

# Zachary Sailer

GRADUATE STUDENT · COMPUTATIONAL EVOLUTIONARY BIOLOGIST · SOFTWARE DEVELOPER

Harms Lab · Department of Chemistry & Biochemistry · University of Oregon

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## Research Interests

I am seeking to understand how protein sequence space shapes protein evolution. How does the distribution of function in sequence space determine evolutionary trajectories? What is the role of epistasis in these spaces? How do the statistical properties of sequence space scale with increasing space size? To answer these questions, I am developing new techniques and software to extract key features of sequence spaces, and then using these tools to study evolutionary trajectories through this space.

## Education

### PH.D. CANDIDATE IN CHEMISTRY AND BIOCHEMISTRY

UNIVERSITY OF OREGON

Eugene, OR

Sep. 2013 - Present

### B.S. IN PHYSICS

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

San Luis Obispo, CA

Sep. 2009 - Jun. 2013

## Research Positions

### GRADUATE RESEARCH ASSISTANT MICHAEL J HARMS

UNIVERSITY OF OREGON

Eugene, OR

Sep. 2013 - Present

### CORE DEVELOPER BRIAN GRANGER

IPYTHON-JUPYTER TEAM

San Luis Obispo, CA

Dec. 2012 - Sep. 2013

### UNDERGRADUATE RESEARCH ASSISTANT JONATHAN FERNLER

CAL POLY SLO

San Luis Obispo, CA

Jun. 2011 - Jul. 2013

## Publications

### SAILER ZS\*, HARMS MJ

“High-order epistasis shapes evolutionary trajectories”

PLOS Computational Biology

In Review

### SAILER ZS\*, HARMS MJ

“Detecting high-order epistasis in nonlinear genotype-phenotype maps”

Genetics

2017

## Honors & Awards

### ART ROSEN MEMORIAL SCHOLAR

TOP STUDENT IN QUANTUM LABORATORY

San Luis Obispo, CA

May 2012

## Presentations

### Poster · “High-order Interactions Create Long-Term Memory in Protein Evolution.”

GIBBS SOCIETY FOR BIOTHERMODYNAMICS

Carbondale, IL

Oct. 2016

### Poster · “Long-term memory in Molecular Evolution Shapes Evolutionary Outcomes.”

PROTEIN FOLDING CONSORTIUM

St. Louis, MO

May 2016

### Poster · “High-order Epistasis in Genotype-Phenotype Maps Shapes Evolutionary Outcomes”

GIBBS SOCIETY FOR BIOTHERMODYNAMICS

Carbondale, IL

Oct. 2015

### Poster · “Long-term memory in molecular evolution shapes evolutionary outcomes.”

PROTEIN FOLDING CONSORTIUM

Berkeley, CA

May 2015

### Speaker · “Dielectric Spectroscopy in Liquid Crystals”

AMERICAN PHYSICS SOCIETY, CALIFORNIA-NEVADA SECTION

San Luis Obispo, CA

Nov. 2012

# Open Source Software

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## **CONTRIBUTOR** JUPYTER NOTEBOOKS

Web application that allows you to create and share documents that contain live code, equations, visualizations and explanatory text.

<https://github.com/jupyter/notebook>

## **CONTRIBUTOR** IPYTHON

Command shell for interactive computing in Python that offers introspection, rich media, shell syntax, tab completion, and history.

<https://github.com/ipython/ipython>

## **CONTRIBUTOR** LATTICEPROTEINS

2d lattice protein simulator written in Python.

<https://github.com/jbloomlab/latticeproteins>

## **OWNER** EPISTASIS

Python API for estimating statistical high-order epistasis in large genotype-phenotype maps.

<https://github.com/harmslab/epistasis>

## **OWNER** GP MAP

Python API for analyzing, manipulating, and simulating large genotype-phenotype map data.

<https://github.com/harmslab/gpmap>

## **OWNER** PHYLOGENETICS

Python API for managing phylogenetic projects, constructing phylogenetic trees, and reconstructing ancestral sequences.

<https://github.com/zsailer/phylogenetics>

# Teaching

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## **COLLABORATING ON CODE**

Guest lecture introducing bioinformatics graduate students to clone, sharing, and collaborating on code using Git and Github (20 students).

July 2016

## **GENERAL CHEMISTRY LABORATORY**

Introduce undergraduates to general chemistry laboratory techniques (40 students).

2013-2014

# Mentoring

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**THOMAS BAILEY** Biochemistry Graduate Student

Winter 2017

**ABRAHAM RICKETT** Biochemistry Undergraduate student

Winter 2015 - Present

**SOFIE CHRISTIE** Academy for Science and Engineering High School Intern

Summer 2015