

DANIEL R. KICK, PHD

- Experience predicting maize yield across environments using **deep learning**, **machine learning**, **statistical modeling** to facilitate crop improvement.
- **Designed funded research project** (USDA NIFA) to create environmentally aware **deep learning models for trait prediction** in row crops (\$225,000, [Grant 2023-67012-39485](#)).
- Initiated and led a multi-institutional research collaboration; collaborated with domain experts.
- **Presented** to scientific and general audiences **36 times** since 2016.
- Invited presentations at University of Michigan, Truman State University, Iowa State University, and University of Georgia's **AI in Plant Breeding Symposium**.
- **Developed data analysis app** used by **>700 students** as of 2021.
- **Data and models** downloaded over **775 times** and viewed over **1565 times**.
- **Led 4 teaching assistants** and **mentored 9 research students**.



PROFESSIONAL AND RESEARCH EXPERIENCE

Present
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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](#)).
- Initiated and led a multi-institutional research collaboration and wrote custom libraries for same.
- Employed **deep neural networks**, **machine learning models**, **best linear unbiased predictors**, and **scientific models** (i.e. process based) to improve trait prediction accuracy in diverse environments.
- **Communicated** with stakeholders via **21 presentations** (7 national, 10 regional, 4 outreach).
- **Organized and led** deep learning community attended by students, university professors, and government scientists.
- **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**.
- **Mentored** and advised 4 students (including through the 2024 pilot of the USDA Postdoc Mentorship Program) with projects involving high throughput phenotyping, a genome wide association study (GWAS), and representing spatial effects.
- Served as a **panel member** on “Next-Generation Omics” at the 2022 University of Missouri Division of Biological Sciences Retreat.
- Designed and completed a professional development curriculum with the guidance of an industry scientists via the **Bayer-University Mentoring Program** and the **Maize Genetics Mentoring Program**.

2021
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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 predict cell identity from mRNA and contig abundances. **Applied cluster estimation**, **hyperparameter tuning**, **unsupervised machine learning**, and **supervised machine learning**.
- Defined research question and experiments. **Developed novel methodologies and approaches** to address research questions.
- Collaborated with molecular biology project lead, providing data analysis and statistical knowledge. (see *Northcutt¹, Kick¹, et al. 2019*).
- **Collaborated with biologists and physiologists**, assisting with data analysis.
- Served as a **peer mentor of 3 PhD students** in use of R for reproducible data analysis, created internal documents on same.
- **Mentored 5 students** and provided oversight and advice on their projects and analysis.
- 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.

CONTACT INFO

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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

🐍: Python (3 years)
experience with **pandas**,
numpy, **plotly**, **scikit-learn**, **keras**, **pytorch**.

📊: R (8 years) experience
with **tidyverse**, **lme4**, **caret**,
ggplot2, **shiny**, & package
creation.

📦: Miscellaneous Experience
with high performance
computing (**bash**, **slurm**),
virtual environments (**conda**,
singularity), version control
(**git**, **GitHub**), literate
programming (**Quarto**,
Rmarkdown, **Jupyter**, **nbdev**),
Scientific modeling (crop
growth modeling **APSIM**
Next Generation), basic **SQL**
(**SQLite**, **PostgreSQL**).

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links scan here.



2021
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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
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2018

Teaching Assistant, Animal Physiology Lab

Biological Sciences, University of Missouri

- Iteratively refined data analysis components of the curriculum, modeled student grade distributions to identify and adjust for differences in grading.

2018

Curriculum Consultant, Animal Physiology Lab

Biological Sciences, University of Missouri

- Redesigned and updated course material to incorporate data analysis and primary literature.

2016
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2015

Teaching Assistant, Animal Physiology Lab

Biological Sciences, University of Missouri

- Delivered weekly lectures, ensured experiments were conducted safely, provided timely feedback on assignments.

2015
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2013

Undergraduate Researcher

University of Missouri, University of Connecticut, and Truman State University

- Designed a hydroponic system for maize root phenotyping –(2014-2015), Quantified retinal minor splice expression using immunohistochemistry – (2014), Measured effectiveness of oligonucleotide treatment for spinal muscular atrophy in mice – (2013).



HONORS AND AWARDS (SHOWING 4/5)

2025
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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
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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 3/9 PUBLISHED, 5 IN PREP. OR REVIEW)

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](#)

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 (¹denotes co-first authorship) [Proceedings of the National Academy of Sciences](#)