

Dr. François Ribalet

SENIOR RESEARCH SCIENTIST

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Education

Open University

PH. D. IN BIOLOGICAL SCIENCES

London, UK

Nov 2007

Sorbonne University

M. SC. IN BIOLOGICAL OCEANOGRAPHY AND MARINE ENVIRONMENT

Paris, FR

June 2003

Sorbonne University

B. SC. IN POPULATION BIOLOGY AND ECOSYSTEMS

Paris, FR

June 2001

Ecole Supérieure d'Angers

POST-SECONDARY PREPARATORY CLASSES FOR THE FRENCH GRANDES ECOLES

Angers, FR

June 1999

Research Experience

University of Washington

SENIOR RESEARCH SCIENTIST

Seattle, USA

Sept 2015 – present

University of Washington

RESEARCH ASSISTANT PROFESSOR

Seattle, USA

Sept 2012 – August 2015

University of Washington

POSTDOCTORAL RESEARCH ASSOCIATE

Seattle, USA

Jan 2008 – July 2012

Stazione Zoologica Anton Dohrn

PH. D. CANDIDATE

Naples, IT

Nov 2003 – Sept 2007

Station Biologique de Roscoff

M. SC. STUDENT

Roscoff, FR

Sept 2002 – June 2003

Teaching and Mentoring Experience

Teaching

INSTRUCTOR AT THE FRENCH OFFICE OF FAMILY ALLOCATIONS

- “Math without junk food” (K-12 students)

Paris, FR

Sept 1999 – June 2003

Research Advisor

RESEARCH SCIENTIST

- Dr. Annette Hynes

Seattle, WA

Nov 2018 – present

POSTDOCTORAL RESEARCHER

- Dr. Mattias Cape

June 2018 – July 2020

Student Mentoring

GRADUATE STUDENTS

- Kristof Glauninger

Seattle, WA

Nov 2019 – present

UNDERGRADUATE STUDENTS

- Jordan Winter
- Denise Devlyn
- John MacMillan
- Grace Novacek
- Maria Hamilton
- Alex Mitchell-Morton
- Jackie Schwartzstein
- George Roth
- Chris Fox

Sept 2019 – present
Sept 2019 – March 2020
June 2016 – June 2018
March 2014 – June 2015
Sept 2012 – Jan 2014
Jan 2011 – June 2012
March 2011 – Nov 2011
Sept 2010 – May 2011
Sept 2009 – June 2010

Publications

- [1] Carlson, M. C. G., **Ribalet, F.**, Maidanik, I., Durham, B. P., Hulata, Y., Ferrón, S., Weissenbach, J., Shamir, N., Goldin, S., Baran, N., Cael, B. B., Karl, D. M., White, A. E., Armbrust, E. V., Lindell, D., “Viruses affect picocyanobacterial abundance and biogeography in the North Pacific Ocean,” *Nature Microbiology* 2022 7:4, vol. 7, no. 4, pp. 570–580, Apr. 2022. doi: 10.1038/s41564-022-01088-x.
- [2] Follett, C. L., Dutkiewicz, S., **Ribalet, F.**, Zakem, E., Caron, D., Armbrust, E. V., Follows, M. J., “Trophic interactions with heterotrophic bacteria limit the range of *Prochlorococcus*,” *Proceedings of the National Academy of Sciences*, vol. 119, no. 2, e2110993118, Jan. 2022. doi: 10.1073/PNAS.2110993118.
- [3] Mattern, J. P., Glauninger, K., Britten, G. L., Casey, J. R., Hyun, S., Wu, Z., Armbrust, E. V., Harchaoui, Z., **Ribalet, F.**, “A Bayesian approach to modeling phytoplankton population dynamics from size distribution time series,” *PLOS Computational Biology*, vol. 18, no. 1, e1009733, Jan. 2022. doi: 10.1371/JOURNAL.PCBI.1009733.
- [4] Boysen, A. K., Carlson, L. T., Durham, B. P., Groussman, R. D., Aylward, F. O., **Ribalet, F.**, Heal, K. R., White, A. E., Delong, E. F., Armbrust, E. V., Ingalls, A. E., “Particulate Metabolites and Transcripts Reflect Diel Oscillations of Microbial Activity in the Surface Ocean,” *MSystems*, vol. 6, no. 3, pp. 00896–20, 2021. doi: 10.1128/mSystems.00896-20.
- [5] Coesel, S. N., Durham, B. P., Groussman, R. D., Hu, S. K., Caron, D. A., Morales, R. L., **Ribalet, F.**, Armbrust, E. V., “Diel transcriptional oscillations of light-sensitive regulatory elements in open-ocean eukaryotic plankton communities,” *Proceedings of the National Academy of Sciences*, vol. 118, no. 6, e2011038118, Feb. 2021. doi: 10.1073/pnas.2011038118.
- [6] Jones, C., Clayton, S., **Ribalet, F.**, Armbrust, E. V., Harchaoui, Z., “A kernel-based change detection method to map shifts in phytoplankton communities measured by flow cytometry,” *Methods in Ecology and Evolution*, vol. 12, pp. 1687–1698, Jun. 2021. doi: 10.1111/2041-210X.13647.
- [7] Connell, P., **Ribalet, F.**, Armbrust, E., White, A., Caron, D., “Diel oscillations in the feeding activity of heterotrophic and mixotrophic nanoplankton in the North Pacific Subtropical Gyre,” *Aquatic Microbial Ecology*, vol. 85, pp. 167–181, Dec. 2020. doi: 10.3354/ame01950.
- [8] Gradoville, M. R., Farnelid, H., White, A. E., Turk-Kubo, K. A., Stewart, B., **Ribalet, F.**, Ferrón, S., Pinedo-Gonzalez, P., Armbrust, E. V., Karl, D. M., John, S., Zehr, J. P., “Latitudinal constraints on the abundance and activity of the cyanobacterium UCYN-A and other marine diazotrophs in the North Pacific,” *Limnology and Oceanography*, vol. 65, no. 8, pp. 1858–1875, Mar. 2020. doi: 10.1002/lno.11423.
- [9] Heal, K., Durham, B., Boysen, A., Carlson, L., Qin, W., **Ribalet, F.**, White, A., Bundy, R., Armbrust, E., Ingalls, A., *Marine community metabolomes carry fingerprints of phytoplankton community composition*, 2020. doi: 10.1101/2020.12.22.424086.
- [10] Henderikx Freitas, F., Dugenne, M., **Ribalet, F.**, Hynes, A., Barone, B., Karl, D., White, A., “Diel variability of bulk optical properties associated with the growth and division of small phytoplankton in the North Pacific Subtropical Gyre,” *Applied Optics*, vol. 59, no. 22, pp. 6702–6716, Jun. 2020. doi: 10.1364/ao.394123.
- [11] Juranek, L. W., White, A. E., Dugenne, M., Henderikx Freitas, F., Dutkiewicz, S., **Ribalet, F.**, Ferrón, S., Armbrust, E. V., Karl, D. M., “The Importance of the Phytoplankton “Middle Class” to Ocean Net Community Production,” *Global Biogeochemical Cycles*, vol. 34, no. 12, e2020GB006702, Dec. 2020. doi: 10.1029/2020GB006702.
- [12] Mruwat, N., Carlson, M. C., Goldin, S., **Ribalet, F.**, Kirzner, S., Hulata, Y., Beckett, S. J., Shitrit, D., Weitz, J. S., Armbrust, E. V., Lindell, D., “A single-cell polony method reveals low levels of infected *Prochlorococcus* in oligotrophic waters despite high cyanophage abundances,” *ISME Journal*, vol. 15, pp. 41–54, Sep. 2020. doi: 10.1038/s41396-020-00752-6.

- [13] **Ribalet, F.**, Berthiaume, C., Hynes, A., Swalwell, J., Carlson, M., Clayton, S., Hennon, G., Poirier, C., Shimabukuro, E., White, A., Armbrust, E. V., "SeaFlow data v1, high-resolution abundance, size and biomass of small phytoplankton in the North Pacific," *Scientific Data*, vol. 6, no. 1, p. 277, Dec. 2019. DOI: 10.1038/s41597-019-0292-2.
- [14] Wilson, S. T., Hawco, N. J., Armbrust, E. V., Barone, B., Björkman, K. M., Boysen, A. K., Burgos, M., Burrell, T. J., Casey, J. R., DeLong, E. F., Dugenne, M., Dutkiewicz, S., Dyhrman, S. T., Ferrón, S., Follows, M. J., Foreman, R. K., Funkey, C. P., Harke, M. J., Henke, B. A., Hill, C. N., Hynes, A. M., Ingalls, A. E., Jahn, O., Kelly, R. L., Knapp, A. N., Letelier, R. M., **Ribalet, F.**, Shimabukuro, E. M., Tabata, R. K. S., Turk-Kubo, K. A., White, A. E., Zehr, J. P., John, S., Karl, D. M., "Kīlauea lava fuels phytoplankton bloom in the North Pacific Ocean," *Science*, vol. 365, no. 6457, pp. 1040–1044, Sep. 2019. DOI: 10.1126/SCIENCE.AAX4767.
- [15] Hamilton, M., Hennon, G., Morales, R., Needoba, J., Peterson, T., Schatz, M., Swalwell, J., Armbrust, E., **Ribalet, F.**, "Dynamics of Teleaulax-like cryptophytes during the decline of a red water bloom in the Columbia River Estuary," *Journal of Plankton Research*, vol. 39, no. 4, 2017. DOI: 10.1093/plankt/fbx029.
- [16] Heal, K., Qin, W., **Ribalet, F.**, Bertagnolli, A., Coyote-Maestas, W., Hmelo, L., Moffett, J., Devol, A., Armbrust, E., Stahl, D., Ingalls, A., "Two distinct pools of B12 analogs reveal community interdependencies in the ocean," *Proceedings of the National Academy of Sciences of the United States of America*, vol. 114, no. 2, 2017. DOI: 10.1073/pnas.1608462114.
- [17] Howard, E. M., Durkin, C. A., Hennon, G. M., **Ribalet, F.**, Stanley, R. H., "Biological production, export efficiency, and phytoplankton communities across 8000 km of the South Atlantic," *Global Biogeochemical Cycles*, vol. 31, no. 7, pp. 1066–1088, 2017. DOI: 10.1002/2016GB005488.
- [18] Wilson, S. T., Aylward, F. O., **Ribalet, F.**, Barone, B., Casey, J. R., Connell, P. E., Eppley, J. M., Ferrón, S., Fitzsimmons, J. N., Hayes, C. T., Romano, A. E., Turk-Kubo, K. A., Vislova, A., Armbrust, E. V., Caron, D. A., Church, M. J., Zehr, J. P., Karl, D. M., DeLong, E. F., "Coordinated regulation of growth, activity and transcription in natural populations of the unicellular nitrogen-fixing cyanobacterium Crocosphaera," *Nature Microbiology*, vol. 2, no. 9, p. 17118, Sep. 2017. DOI: 10.1038/nmicrobiol.2017.118.
- [19] Hyrkas, J., Clayton, S., **Ribalet, F.**, Halperin, D., Armbrust, E. V., Howe, B., "Scalable clustering algorithms for continuous environmental flow cytometry," *English, Bioinformatics*, vol. 32, no. 3, pp. 417–423, 2016. DOI: 10.1093/bioinformatics/btv594.
- [20] **Ribalet, F.**, Swalwell, J., Clayton, S., Jiménez, V., Sudek, S., Lin, Y., Johnson, Z. I., Worden, A. Z., Armbrust, E. V., "Light-driven synchrony of Prochlorococcus growth and mortality in the subtropical Pacific gyre," *Proceedings of the National Academy of Sciences*, vol. 112, no. 26, pp. 8008–8012, Jun. 2015. DOI: 10.1073/pnas.1424279112.
- [21] **Ribalet, F.**, Bastianini, M., Vidoudez, C., Acri, F., Berges, J., Ianora, A., Miralto, A., Pohnert, G., Romano, G., Wichard, T., Casotti, R., "Phytoplankton cell lysis associated with polyunsaturated aldehyde release in the northern Adriatic Sea," *PLoS ONE*, vol. 9, no. 1, 2014. DOI: 10.1371/journal.pone.0085947.
- [22] Halperin, D., Weitz, K., Howe, B., **Ribalet, F.**, Saito, M., Virginia Armbrust, E., "Real-time collaborative analysis with (almost) pure SQL: A case study in biogeochemical oceanography," in *ACM International Conference Proceeding Series*, 2013. DOI: 10.1145/2484838.2484880.
- [23] Howe, B., Halperin, D., **Ribalet, F.**, Chitnis, S., Armbrust, E., "Collaborative science workflows in SQL," *Computing in Science and Engineering*, vol. 15, no. 3, 2013. DOI: 10.1109/MCSE.2013.42.
- [24] Palevsky, H. I., **Ribalet, F.**, Swalwell, J. E., Cosca, C. E., Cokelet, E. D., Feely, R. A., Armbrust, E. V., Quay, P. D., "The influence of net community production and phytoplankton community structure on CO₂ uptake in the Gulf of Alaska," *Global Biogeochemical Cycles*, vol. 27, no. 3, pp. 664–676, 2013. DOI: 10.1002/gbc.20058.
- [25] **Ribalet, F.**, Schruth, D., Armbrust, E. V., "flowPhyto: Enabling automated analysis of microscopic algae from continuous flow cytometric data," *Bioinformatics*, vol. 27, no. 5, 2011. DOI: 10.1093/bioinformatics/btr003.
- [26] Swalwell, J. E., **Ribalet, F.**, Armbrust, E. V., "Seaflow: A novel underway flow-cytometer for continuous observations of phytoplankton in the ocean," *Limnology and Oceanography: Methods*, vol. 9, no. OCTOBER, 2011. DOI: 10.4319/lom.2011.9.466.
- [27] **Ribalet, F.**, Marchetti, A., Hubbard, K. A., Brown, K., Durkin, C. ., Morales, R., Robert, M., Swalwell, J. E., Tortell, P. D., Armbrust, E. V., "Unveiling a phytoplankton hotspot at a narrow boundary between coastal and offshore waters," *Proceedings of the National Academy of Sciences of the United States of America*, vol. 107, no. 38, 2010. DOI: 10.1073/pnas.1005638107.

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- [29] **Ribale, F.**, Vidoudez, C., Cassin, D., Pohnert, G., Ianora, A., Miralto, A., Casotti, R., “High Plasticity in the Production of Diatom-derived Polyunsaturated Aldehydes under Nutrient Limitation: Physiological and Ecological Implications,” *Protist*, vol. 160, no. 3, 2009. DOI: 10.1016/j.protis.2009.01.003.
- [30] **Ribale, F.**, Intertaglia, L., Lebaron, P., Casotti, R., “Differential effect of three polyunsaturated aldehydes on marine bacterial isolates,” *Aquatic Toxicology*, vol. 86, no. 2, 2008. DOI: 10.1016/j.aquatox.2007.11.005.
- [31] **Ribale, F.**, “The role of the polyunsaturated aldehydes in the physiology and ecology of diatoms,” PhD thesis, 2007, p. 270.
- [32] **Ribale, F.**, Berges, J. A., Ianora, A., Casotti, R., “Growth inhibition of cultured marine phytoplankton by toxic algal-derived polyunsaturated aldehydes,” *Aquatic Toxicology*, vol. 85, no. 3, pp. 219–227, 2007. DOI: 10.1016/j.aquatox.2007.09.006.
- [33] **Ribale, F.**, Wichard, T., Pohnert, G., Ianora, A., Miralto, A., Casotti, R., “Age and nutrient limitation enhance polyunsaturated aldehyde production in marine diatoms,” *Phytochemistry*, vol. 68, no. 15, pp. 2059–2067, 2007. DOI: 10.1016/j.phytochem.2007.05.012.
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Funding

Life Science Project award (\$891,769)

Computational Flow Cytometry Analysis of Marine Phytoplankton
PRINCIPAL INVESTIGATOR

Simons Foundation

2021-2024

Life Science Project award (\$756,007)

Computational Flow Cytometry Analysis of Marine Phytoplankton
PRINCIPAL INVESTIGATOR

Simons Foundation

2018-2021

Interdisciplinary Research in Earth Science (\$291,379)

Signatures of the multiple scales of motion in shaping marine phytoplankton biogeography
CO-INVESTIGATOR

*National Aeronautics and
Space Administration*

2017-2021

Fieldwork

2016 SF-Gradient cruise (14 d), 2015 SF-SCOPE Diel cruise (12 d), 2015 HOT cruise (4 d), 2015 SF-SCOPE transit cruise (8 d), 2013 CMOP survey (2 d) and pilot project (7d), 2013 UW transit cruise (8 d), 2013 UW Senior thesis cruise (8 d), 2012 UW transit cruise (9d), 2012 GeoMICS cruise (6 d), 2011 UW transit cruise (9 d), 2011 PRISM cruise (2 d), 2010 UW transit cruise (9 d), 2010 MBARI-CANON cruise (12 d), 2010 CMOP cruise (5 d), 2009 PRISM cruise (3 d), 2008 PRISM cruise (3d), 2006 INTERREG spring cruise (7 d), 2005 INTERREG summer cruise (7d), 2004 INTERREG summer cruise (7 d), 2004 INTERREG spring cruise (7 d).

Total of **149** fieldwork days

Reviewer Activity

Agencies National Science Foundation (8), Spanish National Agency for Scientific Evaluation (4), French National Research Agency (1).

Journals Advances in Oceanography & Limnology (1), Applied Sciences (1), Aquatic Botany (4), Aquaculture International (1), Aquatic Toxicology (1), Bioinformatics (1), BMC Bioinformatics (2), Biogeosciences (1), Continental Shelf Research (1), Frontiers in Ecology and Evolution (1), Frontiers in Microbiology (1), Geophysical Research Letters (2),

Global Biogeochemical Cycles (4), Harmful Algae (3), ISME Journal (3), Journal of Experimental Marine Biology and Ecology (1), Journal of Geophysical Research (2), Journal of Marine Biology & Oceanography (2), Journal of Marine Systems (2), Journal of Phycology (2), Journal of Sea Research (2), Limnology & Oceanography (13), Limnology & Oceanography Methods (6), Marine Drugs (3), Marine Environmental Research (2), Methods in Ecology and Evolution (1), Microbial Ecology (5), Proceedings of the National Academy of Sciences USA (1), Oceanography (1), Oceanological and Hydrological Studies (1), Peer Journal (1), PLoS One (7), Progress in Oceanography (4).

Total of **83** reviewed articles

Languages

- French (native)
- English (fluent)
- Italian (proficient)

Activities

Director of Vashon Island Rowing Club
PADI Master scuba diver

2022 - present
2007

References

- **Dr. Virginia E. Armbrust**
Professor at the School of Oceanography
University of Washington
armbrust@uw.edu
- **Dr. Mick Follow**
Professor at Department of Earth, Atmospheric and Planetary Sciences
Massachusetts Institute of Technology
mick@ocean.mit.edu
- **Dr. Debbie Lindell**
Professor at the Faculty of Biology
Technion – Israel Institute of Technology
dlindell@technion.ac.il
- **Dr. Joshua Weitz**
Professor at Department of Biological Sciences
Georgia Institute of Technology
jsweitz@gatech.edu