

Cynthia Barbosa da Silveira

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San Diego, CA 92182

Education

- 2015 Ph.D. in Genetics, Federal University of Rio de Janeiro, Brazil.
- 2011 M.Sc. in Biological Chemistry, Federal University of Rio de Janeiro, Brazil.
- 2009 B.S. in Marine Biology, Fluminense Federal University, Brazil. Supervisor Ricardo Vieira.

Employment

- 2018 – current Adjunct Research Professor, San Diego State University, CA
- 2016 – 2017 Postdoctoral Researcher, San Diego State University, CA
- 2015 – 2016 CNPq Postdoctoral Fellow at San Diego State University, CA
- 2012 – 2014 Lecturer, Fluminense Federal University, RJ, Brazil

Publications (h-index 14, 574 citations on November 13, 2018; Google Scholar)

1. Nakajima, R., Haas, A., **Silveira, C.B.**, Kelly, E., Smith, J., Sandin, S., Kelly, L., Rohwer, F., Nakatomi, N., Kurihara, H. Release of dissolved and particulate organic matter by the soft coral *Lobophytum* and subsequent microbial degradation. *Journal of Experimental Marine Biology and Ecology* (504) 53 – 60. 2018.
2. **Silveira, C.B.**, Cavalcanti, G.S., Walter, J., Silva-Lima, A.W., Dinsdale, L., Bourne, D., Thompson, C.C., and Thompson, F. Microbial processes driving coral reef organic carbon flow. *FEMS Microbiology Reviews* 41(4) 575–595. 2017.
3. **Silveira, C.B.**, Gregoracci, G.B., Coutinho, F.H., Silva, G.G.Z., Haggerty, J.M., Oliveira, L., Cabral, A., Rezende, C.E., Thompson, C.C., Francini-Filho, R.B., Edwards, R.A., Dinsdale, E.A., Rohwer, F., and Thompson, F.L. Bacterial community associated with the reef coral *Mussismilia braziliensis*'s momentum boundary layer over a diel cycle. *Frontiers in Microbiology* 8, 784. 2017.
4. Coutinho, F.H., **Silveira, C.B.**, Gregoracci, G.B., Thompson, C.C., Edwards, R.A., Brussaard, C., Dutilh, B., and Thompson, F.L. Marine viruses discovered via metagenomics shed light on viral strategies throughout the oceans. *Nature Communications* 8, 15955. 2017.
5. Knowles, B., Bailey, B., Boling, L., Breitbart, M., Cobián-Güemes, A., del Campo, J., Edwards, R., Felts, B., Grasis, J., Haas, A.F., Katira, P., Kelly, L.W., Luque, A., Nulton, J., Paul, L., Peters, G., Robinett, N., Sandin, S., Segall, A., **Silveira, C.B.**, Youle, M., Rohwer, F. Variability and host density independence in inductions-based estimates of environmental lysogeny. *Nature Microbiology* 2, 17064. 2017.
6. *Knowles B., ***Silveira C.B.**, Bailey, B.A., Barott, K., Cantu, V.A., Cobián-Güemes, A.G., Coutinho F.H., Dinsdale E.A., Felts, B., Furby K., George, E.E., Green, K.T., Gregoratti G., Haas A.F., Haggerty M., Hester E., Hisakawa N., Kelly L.W., Lim Y.W., Little M., Luque, A., McDole-Somera T., McNair, K., Oliveira L.S., Quistad S.D., Robinett, N.L., Sala, E., Salamon, P., Sanchez S.E., Sandin S., Silva G.G.Z., Smith J., Sullivan, C., Thompson C.C., Vermeij, M.J.A., Youle, M., Young C., Zyglinski B., Brainard R., Edwards R.A., Nulton J., Thompson F., and Rohwer F. Lytic to Temperate Switching of Viral Communities. *Nature* 531 (7595), 466-470. 2016.

***These authors contributed equally to this work**

7. **Silveira, C.B.** and Rohwer, F. Piggyback-the-Winner in host-associated microbial communities. *Nature Biofilms and Microbiomes* 2, 16010. 2016.
8. Haas, A.F., Fairoz, M.F.M., Kelly, L.W., Nelson, C., Lim, Y.W., Knowles, B., Dinsdale, E.A., Edwards, R. A., Giles, S., Hatay, M., Hisakawa, N., Maughan, H., Pantos, O., Roach, T., Sanchez, S.E., **Silveira, C.B.**, Sandin, S., Smith, J., Rohwer, F. Global microbialization of coral reefs. *Nature Microbiology* 1, 16042. 2016.
9. Somera, T.M., Bailey, B., Barott, K., Grasis, J., Hatay, M., Hilton, B.J., Hisakawa, N., Nosrat, B., Nulton, J., **Silveira, C.B.**, Sullivan, C., Brainard, R., Rohwer, F. Energetic differences between bacterioplankton trophic groups and coral reef resistance. *Proceedings of the Royal Society B.* 283 (1829), 20160467. 2016.
10. **Silveira, C.B.**, Silva-Lima, A.W., Francini-Filho, R.B., Marques, J.S.M., Almeida, M.G., Rezende, C.E., Paranhos, R., Moura, R.L., Salomon, P.S., and Thompson, F.L. Microbial and sponge loops modify fish production in phase-shifting coral reefs. *Environmental Microbiology* 17 (10), 3832-3846. 2015.
11. Coutinho, F.H., **Silveira, C.B.**, Pinto, L.H., Salloto, G.R.B., Cardoso, A.M., Martins, O.B., Vieira, R.P., Clementino, M.M. Antibiotic resistance is widespread in urban aquatic environments of Rio de Janeiro, Brazil. *Microbial Ecology* 68(3), 441-452. 2014.
12. **Silveira, C.B.**, Cardoso, A.M., Coutinho, F.H., Lima, J.L., Pinto, L.H., Albano, R.M., Clementino, M.B. M., Martins, O.B., Vieira, R.P. Tropical aquatic archaea show environment-specific community composition. *PLoS One* 8, 76321. 2013.
13. Bertino-Grimaldi, D., Medeiros, M.N., Vieira, R.P., Cardoso, A.M., Turque, A.S., **Silveira, C.B.**, Albano, R.M., Bressan-Nascimento, S., Garcia, E.S., De Souza, W., Martins, O.B., Machado, E.A. Bacterial community composition shifts in the gut of *Periplaneta americana* fed on different lignocellulosic materials. *SpringerPlus* 2(609). 2013.
14. Lins-de-Barros, M.M., Cardoso, A., **Silveira, C.B.**, Cardoso, A.M., Lima, J.L., Clementino, M.M., Martins, O.B., Albano, R.M., Vieira, R.P. Microbial Community compositional shifts in bleached colonies of the Brazilian reef-building coral *Siderastrea stellata*. *Microbial Ecology* 65, 205-213. 2013.
15. Cavalcanti, G.S., Gregoracci, G.B., Dos Santos, E.O., **Silveira, C.B.**, Meirelles, P.M., Longo, L., Gotoh, K., Nakamura, S., Iida, T., Sawabe, T., Rezende, C.E., Francini-Filho, R.B., Moura, R.L., Amado-Filho, G. M., Thompson, F.L. Physiologic and metagenomic attributes of the rhodoliths forming the largest CaCO₃ bed in the South Atlantic Ocean. *The ISME Journal* 8(1), 52-62. 2013.
16. **Silveira, C.B.**, Vieira, R.P., Cardoso, A.M., Paranhos, R., Albano, R.M., Martins, O.B. Influence of salinity on bacterioplankton communities from the Brazilian rain forest to the coastal Atlantic Ocean. *PLoS One* 6, 17789. 2011.
17. Lins-de-Barros, M.M., Vieira, R.P., Cardoso, A. M., Monteiro, V.A., Turque, A.S., **Silveira, C.B.**, Albano, R.M., Clementino, M.M., Martins, O.B. Archaea, Bacteria, and Algal Plastids Associated with the Reef-Building Corals *Siderastrea stellata* and *Mussismilia hispida* from Búzios, South Atlantic Ocean, Brazil. *Microbial Ecology* 59, 523-532. 2010.
18. Turque, A.S., Batista, D., **Silveira, C.B.**, Cardoso, A.M., Vieira, R.P., Moraes, F.C., Clementino, M.M., Albano, R.M., Paranhos, R., Martins, O.B., Muricy, G. Environmental shaping of sponge-associated archaeal communities. *PLoS One* 5, 15774. 2010.
19. Almeida, W.I., Vieira, R.P., Cardoso, A.M., **Silveira, C.B.**, Costa, R.G., Gonzalez, A.M., Paranhos, R., Medeiros, J.A., Freitas, F.A., Albano, R.M., Martins, O.B. Archaeal and bacterial communities of heavy metal contaminated acidic waters from zinc mine residues in Sepetiba Bay. *Extremophiles* 13, 263-271. 2009.
20. Turque, A.S., Cardoso, A.M., **Silveira, C.B.**, Vieira, R.P., Freitas, F.A.D., Albano, R.M., Gonzalez, A.M., Paranhos, R., Muricy, G., Martins, O.B. Bacterial communities of the marine sponges *Hymeniacidon heliophila* and *Polymastia janeirensis* and their environment in Rio de Janeiro, Brazil. *Marine Biology* 155, 135-146. 2008.

21. Turque, A.S., **Silveira, C.B.**, Vieira, R.P., Muricy, G., Cardoso, A.M., Clementino, M.B.M., Martins, O. B. Microrganismos Associados a Poríferos. *Biotecnologia Ciência & Desenvolvimento* 37, 64-69. 2008.
22. Clementino, M.B.M., Vieira R.P., Cardoso, A.M., Nascimento, A.P.A., **Silveira, C.B.**, Riva, T.C., Gonzalez, A.S.M., Paranhos, R., Albano, R.M., Ventosa, A., Martins, O.B. Prokaryotic diversity in one of the largest hypersaline coastal lagoons in the world. *Extremophiles* 12(4), 595-604. 2008.

Manuscripts in review/revision (* Indicates students under my mentorship)

1. **Silveira, C.B.**, Roach, T.N.F., Villela, H., Barno, A., Reyes, B., Rubio-Portillo, E., Le, T., Wegley-Kelly, L., Luque, T., Hatay, M., Vermeij, M., Takeshita, Y., Bailey, B., Haas, A., Rohwer, F. Photosynthetic O₂ ebullition from macroalgae changes bacterial community physiology. *In review*.
2. **Silveira, C.B.**, Gregoracci, G.B., Coutinho, F.H., Silva, G.G.Z, Haggerty, J.M., Dinsdale, E.A., Paranhos, R., Francini-Filho, R.B., Wegley-Kelly, L., Edwards, R. A., Rohwer, F., and Thompson, F.L. Phage-mediated transfer of bacterial virulence genes in coral reefs. *In revision*.
3. George, E., Mullinix, J., Meng, F., Bailey, B., Edwards, C., Felts, B., Haas, A., Hartmann, A., Mueller, B., Nulton, J., Roach, T., Salamon, P., **Silveira, C.B.**, Vermeij, M., Rohwer, F., Luque, A. Relevance of coral geometry in the outcomes of the coral-algal benthic war. *In revision*.

Manuscripts in preparation (* Indicates students under my mentorship)

1. **Silveira, C.B.**, Parsons, J., Haas, A.F., Cobián-Güemes, A.G., Nulton, J., Brainard, R.E., Luque, A., Bailey, B., Katira, P., Rohwer, F. From phage to sharks: a statistical and mathematical model of coral reef trophic downgrading.
2. **Silveira, C.B.**, Barno, A., Vander Griend, J., Segall, A., Luque, A., Rohwer, F. Role of oxidative metabolism in phage community lysogenic decision.
3. Roach, T.N.F., Little, M., Arts, M.G.I, Huckeba, J., Haas, A.F., George, E.E., Quinn, R., Naliboff, D.S., **Silveira, C.B.**, Vermeij, M.J.A., Wegley Kelly, L., Rohwer, F. Multi-omic analysis of in situ coral-algal interactions.
4. Rubio-Portillo, E., **Silveira, C.B.**, Villela, H., Reyes, B., Roach, T.N.F., Cobián-Güemes, A., Vermeij, M.A.J., Antón, J., Rohwer, F. Prophages are responsible for the presence of *zonula occludens* toxin in bacterial pathogens that infect phylogenetically divergent hosts.
5. Jasien, E., Anthenelli, M., Edwards, R.A., Bailey, B., Felts, B., Katira, P., Nulton, J., Salamon, P., Rohwer, F., **Silveira, C.B.**, Luque, A. A mathematical and evolutionary model of lysogeny-driven transitions across viral and microbial abundances.
6. Cobián-Güemes, A.G., **Silveira, C.B.**, Cantu, A.V., Lim, Y.W., Edwards, R.A., Conrad, D., Rohwer, F. Rapid Response: generation of multi-omic data at clinically-relevant time scales for personalized medicine.

Book Chapters

Francini-Filho, R.B., **Silveira, C.B.** Importância de Áreas Marinhas Protegidas para conservação da biodiversidade e do patrimônio biotecnológico brasileiro. *In* Fundamentos de Biotecnologia Marinha. Thompson, F. PPGMAR (CIRM), *in press*.

Silveira, C.B., Thompson, F.L. The Family *Alcanivoraceae*. *In* The Prokaryotes, 7th Edition. Rosenberg, E., DeLong, E.F., Lory, S., Stackebrandt, E., Thompson, F. Springer, 2014, v.6, p.59 – 68.

Cardoso, A.M., Coutinho, F.H., **Silveira, C.B.**, Ignacio, B.L., Vieira, R.P., Salloto, G.R., Clementino, M.B. M., Albano, R.M., Paranhos, R., Martins, O.B. Metagenomics in Polluted Aquatic Environments. In *Water Pollution*. In Tech, 2012, p.89-104.

Awards

- 2016 Excellence in Research Award (Honorable Mention) – National Award by CAPES/Natura, Brazil.
- 2016 ISME16 Travel Award - International Society for Microbial Ecology Symposium, Montreal, Canada.
- 2015 Best Dissertation - Genetics Graduate Program, Federal University of Rio de Janeiro, Brazil.
- 2015 Most Collaborative Work - Cell and Molecular Biology Graduate Program Student Symposium, SDSU.

Scholarships and Fellowships

- 2018 – 2020 CFRI Elizabeth Nash Memorial Fellowship (US 120,000.00)
- 2015 – 2016 CNPq Science Without Borders Postdoctoral Fellowship (US 34,784.00)
- 2014 – 2015 CNPq Science Without Borders PhD Fellowship (US 22,780.00)
- 2014 *Nota 10* Ph.D. Fellowship, FAPERJ (~ US 20,000.00 in local currency)
- 2011 – 2014 CAPES Ph.D. Scholarship (~ US 17,000.00 in local currency)
- 2010 *Nota 10* M.Sc. Fellowship, FAPERJ (~ US 10,200.00 in local currency)
- 2009 – 2010 CNPq M.Sc. Scholarship (~ US 7,200.00 in local currency)
- 2005 – 2009 FAPERJ Undergraduate Scholarship

Teaching

- 2012 – 2014 Lecturer in Biochemistry - Fluminense Federal University, Brazil.
- Fall 2010 Teaching Assistant in Biochemistry - Federal University of Rio de Janeiro, Brazil.

Talks at Scientific Meetings

Invited Talks

- Lysogenic switches in marine phage communities. Gordon Conference Marine Molecular Ecology. Hong Kong, July 2019.
- Bacteriophage strategies promoting microbial dominance in coral reefs. Environment and Sustainability Institute, University of Exeter, Peryn, UK. December, 2017.
- From phage to fish: anthropogenic shifts in coral reef organic carbon flow. Marine Biology Seminar Series, Scripps Oceanography Institute, San Diego, CA. January, 2017.
- Piggyback-the-Winner: lytic to temperate switching of viral communities. San Diego Microbiology Group, San Diego, CA. January, 2017.
- Microbial loop, carbon recycling and phage dynamics in coral reefs. San Diego Coral Club, San Diego, CA. September, 2014.

Contributed Talks

- Bacteriophage strategies promoting microbial dominance in coral reefs. International Society for microbial Ecology Meeting. Leipzig, Germany. August 2018.

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Hypoxia zones created by feedback loops between benthic algae and microbial metabolism in coral reefs. Ocean Sciences Meeting. Portland, OR. February, 2018.

Bacteriophage strategies promoting microbial dominance in coral reefs. European Coral Reef Symposium. Oxford, UK. December, 2017.

The role of lysogeny in disease states of the human microbiome. TSRC Workshop: Cystic Fibrosis – Ecology, Evolution, Eradication. Telluride, CO. August, 2017.

Piggyback-the-Winner: lytic to temperate switching of viral communities. International Society for Microbial Ecology Symposium. Montreal, Canada. August, 2016.

Viruses as reservoirs of bacterial virulence genes in coral reefs. International Coral Reef Symposium, Honolulu, HI. June, 2016.

Lysogeny is a successful strategy in high cell abundance environments. American Society for Microbiology Annual Meeting. New Orleans, LA. May, 2015.

The role of bacteriophages in coral reef ecology. Student Research Symposium – San Diego State University. San Diego, CA. March, 2015.

Microbial Loop Impacts on the productivity of South Atlantic Reefs. American Society for Microbiology Annual Meeting. Boston, MA. May, 2014.

Mentorship

Ana G. Cobián-Guemes (PhD Student, Cell and Molecular Biology Program, SDSU/UCSD). 2016 – current.

Adam Barno (MSc Student, Cell and Molecular Biology Program, SDSU). August 2016 – current.

Jon Parsons (MSc Student, Computational Science program). March 2018 – current. Co-mentorship with Prof. Parag Katira at the Physics Department, SDSU.

Kerry Conely (Undergraduate Student in Biology, SDSU). May 2018 - current.

Spencer Mead (Undergraduate Student, Biology, SDSU). May 2018 - current.

Tram Le (Undergraduate Student, Biology, SDSU). April 2017 - current.

Jake Van Der Griend (Undergraduate Student in Biology, SDSU). June 2017 - current.

Ty Roach (PhD Student, Cell and Molecular Biology Program, SDSU/UCSD). 2016/2017.

Emily Jasien (MSc Student, Applied Mathematics Program). 2016/2017. Co-mentorship with Prof. Antoni Luque, at Department of Mathematics and Statistics, SDSU.

Monique Mendez (High School student). Summer 2017, San Diego State University. Moved to internship at the Salk Institute, CA.

Kevin Green (Master Student, Cell and Molecular Biology Program). 2016/2017, San Diego State University. Currently master student at San Diego State University.

Hanna Storrestein (Undergraduate Student, Biology). 2016, San Diego State University. Became student fellow at the California Institute for Regenerative Medicine.

Domingos Savio (Undergraduate, B.S. in Biology). 2014, Fluminense Federal University, Brazil.

Felipe H. Coutinho (Undergraduate, B.S. in Biology). 2009/2010. Rio de Janeiro Federal University, Brazil. Currently postdoctoral researcher at Universidad Miguel Hernández, Spain.

Ad hoc peer review

ISME Journal; PLoS One; BMC Genomics; Frontiers in Microbiology; Chemosphere; International Journal of Systematic and Evolutionary Microbiology; NSF - Biological Oceanography, OCE Program

Outreach

San Diego Coral Club coordinator 2017/2018. <http://coralreefsystems.org/content/coral-club>

High School students use their *ARMS* for science. 2016/2017. http://coralandphage.org/outreach_seagrass.php

Phage discovery in *An Illustrated History of Phage Research*. 2015. http://2015phage.org/phage_art.php

Sábado da Ciência (Science Saturdays, Sciences Alive Center), Rio de Janeiro, Brazil. 2009.

Ciência na Praça (Science at the Park, Sciences Alive Center), Rio de Janeiro, Brazil. 2009.