DANIEL R. KICK, PHD

- Quantitative biologist with 7 years of experience in academic and government laboratories.
- Experience with **statistical modeling, machine learning, deep learning**, and data visualization.
- Experience with leadership, management, mentorship, and teaching.
- Developed and deployed an educational statistical tool used by >700 students as of 2021.

PROFESSIONAL AND RESEARCH EXPERIENCE

Present | 2021

Research Geneticist

Jacob Washburn Lab, USDA-ARS

- Evaluated **deep neural networks, machine learning models,** and **best linear unbiased predictors** to **improve yield prediction accuracy** in diverse environments.
- **Communicated with stakeholders through 7 presentations** (3 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. Grace Sidberry (2021-pres.), Madi Michell (2022-pres.)
- **Created and taught a Python data visualization workshop** at University of Missouri Bioinformatics in Plant Science group 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 | 2016

Graduate Researcher

David Schulz Lab, University of Missouri

- **Author on 6 publications**: 4 original research and 2 eLife Insight publications.
- Communicated results with stakeholders through **17 presentations** (6 national, 6 regional, and 5 outreach and recruitment).
- **Collaborated with electrophysiologists** studying spinal cord injury. Assisted with data organization, cleaning, and analysis (manuscript in preparation).
- **Collaborated with computational neurosciencists**, contributing biological and statistical expertise (in preparation).
- **Mentored 5 students** and oversaw their projects. Abby Beckerdite (2016-2019), Ayla Ross (2019), Katlyn Sullivan (2018), Kelly Hiersche (2017), & Rody Kingston (2016)
- Served as a peer mentor for 3 PhD students in use of `R` for reproducible data analysis, created internal guides to share knowledge on same.
- Assessed the efficacy of machine learning models to recapitulate neural cell identity from mRNA and contig abundances. **Applied cluster estimation, hyperparameter tuning, unsuprevised machine learning,** and **supervised machine learning** techniques. Identified theoretical and practical resources, then learned needed knowledge and skills primarily through self study. Collaborated with molecular biology project lead (Adam Northcutt).
- Demonstrated that activity desynchronization induces degree dependent changes in conductance between neurons. Defined research question and approach, designed and implemented experiments using current clamp, voltage clamp, dynamic clamp, and pharmaceutical application. **Developed novel approach to quantify changes in cell activity**. Applied **resampling techniques, mixed effects models, and akaike information criteria,** and **asympotic regression**.
- Investigated activity dependent changes from elevated depolarization in neuronal excitability, conductances, and ion channel mRNA abundances in small neural networks. Designed and executed experiments, collected data, performed analysis, **developed novel method for quantifying changes in cell activity** using *in silico* simulations.

CONTACT INFO.

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github.com/danielkick
daniel-kick-5a449b9a
Google Scholar

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, Analysis of Variance and Experimental Design, Non-Parametric Statistics, and *Economic & Medicinal Botany*

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.
- Lead 3-4 Teaching Assistants and coordinated adaptation of lab curriculum to be fully online due to Covid-19.
- *Mentored* successor, created documentation on best practices.

2020 | 2018

Teaching Assistant, Animal Physiology Lab

Biological Sciences, University of Missouri

- Analyzed student grade distributions to adjust for grader effects at request of the instructor of record.
- Continued duties below.

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

- Provided 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 (2/5)

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.

SELECTED PUBLICATIONS (3/7, 5 REVIEWED)

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