

# Zhengqiao Zhao, PhD

GRADUATE RESEARCHER, DREXEL UNIVERSITY

Philadelphia, PA 19104

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## Research Summary

I'm a data scientist and bioinformatician with key talents in research, manuscript writing, and mentoring. I have successfully developed efficient machine learning algorithms to uncover hidden signals in genomic data and text data over the past 6 years. I am experienced in meeting tight deadlines, cross-disciplinary collaboration, and communicating data-driven solutions to a wide variety of stakeholders.

In my graduate studies, I've taken on various leadership roles, including instructing undergraduate courses/laboratories, mentoring undergraduate/graduate research assistants, and coordinating cross-disciplinary research projects. I was awarded the Research Excellence Award and Teaching Assistant Excellence Award by the Drexel Graduate College for my exemplary commitments to innovative research and student learning.

## Education

### Drexel University

DOCTOR OF PHILOSOPHY, ELECTRICAL & COMPUTER ENGINEERING

Philadelphia, PA

2016 - 2020

- Mentor: Gail L. Rosen PhD
- Lab: Ecological and Evolutionary Signal-Processing and Informatics
- Thesis: Improvements in machine learning for predicting taxon, phenotype and function from genetic sequences

### Drexel University

MASTER OF SCIENCE, ELECTRICAL ENGINEERING

Philadelphia, PA

2014 - 2016

### Northwestern Polytechnical University

BACHELOR OF ENGINEERING, ELECTRONICS AND INFORMATION ENGINEERING

Xi'an, China

2010 - 2014

## Awards & Honors

2020	<b>Research Excellence Awards</b> , The Graduate College of Drexel University	Philadelphia, PA
2019	<b>Teaching Assistant Excellence Award</b> , The Graduate College of Drexel University	Philadelphia, PA
2018	<b>Finalist, Teaching Assistant Excellence Award</b> , The Graduate College of Drexel University	Philadelphia, PA
2018	<b>Leroy L. Resser Endowed Fellowship</b> , The Drexel University College of Engineering	Philadelphia, PA
2017	<b>Lee Smith Traveling Fellowship</b> , The Graduate College of Drexel University	Philadelphia, PA
2016-18	<b>Graduate College Fellowship</b> , The Graduate College of Drexel University	Philadelphia, PA
2016	<b>Outstanding Promising Award (Honorable Mention)</b> , The Graduate College of Drexel University	Philadelphia, PA
2014-16	<b>Dean's Fellowship</b> , The Drexel University College of Engineering	Philadelphia, PA

## Working Experience

2019.6-8	<b>Senior Data Scientist, Analyst Internship Program (AIP)</b> , Capital One	Richmond, VA
2015.6-9	<b>Electrical Engineering Intern</b> , Kulicke & Soffa	Fort Washington, PA

## Professional Affiliations

- 2016.6- **IEEE Eta Kappa Nu (HKN)**
- 2016.1- **Institute of Electrical and Electronics Engineers**

## Scientific Contributions

### Peer Reviewed Journal Articles

- **Zhengqiao Zhao**, Bahrad A. Sokhansanj, Charvi Malhotra, Kitty Zheng, Gail Rosen, (2020). Genetic grouping of SARS-CoV-2 coronavirus sequences using informative subtype markers for pandemic spread visualization. *PLoS Computational Biology* [PLoS]
- **Zhengqiao Zhao**, Alexandru Cristian, Gail Rosen, (2020). Keeping up with the genomes: efficient learning of our increasing knowledge of the tree of life. *BMC Bioinformatics* [BMC]
- **Zhengqiao Zhao**, Stephen Woloszynek, Felix Agbavor, Joshua Chang Mell, Bahrad A. Sokhansanj, Gail Rosen, (2020). Learning, Visualizing and Exploring 16S rRNA Structure Using an Attention-based Deep Neural Network. *Cold Spring Harbor Laboratory* [bioRxiv]

- Taha Valizadehaslani, **Zhengqiao Zhao**, Bahrad A. Sokhansanj, Gail Rosen, (2020). Amino Acid k-mer Feature Extraction for Quantitative Antimicrobial Resistance (AMR) Prediction by Machine Learning and Model Interpretation for Biological Insights. *Biology* [MDPI]
- Stephen Woloszynek, **Zhengqiao Zhao**, Jian Chen, and Gail L. Rosen, (2019). 16S rRNA sequence embeddings: Meaningful numeric feature representations of nucleotide sequences that are convenient for downstream analyses. *PLOS Computational Biology* [PLOS]
- Stephen Woloszynek, Joshua Chang Mell, **Zhengqiao Zhao**, Gideon Simpson, Michael P. O'Connor, and Gail L. Rosen, (2019). Exploring thematic structure and predicted functionality of 16S rRNA amplicon data. *PLoS ONE* [PLOS]

## Chapters and Reviews

- Cullen, Chad M. and Aneja, K. and Beyhan, S. and Cho, C. and Woloszynek, S. and Convertino, M. and McCoy, S. and Zhang, Y. and Anderson, M. and Alvarez-Ponce, D. and Smirnova, E. and Karstens, L. and Dorrestein, P. and Li, H. and Sen G. and Cheung, K. and Powers, J. and **Zhao, Z.** and Rosen, G., (2020). Emerging Priorities for Microbiome Research. *Frontiers in Microbiology* [Frontiers]
- S. Woloszynek, **Z. Zhao**, G. Ditzler, J. Price, E. Reichenberger, Y. Lan, J. Chen, J. Earl, S. Langroodi, G. Ehrlich, G. Rosen, (2018). Analysis Methods for Shotgun Metagenomics. Book chapter for *Theoretical and Applied Aspects of Systems Biology*, Editors: F. A. Silva, N. Carels, F. P. Silva Junior. [Springer]

## Conference Papers and Patent applications

- **Zhengqiao Zhao**, Gail Rosen, (2018). Multi-temporal Information Object Incremental Learning Software System. *The United States Patent and Trademark Office Patent Application: us15/910845* [USPTO]
- **Zhengqiao Zhao**, Jason Rollins, Linge Bai, Gail Rosen, (2017). Incremental Author Name Disambiguation in Scientific Citation Dataset. *4th IEEE international conference on Data Science and Advanced Analytics* [IEEE]
- Marco A Janko, **Zhengqiao Zhao**, Moshe Kam, Yon Visell, (2018). A partial contact frictional force model for finger-surface interactions. *IEEE Haptics Symposium 2018* [IEEE]

## Invited Talks

- **Zhengqiao Zhao**, Gail Rosen, (2020). Visualizing and Annotating Protein Sequences using Deep Neural Network. Invited oral presentation at *54th Annual Asilomar Conference on Signals, Systems, and Computers* [IEEE]
- **Zhengqiao Zhao**, Stephen Woloszynek, Felix Agbavor, Joshua Chang Mell, Gail Rosen, (2019). Learning, Visualizing and Exploring 16S rRNA Structure Using an Attention-Based Deep Neural Network. Invited Keynote speaker at *2019 IMMID Workshop on Applications of Artificial Intelligence to Microbial Genomics in Health and Disease* [Drexel University, College of Medicine]
- **Zhengqiao Zhao**, Jason Rollins, Linge Bai, Gail Rosen, (2017). Incremental Author Name Disambiguation in Scientific Citation Dataset. Invited oral presentation and poster at *4th IEEE international conference on Data Science and Advanced Analytics* [IEEE]
- **Zhengqiao Zhao**, (2017). Machine Learning in an Evolving Domain. Presented at *Scholars Share: Conversations on Graduate Student Research* [Drexel University, Graduate College]

## Poster Presentations

- **Zhengqiao Zhao**, Bahrad A. Sokhansanj, Gail Rosen, (2020). Genetic Grouping of SARS-CoV-2 Coronavirus Sequences using Informative Subtype Markers (ISM) for Pandemic Spread Visualization. 4th Drexel Emerging Graduate Scholars (DEGS) Conference, Drexel University, PA, 2020.
- **Zhengqiao Zhao**, Stephen Woloszynek, Felix Agbavor, Joshua Chang Mell, Gail Rosen, (2019). Visualizing and Exploring 16S rRNA Using an Attention-based Deep Neural Network. 3rd Drexel Emerging Graduate Scholars (DEGS) Conference, Drexel University, PA, 2019.
- **Zhengqiao Zhao**, Gail Rosen. Incremental Machine Learning for Big Data. (1) DIG's 10th Annual Research Symposium, Drexel University, Philadelphia, PA, 2018, (2) 2nd Drexel Emerging Graduate Scholars (DEGS) Conference, Drexel University, PA, 2018.
- **Zhengqiao Zhao**, Jason Rollins, Linge Bai, Gail Rosen, (2017). Incremental Author Name Disambiguation in Scientific Citation Dataset. Invited oral presentation and poster at *4th IEEE international conference on Data Science and Advanced Analytics* [IEEE]

## Software and Packages

- sequence\_attention. **Zhengqiao Zhao**, Python package
- ncov\_ism. **Zhengqiao Zhao**, command-line interface

## Media Coverage

- Cover Art: Genetic grouping of SARS-CoV-2 coronavirus sequences using informative subtype markers for pandemic spread visualization. *PLOS Computational Biology*. 2020.
- Genetic Tracing "Barcode" Is Rapidly Revealing COVID-19's Journey and Evolution. The Drexel University College of Engineering. 2020.

## Didactic

### TEACHING

## Statistical Analysis of Metagenomes

GAIL L. ROSEN PHD

- Lecturer: Introduction to microbiome data science using QIIME 2

Drexel University

2020

## Multi-Disciplinary Digital Signal Processing

GAIL L. ROSEN PHD

- Lecturer: Introduction to Hidden Markov Models

Drexel University

2019

## Computing and Control

ECE-403

- Teaching assistant

Drexel University

2019

## Programming for Engineers

ECE-203

- Teaching assistant

Drexel University

2018

## MENTORING

### Melissa Gray

UNDERGRADUATE, COMPUTER ENGINEERING

- Projects: incremental taxonomic classification

Drexel University

2020

### Felix Agbavor

UNDERGRADUATE, BIOMEDICAL ENGINEERING

- Projects: host phenotype prediction

Drexel University

2017

## Conferences Attended

- |      |  |              |
|------|--|--------------|
| 2020 | <b>Asilomar 2020, the 54th Annual Asilomar Conference on Signals, Systems, and Computers</b>   | Online       |
| 2019 | <b>SciPy 2019, the 18th annual Scientific Computing with Python Conference</b>                 | Austin, TX   |
| 2017 | <b>DSAA 2017, the 4th IEEE international conference on Data Science and Advanced Analytics</b> | Tokyo, Japan |

## Skills

**Programming** Python, TensorFlow, Matlab, Bash, SQL, regex, Git, cluster computing,  $\text{\LaTeX}$