DANIEL R. KICK, PHD

- Experience with **statistics, programming, machine learning, and deep learning**.
- **Presented** to scientific and general audiences **25 times** since 2016.
- **Led 4 teaching assistants** and **mentored 7 research students**.
- **Developed statistical tool** used by **>700 students** as of 2021.

PROFESSIONAL AND RESEARCH EXPERIENCE

Present | 2021

Research Geneticist

Jacob Washburn Lab, USDA-ARS

- Employed **deep neural networks, machine learning models,** and **best linear unbiased predictors** to **improve corn yield prediction accuracy** in diverse environments (see *Kick et al., 2023*).
- **Designed project plan** and **submitted grant** application titled **"Environmentally Aware Deep Learning Based Genomic Selection And Management Optimization For Maize Yield"** to the NIFA Agriculture and Food Research Initiative's Education and Workforce Development Program (*Decision Pending*).
- **Communicated** with stakeholders through **8 presentations** (4 national, 2 regional, and 2 outreach presentations).
- **Mentored** 2 students conducting a high throughput root phenotyping experiment and wrote scripts for data organization and analysis.
- **Created** and taught a **Python data visualization workshop** titled "Tools and Techniques for a Jupyter Based Scientific Workflow".
- **Collaborated with plant biologists**, contributing statistical expertise (manuscript in preparation).
- Completed **Software Carpentries instructor certification**, taught **R for Reproducible Scientific Analysis**, and assisted in teaching **Data Management with SQL**.
- Designed and completed a professional development curriculum with the guidance of an industry scientist via the **Bayer-University Mentoring Program**.
- Served as a **panel member on "Next-Generation Omics"** at the 2022 University of Missouri Division of Biological Sciences Retreat.

2021 | 2015

Graduate Researcher

David Schulz Lab, University of Missouri

- **Author on 6 publications**: 4 original research and 2 eLife Insight publications.
- **Assessed the efficacy of machine learning models** to identify cell identity from mRNA and contig abundances. **Applied cluster estimation, hyperparameter tuning, unsupervised machine learning,** and **supervised machine learning**. Identified and learned needed skills primarily through self study. Collaborated with molecular biology project lead. (see *Northcutt[1], Kick[1], et al. 2019*).
- Demonstrated activity desynchronization induces changes in neuronal connections. Defined research question and experiments. **Developed novel approach to quantify changes in cell activity** (see *Kick and Schulz 2022*).
- Investigated activity dependent changes in neuronal excitability, conductances, and ion channel mRNA abundances. Designed experiments, collected data, performed analysis, and **developed novel method for quantifying changes in cell activity** using *in silico* simulations.
- **Collaborated with electrophysiologists**, assisting with data organization, cleaning, and analysis.
- **Collaborated with computational neuroscientists**, contributing biological and statistical expertise (in preparation).
- **Mentored 5 students** and oversaw their projects.
- Communicated results through **17 presentations** (6 national, 6 regional, and 5 outreach and recruitment).
- Served as a **peer mentor of 3 PhD students** in use of R for reproducible data analysis, created internal documents on same.

Contact Info.

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EDUCATION

PhD: Biological Sciences

University of Missouri, Columbia, MO (2021)

Machine Learning Methods for Biomedical Informatics, Quantitative Methods in the Life Sciences, and Grant Writing

Bachelor of Science: Biology

Truman State University, Kirksville, MO (2015)

Next Generation Sequence Data and Analysis, Bioinformatics, ANOVA and Experimental Design, Non-Parametric Statistics

Leadership role in the biological honors society Tri-Beta

Technical Skills

R: R Programming (6 years) experience with `tidyverse`, `lme4`, `caret`, `ggplot2`, `shiny`, & package creation.

Python Programming (2 years) experience with `pandas`, `numpy`, `plotly`, `scikit-learn`, `keras`, `pytorch`.

Miscellaneous Experience with high performance computing (`bash`, `slurm`), virtual environments (`conda`, `singularity`, `docker`), version control (`git`, `GitHub`), literate programming (`Rmarkdown`, `Jupyter`).

For a pdf with links scan here.

2021 | 2020

Lead Teaching Assistant, Animal Physiology Lab

Biological Sciences, University of Missouri

- **Developed statistics web application used by more than 700 students** as of 2021 with **shiny** (source, deployed) for data visualization, testing assumptions, and fitting **frequentist**, **non-parametric**, and **Bayesian** models.
- Led 4 Teaching Assistants and coordinated adaptation of lab curriculum to be fully online due to COVID-19 pandemic.
- **Mentored** next Lead Teaching Assistant, created documentation on best practices.

2020 | 2018

Teaching Assistant, Animal Physiology Lab

Biological Sciences, University of Missouri

- Updated and refined curriculum.
- Delivered lectures and ensured experiments were conducted safely.
- Modeled student grade distributions to identify and adjust for differences in grading.

2018

Curriculum Consultant, Animal Physiology Lab

Biological Sciences, University of Missouri

- Redesigned course material to incorporate primary literature and data analysis.

2016 | 2015

Teaching Assistant, Animal Physiology Lab

Biological Sciences, University of Missouri

- Delivered weekly lectures, ensured experiments were conducted safely, provided timely feedback on assignments.

2013 | 2015

Undergradute Researcher

University of Missouri, University of Connecticut, and Truman State University

- Designed a hydroponic system for maize root phenotyping – Diane Janick-Buckner and Brent Buckner, Truman State University (2014-2015), Quantified retinal minor splicisome expression using immunohistochemistry – (NSF REU) Rahul Kanadia, University of Connecticut (2014), Measured effectiveness of oligonucleotide treatment for spinal muscular atrophy in mice – (NSF REU) Christian Lorson, University of Missouri (2013).

HONORS AND AWARDS

2022

Ranked First in University of Missouri Plant Research Symposium Poster Competition

2019

J. Perry Gustafson Award for Outstanding Graduate Research in the Life Sciences

This award is granted for the quality of a student's **independent research and academic achievements**. Recipients receive a $2,000 award.

2018 | 2016

National Institutes of Health T32 Training Grant Recipient

This fellowship provides a $27,000 yearly stipend and travel awards of $750.

2015

Cum Laude & President's Recognition, Truman State University

SELECTED PUBLICATIONS (3/7, +1 IN REVIEW, +2 IN PREP.)

2023

Yield Prediction Through Integration of Genetic, Environment, and Management Data Through Deep Learning

Daniel R. Kick, Jason G. Wallace, James C. Schnable, Judith M. Kolkman, Baris Alaca, Timothy M. Beissinger, David Ertl, Sherry Flint-Garcia, Joseph L. Gage, Candice N. Hirsch, Joseph E. Knoll, Natalia de Leon, Dayane C. Lima, Danilo Moreta, Maninder P. Singh, Teclemariam Weldekidan, Jacob D. Washburn G3: Genes, Genomes, Genetics

2022

Timing dependent potentiation and depression of electrical synapses contributes to network stability in the crustacean cardiac ganglion

Daniel R. Kick and David J. Schulz The Journal of Neuroscience

2019

Molecular profiling of single neurons of known identity in two ganglia from the crab Cancer borealis

Adam J. Northcutt[1], ***Daniel R. Kick***[1], Adriane G. Otopalik, Benjamin M. Goetz, Rayna M. Harris, Joseph M. Santin, Hans A. Hofmann, Eve Marder, and David J. Schulz ([1] ***denotes co-first authorship***) Proceedings of the National Academy of Sciences