

Fecha del CVA	01 Febrero 2024
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Parte A. DATOS PERSONALES

Nombre y apellidos	Lázaro Marín Guirao		
DNI/NIE/pasaporte	23257364V	Edad	48 años
Núm. identificación del investigador	Researcher ID	A-3481-2013	
	Código ORCID	https://orcid.org/0000-0001-0010-0010	

A.1. Situación profesional actual

Organismo	Instituto Español de Oceanografía		
Dpto./Centro	Centro Oceanográfico de Murcia		
Dirección	C/ Varadero 1, 30740, Lo Pagan, Murcia		
Teléfono	968180500	correo electrónico	lazaromar@ieo.csic.es
Categoría profesional	Científico Titular	Fecha inicio	Noviembre 2021
Espec. cód. UNESCO	241705, 2510.04		
Palabras clave	Ecología marina, Ecofisiología, Ecología Molecular, Angiospermas Marinas		

A.2. Formación académica (título, institución, fecha)

Licenciatura/Grado/Doctorado	Universidad	Año
Lcdo. Ciencias del Mar	Universidad de Cádiz	1999
Doctorado en Biología	Universidad de Murcia	2007

A.3. Indicadores generales de calidad de la producción científica (véanse instrucciones)

Since 2002, my research has resulted in 85 SCI publications (WoS) in leading journals in Marine Biology, Ecology and Conservation (>85% in Q1 journals and two awarded as top most cited in the journals Marine Pollution Bulletin and Estuarine Coastal and Shelf Science), 8 book chapters in national and international editions and several popular science publications. From the SCI publications I am first author of 30% of the papers, second author in 25% and last author (senior authorship) in 25 papers, mainly as the result of students' supervision in the last years. This scientific production has received 3,539 cites (h-index = 39, i10-index = 65, Google Scholar, February 2024). I have presented dozens of oral and poster communications in conferences (80% in international meetings of which two awarded as second best posters), given invited talks and acted as a chairman in international workshops. I have extensive collaborations within and outside Europe, as highlighted by my publication track-record. I have been external reviewer for specialized journals in the field (most of them Q1 journals). I have coordinated research groups in Spain (IEO) and Italy (SZN), supervised the research activities of numerous undergraduate and graduate students and directed 4 PhD students and 4 Master Thesis; I am currently supervising 1 PhD student. I have participated in the elaboration of dozens of scientific and technical reports as well as advisory reports for public and private organizations. I have delivered practical and theoretical lectures in marine biology, ecology and conservation at the undergraduate and graduate levels and participated in numerous dissemination and public awareness activities.

Parte B. RESUMEN LIBRE DEL CURRÍCULUM (máximo 3500 caracteres)

After attaining his PhD degree at the University of Murcia, Dr Marín-Guirao gained two competitive postdoctoral contracts at the Spanish Institute of Oceanography (IEO, 2008-2013). In 2014 he was awarded a Marie Curie Intra-European fellowship (HEATSTRESS project; FP7-PEOPLE-2013-624035) to develop his own research project at the Stazione Zoologica Anton Dohrn (SZN) of Naples, Italy. After finishing the HEATGRASS project, he was contracted as researcher at the SZN (2016-2018), where he subsequently gained a permanent researcher position (Ricercatore III livello) in 2018. However, in December 2018 he returned back to Spain to take a permanent position as I+D+I collaborator at the IEO. Dr Marín-Guirao is currently a permanent researcher (Científico titular) at the IEO.

Along his career, Dr Marín-Guirao have conducted research in prestigious national and international research institutions (e.g. Spanish Institute of Oceanography, Universidade Federal da Bahia, National Autonomous University of Mexico, Canary Islands Technological Institute, Stazione Zoologica Anton Dohrn), establishing an enriching network of collaborative research with institutions of more than 15 countries. Throughout his scientific career he has been involved in more than 15 I+D+i research projects and more than 40 environmental studies and contracts related to ecological changes and responses of benthic communities and ecosystems under different human disturbances (e.g. invasive species, desalination, climate change, eutrophication, fish farming). He has also been in charge of the design, construction and operation of pioneer mesocosms systems for long-term laboratory experimentation with marine plants both at the IEO in Spain and at the SZN in Naples.

Dr Marín-Guirao has focused his researches on the context of integrative seagrass biology and ecology with the aim to determine the capacity of marine plants to cope with and adapt to altered/changing environments. In his studies Dr Marín-Guirao have combined and integrated multilevel approaches including population, community and ecosystem analysis, ecophysiological/biochemical measurements and genetic and transcriptomic techniques. These holistic approaches have been applied both in the field and laboratory manipulative experiments to understand and predict the future of these key benthic foundation species under complex and unprecedented environmental scenarios of global change. These kind of approaches are now of great value to explore the role that phenotypic plasticity and (epi-)genetic evolution play in the adaptation of seagrass to the ongoing global climate change and how climatic threats interact with other increasing global impacts (e.g. eutrophication, pollution). He is also interested in exploring particular research perspectives including the identification of the mechanisms, thresholds and early indicators of regime shifts in seagrass ecosystems, to gain further knowledge about how resilience is built-up in this ecosystems and which mechanisms are compromised when they undergo regime shift.

Parte C. MÉRITOS MÁS RELEVANTES (*ordenados por tipología*)

C.1. Publicaciones

(* Indicates authors sharing position in the list of authors)

Ma, X., Vanneste, S., Chang, J., Ambrosino, L., Barry, K., Bayer, T., Bobrov, A.A.; Boston, L., Campbell, J.E., Chen, H., Chiusano, M.L., Dattolo, E., Grimwood, J., He, G., Jenkins, J., Khachatryan, M., **Marín-Guirao, L.**, ...Van de Peer, Y. 2024. Seagrass genomes reveal ancient polyploidy and adaptations to the marine environment. *Nature Plants*, 10, 240–255

Nguyen, H. M., Ruocco, M., Dattolo, E., Cassetti, F. P., Calvo, S., Tomasello, A., **Marín-Guirao, L.***, Pernice, M.* & Procaccini, G*. 2023. Signs of local adaptation by genetic selection and isolation promoted by extreme temperature and salinity in the Mediterranean seagrass *Posidonia oceanica*. *Molecular Ecology*, 32, 4313–4328.

Santillán-Sarmiento A, Pazzaglia J, Ruocco M, Dattolo E, Ambrosino L, Winters G, **Marín-Guirao L***, Procaccini G*. 2023. Gene co-expression network analysis for the selection of candidate early warning indicators of heat and nutrient stress in *Posidonia oceanica*. *Science*

of the *Total Environment*, 877:162517. doi: 10.1016/j.scitotenv.2023.162517

Sandoval-Gil JM, Ruiz JM, **Marín-Guirao L.** 2023. Advances in understanding multilevel responses of seagrasses to hypersalinity. *Marine Environmental Research*, 183:105809. doi: 10.1016/j.marenvres

Marín-Guirao L, Bernardeau-Esteller J, Belando MD, García-Muñoz R, Ramos-Segura A, Alcoverro T, Minguito-Frutos M, Ruiz JM. 2022. Photo-acclimatory thresholds anticipate sudden shifts in seagrass ecosystem state under reduced light conditions. *Marine Environmental Research*, 177:105636. doi: 10.1016/j.marenvres.2022.105636

Nguyen, H.M., Ralph, P.J., **Marín-Guirao, L.***, Pernice, M.*, Procaccini, G*. 2021. Seagrasses in an era of ocean warming: a review. *Biological Reviews*, 96: 2009-2030. <https://doi.org/10.1111/brv.12736>

Entrambasaguas, L., Ruocco, M., Verhoeven, K.J.F., Procaccini, G., **Marín-Guirao, L.** 2021. Gene body DNA methylation in seagrasses: inter- and intraspecific differences and interaction with transcriptome plasticity under heat stress. *Scientific Reports*, 11:14343. <https://doi.org/10.1038/s41598-021-93606-w>

Pazzaglia J, Reusch TBH, Terlizzi A, **Marín-Guirao L***, Procaccini G*. 2021. Phenotypic plasticity under rapid global changes: The intrinsic force for future seagrasses survival. *Evolutionary Applications*, 14: 1181–1201. <https://doi.org/10.1111/eva.13212>

Ruocco M, Entrambasaguas L, Dattolo E, Milito A, **Marín-Guirao L***, Procaccini G*. 2020. A king and vassals' tale: Molecular signatures of clonal integration in *Posidonia oceanica* under chronic light shortage. *Journal of Ecology*. 00:1–19.

Pazzaglia J, Santillán-Sarmiento A, Helber SB, Ruocco M, Terlizzi A, **Marín-Guirao L***, Procaccini G*. 2020. Does Warming Enhance the Effects of Eutrophication in the Seagrass *Posidonia oceanica*? *Frontiers in Marine Science*. 7:564805.

Nguyen HM, Kim M, Ralph PJ, **Marín-Guirao L***, Pernice M*, Procaccini G*. 2020. Stress Memory in Seagrasses: First Insight Into the Effects of Thermal Priming and the Role of Epigenetic Modifications. *Frontiers in Plant Science*. 11:494.

Marín-Guirao L, Entrambasaguas L, Ruiz JM, Procaccini G. 2019. Heat-stress induced flowering can be a potential adaptive response to ocean warming for the iconic seagrass *Posidonia oceanica*. *Molecular Ecology*, 28:2486-2501.

L Marín-Guirao, J Bernardeau-Esteller, R García-Muñoz, A Ramos, Y Ontoria, J Romero, M Pérez, JM Ruiz, G Procaccini. 2018. Carbon economy of Mediterranean seagrasses in response to thermal stress. *Marine Pollution Bulletin*, 135:617-629.

Marín-Guirao L, Entrambasaguas L, Dattolo E, Bernardeau-Esteller J, Ruiz JM, Procaccini G. 2017. Molecular mechanisms behind the physiological resistance to intense transient warming in an iconic marine plant. *Frontiers in Plant Science*, 8-1142.

C.2. Proyectos

1. **Proyecto:** GRASSREC: New approaches to assist and assess seaGRASS Ecosystem REcovery” funded by the Spanish Ministry of Science and Innovation (2021-2024).
2. **Proyecto:** 19-ESMARES2-ANG: Marine angiosperm meadow monitoring programmes under the Marine Strategy Framework Directive and the Natura 2000 Network. Funding: Spanish Ministry for Ecological Transition and the Demographic Challenge. Duration: 2019-2023.
3. **Proyecto:** BAHIPAL: Assessment of the impact of untreated urban wastewater discharges in the bay of Palma. Funding: Spanish Institute of Oceanography. Duration: 2019-2021.
4. **Proyecto:** DMMEM: Marine Strategies Framework Directive: Mar Menor Eutrophication Monitoring. Funding: Spanish Institute of Oceanography. Duration: 2019-2024.
5. **Proyecto:** CLIMAVEMAR - Evaluación de los efectos del cambio climático en la vegetación marina sumergida: integración de las respuestas a los niveles molecular, fisiológico y de comunidad (A1-S-8382, 2019-2021). Financiación: Consejo Nacional de

Ciencia y Tecnología (México; 75,000.00€). Duración: 2019-2021. PI: JM Sandoval (UABC).

- 6. Proyecto:** ABBACO - Environmental Restoration of Bagnoli-Coroglio Bay (Restauro Ambientale e Balneabilità del SIN Bagnoli-Coroglio). Financiación: Italian Ministry of Education, University and Research – Special Integrative Funds for research (determina CIPE - GU n.56 8.3.2017): €2,000,000 (MIUR contribution) plus €1,700,000 (Stazione Zoologica Anton Dohrn co-financing contribution). PI: L. Musco & V. Saggiomo (SZN). Duración: 2017-2020.

WP4: Holistic approach to the study of multiple stress and risk reduction. PI: I Bertocci I & E Tosti (SZN).

WP5: Pilot studies of restoration and rehabilitation. PI: G Procaccini (SZN).

- 7. Proyecto:** UMBRAL - Respuestas de la vegetación marina bentónica al estrés: transiciones críticas, resiliencia y oportunidades de gestión. análisis experimental y validación extensiva (CTM2017-86695-C3-2-R). Financiación: Ministerio de Ciencia, Innovación y Universidades (106.843,00€). Duración: 2018-2020. PI(sub-project 3): JM Ruiz (IEO).
- 8. Proyecto:** SEASTRESS - Application of molecular tools for detecting early signals of stress in Israeli and Italian seagrass species. Financiación: Israeli-Italian Scientific & Technological Cooperation Programme – Italian Ministry of Foreign Affairs and International Cooperation (201,955.85 €). Duración: 2018-2019. Italian PI: G. Procaccini (SZN).
- 9. Proyecto:** EPICSEA – Role of Epigenetic Mutations in Plastic Response. Comparison between southern and north hemisphere seagrass species. Financiación: Extra-European Scientific Research & Cooperation Programme - Stazione Zoologica Anton Dohrn (20,000.00€). Duración: 2018-2019. PI: G. Procaccini (SZN).
- 10. Proyecto:** RECCAM - Resiliencia de las praderas de angiospermas marinas al calentamiento global: un análisis basado en respuestas ecofisiológicas, poblacionales y ecosistémicas (CTM2013-48027-C3-2-R). Financiación: Ministerio de Economía y Competitividad. Programa Nacional de Ciencias y Tecnologías Medioambientales (52,000.00€). Duración: 01/01/2014 - 31/12/2017. PI: Juan M Ruiz (IEO).
- 11. Proyecto:** HEATSTRESS - Tolerance to HEAT stress induced by climate change in the seagrass *Posidonia oceanica* (FP7-PEOPLE-2013-624035). Financiación: European Commission (249,242.80€). Duración: 2014-2016. PI: **L. Marín-Guirao** & G. Procaccini

C.3. Contratos, méritos de transferencia

- Characterization of *Posidonia oceanica* meadows in the Island of Salina: Establishment of a long term monitoring network. Financiación: Blue Marine Foundation (20,000.00€). Duración: 2018. PI: G. Procaccini & **L. Marín-Guirao**.
- Informe sobre el uso del agua industrial. Tipo de contrato: Universidad-Empresa (Recursos hídricos de Cartagena S.L.; 2,950.00€). Universidad de Murcia, Grupo de Ecología Acuática. Duración: 01/03/2011 - 01/05/2011. PI: A. Marín
- Caracterización de la pradera de *Posidonia oceanica* próxima a la granja de peces de Culmarex S.A. situada en Águilas. Tipo de contrato: Universidad-Empresa (Culmarex S.A.) (2,950.00€). Universidad de Murcia, Grupo de Ecología Acuática. Duración: 13/11/2009 - 13/11/2010. PI: A. Marín.

C.5. Afiliaciones y acreditaciones

- Investigador asociado a la Stazione Zoologica Anton Dohrn de Nápoles (Italia) desde 2019 hasta la actualidad.
- Miembro del Grupo nacional de expertos en hábitats de angiospermas marinas en el ámbito de la Directiva Marco sobre la Estrategia Marina (*Directiva 2008/56/CE*) desde 2019 hasta la actualidad.

C.6. Evaluaciones externas

Evaluador en revistas científicas internacionales indexadas (ISI): Global Change Biology, PeerJ, New Phytologist, Marine Environmental Research, Marine Pollution Bulletin, Biological Invasions, Marine Ecology Progress Series, Chemistry and Ecology, Environmental Science and Pollution Research, Regional Studies in Marine Science, Scientific Reports, Journal of Sea Research, Hydrobiologia, Aquatic Botany, Environmental and Experimental Botany...