



Prof. Dr. Luis Fernando Larrondo Castro
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Dr. Luis Larrondo's research employs fungi as model organisms to investigate complex biological processes, with a focus on circadian rhythms, photobiology, transcriptional regulation, and plant biomass degradation. His interdisciplinary approach integrates molecular genetics, synthetic biology, and fungal biology.

Dr. Larrondo has significantly advanced the understanding of eukaryotic circadian clocks, challenging established views regarding the role of clock protein degradation in determining circadian periods and the impact of transcriptional mechanisms on clock dynamics. His lab's findings have uncovered circadian regulation in phytopathogenic fungi such as *Botrytis cinerea*, influencing virulence, and in biocontrol fungi like *Trichoderma atroviride*, modulating secondary metabolism. Additionally, his research provided novel insights into caffeine's influence on circadian rhythms, independent of cAMP signaling.

A pioneer in optogenetics, Dr. Larrondo developed innovative tools for precise, light-based transcriptional manipulation in yeast and in *Neurospora crassa*, facilitating advancements in

synthetic biology and biotechnology approaches. His optogenetic strategies have also enabled novel studies of intercellular communication within yeast populations, contributing to the emerging field of "optoecology."

Early in his career, Dr. Larrondo made foundational contributions to fungal enzymology, genome annotation, and lignocellulose degradation, notably identifying novel multicopper oxidases and elucidating enzyme multiplicity driven by post-translational modifications.

In 2017, Dr. Larrondo co-founded the Millennium Institute for Integrative Biology (iBio Chile), fostering synthetic biology research and open science practices.

PRINCIPAL PUBLICATIONS

A full list of publications can be found at https://scholar.google.com/citations?user=-fng7_sAAAAJ&hl=en&oi=sra

1. Rojas, V., Rivera, D., Larrondo, L. F. 2025. A new flavor of synthetic yeast communities sees the light. *mBio* doi.org/10.1128/mbio.02008-23
2. Larrondo, L. F. 2025. Circadian Rhythms: Pervasive, and often times evasive. *Philos Trans R Soc Lond B Biol Sci.* 380(1918): 20230477. doi: 10.1098/rstb.2023.0477. [Pubmed]
3. Goity, A., Dovzhenok, A., Lim, S., Hong, C., Loros, J., Dunlap, J.C. Larrondo, L. F. 2024. Transcriptional rewiring of an evolutionarily conserved circadian clock. *EMBO J.* 43(10):2015-2034. doi: 10.1038/s44318-024-00088-3
4. Olivares-Yañez, C., Alesandri, M. P., Salas, L., Larrondo, L. F. 2023. Methylxanthines modulate circadian period length independently of the action of phosphodiesterase. *Mycrobiology Spectrum* 11(4): e0372722. doi:10.1128/spectrum.03727-22.
5. Rojas V. and Larrondo, L. F. 2023. Coupling cell communication and optogenetics: Implementation of a light-inducible intercellular system in yeast. *ACS Synth Biol* 12(1):71-82. doi:10.1021/acssynbio.2c00338.
6. Henriquez-Urrutia, M., Seguel-Avello, A., Olivares-Yanez, C., Guillén-Alonso, H., Winkler, R., Herrera-Estrella, A., Canessa, P., Larrondo, L. F. 2022. Circadian oscillations in *Trichoderma atroviride* and the role of core clock components in secondary metabolism, development, and mycoparasitism against the phytopathogen *Botrytis cinerea*. *eLife* 11:e71358. doi: 10.7554/eLife.71358.

7. Salinas, F., Rojas, V., Delgado, V., López, J., Agosin, E., Larrondo, L. F. 2018. Fungal Light-Oxygen-Voltage Domains for Optogenetic Control of Gene Expression and Flocculation in Yeast. *mBio*. 9(4). pii: e00626-18
8. Salinas F., Rojas V., Delgado, V., Agosin, E., Larrondo, L. F. 2017. Optogenetic switches for light-controlled gene expression in yeast. *Appl Microbiol Biotechnol*. 101(7):2629-2640.
9. Montenegro-Montero, A., Canessa, P., Larrondo, L. F. 2015. Around the Fungal Clock: Recent Advances in the Molecular Study of Circadian Clocks in *Neurospora* and Other Fungi. *Advances in Genetics*. 92: 107-184.
10. Hevia, M. A, Canessa, P., Müller-Esparza, H., Larrondo, L. F. 2015. A circadian oscillator in the fungus *Botrytis cinerea* regulates virulence when infecting *Arabidopsis thaliana*. *Proc Natl Acad Sci U S A*. 112:8744-8749.
11. Larrondo, L.F., Olivares-Yañez, C., Baker, C.L., Loros, J.J., Dunlap, J.C. 2015. Decoupling circadian clock protein turnover from circadian period determination. *Science*. 347(6221):1257277. doi:10.1126/science.1257277.
12. Belden, W. J*, Larrondo, L. F*, Froehlich, A. C*, Shi, M., Chen, C., Loros, J. J., Dunlap, J. C. 2007. The band mutation in *Neurospora crassa* is a dominant allele of *ras-1* implicating RAS signaling in circadian output. *Genes & Dev*. 21: 1494-1505. *These authors contributed equally to this work.
13. Martinez, D., Larrondo, L. F., Putnam, N., Sollewijn Gelpke, M. D., Huang, K., Chapman, J., Helfenbein, K. G., Ramaiya, P., Detter, J. C., Larimer, F., Henrissat, B., Berka, R., Cullen, D., Rokhsar, D. 2004. Genome sequence of the lignocellulose degrading fungus *Phanerochaete chrysosporium*. *Nature Biotech*. 22: 695-700 (Cover article).
14. Larrondo L. F., Salas L., Melo F., Cullen D. and Vicuña R. 2003. A novel extracellular multicopper oxidase from *Phanerochaete chrysosporium* with ferroxidase activity. *Appl. Environ. Microbiol*. 69: 6257-6263.
15. Larrondo L. F., Avila, M., Salas L., Cullen D., Vicuña R. 2003. Heterologous expression of laccase cDNA from *Ceriporiopsis subvermispora* Yields Copper Activated Apoprotein and Complex Isoform Patterns. *Microbiology* 149:1177-1182.