

## PIF2024 - PLANCTON Y FLUJOS DE CARBONO EN EL OCÉANO PROFUNDO (PID2023-148046NB-I00)

El proyecto de tesis doctoral será codirigido por los dos IPs del proyecto “SHEdDing Light on the DArk ocean: Temporal variability of epipelagic plankton production, carbon export and organic matter transformation in the deep NE Atlantic” (SHELIDA). Se adjuntan a continuación los CVAs en el momento de la solicitud para proporcionar información sobre sus líneas de investigación respectivas.

Se propone una tesis interdisciplinar en ecología microbiana y biogeoquímica marinas que tendrá en consideración la formación previa y los intereses del candidato o candidata seleccionado. El/la estudiante se formará en diversas técnicas avanzadas de análisis en el laboratorio (p. ej., *metabarcoding* de ADN, citometría de flujo) así como en métodos de observación y experimentación en campañas oceanográficas (p. ej., trampas de sedimento, incubaciones de producción primaria y bacteriana), que le permitirán contribuir a responder a los desafíos que representan el cambio global y el papel preponderante del océano. Prevemos que el trabajo del/la estudiante tenga tres componentes interrelacionados con los siguientes objetivos específicos:

### 1. Composición y estructura de las comunidades microbianas

1. 1. Diversidad del picoplancton y nanoplancton con especial énfasis en las zonas mesopelágica y batipelágica usando técnicas de citometría de flujo y análisis moleculares.
1. 2. Relaciones entre la diversidad microbiana (fitoplancton y procariotas) en la columna de agua y en las muestras de trampas de sedimentación recogidas en las diversas zonas.

### 2. Producción y consumo microbianos

2. 1. Variabilidad temporal del acoplamiento entre las producciones del fitoplancton y de los procariotas heterotróficos mediante incorporación de  $^{14}\text{C}$ -bicarbonato y  $^3\text{H}$ -leucina.
2. 2. Variabilidad temporal de la relación entre las tasas de herbivoría y de bacterivoría de los protistas heterotróficos obtenidas mediante experimentos de dilución.

### 3. Exportación de carbono y atenuación de los flujos verticales

3. 1. Aspectos cuantitativos del análisis de *metabarcoding* de ADN de las partículas exportadas para mejorar las estimaciones de las contribuciones específicas de cada grupo a la bomba gravitacional.
3. 2. Estacionalidad de la exportación de partículas y la atenuación del flujo con métodos complementarios (p. ej., trampas de sedimento flotantes y ancladas, análisis del desequilibrio del  $^{238}\text{U}$ · $^{234}\text{Th}$ ) y de la composición biogeoquímica de las partículas exportadas verticalmente en relación con la composición de los microorganismos de vida libre y adheridos a partículas.

3. 3. Desarrollo de métodos para estimar la variabilidad anual de la exportación de carbono mediante datos de satélite ajustados regionalmente con mediciones in situ de la producción primaria, la transferencia trófica y la exportación de carbono.

Durante su formación, está previsto que el/la estudiante realice estancias cortas para el aprendizaje de metodologías punteras bajo la supervisión de algunos de los colaboradores del proyecto en centros como Station Biologique de Roscoff (Francia) [sobre técnicas de separación de citometría de flujo y aproximaciones genómicas (A. Lopes dos Santos)], Florida State University [sobre métodos de medición de la exportación de carbono (M. R. Stukel)], Scripps Institution of Oceanography-UCSD [sobre técnicas moleculares y biogeoquímicas para el análisis de la partículas exportadas (M. R. Landry y A. E. Allen)] o Aarhus University [sobre el análisis de la materia orgánica disuelta (C. Lønborg)].

**CURRICULUM VITAE ABREVIADO (CVA)**

**IMPORTANT** – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

**Part A. PERSONAL INFORMATION**

First name	Xosé Anxelu		
Family name	Gutiérrez Morán		
Gender (*)	Male	Birth date (dd/mm/yyyy)	14/04/1969
Social Security, Passport, ID number	11419241V		
e-mail	xelu.moran@ieo.csic.es	URL Web	
Open Researcher and Contributor ID (ORCID) (*)	0000-002-0624-3498		

(\*) Mandatory

**A.1. Current position**

Position	Research Professor		
Initial date	2021		
Institution	Spanish Institute of Oceanography (IEO-CSIC)		
Department/Center	Oceanographic Centre of Gijón/Xixón		
Country	Spain	Teleph. number	985308672
Key words	biological oceanography, microbiology, pelagic ecosystems, marine biodiversity, anthropogenic impact, biogeochemistry, aquatic ecology		

**A.2. Previous positions (research activity interruptions, indicate total months)**

Period	Position/Institution/Country/Interruption cause
2021-current	Research professor / IEO-CSIC / Spain
2020-2021	Senior scientist / IEO-CSIC / Spain
2014-2020	Associate professor / KAUST / Saudi Arabia
2001-2014	Senior scientist / IEO-CSIC / Spain
2000-2000	Postdoctoral fellow / ICM-CSIC / Spain
1995-1999	FPI predoctoral fellow / ICM-CSIC / Spain
1992-1994	Research fellow / Univ. Oviedo/Uviéu / Spain

**A.3. Education**

PhD, Licensed, Graduate	University/Country	Year
PhD Biology	Univ. Oviedo/Uviéu / Spain	1999
Graduate Biological Sciences	Univ. Oviedo/Uviéu / Spain	1992

(Include all the necessary rows)

**Part B. CV SUMMARY** (max. 5000 characters, including spaces)

As a biological oceanographer and ecologist, my research has revolved around the role of microbial plankton in marine biogeochemical cycles, targeted from diverse perspectives. My interests include the bottom-up and top-down controls of heterotrophic bacteria and archaea, the dynamics of planktonic microbes and their response to global change, especially warming, for which I have used the theoretical framework of metabolic ecology. I have ample expertise in the use of radioisotopes as tracers of carbon fluxes within microbial food webs, the flow cytometric characterization of the abundance and activity of small plankton and the application of macroecological approaches to time-series datasets. I have combined experimental approaches with large-scale observations, both spatial and temporal, aimed at predicting the direction and extent of changes in the structure and function of microbial food webs in the



global ocean. I have published 127 articles in SCI peer-reviewed journals (28 of them as first author), including *Limnology and Oceanography*, *Environmental Microbiology*, *Global Change Biology*, *Proceedings B*, *Nature Reviews Microbiology*, *The ISME Journal*, *Science of the Total Environment* and *Science Advances*, as well as 12 book chapters and 130 contributions to congresses.

Some of my earlier work has been important in determining where and when to expect a strong dependence of heterotrophic prokaryotes on phytoplankton extracellular products (e.g., Morán et al. 2001, *Mar Ecol Prog Ser* 222: 25-39; Morán et al. 2002, *Microb Ecol* 44: 217-223; Morán et al. 2011, *Limnol Oceanogr* 56: 37-48). A noticeable fraction of my publications have dealt with the seasonal variability of primary and bacterial production in the Cantabrian Sea continental shelf (e.g., Calvo-Díaz et al. 2014, *J Plankton Res* 36: 859-865; Morán and Scharek 2015, *Est Coast Shelf Sci* 154: 255-263; Huete-Stauffer et al. 2018, *Ecosystems* 21: 1139-1154), which will be useful for comparison with the open ocean site of this proposal (de la Iglesia-Vélez et al. 2024, *Mar. Environ. Res.* 194: 106331). Also of interest are other studies based on either temporally or geographically extensive datasets that include hypotheses about future re-arrangements of the pelagic ecosystem, towards a potential greater presence of small phytoplankton or typically oligotrophic prokaryotes (Morán et al. 2010, *Glob Change Biol* 16: 1137-1144; Morán et al. 2015, *Proc B Biol Sci* 282: 20150371), and latitudinal differences of the latter (Morán et al. 2017, *Glob Change Biol*, 23: 3956-3964). Finally, the presence of deep scattering layers of large fish may have a profound impact on heterotrophic prokaryotes and carbon fluxes, as recently demonstrated for the Red Sea mesopelagic layer (Calleja et al., 2018 *Front Mar Sci* 5: 259; Morán et al. 2022, *Sci Tot Environ* 804: 150098; Aksnes et al. 2023 *Mar Ecol Prog Ser* 717: 107-126).

I have participated in 20 research projects (3 as PI, total budget 667,000 €) and established a solid network of international collaborators as shown by the authorship of my publications. During my stay at King Abdullah University of Science and Technology (KAUST) in Saudi Arabia from 2014 to 2020, I led a group of 12 people including MS and PhD students, postdocs, researchers and technicians in my Microbial Oceanography and Biogeochemistry Lab associated to the Red Sea Research Center. I also chaired the Marine Science Program of the university (2018-2020) and CMOR (Marine Science Operations) Core Lab users group (2019). Previously, I served as Spain's alternate member in ICES Science Committee (SCICOM) from 2013 to 2014 and was co-chair of ICES Working Group on Phytoplankton and Microbial Ecology for 6 years (2009-2015). During this period I co-edited the first ICES Phytoplankton and Microbial Plankton Status Report 2009/2010. Both as a researcher at the IEO-CSIC and during my associate professorship of Marine Science at KAUST, I have frequently taken part in outreach activities. As recent examples, I contributed with the text "Plankton" to the photography book "Into the Red Sea" (Bennett-Smith M. & Berumen M.L., KAUST, 2021) and in the past two years I gave 4 talks about plankton and the Cantabrian Sea aimed at the general public.

I have been advisor of 4 MS students and 7 PhD students. I have reviewed manuscripts for more than 40 journals and I am currently editor of *PeerJ* and *Frontiers in Marine Science* (Marine Ecosystems Ecology) and review editor of *Aquatic Microbial Ecology* and the Aquatic Microbiology section of *Frontiers in Microbiology* and *Frontiers in Marine Science*. Besides being a regular reviewer of Spanish proposals to Marine Science and Technology (CTM-MAR), I served on two occasions (2004 and 2018) as an expert of the Scientific Technical Commission (CCT). I have also reviewed international proposals including NSF (US).

Times cited: 4544 WoS, 4731 Scopus. h-index: 37 WoS, 38 Scopus. 4 6-year research periods starting 1996.

## **Part C. RELEVANT MERITS** (sorted by typology)

### **C.1. Publications** (see instructions)

**1 Scientific article.** de la Iglesia-Vélez B., Díaz-Pérez L., Acuña J.L., **Morán X.A.G.** 2024. Spatial and seasonal variability of picoplankton abundance and growth rates in the southern Bay of Biscay. *Marine Environmental Research* 194: 106331. <https://doi.org/10.1016/j.marenvres.2023.106331>



**2 Scientific article.** Sabbagh E.I., Calleja M.LI., Daffonchio D., **Morán X.A.G.** 2023. Seasonality of top-down control of bacterioplankton at two central Red Sea sites with different trophic status. *Environmental Microbiology* 25: 2002-2019. <https://doi.org/10.1111/1462-2920.16439>

**3 Scientific article.** Latasa M., Scharek R., **Morán X.A.G.**, Gutiérrez-Rodríguez A., Emelianov M., Salat J., Vidal M., Estrada M. 2022. Dynamics of phytoplankton groups in three contrasting situations of the open NW Mediterranean Sea revealed by pigment, microscopy, and flow cytometry analyses. *Progress in Oceanography* 201: 102737. <https://doi.org/10.1016/j.pocean.2021.102737>

**4 Scientific article.** **Morán X.A.G.**, García F.C., Røstad A., Silva L., Al-Otaibi N., Irigoien X., Calleja M.LI. 2022. Diel dynamics of dissolved organic matter and heterotrophic prokaryotes reveal enhanced growth at the ocean's mesopelagic fish layer during daytime. *Science of the Total Environment* 804: 150098. <https://doi.org/10.1016/j.scitotenv.2021.150098>

**5 Scientific article.** Ruiz-González C., Mestre M., Estrada M., Sebastián M., Salazar G., Agustí S., Moreno-Ostos E., Reche I., Álvarez-Salgado X.A., **Morán X.A.G.**, Duarte C.M., Sala M.M., Gasol J.M. 2020. Major imprint of surface plankton on deep ocean prokaryotic structure and activity. *Molecular Ecology* 29: 1820-1838. <https://doi.org/10.1111/mec.15454>

**6 Scientific article.** Calleja M.LI., Al-Otaibi N., **Morán X.A.G.** 2019. Dissolved organic carbon seasonal and vertical dynamics in the Red Sea: contribution to oxygen respiration. *Scientific Reports* 9: 4690. <https://doi.org/10.1038/s41598-019-40753-w>

**7 Scientific article.** **Morán X.A.G.**, Alonso-Sáez L., Nogueira E., Ducklow H. W. González N., López-Urrutia Á., Díaz-Pérez L., Calvo-Díaz A., Arandia-Gorostidi N., Huete-Stauffer T.M. 2015. More, smaller bacteria in response to ocean's warming? *Proceedings of the Royal Society B-Biological Sciences* 282: 20150371. <https://doi.org/10.1098/rspb.2015.0371>

**8 Scientific article.** **Morán X. A. G.**, López-Urrutia Á., Calvo-Díaz A., Li W. K. W. 2010. Increasing importance of small phytoplankton in a warmer ocean. *Global Change Biology* 16: 1137–1144. <https://doi.org/10.1111/j.1365-2486.2009.01960.x>

**9 Scientific article.** Calvo-Díaz A., **Morán X. A. G.** 2006. Seasonal dynamics of picoplankton in shelf waters of the southern Bay of Biscay. *Aquatic Microbial Ecology* 42: 159-174. <https://doi.org/10.3354/ame042159>

**10 Scientific article.** **Morán X. A. G.**, Estrada M. 2005. Winter pelagic photosynthesis in the NW Mediterranean. *Deep-Sea Research Part I* 52: 1806-1822. <https://doi.org/10.1016/j.dsr.2005.05.009>

**C.2. Congress**, indicating the modality of their participation (invited conference, oral presentation, poster)

**1** Gordon Research Conference 2022 on Marine Microbes, Les Diablerets (Switzerland), 2022. **Morán X.A.G.**, Alonso-Sáez L. Environmental shaping of microbial communities and vice versa. Oral presentation (invited discussion leader).

**2** Ocean Carbon and Biogeochemistry in Tropical Seas, KAUST virtual conference, Thuwal (Saudi Arabia), 2021. **Morán X.A.G.** Biogeochemical fluxes mediated by heterotrophic prokaryotes in the tropical ocean and the role of advected DOM. Invited conference.

**3** 1st Meeting of the Iberian Ecological Society (SIBECOL), Barcelona (Spain), 2019. **Morán X.A.G.**, Røstad A., Ansari M.I., Silva L., García F.C., Kaartvedt S., Irigoien X., Huete-Stauffer T.M., Calleja M.L. Oasis in the desert: mesopelagic microbes rely on fish for labile DOM supply. Oral presentation.



**4** ASLO 2019 Aquatic Sciences Meeting, Puerto Rico (USA), 2019. Silva L., Calleja M.L., Ivetic S., Roth F., Carvalho S., **Morán X.A.G.** Effect of the shift from coral- to algal-dominated dissolved organic matter on tropical heterotrophic bacterioplankton in the central Red Sea. Oral presentation.

**5** ASLO 2019 Aquatic Sciences Meeting, Puerto Rico (USA), 2019. Calleja M.L., Al-Otaibi N., **Morán X.A.G.** Dissolved organic carbon transport to the ocean interior: Seasonal and diel processes in the central Red Sea. Oral presentation.

**6** Gordon Research Conference 2018 on Marine Microbes, Lucca (Italy), 2018. **Morán X.A.G.** Large scale controls on heterotrophic prokaryotes: where and when will temperature matter. Invited conference.

**7** Goldschmidt 2017, Paris (France), 2017. Calleja, M.L., Ansari, M.I., Silva, L., Røstad, A., Kaartvedt, S., Irigoien X., García, F.C., **Morán X.A.G.** Dissolved organic matter dynamics in the mesopelagic fish accumulation layer: implications for C cycling. Poster.

**8** 2016 Ramon Margalef Summer Colloquium "Microbes in a changing world: diversity and biogeochemistry", Barcelona (Spain), 2016. Predicting responses of marine prokaryotes to ocean warming: latitude and food matter. Invited conference.

**9** ASLO 2016 Summer Meeting, Santa Fe (USA), 2016. Al-Otaibi N., Viegas M., **Morán X.A.G.**, Irigoien X. Autotrophic and heterotrophic picoplankton in the Red Sea: seasonal and diel variability. Oral presentation.

**10** ASLO 2016 Summer Meeting, Santa Fe (USA), 2016. **Morán X.A.G.**, Gasol J.M., Pernice M.C., Massana R., Lara E., Vaqué D., Duarte C.M. Temperature control of marine heterotrophic prokaryotes: A latitudinal gap between bottom-up and top-down controls. Oral presentation.

**C.3. Research projects**, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

**1** The smallest among the small: Exploring the diversity and ecology of marine ultramicrobacteria (MarUMBa), KAUST (Saudi Arabia), Competitive Research Grant 2018, PI: X.A.G Morán (KAUST), 2019-2021, 398,576 USD, PI.

**2** The planktonic food web in the Cantabrian Sea: Structure and biogenic Carbon Pathways (SCAPA), CTM2013-45089-R, Ministry of Science and Innovation (Spain), PI: E. Nogueira (IEO), 2014-2016, 169,400 EUR, researcher.

**3** Coastal Ocean Microbial plankton and Temperature (COMITE), CTM2010-15840, Ministry of Science and Innovation (Spain), PI: X.A.G. Morán (IEO), 2010-2013, 176,660 EUR, PI.

**4** Destino de la floración primaveral de mar abierto en el Mediterráneo Noroccidental: Transferencias Tróficas (FAMOSO). CTM2008-06261-C03-02/MAR, Ministry of (Spain), coordinator PI: M. Latasa (ICM-CSIC), 2008-2011, 190,000 EUR, researcher.

**5** CARbon fluxes mediated by Plankton in Oligotrophic Subtropical environments: a lagrangian approach (CARPOS), REN2003-09532-C03-02, Ministry of Science and Technology (Spain), coordinator PI: E. Fernández (Univ. Vigo), 2004-2006. 134,550 EUR, PI.

**C.4. Contracts, technological or transfer merits**, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any. Not applicable.



**CURRICULUM VITAE ABREVIADO (CVA)**

**IMPORTANT** – The Curriculum Vitae **cannot exceed 4 pages**. Instructions to fill this document are available in the website.

**Part A. PERSONAL INFORMATION**

First name	Andrés		
Family name	Gutiérrez Rodríguez		
Gender (*)	Male	Birth date (dd/mm/yyyy)	10/04/1980
Social Security, Passport, ID number	201010548694	AAH691491	44164514Y
e-mail	andres.gutierrez@ieo.csic.es	URL Web	
Open Researcher and Contributor ID (ORCID) (*)	0000-0003-1274-3752		

(\*) *Mandatory*

**A.1. Current position**

Position	Distinguished Researcher		
Initial date	01/05/2022		
Institution	Spanish Oceanographic Institute – Spanish National Research Council (IEO-CSIC)		
Department/Center	Oceanografía y cambio global.	Centro Oceanográfico de Gijón (COG)	
Country	Spain	Teleph. number	+34 985 30 97 80
Key words	Biological oceanography, physical-biological coupling, phytoplankton, biodiversity, primary productivity, trophic interactions, carbon export		

**A.2. Previous positions (research activity interruptions, indicate total months)**

Period	Position/Institution/Country/Interruption cause
2015-2022	Staff Researcher (S2) / NIWA / New Zealand
2013-2015	Post-doctoral researcher / SBR-UPMC-CNRS / France
2009-2013	Post-doctoral researcher/SIO-UCSD / USA
2008-2009	Technician / ICM-CSIC / Spain
2003-2007	FPI predoctoral fellow / ICM-CSIC / Spain
2001-2002	Research Fellow / Univ. Oviedo / Spain

**A.3. Education**

PhD, Licensed, Graduate	University/Country	Year
PhD in Marine Science	Universitat Politècnica de Catalunya/Spain	2008
BSc Biological Sciences	Univ. Oviedo / Spain	2002

**Part B. CV SUMMARY (max. 5000 characters, including spaces)**

My research spans the intersection between marine plankton ecology and biogeochemistry with the goal of understanding the spatio-temporal variation of marine plankton communities' structure and function in relation to ocean dynamics. I have followed an observational and experimental approach articulated around oceanographic cruises, manipulative experiments with natural plankton communities and cultures; and integrating knowledge and techniques from multiple disciplines (molecular biology, ecology, oceanography) and working across scales and levels of organization (molecular-community-ecosystem).

My work has contributed to characterize the seasonal variability of phytoplankton biomass and composition in coastal and open-ocean regions of the Mediterranean Sea (Gutiérrez-Rodríguez et al 2010; Gutiérrez-Rodríguez et al 2011), and to establish the trophic preferences of key phytoplankton groups, (Latasa et al 2010). Work conducted along (sub)tropical to subantarctic and Antarctic regions has contributed to understand environmental drivers of phytoplankton communities' composition (Gutiérrez-Rodríguez et al 2011; Taylor et al 2016; Gutiérrez-Rodríguez et al 2020; Hayward et al. 2024). During my post-doctoral stays, I had the opportunity to develop molecular approaches that served

to demonstrate the vertical partitioning of *Synechococcus* genotypes (Gutiérrez-Rodríguez et al 2014) or to provide the first basin-scale biogeography of planktonic protist in the SW Pacific (Gutiérrez-Rodríguez et al 2022) and the Ross Sea (Cristi et al 2024). A substantial part of my work has been devoted to assessing phytoplankton growth, productivity and microzooplankton grazing rates. Combining biooptical observations and experimental incubations with different HPLC analysis we have contributed not only to assess community growth and production rates (Landry et al 2016; Chiswell et al 2022) but also taxon-specific contribution to carbon production and consumption (Gutiérrez-Rodríguez et al 2010; Selph et al 2016; Gutiérrez-Rodríguez et al. 2023), which has implications for the subsequent trophic and vertical export. Regarding microzooplankton pathway, my results have also contributed to consolidate standard methods (Gutiérrez-Rodríguez et al 2009; Gutiérrez-Rodríguez et al 2014), reinforce the dominant role this pathway (Gutiérrez-Rodríguez 2010; 2011; Landry et al 2016; Safi et al., 2023 DSR-I) and highlight the importance of physical factors in disrupting the coupling between growth and grazing rates (Gutiérrez-Rodríguez et al 2016; Gutiérrez-Rodríguez et al 2020). Regarding vertical export, I lead the first application of DNA metabarcoding to the analysis of particles collected in drifting sediment traps and reveal the dominant role that Rhizaria, a group largely overlooked by traditional methods, has in the biological pump. This work paved the way for implementation of genomic approaches in export studies and it is now widespread among the study the biological carbon pump (BCP). More recently, I have participated in an interdisciplinary project to investigate the role of Salps proliferations in the BCP, which has led to a high impact paper that demonstrated a strong increase in passive export (Decima et al. 2023) and other effects salps have on the microbial food-web (Stukel et al 2021 L&O; Fender et al. Mar. Biol. 2023)

I have spent most of my research career abroad where I have participated in a number of multidisciplinary projects and field campaigns (FLuZie, Ross-RAMP, SalpPooP) building an extensive network of international collaborations. I have participated in 16 R+D+i projects funded in competitive calls, 4 as PI, and in 22 non-competitive R+D+i projects with public entities. I have participated in 15 oceanographic cruises including several 'longish' 5-6-week cruises in the Southern Ocean, where I have led and coordinated the microbial research component (3-9 pp.) including associated outreach activities through blogs and school talks. I have published 38 articles in peer-reviewed journals 37 of them in top-tier journals (*Limnol. Oceanogr.*, *Progr. in Oceanogr.*, *ISME J*, *Nat Comms*). I have an h-index of 15 (Scopus) and 18 (Google Scholar) as for 01/23/24. I have authored two book chapters and presented 40 communications in national and international meetings. I have supervised 2 PhD candidates who successfully defended their dissertation and obtained the degree in July and November 2023, and a third one who will be submitting her thesis dissertation in February 2024. From 2018 to 2022 I coordinated the primary production group at NIWA (6 pp.) and since 05/2022 I am part of the Biodiversity and Ecology of Marine Ecosystems (BEME) group at CO Gijón (IEO-CSIC) as Distinguished Researcher waiting to officially take possession of the Tenured Researcher position I earned in November 2023. I have reviewed proposals for international funding agencies including the US, French and Singapore main agencies.

## **Part C. RELEVANT MERITS** (sorted by typology)

### **C.1. Publications** (see instructions)

- Cristi, A., Law, C.S., Pinkerton, M., Lopes dos Santos, A., Safi, K., **A. Gutiérrez-Rodríguez** (Accepted). Environmental driving forces and phytoplankton diversity across the Ross Sea region during a summer-autumn transition. *Limnol. Oceanogr.*
- Gutiérrez-Rodríguez, A.**, (AC), M. Latasa, K. Safi, M.H. Pinkerton, S.D. Nodder. (2023) Decoupled Growth and Grazing Rates of Diatoms and Green Algae Drive Increased Phytoplankton Productivity on HNLC Sub-Antarctic Plateaux. *Limnol. Oceanogr. Letters*, 8 (6), 896–905. <https://doi.org/10.1002/lol2.10355>.
- Décima, M., M.R. Stukel, S.D. Nodder, ... M. Pinkerton. (4/14) (2023). Salp blooms drive strong increases in passive carbon export in the Southern Ocean. *Nat. Comms.* 14(1), 425. <https://doi.org/10.1038/s41467-022-35204-6>.
- Hayward, A., M.H. Pinkerton, **Gutiérrez-Rodríguez, A.** (2023) Phytoclass: A Pigment-Based Chemotaxonomic Method to Determine the Biomass of Phytoplankton Classes. *Limnol. Oceanogr.: Methods*, 21 (4), 220–241. <https://doi.org/10.1002/lom3.10541>.
- Gutiérrez-Rodríguez, A.**, (AC), A. Lopes dos Santos, K. Safi, ... S.D. Nodder (2022). Planktonic Protist diversity across contrasting Subtropical and Subantarctic Waters of the Southwest Pacific. *Progr. in Oceanogr.* 206: 102809. <https://doi.org/10.1016/j.pocan.2022.102809>.



**Gutiérrez-Rodríguez, A.**, (AC), K. Safi, D. Fernández,... S.D., Nodder (2020). Decoupling between phytoplankton growth and microzooplankton grazing enhances productivity in Subantarctic waters on Campbell Plateau, southeast of New Zealand. *Journal of Geophysical Research: Oceans*, 125, e2019JC015550. <https://doi.org/10.1029/2019JC015550>

**Gutiérrez-Rodríguez A.**, (AC), M.R., Stukel, A. Lopes dos Santos, T. Biard, R. Scharek, D. Vaultot, M.R. Landry, F. Not F. (2018) High contribution of Rhizaria (Radiolaria) to vertical export in the California Current Ecosystem revealed by DNA metabarcoding. *The ISME J.* 13, 964–976. <https://doi.org/10.1038/s41396-018-0322-7>

**Gutiérrez-Rodríguez A.**, (AC), K.E., Selph, M.R., Landry (2016). Phytoplankton growth and microzooplankton grazing dynamics across vertical environmental gradients determined by transplant *in situ* dilution experiments *J. Plankton Res.* 38(2) 271-289. <https://doi.org/10.1093/plankt/fbv074>

**Gutiérrez-Rodríguez A.**, (AC), M. Décima, B. Popp, M.R. Landry (2014). Isotopic invisibility of protozoan trophic steps in marine food webs. *Limnol. Oceanogr.* 59(5), 1590-1598. <https://doi.org/10.4319/lo.2014.59.5.1590>

**Gutiérrez-Rodríguez A.**, (AC), G. Slack, E.F. Daniels, K.E. Selph, B. Palenik, M.R. Landry (2014) Fine spatial structure of genetically distinct picocyanobacterial populations across environmental gradients in the Costa Rica Dome. *Limnol. Oceanogr.* 59(3), 705-723. <https://doi.org/10.4319/lo.2014.59.3.0705>

### **C.2. Congress**, indicating the modality of their participation (invited conference, oral presentation, poster)

ASLO Aquatic Sciences Meeting (4-9 June, Palma Mallorca, Spain) “Taxon-specific phytoplankton growth and microzooplankton grazing in the Ross Sea region: the race between diatoms and prymnesiophyceae”. **Gutiérrez-Rodríguez, A.**, K. Safi, M. Gall, A. Cristi,... Pinkerton (Oral).

Ocean Science Meeting (24 Feb-4 March 2022, virtual meeting). “Integrating biogeochemical and molecular tools to assess planktonic protist contribution to organic carbon fluxes and export efficiency in subtropical waters of the southwest Pacific.” **Gutiérrez-Rodríguez, A.**, A. Lopes-Dos Santos, D. Vaultot, S.D. Nodder (Poster)(1/10)

Ocean Science Meeting (16-21 Feb 2020 – San Diego, USA) “The limited effect of Salps on the coupling between microzooplankton and phytoplankton in subtropical and subantarctic oceanic waters east of New Zealand”. **Gutiérrez-Rodríguez A.**, S. O’Connor, N. N. Yingling, T. Kelly, ...M. Decima (Oral)(1/11).

Antarctica New Zealand – The future under scope (17-19 June 2019, Christchurch, NZ). “Phytoplankton community composition, production and grazing dynamics in the Ross Sea.” **Gutiérrez-Rodríguez A.**, K. Safi, H. Chae, M. Décima, ... MH. Pinkerton (Oral).

AGU Fall meeting (10-14 Dec 2018, Washington, D.C., , USA). From genes to particles to the global carbon cycle: Using genetic analyses to investigate the marine biological carbon pump. M.R. Stukel; V. Coles, B.Valencia, A. Gutierrez-Rodriguez, M.R. Landry, A. Allen (Oral).

ASLO 2018 Summer meeting (10-15 June, Victoria BC, Canada) “Phytoplankton community composition, production and consumption rates in Subantarctic HNLC waters southeast of New Zealand” **Gutiérrez-Rodríguez, A.**, K. Safi, F. Rudminat, ... S.D. Nodder (Oral).

New Zealand Marine Science Symposium (4-7 July 2017, Christchurch, NZ). “Phytoplankton growth, microzooplankton grazing and the fate of primary production in contrasting oceanographic conditions of New Zealand open ocean waters”. **Gutiérrez-Rodríguez, A.**, K. Safi, R. Allen, M. Decima, K. Thompson, ...S.D. Nodder (Oral).

ASLO 2017 Aquatic Sciences Meeting (February 2017, Honolulu, USA). “Protistan plankton diversity and species-specific contribution to oceanic carbon export in the California Current Ecosystem (CCE) revealed by DNA metabarcoding”. **Gutiérrez-Rodríguez, A.**, M.R. Stukel, A. Lopes dos Santos, T. Biard, D. Vaultot, M.R. Landry, and F. Not (Oral).

ASLO Aquatic Sciences Meeting. (Jan 25-30, 2009, Nice, France). “Carbon flux through major phytoplankton groups in the Subtropical NE Atlantic Ocean”. **Gutiérrez-Rodríguez A.**, M. Estrada, M. Latasa, M. Emilianov (Oral).

### **C.3. Research projects**, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

BIOTROPHEX – BIOgeochemical and TROPHic control of plankton mediated carbon EXport in the northeast Atlantic. PI **A Gutiérrez-Rodríguez** (Ministerio de Ciencia e Innovación). 01/09/2023 – 31/08/2025 172.546 €

ROSS-RAMP - Ross Sea Research and Monitoring Programe: is the worlds largest MPA effective?

- Ministry of Business Employment and Innovation. PI Matt Pinkerton. (National Institute of Water and Atmospheric research). 01/09/2018- 01/09/2023. 6.500.000 €.
- The ocean vacuum-cleaner: Salp effects on the marine carbon cycle. Royal Society of New Zealand. PI Moira Decima, Co-PI **A Gutiérrez-Rodríguez**. (National Institute of Water and Atmospheric research). 01/01/2017-01/01/2020. 174.551 €.
- Integrating oceanography and molecular biology to develop an ecosystem framework for the New Zealand Exclusive Economic Zone. Ministry of Business, Innovation and Employment. **PI A. Gutiérrez Rodríguez**. (National Institute of Water and Atmospheric research). 01/01/2017-31/12/2018. 45.200 €.
- Novel fluorometry approaches for primary production estimates. Ministry of Business Innovation and Employment. **PI A. Gutiérrez Rodríguez**. (National Institute of Water and Atmospheric research). 2016-2017. 35.000 €.
- SYMBIOX - Dimethyl sulfur and its derivatives as anti-oxidant in marine photosymbiosis. Physio-molecular basis and ecological significance. Region Bretagne. **PI A. Gutiérrez** (Station Biologique de Roscoff). 2013-2014. 60.000 €.
- A novel tool for validating trophic position estimates in ecosystem-based fisheries models. National Science Foundation. PI Brian Popp. (Scripps Institution of Oceanography - University of California San Diego). 2010-2013. 426.800 €.
- Fluxes and Zinc Experiment in the Costa Rica Dome ecosystem (FLUZIE). National Science Foundation (USA). PI Michael Landry. (Scripps Institution of Oceanography - University of California San Diego). 2009-2012. 516.686 €.
- Fate of the NW Mediterranean spring bloom (FAMOSO). MCYT (Spain). PI Mikel Latasa (Centro Mediterraneo de Investigaciones Marinas y Ambientales). 2009-2012. 205.000 €
- Estructuras y flujos biogeoquímicos en sistemas pelágicos del Mediterráneo noroccidental. MCYT (Spain). Mikel Latasa. (Centro Mediterráneo de Investigaciones Marinas y Ambientales). 2003-2006. 130.000 €.

#### **C.4. Contracts, technological or transfer merits,**

- The Productive Ocean. MBIE (New Zealand) PI S. Nodder (NIWA). 01/07/2021- 01/07/2022. 313.000 €.
- Ecosystem Structure & Function-Marine food-web dynamics. MBIE (New Zealand) PI M. Pinkerton. (NIWA). 01/07/2021- 01/07/2022. 483.117 €.
- Ocean Tools. MBIE (New Zealand) PI Craig Stevens. (NIWA). 01/07/2021-01/07/2022. 72.718 €
- Ocean Flows. MBIE (New Zealand) Joanne O'Callahan. (NIWA). 01/06/2021-01/06/2022. 250.940 €.
- Productivity. MBIE (New Zealand) PI S. Nodder (NIWA). 01/07/2020-01/07/2021. 312.780 €.
- Ecosystem Structure & Function-Marine food-web dynamics. MBIE (New Zealand) PI M Pinkerton. (NIWA). 01/07/2020- 01/07/2021. 488.530 €
- Ocean Flows. MBIE (New Zealand). PI Craig Stevens. (NIWA). 01/06/2020-01/06/2021. 275.940 €
- Productivity. MBIE (New Zealand) PI S. Nodder (NIWA). 01/07/2019-01/07/2020. 357.220 €.
- Ecosystem Structure & Function-Marine food-web MBIE (New Zealand). PI Matt Pinkerton. (NIWA). 01/07/2019- 01/07/2020. 492.820 €.
- Productivity. MBIE (New Zealand) PI S. Nodder (NIWA). 01/07/2018-01/07/2019. 451.000 €.
- Ecosystem Structure & Function-Marine food-web dynamics. MBIE (New Zealand) PI Matt Pinkerton. (NIWA). 01/07/2018- 01/07/2019. 466.338 €.