Erik Alfonso Serrano

Denver, Colorado | Linkedin | Github | Google Scholar

About me

I am a computational biologist passionate about transforming large-scale data into biological discovery. My work bridges computational and experimental science, with a strong focus on developing robust, reproducible, and open-source software. I bring expertise in machine learning, image-based profiling, and data integration, with a proven record of building scalable frameworks, contributing to community standards, and enabling reproducible research. Driven by collaboration and transparency, my goal is to advance both methodological innovation and biological insight in ways that are impactful and widely accessible.

Education

University of Colorado, Anschutz Medical Campus — Aurora, Colorado
PhD. Computational Bioscience — *September 2021 - present*

University of California, Northridge — Northridge, California
B.Sc in Biology; Minor in Chemistry — *September 2017- May 2020*

Los Angeles Valley College — Valley Glen, California
AS in Health Sciences — *December 2012 - May 2017*

Research experience

University of Colorado, Anschutz Medical Campus — Aurora, Colorado
Advisor: Gregory Way, Ph.D. — *January 2022 - Present*
Position: PhD Candidate

- Developed open-source software for processing image-based profiles.
- Developed frameworks to assess and evaluate compounds using single-cell image-based profiles in high-content screening data.
- Developed machine learning applications utilizing image-based profiles to predict specific cellular phenotypes.
- Led comprehensive review article on image-based profiling that involved 23 authors spanning 5 countries.

Cedar Sinai Medical Campus — Los Angeles, California

Advisor: Lali Medina-Kauwe, Ph.D. *July 2020 - July 2021*
Position: Post Baccalaureate Researcher

- Utilized computational modeling and molecular dynamics to design nanoparticles and simulate their interactions, while also assessing the structural integrity of developed models.
- Validated nanoparticle design via experimental methodologies.

University of California, Northridge Northridge, California
Advisor: Ravinder Abrol, Ph.D. *September 2017 - May 2020*
Position: Undergraduate Scholar

- Implemented computational developing advanced methodologies for conformational sampling of protein dynamics.
- Developed analytical pipelines for processing molecular dynamics data, enabling the identification of new starting configurations for simulations using statistical modeling techniques.

Drexel University Center City Campus Philadelphia, Pennsylvania
Advisor: Eishi Nogouchi, Ph.D *July 2018 to August 2018*
Position: Summer intern Researcher

- Investigated cellular mechanisms for the maintenance of genomic integrity to regulate lifespan and prevent tumorigenesis.

Los Angeles Valley College Allied Health Sciences Lab Valley Glen, California
Advisors: Pamela Byrd-Williams M.Sc and Erika Brockmann M.Sc *September 2016 to July 2017*
Position: Research Trainee

- Investigated the antimicrobial properties of essential oils on pathogenic microorganisms.
- Contributed to the publication "The Impact of *Salvia hispanica* Extract on Interleukin-1 Production in Macrophages".

Honors and awards

CytoData at Allen Institute Travel Scholarship *September 2022*
Awarded funding to attend CytoData at the Allen Institute, engaging in workshops, networking, and discussions on image-based profiling, machine learning, and computational biology.

SACNAS NDiSTEM Travel Scholarship (Puerto Rico) *September 2022*
Awarded travel funding to attend the SACNAS National Diversity in STEM (NDiSTEM) Conference, supporting professional development, networking, and the presentation of research in a diverse, interdisciplinary scientific community

NIH T15 National Library of Medicine Biomedical Informatics Fellowship *July 2022 - June 2024*
Recipient of the NIH NLM T15 training grant, gaining specialized training in biomedical informatics, data science, and open science.

Engaged in interdisciplinary coursework and research to develop computational skills for biomedical data analysis.

BUILD PODER Post baccalaureate Program *June 2020 - July 2021*
BUILD PODER Scholar (Building Infrastructure Leading to Diversity; Promoting Opportunities for Diversity in Education and Research;

BUILD PODER Scholar Grant *July 2016 - July 2019*
BUILD PODER Scholar (Building Infrastructure Leading to Diversity; Promoting Opportunities for Diversity in Education and Research); Funded by the *National Institute of health* (NIH). Award amount: $20,000

Publications

- **Serrano, E.,** Peters, J., Wagner, J., Graham, R. E., Chen, Z., Feng, B., Miranda, G., Kalinin, A. A., Vulliard, L., Tomkinson, J., Mattson, C., Lippincott, M. J., Kang, Z., Sitani, D., Bunten, D., Seal, S., Carragher, N. O., Carpenter, A. E., Singh, S., … Way, G. P. (2025). Progress and new challenges in image-based profiling. In *arXiv [q-bio.QM]*. arXiv. http://arxiv.org/abs/2508.05800
- **Serrano, E.,** Chandrasekaran, S. N., Bunten, D., Brewer, K. I., Tomkinson, J., Kern, R., Bornholdt, M., Fleming, S. J., Pei, R., Arevalo, J., Tsang, H., Rubinetti, V., Tromans-Coia, C., Becker, T., Weisbart, E., Bunne, C., Kalinin, A. A., Senft, R., Taylor, S. J., … Way, G. P. (2025). Reproducible image-based profiling with Pycytominer. *Nature Methods*, *22*(4), 677–680.
- Kalinin, A. A., Arevalo, J., **Serrano, E.,** Vulliard, L., Tsang, H., Bornholdt, M., Muñoz, A. F., Sivagurunathan, S., Rajwa, B., Carpenter, A. E., Way, G. P., & Singh, S. (2025). A versatile information retrieval framework for evaluating profile strength and similarity. *Nature Communications*, *16*(1), 5181.
- Bunten, D., Tomkinson, J., **Serrano, E.,** Lippincott, M. J., Brewer, K. I., Rubinetti, V., Alquaddoomi, F., & Way, G. P. (2025). Scalable data harmonization for single-cell image-based profiling with CytoTable. In *bioRxiv*. https://doi.org/10.1101/2025.06.19.660613
- Alonso-Valenteen, F., Mikhael, S., Wang, H., Sims, J., Taguiam, M., Teh, J., Sances, S., Wong, M., Miao, T., Srinivas, D., Gonzalez-Almeyda, N., Cho, R. H., Sanchez, R., Nguyenle, K., **Serrano, E.**, Ondatje, B., Benhaghnazar, R. L., Gray, H. B., Gross, Z., … Medina-Kauwe, L. K. (2025). Systemic HER3 ligand-mimicking nanobioparticles enter the brain and reduce intracranial tumour growth. *Nature Nanotechnology*, *20*(5), 683–696.
- Abrol, R., **Serrano, E.**, & Santiago, L. J. (2022). Development of enhanced conformational sampling methods to probe the activation landscape of GPCRs. *Advances in Protein Chemistry and Structural Biology*, *128*, 325–359.
- Luna, E., Parkar, S. G., Kirmiz, N., Hartel, S., Hearn, E., Hossine, M., Kurdian, A., Mendoza, C., Orr, K., Padilla, L., Ramirez, K., Salcedo, P., **Serrano, E.**, Choudhury, B., Paulchakrabarti, M., Parker, C. T., Huynh, S., Cooper, K., & Flores, G. E. (2022). Utilization efficiency of human

milk oligosaccharides by human-associated Akkermansia is strain dependent. *Applied and Environmental Microbiology*, *88*(1), e0148721.

Presentations

- **Serrano, E.** et.al. (October 2024) PyCytominer: Standardized ToolKit For Processing Image-Based Profiles, Poster presentation, The Society of Biomolecular Imaging and Informatics, Boston, Massachusetts
- **Serrano, E.** et.al. (July 2024) PyCytominer: Standardized ToolKit For Processing Image-Based Profiles, Poster presentation, Computational Systems for Integrative Genomics (CSIG) at the Flatiron Institute New York, New York
- **Serrano, E.** & Gregory, Way (October 2022) CytoSnake: Reproducible workflow software for processing cell morphology features fast, Poster presentation, CytoData at the Allen Institute Seattle, Washington
- **Serrano, E.** & Abrol, R (April 2020) Development of New Methods for Enhanced Conformational Sampling of GPCRs at International Society for Computational Biology, Montreal, Canada (*virtual)*
- **Serrano, E.** & Abrol, R (April 2020) Development of New Methods for Enhanced Conformational Sampling of GPCRs at Biophysical Society, San Diego, CA (*Abstract Accepted:* Canceled due to COVID-19*)*
- **Serrano, E**., Khleif, R & Abrol, R (January 2020) Development of New Methods for Enhanced Conformational Sampling of GPCRs at California State University Program for Education, Research and Biotechnology (CSUPERB) Symposium, Santa Clara, CA
- **Serrano, E**., Khleif, R & Abrol, R (April 2019) Development of Enhanced Conformational Sampling Methods for GPCRs at the American Society of Biochemistry and Molecular Biology (ASBMB), Orlando, FL
- **Serrano, E.**, Khleif, R & Abrol, R (April 2019) Development of Enhanced Conformational Sampling Methods for GPCRs at the CSUNposium, Northridge, CA
- **Serrano, E.** & Abrol, R (April 2018) Development of New Methods for Enhanced Conformational Sampling of GPCRs and Application to Glucagon-Like Peptide-1 Receptor Poster presentation at the CSUNposium, Northridge, CA
- An, J., Goldberg, B., Marien, W., & **Serrano, E**. (April 2017) Inhibitory Effects of Essential Oils. Poster presentation at the CSUNposium, Northridge, CA. (Supervised by Professor Byrd-Williams and Professor Brockmann at LAVC)

Scientific community and leadership

Admission committee at University of Colorado, Anschutz *February 2022 - February 2024*

- Interviewed prospective PhD students.
- Contributed to the development of improved student selection methodologies.
- Participated in the overall admissions process, including reviewing applications, evaluating academic credentials, and assessing research potential to identify top candidates for the program.

SACNAS Chapter at University of Colorado, Anschutz *September 2022 - present*

- STEM Education Outreach: Assisted in teaching science to K-12 students, inspiring curiosity and engagement in scientific learning.
- Diversity and Inclusion Advocacy: Participated in diversity events, promoting STEM education and opportunities within underrepresented communities.
- Campus Leadership and Event Planning: Active SACNAS member, contributing to the design and organization of SACNAS-related events on campus.

CytoData: Board member and resource officer *September 2022 - present*

- Conference Planning & Organization: Assist in coordinating and planning CytoData conferences, including logistics, speaker selection, and workshop development.
- Scientific Contributions: Actively participate in community-driven research, including writing papers, and contributing to open-source projects.
- Resource Management & Development: Maintain and improve community resources, such as the website, documentation, and playbooks, to ensure accessibility and usability for members.

Skills

Languages: Fluent in English, Spanish, and intermediate in Portuguese (BR)

Programming Languages (Expert)

- Python, Rust, R

Software & Technical Skills

- **Version Contro**l: Git, GitHub
- **DevOps & CI/CD**: GitHub Actions, Docker
- **Data Analysis & Scientific Computing**: Pandas/Polars, NumPy, SciPy, scikit-learn, PyTorch
- **Workflow Managers**: Snakemake, Nextflow
- **Data Visualization**: ggplot, seaborn, matplotlib, plotly