Alencar Xavier

Plant Breeding and Statistical Genetics

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Self-motivated research scientist with expertise in the fields of agronomy, plant genetics and breeding, quantitative and statistical genetics, machine learning, phenomics and genomics. Adept in design, execution, and analysis of experiments, as well as analysis of observational studies. Proficient communicator with proven capacity to resolve problems within plant breeding-related and interdisciplinary team settings. Three years of industry experience as quantitative geneticist, complemented by adjunct faculty position at Purdue University. Proactive character with personal values rooted on honesty and integrity. Leadership based on promoting collaborative environment, building trust and encouraging teamwork.

EXPERIENCE

- 2016 - Current: **Research Scientist**, Biostatistics group at Corteva Agrisciences.
- 2017 - Current: **Adjunct Faculty**, Department of Agronomy, Purdue University.
- 2013 - 2016: **RA Population Genetics**, Purdue University. Supv. by William Muir (bmuir@purdue.edu).
- 2013 - 2016: **RA Soybean Breeding**, Purdue University. Supv. by Katy Rainey (krainey@purdue.edu).
- 2010 - 2011: **RA Potato Breeding**, UFSM, Brazil. Supv. by Dilson Bisognin (dilsonb@smail.ufsm.br).
- 2009 - 2011: **RA Soil Physics**, UFSM, Brazil. Supv. by Jose Miguel Reichert (reichert.jm@gmail.com).

ACADEMICS

1. **Academic Background**
   - *Technical degree in agriculture and livestock* (2004-2006). E.E.T. Celeste Gobbato, RS, Brazil.
   - *B.Sc. Agronomic Engineering* (2007-2011). Federal University of Santa Maria, RS, Brazil.
   - *Ph.D. Soybean Breeding and Statistical Genetics* (2013-2016). Purdue University, IN, USA. *GPA 4.*
2. **Awards and Recognitions**
   - *Summer Institute of Statistical Genetics (SISG) Scholarship*, University of Washington. 2016.
   - *John Axtell Graduate Student Award in Plant Breeding and Genetics*, Purdue University. 2016.
   - *ICQG5 Fellowship.* Support for graduate students in plant breeding. Sponsored by USDA. 2016.
   - *Dow AgroSciences Graduate Scholarship.* Integrity, academic excellence, initiative and leadership, 2016.
   - *Outstanding Graduate Research Award (PhD).* Purdue 2015 Graduate Student Award.
   - *Summer Institute in Statistics for Big Data (SISBID) Scholarship*, University of Washington. 2015.
   - *AG Spotlight* - Graduate AG Research Spotlight. College of Agriculture, Purdue University. Feb 2015.
   - *Bauman-Doolittle Endowment* - Support for graduate students in breeding and genetics. 2015.
   - *Loyal F. Pete Bauman Memorial Fund* - Support for graduate students in breeding and genetics. 2014.
   - *Wyman E. Nyquist Scholarship* - Quantitative Genetics. Purdue 2014 Graduate Student Award.
   - *Soy2014 Student Award* - MCBS: 15th Biennial Conference. University of Minnesota, 2014.
   - *Summer Institute of Statistical Genetics (SISG) Scholarship*, University of Washington. 2013.
3. **Areas of Expertise**
   - Plant genetics and breeding, field breeding techniques and selection theory;
   - Phenomics and high-throughput technologies in plant breeding;
   - Mixed models, multivariate models, machine learning and Bayesian methods;
   - Spatial statistics, adjustment of field variation and imputation methods;
   - QTL mapping, Genome-wide association mapping, genome-wide prediction methods;
   - Computational breeding, algorithm development and high-performance computing;
4. **Editor**
   - Scientia Agricola (2019)
5. **Reviewer**
   - African Journal of Agricultural Research (2016), BMC Genomics (2016), Crop Science (2016), Euphytica (2018), Evolutionary Bioinformatics (2018), Field Crop Research (2018), Genes (2019), Genetics (2016), G3 (2016), Heredity (2019), iMedPub (2016), International Journal of Molecular Sciences (2019), Journal of Animal Breeding and Genetics (2018), Plants (2019), PLOS Computational Biology (2018), The Crop Journal (2018), Theoretical and Applied Genetics (2019).

6. **Complementary Background**
   - Plant genetics and breeding, 4 cr. (2012). *MAST*. University of Minnesota.
   - Plant disease resistance, 3 cr. (2012). *MAST*. University of Minnesota.
   - Weed ecology and management, 3 cr. (2012). *MAST*. University of Minnesota.
   - Mixed Models in Quantitative Genetics (2013). *SISG*. University of Washington.
   - Markov chain Monte Carlo applied to Genetic Analysis (2013). *SISG*. University of Washington.
   - Supervised Methods for Statistical Machine Learning (2015). *SISG*. University of Washington.
   - Unsupervised Methods for Statistical Machine Learning (2015). *SISG*. University of Washington.
   - Population Genetic Data Analysis (2016). *SISG*. University of Washington.
   - Association Mapping: GWAS and Sequencing Data (2016). *SISG*. University of Washington.
7. **Computational**
   - Advanced R programming and related tools (Markdown, Shiny, Rcpp).
   - Background on C++, parallel computing, commercial analytical libraries (Eigen, SAS, ASReml, BLUPF90).
   - Familiarity with machine learning computation and libraries (AWS, Docker, Keras, h2o, XGBoost).
   - Basic coding in Python, Shell, SQL, Perl/regex and LaTeX.

PUBLICATIONS

1. **Software**
   - Xavier, A. et al. (2015). NAM: Nested Association Mapping. LINK
   - Xavier, A. et al. (2015). SoyNAM Dataset. LINK
   - Xavier, A. et al. (2015). bWGR: Bayesian Whole-Genome Regression. LINK
2. **Presentations & Short Courses**
   - ANSC595, Quantitative Genomics Applied to Breeding (1 lecture), Purdue University, Fall 2019. LINK
   - Xavier, A. Good learners, faster learning. *IMPG3*, University of Sao Paulo, 2019. LINK
   - Xavier, A., Brito, L., Rainey, KM. Mixed models applied to breeding. *Purdue*, 2019. LINK
   - Xavier, A. Good learners, faster learning. *PAG*, 2019. LINK
   - Xavier, A. and Morota, G. Short course in mixed models. *UFV*, 2018. LINK
   - Xavier, A. Learning from Data: Machine Learning in Plant Breeding. *UFV*, 2018.
   - AGRY611, Quantitative Genetics (7 lectures), Purdue University, Fall 2017. LINK
   - AGRY620, Advanced Plant Breeding (3 lectures), Purdue University, Spring 2017.
   - Xavier, A. Analytical Methods for Phenomics. *Purdue Phenomic Workshop*, 2017. LINK
   - Xavier, A. Learning from Data: Machine Learning in Plant Breeding. *UNL*, 2016.
   - Xavier, A. Learning from Data: Machine Learning in Plant Breeding. *Cornell*, 2016.
   - Xavier, A. Learning from Data: GxE analysis on multiple population. *SBW*, 2016.
   - Xavier, A. Learning from Data. Purdue. LINK. 2015.
   - Rainey, KM and Xavier, A. Learning from Data: A SoyNAM Study. *SBW*, 2014.
3. **Selected articles**
   - Mohammadi, Xavier, et al. (2020). Deployment of QTLs from GWAS in plants. Current Plant Biology. LINK
   - Hall, Xavier, et al. (2020). Quantitative characterization of proximate sensing canopy traits. Crop Sciences. LINK
   - Xavier and Rainey (2020). Quantitative Genomic Dissection of Soybean Yield Components. G3. LINK
   - Gangurde et al. (2020). NAM uncovers candidate genes for seed and pod weights in peanut. Plant Biotech J. LINK
   - Xavier and Rainey (2019). Quantitative Genomic Dissection of Soybean Yield Components. bioRxiv. LINK
   - Xavier et al (2019). bWGR: Bayesian Whole-Genome Regression. Bioinformatics. LINK
   - Xavier (2019). Efficient Estimation of Marker Effects in Plant Breeding. G3. LINK
   - Lopez et al (2019). Genetic architecture of photosynthesis and water use efficiency in Soybean. Frontiers. LINK
   - Diers et al (2018). Genetic architecture of soybean yield and agronomic traits. G3. LINK
   - Xavier et al (2018). Genomic properties of the USDA soybean germplasm collection. Plant Genetic Resources. LINK
   - Jarquin et al (2018). Modeling Interactions between environments, genotype and soybeans canopy. Agronomy. LINK
   - Xavier et al (2018). Genome-Wide Analysis of Grain Yield Stability in Soybeans. G3. LINK
   - Xavier et al (2017). Genetic Architecture of Phenomic-enabled Canopy Coverage in *Glycine max*. Genetics. LINK
   - Xavier et al (2017). Genomic Prediction using Subsampling. BMC Bioinformatics. LINK.
   - Xavier et al (2017). Unsupervised learning techniques to dissect associations of soybean traits. Euphytica. LINK.
   - Xavier et al (2016). Walking through the Black Boxes of Statistical Plant Breeding. TAG. LINK.
   - Xavier et al (2016). Assessment of Predictive Properties of Genome-wide Selection in Soybeans. G3. LINK.
   - Xavier et al (2016). Genetic variation captured by a SNP panel in soybean. BMC Informatics. LINK
   - Xavier (2016). Learning from data: Plant breeding applications of machine learning. Purdue University. LINK
   - Xavier et al (2015). Association Studies in Multiple Populations. Bioinformatics. LINK.
4. **Patents**
   - Rainey, et al. (2018). Method of using genetic architecture of phenomic-enabled canopy coverage in glycine max. LINK