# William Raymond

Bioengineering PhD

2302 Clipper Way, Fort Collins CO, 80524
701-570-8305
williamscottraymond@gmail.com
https://will-raymond.github.io/will_raymond_cv


## Education

**Colorado State University** — Fort Collins, CO
Doctorate of Philosophy - Bioengineering. — Fall 2018 - Spr 2024

- Dissertation title: Stochastic modeling to explore the Central Dogma of molecular biology and to design more informative single-molecule live-cell fluorescence microscopy experiments.

**Colorado State University** — Fort Collins, CO
Bachelor of Science - Chemical and Biological Engineering. GPA: 3.35 — Fall 2012 - Spr 2017
Bachelor of Science - Biomedical Engineering

## Publications

Aguilera et. al. Methods in Quantitative Biology – from Analysis of Single-Cell Microscopy Images to Inference of Predictive Models for Stochastic Gene Expression. UNDER REVIEW. — Contributing Author

Raymond et. al. Identification of potential riboswitch elements in Homo Sapiens mRNA 5'UTR sequences using Positive-Unlabeled machine learning. ACCEPTED FOR PUBLICATION. — 1st Author

Raymond et. al. Using mechanistic models and machine learning to design single-color multiplexed nascent chain tracking experiments. *Frontiers in Cell and Developmental Biology.* 11, 2023. doi: 10.3389/fcell.2023.1151318 — 1st Author

Forero-Quintero et. al. Visualization, quantification and Modeling of Endogenous RNA Polymerase II Phosphorylation at a Single-copy Gene in Living Cells. *Bio-protocol.* 12(14) 2022. doi: 10.21769/BioProtoc.4482. — 2nd Author

Forero-Quintero et. al. Live-cell imaging reveals the spatiotemporal organization of endogenous RNA polymerase II phosphorylation at a single gene. *Nature Communications.* 12(1):3158 2021. doi: 10.1038/s41467-021-23417-0. — 2nd Author

Aguilera et. al. Computational design and interpretation of single-RNA translation experiments. *PLOS Computational Biology.* 15(10) 2019. doi: 10.1371/journal.pcbi.1007425. — 2nd Author

Weber et. al. Identification of gene regulation models from single-cell data. *Physical Biology.* 15(5) 2018. doi: 10.1088/1478-3975/aabc31. — 2nd Author

## Teaching Experience

Course Instructor - Colorado State University — Jan 2023 - May 2023
BIOM 421 - Transport Phenomena

- Instructed senior undergraduate engineering students principles in transport phenomena including topics such as pharmacokinetics, fluid dynamics, mass transport, and FEM / FVM analyses.
- Created an engaging and vibrant learning environment and lecture materials with a focus on applicable real world examples.

Learning Assistant - UQ-Bio summer school — Summer 2021, 2022, 2023 & 2024

- Taught and assisted various levels of student from undergraduate to first year PhD students at the undergraduate quantitative biology summer school across many topics: ODE modeling, Machine learning, Python coding, MCMC, stochastic simulation, and finite state projection.
- Generated lecture materials used for teaching students on topics for learning Python, TASEP modeling, and machine learning. Provided these materials as open source Colab notebooks.

- Fostered a welcoming and collaborative project-focused environment for small groups via mentoring student teams.

Graduate Teaching Assistant - Colorado State University — Fall 2020, Fall 2021
BIOM 421 - Transport Phenomena

- Assisted undergraduate students during one-on-one sessions and office hours.

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**Work Experience**

Research Assistant - Colorado State University — Sept 2017 - Aug 2018

- Developed open source python packages aimed at providing our lab's research to the public and allow fellow scientists to quickly build TASEP-based Nascent Chain Tracking models.

Undergraduate Research Assistant - Colorado State University — Fall 2016 - Summer 2017

- Completed an honors thesis focusing on a Python GUI for solving bursting gene models
- Provided support to a research laboratory with implementing models in Python.

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**Accepted Talks**

UQ-Bio 2023 Guest Lecturer - Fort Collins, Colorado — June 2023

- Gave a 15 minute talk on my dissertation project combining mechanistic mRNA models to extend the color pallette of NCT experiments.
- Presented a poster on my publication "Using mechanistic models and machine learning to design single-color multiplexed nascent chain tracking experiments"

APS March Meeting - Las Vegas, Nevada — March 2023

- Talk title: "Combining mechanistic and statistical models to enable Nascent Chain Tracking for multiple mRNAs using a single color"

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**Conference Attendances**

qCMB Symposium - Fort Collins, Colorado — June 2024
Attendee and poster presenter

- Presented a poster on my publication "Identification of Potential Riboswitch Elements in Homo Sapiens 5'UTR Sequences using Positive-Unlabeled Machine Learning."

Rocky Mountain RNA Symposium - Aurora, Colorado — April 2024
Attendee and poster presenter

- Presented a poster on my publication "Identification of Potential Riboswitch Elements in Homo Sapiens 5'UTR Sequences using Positive-Unlabeled Machine Learning."

qCMB Symposium - Fort Collins, Colorado — June 2023
Attendee and poster presenter

- Gave a 2.5 minute lightning talk advertising my poster.
- Presented a poster on my publication "Using mechanistic models and machine learning to design single-color multiplexed nascent chain tracking experiments"

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**Awards**

Outstanding Graduate Student - Colorado State University — Spring 2023

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**Outreach**

Guest Judge CSU Gradshow - Colorado State University — Fall 2024

Engineering Mentor - Colorado State University — Fall & Spr 2014