



<b>CV date</b>	02/01/2025
----------------	------------

## Part A. PERSONAL INFORMATION

First name	Santiago		
Family name	Hernández León		
Gender (*)	Hombre	Birth date	08/09/1958
ID number	DNI		42.792.602 K
e-mail	shernandezleon@ulpgc.es	<a href="https://iocag.ulpgc.es/people/santiago-hernandez-leon">https://iocag.ulpgc.es/people/santiago-hernandez-leon</a>	
Open Research and Contributor ID (ORCID) Researcher ID	0000-0002-3085-4969 M-2563-2014		

### A.1. Current position

Position	Catedrático de zoología (Professor in zoology)		
Initial date	2001		
Institution	Universidad de Las Palmas de Gran Canaria (ULPGC)		
Department/Center	Instituto de Oceanografía y Cambio Global (IOCAG)		
Country	Spain	Telephon number	34-928-45-29.07
Key words	Oceanography, ecology, physiology, plankton		

### A.2. Previous positions (research activity interruptions, art. 45.2.c))

Period	Position/Institution/Country/Interruption cause
1981-1982	Beca de Investigación (Inst. Canario Ciencias Marinas)
1982-1983	Investigador Contratado (Inst. Canario Ciencias Marinas)
1983-1986	Profesor Colaborador (ULPGC)
1986-1989	Profesor Titular Interino (ULPGC)
1989-2001	Profesor Titular de Universidad (ULPGC)

### A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Licensed	Universidad de La Laguna (Tenerife)	1980
PhD	Universidad de La Laguna (Tenerife)	1986

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

Santiago Hernández-León is a biological oceanographer at the Institute of Oceanography and Global Change in the Canary Islands. He obtained the degree in biology in 1980 and received a PhD in Oceanography in 1986 from the Universidad de La Laguna. He was awarded as the best PhD thesis in 1986 from the Government of the Canary Islands. He performed research stays in France (1983) at IFREMER, United States of America (1984) at the Bigelow Laboratory for Ocean Sciences, and Norway (1993) at the Institute of Marine Research. He obtained the lecture degree (Profesor Titular) in 1989, and he is nowadays (since 2001) full professor of zoology (Catedrático) at the Universidad de Las Palmas de GC. He has participated in 47 research projects (from regional, national and European agencies), leading 15 as principal investigator. He has more than 12200 citations and an H index of 50 (Scholar Google, 47 in ResearchGate, 38 Clarivate) being one of the most cited authors in the Canary Islands and at a significant level at Spanish universities. Fifteen PhDs supervised, 172 papers published, most of them in peer reviewed journals (149), with impact index (131) and book chapters in prestigious editorials (6). His research interest is related to the effect of climate on

the ecology and physiology of plankton communities. He has been working on the role of micro-, mesozooplankton, and micronekton in the oceanic carbon flux from the Arctic to Antarctica, but he is especially interested in the assessment of the active flux due to vertical migrants in subtropical waters. He is right now a world leader in this component of the biological carbon pump. He has participated in more than 40 oceanographic cruises, 8 in polar areas.

Keystone findings related to his research could be shortened in the discovery during the 90s of the island-induced eddies southward of the Canary Islands, leading the projects in which we disentangle the long-ago pursued functioning of the Canary Current. This finding opened many avenues of research in the area.

A second keystone finding was to discover the lunar cycle of zooplankton in the ocean, also during the 90s. This effect, due to the intermittent presence of diel vertical migrants in the epipelagic zone related to lunar illumination unveiled the role of the active flux in the ocean. Recent results provide evidence of a lunar cycle from pico-, nano-, micro- and mesoplankton governing the food web in the high turnover warm oligotrophic waters.

A third keystone finding was the discovery of high backscatter at bathypelagic depths below equatorial upwelling zones at the global scale. This finding unveiled the transport of organic matter from the surface down to the bathypelagic zone, promoting true carbon sequestration. Jointly, we observed high active fluxes (higher than passive flux) in areas related to oceanic upwellings.

A fourth keystone finding was to unveil the relationship between physiological processes such as respiration, nitrogen excretion, and growth, and the enzymatic proxies normally used in oceanography to estimate them (ETS, GDH, ATC, and AARS, activities). A series of papers from 1995 to present has unraveled the functioning of the different enzymes in relation to the problems faced to use these indices to assess physiological rates in the ocean.

Finally, a fifth keystone finding is the proposal of a novel procedure for marine carbon dioxide removal (mCDR) based on the concept of biomanipulation, following the knowledge acquired in the second keystone finding (see above). This new methodology does not need to dump any substance in the ocean, and it is proposed as an ecologically friendly method.

Vice-dean (1994-1998) and Dean (2004-2009) of the Marine Sciences School (ULPGC). Director of the Institute of Oceanography and Global Change (IOCAG) of the ULPGC (2022-present).

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

### **C.1. Publications** (*Last 10 years, 10 papers*)

Yebra, L., T. Kobari, A.R. Sastri, F. Gusmão, **S. Hernández-León** (2017). Advances in biochemical indices of zooplankton production. *Advances in Marine Biology*, 76, 157-240.

**Hernández-León, S.**, S. Putzeys, C. Almeida, P. Bécognée, A. Marrero-Díaz, J. Arístegui, L. Yebra (2019a). Carbon export through zooplankton active flux in the Canary Current. *J. Mar. Syst.* 189, 12-21.

Armengol L., Calbet A., Franchy G., Rodríguez-Santos A., **Hernández-León S.** (2019). Planktonic food web structure and trophic transfer efficiency along a productivity gradient in the tropical and subtropical Atlantic Ocean. *Scientific Reports* 9, 2044, doi.org/10.1038/s41598-019-38507-9.

**Hernández-León, S.**, Calles, S., Fernández de Puelles, M.L. (2019b). The estimation of metabolism in the mesopelagic zone: Disentangling deep-sea zooplankton respiration. *Progress in Oceanography* 178, doi.org/10.1016/j.pocean. 2019.102163.

- Hernández-León, S.**, Olivar, P., Fernández de Puellas, M.L., Bode, A., Castellón, A., López-Pérez, C., Tuset, V.M., González-Gordillo J.I. (2019c). Zooplankton and micronekton active flux across the tropical and subtropical Atlantic Ocean. *Frontiers in Marine Science* 6, 535
- Hernández-León, S.**, Koppelman, R., Fraile-Nuez, E., Bode, A., Mompeán, C., Irigoien, X., Olivar, P., Echevarría, E., Fernández de Puellas, M.L., González-Gordillo, I., Cózar, A., Acuña, J.L., Agustí, S., Duarte C.M. (2020). Large deep-sea zooplankton biomass mirrors primary production in the global ocean. *Nature Communications*, doi: 10.1038/s41467-020-19875-7
- Saba G.K., Burd A.B., Dunne J.P., **Hernández-León S.**, Martin A.H., Rose K.A., Salisbury J., Steinberg D.K., Trueman C.N., Wilson R.W., Wilson S.E. (2021). Towards a better understanding of fish contribution to carbon export flux. *Limnology and Oceanography*, doi: 10.1002/lno.11709.
- Hernández-León, S.** (2023). The biological carbon pump, diel vertical migration, and carbon dioxide removal. *iScience* doi.org/10.1016/j.isci.2023.107835.
- Hernández-León, S.** Sarmiento-Lezcano, A., Couret, M., Armengol, L., Medina-Suárez, I., Fatira, E., Tuset, V.M., Limam, A., Sánchez-Díez, A., Díaz-Pérez, J., Landeira, J.M., (2024). Seasonality of zooplankton active flux in subtropical waters. *Limnology and Oceanography* doi: 10.1002/lno.12689.
- Hernández-León, S.**, Torreblanca, L., Herrera, I., Armengol, L., Franchy, G., Ariza, A., Garijo, J.C., Couret, M. (2024). Variability of micro- and mesozooplankton in relation to the lunar cycle in oceanic waters off the Canary Islands. *Frontiers in Marine Science* 10.3389/fmars.2025.1476524.

## C.2. Congress (*Last 10 years*)

- Hernández-León, S. 2014. The role of diel vertical migrants in the oceanic carbon pump. International Symposium of Marine Sciences, Junio de 2014, Las Palmas de GC, Islas Canarias. Oral presentation.
- Hernández-León, S., E. Fraile-Nuez, J.C. Garijo, A. Ariza, X. Irigoien, P. Olivar, I. González-Gordillo, M.L. Fernández de Puellas, A. Bode, J.M. Gasol (2015). Diel vertical migrants and the ocean carbon pump: Is there a ladder of migration? ASLO meeting, Granada 22-27, February, 2015. Oral presentation.
- Hernández-León, S. (2016). The effect of warming ocean on subtropical zooplankton: The case of the Canary Current. ICES/PISCES 6<sup>th</sup> Zooplankton Production Symposium. In: Response of zooplankton communities to changing ocean. Bergen, Norway. Oral presentation.
- Hernández-León, S., R. Koppelman, E. Fraile-Nuez, A. Bode, C. Mompeán, X. Irigoien, P. Olivar, F. Echevarría, M.L. Fernández de Puellas, I. González-Gordillo, A. Cózar, J.L. Acuña, S. Agustí, C.M. Duarte (2017). Bathypelagic fauna as a main driver of carbon sequestration in the ocean. ASLO meeting, Hawai 26 February- 3 March, 2017. Oral presentation.
- Hernández-León, S. (2021). Comparing Migrant Biomass and Active Flux in Zooplankton. Unravelling the ecology and biogeochemistry of the mesopelagic zone. ASLO meeting, Virtual meeting. Oral presentation.
- Hernández-León, S. (2022). Light promoting higher efficiency of the biological carbon pump: A environmentally friendly CDR candidate. ASLO Ocean Sciences Meeting 2022. Beyond a research dialogue: progress in testing marine CO<sub>2</sub> removal methods. Virtual meeting. Oral presentation.
- Hernández-León, S. (2022). Active flux in the Ocean: Magnitude, variability, and its role as a CDR procedure. 2022 Gordon Research Conference on Ocean Biogeochemistry, 1-6 May 2022, Barcelona, Invited Oral presentation.
- Hernández-León, S. (2023). Seasonality of zooplankton active flux in the Canary Current System. ASLO Ocean Sciences Meeting 2022. Resilience and Recovery in Aquatic Systems, 4-9 June 2023, Palma de Mallorca. Oral presentation.

Hernández-León, S. (2023). Active flux by Zooplankton and Micronekton: Variability, gaps, and CDR. Ocean Twilight Zone: Biodiversity, Ecology, and the Biological Carbon Pump. 13-20 September 2023, Woods Hole Oceanographic Institution, USA. Invited oral presentation.

Hernández-León, S. (2024). Variability of active flux by zooplankton and micronekton in the ocean. ICES/PISCES 7<sup>th</sup> Zooplankton Production Symposium. 17-22 March, 2024, Hobart, Tasmania. Australia. Oral presentation.

### C.3. Research projects (Last 10 years)

“Mafia: Migradores y Flujo Activo en el Océano Atlántico”

Entidad Financiadora : Comisión Interministerial de Ciencia y Tecnología (CICYT).  
Periodo : 2013-2015  
Subvención : 400.000,00 €  
Investigador Principal : Dr. Santiago Hernández León

“Ecología, balance de carbono y adaptaciones del zooplancton de la Zona del Mínimo de Oxígeno del Pacífico Tropical”

Entidad Financiadora : Consejo Nacional de Ciencia y Tecnología de México (CONACYT)  
Periodo : 2016-2018  
Subvención : 3.976.000 \$ (México)  
Investigador Principal : Dr. Jaime Färber-Lorda

“Bathypelagic: Biomass and Active Flux in the Bathypelagic Zone”.

Entidad Financiadora : Comisión Interministerial de Ciencia y Tecnología (CICYT).  
Periodo : 2017-2019  
Subvención : 326.700,00 €  
Investigador Principal : Dr. Santiago Hernández León

“SUMMER: Sustainable Management of Mesopelagic Resources”.

Entidad Financiadora : European Union (H2020, BG03).  
Periodo : 2019-2022  
Subvención : 286.250,00 €  
Investigador Principal : Dr. Xabier Irigoien (Santiago Hernández León for the ULPGC).

“TRIATLAS: Tropical and South Atlantic climate-based marine ecosystem prediction for sustainable management”.

Entidad Financiadora : European Union (H2020, BG08).  
Periodo : 2019-2022  
Subvención : 266.000,00 €  
Investigador Principal : Dr. Noel Keenlyside (Santiago Hernández León for the ULPGC).

“DESAFÍO:”DisEntangling Seasonality of Active Carbon Flux In the Ocean”.

Entidad Financiadora : Ministerio de Ciencia y Tecnología (Spain)  
Periodo : 2021-2025  
Subvención : 310.970 €  
Investigador Principal : Dr. Santiago Hernández León

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