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 by 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 — *Eugene, OR*
University of Oregon — *Sep. 2013 - June 2018*

B.S. in Physics — *San Luis Obispo, CA*
California Polytechnic State University — *Sep. 2009 - Jun. 2013*

Research Positions

Graduate Research Student Michael J Harms, PhD — *Eugene, OR*
University of Oregon — *Sep. 2013 - Present*

Core Developer Brian Granger, PhD — *San Luis Obispo, CA*
IPython-Jupyter Team — *Dec. 2012 - Sep. 2013*

Undergraduate Research Student Jonathan Fernler, PhD — *San Luis Obispo, CA*
Cal Poly San Luis Obispo — *Jun. 2011 - Jul. 2013*

Publications

Sailer ZS*, Harms MJ — *PNAS*
"Molecular ensembles make evolution unpredictable" — *2017*

Sailer ZS*, Harms MJ — *PLOS Computational Biology*
"High-order epistasis shapes evolutionary trajectories" — *2017*

Sailer ZS*, Harms MJ — *Genetics*
"Detecting high-order epistasis in nonlinear genotype-phenotype maps" — *2017*

Sailer ZS*, Harms MJ — *In Prep*
"Epistasis as uncertainty." — *2018*

Sailer ZS*, Summers RL, Shafik SH, Joule A, Martin RE, and Harms MJ — *In Prep*
"Predicting evolutionary trajectories towards chloroquine resistance in a plasmodium falciparum genotype-phenotype map." — *2018*

Presentations

Invited Talk · "Resurrecting ancient proteins in Python." — *Austin, TX*
SciPy — *July. 2018*

Invited Talk · "How Jupyter makes experimental and computational collaborations easy" — *NYC, NY*
JupyterCon — *Aug. 2017*

Invited Talk · "High-order epistasis makes evolution unpredictable" — *Austin, TX*
Society of Molecular Biology and Evolution — *Jul. 2017*

Poster · "High-order Interactions Create Long-Term Memory in Protein Evolution." — *Carbondale, IL*
Gibbs Society for Biothermodynamics — *Oct. 2016*

Poster · "Long-term memory in Molecular Evolution Shapes Evolutionary Outcomes." — *St. Louis, MO*
Protein Folding Consortium — *May 2016*

Poster · "High-order Epistasis in Genotype-Phenotype Maps Shapes Evolutionary Outcomes" — *Carbondale, IL*
Gibbs Society for Biothermodynamics — *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"
American Physics Society, California-Nevada Section
San Luis Obispo, CA
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
SciPy 2017
Austin, TX
July 2018

Travel Award
JupyterCon 2017
New York City, NY
August 2017

Scholarship Recipient *Austin, TX*

SciPy 2017 *July 2017*

Art Rosen Memorial Scholar *San Luis Obispo, CA*

Top student in Quantum Laboratory *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*

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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*

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Sofie Christie Academy for Science and Engineering High School Intern *Summer 2015*

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