Complete CV

Glaucia Moreira Fragoso
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https://www.researchgate.net/profile/Glaucia_Fragoso2
(Updated 12/03/2024)

Nationality: Brazilian
Date of birth: 17/03/1984
Residency: Norway
Languages: English (highly fluent) and Portuguese (native), Spanish (good knowledge), Norwegian (intermediate).
Maternity Leave: 1) May 2019 – Feb 2020; 2) Sept 2020 – April - 2021
ORCID: https://orcid.org/0000-0002-4497-2536.
Scopus ID: 56519588400
https://www.ntnu.edu/employees/glaucia.m.fragoso

https://www.ntnu.edu/monitare

Education

- 2012 – 2016: PhD in Oceanography. National Oceanographic Centre, University of Southampton (UK). PhD awarded by November 2016. *Thesis: Biogeography of spring phytoplankton communities from the Labrador Sea: drivers, trends, ecological traits and biogeochemical implications.* Date of defence: 17/10/2016 (https://eprints.soton.ac.uk/403357/1/Fragoso_PhD_Thesis_Nov_16%2520final.pdf)
- 2010: M.Sc. in Marine Science, Virginia Institute of Marine Science, School of Marine Science, College of William and Mary, VA (USA). *Thesis: Hydrography and phytoplankton distribution in the Amundsen and Ross Seas* (http://web.vims.edu/library/Theses/Fragoso09.pdf)
- 2006: BSc in Biological Sciences, emphasis in Environmental Science, Universidade Estadual do Norte Fluminense, RJ (Brazil). *Thesis: Spatial and Seasonal Variation of Phytoplankton Community of Campelo Lagoon, Campos, RJ*
- 2006: Undergraduate Exchange Student at Washington and Lee University, US-Brazil Consortium at Washington & Lee University, VA (USA)

Professional experience

- Associate Professor at Norwegian University of Science and Technology, Trondheim, Norway (August 2023 – present) – 10% position
- Researcher at Norwegian University of Science and Technology, Trondheim, Norway (August 2021 – present)
- Post-doctoral researcher at Norwegian University of Science and Technology, Trondheim, Norway (March 2017 – July 2021)
- Research Assistant at Universidade Federal do Rio de Janeiro, Brazil (August 2010 to September 2012)
- Optional Practical Training at the Smithsonian Environmental Research Center, USA (Jan to Jul 2010)
- Graduate Research Assistant at VIMS, College of William and Mary, USA (2007 to 2009)

Project management experience
(*Academic sector/research institutes/industrial sector/public sector/other. Please list the most relevant.)*

Year	Project owner - Project - Role – Funder
2021-2025	Autonomous underwater monitoring of kelp-farm biomass, growth, health and biofouling using optical sensors, MoniTARE, Project Owner: NTNU, Role: **Principal Investigator**, Young Research Talents, Norwegian Research Council
2021-2025	Project: AWAS (Autonomous water sampling with real-time *in situ* data analysis for ocean environmental monitoring); Project Owner: Prof. Tor Arne Johansen (NTNU); Project Role: **Co-WP leader** and researcher, Funder: Norwegian Research Council
2022-2026	Project: SoS (A system-of-systems approach to real-time integrated ocean environmental monitoring), Project Owner: Prof. Tor Arne Johansen (NTNU); Project Role: **Collaborator** and researcher, Funder: Norwegian Research Council
2023-2027	Project DiverSea: Integrated Observation, mapping, monitoring, and prediction for functional biodiversity of coastal seas. Project Owner: Murat Ardelan and Glenn Dunshea (NTNU). Project Role: **Deputy Executive Board**, Funder: Horizon Europe (HORIZON-CL6-2022-BIODIV-01-01)
2021-2025	Project: HYPSCI: (Observational Pyramid with Hyperspectral Nano-Satellites for Ocean Science); Project Owner: Prof. Tor Arne Johansen (NTNU); Project Role: **Collaborator** and researcher, Funder: Norwegian Research Council

Teaching and Coordinator Experience

- Coordinator of *Marine Seminar Series for Master Students in Ocean Resources*, Norwegian University of Science and Technology from 2023-2025 (so far **50 hours** of 200 hours total in 2 years).
- Multiple Lectures at Norwegian University of Science and Technology 2017-2023: *Diversity in Phytoplankton Communities* (Marine Biodiversity, BI2036), *Remote sensing and enabling technology for biological studies* (Enabling Technology, BI3070, BI8075), *Measurements of Primary Production and Remote Sensing*, *Primary production processes*, *Deep Sea Ecology* (Marine Ecology, BI2060), *Remote and in situ sensing in Biological Oceanography* (Biological Oceanography (BI3061, BI8061), *Measurements of photosynthesis and respiration in plankton communities* (Assessment of environmental state and quality of coastal water, BI3060) – 2 hours each theoretical lecture, 50 hours field work for Marine Biodiveristy and Enabling Technology. (~ **110 hours** total)
- Lecturer on the intensive summer course "*Light and Primary Productivity in the Arctic* (AB323/823)". **120 hours** of teaching, laboratory and field work in 2 weeks (2018). University of Svalbard. Norway.
- Demonstrator for "*SOES 2006 Phytoplankton and Primary Production*". **128 hours** of teaching, laboratory and field work in 2 years (2014, 2015). National Oceanography Centre, UK.
- Teaching Assistant in *"Biologia dos Vegetais Superiores"* (Biology of Higher Plants). **288 hours** of teaching, laboratory and field work in 1 year (2005). Universidade Estadual do Norte Fluminense. Brazil

Awards

- NTNU Outstanding Academic Fellow Program (Stjerneprogrammet 2022-2026) - Award to qualify young research talents for networking, research plans and mentoring **(NOK 0.8 mil)** funded by NTNU.
- Multiple travel awards, including accommodation, food and registration, to attend conferences.
- Editor's Student Research Award (US$ 600) – Outstanding research on Photochemistry & Photobiology as first author (2014)
- Best poster award (£60) – 4th Polar Marine Diatom Taxonomy and Ecology Workshop, 2013, Cardiff, UK (2013)

Grant awards

- Grant award **(NOK 7.2 mil)** for the Young Research Talents (4-years funded by Norwegian Research Council) - Project MoniTARE (Autonomous underwater monitoring of kelp-farm biomass, growth, health and biofouling using optical sensors).
- Science without Borders – CNPq fellowship **(£135k)**. Tuition for 4 years and stipend for PhD studies in the UK (2012)
- Fellowship by CAPES/FIPSE for the US-Brazil Exchange Consortium as an undergraduate at Washington & Lee University (6 months) (2006)
- Fellowship by FAPERJ for scientific project as an undergraduate in Brazil *"Controle de Florações de Cianobactéria Tóxicas em Águas Continentais – Identificação do Composto Autoinibidor que Controla a Floração de Microcystis"* (Bloom Control of Toxic Cyanobacteria in Continental Waters – Identification of the Self-Inhibition Compound that Controls *Microcystis* Blooms) (2 years) (2004/05).

Supervision of Graduate students and research assistants

- PhD (2023 - present): **Main supervision** of Janina Osanen with co-supervisor Geir Johnsen (NTNU) – Project title: "Use of novel hyperspectral imaging technologies for the study of algal dynamics across spatial and temporal scales" from HYPSCI project.
- PhD (2022 - present): co-supervision of Matias Haugum with Professors Anette Stahl and Tor Arne Johansen (NTNU). Project title: "Autonomous Flow-Through Imaging for Uncrewed Surface Vehicles" from AWAS project.
- PhD (2019 – expected to finish in 2024): co-supervision of Natalie Summers with Professors Geir Johnsen and Martin Ludvigsen (NTNU). Project title: "Phytoplankton dynamics in time and space in the Arctic using autonomous underwater vehicles (AUV)" from Nansen Legacy project.
- Msc (2023-2025) **Main supervision:** Lavrans Lysne-Ness (NTNU). Project title: "Investigation of deployment time and environmental conditions for growth optimization of cultivated kelp (*Saccharina latissima* and *Alaria esculenta*)" from MoniTARE project.
- Msc (2023-2025) **Main supervision** Christian Thauland (NTNU). Project title: "Physiological and growth response of Saccharina latissima from cultivation sites with different exposure levels" from MoniTARE project.
- Msc (2023-2024) co-supervision of Amy Li (NTNU). Project title: "Evaluating maximum depth limit for photosynthesis using coralline algae as model organism".
- Msc (2023-2024) co-supervision of Ranya Hassan (OsloMET). Project title: "Automated image detection and quantification of bryozoan colonies from kelp farm".
- Msc (2022-2024) **Main supervision** Nalia Hama (NTNU). Project title: "Using a low-cost high throughput microscope in cultivated seaweed farms for early biofouling detection" from MoniTARE project.

- Msc (2022-2024) **Main supervision** Adrian Hansø Project title: "Combining in situ lasers mounted in mini-ROVs and computer vision for kelp size and biomass estimations" from MoniTARE project.
- Msc (2022-2024) **Main supervision** Elisabeth Snijder. Project title: "Investigating environmental and biotic factors related to the growth of encrusting bryozoans on kelp fronds" from MoniTARE project.
- Msc (2022-2024) co-supervision of Ingeborg Dale. Project title: "Applying automated camera systems for analysis of food-web interactions in the planktonic community of Northern Baffin Bay, Canada".
- Msc (2021-2023) **Main supervision** Martin Molberg Overrein (NTNU). Project title: "In situ biomass estimations of cultivated kelp using RGB imagery." (https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/3086275) from MoniTARE project.
- Msc (2021-2023) **Main supervision** Ben Thomason (NTNU). Project title: "Bryozoan larvae (cyphonaut) growth and encrustation in *Saccharina latissima*: analysis of biotic and abiotic interactions". (https://ntnuopen.ntnu.no/ntnu-xmlui/bitstream/handle/11250/3080349/no.ntnu:inspera:141153294:98277724.pdf?sequence=1) from MoniTARE project.
- Msc (2020-2022) co-supervision of Maren Thu. Project title: "Phytoplankton spring bloom mapping in coastal waters using Autonomous Underwater Vehicles (AUV) and optical approaches" from AILRON project (file:///C:/Users/glauciaf/Downloads/no.ntnu%20inspera%20101980170%2023030101-3.pdf)
- Research assistant (3 months in 2022-2023) Phil Tinn – Computational skills in MoniTARE project
- Research assistant (3 months in 2023-2024) Maja Hatlebakk – Microscopic skills in MoniTARE project
- Research assistant (5 months in 2024) Natalie Summers – Fieldwork assistance and lab analyses of kelp pigments, C:N and phytoplankton flow cytometry in MoniTARE project

Research Cruises and Field Experience

- Multiple daily trips (2 – 4 hours) in kelp farms of Frøya, Trondelag, Frohavet and the arctic circle to Adventfjorden, Isfjorden (Longyearbyen) and Kongsfjorden (Ny-Ålesund) in Norway.
- Jan 5th – Jan 19th 2018, R/V Helmer-Hanssen, Arctic prize expedition, Barents Sea.
- May 8th – May 12th, 2017 R/V Gunnerus, Runde Island, Coast of Norway
- Jun 16th – Jun 21th, 2017 R/V Gunnerus, Mausund Island, Coast of Norway
- May 4th – May 28th, 2012 R/V Hudson, Canada, Labrador Sea.
- Jan 7 – Feb, 12th, 2012 R/V James Clark Ross, BAS, UK, Scotia Sea, Antarctica
- Dec 29, 2008 – Feb 6, 2009 R/V Laurence M. Gould, PALMER-LTER, West Antarctica Peninsula, Antarctica
- Nov. 29, 2007 – Jan. 9, 2008 R/V Oden, Oden Antarctic Expedition 07, Amundsen and Ross Sea, Antarctica

Oral Presentations (last 2 years)

- **FRAGOSO, G.** Developing novel marine observation and monitoring technology (DiverSea, Horizon Europe), Euromarine, Bologna, Italy, February 2024.
- **FRAGOSO, G.** Using technology for automated biomass estimations in a kelp farm. AquaNOR, Trondheim, August 2023

- **FRAGOSO, G.** Investigations of phytoplankton spring blooms dynamics using an autonomous unmanned surface vehicle, Nordic Microalgae Phytoplankton Group, Hafnarfjördur, September 2023.
- **FRAGOSO, G.:** Plankton from inside out: how to combine multiple platforms, sensors and discrete sampling to study plankton distributions. Working Group on Phytoplankton and Microbial Ecology (March, 2023, WGPME, ICES, Copenhagen, Denmark)
- **FRAGOSO, G.:** Beyond gating: how can high throughput imaging and optical techniques be used for trait-based studies of plankton communities? ASLO, Aquatic Sciences Meeting (June, 2021)

Other presentations at International Conferences (last 2 years):

- **FRAGOSO, G.** , Sanchez, N., Garrett, J., Davies, E., Haugum. From molecules to satellites - how can we use multi-sensor approaches to extract plankton traits? 6th Trait-based approach for ocean life, Copenhagen, Denmark, August 2023.
- **FRAGOSO, G.**, Overrein, M., Tinn, P., Aldridge, D. Technological tools for cost effective monitoring of kelp farms, Seagriculture EU, June 2023
- **FRAGOSO, G.**, Trinn, P., Overrein, M., Thomason, B., Johnsen G. Developing optical methods for seaweed biomass estimation and biofouling growth in cultivated kelp farms. Ocean Optics XXV, Vietnam, October 2022.

Peer-reviewed publications (23 articles total - 19 peer reviewed articles, 10 as a first author and 1 as a last author - 1 in review, 3 conference papers, 2 book chapters, h-index: 13, i10 index: 14, number of citations: 595, according to Google scholar on 8th Mar 2024).

23. Mo-Bjørkleund, T., Majaneva, S., **Fragoso, G. M.**, Johnsen, G., Ludvigsen, M. Multi vehicle adaptive 3D mapping for targeted ocean sampling. In review at *Plos One*. **Impact factor: 3.7 Citations: 0**

22. Overrein, M. M., Tinn, P., Aldridge, D., Johnsen, G., **Fragoso, G. M.** Biomass estimations of cultivated kelp using underwater RGB images from a mini-ROV and computer vision approaches. 2024 *Frontiers of Marine Sciences*. Vol 1, 1324075. doi: 10.3389/fmars.2024.1324075 **Impact factor: 5.2 Citations: 0**

21. Fragoso, G. M., Dallolio, A., Grant, S., Garrett, J. L., Ellingsen, I., Johnsen, G., & Johansen, T. A. (2024). The role of rapid changes in weather on phytoplankton spring bloom dynamics from mid-Norway using multiple observational platforms. *Journal of Geophysical Research: Oceans*, 129, e2023JC020415. https://doi.org/10.1029/2023JC020415 **Impact factor: 3.7 Citations: 0**

20. Haugum, M., **Fragoso, G. M.**, Stahl, A., Johansen, T. A. In-situ segmentation and post-processing of phytoplankton image data suitable for an autonomous surface vehicle. 2024. 20th International Conference on Harmful Algae – ICHA – Proceedings. Japan 2023. **Impact factor: NA Citations: 0**

19. Summers, N., **Fragoso, G.M.** and Johnsen, G. 2023. Photophysiologically active green, red, and brown macroalgae living in the Arctic Polar Night. *Scientific Reports* 13, no. 1 (2023): 17971. https://doi.org/10.1038/s41598-023-44026-5 **Impact factor: 4.6 Citations: 0**

18. Haugum, M., **Fragoso, G.M.**, Bøe Henriksen, M., Zolich, A.P., Arne Johansen, T., 2023. Autonomous Flow-Through RGB and Hyperspectral Imaging for Unmanned Surface Vehicles, in: OCEANS 2023 - Limerick. IEEE, pp. 1–8. https://doi.org/10.1109/OCEANSLimerick52467.2023.10244605 **Impact factor: NA Citations: 0**

17. Williamson, D., **Fragoso, G.**, Majaneva, S., Dallolio, A., Halvorsen, D., Hasler, O., Oudijk, A., Langer, D., Johansen, T., Johnsen, G., Stahl, A., Ludvigsen, M., Garrett, J., 2023. Monitoring Algal Blooms with Complementary Sensors on Multiple Spatial and Temporal Scales. Oceanography 2022–2024. https://doi.org/10.5670/oceanog.2023.s1.11 **Impact factor: 3.4 Citations: 3**

16. Oudijk, A.., Hasler, O., Overaas, H., Marty, S., Williamson, D.., T, S., Berg, S., Birkeland, R., Halvorsen, D.., Bakken, S., Henriksen, M.., Alver, M.., Johnsen, G., Johansen, T.., Stahl, A., KvalOy, P., Dallolio, A., Majaneva, S., **Fragoso, G.**, Garrett, J., 2022. Campaign For Hyperspectral Data Validation In North Atlantic Coastal Waters, in: 2022 12th Workshop on Hyperspectral Imaging and Signal Processing: Evolution in Remote Sensing (WHISPERS). IEEE, pp. 1–5. https://doi.org/10.1109/WHISPERS56178.2022.9955134 **Impact factor: NA Citations: 4**

15. Fragoso, G.M., Davies, E.J., Fossum, T.O., Ullgren, J.E., Majaneva, S., Aberle, N., Ludvigsen, M. and Johnsen, G., 2022. Contrasting phytoplankton-zooplankton distributions observed through autonomous platforms, in-situ optical sensors and discrete sampling. *Plos One*, *17*(9), p.e0273874. https://doi.org/10.1371/journal.pone.0273874 **Impact factor: 3.7 Citations: 4**

14. Summers, N., Johnsen, G., Mogstad, A., Løvås, H., **Fragoso**, G., & Berge, J. (2022). Underwater hyperspectral imaging of Arctic macroalgal habitats during the polar night using a novel mini-ROV-UHI portable system. *Remote sensing*, *14*(6), 132 https://doi.org/10.3390/rs14061325 **Impact factor: 5.3 Citations: 13**

13. Fragoso, G.M., Johnsen, G., Chauton, M.S., Cottier, F., Ellingsen, I., (2021). Phytoplankton community succession and dynamics using optical approaches. Cont. Shelf Res. 213, 104322. https://doi.org/10.1016/j.csr.2020.104322 **Impact factor: 2.6 Citations: 12**

12. Fragoso, G. M., Davies, E.J., Ellingsen, I., Chauton, M.S., Fossum, T., Ludvigsen, M., Steinhovden, K.B., Rajan, K., Johnsen, G., 2019. Physical controls on phytoplankton size structure, photophysiology and suspended particles in a Norwegian biological hotspot. *Progress in Oceanography*, 175: 284-299. https://doi.org/10.1016/j.pocean.2019.05.001 **Impact factor: 4.4 Citations: 15**

11. Fragoso, G.M., Poulton, A.J., Pratt, N.J., Johnsen, G., Purdie, D.A., 2019. Trait-based analysis of subpolar North Atlantic phytoplankton and plastidic ciliate communities using automated flow cytometer. *Limnology and Oceanography*. 64(4), 1763-1778. https://doi.org/10.1002/lno.11189 **Impact factor: 4.7 Citations: 16**

10. Fossum, T.O., **Fragoso, G.M.**, Davies, E.J., Ullgren, J.E., Mendes, R., Johnsen, G., Ellingsen, I., Eidsvik, J., Ludvigsen, M., Rajan, K., 2019. Toward adaptive robotic sampling of phytoplankton in the coastal ocean. *Science Robotics* 4, eaav3041. https://doi.org/10.1126/scirobotics.aav3041 **Impact factor: 27.5 Citations: 65**

9. Fragoso, G.M., Poulton, A.J., Yashayaev, I.M., Head, E.J.H., Johnsen, G., Purdie, D.A., 2018. Diatom Biogeography From the Labrador Sea Revealed Through a Trait-Based Approach. *Frontiers in Marine Sciences* 5. https://doi.org/10.3389/fmars.2018.00297 **Impact factor: 5.2 Citations: 18**

8. Daniels, C.J., Poulton, A.J., Balch, W.M., Marañón, E., Adey, T., Bowler, B.C., Cermeño, P., Charalampopoulou, A., Crawford, D.W., Drapeau, D., Feng, Y., Fernández, A., Fernández, E., **Fragoso, G.M.**, González, N., Graziano, L.M., Heslop, R., Holligan, P.M., Hopkins, J., Huete-Ortega, M., Hutchins, D.A., Lam, P.J., Lipsen, M.S., López-Sandoval, D.C., Loucaides, S., Marchetti, A., Mayers, K.M.J., Rees, A.P., Sobrino, C., Tynan, E., Tyrrell, T., 2018. A global compilation of coccolithophore calcification rates. *Earth System Science Data* 10, 1859–1876. https://doi.org/10.5194/essd-10-1859-2018 **Impact factor: 11.8 Citations: 26**

7. Fossum T. O., Eidsvik, J., Ellingsen, I., Alver M. O., **Fragoso, G. M.**, Johnsen, G. Ludvigsen, M., Rajan, K. 2018 Information-driven robotic sampling in the coast ocean. *Journal of Field Robotics*. 1–21. https://doi.org/10.1002/rob.21805 **Impact factor: 6.4 Citations: 50**

6. Fragoso, G. M., A. J. Poulton, I. M. Yashayaev, E. J. H. Head, and D. A. Purdie. 2017. Spring phytoplankton communities of the Labrador Sea (2005–2014): pigment signatures, photophysiology and elemental ratios. *Biogeosciences* **14**: https://doi.org/10.5194/bg-14-1235-2017 **Impact factor: 4.2 Citations: 41**

5. Fragoso, G. M., A. J. Poulton, I. M. Yashayaev, E. J. H. Head, M. C. Stinchcombe, and D. A. Purdie. 2016. Biogeographical patterns and environmental controls of phytoplankton communities from contrasting hydrographical zones of the Labrador Sea. *Progress in Oceanography*. **141**: 212–226. https://doi.org/10.1016/j.pocean.2015.12.007 **Impact factor: 4.4 Citations: 34**

4. Cavan, E. L., F. A. C. Le Moigne, A. J. Poulton, G. A. Tarling, P. Ward, C. J. Daniels, **G. M. Fragoso**, and R. J. Sanders. 2015. Attenuation of particulate organic carbon flux in the Scotia Sea, Southern Ocean, is controlled by zooplankton fecal pellets. *Geophysical Research Letters.* **42**. https://doi.org/10.1002/2014GL062744 **Impact factor: 5.6 Citations: 131**

3. Le Moigne, F. A. C., A. J. Poulton, S. A. Henson, S. A., Daniels, C. J., **Fragoso, G. M.**, Mitchell, E., Richier, S.; Russell, B. C.; Smith, H. E. K.; Tarling, G. A.; Young, J. R.; Zubkov, M. (2015). 2015. Carbon export efficiency and phytoplankton community composition in the Atlantic sector of the Arctic Ocean. *Journal of Geophysical Research: Oceans.* **120**: 3896–3912. https://doi.org/10.1002/2015JC010700 **Impact factor: 3.7 Citations: 56**

2. Fragoso, G. M., P. J. Neale, T. M. Kana, and A. L. Pritchard. 2014. Kinetics of photosynthetic response to ultraviolet and photosynthetically active radiation in synechococcus WH8102 (CYANOBACTERIA). *Photochemistry and Photobiology*. **90**. https://doi.org/10.1111/php.12202 **Impact factor: 3.5 Citations: 16**

1. Fragoso, G. M., and W. O. Smith. 2012. Influence of hydrography on phytoplankton distribution in the Amundsen and Ross Seas, Antarctica. *Journal of Marine Systems*. **89**: 19–29. https://doi.org/10.1016/j.jmarsys.2011.07.008 **Impact factor: 3.0 Citations: 75**

In preparation publications

1. **Fragoso, G.M.**, Høgstedt, E., Thu, M., Nøland, A., Williamson, D., Schellewald, C., Aberle, N., Johnsen, G., Stehl, A. In situ imaging and quantification of copepod, fecal pellets and gelatinous zooplankton from an Autonomous Underwater Vehicle. In preparation for Scientific Reports.

2. Singh, A., Sanchez, N., **Fragoso, G.**, Dallolio, Osanen, J., A., Johnsen, G., Ardelan, M., From satellites to molecules: the influence of snow melt and run off on spring phytoplankton in Trondheimsfjord. In preparation for Limnology and Oceanography.

3. **Fragoso, G.M.**, Hatlebakk, M., Borrero, A., Aldridge, D. The effect of the timing and community structure of phytoplankton blooms on bryozoan larvae abundances and colonization in kelp farms. In preparation for MEPS.

4. **Fragoso, G.M.**, Summers, N., Borrero, A., Aldridge, D., Johnsen. G., Response of growth, health state and elemental ratios of cultivated kelp in relation to time and development of phytoplankton blooms. In preparation for Aquaculture.

5. Snijder, E., Broch, O. Aldridge, D., Johnsen, G., **Fragoso, G. M.** The influence of temperature and phytoplankton on growth, settlement and development of bryozoan colonies in kelp farms. In preparation for ICES Journal of Marine Sciences.

Book Chapters

- Tenenbaum, D. R., Nascimento, S. M., Vianna, S., **Fragoso, G.**, Hatherly, M., Moraes, R. Estrutura especial e temporal da comunidade microplanctônica. 2017. In: Falcão, A. P. C., Moreira, D. L., editores. *Ambiente pelágico: caracterização ambiental regional da Bacia de Campos, Atlântico Sudoeste.* Rio de Janeiro: Elsevier. Habitats, v. 5. P. 127-170.
- Le Moigne, F. A.C.; Poulton, A. J.; Henson, S. A.; Daniels, C. J.; **Fragoso, G. M.**; Mitchell, E.; Richier, S.; Russell, B. C.; Smith, H. E.K.; Tarling, G. A.; Young, J. R.; Zubkov, M. Carbon export efficiency and phytoplankton community composition in the Atlantic sector of the Arctic Ocean. 2017 In: Ferrera, Isabel, (ed.). *Climate change and the oceanic carbon cycle: variables and consequences.* Oakville, Ontario, Apple Academic Press Inc, 149-190.

1. Other outputs of relevance (e.g. datasets, software, non-peer-reviewed publications)

1. **Fragoso, G.,** Alberto Dallolio, Stephen Grant, Joseph Garrett, Ingrid Ellingsen, Geir Johnsen, and Tor Arne Johansen. "The Role of Rapid Changes in Weather on Phytoplankton Spring Bloom Dynamics Captured by an Autonomous Uncrewed Surface Vehicle." *Authorea Preprints* (2023).

2. **Fragoso, G.**, Dallolio, A., Grant, S., Garrett, J., Ellingsen, I., Johnsen, G. and Johansen, T.A., 2023. Dataset from the USV AutoNaut in Frohavet, Norway. https://zenodo.org/records/8283108

3. Daniels, C.J., Poulton, A.J., Balch, W.M., Marañón, E., Adey, T., Bowler, B.C., Cermeño, P., Charalampopoulou, A., Crawford, D.W., Drapeau, D., Feng, Y., Fernández, A., Fernández, E., **Fragoso, G.M.**, González, N., Graziano, L.M., Heslop, R., Holligan, P.M., Hopkins, J., Huete-Ortega, M., Hutchins, D.A., Lam, P.J., Lipsen, M.S., López-Sandoval, D.C., Loucaides, S., Marchetti, A., Mayers, K.M.J., Rees, A.P., Sobrino, C., Tynan, E., Tyrrell, T., 2018. A global compilation of coccolithophore calcification rates. *Earth System Science Data* 10, 1859–1876 https://doi.org/10.1594/PANGAEA.888182

4. **Fragoso, G. M;** Poulton, A. J., Yashayaev, I. M., Head, E. J. H., Purdie, D. A. (2017): Spring phytoplankton communities of the Labrador Sea (2005-2014): pigment signatures, photophysiology and elemental ratios. PANGAEA, https://doi.org/10.1594/PANGAEA.871872.

5. Bazilchuk, Nancy Reney; Fossum, Trygve Olav; **Fragoso, Glaucia Moreira**; Ludvigsen, Martin; Johnsen, Geir. (2019) Smart undervannsrobot leter etter plankton. Av N Bazilchuk. Forskning.no. Angående NTNU Entice prosjekt publisert i Science Robotics. Forskning.no. Popular scientific article. https://www.forskning.no/ntnu-partner-roboter/smart-undervannsrobot-leter-etter-plankton/1310216

6. Fossum, T. O., Johnsen, G., **Fragoso, G. M.**, Ludvigsen, M. 2019. Ocean life in 3-D: Mapping phytoplankton with a smart AUV. Norwegian SciTech News. https://norwegianscitechnews.com/2019/03/ocean-life-in-3-d-mapping-phytoplankton-with-a-smart-auv/

Membership of Societies

Member of the Association of the Science of Limnology and Oceanography (ASLO), The Oceanographic Society (TOS), Working Group on Phytoplankton and Microbial Ecology (WGPME, International Council for the Exploration of the Sea, ICES), European Marine Research Network (Euromarine), Nordic Marine Phytoplankton Group (NOMP).

Review Boards (peer-reviewer for the following Journals)

Selectively peer-reviewed (last 5 years) for: Global Biogeochemical Cycles (2024), Frontiers in marine Ecology (2022, 2023), Limnology and Oceanography Methods (2022), Marine Ecology Progress Series (2020), Journal of Oceanography (2019), Limnology and Oceanography (2018).

Advisory boards and committees

Session organizer- 2023 Aquatic Sciences meeting (ASLO), Palma de Mallorca, Spain, SS027 Environmental Benefits and Risks of the Current and Future Seaweed Aquaculture Industry. Internal examiner of NTNU Master students in Ocean Resources: Msc Camilla Mult Marnor (2022), Nora Rønningen (2023), Emilie Bendiksen (2023) and from Nord University: Johana Jaramillo Guzman (2023). Research committee member for the Marine Section, Department of Biology (NTNU) (2021-2023). Member of the of committee to recruit a post-doctoral researcher at NTNU (2020).

Skills and Abilities

Experience of the following techniques: phytoplankton culturing and taxonomy, light and scanning electron microscopy (SEM), HPLC analysis of pigments and calibration, zooplankton sampling, sorting and identification, measuring photosynthesis-light curves, primary production and coccolithophore calcification rate (^{14}C), phytoplankton trait-based analysis, CHEMical TAXonomy (CHEMTAX), Species Distribution Modelling (SDM), measuring particulate organic carbon (POC), nitrogen (PON) and phosphate (POP), Flow cytometry.

Practice with the following bench instruments: microscopy (SEM and LM), imaging in flow microscope (PlanktoScope), spectrophotometer, HPLC, fluorometer, PAM (pulse amplitude modulation fluorometer), MIMS (Membrane Inlet Mass Spectrometry), Cytosense, CHN (Carbon, Nitrogen, Hydrogen) analyser.

Practice with the following in situ sensors: Cytosense/cytosub flow cytometer (CytoBuoy), FRRf (Chelsea Technologies, Fast-Repetition Rate fluorometer), Diving PAM (Walz, variable chlorophyll fluorescence, photo-physiologic parameters), Ecotriplet and C3 submersible fluorometers (WETLABS, chlorophyll fluorescence, optical backscatter, fluorescent dissolved organic matter), ECO-PAR sensor (WETLABS, irradiance), CTD (Seabird, SAIV/AS, Conductivity, Temperature and Depth),

Computer Skills: MatLab, python, R, ODV, ARCMap GIS, STATISTICA, Sigma Plot, Minitab, PRIMER (statistical cluster analysis package), CANOCO (Correspondance Analyses), Maxent (for Species Distribution Modelling), R and WIMsoft.

Community Outreach

Participation in: Passion for Ocean, MoniTARE exhibition, Trondheim, Norway (2023), Ocean and Earth Day, University of Southampton, UK (2014, 2015), Antarctic Research Exhibition for the VIMS Marine Science Day, US, (2008); the Daffodil festival, Gloucester, VA, US, (2009).

Participated on the AMOS 2021 Annual Report ("MoniTARE: Food for thought, https://www.ntnu.edu/documents/20587845/621664524/NTNU_AMOS_2021_Scr.pdf/a925fcbd-c90f-9e4d-5a5b-27dd41003e57?t=1648810597413). Participation in the interview for Forskning.no (https://forskning.no/fisk-havet/noen-steder-langs-kysten-er-det-veldig-mye-fisk-na-vet-forskere-hvorfor/1259646 in 2018), Into the dark movie (https://vimeo.com/365831168) and Gemini magazine https://gemini.no/2019/03/smart-auv-kartlegger-planteplankton/ (2019). Participation in interview for NTNU news (https://nyheter.ntnu.no/en/ntnus-laboratory-for-subsea-robots-celebrates-15-years-of-operation/)

Organization of event: *"I and II Semana da Biologia da UENF"* (2nd and 3rd Biology Week at UENF), Universidade Estadual do Norte Fluminense (64hrs) (2003, 2004).