

Paulo Izquierdo

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EDUCATION

- 2017- present **Ph.D. Degree**, Michigan State University, Plant Breeding Genetics and Biotechnology, Dissertation Title: “Exploring the genetic architecture and improving genomic prediction accuracy for yield, mineral concentration, and canning quality traits in common bean.”
- 2010 **B.S. Degree**, Universidad del Tolima, with Distinction, Biology, Thesis title: “Use of the advanced backcross-QTL method to transfer seed mineral accumulation nutrition traits from wild to Andean cultivated common beans.”

RESEARCH AND PROFESSIONAL EXPERIENCE

- 2017 - present Graduate research assistant, Dissertation Title: “Exploring the genetic architecture and improving genomic prediction accuracy for yield and end-use quality traits in common bean.” Michigan State University. Advisor: Karen Cichy
- 2016 Visiting Scholar, “Development of molecular markers linked to anthracnose resistance in common bean.” Michigan State University. Advisors: James Kelly and Karen Cichy
- 2013 - 2016 Research assistant, “Fine-mapping of QTLs associated with minerals concentration in common bean and Genome-wide association mapping for agronomic traits in a Multiparent Advance Generation Intercross population.” CIAT. Advisor: Bodo Raatz
- 2011 - 2013 Research assistant, “QTL analysis and chloroplast transformation in sugarcane.” Colombian Sugarcane Research Center. Advisor: Jershon Lopez
- 2010 Visiting researcher, “Use of molecular marker assisted selection for resistance to anthracnose in common bean.” CIAT/Universidad Nacional de Colombia. Advisor: Matthew Blair
- 2009 - 2010 Undergraduate Research Assistant, “Use of the advanced backcross-QTL method to transfer seed mineral accumulation nutrition traits from wild to cultivated common beans. CIAT. Advisor: Matthew Blair.

PUBLICATIONS

1. **Izquierdo, P**; Lopez, M; Kelly, J; Cichy, K. Accelerating genetic gain in dry beans for yield and end-use quality traits using genomic selection and high-throughput phenotyping. **In preparation.**
2. **Izquierdo, P** and Cichy, K. Meta-QTL and ortho-MQTL analyses for yield and yield components in dry bean. **In preparation.**
3. Sadohara, R; **Izquierdo, P**; Alves, F; Porch, T; Beaver, J; et al. The *Phaseolus vulgaris* Yellow Bean Collection: Genetic diversity and characterization for cooking time. *Genet. Resour. Crop. Evol.* **2022**
4. Sadohara, R; Long, Y; **Izquierdo, P**; Urrea, C; Morris, D and Karen Cichy. Seed Coat Color Genetics and G×E in a Yellow Bean Collection via Image Analysis Paired with Machine-Learning and GWAS. *The Plant Genome.* **2021.**

5. Diaz, S; Ariza-Suarez, D; **Izquierdo, P**; Lobaton, JD; de la Hoz, JF; et al. Genetic mapping for agronomic traits in a MAGIC population of common bean (*Phaseolus vulgaris* L.) under drought conditions. BMC Genomics. **2020**.
6. Berry, M; **Izquierdo, P**; Jeffery, H; Shaw, S; Nchimbi-Msolla, S and Cichy, K. QTL analysis of cooking time, seed attributes, and protein concentration in a recombinant inbred dry bean (*Phaseolus vulgaris* L.) population grown in two agro-ecological zones in Tanzania. Theor. Appl. Genet. **2020**.
7. **Izquierdo, P**; Astudillo, C; Blair, M; Iqbal, A; Raatz, B and Cichy, K. Meta-QTL analysis of seed iron and zinc concentration in common bean (*Phaseolus vulgaris* L.) Theor. Appl. Genet. **2018**.
8. **Izquierdo, P**; Shaw, S; Berry, M and Cichy K. A saturated genetic linkage map of common bean (*Phaseolus vulgaris* L.) developed using Genotyping by Sequencing (GBS). Annual report of the Bean improvement cooperative. **2017**.
9. Perea, C; De la Hoz, J; Cruz, J; Lobaton, J; **Izquierdo, P**, et al. Bioinformatic analysis of genotype by sequencing (GBS) data with NGSEP. BMC Genomics. **2016**.
10. Blair, M; **Izquierdo, P**; Astudillo, C and Grusak, M. A. Legume Biofortification Quandary: Variability and genetic control of seed coat micronutrient accumulation in common beans. Front. Plant Sci. **2013**.
11. Delgado, H; Pinzón, E; Blair, M and **Izquierdo, P**. Evaluation of bean (*Phaseolus vulgaris* L.) lines result of an advanced backcross between a wild accession and Radical Cerinza. U.D.C.A Act. & Div. Cient. **2013**.
12. **Izquierdo, P**; A. Gutiérrez; J.I. Victoria; M.C. Ángel and J. López: Molecular markers associated with resistance to Sugarcane yellow leaf virus. Proceedings International Society Sugar Cane Technologists. **2013**.
13. Blair, M and **Izquierdo, P**. Use of the advanced backcross-QTL method to transfer seed mineral accumulation nutrition traits from wild to Andean cultivated common beans. Theor. Appl. Genet. **2012**.
14. Blair, M; **Izquierdo, P**; Astudillo, C; Monserrate, F; Cortés, M, et al. Utilization of near infrared spectrophotometry (NIRS) analysis for evaluation of mineral content in Andean bean samples. Annual report of the Bean improvement cooperative. **2011**.

ORAL AND POSTER PRESENTATIONS

1. **Izquierdo, P**; Lopez, M; Kelly, J; Cichy, K. Assessing Genomic Selection Prediction Accuracy for Yield and End-Use Quality Traits in Black Beans. Bean improvement cooperative. **Poster. 2019**.
2. **Izquierdo, P**; Katuuramu, D; Cichy, K. Genomic selection for nutritional traits and cooking time in common bean) using Genotyping by Sequencing. Plant & Animal Genome. **Poster. 2019**.
3. **Izquierdo, P**; Astudillo, C; Iqbal, A; Blair, M; Raatz, B and Cichy, K. Meta-QTL Analysis in Common Bean to Uncover the Genetic Architecture of Iron and Zinc Concentration in Seed. Plant & Animal Genome. **Poster. 2018**.
4. **Izquierdo, P**; Shaw, S; Berry, M and Cichy K. A saturated genetic linkage map of common bean developed using Genotyping by Sequencing (GBS). Bean improvement cooperative. **Poster. 2017**.
5. **Izquierdo, P**; Lobaton, J; Mayor, V; Grajales, M; Cajiao, C; Duitama, J and Raatz, B. Genome-wide association mapping for yield and other agronomic traits in a Multi-parent advanced generation inter-cross population of Mesoamerican common bean (*Phaseolus vulgaris* L.). IX Latin American and Caribbean Agricultural and Forestry Biotechnology Meeting, Peru. **Oral presentation. 2016**.
6. **Izquierdo, P**; Gutiérrez, A; Victoria, J; C; Ángel, López, J; Avellaneda, C. Molecular markers associated with resistance to the sugarcane yellow leaf virus. XXVIII International Society of Sugarcane Technologists (ISSCT). Brazil. **Oral presentation. 2013**.

7. **Izquierdo, P;** Gutiérrez, A; Victoria, J; Ángel, J; López, J; Avellaneda, C. Molecular markers associated with resistance to the sugarcane yellow leaf virus. IX Association for Sugarcane Technology in Latin America and the Caribbean (Atalac-Tecnicaña). Colombia. **Oral presentation. 2012.**
8. **Izquierdo, P;** Gutiérrez, A; Avellaneda, C; Victoria, J; Ángel, J; López, J. Molecular markers associated with resistance to the sugarcane yellow leaf virus. Colombian and Latin American Phytopathological Association. Colombia. **Oral presentation. 2011.**

HONORS, AWARDS, AND FELLOWSHIPS

- 2021 NSF Research Traineeship – Integrated training model in plant and computational sciences fellowship.
- 2021 Everett and Jane Everson fellowship in Plant Breeding.
- 2021 Jason and Dana Lilly fellowship in Plant Breeding, Genetics & Biotechnology.
- 2021 Norman and Jessie Thompson fellowship in Crop and Soil Sciences.
- 2021 College of Agriculture and Natural Resource fellowship, Michigan State University.
- 2020 Bayer Diversity Initiative Scholar.
- 2019 Everett and Jane Everson fellowship in Plant Breeding.
- 2019 Norman and Jessie Thompson fellowship in Crop and Soil Sciences.
- 2019 Graduate student language fellowship in undergraduate teaching and learning Residential College in the Arts and Humanities, Michigan State University.
- 2019 Council of graduate students, Conference Award, Michigan State University.
- 2018 The Crop and Soil Science Graduate award, Michigan State University.
- 2018 Jason and Dana Lilly fellowship in Plant Breeding, Genetics & Biotechnology.
- 2018 Elmer C. Rossman fellowship in Plant, Soil & Microbial Science.
- 2018 Everett and Jane Everson fellowship in Plant Breeding.
- 2018 Resilient and Nutritious dry beans for Africa fellowship, USDA-FAS.
- 2017 Doctoral Fellowship Program. COLCIENCIAS, Colombia's Administrative Department of Science, Technology, and Innovation.

PEDAGOGICAL EXPERIENCE & MENTORING

- 2021 Workshop Instructor: Quantitative Genetics, Feed the Future Innovation Lab for Crop Improvement, Eastern Africa.
Website: https://pauloizquierdo.github.io/Quantitative_Genetics/
- 2021 Workshop Co-Instructor: Data visualization with R, Industrial University of Santander, Colombia.
Website: <https://compasscol.github.io/dataviz/>
- 2021 Workshop Co-Instructor: Introduction to R, Industrial University of Santander, Colombia.
Website: <https://compasscol.github.io/IntroR/>
- 2019 Spanish Language Assistant: Residential college in the arts and humanities, program on sustainability in Costa Rica, Michigan State University.
- 2019 Teaching assistant: Department of plant, soil and microbial sciences, Introduction to plant genetics (CSS350), Michigan State University
- 2018 As a research assistant, I mentored an USDA Borlaug fellow in lab-based research. Michigan State University. Trainee: Winnyfred Amongi.

- 2016- As a research assistant, I mentored 2 undergraduates in greenhouse and lab-based research, CIAT.
 2015 Trainees: Wilson Santiago, Laura Paz.

SYNERGISTIC ACTIVITIES

- 2021 Co-Organizer, Workshops series focused on data analysis in biology and agriculture. Industrial University of Santander, Colombia.
 Website: https://compasscol.github.io/2021B_talleres-UIS.html
- 2021 Co-Organizer, Online seminar series on phytopathology and plant breeding. University of Nariño, Colombia.
 Website: https://compasscol.github.io/2021A_Conferencias-UNar.html
- 2020 Co-Founder, Community Platform for Agricultural Sciences (COMPASS).
 Website: <https://compasscol.github.io/>
- 2020 Co-Organizer, Online science: promoting the use of platforms for scientific dissemination, collaboration, and inspiration, SOCOLEN symposium. Colombia.
- 2019 Co-Organizer, Phenomic Application in Plant Breeding, Corteva-PBGB symposium. Michigan State University.

MEMBERSHIPS

Bean Improvement Cooperative
 American Society of Agronomy
 Crop Science Society of America
 Soil Science Society of America

REFERENCES

- Dr. Karen Cichy USDA-ARS adjunct associate professor, karen.cichy@usda.gov
 Michigan State University; Department of Plant, Soil and Microbial Sciences.
- Dr. Bodo Raatz Breeder, bodoraatz@gmail.com
 Limagrain, France
- Dr. Robin Buell GRA Eminent Scholar Chair in Crop Genomics, Robin.Buell@uga.edu
 Department of Crop & Soil Sciences and the Center for Applied Genetic Technologies