

# VALERIA VELASQUEZ-ZAPATA

+1 (515) 735-1551 ◊ [valeria.velasquezz@gmail.com](mailto:valeria.velasquezz@gmail.com) ◊ [github.io/vvelasqz](https://github.io/vvelasqz)

## SUMMARY

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My research currently focuses on developing mathematical models and methods for understanding disease emergence. I study pathogenic mechanisms and host immune responses through the combination of statistical modeling and wet lab approaches, such as the production and analysis of high-throughput data (like Y2H-Seq and RNA-Seq), the use of systems biology to build biological networks, and the integration multi-omics data. Multidisciplinary collaborations have led me to interact with molecular biologists, geneticists, statisticians, and computer scientists in the development of solutions in the field. I hope to find opportunities where I can find fulfillment in my work by continuing to expand my understanding of biological systems and apply my data analysis expertise.

## EDUCATION

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<b>PhD, Bioinformatics and Computational Biology (minor in Statistics)</b> Iowa State University, USA	GPA: 4/4 July 2021
<b>MS, Biomedical Research</b> University of Valladolid, Spain	GPA: 9.2/10 July 2015
<b>BS, Biology</b> University of Antioquia, Colombia	GPA: 4.4/5 October 2013
<b>BS, Biological Engineering</b> National University of Colombia	GPA: 4.1/5 July 2010

## PROJECTS

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**Y2H-SCORES:** [Y2H-SCORES](#) is a software developed to rank protein-protein interactions from yeast two-hybrid next generation interaction screening (Y2H-NGIS) data. Besides the software, I developed a [Y2H-NGIS simulator](#) to generate Y2H-NGIS data, and a [Benchmarking](#) section that proves the performance of the software across published datasets.

**Interact-omics:** I developed [Interact-omics](#), a series of workflows to integrate interactome data with omics like eQTL, RNASeq and Y2H-NGIS. Different network analyses are presented and applied to characterize the *Mla* receptor signaling.

**TranscriptoNET:** I am developing different data analysis workflows for transcriptome data. [TranscriptoNET](#) include generation and integration of Gene Regulatory Networks (GRNs), prioritization of transcription factors for their role in regulating expression, data visualization and epistatic analysis of gene effects on gene expression.

## SKILLS

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**Proficient:** R, Python, MATLAB, L<sup>A</sup>T<sub>E</sub>X, Git, BASH, Slurm, Excel, Benchling, Biorender

**Familiar:** SQL, SAS, Adobe illustrator

**Languages:** Spanish (native), English (C2), Portuguese (A2)

## PUBLICATIONS

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- **Velásquez-Zapata V**, Elmore J, Banerjee S, Dorman K, Wise R. *Next-generation yeast-two-hybrid analysis with Y2H-SCORES identifies novel interactors of the MLA immune receptor*. PLoS Computational Biology (2021).
- Banerjee S, **Velásquez-Zapata V**, Fuerst G, Elmore J, Wise R. *NGPINT: A Next-generation protein-protein interaction software*. Briefings in Bioinformatics (2020).
- Chapman A, Hunt M, Surana P, **Velásquez-Zapata V**, Xu W, Fuerst G, Wise R. Disruption of barley immunity to powdery mildew by an in-frame Lys-Leu deletion in the essential protein SGT1. GENETICS (2020).
- **Velásquez-Zapata V**, Palacio K, Gaviria A, Cano LE. *Assessment of genotyping markers in the molecular characterization of a population of clinical isolates of Fusarium in Colombia*. Biomedica (2021).
- Reyes-Herrera P, Muñoz-Baena L, **Velásquez-Zapata V**, Patiño L, Delgado O, Díaz-Diez C, Navas-Arboleda A, Cortés A. *Inheritance of Rootstock Effects in Avocado (Persea americana Mill.) cv. Hass*. Frontiers in Plant Science (2020).

- Gemmell N, et al. *The tuatara genome reveals ancient features of amniote evolution*. Nature (2020).
- Fraile E, Díez B, **Velásquez-Zapata V**, Acedo A, Sanz D, Velasco E. *Functional classification of DNA variants by hybrid minigenes: Identification of 30 spliceogenic variants of BRCA2 exons 17 and 18*. PLOS Genetics (2017).
- **Velásquez-Zapata V**, Ochoa R, Muskus C. *Detection of molecular targets in the phosphatidylinositol signaling pathway in Leishmania spp. through bioinformatics tools and mathematical modeling*. Biomedica (2015).

## EXPERIENCE

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**2021-present:** Postdoctoral Research Scientist, Wise Laboratory, Plant Pathology and Microbiology Department, Iowa State University. USA. Project: Temporal control of immunity to powdery mildew in barley.

**2017-2021:** Research Assistant, Wise Laboratory, Plant Pathology and Microbiology Department, Iowa State University. Project: Host and pathogen signalling in cereal fungal interactions.

**2015-2016:** Research Professional, Colombian Corporation of agricultural research (Agrosavia), Colombia. Project: Technological, productive, and commercial development of avocado in Antioquia.

**2014-2015:** Research Assistant, Splicing and Cancer susceptibility Laboratory, Molecular Biology and Genetics Institute (IBGM), University of Valladolid, Spain.

**2012:** Biotechnology Advisor, Microplast S.A. Colombia. Project: Establishment of a controlled breeding system of *Sitophilus oryzae* for repellency bioassays

## TALKS

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*Multi-layered characterization of the barley interactome links MLA immune receptor signaling with defense gene expression*, 2021, IS-MPIM conference

*Multi-layered characterization of the barley interactome links MLA immune receptor signaling with defense gene expression*, 2021, Powdery mildew workshop, IS-MPIM conference

*Statistical inference of protein-protein interactions with Y2H-SCORES*, 2021, ISCB-SC webinars

*Modeling effector-host interactions in the context of the barley protein interactome*, 2019, Colombian Conference in Bioinformatics and Computational Biology

*Next-Generation Screening for Host Interactors of Fungal Effectors in Cereal Immunity*, 2018, Predictive Plant Phenomics symposium. Iowa State University

## FELLOWSHIPS AND ACADEMIC AWARDS

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**2021:** Research Excellence Award. Iowa State University.

**2019:** Brown Graduate Fellowship. Iowa State University.

**2018-2020:** Faculty for The Future Ph.D. Fellowship. The Schlumberger Foundation.

**2016:** Diane Brandt scholarship. Iowa State University.

**2015-2021:** Fulbright-Minciencias Ph.D. Fellowship.

**2014, 2015:** Enrollment of honor. Universidad de Valladolid, Spain.

**2014, 2015:** Asia-Iberoamerica Master Scholarship. Universidad de Valladolid- Banco Santander. Spain.

**2012:** Iberoamerica Scholarship. Undergraduates. Banco Santander. Spain.

## WORKSHOP AWARDS

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**2022:** Genetics Society of America DeLill Nasser award.

**2021:** Genetics Society of America Presidential Membership.

**2019:** Sponsorship for attendance to the Grace Hopper Celebration. Anita.org.

**2019, 2021:** SACNAS conference travel award.

**2019, 2021:** Sponsorship for attendance to the CRA IDEALS and CRA-W Grad Cohort Workshops.

**2018:** Bioinformatics Analysis for Conservation Genomics. Smithsonian-Mason School for conservation scholarship.

**201e:** Centro Argentino Brasileiro en Biotecnologia CABBIO and Colciencias course scholarship.

**2015:** Universidad Internacional de Andalucía Summer course scholarship. Spain.