

Recipients of the C. R. Weber Award for Excellence in Plant Breeding

Spring 2021

Matthew Carroll is originally from Elizabeth, IL. He grew up working on his parent's farm, which gave him a passion for agriculture. This led Matt to Iowa State University where he earned a B.S. degree in both Agronomy and Genetics. Matt started his Ph.D. in 2017 as a plant breeding student in Dr. Danny Singh's lab, working in the soybean breeding program. His graduate research work focuses on high throughput phenotyping to improve soybean breeding programs. His work using UAVs led to a two-week internship at the University of Tokyo where he worked on a project that helped breeders more easily acquire data from the images they collect. This work and collaboration led to a review paper, *UAS based plant phenotyping for research and breeding applications*, in press in [Plant Phenomics](#). His second project is working with autonomous ground-based rovers to collect images of soybean pods to estimate end season yield in large soybean breeding trials. This work is in collaboration with data scientists at Iowa State using machine learning for complex trait extraction and prediction. The manuscript reporting their findings is currently under review.



Matthew has been actively involved in the R.F. Baker Plant Breeding Symposium, most recently serving as a Co-Chair for the 2021 event. In his free time Matt enjoys going for walks with his wife and dog, helping on his parent's farm, and game nights with fellow graduate students.

Aaron Kusmec, originally from Harrisonville, MO, obtained a B.S. in Biology from Truman State University in 2014. During his undergraduate studies, he completed an REU in Dr. Patrick Schnable's lab, where he was first introduced to quantitative and population genetics. Since 2014, Aaron has been a genetics Ph.D. student at Iowa State University, working in Dr. Schnable's lab. His graduate research work focuses on understanding genotype-environment interactions. The first project employed Finlay-Wilkinson regression and GWAS to identify candidate genes controlling phenotypic plasticity in 23 maize phenotypes. This work, *Distinct genetic architectures for phenotype means and plasticities in Zea mays*, was published in [Nature Plants](#) in 2017. The second project investigates the use of a genetic algorithm to search large sets of candidate environmental variables to identify those associated with phenotypic plasticity in maize. The third project leverages historical data from public hybrid maize trials and weather observations to study temperature adaptation in hybrid maize during the 20th century and the impacts of climate change on maize yields. He has also collaborated on projects applying operations research to plant breeding and the analysis of high-throughput phenotyping data. His first-authored perspective paper on data-driven plant breeding appeared recently in [One Earth](#) in 2021.



Aaron has participated in the R.F. Baker Plant Breeding Symposium at ISU, multiple Plant Sciences Symposia at other universities, and the ISU Plant Breeding Seminar Series, where he has shared his research findings with both oral and poster presentations. In his free time, Aaron enjoys spending time with his wife and children, reading, running, and playing the piano.

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- The C. R. Weber Award for Excellence in Plant Breeding was established in 1981 to recognize outstanding academic and research accomplishments by plant breeding graduate students in the Department of Agronomy.
 - C. R. Weber was a professor in the Department of Agronomy at Iowa State University who made outstanding contributions to plant breeding, particularly in soybeans. The award was established by his family and friends to reward graduate students with the same goal for excellence to which he aspired.
 - A cash award of \$500 will be given to students in the Department of Agronomy with majors in plant breeding who meet the qualifications.