

DANIEL R. KICK, PHD

- Interdisciplinary quantitative biologist with 7 years of experience in academic and government laboratories.
- Experience with **statistical modeling, machine learning, deep learning**, experimental design and execution, data visualization.
- Authored peer reviewed scientific publications and presented results to stakeholders in academic and non-academic settings.
- Experience with leadership, management, mentorship, and teaching.
- Developed and deployed an educational statistical tool used by >700 students as of 2021.
- Currently a **Research Geneticist** at the USDA-ARS (Agricultural Research Service) I am working to improve corn yield prediction by modeling genetic, environmental, management, and interaction effects using **deep learning, machine learning, and statistical modeling**.
- As a PhD student, I applied **machine learning** to identify neuronal cell types from transcriptomic and ion channel mRNA data and used **statistical modeling** in conjunction with electrophysiological experiments to study activity dependent compensation in neurons and neural circuits.



SELECTED PUBLICATIONS

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. Northcutt¹, *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](#)



RESEARCH AND PROFESSIONAL EXPERIENCE

Present
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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

CONTACT INFO

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- ⌚ github.com/danielkick
- ⌚ [linkedin.com/in/daniel-kick-5a449b9a/](https://www.linkedin.com/in/daniel-kick-5a449b9a/)
- ⌚ [Google Scholar](https://scholar.google.com/citations?user=0000-0002-9002-1862)
- ⌚ [0000-0002-9002-1862](tel:0000-0002-9002-1862)

Technical Skills

- ⌚ **R Programming**
(6 years) including experience with **tidyverse, lme4, caret, ggplot2, shiny**, & package creation.
- ⌚ **Python Programming**
(2 years) including 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
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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 neuroscientists**, 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, unsupervised 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 asymptotic 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.

2021
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2018

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.
- Redesigned course material to incorporate primary literature and data analysis.
- Analyzed student grade distributions to adjust for grader effects at request of the instructor of record.

2021
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2018

Undergraduate 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 splicesome 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

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
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2016

National Institutes of Health T32 Training Grant Recipient

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



EDUCATION

2021
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2015

PhD. Biological Sciences

University of Missouri, Columbia, MO

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

2015
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2011

Bachelor of Science: Biology

Truman State University, Kirksville, MO