

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 physicist, turned software developer, turned evolutionary biologist. Having worked in the biological sciences throughout my graduate career, I have been acutely aware that they lag behind in software. I would like to push to field into the modern software world by leveraging and developing tools like Jupyter, XX, and XX.

Education

PH.D. IN CHEMISTRY AND BIOCHEMISTRY

UNIVERSITY OF OREGON

Eugene, OR

Sep. 2013 - June 2018

B.S. IN PHYSICS

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

San Luis Obispo, CA

Sep. 2009 - Jun. 2013

Research Positions

GRADUATE RESEARCH STUDENT MICHAEL J HARMS, PhD

UNIVERSITY OF OREGON

Eugene, OR

Sep. 2013 - Present

CORE DEVELOPER BRIAN GRANGER, PhD

IPYTHON-JUPYTER TEAM

San Luis Obispo, CA

Dec. 2012 - Sep. 2013

UNDERGRADUATE RESEARCH STUDENT JONATHAN FERNLER, PhD

CAL POLY SAN LUIS OBISPO

San Luis Obispo, CA

Jun. 2011 - Jul. 2013

Publications

SAILER ZS*, HARMS MJ

“Molecular ensembles make evolution unpredictable”

PNAS

2017

SAILER ZS*, HARMS MJ

“High-order epistasis shapes evolutionary trajectories”

PLOS Computational Biology

2017

SAILER ZS*, HARMS MJ

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

Genetics

2017

SAILER ZS*, HARMS MJ

“Epistasis as uncertainty.”

In Prep

2018

SAILER ZS*, SUMMERS RL, SHAFIK SH, JOULE A, MARTIN RE, AND HARMS MJ

“Predicting evolutionary trajectories towards chloroquine resistance in a plasmodium falciparum genotype-phenotype map.”

In Prep

2018

Presentations

Invited Talk · “Resurrecting ancient proteins in Python.”

SciPy

Austin, TX

July. 2018

Invited Talk · “How Jupyter makes experimental and computational collaborations easy”

JUPYTERCON

NYC, NY

Aug. 2017

Invited Talk · “High-order epistasis makes evolution unpredictable”

SOCIETY OF MOLECULAR BIOLOGY AND EVOLUTION

Austin, TX

Jul. 2017

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

Invited Talk · “Dielectric Spectroscopy in Liquid Crystals”

San Luis Obispo, CA

AMERICAN PHYSICS SOCIETY, CALIFORNIA-NEVADA SECTION

Nov. 2012

Highlighted Open-Source Software

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>

CONTRIBUTOR BIOPYTHON

Python tools for computational molecular biology.

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

CONTRIBUTOR NETWORKX

Python package for complex networks.

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

OWNER NX_ALTAIR

NetworkX graphs in Altair.

https://github.com/zsailer/nx_altair

OWNER PANDAS_FLAVOR

The easy way to write your own flavor of Pandas.

https://github.com/zsailer/pandas_flavor

OWNER EPISTASIS

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

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

OWNER GPMAP

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

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

OWNER PHYLOPANDAS

Pandas DataFrames for Phylogenetics

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

OWNER PHYLOVEGA

Declarative tree visualizations in Python powered by Vega

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

OWNER PHYLOGENETICS

Python API for managing phylogenetic projects

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

OWNER PYASR

Ancestral Sequence Reconstruction in Python

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

Honors & Awards

SCHOLARSHIP RECIPIENT

SCI-PY 2017

Austin, TX

July 2018

TRAVEL AWARD

JUPYTERCON 2017

New York City, NY

August 2017

SCHOLARSHIP RECIPIENT

SciPy 2017

Austin, TX

July 2017

ART ROSEN MEMORIAL SCHOLAR

TOP STUDENT IN QUANTUM LABORATORY

San Luis Obispo, CA

May 2012

Teaching

REPRODUCIBILITY AND OPEN SCIENCE POWERED BY JUPYTER

June 2018

Guest lecture introducing bioinformatics graduate students to Jupyter Lab, Binder, and RISE for reproducible research. (20 students)

WORKING ON GITHUB AS A TEAM

September 2017

Guest lecture introducing bioinformatics graduate students how to contribute to open source projects on Github. (20 students)

REPRODUCIBILITY AND OPEN SCIENCE POWERED BY JUPYTER

July 2017

Guest lecture introducing bioinformatics graduate students to the Jupyter Notebook and how it can be used for reproducible research. (20 students)

SCIENTIFIC PYTHON COURSE (TA)

March-June 2017

Introduce graduate students to scientific computing, basic machine-learning, and image processing in Python. (20 students)

COLLABORATING ON CODE

July 2016

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

GENERAL CHEMISTRY LABORATORY (TA)

2013-2014

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

Mentoring

LEANDER GOLDBACH INTERNATIONAL MASTERS STUDENT

May 2018 - August 2018

adas

DOUG SCHUETT SUMMER PROGRAM FOR UNDERGRADUATE RESEARCH (SPUR) STUDENT

Summer 2018

adas

THOMAS BAILEY BIOCHEMISTRY GRADUATE STUDENT

Winter 2017

adas

ABRAHAM RICKETT BIOCHEMISTRY UNDERGRADUATE STUDENT

Winter 2015 - Spring 2017

adas

SOFIE CHRISTIE ACADEMY FOR SCIENCE AND ENGINEERING HIGH SCHOOL INTERN

Summer 2015

adas