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

- **Secured $225,000** to develop **"Environmentally Aware Deep Learning Based Genomic Selection And Management Optimization For Maize Yield"** from the National Institute of Food and Agriculture.
- Employed **deep neural networks, machine learning models,** and **best linear unbiased predictors** to **improve corn yield prediction accuracy** in diverse environments.
- **Communicated** with stakeholders via **11 presentations** (5 national, 3 regional, 3 outreach).
- **Mentored** 2 students conducting a high throughput root phenotyping experiment.
- **Created** and taught a **Python data visualization workshop** titled "Tools and Techniques for a Jupyter Based Scientific Workflow".
- 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*).
- Defined research question and experiments. **Developed novel approaches to quantify changes in cell activity**.
- **Collaborated with electrophysiologists**, assisting with data analysis.
- **Collaborated with computational neuroscientists**, contributing domain expertise.
- **Mentored 5 5 students** and oversaw their projects.
- Communicated results through **18 presentations** (6 national, 6 regional, 6 outreach).
- Served as a **peer mentor of 3 PhD students** in use of R for reproducible data analysis, created internal documents on same.

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, and modeled student grade distributions to identify and adjust for differences in grading.

CONTACT INFO

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Google Scholar
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

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`), version control (`git`, `GitHub`), literate programming (`Rmarkdown`, `Jupyter`), crop growth modeling (`APSIM`).

For a pdf with links scan here.

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 –(2014-2015), Quantified retinal minor splicisome expression using immunohistochemistry – (2014), Measured effectiveness of oligonucleotide treatment for spinal muscular atrophy in mice – (2013).

HONORS AND AWARDS (4/5)

2025 | 2023 **NIFA Fellowship (AFRI EWD)**

$225,000 awarded over two years to create and environmentally aware deep learning genomic selection models and prepare the recipient to transition into industry Grant Number 2023-67012-39485

2019 **J. Perry Gustafson Award for Outstanding Graduate Research in the Life Sciences**

This $2,000 award is granted for the quality of their research and academic achievements.

2018 | 2016 **NIH T32 Training Grant Recipient**

This provides a $27,000 yearly stipend and $750 yearly to facilitate presenting research at scientific conferences.

2015 **Cum Laude & President's Recognition, Truman State University**

SELECTED PUBLICATIONS (SHOWING 3/7 PUBLISHED, 1/2 IN REVIEW, 0/3 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 ($bioR\chi iv$) In Review at *In silico Plants*

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