

# Harrison Specht

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## EDUCATION

Northeastern University, Ph.D. Bioengineering, Graduate Student March 2022  
Cornell University, B.A. Chemistry, *magna cum laude* 2014

## RESEARCH EXPERIENCE

*Northeastern University*

Slavov Lab, Bioengineering & Barnett Institute, Post-doc 2022–Present

Slavov Lab, Bioengineering & Barnett Institute, Graduate Student 2016–2022

*Merck, Sharpe & Dohme Corporation*

Merck Exploratory Sciences Division, Coop Spring 2020

*Broad Institute of MIT and Harvard*

Proteomics Platform, Research Associate 2014–2016

*Cornell University, Ithaca, NY*

Petersen Lab, Department of Chemistry, Research Assistant 2012–2014

Zinder Lab, Department of Microbiology, Research Assistant 2010–2011

The Triple Helix, magazine, Executive Editor-in-chief 2013 – 2014

*Bermuda Institute for Ocean Sciences*

National Science Foundation REU Fellow 2013

*Vertex Pharmaceuticals, Boston, MA*

Drug Metabolism and Pharmacokinetics, Internship 2013

## FELLOWSHIPS AND AWARDS

**2021** NSF I-Corps Grant \$10,000 for development of single cell proteomics venture

**2021** Frequency Bio by Pillar VC & Petri [pillar.vc/frequency/](http://pillar.vc/frequency/)

**2020** Rising Stars in Proteomics and Metabolomics, Journal of Proteome Research.

<https://pubs.acs.org/doi/full/10.1021/acs.jproteome.0c01026>

**2019** 2nd place in Chemical Biology, Royal Society of Chemistry Twitter Poster Conference

**2016–** College of Engineering Dean's Distinguished Fellowship, Northeastern University

**2013** Best Oral Presentation, Bermuda Institute for Ocean Science NSF REU Program

## EXPERTISE

**Computational:** Proteomics data processing (DIA, DDA, phospho-, targeted-), transcriptomics and proteomics data integration, protein-set enrichment analysis (PSEA), gene-set enrichment analysis (GSEA), imputation, principal component analysis (PCA), created first computational single cell proteomics data processing pipeline (<https://github.com/SlavovLab/SCoPE2/>), replicated by 'scp' package: <https://bioconductor.org/packages/release/bioc/html/scp.html>)

**Coding and Software:** R, Shiny, MS-Fragger, DIA-NN, SpectroNaut, MaxQuant, Skyline

**Experimental:** Single-cell proteomics, triple-quad and orbitrap-based mass spectrometry proteomics, data dependent (DDA) and data independent (DIA) acquisition, protein and peptide N-terminomics, phosphoproteomics, antibody and chemical enrichment of proteins and peptides, reverse-phase and ERLIC liquid chromatography, robotic sample preparation, cell culture, flow cytometry

## PUBLICATIONS

Derks, J., Leduc, A., Huffman, R.G., **Specht, H.**, Ralser, M., Demichev, V., Slavov, N. Increasing the throughput of sensitive proteomics by plexDIA. biorxiv. 2021. <https://doi.org/10.1101/2021.11.03.467007>

Petelski, A.A., Emmott, E., Leduc, A., Huffman, R.G., **Specht, H.**, Perlman, D.H., Slavov, N. Multiplexed single-cell proteomics using SCoPE2. Nature Protocols. doi: <https://doi.org/10.1101/2021.03.12.435034>

**Specht, H.**, Emmott, E., Petelski, A.A. et al. Single-cell proteomic and transcriptomic analysis of macrophage heterogeneity using SCoPE2. Genome Biol 22, 50 (2021). <https://doi.org/10.1186/s13059-021-02267-5>

**Specht, H.**, Slavov, N., 2021. Optimizing accuracy and depth of protein quantification in experiments using isobaric carriers. J. Proteome Res. 20, 880-887. <https://doi.org/10.1021/acs.jproteome.0c00675>

Keshishian et al. Highly multiplexed quantitative phosphosite assay for biology and preclinical studies. bioRxiv 2020.12.08.415281; doi: <https://doi.org/10.1101/2020.12.08.415281> **In press at Molecular Systems Biology**

Huffman, R.G., Chen, A., **Specht, H.**, Slavov, N., 2019. DO-MS: Data-Driven Optimization of Mass Spectrometry Methods. J. Proteome Res. 18, 2493-2500. <https://doi.org/10.1021/acs.jproteome.9b00039>

**Specht, H.**, Harmange, G., Perlman, D.H., Emmott, E., Niziolek, Z., Budnik, B., Slavov, N., 2018. Automated sample preparation for high-throughput single-cell proteomics. bioRxiv 399774. <https://doi.org/10.1101/399774>

**Specht, H.**, Slavov, N., 2018. Transformative Opportunities for Single-Cell Proteomics. J. Proteome Res. 17, 2565-2571. <https://doi.org/10.1021/acs.jproteome.8b00257>

Khajuria, R.K., Munschauer, M., Ulirsch, J.C., Fiorini, C., Ludwig, L.S., McFarland, S.K., Abduhay, N.J., **Specht, H.**, Keshishian, H., Mani, D.R., Jovanovic, M., Ellis, S.R., Fulco, C.P., Engreitz, J.M., Schütz, S., Lian, J., Gripp, K.W., Weinberg, O.K., Pinkus, G.S., Gehrke, L., Regev, A., Lander, E.S., Gazda, H.T., Lee, W.Y., Panse, V.G., Carr, S.A., Sankaran, V.G., 2018. Ribosome Levels

Selectively Regulate Translation and Lineage Commitment in Human Hematopoiesis. *Cell* 173, 90-103.e19. <https://doi.org/10.1016/j.cell.2018.02.036>

Keshishian, H., Burgess, M.W., **Specht, H.**, Wallace, L., Clauser, K.R., Gillette, M.A., Carr, S.A., 2017. Quantitative, multiplexed workflow for deep analysis of human blood plasma and biomarker discovery by mass spectrometry. *Nat Protoc* 12, 1683–1701. <https://doi.org/10.1038/nprot.2017.054>

## TALKS

**2022. Harrison Specht.** The Scientist, webinar series: [Accessible single cell proteomics by mass spectrometry](#). *Invited*

**2022. Harrison Specht.** Accessible single cell proteomics by mass spectrometry. The Broad Institute of MIT and Harvard's Cell Circuits and Epigenomics seminar series. *Invited*

**2020. Harrison Specht,** Edward Emmott, Aleksandra A. Petelski, R. Gray Huffman, David H. Perlman, Marco Serra, Peter Kharchenko, Antonius Koller, Nikolai Slavov. "How to perform quantitative single cell proteomics with SCoPE2." GenomeWeb Webinar Series. *Invited*

**2020. Harrison Specht,** Edward Emmott, Aleksandra A. Petelski, R. Gray Huffman, David H. Perlman, Marco Serra, Peter Kharchenko, Antonius Koller, Nikolai Slavov. "How to perform quantitative single cell proteomics with SCoPE2." Association of Biomolecular Resource Facilities (ABRF) 2020 Annual Meeting. *Invited*

**2019. Harrison Specht,** Edward Emmott, Aleksandra A. Petelski, R. Gray Huffman, David H. Perlman, Antonius Koller, Nikolai Slavov. "Design of single cell proteomics experiments." Single Cell Proteomics Conference. Boston, MA. 2019.

**2019. Harrison Specht,** Nikolai Slavov. Quantifying proteins by mass spectrometry. Models, Inference, and Algorithms Seminar. Broad Institute of MIT and Harvard. *Chalk-talk*

**2018. Harrison Specht,** Guillaume Harmange, David H Perlman, Edward Emmott, Zachary Niziolek, Bogdan Budnik, Nikolai Slavov. "Automated sample preparation for high-throughput single-cell proteomics." HUPO 2018.

**2018. Harrison Specht,** Guillaume Harmange, David H Perlman, Edward Emmott, Zachary Niziolek, Bogdan Budnik, Nikolai Slavov. "Automated sample preparation for high-throughput single-cell proteomics." Single Cell Proteomics Conference. Boston, MA. 2018.

## POSTERS

**2019. Harrison Specht.** "Automated sample preparation for high-throughput single-cell proteomics." Royal Society of Chemistry Twitter Poster Conference. *Twitter poster presenter* Awarded 2nd place in Chemical Biology category.

**2018.** Hasmik Keshishian, Luke Wallace, **Harrison Specht,** Judit Jan-Valbuena, Rob McDonald, Dale Petterson, Eric Kuhn, Michael Burgess, D. R. Mani, Tomas Rejtar, Javad Golji, Karen Wang, William Sellers, Steven A. Carr. "SigPath300: A high throughput MS-based assay to quantify over 300 phosphosites of known biological relevance in cells and tissues." American Society for Mass Spectrometry Annual Meeting. *Contributor*

**2017.** Bogdan Budnik, Ezra Levy, **Harrison Specht,** Nikolai Slavov. "Exploring cell division dynamics across single cell proteomes." Cold Spring Harbor Laboratories: Single Cell Analyses. *Poster Presenter*

**2017. Harrison Specht**, Ezra Levy, Bogdan Budnik, Nikolai Slavov. “Mass-spectrometry of single mammalian cells quantifies proteome heterogeneity during cell differentiation.” American Society for Mass Spectrometry Annual Meeting. *Poster Presenter*

**2015. Harrison Specht**, Hasmik Keshishian, Rajiv K. Khajuria, et al. “Addressing the challenge of ribosomal protein stoichiometry by proteomics.” Broad Institute of MIT and Harvard Retreat. *Poster Presenter*

**2013. Harrison Specht** and Andrew Peters “Investigating North Atlantic Tar in Bermuda: the hydrocarbon composition of North Atlantic pelagic tar and their hydrocarbon leaching into seawater.” BIOS NEF REU Program. *Presenter*

## **PROFESSIONAL AFFILIATIONS, TRAINING & SERVICE**

- Volunteer for Single Cell Proteomics Conference 2018, 2019, 2021
- Volunteer moderator for Single Cell Proteomics Conference (Zoom) 2020
- Northeastern University Graduate Student Liason, 2018-2019
- Member of Northeastern University Fencing Club
- Member of Barnett Institute for Chemical and Biological Analysis
- eLife Ambassador, 2018
- ASAPbio Ambassador, 2018
- American Society for Mass Spectrometry
- May Institute on computation and statistics for mass spectrometry and proteomics, 2016
- Lab preprint journal club founder

## **REFERENCES**

Available upon request