# DANIEL R. KICK, PHD

- Experience with **statistics, programming, machine learning, and deep learning**.
- **Presented** to scientific and general audiences over **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

- ✉ hello@danielkick.com
- 🔗 daniel-kick-5a449b9a/
- 🎓 Google Scholar
- 🆔 0000-0002-9002-1862
- 🐙 github.com/danielkick
- 🔗 danielkick.com

## 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 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 (3/4)

**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 PUBLISHED, 2 IN REVIEW, 2 IN PREP.)

**2023**

### Ensemble of BLUP, Machine Learning, and Deep Learning Models Predict Maize Yield Better than Each Model Alone

*Daniel R. Kick*, Jacob D. Washburn In Review

**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