

# JAESEOK PARK, PHD

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## Skills

### LANGUAGES/TOOLS

Python  
Pandas  
Numpy  
NLTK  
Scikit-Learn  
Git  
SQL  
StyleGAN2-ADA

### MACHINE LEARNING

Regression Analysis  
Classification  
Clustering  
Natural Language Processing  
Web-Scraping  
Neural Networks

### VISUALIZATION

Seaborn  
Matplotlib

### BIOLOGY

Plasmid Cloning  
FISH  
CRISPR-Cas9  
Mutagenesis  
Molecular Genetics  
Confocal Microscopy  
ImageJ

## Education

Massachusetts  
Institute of Technology  
Ph.D. Biology 2019

Rice University  
B.S. Biochemistry and Cell  
Biology 2014

## Experience

### Metis

Data Scientist

Remote  
Sept. 2020 to Dec. 2020

Completed a 12-week ACCTE-accredited data science training program that focuses on projects solving business problems. Designed and built end-to-end projects using statistical models and machine learning algorithms.

#### Selected work includes:

#### DeepFlag: the Deep-Learning Flag Generator

- Trained a Generative Adversarial Network (GAN) framework, specifically StyleGAN2-ADA developed by NVIDIA, on 1300 flags of nation-states, municipalities, and organizations.
- The trained network generated novel, realistic flag designs as well as artistic ones
- Implies that the design of commercial logos, as well as pure art, can be aided by deep-learning techniques

#### Song Lyrics Analysis

- Analyzed past 30 years of popular U.S. pop songs using unsupervised learning techniques (e.g. TF-IDF, NMF) and natural language processing
- Further performed K-means clustering and principal component analysis (PCA) to extract and visualize past business trends in the music industry

#### Predicting Clinical Classification of Human Genetic Variants

- Created a classification model that predicts whether a given human genetic variation will be pathogenic or benign using an ensemble of bioinformatic metrics
- Tested various machine learning classification algorithms (logistic regression, KNN, gradient-boosted classifier). The final model employed the XGBoost classifier with an F1 score of 0.88
- Created an interactive Streamlit app showcasing the project

### Boston Children's Hospital/Harvard Medical School

Postdoctoral Researcher

Boston, MA  
Sept. 2019 to Aug. 2020

In the Division of Infectious Diseases @ Boston Children's Hospital completed doctoral thesis work on understanding the molecular mechanisms of pathogen detection in the model organism *C. elegans*.

### Massachusetts Institute of Technology

Graduate Researcher and TA

Cambridge, MA  
Sept. 2014 to Sept. 2019

- Headed a project that sought to understand and elucidate the molecular pathway that the microscopic roundworm *Caenorhabditis elegans* uses to detect the secondary metabolite secreted by the pathogen *Pseudomonas aeruginosa*.
- Graduate thesis work was titled "Genetic analysis of cGMP-dependent chemosensory signal transduction pathways in the detection of bacterial metabolites by *C. elegans*".
- Worked as TA for two semesters (Molecular Neurobiology and Introductory Biology). Earned the Gene Brown — Merck Teaching Award for the school year 2015-2016.

### Rice University

Undergraduate Research Assistant

Houston, TX  
Jan. 2013 to Aug. 2014

Utilizing the organism *Arabidopsis thaliana*, worked on various projects studying plant cell biology and molecular genetics.

### Baylor College of Medicine

Project Intern

Houston, TX  
Jan. 2012 to Dec. 2012

Worked on biological questions in human metabolism using patient samples of HIV and sepsis patients.

## Publications

Park J, Meisel JD, Kim DH. Immediate activation of chemosensory neuron gene expression by bacterial metabolites is selectively induced by distinct cyclic GMP-dependent pathways in *Caenorhabditis elegans*. *PLoS Genet.* 2020 Aug 10;16(8):e1008505. doi: 10.1371/journal.pgen.1008505. PMID: 32776934; PMCID: PMC7416920.

Rinaldi MA, Fleming WA, Gonzalez KL, Park J, Ventura MJ, Patel AB, Bartel B. The PEX1 ATPase Stabilizes PEX6 and Plays Essential Roles in Peroxisome Biology. *Plant Physiol.* 2017 Aug;174(4):2231-2247. doi: 10.1104/pp.17.00548. Epub 2017 Jun 9. PMID: 28600347; PMCID: PMC5543962.

Rinaldi MA, Patel AB, Park J, Lee K, Strader LC, Bartel B. The Roles of  $\beta$ -Oxidation and Cofactor Homeostasis in Peroxisome Distribution and Function in *Arabidopsis thaliana*. *Genetics.* 2016 Nov;204(3):1089-1115. doi: 10.1534/genetics.116.193169. Epub 2016 Sep 7. PMID: 27605050; PMCID: PMC5105844.