Andrea Lira Loarca

PhD. Civil Engineering

Education

March 2016 - July 2019 **PhD Programme in Biogeochemical Fluid Dynamics and their Applications**, *University of Granada, Spain. Co-tutelle with University of Parma (Italy)*, PhD Programme of Architecture and Engineering.

Thesis: Experimental and analytical study of the hydrodynamics on an OWC device
Supervisors: Asunción Baquerizo Azofra and Sandro G. Longo

2014–2015 **MSc. in Environmental Hydraulics with specialization in Integral Management of Ports and Coastal Zones**, *University of Granada, Spain. First class honours*.

Master Thesis: Experimental study of a hybrid wind-wave WEC system with floating structure subjected to the action of wind and waves
Supervisors: María Clavero Gilabert & Miguel A. Losada Rodríguez

2007–2013 **MSc. Civil Engineering**, *(Ingeniería de Caminos, Canales y Puertos). University of Granada, Spain. Second class honours (2:1)*.

2012–2013 - Thesis: Identification and classification of shoreline undulations patterns: a European database. Published at the University of Granada Digital Repository (in Spanish): http://digibug.ugr.es/handle/10481/32329
Supervisors: Alejandro López Ruiz, Miguel A. Losada Rodríguez y Miguel Ortega Sánchez

Experience

June 2020 - **Postdoctoral researcher**, *MeteOcean Research Group*, University of Genova, Italy.

- Implementation, optimization and validation of meteocean forecasting chain in the Tyrrhenian sea using WaveWatch III and Delft3D.
- Wave climate characterization in the upper Tyrrhenian Sea under climate change scenarios.

Aug. 2019 - May 2020 **Postdoctoral researcher**, *Environmental Fluid Dynamics Group*, Andalusian Institute for Earth System Research (IISTA), University of Granada, Spain.

- Maritime climate time series simulations under climate change scenarios.
- Wave, currents and tide analysis using numerical models (Delft3D).

Sep. 2015 - July 2019 **Researcher**, *Environmental Fluid Dynamics Group*, Andalusian Institute for Earth System Research (IISTA), University of Granada, Spain.

- Analysis of climate change impacts on coastal areas. Extreme wave climate analysis.
- Development of tools for the calculation and optimization of port operations.
- Experimental work on wave, wind and currents flume. Water level and pressure measurements.

Sep. 2014 - Aug. 2015 **Researcher in training**, *Environmental Fluid Dynamics Group*, Andalusian Institute for Earth System Research (IISTA), University of Granada, Spain.

- Experimental setup, scale-models design and modelling in a wave flume and wind tunnel.
- Data analysis and related statistics of experimental data.
- Motion analysis using digital image processing.

Research stays

Sept. 2018 – Feb. 2019 **Research stay at University of Parma, Italy**, *Department of Engineering and Architecture*.

- Analysis of wind and wind-driven sea waves impacts on the hydrodynamics of an OWC device.

Sept. 2017 – Feb. 2018 **Research stay at University of Parma, Italy**, *Department of Engineering and Architecture*.

- Data analysis and related statistics of experimental data.
- Experience on experimental setup and scale-models design.
- Knowledge of specific instrumentation in a laboratory: Pitot-Prandtl tube, resistance probes for water level measurements, laser doppler velocimetry LDV, Particle Image Velocimetry PIV.

Publications

Peer-reviewed journal papers

A. Lira-Loarca, M. Cobos, G. Besio, and A. Baquerizo, "Projected wave climate temporal variability due to climate change," *Stochastic Environmental Research and Risk Assessment*, under review.

P. Magaña, J. Del-Rosal-Salido, M. Cobos, **A. Lira-Loarca**, and M. Ortega-Sánchez, "Approaching Software Engineering for Marine Sciences: A Single Development Process for Multiple End-User Applications," *Journal of Marine Science and Engineering*, vol. 8, p. 350, May 2020.

A. Lira-Loarca, M. Cobos, M. Ángel Losada, and A. Baquerizo, "Storm characterization and simulation for damage evolution models of maritime structures," *Coastal Engineering*, vol. 156, p. 103620, 2020.

A. Lira-Loarca, A. Baquerizo, and S. Longo, "Interaction of swell and sea waves with partially reflective structures for possible engineering applications," *Journal of Marine Science and Engineering*, vol. 7, no. 2, 2019.

M. Jalón, **A. Lira-Loarca**, A. Baquerizo, and M. Losada, "An analytical model for oblique wave interaction with a partially reflective harbor structure," *Coastal Engineering*, vol. 143, pp. 38 – 49, 2019.

F. Addona, **A. Lira-Loarca**, L. Chiapponi, M. Losada, and S. Longo, "The Reynolds wave shear stress in partially reflected waves," *Coastal Engineering*, vol. 138, pp. 220 – 226, 2018.

A. López-Ruiz, R. J. Bergillos, **A. Lira-Loarca**, and M. Ortega-Sánchez, "A methodology for the long-term simulation and uncertainty analysis of the operational lifetime performance of wave energy converter arrays," *Energy*, vol. 153, pp. 126 – 135, 2018.

P. Magaña, A. López-Ruiz, **A. Lira**, M. Ortega-Sánchez, and M. A. Losada, "A public, open Western Europe database of shoreline undulations based on imagery," *Applied Geography*, vol. 55, pp. 278–291, Dec. 2014.

Chapters in Books

M. Cobos, **A. Lira-Loarca**, G. Christakos, and A. Baquerizo, *Theory and Applications of Time Series Analysis. ITISE 2018. Contributions to Statistics.*, ch. Storm Characterization Using a BME Approach. Springer Nature Switzerland.

International peer-reviewed conferences

M. Bermúdez, A. Millares, **A. Lira-Loarca**, and A. Baquerizo, "Towards sustainable sediment management strategies in Mediterranean reservoirs: Insights from the Guadalfeo semi-arid river basin," in *Proceedings of the 10th Conference on Fluvial Hydraulics*, (Delft, Netherlands (virtual conference)), 2020.

A. Lira-Loarca, M. Cobos, A. Millares, G. Besio, and A. Baquerizo, "Integrated extreme sea level events in the mediterranean coast of spain," in *Proceedings of the EGU General Assembly 2020*, 2020.

C. Photiadou, L. Little, P. Berg, R. Pimentel, M. J. Polo, T. Sonnenborg, E. Pasten-Zapata, V. Andréassian, J. Lückenkötter, P. Kruse, D. Leidinger, A. Huber, S. Achleitner, **A. Lira-Loarca**, and B. Arheimer, "Best practises and lessons learnt from AQUACLEW," in *Proceedings of the EGU General Assembly 2020*, 2020.

H. J. Henriksen, E. Pasten-Zapata, P. Berg, R. Pimentel, G. Thirel, **A. Lira-Loarca**, and C. Photiadou, "Expert elicitation as tool for climate and hydrological model uncertainty reduction," in *Proceedings of the EGU General Assembly 2020*, 2020.

R. Pimentel, M. J. Polo, M. J. Pérez-Palazón, S. Achleitner, M. Díez-Minguito, A. Huber, P. Kruse, **A. Lira**, J. Lückenkötter, and M.-H. Ramos, "Assessing the role of a priori user knowledge in climate services perception: An experiment with university students across europe," in *Proceedings of the EGU General Assembly 2020*, 2020.

A. Lira-Loarca, M. Cobos, G. Besio, and A. Baquerizo, "Coastal flooding due to extreme events in the mediterranean coast of spain," in *Proceedings of the International Conference on Regional Climate ICRC-CORDEX19*, (Beijing, China), 2019.

M. Cobos, **A. Lira-Loarca**, G. Christakos, and A. Baquerizo, "Storm characterization using a BME approach," in *Proceedings of the International Conference on Time Series and Forecasting ITISE*, (Granada, Spain), 2018.

A. Lira-Loarca, M. Cobos, A. Baquerizo, and M. A. Losada, "Multivariate forecasting of extreme wave climate and storm evolution," in *Proceedings of the International Conference on Time Series and Forecasting - ITISE*, (Granada, Spain), 2018.

A. Lira-Loarca, M. Cobos, A. Baquerizo, and M. A. Losada, "A multivariate statistical model to simulate storm evolution," in *Proceedings of the 36th International Conference on Coastal Engineering - ICCE*, (Baltimore, USA), 2018.

A. Lira-Loarca, M. Cobos, P. Magaña, A. Millares, and A. Baquerizo, "Integrated Statistical Modeling Framework of Maritime Data in a Climate Change Context: Application to MSc. Teaching," in *Proceedings of 10th International Conference on Education and New Learning Technologies - EDULEARN18*, (Palma de Mallorca, Spain), 2018.

A. Lira-Loarca, A. Baquerizo, and S. Longo, "Wind-wave interaction with a vertical semi-immersed barrier," in *Proceedings of 7th International Conference on the Application of*

Physical Modelling in Coastal and Port Engineering and Science - Coastlab18, (Santander, Spain), 2018.

A. López-Ruiz, P. Magaña, **A. Lira**, J. Gallego, and M. Ortega-Sánchez, "Databases of coastal features as an introduction to coastal engineering research," in *International Congress on Education, Innovation and Learning Technologies - ICEILT*, (Granada, Spain), 2015.

P. Magaña, A. López-Ruiz, **A. Lira**, J. Gallego, and M. Ortega-Sánchez, "Using cutting-edge technologies to motivate students to engineering research: the example of data mining," in *International Congress on Education, Innovation and Learning Technologies - ICEILT*, (Granada, Spain), 2015.

A. López-Ruiz, P. Magaña, **A. Lira**, and M. Ortega-Sánchez, "Exploring the potential of Google Earth for large-scale geographic studies: generating a database of coastal features," in *8th annual International Conference of Education, Research and Innovation - ICERI*, (Seville, Spain), 2015.

P. Magaña, A. López-Ruiz, **A. Lira**, and M. Ortega-Sánchez, "Data mining: how to make a research methodology attractive for students and engineering applications," in *8th annual International Conference of Education, Research and Innovation - ICERI*, (Seville, Spain), 2015.

Spanish peer-reviewed conferences

A. Lira-Loarca, A. Baquerizo, and M. A. Losada, "Un estudio sobre el control de la agitación en la dársena de Guadiaro en el Puerto de Málaga," in *XV Jornadas Españolas de Ingeniería de Costas y Puertos*, (Torremolinos, Málaga, España), 2019.

P. Magaña, J. Del-Rosal-Salido, M. Cobos, **A. Lira-Loarca**, and M. Ortega-Sánchez, "Desarrollo de software científico en el ámbito de la ingeniería de costas," in *XV Jornadas Españolas de Ingeniería de Costas y Puertos*, (Torremolinos, Málaga, España), 2019.

F. Addona, **A. Lira-Loarca**, L. Chiapponi, M. Clavero, M. A. Losada, and S. Longo, "Spatial variation of wave shear stresses, under partial reflection conditions. an experimental study," in *XXXVI Convegno Nazionale di Idraulica e Costruzioni Idrauliche*, (Ancona, Italia), 2018.

A. Lira-Loarca, F. Addona, M. Clavero, S. Longo, A. Baquerizo, and M. A. Losada, "Estudio experimental del transporte de cantidad de movimiento bajo la influencia de viento," in *XIV Jornadas Españolas de Ingeniería de Costas y Puertos*, (Alicante, España), 2017.

C. Zarzuelo, A. López-Ruiz, M. Díez-Minguito, **A. Lira-Loarca**, and M. Ortega-Sánchez, "Alteraciones en el flujo de energía mareal en las bahías por el impacto de nuevas construcciones: Bahía de Cádiz," in *XIV Jornadas Españolas de Ingeniería de Costas y Puertos*, (Alicante, España), 2017.

A. Lira-Loarca, M. Clavero, and M. A. Losada, "Canal de Interacción Atmósfera-Océano (CIAO)," in *I Jornadas de Investigadores en Formación*, (Granada, España), 2016.

M. Cobos, **A. Lira-Loarca**, P. Magaña, and A. Baquerizo, "Caracterización espacial del viento en el entorno portuario basada en técnicas estadísticas a partir de registros SIMAR," in *I Jornadas de Investigadores en Formación*, (Granada, España), 2016.

A. M. Jiménez-Robles, **A. Lira-Loarca**, C. Zarzuelo, and M. Ortega-Sánchez, "Modelado numérico en desembocaduras fluviales," in *I Jornadas de Investigadores en Formación*, (Granada, España), 2016.

A. Lira-Loarca, P. Magaña, A. López-Ruiz, M. Ortega-Sánchez, and M. A. Losada, "Ondulaciones en la línea de costa: un ejemplo de la potencialidad de Google Earth para estudios

costeros a gran escala," in *XIII Jornadas Españolas de Ingeniería de Costas y Puertos*, (Avilés, España), 2015.

S. Nieto, **A. Lira-Loarca**, M. Clavero, and M. A. Losada, "Canal de Interacción Atmósfera-Océano," in *XIII Jornadas Españolas de Ingeniería de Costas y Puertos*, (Avilés, España), 2015.

Other research activities

Research stays

Sep. 2018 - Feb. 2019 **Department of Engineering and Architecture**, *University of Parma, Italy*.

Sep. 2017 - Feb. 2018 **Department of Engineering and Architecture**, *University of Parma, Italy*.

Intellectual Property Rights (IPR) registry

June 2020 **SIMSTORM. Storm analysis and simulation**, *(Análisis y simulación de tormentas)*, M. Cobos, **A. Lira-Loarca**, P. Magaña, A. Baquerizo, M. Losada..

May 2016 **CORPORA. Tool for the analysis and simulation of port operations**, *(Herramienta para el cálculo de operatividad portuaria)*, **A. Lira-Loarca**, P. Magaña, M. Cobos, A. Baquerizo, M. Losada..

June 2015 **TESLA. Western Europe Shoreline Ondulations Database**, *(Base de datos de ondulaciones de la línea de costa en Europa occidental)*, **A. Lira-Loarca**, A. López-Ruiz, P. Magaña, M. Ortetga-Sánchez, M. Losada..

Reviewer

2020 **Climate**, MDPI, Basel, Switzerland.

2019 - 2020 **Journal of Marine Science and Engineering**, MDPI, Basel, Switzerland.

2019 - 2020 **Remote sensing**, MDPI, Basel, Switzerland.

Funding

Travel and expenses grant, *Full financial support to attend the International Conference on Regional Climate-CORDEX (ICRC-CORDEX 2019)*, 14-18 Oct. 2019, Beijing, China, awarded by Swedish Meteorological and Hydrological Institute (SMHI) and World Climate Research Programme (WCRP).

Research stay fellowship, *Department of Engineering and Architecture, University of Parma, Italy*, Dec. 2018 - Feb. 2019, awarded by ERASMUS+ EU-programme.

Research stay fellowship, *Department of Engineering and Architecture, University of Parma, Italy*, Sep. - Nov. 2018, awarded by the International Campus of Excellence in Marine Science CEIMAR.

Travel and expenses grant, *Full financial support to attend the CLIVAR-FIO Summer School on Past, present and Future Sea level changes and UNESCO/IOC ODC Training Course on Ocean Forecast Systems*, 25 June - 07 July 2018, Qingdao, China, awarded by CLIVAR (Climate and Ocean: Variability, Predictability and Change) - World Climate Research Programme (WCRP), Intergovernmental Oceanographic Commission (IOC) of UNESCO and The First Institute of Oceanography (FIO), China.

Research stay fellowship, *Department of Engineering and Architecture, University of Parma, Italy*, Dec. 2017 - Feb. 2018, awarded by ERASMUS+ EU-programme.

Research stay fellowship, *Department of Engineering and Architecture, University of Parma, Italy*, Sep. - Nov. 2017, awarded by the Programme of International Mobility of PhD students of the University of Granada, Spain.

Travel and expenses grant, *Full financial support to attend HYDRALAB+ Next Generation Researchers's Workshop, New Scaling issues in hydraulic models and optical measurement techniques.*, 17 - 20 Jan. 2017, Toulouse, France, awarded by the Hydralab+ Project and University of Hull, UK.

Teaching experience

2019-2020 **Planning and management**, *Block I: Reliability and Block II: Introduction to stochastic optimization*, Interuniversity Masters Program in Environmental Hydraulics, second semester.

2019-2020 **Foundations and applied methods in environmental hydraulics**, *Block I: Numerical methods and Block II: Statistical methods*, Interuniversity Masters Program in Environmental Hydraulics, first semester.

Participation in R+D Projects

Public Funding

ICCOAST,
Estudio de inundación y erosión en zonas costeras de Andalucía en un escenario de cambio climático (Flooding and erosion in coastal regions of Andalusia in a climate change scenario).

Funding organism: Andalusian Regional Government (Junta de Andalucía)
Duration: 2020 – 2021
Project director: Asunción Baquerizo Azofra
Funding received: 284.614,82 euros

PIRATES,
Multi-criteria analysis for physical and biotic risk assessment in estuaries.

Funding organism: Ministry of Economy, Industry and Competitiveness. Spanish Government
Duration: 2018 – 2020
Project director: Manuel Diez Minguito
Funding received: 96.679,00 euros

AQUACLEW-UGR,
Advancing quality of climate services for fluvial & coastal processes in Europe.

Funding organism: Ministry of Economy, Industry and Competitiveness. Spanish Government
Duration: 15/09/2017 – 15/09/2020
Project director: Asunción Baquerizo Azofra
Funding received: 96.000,00 euros

Recomendations for Maritime Works,
Redaction of the Recomendations for Maritime Works: Breakwaters (ROM 1.1).

Funding organism: Puertos del Estado. Spanish Government
Duration: 01/01/2012 – 01/01/2019
Project director: Miguel A. Losada
Funding received: 360.000,00 euros

Private Funding

Tools for the Simulation and Optimization of Port Operations Based on Probabilistic Methodologies.

Funding organism: UT FCC - Proes Consultores, S.A.
Duration: 01/09/2015 - 15/05/2016
Project director: Asunción Baquerizo Azofra
Funding received: 122.000,00 euros

UNDIGEN - Study of Ocean Wave Energy Extraction,
Activity III: Development of an experimental platform for the analysis, simulation and validation of offshore devices..

Funding organism: Abengoa Research S.L.
Duration: 11/03/2013 - 11/03/2016
Project director: Miguel A. Losada
Funding received: 120.000,00 euros

Courses and workshops

14-15 May 2019 Lisbon, Portugal — **Copernicus Marine Service Training Workshop for to Iberia-Biscay-Ireland region**, Organized by Copernicus Marine Service.

10-14 Sept. 2018 Pisa, Italy — **ERA4CS Summer School on Climate Services from the users' perspective**, Organized by ERA4CS (European Research Area for Climate Services) initiative of the Joint Programming Initiative (JPI Climate).

25-30 June 2018 Qingdao, China — **CLIVAR-FIO Summer School on Past, Present and Future Sea Level Changes**, Organized by CLIVAR (Climate and Ocean: Variability, Predictability and Change) part of the World Climate Research Programme (WCRP) & The First Institute of Oceanography (FIO), State Oceanic Administration (SOA), China .

2-7 July 2018 Qingdao, China — **UNESCO/IOC ODC Training Course On Ocean Forecast Systems**, Organized by the Intergovernmental Oceanographic Commission (IOC) of UNESCO & The First Institute of Oceanography (FIO), State Oceanic Administration (SOA), China .

13-15 Nov. 2017 Parma, Italy — **DualSPHysics Users Workshop**, Organized by the University of Parma. Italy; The University of Manchester, U.K.; Universidade de Vigo, Spain; Universiteit Gent - Flanders Hydraulics Research, Belgium. .

17-20 Jan. 2017 Toulouse, France — **HYDRALAB+ Next Generation Researchers' Workshop. "New Scaling issues in hydraulic models and optical measurement techniques"**, Organized by the HYDRALAB project (financed by EU Horizon 2020 Research and Innovation Programme).

15 March 2015 Madrid, Spain — **Technical seminary "Fluid Mechanics Technologies"**, Organized by Alava Ingenieros.

Languages

Spanish	Mother tongue	
English	Proficient user - C2	*Certificate of Proficiency in English (CPE)*
Italian	Independent user - B2	

French Independent user - B1 *Certificat de connaissance en langue Française - niveau B1*

Computer skills

Excellent command of MacOS, Linux, Windows, Microsoft Office, and Latex.

Advance knowledge of:

- Python, C++, Matlab
- WaveWatchIII, Delft3D
- AutoCAD 2D y 3D, Corel Draw, SketchUp
- ArcGIS, ArcView, QGIS