Coleman Martin

Seattle WA | (970) 481-0615 | coleman.d.martin@gmail.com

https://www.linkedin.com/in/colemanmartin/

Education

Ph.D. Chemical Engineering with Data Science	University of Washington	May 2025
MS Chemical Engineering with Data Science	University of Washington	June 2022
BS Chemical Engineering	Montana State University	December 2019
BS Biological Engineering	Montana State University	December 2019

DISSERTATION

Physicochemical Hydrodynamics and Machine Learning Characterization of Isothermal Nucleic Acid Amplification Nucleation Site Analysis

Advisor: Jonathan Posner

Nucleic Acid testing at the point of care plays a critical role in diagnosing disease. My dissertation details work in developing point-of-care assays using recombinase polymerase amplification for the rapid detection of SARS-CoV-2 and HIV viral load monitoring. The SARS-CoV-2 work has PCR-level sensitivity and specificity with the ease, speed, and interpretability of an antigen test, including a full-process internal control. For HIV, I expanded the dynamic range of quantifiable nucleic acid spotting using viscous dampening and computer vision. This work aims to improve health outcomes through fast and accurate diagnostics.

Experience

Postdoctoral Researcher

University of Washington: Seattle, WA
2020–2025
Posner Research Group

- Designed and optimized recombinase polymerase amplification (RPA) assays for point-of-care detection of HCV viral load quantification

Graduate Researcher

University of Washington: Seattle, WA
2020–2025
Advisor: Dr. Jonathan Posner

- Designed and optimized recombinase polymerase amplification (RPA) assays for point-of-care detection of SARS-CoV-2 and HIV viral load quantification
- Developed a duplex lateral flow readout with integrated internal process controls for viral lysis, reverse transcription, amplification, and detection
- Applied viscous dampening strategies and deep learning (ResNet) to expand quantifiable dynamic range of nucleic acid detection on paper substrates
- Conducted analytical performance characterization including sensitivity, specificity, and limit-of-detection analyses, matching PCR-level performance
- Institute for Translational Health Science TL1 Translational Research Training Fellow
- Chemical and Biological safety officer, won “Leading the Pack” award

Manufacturing Science and Technology (MSAT)

GlaxoSmithKline (GSK) via Atrium Staffing Services: Hamilton, MT
2019

- Evaluated new fermentation media growth components using spectrophotometry and growth curves to support cGMP supply decisions
- Established and wrote SOPs for downstream formulation equipment including rheometer, microfluidizer, and homogenizer
- Optimized external pump system to improve pilot scale microfluidizer performance for downstream R&D
- Characterized product intermediate to support troubleshooting and root cause analysis for filtration issues
- Maintained detailed lab records per cGLP and ALCOA+ standards
- Escalated potential cGMP compliance or safety risks

Undergraduate Research Scientist

Wiedenheft Lab, Montana State University: Bozeman, MT
2017–2019

- Collaborated with a Research Assistant Professor on a genome engineering project utilizing CRISPR-Cas9 technologies
- Established and adapted a reporter assay system to validate CRISPR-Cas9 gene editing outcomes
- Applied cellular cloning and mutagenesis techniques to develop competent E. coli cell lines harboring the reporter of interest
- Transformed bacterial cultures and generated viral stocks for transduction into HEK293 cell lines
- Maintained tissue and virus culture stocks to support gene editing and expression experiments
- Generated lentiviral stocks
- Performed ELISA-based quantification assays to evaluate CRISPR-driven transport and protein expression
- Contributed to a high-impact publication on autonomous CRISPR-Cas9 delivery systems in Nature Structural & Molecular Biology

Publications

Martin, C. D.; Gummalla, N.S.; Shimazu, K.N.; Bender A.T.; Posner, J.D.; The Impact of PEG 35K on Dynamics and the Quantifiable Range of Isothermal Amplification Nucleation Site Analysis, Analytical Chemistry. Prepared.

Martin, C. D.; Benson, N. C.; Gummalla, N.S.; Bender A.T.; Posner, J.D.; Extending the Dynamic Range of Isothermal HIV-1 DNA Amplification Nucleation Site Analysis Using a Residual Neural Network. Prepared.

Martin, C. D.; Bender, A. T.; Sullivan, B. P.; Lillis, L.; Boyle, D. S.; Posner, J. D. SARS-CoV-2 Recombinase Polymerase Amplification Assay with Lateral Flow Readout and Duplexed Full Process Internal Control. Sens. Diagn. 2024, 10.1039.D3SD00246B.

Chia, C. T.; Bender, A. T.; Lillis, L.; Sullivan, B. P.; Martin, C. D.; Burke, W.; Landis, C.; Boyle, D. S.; Posner, J. D. Rapid Detection of Hepatitis C Virus Using Recombinase Polymerase Amplification. PLOS ONE 2022, 17 (10), e0276582.

Sullivan, B. P.; Chou, Y.-S.; Bender, A. T.; Martin, C. D.; Kaputa, Z. G.; March, H.; Song, M.; Posner, J. D. Quantitative Isothermal Amplification on Paper Membranes Using Amplification Nucleation Site Analysis. Lab Chip 2022.

Wilkinson, R. A.; Martin, C.; Nemudryi, A. A.; Wiedenheft, B. CRISPR RNA-Guided Autonomous Delivery of Cas9. Nat Struct Mol Biol 2019, 26 (1), 14–24.

Awards

TL1 Translational Research Training Fellow

- Institute for Translational Health Sciences (ITHS)

"Leading the Pack" Award

- University of Washington (Chemical & Biological Safety Officer role)

Presentations

RAPID SARS-CoV-2 Testing with Duplexed Recombinase Polymerase Amplification and a Bacteriophage Internal Control
MicroTAS 2021 (The 25th International Conference on Miniaturized Systems for Chemistry and Life Sciences)
Palm Springs, CA, USA — October 2021

RAPID SARS-CoV-2 Testing with Duplexed Recombinase Polymerase Amplification and a Bacteriophage Internal Control
ITHS TL1 Summit
Bozeman, MT, USA — June 2023

Isothermal DNA Quantification Using Puncta-based Analysis
Gordon Research Conference
Renaissance Tuscany Il Ciocco, Italy — June 2023

Isothermal DNA Quantification Using Puncta-based Analysis
Gordon Research Seminar
Renaissance Tuscany Il Ciocco, Italy — June 2023

Annual Department Presentations
University of Washington, Department of Chemical Engineering
January 2020
Presented annually 2020–2025 to faculty and peers.

Teaching

CHEM E 340: Transport II (Heat)
Instructor: Prof. Bergsman
University of Washington — Winter 2022

CHEM E 330: Transport I (Fluids)
Instructor: Prof. Adler
University of Washington — Autumn 2024

Students Mentored- undergraduates

Catherine Chia
Biochemistry, University of Washington
- Mary Gates Research Scholar, Husky 100 recipient
- Contributed to SARS-CoV-2 and HCV diagnostic assay projects
- Now at UW Medicine

Zoe Kaputa
Computer Science, University of Washington
- Contributed to ANSA and smartphone-based diagnostic imaging projects
- Now pursuing an M.S. in Computer Science at Stanford University

Hugh X. March
Computer Science, University of Washington
- Mary Gates Research Scholar
- Contributed to ANSA and smartphone-based diagnostic imaging projects
- Now at Databricks

Nandini Gummalla
Cellular and Molecular Neurobiology, University of Washington
- Contributed to ANSA microchip-based diagnostic project