

# Zhengqiao Zhao, PhD

GRADUATE RESEARCHER, DREXEL UNIVERSITY

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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>Lerey 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]

## 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

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2020 **Asilomar 2020, the 54th Annual Asilomar Conference on Signals, Systems, and Computers**

*Online*

2019 **SciPy 2019, the 18th annual Scientific Computing with Python Conference**

*Austin, TX*

2017 **DSAA 2017, the 4th IEEE international conference on Data Science and Advanced Analytics**

*Tokyo, Japan*

## Skills

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