Francisco Huizar

Data-driven drug discovery scientist

Contact

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Camarillo, CA

Work Authorization
U.S. Citizen

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LinkedIn

Google Scholar

ORCiD

Personal Website

Skills

Transferable and Professional

- Innovative problem solver
- Collaborate cross-functionally
- Project management
- Information, data management

Excellent

- S.M.A.R.T. goals and objectives
- Leadership and initiative
- Professional self-awareness
- Communicate effectively

Very Good

Technical and Software

- Biostatistics and data analysis
- R for biostatistics
- Python, Pandas, Matplotlib
- MATLAB and SimBiology

Excellent

- Computational biology
- Model simulation and development
- Unix, Linux, Cloud Computing
- PyTorch, Keras, TensorFlow

Very Good

- GitHub, Git, GitLFS
- MySQL, SQL, Tableau
- STAN, MCMC for Bayesian inference
- C++ for object-oriented programming

Experienced

- AWS, Azure, GCP
- Seurat, ScanPy, STAR, Cell Ranger
- Pharmacometrics and PKDM
- PK/PD, pharmacology modeling
- NONMEM, Monolix, Phoenix NLME, WinNonLin
- Exposure-response modeling of discrete and time-to-event data

Actively Learning!

Education

Ph.D., Bioengineering
University of Notre Dame (Jul 2018 – Current)

M.S., Computational Statistics
University of Notre Dame (Jul 2018 – Current)

B.S., Chemical Engineering
University of Notre Dame (May 2018)

B.S., Computational Statistics
University of Notre Dame (May 2018)

Mission statement

- I am a collaborative cross-functional scientist with expertise in computational biology, mathematical modeling, science-based decision making, and interdisciplinary communication.
- **The core mission of my professional endeavors is to serve patients** afflicted by genetic-related disease with therapeutic approaches and innovative biotechnology in a clinical setting.
- To achieve **my mission** of service, I aim to utilize **my talents** of communication and execution to perform **my passion** of planning and analyzing by using data-driven approaches for drug discovery.

Summary of qualifications

- Articulate communicator with expertise in data visualization and scientific presentation resulting in 1 academic journal front cover, 14 conference and 5 seminar presentations.
- Self-motivated project manager with excellent communication, innovation and strategic planning abilities resulting in 4 first-author publications and 5 fellowships totaling in $96,000 in funding.
- Versatile learner committed to professional development as demonstrated by integration of 3 computational modeling, pharmacometrics, and clinical drug development training workshops.
- Inspiring leader with expertise in fostering patience, encouragement, collaborative environments, and collective success as evidenced by mentoring 8 undergraduate and 9 graduate students.
- Dedicated and dependable scientist committed to integrity and accountability resulting in 3 discoveries in therapeutic research for oncology and neurodegenerative preclinical disease models.

Professional experience

Quantitative systems biologist, model simulation and drug discovery

As Graduate Research Assistant (Dec 2019 - Current) — *University of Notre Dame, Indiana*

- Integrated quantitative systems pharmacology (QSP) and model-informed drug development (MIDD) modeling software for mechanistic modeling of oncology resulting in 2 collaborations.
- Explored multimodal single-cell omics cancer data with the Seurat and ScanPy genomics toolkits resulting in attainment of 3 bioinformatics analysis approaches in oncology and disease biology.
- Responsible for collaborative relationship building by leading 4 cross-functional teams spanning drug discovery, machine learning, computational biology, simulation, and mathematical modeling.
- Developed a Gaussian process surrogate model (PyTorch) for prediction and simulation of therapeutic viability of 1,498 compounds to 172 kinase targets for cancer research.
- Implemented 2 machine learning approaches for de novo therapeutic design as a scientific approach for identification and simulation of new therapeutics using generative models.
- Utilized machine learning, mathematical modeling, and cloud computing for rapid simulation and data classification of 4 unique calcium signatures in developmental biology.
- Operated mechanistic modeling tools to discover 2 distinct cell populations in developing epithelial tissue via simulation and analytic techniques.

Computational biologist, data management and data science

As Graduate Research Assistant (Jul 2018 - Dec 2019) — *University of Notre Dame, Indiana*

- Participated in cross-function teams to collaborate with other scientists that led to development of a cloud computing project to manage datasets consisting of 13,324 images.
- Deployed bioinformatics, data processing, and data science methods for analysis of phenomic datasets to identify 4 lead therapeutic candidates using Python and MATLAB.
- Performed in vivo gene expression of 425 human disease related genes in *Drosophila Melanogaster*
- Spearheaded design and innovation of a more efficient coverslip plating protocol for in vivo calcium signaling imaging that increased throughput by a factor of 2.
- Executed innovation in data democratization as demonstrated by generating 2 open-source repositories for biotechnology software (simulation and biostatistics) for non-technical users.

Honors and awards

• Berthiaume Institute for Precision Health Summer Graduate Research Fellowship	May 2022 – Aug 2022
• 10th Annual Harper Cancer Research Institute Research Day Presentation Moderator	Mar 2022
• Notre Dame CBE Lead Graduate Student Mentor	Jan 2022 – Current
• Harper Cancer Research Institute Interdisciplinary Interface Training Program Grant	Jul 2020 – Jul 2022
• Leahy-Filipi Graduate Fellowship for excellence in neuroscience research	May 2020 – May 2021
• Notre Dame Annual Building Bridges Reception Keynote Speaker	Sep 2019
• Harper Cancer Research Institute Research Day Oral Presentation Award	Apr 2019
• Stem Cells & Regenerative Medicine Research Fellowship	May 2017 – Aug 2017
• Notre Dame CBE Early Start Fellowship	Jul 2018 – Aug 2018
• Provost Scholarship for academic achievement	Aug 2013 – May 2017
• Kaneb-Gillen Hispanic Scholar for academic achievement	Aug 2015 – May 2017

Publications

Kumar, N., **†Huizar, F.J.,** Farfán-Pira K.J., Brodskiy, P., Soundarrajan, D.S., Nahmad, M., Zartman, J.J.; MAPPER: An open-source, high-dimensional image analysis pipeline unmasks differential regulation of *Drosophila* wing features. *Frontiers in Genetics* (2022). https://doi.org/10.3389/fgene.2022.869719.
†Co-first authorship.

Huizar, F.J., Hill, H., Bacher, E., Eckert, K., Gulotty, E., Rodriguez, K., Tucker, Z., Banerjee, M., Wiest, O., Zartman, J. and Ashfeld, B.L. (2022), Rational Design and Identification of Harmine-Inspired, N-Heterocyclic DYRK1A Inhibitors Employing a Functional Genomic In Vivo *Drosophila* Model System. *ChemMedChem*. (2022). https://doi.org/10.1002/cmdc.202100512

Soundarrajan, D., **†Huizar F.J.**, Paravitorghabeh, R., Robinett, T., Zartman, J. (2021), From spikes to intercellular waves: Tuning intercellular calcium signaling dynamics modulates organ size control. PLOS Computational Biology. 2021 Nov 1;17(11):e1009543. https://doi.org/10.1371/journal.pcbi.1009543 **†Co-first authorship.**

Huizar, F.J., Soundarrajan, D., Paravitorghabeh, R, Zartman, J.J., Interplay between morphogen-directed positional information systems and physiological signaling. Developmental Dynamics. 2020; 249: 328– 341. https://doi.org/10.1002/dvdy.140

Kumar, N., **Huizar, F.J.,** Unger, M., Soundarrajan, D., Velagala, V., Koren, J., Zartman, J.J. (2020). Neurotransmitter Receptors as Key Physiological Regulators of Epithelial Morphogenesis. Biophysical Journal. https://doi.org/10.1016/j.bpj.2019.11.673

Brodskiy, P.A., Wu, Q., Soundarrajan, D.K., **Huizar, F.J.**, Chen, J., Liang, P., Narciso, C., Levis, M., Arredondo-Walsh, N., Chen, D., Zartman, J.J. (2019). Decoding calcium signaling dynamics during *Drosophila* wing disc development. Biophysical Journal. https://doi.org/10.1016/j.bpj.2019.01.007

Brodskiy, P.A., Wu, Q., Kumar, N. Velagala, V. Snyder, K. **Huizar, F.J.**, Tautges, S., Snyder. M, Zartman J.J. (2018). Mapping the calcium signalsome during *Drosophila* wing development. IFAC-PapersOnLine. https://doi.org/10.1016/j.ifacol.2018.09.019

Brodskiy, P. A., Wu, Q., **Huizar, F. J.**, Soundarrajan, D. K., Narciso, C., Levis, M., … Zartman, J. J. (2017). Intercellular calcium signaling is regulated by morphogens during *Drosophila* wing development. bioRxiv, 104745. *Pre-print.* https://doi.org/10.1101/104745

Conference and seminar presentations

Huizar, F.J. et al., "Flying" over pre-clinical barriers: Machine learning approaches to characterize novel DYRK1A inhibitors as potential cancer therapeutics. **Notre Dame Quantitative Biology Retreat.** Poster. April 08, 2022.

Huizar, F.J. et al., "Flying" over pre-clinical barriers: Machine learning approaches to characterize novel DYRK1A inhibitors as potential cancer therapeutics. **Cancer Research Institute Cancer Research Day.** Selected graduate student presenter. Poster. March 14, 2022.

Huizar, F.J. et al., "Flying" over pre-clinical barriers: Development of a rapid, low-cost platform for pre-clinical evaluation of novel therapeutics in vivo. **Notre Dame Bioengineering Seminar.** Main speaker. Main speaker. Multidisciplinary Research Building, Notre Dame, IN. Nov 18, 2021.

Huizar, F.J., Hill, H., Kumar, N., Bacher, E., Ashfeld, B., Zartman, J.J., Rational Design and Identification of N-Heterocyclic DYRK1A Inhibitors as Potential Anticancer Therapeutics. **Cancer Biology Training Consortium annual retreat.** Poster. Graduate Hotel Nashville. Nashville, TN. Oct 25, 2021.

Huizar, F.J., Hill, H.M., Bacher, E.P., Eckert, K.E., Gulotty, E.M., Rodriguez, K.X., Tucker, Z.D., Wiest, O., Zartman, J., Ashfeld, B.L., Novel *N*-heterocyclic DYRK1A inhibitors ameliorate overgrowth of epithelial tissue. **IU Simon Comprehensive Cancer Center Cancer Research Day.** Presentation. Online. October 14, 2021.

Huizar, F.J., Using a black hole to identify novel therapeutics: SVGP regression as a statistical framework for drug discovery. **Notre Dame Bioengineering Seminar.** Main speaker. Online. June 22, 2021.

Huizar, F.J., Kumar, N., Robinett, T., Farfan-Pira K.J., Soundarrajan, D., Unger, M., Brodskiy, P., Nahmad, M., Zartman, J.J., MAPPER: A new image analysis pipeline unmasks differential regulation of *Drosophila* wing features. **Genetics Society of America annual *Drosophila* research conference.** Poster. Online. March 31, 2021.

Huizar, F.J., Hill, H., Kumar, N., Bacher, E., Ashfeld, B., Zartman, J.J., In vivo drug discovery "on-the-fly": Towards high-throughput assessment of novel therapeutics in humanized *Drosophila melanogaster*. **Harper Cancer Research Institute Cancer Research Day.** Selected graduate student presenter. Online. March 29, 2021.

Huizar, F.J., Hill, H., Kumar, N., Bacher, E., Ashfeld, B., Zartman, J.J., In vivo drug discovery "on-the-fly": Towards high-throughput assessment of novel therapeutics in humanized *Drosophila melanogaster*. **Cancer Biology Training Consortium annual retreat.** Poster. Online. Oct 27, 2020.

Huizar, F.J., Hill, H., Kumar, N., Bacher, E., Ashfeld, B., Zartman, J.J., In vivo drug discovery "on-the-fly": Towards high-throughput assessment of novel therapeutics in humanized *Drosophila melanogaster*. **Notre Dame Bioengineering Seminar.** Main speaker. Multidisciplinary Research Building, Notre Dame, IN. Sep 29, 2020.

Maini, P., **Huizar F.J.**, Oliveri, H., Baraban, M., Kumar, N., Parel, K., Telele. C., Modeling shape & size in biological multicellular tissues. Workshop Presentation. **Lorentz Center modeling biological development workshop.** Online. Aug 28, 2020.

Huizar, F.J., Bacher, E., Kumar, N., Gleason, B., Koren, J., Ashfeld, B., Zartman, J.J., Regulation of DYRK1A activity through an integrated inhibitor scaffold design and phenotypic analysis approach. Poster. **7th Annual AD&T Symposium: Extreme Diagnostics**, Notre Dame, IN. Mar 6, 2020.

Huizar, F.J., Wu, Q., Tautges, S., Eckert, K., Bacher, E., Ashfeld, B., Zartman, J.J., Toward a high-throughput *in vivo* screening pipeline for testing new therapeutics using *Drosophila melanogaster* as a disease-model. **Eli Lilly and Company HCRI Notre Dame Alumni Panel**. Poster. Eli Lilly and Company Headquarters, Indianapolis, IN. May 17, 2019.

Huizar, F.J., *Drosophila melanogaster* as a high-throughput model for drug screening and decoding G-protein coupled receptor interactions. **Notre Dame Bioengineering Seminar.** Main speaker. Multidisciplinary Research Building, Notre Dame, IN. Apr 12, 2019.

Huizar, F.J., Bacher, E., Wu, Q., Tautges, S., Kumar, N., Ashfeld, B., Zartman, J.J., A high-throughput *in vivo* screening pipeline for testing novel DYRK1A inhibitors against triple negative breast cancer using *Drosophila melanogaster* as a disease model. **8th Annual HCRI Cancer Research Day.** Selected Presenter. Harper Cancer Research Institute, South Bend, IN. Apr. 8, 2019.

Huizar, F.J., Wu, Q., Tautges, S., Eckert, K., Bacher, E., Ashfeld, B., Zartman, J.J., Toward a high-throughput *in vivo* screening pipeline for testing new therapeutics using *Drosophila melanogaster* as a disease-model. **8th Annual HCRI Cancer Research Day.** Poster. Harper Cancer Research Institute, South Bend, IN. Apr 8, 2019.

Huizar, F.J., Mechanisms of serotonin (5-HT) signaling in development. **Harper Cancer Research Institute Seminar.** Main speaker. Harper Cancer Research Institute, South Bend, IN. Feb 4, 2019.

Huizar, F.J., Wu, Q., Brodskiy, P.A., Zartman, J.J., Regulation and relevance of intercellular calcium signaling. Poster. **Notre Dame College of Science Joint Annual Meeting**, Notre Dame, IN. May 4, 2018.

Huizar, F.J., Levis, M., Zartman J.J., *In vivo* analysis of spontaneous intercellular Ca^{2+} waves in *Drosophila* wing discs. Poster. **5th Midwest Quantitative Biology Symposium**, Notre Dame, IN. Apr 8, 2017.

Research interests

- Translational and clinical research for genetic-related diseases
- Modeling and simulation of virtual clinical trials
- Drug development, pharmacodynamics, and pharmacokinetics
- Scientific computing and machine learning approaches in bioinformatics
- Gene regulatory network modeling
- Phenomics, proteomics, and genomics association analysis

Affiliations

- American Institute of Chemical Engineers (AIChE)
- Notre Dame CBE graduate student organization mentor
- Notre Dame MSPS Building Bridges Mentoring Program
- Notre Dame Hispanic Scientists and Engineers
- Notre Dame CBE First-Year Graduate Student Peer Group Program (Mentor)
- Notre Dame Leadership Advancing Socially Engaged Research (Graduate Mentor)