

ZOE FORREST ELKINS, PH.D.

Data Scientist

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EDUCATION

Ph.D. in Biological Sciences (Quantitative Genetics)

University of Missouri-Columbia

Aug 2016 – Dec 2022

Columbia, MO

Dissertation: The evolution and genetic basis of complex traits in *Drosophila melanogaster*

Advisor: Dr. Elizabeth G. King

B.S. in Computer Science & Psychology

Drake University

Aug 2012 – May 2016

Des Moines, IA

PROFESSIONAL WORK

Data Scientist

VEDA Data Solutions

Mar 2023 – Feb 2025

Remote

- Created, optimized, and automated weekly key performance indices (KPIs) for geolocation software
- Collaborated with software engineers on overhaul of geolocation software
- Performed root-cause and geospatial analyses of geo-location data
- Built out a PostGIS+PostgreSQL database for client healthcare data
- Conceived and implemented a tool to calculate network adequacy based on Centers for Medicare & Medicaid Services (CMS) guidelines
- Created, trained and implemented a machine learning anomaly detection algorithm into an existing software development kit
- Implemented new software features and unit tests with 100% coverage
- Conducted A/B tests between software in development and production environments, and between feature branches
- Developed full-stack KPI performance and interactive geospatial map dashboard microsites for internal stakeholders
- Presented my software improvements and KPI metrics at company All-Hands
- Data:** GeoJSON- and non-GeoJSON-formatted spatial data dictionaries; ESRI ARCGIS, USPS & Smarty address data, health provider data, CMS National Plan and Provider Enumeration System data
- Techs:** Python, SQL, Amazon DynamoDB, Postgres, PostGIS, SQLite, Unit tests, DBeaver, Navicat, VS Code
- Stats:** A/B testing, anomaly detection modeling, unsupervised/supervised machine learning algorithms, regression analyses, root-cause analyses

Science Writer

Columbia Daily Tribune

June 2018 – June 2019

Columbia, MO

- Contributed the weekly 'Ask a Scientist' column to the Columbia Daily Tribune
- Answered science questions from local gradeschool students

Marketing Intern

Health Alliance

May 2014 – Aug 2014

Champaign, IL

- Managed and updated client records on Salesforce
- Participated in call campaigns to update in-network provider data
- Techs:** Salesforce, Excel

SOFTSKILLS

Critical Thinking

Problem Solving

Open-mindedness

Team Work

Adaptability

Professionalism

Work Under Pressure

Learning Potential

STRENGTHS

Data Science

Python

SQL

MLOps

R

MATLAB

JAVA

JavaScript

tidyverse

NumPy

Pandas

scikit-learn

Jupyter notebooks

Git

Unix/*nix

Bash scripting

Data visualization

GeoPandas

ipyleaflet

plotly+mapbox

Quarto

CSS/SCSS

Markdown

High-throughput computing

SLURM

Batch processing

Development Tools – DB

Amazon DynamoDB

SQL

SQLite

MongoDB

PostgreSQL

Development Tools – IDE & Text Editor

VS Code

DBeaver

Navicat

RStudio

Vim

Emacs

Node.js

XCode

Machine Learning & Statistics

A/B testing

Supervised & unsupervised ML

Anomaly detection

NLP

Regression analyses

Bayesian analyses

Monte Carlo methods

Artificial neural networks (ANN)

Survivorship analyses

Evolutionary algorithms

An OpenDyslexic version of this CV can be found here:

OpenDyslexic CV

GRADUATE WORK

Starvation resistance in an evolved multiparent population of the fruit fly (*Drosophila melanogaster*)

Project lead

📅 Aug 2019 – Dec 2022

- Designed an experiment and collected data at twelve-hour intervals every day for two months
- Managed and mentored an undergraduate student in data collection, management and analysis
- Spearheaded the statistical analysis of our survivorship data
- Interpreted and communicated study results for scientific audiences
- **Techs:** RMarkdown, Tidyverse, Git, PowerPoint
- **Stats:** Kaplan-Meier survival analysis, Cox proportional hazard model, multivariate regression, AIC model comparison

Modeling statistical error due to coverage variation in pooled-sequencing DNA experiments

Project lead

📅 Dec 2022

- Identified opportunity to improve genomic analysis
- Simulated statistical error pipeline in a pooled-sequencing experimental framework due to variation in sequencing coverage
- Simulated data from random probability distributions
- Conducted an analysis of allele estimation across multiple sequencing coverages and calculated statistical error
- **Techs:** Quarto Markdown, Tidyverse, reveal.js, LaTeX, Git
- **Stats:** Binomial sampling, error estimation

Exploration behavior in *D. melanogaster*

Project lead

📅 July 2018 – Dec 2022

- Collaboratively developed experimental design, analyses, and manuscript composition
- Cleaned and prepared genomic data for analysis
- Performed data management of large genomic datasets
- Conducted linear regression and randomization analyses on data
- Visualized data using ggplot2
- **Techs:** RMarkdown, Tidyverse, Bash scripting, GATK/BWA, SLURM, Git, Unix
- **Stats:** Monte Carlo randomization method, FDR/FWER significance testing, null distribution simulation

PRESENTATIONS

📄 Oral

The genetic basis and evolution of complex traits in *Drosophila melanogaster*

Dissertation Defense Seminar

📅 Dec 2022

📍 Columbia, MO

The genetic basis and evolution of complex traits in *Drosophila melanogaster*

Life Sciences Fellowship Seminar

📅 2021

📍 Columbia, MO

Escaping the warming climate: from penguins to fruit flies

Public lecture – Daniel Boone Regional Library

📅 2019

📍 Columbia, MO

📄 JOURNAL ARTICLES

- Lazareva, O.F., Paxton Gazes, R., Elkins, Z. *et al.* Associative models fail to characterize transitive inference performance in rhesus monkeys (*Macaca mulatta*). *Learn Behav* **48**, 135-148 (2020). <https://doi.org/10.3758/s13420-020-00417-6>
- Diamond, P., Elkins, Z., Huff, K., Naylor, L., Schoeberle, S., White, S., Urness, T., Zwiernick, M. Identifying splice sites of messenger RNA using Support Vector Machines. *Midwest Instruction and Computing Symposium, Conference Proceedings* (2016).

TEACHING

Genetics

Teaching Assistant

📅 Fall 2021 & 2022

📍 U. of Missouri

Taught on topics ranging across the field of genetics to upper-class undergraduate students

Biology for Non-Majors

Teaching Assistant

📅 Fall 2020 & Spring 2022

📍 U. of Missouri

Taught in-person, hands-on laboratory coursework to undergraduate students

Undergraduate Research Mentor

Mentee: Jordyn Moaton

📅 2019 – 2021

📍 U. of Missouri

Topic: statistical analysis of fruit fly survivorship due to starvation

Evolution

Teaching Assistant

📅 Spring 2019

📍 U. of Missouri

Graded coursework and proctored exams for Dr. Elizabeth King's Evolution undergraduate course.

OUTREACH

Head Representative

Coalition of Graduate Workers

📅 2018 – 2020

- Led the Coalition of Graduate Workers' Representative Assembly, where I wrote and endorsed resolutions for the Representative Assembly's vote

President

Biology Graduate Student Association

📅 Jan 2018 – Dec 2019

- Advocated for biology graduate students' interests at the divisional level of the University of Missouri

Regional Coordinator

Out in STEM

📅 2016 – 2018

- Served as liaison between oSTEM chapters at universities in the Midwest and the global oSTEM organization
- Facilitated programming to make academic environments in STEM more inclusive for members of the LGBTQIA+ community