DANIEL R. KICK, PHD

- Experience using **statistical modeling, machine learning, & deep learning** including for **predicting corn yield in diverse environments**.
- **Designed funded research project** (USDA NIFA) to improve deep learning models for trait prediction.
- **Initiated and led a multi-institutional collaboration** testing genomic prediction models in corn, soybean, fruit fly, and cattle.
- **Highly collaborative** with collaborators including physiologists, neuroscientists, and engineers.
- **Experience cleaning, modeling, and releasing large, complex datasets.** Released data and models that have been downloaded hundreds of times in total (see: 1, 2, 3, 4)
- **Effectively communicates technical concepts and scientific findings** including through >30 presentations including invited presentations at University of Michigan, Truman State University, Iowa State University, and University of Georgia's AI in Plant Breeding Symposium.

PROFESSIONAL AND RESEARCH EXPERIENCE

Present | 2021

Research Geneticist

United States Department of Agriculture - Agricultural Research Service

- **Secured $225,000** to develop **"Environmentally Aware Deep Learning Based Genomic Selection And Management Optimization For Maize Yield"** (NIFA Grant 2023-67012-39485).
- **Initiated and led a multi-institutional research collaboration**.
- **Designed and implemented data & machine learning pipeline** for identifying viruses with potential for cross-species infection using genetic data in collaboration with domain experts.
- **Communicated** with stakeholders via **23 presentations** (7 national, 12 regional, 4 outreach).
- **Organized and led deep learning trainings**, (Webpage), led & assisted in technical workshops as a Software Carpentries instructor, and **mentored 4 students**.
- **Developed conference website on behalf of the Maize Genetics Cooperation** (Demo Site).
- Centralized lab protocols by developing a lab webpage and authored ~60 technical posts.
- Designed and completed a professional development curriculum through the **Bayer-University Mentoring Program** and the **Maize Genetics Mentoring Program**.

2021 | 2015

Graduate Researcher

University of Missouri

- **Author on 6 publications**, one in the *Proceedings of the National Academy of Sciences*.
- **Developed novel analytical methodologies** to solve intractable research questions.
- Provided **statistical consulting** to collaborators: biologists, physiologists, and engineers.
- Communicated results through **18 presentations** (6 national, 6 regional, 6 outreach).
- **Mentored 5 students**, **peer mentored 3 PhD students** in reproducible data analysis.
- **Developed statistics app** used by >700 students as of 2021 (source, deployed).
- **Coordinated and led** 4 Teaching Assistants during pivot caused by COVID-19 pandemic.

HONORS, AWARDS, & PUBLICATIONS

Honors and Awards (3/5)

- **NIFA AFRI EWD: $225,000** awarded (Grant # 2023-67012-39485) to create environmentally aware deep learning genomic selection models.
- **J. Perry Gustafson Award for Outstanding Graduate Research in the Life Sciences:** $2,000 award granted for research quality and academic achievements.
- **NIH T32 Training Grant Recipient:** $27,000 yearly to support graduate research.

Selected Publications (10 Published, 5 in Prep/Review)

- Improving Plant Breeding Through AI-Supported Data Integration *In Review* (2025)
- Ensemble of Best Linear Unbiased Predictor, Machine Learning, and Deep Learning Models Predict Maize Yield Better Than Each Model Alone *in Silico* Plants (2023)
- Yield Prediction Through Integration of Genetic, Environment, and Management Data Through Deep Learning G3: Genes, Genomes, Genetics (2023)
- Molecular profiling of single neurons of known identity in two ganglia from the crab *Cancer borealis* Proceedings of the National Academy of Sciences (2019)

CONTACT INFO

hello@danielkick.com

daniel-kick-5a449b9a

github.com/DanielKick-USDA

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)

ANOVA and Experimental Design, Non-Parametric Statistics, Next Generation Sequence Data and Analysis, Bioinformatics.

Technical Skills

Python (4 years) experience with `pytorch`, `keras`, `scikit-learn`, `polars`, `pandas`, `numpy`, `plotly`.

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

Miscellaneous Experience with high performance computing (`bash`, `slurm`), `SQL`, containerization and virtual environment utilities (e.g. `Singularity`, `Docker`, `Conda`, `uv`), version control (`git`, `GitHub`), literate programming (`Quarto`, `nbdev`), *crop growth modeling* `APSIM Next Generation`).