DANIEL R. KICK, PHD

- Experience with **statistics, programming, machine learning, and deep learning**.
- **Designed NIFA funded research plan** (Grant 2023-67012-39485).
- **Presented** to scientific and general audiences **29 times** since 2016.
- **Developed statistical tool** used by **>700 students** as of 2021.
- **Data and models** downloaded over **235 times** and viewed over **640 times**.
- **Led 4 teaching assistants** and **mentored 7 research students**.

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 (NIFA) (Grant 2023-67012-39485).
- 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 **14 presentations** (5 national, 5 regional, 4 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 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.

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 (7 years) and experience with `tidyverse`, `lme4`, `caret`, `ggplot2`, `shiny`, & package creation.

Python: Python Programming (3 years) and experience with `pandas`, `numpy`, `plotly`, `scikit-learn`, `keras`, `pytorch`.

Miscellaneous: Miscellaneous Experience with high performance computing (`bash`, `slurm`), virtual environments (`conda`, `singularity`), version control (`git`, `GitHub`), literate programming (`Rmarkdown`, `Jupyter`), crop growth modeling (`APSIM Next Generation`).

For a pdf with links scan here.

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.

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 (Grant # 2023-67012-39485) over two years to create and environmentally aware deep learning genomic selection models and prepare the recipient to transition into industry.

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 4/9 PUBLISHED, 0/2 IN PREP.)

2023

Ensemble of Best Linear Unbiased Predictor, Machine Learning, and Deep Learning Models Predict Maize Yield Better Than Each Model Alone

Daniel R. Kick, Jacob D. Washburn *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