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## Professional experience

**January 2016 - present:** Marie Curie post-doc researcher in SEDITRANS (Sediment transport in fluvial and coastal environment) under the project titled "Parallel numerical simulations of coastal flows". European Union Multi-ITN . University of Patras, Greece (http://www.seditrans.civil.upatras.gr).

**January 2016 - present:** external researcher at the Heat and Mass Transfer Technological Center (CTTC) in the Polytechnic University of Catalonia (UPC), Spain (http://cttc.upc.edu).

**January 2014 - present:** external researcher at Termo Fluids S.L., Terrassa, Spain. (http://www.termofluids.com).

**January 2009 - 2015:** researcher at the Heat and Mass Transfer Technological Center (CTTC) in the Polytechnic University of Catalonia (UPC), Spain (http://cttc.upc.edu).

## Education

**2012-2015** PhD at the Heat and Mass Transfer Technological Center from the Polytechnic University of Catalonia, Spain.

**2010-2011** *Master* in "Thermal Engineering: fundamentals, applications and simulations" at the Polytechnic University of Catalonia, Spain.

**2001-2008** *Bachelor of Science and Computational Scientist* at the Federico Santa Maria Technical University, Chile.

## Publications

### PhD thesis

[1] Heterogeneous parallel algorithms for Computational Fluid Dynamics on unstructured meshes. Final qualification: Cum Laude. Date: October 2nd 2015.
URL: http://www.tdx.cat/bitstream/handle/10803/323892/TGAOA1de1.pdf

## International Journal Papers

[2] X. Alvarez, A. Gorobets, F.-X. Trias, R. Borrell, **G. Oyarzun**, HPC2 - a fully-portable CFD solution for heterogeneous computing, Computers & Fluids. Submitted 2017.

[3] **G.Oyarzun**, R. Borrell, A. Gorobets, A. Oliva, Portable implementation model for CFD simulations. Application to hybrid CPU/GPU supercomputers. International Journal of Computational Fluid Dynamics. Available online 27 Oct 2017. DOI:10.1080/10618562.2017.1390084

[4] **G. Oyarzun,** R. Borrell, A. Gorobets, F. Mantovani, A. Oliva, Efficient CFD code implementation for the ARM-based Mont-Blanc architecture, Future Generation Computer Systems, Available online 20 Sept 2017. DOI:10.1016/j.future.2017.09.029

[5] R. Borrell, J. Chiva, O. Lehmkuhl, **G.Oyarzun**, I. Rodríguez, and A. Oliva. Optimising the Termofluids CFD code for petascale simulations. International Journal of Computational Fluid Dynamics Vol. 30 , Iss. 6, 2016. DOI: 10.1080/10618562.2016.1221503

[6] **G. Oyarzun**, R. Borrell, A. Gorobets and A. Oliva. "MPI-CUDA Sparse Matrix-Vector Multiplication for the Conjugate Gradient Method with an Approximate Inverse Preconditioner". Computers & Fluids, 92: 244-252, 2014. DOI: 10.1016/j.compfluid.2013.10.035

## Indexed conference proceedings

[7] **G. Oyarzun**, R. Borrell, F.X. Trias and A. Oliva. "Memory Aware Poisson Solver for Peta-Scale Simulations with one FFT Diagonalizable Direction", 2017 International Conference on High Performance Computing & Simulation (HPCS), IEEE explora, pp. 101-108. doi: 10.1109/HPCS.2017.26

[8] Gorobets A., Trias F.X., Borrell R.**, Oyarzun G**. and Oliva A. "Direct numerical simulation of turbulent flows with parallel algorithms for various computing architectures". 6$^{Th}$ European conference on computational fluid dynamics 2014.

[9] **G. Oyarzun,** R. Borrell, A. Gorobets, O. Lehmkuhl and A. Oliva. "Direct Numerical Simulation of Incompressible flows on unstructured meshes using hybrid CPU/GPU supercomputers". In Procedia Engineering, Volume 61, Pages 87-93, 2013. DOI:10.1016/j.proeng.2013.07.098

## HPC projects

I've participated in 9 competitive HPC projects from different institutions: (4) in the Greek Research & Technology Network (GRNET) , (1) in the Red Española de Supercomputación (RES), (3) in the Partnership for Advanced Computing in Europe (PRACE) and (1) in the Argonne Leadership Computing Facility (ALCF). Here there are 5 selected examples:

[10] Research & Development project 2010PA3748 in PRACE - Partnership for Advanced Computing in Europe; European Commission; Title: Extending the scalability and parallelization of SEDITRANS code to GPU architecture; Role: **Principal Investigator**; Start date: 01.05.2017; Duration: 12 months, SURFsara. (Amsterdam, Netherlands).

[11] Research & Development project CoastHPC in the Greek research & technology network (GRNET) ; Title: Parallel numerical simulations of coastal flows; Role: **Researcher**; Start date: 01.02.2017; Duration: 12 months, GRNET national HPC ARIS ( Athens, Greece).

[12] Research & Development project in Mont-Blanc project – European approach towards energy efficient high performance ; European Commission; Title: End-User group portability of Termofluids to Mont-Blanc prototypes ; Role: **Researcher**; Start date: 01.05.2014; Duration: still active. Barcelona Supercomputing Center (Barcelona, Spain).

[13] Research & Development project CTTCMF in ALCF – Argonne Leadership Computing Facility; Title: Advancement on the performance of a Multi-physic CFD code; Role: **Researcher**; Start date: 02.12.2014; Duration: 12 months. Supercomputer Vesta (Chicago, EEUU).

[14] Research & Development project FI-2014-2-0020 in RES – Spanish network of supercomputing; Spain; Title: Multi-physics coupled simulations: interaction of turbulence with radiation. Application to direct numerical simulation of turbulent Rayleigh-Bénard convection in a radiatively participating medium.; Role: **Researcher**; Start date: 01.07.2014; Duration: 8 month; Supercomputer: Minotauro at BSC (Barcelona, Spain).

## Grants and scholarships

Name of the scholarship: **Becas Conicyt Doctorate,** Issuing body: CONICYT (Chilean goverment), Date of credit: 01-01-2013, Duration: 3 years

Name of the scholarship: **Becas Conicyt Master,** Issuing body: CONICYT (Chilean goverment), Date of credit: 01-01-2010, Duration: 2 years

## Stays in foreign institutions

[15] **Universite Catholique d' Leuven** (Belgium), hosted by Prof. M. Papalexandris in the Multi-phase and reacting flows group, Institute of Mechanics, Materials and Civil Engineering. January-March 2017

[16] **Argonne National Laboratory** (EEUU), hosted by Prof. P. Messina, " The Argonne Training Program on Extreme-Scale Computing", August 2016.

## Teaching activities

[17] Course titled "**Computación de Alto Rendimiento aplicada a problemas de Dinámica de Fluidos Computacional".** XII Escuela de Ciencia de Materiales y Nanotecnología, July 31$^{sr}$ – August 4$^{th}$ 2017, UNAM campus Morelia, Mexico http://www.iim.unam.mx/ecmyn/index.html

## HPC Training

[18] Workshop on exascale and PRACE prototypes, Mont-Blanc End User group, Barcelona Supercomputing Center, May 19-20, 2014.

[19] Programming and tuning massively parallel systems (PUMPS) Summer School, Barcelona Supercomputing Center, July 8-12, 2013.

[20] Scientific Computing Advanced Training (SCAT), CTTC at Polytechnic University of Catalonia (UPC), Barcelona , Spain. May-December 2007.

## Conference participations

[21] **G. Oyarzun**, R. Borrell, F.X. Trias and A. Oliva. “Memory Aware Poisson Solver for Peta-Scale Simulations with one FFT Diagonalizable Direction”, 2017 International Conference on High Performance Computing & Simulation (HPCS), Genoa (Italy), July 17-21, 2017

[22] X. Alvarez, A. Gorobets, F.-X. Trias, R. Borrell, **G. Oyarzun**, "HPC2 - a fully-portable CFD solution for heterogeneous computing", In Parallel Computational Fluid Dynamics Conference, Strathclyde university, Glasgow (UK), May 15-17, 2017.

[23] **G. Oyarzun**, R. Borrell, A. Gorobets. “Hybrid portable cfd solution for incompressible turbulent flows”. XIV International seminar “ Mathematical models & modeling in laser - plasma processes & advanced science technologies”, Moscow (Russia), July 4-9, 2016.

[24] **G. Oyarzun**, R. Borrell, A. Gorobets, O. Lehmkuhl and A. Oliva. “LES unstructured finite volume CFD simulations engaging multiple accelerators”. In Parallel Computational Fluid Dynamics Conference, Montreal (Canada), May 17-20, 2015.

[25] Gorobets A., Trias F.X., Borrell R.**, Oyarzun G**. and Oliva A. “Direct numerical simulation of turbulent flows with parallel algorithms for various computing architectures”. 6$^{Th}$ European conference on computational fluid dynamics, Barcelona (Spain), 2014.

[26] **G. Oyarzun**, R. Borrell, A. Gorobets, O. Lehmkuhl and A. Oliva. “A hybrid MPI-CUDA Implementation of unstructured Navier-Stokes solver focusing on CG preconditioners”. In Parallel Computational Fluid Dynamics Conference, Trondheim (Norway), May 20-22, 2014.

[27] **G. Oyarzun,** R. Borrell, A. Gorobets, O. Lehmkuhl and A. Oliva. “Direct Numerical Simulation of Incompressible flows on unstructured meshes using hybrid CPU/GPU supercomputers”. In Parallel Computational Fluid Dynamics Conference, Changsha (China), May 20-24, 2013.

[28] **G. Oyarzun**, R. Borrell, O. Lehmkuhl, and A. Oliva. “Hybrid MPI-CUDA approximate inverse preconditioner”. In Parallel Computational Fluid Dynamics Conference, Atlanta (USA), May 21-25, 2012.

[29] R. Borrell, O. Lehmkuhl, F. X. Trias, **G. Oyarzun**, and A. Oliva. “FFT-based Poisson solver for large scale numerical simulations of incompressible flows”. In Parallel Computational Fluid Dynamics Conference, Barcelona (Spain), May 16-20, 2011.