Benjamin Valderrama

Computational Biologist

Email | Google Scholar | Personal website | GitHub | LinkedIn | Bioinformatics blog

Education

PhD - Computational approaches to study the microbiome-gut-brain axis (2023-Current)
APC Microbiome Ireland

Diploma - Bioinformatics and Computational Biology (2021)
Universidad de Chile, Department of Chemistry and Pharmaceutical Sciences

Bachelor of Science - Biology (2015-2019)
Pontificia Universidad Católica de Chile, Department of Biological Sciences

Research Experience

Bioinformatics Analyst, Part time (2024)

GERO Chile, Centre for Geriatric Research in Chile

Summary: Data analysis role held remotely while completing my PhD degree in Ireland. **Skills**: Microbiome data analysis with R, Statistical analysis with R, Git, Scientific writing and figure generation, Work with DNA public data repositories, Oral presentations. **Outputs**: 1 research article (under review).

Bioinformatics Analyst, Full time (2022-2023)

APC Microbiome Ireland.

Summary: Industry-funded project to develop a framework to indentify novel probiotics with neuroactive potential. Assisted with the analysis of omics data in multiple projects. **Skills**: Microbiome data analysis, RNAseq data from brain and gut tissue, Metabolomics data analysis, Bacterial genomics analysis, Statistical modelling with R, Python, Bash, Git (GitHub), Nextflow, Development of custom workflows for analysis of omics data, Docker, Scientific writing and figure generation, Oral presentations with stakeholders. **Outputs**: 3 data analysis workflows for internal use, 1 Bacterial genome announcement, 3 Peer-Reviewed research articles.

Automation Specialist, Full time (2021 – 2022)

Multiplex. Research & Development Department.

Summary: Industry Job at a biotech start up while studying my diploma in bioinformatics and computational biology. I Automated laboratory protocols using pipetting robots, such as qPCR, ELISA, DNA and RNA extraction. My work generated a 7-fold increase in the volume of tests conducted daily. **Skills**: Python, Bash, Git (GitHub), Report automation, GUI development, Oral presentations with stakeholders, Opentrons OT-2 robots, Mantis liquid handling robots, Arduino and 3D design and printing. **Outputs**: GUI that helped colleagues with non-coding background in the automation of their laboratory protocols, weekly automated reports of robot's performance.

Bioinformatics Analyst, Full time (2020 - 2021)

National Institute of Nutrition and Food Technology of Chile (INTA Chile).

Summary: Analysed microbiome data generated in industry-funded projects aiming to develop new probiotics for the aquaculture industry. **Skills**: Microbiome analysis with R (16s rRNA and ITS marker genes), Statistical analyses with R, Automated update report generation, Scientific writing, Oral presentations, Scientific writing and figure generation. **Outputs**: 2 peer-reviewed research articles.

Research Assistant, Full time (2020)

National Institute of Nutrition and Food Technology of Chile (INTA Chile).

Summary: Wetlab and Drylab hands-on experience in microbiome analyses. **Skills**: Gut microbiome DNA extraction from Haliotis rufescens (16s rRNA). Soil DNA extraction from Chilean vineyards (16s rRNA). Analysis of microbiome data with R, Genome Inference (PICRUSt2), Phylogenetics analyses, Scientific writing and figure generation.

Research Assistant, Part time (2018 – 2020)

Pontificia Universidad Católica de Chile.

Summary: Role held while completing my bachelor's degree. I generated and analysed behavioural, brain gene expression and gut microbiome data using the animal model D. melanogaster. **Skills**: Animal behaviour, Experimental design, RNA extraction protocol optimization, Gut microbiome DNA extraction protocol setup, Data analysis with R, Experimental design, Scientific writing and figure generation. **Outputs**: 2 peer-reviewed research articles, 1 poster presentation at a national conference.

Publications

2025

"Orchestrating Microbiome Analysis with Bioconductor". Tuomas Borman, Giulio Benedetti, Geraldson Muluh, Aura Raulo, **Benjamin Valderrama**, Artur Sannikov, Stefanie Peschel, Yihan Liu, Rasmus Hindström , OMA consortium, Katariina Pärnänen, Christian L. Müller, Aki S. Havulinna, Sudarshan Shetty, Marcel Ramos, Domenick J. Braccia, Héctor Corrada Bravo, Felix M. Ernst, Levi Waldron, Thomaz F. S. Bastiaanssen, Himel Mallick, Leo Lahti. **Under Review at Nature Biotechnology.** Preprint: https://www.biorxiv.org/content/10.1101/2025.10.29.685036v1.full

"Beyond Solidarity: Global Mental Health Benefits from Expanding Microbiome-Gut-Brain Axis Research to the Global South". **Benjamin Valderrama**, Livia H. Morais, Aonghus Lavelle, Sian M.J. Hemmings, Lindsay J. Hall, Zul Merali, Gerard Clarke, John F. Cryan. **Under Review at Nature Mental Health.**

"In vitro assessment of bacterial supernatants on hypothalamic gene expression: implications for appetite regulation". Cristina Cuesta-Marti, **Benjamin Valderrama**, Thomaz Bastiaanssen, John F Cryan, Catherine Stanton, Siobhain M O'Mahony, Gerard Clarke, Harriët Schellekens. **npj Biofilms and Microbiome.** https://doi.org/10.1038/s41522-025-00820-9

"Gut microbiota regulates exercise-induced hormetic modulation of cognitive function". Elisa Cintado, Pablo Muela, Lucía Martín-Rodríguez, Ignacio Alcaide, Patricia Tezanos, Klara Vlckova, **Benjamin Valderrama**, Thomaz F.S. Bastiaanssen, María Rodríguez-Muñoz, María L.

de Ceballosa, María R. Aburto, John F. Cryan, José Luis Trejo. **The Lancet eBioMedicine**. 10.1016/j.ebiom.2025.105876

"The South American MicroBiome Archive (saMBA): enriching the microbiome field by studying neglected populations". Benjamin Valderrama, Paulina Calderón-Romero, Thomaz FS Bastiaanssen, Aonghus Lavelle, Gerard Clarke, John F Cryan. **Nature Communications.** https://doi.org/10.1038/s41467-025-62601-4

"Supervised Machine Learning". Benjamin Valderrama. Chapter 26 of the Book "Orchestrating Microbiome Analysis with Bioconductor" Available for free online: https://microbiome.github.io/OMA/docs/devel/pages/machine_learning.html

"Escitalopram alters tryptophan metabolism, plasma lipopolysaccharide, and the inferred functional potential of the gut microbiome in deer mice showing compulsive-like rigidity". Larissa Karsten, Brian H Harvey, Dan J Stein, **Benjamin Valderrama**, Thomaz FS Bastiaanssen, Gerard Clarke, John F Cryan, Rencia van der Sluis, Heather Jaspan, Anna-Ursula Happel, De Wet Wolmarans. **Acta Neuropsychiatrica** https://doi.org/10.1017/neu.2025.16

"From in silico screening to in vivo validation in zebrafish–a framework for reeling in the right psychobiotics". **Benjamin Valderrama**, Isabelle Daly, Eoin Gunnigle, Kenneth J O'Riordan, Maciej Chichlowski, Sagarika Banerjee, Alicja A Skowronski, Neeraj Pandey, John F Cryan, Gerard Clarke, Jatin Nagpal. **The Royal Society of Chemistry**. 10.1039/D4FO03932G

2024

"From Gut to Brain: Evidence for a Causal Contribution of Gut-Microbiota to Major Depressive Disorder in Humans". Leon Fehse, Adèle H Ribeiro, Nils R Winter, (...), **Benjamin Valderrama**, (...), Tilo Kircher, Dominik Heider, Tim Hahn. **Under Review at Nature Mental Health**. Preprint: https://www.medrxiv.org/content/10.1101/2024.12.05.24318549v1

"High-quality draft genome of Lactiplantibacillus plantarum strain APC2688 isolated from human feces". Benjamin Valderrama, Isabelle Daly, Eoin Gunnigle, Mary C Rea, John Kenny, Mairead Coakley, John F Cryan, Gerard Clarke, Jatin Nagpal. **Microbiology Resource Announcements.** https://doi.org/10.1128/mra.00641-24

"The Neuroactive Potential of the Elderly Human Gut Microbiome is Associated with Mental Health Status" Paulina Calderón-Romero, **Benjamin Valderrama**, Thomaz Bastiaanssen, Patricia Lillo, Daniela Thumala, Gerard Clarke, John F Cryan, Andrea Slachevsky, Christian González-Billault, Felipe A Court. **Under Review at Plos Biology.** Preprint: https://www.biorxiv.org/content/10.1101/2024.08.08.607034.abstract

2023

"Kanamycin treatment in the pre-symptomatic stage of a Drosophila PD model prevents the onset of non-motor alterations" Daniela Molina-Mateo, **Benjamin Valderrama**, Raffaela V Zárate, S Hidalgo, Javier Tamayo-Leiva, Antonia Soto-González, Simón Guerra-Ayala, Vicente Arriagada-Vera, C Oliva, B Diez, Jorge M Campusano. Neuropharmacology. https://doi.org/10.1016/j.neuropharm.2023.109573

2021

"Cultivable Yeast Microbiota from the Marine Fish Species Genypterus chilensis and Seriolella violacea". Benjamin Valderrama, Ruiz, J. J., Gutiérrez, M. S., Alveal, K., Caruffo, M., Oliva, M., Flores, H., Silva, A., Toro, M., Reyes-Jara, A., & Navarrete, P. **Journal of Fungi.** https://doi.org/10.3390/jof7070515

"Probiotic Yeasts and Vibrio anguillarum Infection Modify the Microbiome of Zebrafish Larvae". Vargas, O., Gutiérrez, M. S., Caruffo, M., **Benjamin Valderrama**, Medina, D. A., García, K., Reyes-Jara, A., Toro, M., Feijóo, C. G., & Navarrete, P. **Frontiers in Microbiology.** https://doi.org/10.3389/fmicb.2021.647977

2020

"The behavioral and neurochemical characterization of a Drosophila dysbindin mutant supports the contribution of serotonin to schizophrenia negative symptoms". Hidalgo, S., Castro, C., Zárate, R. V., **Benjamin Valderrama**, Hodge, J. J. L., & Campusano, J. M. **Neurochemistry International.** https://doi.org/10.1016/j.neuint.2020.104753

My work featured on the media

Future 360 – CNN Chile (2025)
CNN Chile interviewed me about my research published in Nature Communications. Article: https://doi.org/10.1038/s41467-025-62601-4. See the interview in CNN's youtube: https://www.youtube.com/watch?v=2TQiuFNrDeU (Minute 00:50 to 08:50).

El Mercurio newspaper – News release (2025)
One of the largest Chilean newspapers covered my research published in Nature Communications. Article: https://doi.org/10.1038/s41467-025-62601-4. News report: https://x.com/IrlEmbChile/status/1961543041707327884.

UC university newspaper – News release (2020)
A university newspaper covered the release of our science communication book. The book has instructions to perform simple scientific experiments and their explanation. It was released for free during the COVID-19 lockdown to encourage kids to learn about science. News article: https://biologia.uc.cl/convierte-tu-casa-en-un-laboratorio/. Free online book (Spanish only): https://shorturl.at/3XgCm.

Awards

Scientific Excellence Award - PhD students' category (2025).
APC Microbiome Ireland.

Best poster award (2024)
Virtual Institute for Bioinformatics and Evolution (VIBE) conference, Galway, Ireland
I received the award for my poster entitled "The South American MicroBiome Archive (saMBA): enriching the microbiome field by studying neglected populations". Later published in Nature Communications: https://doi.org/10.1038/s41467-025-62601-4.

PhD scholarship (2022)

National Agency for Research and Development (ANID), Chile

I was honored with the most competitive scholarship in the country. Nevertheless, I humbly rejected the award to start a position as a Bioinformatics Analyst in the research laboratory lead by Professor John Cryan at the APC Microbiome Ireland.

Presentations at conferences

Neurogastro, September 2025

London, UK (International)

Virtual Institute for Bioinformatics and Evolution (VIBE) conference, December 2024

Galway, Ireland (National)

Neuroscience School of Advanced Studies, May 2024.

Venice, Italy (International)

Annual Conference of the National Society of Neuroscience, October 2018

Puerto Varas, Chile (National)