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 with cloud computing (Domino, MSU-HPCC), genomic data analytics, conducting field trials from design to analysis, and programming (R, Python and C++) that can scale to big data.

With a passion for learning more about programming, handling big data and its visualization, and several years of experience working for private and public companies globally. I am inquisitive, proactive, and results oriented (DISC personality assessment: D-C).

Education

2019 – present	**Postdoc, Epidemiology and Biostatistics.** Michigan State University.
2013 – 2018	**PhD, Agricultural Science.** Universidad Nacional de Córdoba.
2014 – 2016	**MS, Applied Statistics (92% completed).** Universidad Nacional de Córdoba.
2007 – 2012	**Agronomy engineer.** Universidad Nacional de Córdoba.

Career Summary

Feb 2019 – present **Postdoc Research associate at Michigan State University**

Outline

Developing a technique to detect genetic variants with pleiotropic effects (multi-trait analysis) from millions of variants in the human genome. I developed a software in C++ and R, that can process large individual-level data (Millions of SNPs and individuals, with several traits), can handle unbalanced data, has desirable statistical properties, and user-friendly interface. Grant and paper under review.

Secondary roles

- Statistics consultant for the study of brain development in infants. Fitting non-linear mixed models to explain volume development of subcortical structures, and cognitive abilities measured as Mullen, Bayley and CBCL scores. Two soon to be published papers are the results of this work.
- Teacher Assistant (Fall 2019 and Spring 2020) in EPI809: Biostatistics 2, with Prof. Gustavo de los Campos

Jun 2017 – Feb 2019 **Model developer at Monsanto-Bayer Argentina**

Outline

I worked with a machine learning model to make potential yield predictions using spatial data such as satellite images, soil electro-conductivity, elevation maps, etc. These predictions were then used to make prescriptions of nitrogen fertilization, seed rates and position corn commercial hybrids. I managed and substantially improved a network of ~120 field trials in Argentina, Uruguay and Brazil, from experiment design to data analysis. I incorporated and programmed a large-scale block design and spatial autoregressive regression models for analysis, keeping close contact with representatives responsible of carrying out field trials, and communicating the results. The project was commercially lunched in August 2018, as is known as “Prescripciones Dekalb” (https://prescriptions.velocity.ag/?#/). These activities required knowledge of yield monitors, programming, experiment design, generating and handling geo-spatial data, strong communication skills, and geo-statistics.

Secondary roles

- I started a project to predict insect damage using real time and historical weather data. In Argentina, the migration of fall armyworm (*Spodoptera frugiperda*) is seasonal and can be predicted at large scale. Predictions of possible damage have many important applications, including a tool for complementing insect protection technologies. I left the company with the first version of this model running, with a user-friendly interface.
- I assisted with statistical advice several projects in different areas, including herbicide evaluations, soybean multi-environment trials, nitrogen fertilization in corn trials, and phosphorus fertilization in soybean trials.

Feb 2013 – Jun 2017 **Statistician and Consultant in various projects at Universidad Nacional de Córdoba, Argentina**

Outline

While studying a **PhD in Agricultural Science**, I worked with several projects related to providing statistical tools for the analysis of genotype-by-environment interactions. These tools were part of my thesis, 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). Selecting optimum number of clones and clustering environments to maximize genetic repeatability and potential gain.
- 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 a software for parental selection that is currently being used in this breeding program.
- Study of trash during Sugar cane harvesting (Ledesma SAAI 2013).
- Quantifying the Nutritional quality of Soybean grains and its environment interaction (National Institute of Agricultural Technology, Argentina 2012).
- Analysis of corn multi-environment trials (Syngenta 2012).

Other activities

- Research Scholar at Michigan State University 2015-2016.
- Scientist Visitor at South Australian Research and Development Institute (SARDI), Adelaide, Australia 2013.

Oct 2012 – Feb 2013 **Plant Breeder Assistant at Nidera Seeds (now Syngenta)**

Outline

As recently graduated **Agronomy engineer**, I worked implementing mixed models with ASREML to evaluate the network of pre-commercial corn hybrids including co-ancestry data. The model results were used for further selection at the Nidera Seeds program.

Secondary role

- I realized morphological characterization of pre-commercial corn hybrids needed for national registration.

Community service, fellowships, honors and awards

2018-2020 **Member of the Conference Advisory Committee**
International Biometric Society

2017 **International Statistical Institute (ISI) and International Biometric Society (IBS) joint award**
61th 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 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.

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.

Publications

https://scholar.google.com/citations?user=Bp6h9gEAAAAJ&hl=en