Matt Niederhuber, PhD

mniederhuber@unc.edu
linkedin.com/in/mniederhuber
github.com/mniederhuber
mattniederhuber.com

I am a molecular biologist and bioinformatician who love's to teach and write about science. I care about beautiful data visualization and am on a mission to convince academics to use containers.

Education

PhD - Genetics & Molecular Biology — 2016 - 2023
University of North Carolina — *Chapel Hill, NC*

- NSF Graduate Research Fellow
- Thesis: "Fine-tuning Enhancer Activity in Development"

Certificate - Premedical Sciences — 2011 - 2013
Columbia University — *New York, NY*

BA - English Literature — 2006 - 2010
Kenyon College — *Gambier, OH*

Experience

Postdoctoral Fellow — November 2023 - Current
Bioinformatics and Analytics Research Collaborative — *UNC - Chapel Hill, NC*

- Led analysis of client projects (sc and bulk RNA, CUT&RUN) using nexflow, Bash, R
- Communicated results to clients with interactive reports (R markdown + plotly),
- Designed plots and figures (Illustrator) for client publications
- Refactored and containerized R codebase for multi-institute COPD RNA-seq study
- Developed LLM-based Python package to automate annotation of SRA metadata
- Wrote and led workshops on R/RStudio, Nextflow, Containerization, and ATAC-seq
- Mentored two entry-level bioinformaticians

Graduate Research Student — August 2016 - October 2023
PI: Dr. Daniel J. McKay — *UNC - Chapel Hill, NC*

- Led two first-author projects on developmental gene regulation and enhancer biology
- Wrote custom analysis of CUT&RUN and FAIRE-seq data in R
- Designed a novel fluorescent reporter system to capture dynamic enhancer activity *in vivo*
- Automated quantification of RNAi-screen confocal imaging with Python

Research Assistant II — June 2014 - July 2016
PI: Dr. Pamela A. Silver — *Harvard Medical School - Boston, MA*

- Led a project studying the cyanobacterial carboxysome using super-resolution microscopy
- Helped characterize a novel bacterial memory device for inflammation detection
- Mentored the 2015 Harvard undergraduate IGEM team

Research Assistant — June 2013 - June 2014
PI: Dr. Jerard Hurwitz — *Memorial Sloan Kettering Cancer Center - New York, NY*

- Hands-on experience with cell culture and standard protein biochemistry methodologies

Teaching

How to Learn to Code - Python (Taught 6 classes)	June 2024
Intro to R/RStudio (1 day workshop)	August 2024
UNC BARC Internal Workshops (ATAC-seq, Nextflow, Containerization)	Feb., April, June 2024

Publications

Academic:

Niederhuber MJ, Leatham-Jensen M, McKay DJ. 2024. The SWI-SNF nucleosome remodeler constrains enhancer activity during *Drosophila* wing development. Genetics.

Niederhuber MJ, McKay DJ. 2021. Mechanisms underlying the control of dynamic regulatory element activity and chromatin accessibility during metamorphosis. COIS.

Nystrom SL*, **Niederhuber MJ***, McKay DJ. 2020. Expression of E93 provides an instructive cue to control dynamic enhancer activity and chromatin accessibility during development. Development. *equal contributors

Naydich AD, Nangle SN, Bues JJ, Trivedi D, Nissar N, Inniss MC, **Niederhuber MJ**, Way JC, Silver PA, Riglar DT. 2019. Synthetic gene circuits enable systems-level biosensor discovery at the host-microbe interface. mSystems.

Niederhuber MJ, Lambert TJ, Yapp C, Silver PA, Polka JK. 2017. Superresolution microscopy of the β-carboxysome reveals a homogeneous matrix. MBoC.

Uyehara CM, Nystrom SL, **Niederhuber MJ**, Leatham-Jensen M, Ma Y, Buttitta LA, McKay DJ. 2017.Hormone-dependent control of developmental timing through regulation of chromatin accessibility.Genes and Developmen t. Genes and Development.

Riglar DT, Giessen TW, Baym M, Kerns JS, **Niederhuber MJ**, Bronson RT, Kotula JW, Gerber GK, Way JC, Silver PA. 2017. Engineered bacteria can function in the mammalian gut long-term as live diagnostics of inflammation. Nature Biotechnology.

Selected Popular (see mattniederhuber.com for full list)*:*

AlphaFold Unlocks Protein Structure Prediction with Artificial Intelligence.
UNC: The Pipettepen, 2021.

UNC Scientists Partner with Citizen Scientists to Map Earth's River Obstructions.
UNC Institute for the Environment, 2019.

CUT&RUN: An Improved Method for Studying Protein-DNA Interactions.
Addgene Blog, 2018.

Making Time Matter: How Hormone Pulses Direct Chromatin Accessibility During Development.
Development: The Node, 2017.

Yes, This Exists: A Biohacker Hotline.
Popular Science, 2013. (out of print)