. 64th Annual Conference of the American Society of Mass Spectrometry. PKCε and CDKs Regulate Insulin Signaling in Response to a 3-day High Fat Diet. San Antonio, TX — *June 5-9, 2016*

Poster. 8th United Nations Global Colloquium of University Presidents. Protein Analysis of Dura-Europos Shield Materials. West Haven, CT — *April 13, 2016*

Poster. Yale Cellular and Molecular Physiology Department Annual Retreat. A Quantitative Phosphoproteomic Analysis of Acute Hepatic Insulin Resistance Reveals Novel Regulators of Insulin Signaling. West Haven, CT *Oct 27, 2015*

- Awarded Best Poster

Speaker. HHMI Med-into-Grad Symposium 2015 Metabolism: Fueling Translational Research. A Quantitative Phosphoproteomic Analysis of Mechanisms of Insulin Resistance Reveals a PKCε-Regulated Network. Boston, MA *Oct 9-10, 2015*

Poster. Yale Systems Biology Institute Symposium & Ribbon Cutting Ceremony. A Quantitative Phosphoproteomic Analysis of Mechanisms of Insulin Resistance Reveals a PKCε-Regulated Network. West Haven, CT *April 22, 2015*

Poster. Yale Cellular and Molecular Physiology Department Annual Retreat. A Quantitative Phosphoproteomics Approach to Mechanisms of Hepatic Insulin Resistance II. Phosphoproteomic Analysis. West Haven, CT *Sep 23, 2014*

Poster. MaxQuant Summer School: Computational Mass Spectrometry-Based Proteomics. Quantitative Phosphoproteomic Analysis of Acute Lipid Exposure in Rats Reveals a Direct Regulation of mTOR by AMPK. Bethesda MD. *July 21-25, 2014*

Poster. Yale Cellular and Molecular Physiology Department Annual Retreat. Quantitative Phosphoproteomic Analysis of *abl-1* Knockout in *C. elegans* Embryos. West Haven, CT *Oct 28, 2013*

Speaker. Mass Spectrometry in Biological Applications and New Technologies. Quantitative Phosphoproteomic Analysis of *abl-1* Knockout in *C. elegans* Embryos. West Haven, CT *June 25, 2013*

Publications

Gassaway, B.M., Li, J., Rad, R., Mintseris, J., Mohler, K., Levy, T., Aguiar, M., Beausoleil, S., Paulo, J.A., Rinehart, J., Huttlin, E.L., Gygi, S.P. (2022). A Multi-purpose, Regenerable, Proteome-scale, Human Phosphoserine Resource for Phosphoproteomics. *Nature Methods*, DOI: 10.1038/s41592-022-01638-5

Ferguson, C. J., Urso, O., Bodrug, T., **Gassaway, B. M.,** Watson, E. R., Prabu, J. R., Lara-Gonzalez, P., Martinez-Chacin, R. C., Wu, D. Y., et al. (2022). APC7 mediates ubiquitin signaling in constitutive heterochromatin in the developing mammalian brain. *Molecular Cell*, *82*(1), 90-105.e13.

Huttlin, E.L., Bruckner, R.J., Navarrete-Perea, J., Cannon, J.R., Baltier, K., Gebreab, F., Gygi, M.P., Thornock, A., Zarraga, G., Tam, S., Szpyt, J., **Gassaway, B.M.,** et al. (2021). Dual proteome-scale networks reveal cell-specific remodeling of the human interactome. Cell 184, 3022-3040.e28.

Apostolidi, M., Vathiotis, I.A., Muthusamy, V., Gaule, P., **Gassaway, B.M.,** Rimm, D.L., and Rinehart, J. (2021). Targeting Pyruvate Kinase M2 Phosphorylation Reverses Aggressive Cancer Phenotypes. Cancer Research 81, 4346–4359.

Gassaway, B.M., Paulo, J.A., and Gygi, S.P. (2021). Categorization of Phosphorylation Site Behavior during the Diauxic Shift in Saccharomyces cerevisiae. Journal of Proteome Research 20, 2487–2496.

Ringel, A.E., Drijvers, J.M., Baker, G.J., Catozzi, A., Garcia-Canaveras, J.C., **Gassaway, B.M.,** Miller, B.C., Juneja, V.R., Nguyen, T.H., Joshi, S., et al. (2020). Obesity Shapes Metabolism in the Tumor Microenvironment to Suppress Anti-Tumor Immunity. Cell 183, 1848-1866 e26.

Wu, J., Rowart, P., Jouret, F., **Gassaway, B.M.,** Rajendran, V., Rinehart, J., and Caplan, M.J. (2020). Mechanisms involved in AMPK-mediated deposition of tight junction components to the plasma membrane. American Journal of Physiology-Cell Physiology 318, C486–C501.

Gassaway, B.M., Cardone, R.L., Padyana, A.K., Petersen, M.C., Judd, E.T., Hayes, S., Tong, S., Barber, K.W., Apostolidi, M., Abulizi, A., et al. (2019). Distinct Hepatic PKA and CDK Signaling Pathways Control Activity-Independent Pyruvate Kinase Phosphorylation and Hepatic Glucose Production. Cell Rep 29, 3394-3404.e9.

Codina, A., Renauer, P.A., Wang, G., Chow, R.D., Park, J.J., Ye, H., Zhang, K., Dong, M.B., **Gassaway, B.,** Ye, L., et al. (2019). Convergent Identification and Interrogation of Tumor-Intrinsic Factors that Modulate Cancer Immunity In Vivo. Cell Syst 8, 136-151 e7.

Samuel, V.T., Petersen, M.C., **Gassaway, B.M.,** Vatner, D.F., Rinehart, J., and Shulman, G.I. (2019). Considering the Links Between Nonalcoholic Fatty Liver Disease and Insulin Resistance: Revisiting the Role of Protein Kinase C ε. Hepatology 70, 2217–2220.

Gassaway, B.M., Petersen, M.C., Surovtseva, Y. v, Barber, K.W., Sheetz, J.B., Aerni, H.R., Merkel, J.S., Samuel, V.T., Shulman, G.I., and Rinehart, J. (2018). PKCepsilon contributes to lipid-induced insulin resistance through cross talk with p70S6K and through previously unknown regulators of insulin signaling. Proc Natl Acad Sci U S A 115, E8996–E9005.

D'Lima, N.G., Khitun, A., Rosenbloom, A.D., Yuan, P., **Gassaway, B.M.,** Barber, K.W., Rinehart, J., and Slavoff, S.A. (2017). Comparative Proteomics Enables Identification of Nonannotated Cold Shock Proteins in E. coli. J Proteome Res 16, 3722–3731.

Mohler, K., Aerni, H.R., **Gassaway, B.,** Ling, J., Ibba, M., and Rinehart, J. (2017a). MS-READ: Quantitative measurement of amino acid incorporation. Biochim Biophys Acta Gen Subj 1861, 3081–3088.

Mohler, K., Mann, R., Bullwinkle, T.J., Hopkins, K., Hwang, L., Reynolds, N.M., **Gassaway, B.,** Aerni, H.R., Rinehart, J., Polymenis, M., et al. (2017b). Editing of misaminoacylated tRNA controls the sensitivity of amino acid stress responses in Saccharomyces cerevisiae. Nucleic Acids Res 45, 3985–3996.

Ferdaus, M.Z., Barber, K.W., Lopez-Cayuqueo, K.I., Terker, A.S., Argaiz, E.R., **Gassaway, B.M.,** Chambrey, R., Gamba, G., Rinehart, J., and McCormick, J.A. (2016). SPAK and OSR1 play essential roles in potassium homeostasis through actions on the distal convoluted tubule. J Physiol 594, 4945–4966.

Petersen, M.C., Madiraju, A.K., **Gassaway, B.M.,** Marcel, M., Nasiri, A.R., Butrico, G., Marcucci, M.J., Zhang, D., Abulizi, A., Zhang, X.M., et al. (2016). Insulin receptor Thr1160 phosphorylation mediates lipid-induced hepatic insulin resistance. J Clin Invest 126, 4361–4371.

Rovner, A.J., Haimovich, A.D., Katz, S.R., Li, Z., Grome, M.W., **Gassaway, B.M.,** Amiram, M., Patel, J.R., Gallagher, R.R., Rinehart, J., et al. (2015). Recoded organisms engineered to depend on synthetic amino acids. Nature 518, 89–93.

Sawyer, N., **Gassaway, B.M**., Haimovich, A.D., Isaacs, F.J., Rinehart, J., and Regan, L. (2014). Designed phosphoprotein recognition in Escherichia coli. ACS Chem Biol 9, 2502–2507.

Loffler, M.G., Birkenfeld, A.L., Philbrick, K.M., Belman, J.P., Habtemichael, E.N., Booth, C.J., Castorena, C.M., Choi, C.S., Jornayvaz, F.R., **Gassaway, B.M.,** et al. (2013). Enhanced fasting glucose turnover in mice with disrupted action of TUG protein in skeletal muscle. J Biol Chem 288, 20135–20150.

Dahal, G.R., Rawson, J., **Gassaway, B.,** Kwok, B., Tong, Y., Ptacek, L.J., and Bates, E. (2012). An inwardly rectifying K+ channel is required for patterning. Development 139, 3653–3664.

Personal Information

- Member, American Society of Mass Spectrometry
- Scoutmaster, Boy Scouts of America *2012-2015*
- Performer, BYU International Folk Dance Ensemble *2009-2011*
- Eagle Scout *2001*
- Conversational Proficiency in Ukrainian and Russian