Fernando M. Aguate | PhD, Agricultural Science and Applied Statistics

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Professional Profile

Biometrician with experience in agricultural science, geospatial modeling (GIS) and automated phenotyping, Statistics and machine learning, cloud computing (Domino, MSU-HPCC), genomic data analytics, conducting field trial design and analysis, and programming (R, Python, and C++) that can scale to big data.

Education

2019 – present **Postdoc, Epidemiology, and Biostatistics.** Michigan State University.
2013 – 2018 **PhD, Agricultural Science.** Universidad Nacional de Córdoba.
Dissertation: *"Statistical tools for the analysis of multi-environment trials".* Major Advisor: Dra. Mónica Balzarini
2014 – 2016 **MS, Applied Statistics (92% completed).** Universidad Nacional de Córdoba.
2007 – 2012 **Agronomy engineer.** Universidad Nacional de Córdoba.

Career Summary

2019 – present **Postdoc Research associate, Michigan State University**
Outline
Developing a technique to detect genetic variants with pleiotropic effects from millions of variants in the human genome. Software, R03-NIH grant, and paper under review.
Secondary roles
- Study the development of subcortical structures and cognitive scores in infants.
- **Teaching Assistant Professor** (Fall 2019 and Spring 2020). EPI809: Biostatistics 2
- **Journal Reviewer,** Crop Science Society of America.

2017 – 2019 **Model developer, Monsanto-Bayer Argentina**
Outline
Developing machine learning models to make potential yield predictions using spatial data such as satellite images, soil electro-conductivity, elevation maps, etc. Managed a network of ~120 field trials in Argentina, Uruguay, and Brazil, from experiment design to data analysis. The project is commercially known as "Prescripciones Dekalb" (https://prescriptions.velocity.ag/?#/).
Secondary roles
- Project to predict insect damage using real-time and historical weather data.
- Statistical advice on several projects, including herbicide evaluations, soybean multi-environment trials, nitrogen fertilization in corn, and phosphorus fertilization in soybean trials.

2012 – 2017 **Statistician and Consultant in various projects, Universidad Nacional de Córdoba, Argentina**
Outline
Providing statistical tools for the analysis of genotype-by-environment interactions, focusing on public and private necessities for statistical advice and software development.
Most relevant consultancy services:
- Re-designing Multi-environment trials in a multi-national Sugarcane breeding program (Ledesma SAAI 2016-2017).
- Measuring the efficiency of Sunflower yield trials (Advanta Inc. 2015).
- Assisting parental selection strategy in Sugar cane breeding program (Chacra Experimental Santa Rosa 2014-2015). I co-programmed software for parental selection that is currently being used in this breeding program.
- Studying trash generation during Sugar cane harvesting (Ledesma SAAI 2013).

- Quantifying the nutritional quality of Soybean grains and the environmental interaction (National Institute of Agricultural Technology, Argentina 2012).
- Analysis of corn multi-environment trials (Syngenta 2012).

Other activities

- **Visiting Scholar**, Department of Epidemiology, Michigan State University 2015-2016.
- **Visiting Researcher**, Climate Application Unit, South Australian Research and Development Institute (SARDI), Adelaide, Australia 2013.

2012 – 2013 Plant Breeder Assistant, Nidera Seeds

Outline

Including pedigree in mixed models to evaluate the network of pre-commercial corn hybrids. The model results were used for further selection at the Nidera Seeds program.

Secondary role

- Morphological characterization of pre-commercial corn hybrids needed for national registration.

Memberships, fellowships, honors, and awards

Since 2020 Society member: American Society of Agronomy
Since 2020 Society member: Crop Science Society of America
2018-2020 Member of the Conference Advisory Committee
International Biometric Society
2017 International Statistical Institute (ISI) and International Biometric Society (IBS) joint award
61st World Statistics Congress ISI in Marrakech, Morocco.
2017 Red Macro Universidades Mobility grant
Funded by 37 public universities in Latin America for 5 months working at the University of Puerto Rico.
2016 First prize Young Biometrician Contest
Grupo Argentino de Biometría (IBS Argentinean region), Corrientes, Argentina.
2016 Young Statistician's Showcase award
28th International Biometric Conference in Victoria, British Columbia, Canada.
Since 2014 Society member: International Biometric Society
Since 2014 Society member: Grupo Argentino de Biometría
2013-2017 Ph.D. scholarship
National Scientific and Technical Research Council (CONICET), Argentina.
2013-2014 Teaching Statistics to undergraduate students
Universidad Nacional de Córdoba, Argentina.
2013 Individual Training Award
Crawford Fund. Climate Applications Unit, SARDI, Adelaide, Australia.

Research Experience and Publications

Publications (Refereed Journals):

Aguate, F., Vazquez, A., Merriman T., de los Campos G. (2020). Mapping Pleiotropic Loci Using a Fast-Sequential Testing Algorithm. Eur. J. Hum. Genet. (under review).

Aguate, F., Crossa, J., Balzarini M. (2019). Effect of missing values on variance component estimates in multi-environment trials. Crop Sci. 59(2), 508-517.

Aguate, F., Trachsel, S., Gonzalez Perez, L., Burgueño, J., Crossa, J., Balzarini, M., Gouache, D., Bogard, M., de los Campos, G. (2017). Use of Hyper-Spectra Image outperforms Vegetation Indices in prediction of Maize yield. Crop Sci. 57, 1-8.

Bodoira, R., Torres, M., Pierantozzi, P., **Aguate, F.**, Taticchi, A., Servili, M., Maestri, D. (2016). Dynamics of Fatty Acids, Tocopherols and Phenolic Compounds Biogenesis During Olive (Olea europaea L.) Fruit Ontogeny. J. Am. Oil Chem.' Soc. 93(9), 1289-1299.

Marioli, C., Balzarini, M., **Aguate, F.**, Grosso, N., Soldini, D., Zeng, H., Cheng, W.-H., Martinez, M.J. (2015). Climatic thresholds for concentrations of minerals and heavy metals in Argentinean soybeans. Agron. J. 108(2), 532-539.

Books:
Córdoba M, Bruno C, **Aguate F.**, Tablada M, Balzarini M. (2014). Análisis de la variabilidad espacial en lotes agrícolas. Manual de Buenas Prácticas. Ed. Balzarini, M. Eudecor. Córdoba, Argentina.

Licensed Software Developed:
Córdoba M., Balzarini M., Bruno C., **Aguate F.**, Paccioretti P. (2015). FastMapping, statistical analysis of spatial variability and automatic geostatistical interpolation mapping. Published work N° 16535, Argentina.

Additional Skills

Proficient programming skills in R, and several of its dependencies such as Rcpp, RcppArmadillo, rstan, shiny, ggplot2, H2O, etc. Intermediate skills in Python (and some of its dependencies as well) and C++.
Language skills: Native in Spanish language, fluent in English, and functional in Italian and Russian.
Results of soft skills evaluation (DISC assessment test): Primary C, Secondary D.