



Eduardo González-Gorbeña Eisenmann, Ph.D.

Marie Skłodowska-Curie Fellow – Project OpTiCA GA#: 748747

Nationality: Spanish

Campus Universitário de Gambelas, Ed. 7,

8005-139 Faro; Portugal

Tel.: +351 91511 3242;

E-mail: egeisenmann@ualg.pt, egge24@hotmail.com

[Linkedin](#), [Researchgate](#), [CNPq Lattes](#)

Education

- 12/2013 **Ph.D. in Ocean Engineering (Recognised in Portugal).**
Federal University of Rio de Janeiro, Rio de Janeiro; Brazil. Thesis title: An optimization model to maximize electrical energy generation from hydrodynamic currents. Advisors: Prof. [Raad Y. Qassim](#) and Prof. [Paulo C.C. Rosman](#). <http://www.oceanica.ufrj.br>
- 02/2009 **M.Sc. in Coastal and Port Engineering (Recognised in Brazil, and Portugal).**
University of Cantabria, Santander; Spain. Thesis title: Methodology to define surfability of waves. Advisor: [Javier López Lara](#). <http://www.ihcantabria.com>
- 02/2005 **B.Sc. in Environmental Engineering (Recognised in Spain, Brazil, and Portugal).**
Polytechnic University of Puerto Rico, San Juan; PR. <http://www.pupr.edu>

Continuous education

- /2019 **3D SolidWorks course.**
CIM-Polytechnic University of Catalonia (60 hr). [Course link](#).
- 02/2019-to date **Specialist's Degree in Numerical Simulation in Engineering with ANSYS.**
Polytechnic University of Madrid. Fluid dynamics specialisation, modules: Basic (20 ECTS) Multiphase (20 ECTS), Turbulence (10 ECTS), Turbomachinery (10 ECTS) and Fluids optimisation (10 ECTS). [Course link](#).

Professional Experience

- 10/2016-to date **University of Algarve, Centre for Marine and Environmental Research (CIMA).** Faro, Portugal.
Position: Invited Auxiliary Researcher - Marie Skłodowska-Curie Fellow. Involved in the following projects:
- 07/2017-06/2019 **OpTiCA – Optimisation of Tidal energy Converter Arrays.** This project aims to provide a significant contribution towards the understanding of (a) the effects of Tidal Energy Converters (TECs) interactions with the environment; (b) the capabilities and limitations of common strategies used for the numerical modelling of TECs; and (c) how to mathematically formulate optimisation models to solve the TEC array layout problem considering technical, socio-economic and environmental constraints. Funded by: H2020-MSCA-IF-EF-RI-2016 GA# 748747. Project coordinator: Eduardo G-Gorbeña. Supervisor: Óscar Ferreira. Project website: <http://www.msca-optica.eu>
- 08/2017-04/2021 **MONITOR - Multi-model investigation of tidal energy converter reliability.** Project objectives are to investigate the reliability of tidal energy converters and develop tools to increase it. The role of CIMA-UALG is to plan and coordinate fieldwork activities under; to collect and process the resulting data; and to publish the findings in a suitable format. Funded by: Interreg Atlantic Area – ERDF - EAPA333/2016. Project Coordinator: Dr. Michael Torgneri (Swansea University). Project website: <https://www.monitoratlantic.eu/>
- 10/2016-06/2019 **SCORE – Sustainability of using Ria Formosa Currents On Renewable Energy**

- production.** The general objective of SCORE is to examine a small-scale tidal current turbine (Evopod E1) to be deployed in a shallow-water estuarine environment, looking at both the impacts of the turbine on its environment and the effects of the flow conditions on the turbine. Funded: FCT-PTDC/AAG-TEC/1710/2014. Project coordinator: Dr. André Pacheco (UALG). Project website: <http://w3.ualg.pt/~ampacheco/Score/index.html>
- 01/2017-10/2017 **FLOWSPA - Floating Offshore Wind Support Platform Assembly.** The project objectives were to demonstrate the feasibility of floating offshore wind foundation structure (Starfloat™). Active participation in: set-up numerical simulations using both Orcaflex and Ansys Fluent, prototype construction and initial stability tests. Funded by: H2020-SMEINST-1-2016-2017 GA# 744518. Project Coordinator: Graeme MacKie (Ocenaflo Energy Ltd.). Project website: <http://www.oceanflowenergy.com/Starfloat-Technology.html>
- 09/2009-10/2016 **The Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering (COPPE/UFRJ).** Rio de Janeiro, Brazil.
Position: Marine renewable energy researcher and Coastal Engineer.
Participation in research and technical projects:
- 03/2014-10/2016 **Optimisation of hydrokinetic energy converter array layouts.** Postdoctoral research at the Department of Ocean Engineering. The objective of the research is to formulate mathematical constraint optimisation models for the turbine layout problem using surrogates based on numerical simulations. Tools: ANSYS Fluent, SisBaHiA®, Matlab, Surfer, Grapher, MS Office. Advisor: Prof. Paulo C.C. Rosman.
- 06/2015-10/2015 **Investigation of coastal erosion process in the district of Praia do Açú - RJ, and proposal for restoration actions (PENO-19213).** The project involved wave climate re-analysis over a period of 40 years to study the influence of Açú Port Facility in longshore drift patterns and extreme erosion events. Tasks: set-up, calibrate and validate wave propagation models, conduct wave induced sediment transport numerical simulations for scenarios pre and post port construction; calculate beach nourishment volumes; and propose shoreline stabilization measures. Tools: SisBaHiA®, Ref-Dif, SMC Tools, Matlab, Surfer, Grapher, MS Office. **Client: Prumo Logística S.A.** Project coordinator: Prof. Paulo C.C. Rosman.
- 08/2014-10/2015 **Hydrosedimentological Analysis and Data Collection for the Bridge Project between Salvador and Ilha de Itaparica, BA (PENO18126).** Tasks: 1) set-up, calibrate and validate hydromorphodynamic models to analyse environmental impacts of proposed bridge layouts; 2) wave propagation modelling to define wave forces on bridge piers. Tools: SisBaHiA®, Ref-Dif, SMC Tools, Matlab, Surfer, Grapher, MS Office. **Client: The State of Bahia Department of Transport Infrastructures (DERBA).** Project coordinator: Prof. Paulo C.C. Rosman.
- 06/2013-10/2015 **Numerical calculation of sedimentation rates in navigational channel for Brazilian main public port facilities (IVIG-16861).** Tasks: set-up, calibrate and validate hydromorphodynamic models to study sedimentation rates in navigational waterways. Tools: SisBaHiA®, Ref-Dif, SMC Tools, Matlab, Surfer, Grapher, MS Office. **Client: Secretariat of Ports of the Ministry of Transport of Brazil (SEP).** Project coordinator: Marcos Aurélio Vasconcelos de Freitas.
- 12/2011-10/2013 **Complementary Studies for Deployment Angra-3 Nuclear Power Plant, RJ (PENO-13378).** Tasks: set-up, calibrate and validate 3D hydrodynamic model of Ilha Grande and Sepetiba bays to investigate thermal plume recirculation; geometry optimisation of cooling water intake basin. Tools: SisBaHiA®, Surfer, Grapher, MS Office. **Client: Eletrobrás Termonuclear S.A.** Project coordinator: Prof. Paulo C.C. Rosman.
- 01/2012-03/2012 **Numerical Modelling Report of Sedimentological Processes Downstream of Jirau Hidroelectric Power Station, RO-BR (PENO-11920).** Jirau HPS (3750MW) placed at Rio Madeira. Tasks: set-up a 2DH coupled hydromorphodynamic model to simulate a 20 years

- period using 4 hydrograms after reservoir filling. The objectives of the study was to define critical regions of erosion and sedimentation. Tools: SisBaHiA®, Surfer, Grapher, MS Office. **Client: Energia Sustentável do Brasil S.A.** Project coordinator: Prof. Paulo C.C. Rosman.
- 12/2011 **Optimization of Systems for Electrical Energy Extraction from Tidal Currents (ATN/MC-11513-RG).** Tasks: set-up, calibrate and validate a hydrodynamic model to develop a tidal stream energy resource assessment; formulate a mathematical optimisation model using 1D analytical models considering geometric and economic constraints. Tools: SisBaHiA®, Matlab, Surfer, Grapher, MS Office. **Client: Inter-American Development Bank.** Project coordinator: Prof. Raad Y. Qassim.
- 06/2011-11/2011 **Coastal Hydrodynamic Modelling to Subside EIA-RIMA for Nutripetro Terminal, ES (PENO-14615).** Tasks: set-up, calibrate and validate a hydrodynamic model and wave propagation model. Tools: SisBaHiA®, Surfer, Grapher, MS Office. **Client: NutriPetro S.A.** Project coordinator: Prof. Paulo C.C. Rosman.
- 02/2010-08/2011 **Environmental Computational Modelling for Monitoring Dredge Activities in Ports of the RJ State (IVIG-12932):** Tasks: set-up, calibrate and validate a hydromorphodynamic model to analyse, using a Lagrangian sediment transport model, dredge and disposal plumes, and to delimitate regions and thickness of sediments depositions for the ports of Angra dos Reis, Itaguaí and Rio de Janeiro. Tools: SisBaHiA®, Surfer, Grapher, MS Office. **Client: Secretariat of Ports of the Ministry of Transport of Brazil (SEP).** Project coordinator: Prof. Paulo C.C. Rosman.
- 05/2011-11/2011 **Tidal Current Electricity Generation in São Marcos Bay: Pre-Site Mapping Techno-Economic Feasibility Assessment.** Preliminary cost and power output estimation for the implementation of a tidal energy farms at São Marcos Bay, MA-Brazil. Tasks: set-up, calibrate and validate a hydrodynamic model to develop a tidal stream energy resource assessment and identify hot spots for turbine arrays deployment; estimate power output for each area identified using an analytical model. Tools: SisBaHiA®, Matlab, Surfer, Grapher, MS Office. **Client: Vale S.A.** Project coordinator: Prof. Raad Y. Qassim.
- 09/2008-11/2008 **Santander Port Authority.** Santander, Spain.
Position: Coastal and Port Engineering. Three months internship as required for the completion of the master program. The tasks entrusted consisted in: review of environmental legislation relevant to port activities, actualization of the Environmental Norms, and statistical analysis study of generated waste during loading/unloading merchandise from ships. <http://www.puertosantander.es>
- 05/2006-08/2007 **Berkeley Energía Ltd.** Salamanca, Spain.
Position: Environmental Engineer for an uranium exploration project in the Iberian Peninsula. The main role was to manage the environmental department to ensure compliance with the environmental regulation of uranium exploration activities in the region. Specific tasks consisted in developing, before drilling activities, an environmental radioactive reconnaissance survey that included: γ radiation, radon exhalation, α and β radioactive analysis for surface and ground water; design and implementation of radioactive monitoring plans for drilling campaigns. <https://www.berkeleyenergia.com/>
- 03/2005-03/2006 **G.L. Morris Engineering.** San Juan, Puerto Rico.
Position: Environmental Engineer in a Civil Engineering consulting firm. My main duties were to coordinate environmental studies for water resources engineering projects, e.g.: EIA, sanitary survey, and cumulative impacts analysis for a 9 Mm³ earth dam reservoir; EIA review of a multi residential development; process design for a 14 mgd water filtration plant; and monitoring of a flooding, sedimentation, and erosion control plan for a residential

development. <http://www.gmaeng.com>

01/2002-03/2002 **Cambridge Mineral Resources Plc.** Aracena, Huelva; Spain.

Position: Field assistant. Geophysical and gravimetric studies. The principal responsibility entailed the development of a bedrock density map using data collected from field gravimetric measurements using an electronic gravimeter. The aim of this work was to locate a metal mineralization.

Languages

Languages: Spanish - native; English and Portuguese – proficient.

Software Skills

- Operating systems: Windows, Lynux.
- Programming: Matlab, Fortran, Python, Lingo.
- Computational softwares: ANSYS Inc. Fluent (www.ansys.com). Blade Element Momentum model using OpenFoam (www.openfoam.com). Orcina OrcaFlex (www.orcina.com). SisBaHiA® environmental hydrodynamics modelling system (www.sisbahia.coppe.ufrj.br). OpenTelemac-Mascaret (www.openmascaret.org). Delft3D (oss.deltares.nl/web/delft3d). MIKE Zero (www.mikebydhi.com). Ref-Dif – a phase-resolving parabolic refraction-diffraction model for ocean surface wave propagation.
- Data modelling, analysis and visualization software: [ParaView](#), [Grapher](#), [Surfer](#).

Skills with Surveying Equipment

RTK-DGPS, Single Beam echo-Sounder 200kHz, ADCPs: Nortek As Signature 1000 and Sontek 1.5MHz boat-mounted ADCPs, radiometer, gravimeter.

Other Skills

High level of communication skills (both oral and written), teamwork oriented, good field surveying experience and understanding interacting with international teams.

Experience with H2020 proposals writing.

Research Interests

Surrogate based optimization, mathematical optimization, machine learning, data mining and analysis, renewable energy, meteorology, climate change, teaching techniques, online learning tools, coastal and port engineering, mining engineering, CFD modelling, logistics and supply chain management, reservoir geomechanics, nearshore wave propagation models, water wave mechanics, nearshore hydrodynamics, coastal processes.

Awards

01/2017 **Marie Skłodowska-Curie Actions Individual Fellowship – EU Horizon 2020.**

Awarded to the best or most promising researchers of any nationality, for employment in EU Member States or Associated Countries.

11/2013 **COPPE 50 Anos Award**

Awarded to students of the Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering (COPPE) on the basis of exceptional academic achievement.

03/2012 **Nota 10 (DSc-10) Scholarship – Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ)**

Awarded to students on the basis of exceptional academic achievement from the state of Rio de Janeiro.

05/2004 **National Science Foundation – Polytechnic University of Puerto Rico - Computer Science,**

Engineering, and Mathematics Scholarships (CSEMS) Scholarship

Awarded to students on the basis of exceptional academic achievement.

License/Examinations

- 12/2008 Professional Engineering, P.E. # 21807 from the School of Engineers and Land Surveyors of Puerto Rico.
- 10/2005 Principles & Practice of Engineering/Environmental exam.

Publications**Journals**

- 05/2019 SEQUEIRA, C., PACHECO, A., GALEGO P., GONZÁLEZ-GORBEÑA, E., 2019. Analysis of the efficiency of wind turbine gearboxes using the temperature variable. *Renewable Energy*, 135:465-472. Doi: [10.1016/j.renene.2018.12.040](https://doi.org/10.1016/j.renene.2018.12.040)
- 03/2019 VARTDAL, J.T., QASSIM, R.Y., MOKLIEV, B., UDJUS, G., GONZÁLEZ-GORBEÑA, E., 2019. Tidal turbine farm electrical power cable optimal configuration problem identification via traveling salesman problem modeling approach. *Journal of Modern Power Systems and Clean Energy*, 7(2):289-296. Doi: [10.1007/s40565-018-0472-7](https://doi.org/10.1007/s40565-018-0472-7)
- 12/2018 GORBEÑA, E.G., PACHECO, A., PLOMARITIS, T., FERREIRA, Ó., SEQUEIRA, C. 2019. Estimating the optimum size of a tidal array at a multi-inlet system considering environmental and performance constraints. *Applied Energy*, 232:292-311. Doi: [10.1016/j.apenergy.2018.09.204](https://doi.org/10.1016/j.apenergy.2018.09.204)
- 09/2018 PACHECO, A., GORBEÑA, E.G., PLOMARITIS, T., GAREL, E., GONÇALVES, J., BENTES, L., MONTEIRO, P., AFONSO, C., OLIVEIRA, F., ZABEL, F., SEQUEIRA, C., 2018. Deployment of a floatable tidal turbine on a tidal lagoon system. *Energy*, 168:89-104. Doi: [10.1016/j.energy.2018.06.034](https://doi.org/10.1016/j.energy.2018.06.034)
- 02/2018 GORBEÑA, E.G., QASSIM, R.Y., ROSMAN, P.C.C., 2018. Multi-dimensional Optimisation of Tidal Energy Converters Array Layouts Considering Geometric, Economic and Environmental Constraints. *Renewable Energy*, 116(Part A):647-658. Doi: [10.1016/j.renene.2017.10.009](https://doi.org/10.1016/j.renene.2017.10.009)
- 05/2017 PACHECO, A., GORBEÑA, E., SEQUEIRA, C., 2017. An evaluation of offshore wind power production by floatable systems: a case study from SW Portugal. *Energy*, 137:239-250. Doi: [10.1016/j.energy.2017.04.149](https://doi.org/10.1016/j.energy.2017.04.149)
- 08/2016 GORBEÑA, E.G., QASSIM, R.Y., ROSMAN, P.C.C., 2016. Optimisation of hydrokinetic turbine array layouts via surrogate modelling. *Renewable Energy* 93:45-57. Doi: [10.1016/j.renene.2016.02.045](https://doi.org/10.1016/j.renene.2016.02.045)
- 03/2016 GORBEÑA, E.G., ROSMAN, P.C.C., 2016. About computational modelling in sub-grid scale of structures submerged in flows. *Revista Brasileira de Recursos Hídricos*, 21(1):209-221, (In Portuguese). Doi: [10.21168/rbrh.v21n1.p209-211](https://doi.org/10.21168/rbrh.v21n1.p209-211)
- 06/2015 GORBEÑA, E.G., ROSMAN, P.C.C., QASSIM, R.Y., 2015. Assessment of the tidal current energy resource in São Marcos Bay, Brazil. *Journal of Ocean Engineering and Marine Energy*, 1(4):421-433. Doi: [10.1007/s40722-015-0031-5](https://doi.org/10.1007/s40722-015-0031-5)
- 04/2015 GORBEÑA, E.G., WILSON JR.G., ROSMAN, P.C.C., QASSIM, R.Y., 2015. Influence in sediment dynamics due to tidal energy farms at São Marcos Bay, Ma. *Revista Brasileira de Recursos Hídricos*, 20(2):379-393 (In Portuguese). Doi: [10.21168/rbrh.v20n2.p379-393](https://doi.org/10.21168/rbrh.v20n2.p379-393)
- 01/2015 GORBEÑA, E.G., QASSIM, R.Y., ROSMAN, P.C.C., 2015. A Metamodel Simulation Based Optimisation Approach for the Tidal Turbine Location Problem. *Aquatic Science and Technology*, 3:33-58. Doi: [10.5296/ast.v3i1.6544](https://doi.org/10.5296/ast.v3i1.6544)

Congresses

- 06/2019 GORBEÑA, E.G., PACHECO, A., PLOMARITIS, T., FERREIRA, Ó., SEQUEIRA, C., Moura, T. 2019. Surrogate-based optimization of tidal turbine arrays: A case study for the Faro-Olhão Inlet. In proceedings of the International Conference On Computational Science, 12th 14th of June, Faro, Portugal.
- 12/2018 GORBEÑA, E. Marine Offshore Renewable Energy Team synergies with UK institutions. WavEC

- 06/2018 Annual Seminar, 4th December, Lisbon, Portugal. [Presentation](#).
 PACHECO, A., GORBEÑA, E., PLOMARITIS, T., SEQUEIRA, C. Lessons learned from E1 Evopod Tidal Energy Converter deployment at Ria Formosa, Portugal. 7th International Conference on Ocean Energy, Cherbourg, France, 2018. [Paper](#), [Presentation](#).
- 08/2017 GORBEÑA, E., PACHECO, A., SEQUEIRA, C. Assessing the Effects of Tidal Energy Converter Array Size on Hydrodynamics of Ria Formosa (Portugal). 12th European Wave and Tidal Energy Conference, 27th-31st August, Cork, Ireland. Paper, Poster.
- 10/2015 SIGAÚQUE, P.J., ROSMAN, P.C.C., GORBEÑA, E.G., 2015. Hydro-Sedimentological Modelling of Maputo Bay. Poster presentation, 9th Symposium of Western Indian Ocean Marine Science Association, held in Wild Coast Sun, South Africa, October 26-31, 2015.
- 08/2015 GORBEÑA, E.G., WILSON JR.G., ROSMAN, P.C.C., QASSIM, R.Y. Effects Of Hydrokinetic Energy Turbine Arrays On Sediment Transport At São Marcos Bay, Brazil. Poster presentation, 9th Symposium on River, Coastal and Estuarine Morphodynamics, RCEM, held in Iquitos City (Peru), from August 30 to September 3, 2015.

Other

- 12/2013 GORBEÑA, E.G., 2013. An optimization model to maximize electrical energy generation from hydrodynamic currents. PhD Thesis COPPE/UFRJ, Rio de Janeiro, RJ, Brazil (In Portuguese). http://www.oceanica.ufrj.br/intranet/teses/2013_Doutorando_Eduardo_Gonzalez_Gorbena_Eisenmann.pdf
- 12/2013 GORBEÑA, E.G., 2009. Methodology to define surfability of waves. MSc Thesis University of Cantabria, Santander, Cantabria, Spain (In Spanish). Doi: [10.13140/RG.2.1.2740.1049](https://doi.org/10.13140/RG.2.1.2740.1049)

Articles in elaboration process

PINTASSILGO, P., PACHECO, A., GONZÁLEZ-GORBEÑA, E., PLOMARITIS, T., SEQUEIRA, C., CALHAU, F. Economic feasibility for tidal energy production at a tidal lagoon, Ria Formosa, Portugal.

Editorial positions and peer review

Peer review: Applied Energy; Journal of Ocean Engineering and Marine Energy; International Journal of Marine Energy; Journal of Renewable and Sustainable Energy; Energy; Energy Conversion and Management; Journal of Cleaner Production; Applied Soft Computing; and Water.