Guillermo Marcillo

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Agricultural data scientist with 8+ years of experience leveraging robust methodologies for data collection, synthesis, and analysis, to prescribe solutions to promote resilient agriculture in the advent of climate and economic instability.

Experience

Jun 2020–Present **University of Illinois Urbana-Champaign**.
Implement data science assisted methodologies to support the evaluation of stress-resistant and high yielding soybean cultivars under growing conditions of smallholding production in Africa.
- Georeference, extract, and impute, weather and soil data from 100 testing sites in 24 countries in Sub-Saharan Africa.
- Build statistical tools to visualize soybean performance as a function of weather and biological traits
- Standardize and synthesize crop productivity metrics to support field management operations

Sep 2018–May 2020 **Beltsville Agricultural Research Center, USDA-ARS, Precision Sustainable Agriculture**.
Integrate precision digital technologies to evaluate the impacts of sustainable farm practices.
- Compile field-level data from experiments testing regenerative practices adapted to no-tilled organic production (ground-based remote sensing, biomass, soil carbon and nitrogen)
- Process, interpret, and visualize multi-spectral satellite imagery to visualize canopy changes in Maryland research fields under regenerative and remediation treatments, e.g. no-tillage, cover crops.
- Develop data pipelines for building machine learning models to predict growth and N removal of cover crops in the US Mid-Atlantic and US North-East.

Jan 2014–June 2018 **Agronomy Department, Iowa State University**.
Evaluate the impacts of cover crops on US corn productivity through statistical and biophysical models.
- Synthesize 65-years of scientific literature to conduct a meta-analysis of cover crops effects on US corn yields across multiple climates and management scenarios.
- Design field trials and collect data to calibrate a computer model to simulate environmental services of cover crops to enhance soil quality, water quality, and grain yields.
- Perform computer simulations to forecast soil productivity and farm income changes as a result of cover crop adoption by Iowa corn-cattle operations over time.

Education

2014–2018 **Iowa State University, Ames IA (United States of America)**.
Ph.D. Crop Production and Physiology. *(Cropping Systems Modeling)*
Cover crop effects on maize productivity: Insights from statistical and process-based models.

2009–2011 **New Mexico State University, Las Cruces NM (United States of America)**.
MSc. Agricultural Economics
Econometric models in food safety economics.

1999–2004 **Escuela Politécnica del Ejército (Quito-Ecuador)**.
B.Sc. Crop and Animal Sciences

Technical skills

Statistics & Analytics: Data science and analytics applied to Agriculture (data processing, modeling, visualization)
Observational and Experimental Methods. Meta-analysis. Econometrics.
Crop and Soil Simulation Models.

Programming: R, Python, SQL, GIS, Git Bash, ***Professional Links***: GitHub, LinkedIn

Selected Publications, Proposals, and Talks

Marcillo G.S., Miguez, F.E., (2016). Corn yield response to Winter cover crops: An updated meta-analysis. Journal of Soil and Water Conservation. 72(03):216-229.

Bestelmeyer B., Marcillo G.S, Mc Cord S., Mirsky S, et al. 2020. Scaling Up Agricultural Research with Artificial Intelligence. IEEE-IT Professional; 33-38.

Hovakimyan N., Martin N.F., Kalantari Z., Ferreira C., Zhao P., Marcillo G.S. 2021. Optimization of Agricultural Management for Soil Carbon Sequestration Using Deep Reinforcement Learning and Large-Scale Simulations. C3-DTI Digital Transformation and AI for Energy and Climate Security-II Call.

Marcillo G.S., Martin N.F. 2020. Advancing Soybean Breeding Evaluation in the US Midwest with Learning Algorithms and Crop Simulation Models. Bayer Crop Science Grants 4 AG (submitted).

Conference on Applied Statistics in Agriculture and Natural Resources. Soybean Maturity Characterization of Pan-African Breeding Trials using Generalized Additive Models (GAM), Gainesville, FL. University of Florida, virtual conference, May 2021

AI and Machine Learning SCINet Conference. Current Uses and Potential to Solve Complex Problems in Agriculture, Beltsville, MD. USDA-ARS, Sept 2019

Models for Sustainable Maize Management in the US Corn Belt. XXII Latin American maize growers meeting, Quevedo-Ecuador. CIMMYT-INIAP-Agriculture Ministry of Ecuador, Sept 2017

Marcillo G., Miguez F.E. A review of cover crop effects in US corn production. Climate and corn CAP next generation scientists, USDA symposium. Washington, DC. Oct. 2015.

Full academic records: Google Scholar, ResearchGate

Professional Affiliations and Service

Biometry and Statistical Computing (ASA) - Crop Science Society of America (CSA)
Soil Science Society of America (CSSA) - Soil and Water Conservation Society (SWCS)

Languages

English: Fluent, Spanish: Native