

curriculum vitae

Luca Arpaia

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Date of birth: Bari (Italy), xxxxxx

Citizenship: Italian

Work experience

Oct/2017-Now

Research-engineer at BRGM (French Geological Survey)/Coastal Risk and Climate Change Unit, Orleans.

Since I have been working at BRGM, I contributed to two international research projects: the INTERREG Carib-coast (<https://www.carib-coast.com/>) on large scale simulations of tsunami and storm surge and the H2020 Narsis (<http://www.narsis.eu/>) on probabilistic tsunami hazard assessment. I have also worked on two main consulting studies for the french public policy: Life-Adapto (<https://www.lifeadapto.eu/>) and Hydrosedmar (<https://hydrosedmar.brgm.fr/>). I am currently co-developing within a partnership INRIA-CNRS-BRGM a discontinuous finite element model for nearshore wave modelling and flooding applications. Here a reference:

<https://hal-insu.archives-ouvertes.fr/hal-01824108/>.

Jen/2019-Apr/2019

Teacher-assistant at ESTACA (Engineering School). Saint Quentin en Yvelines. Lecture title: "Numerical tools for scientific modelling".

Mar/2014-Sep/2017

PhD in informatics and applied mathematics at INRIA Bordeaux Sud-Ouest/UNIVERSIT DE BORDEAUX. Thesis title: "Adaptive and robust tools for the numerical simulation of free surface waves".

http://www.magest.u-bordeaux1.fr/indiv/bonneton/Divers/these_LucaArpaia.pdf

Abstract: In this thesis we implement the Shallow Water equations (SWEs) on unstructured grids in order to simulate free surface flow over irregular bathymetries, wetting/drying and other complex phenomena that typically occur in hydrodynamic applications. In particular we accurately simulate tsunami events, from large scale wave propagation up to localized runup. To this aim we use two methods that are extensively compared along the manuscript: the Finite Volume method, which is very popular in the hydrodynamics and hydraulic community and a more recent technique called Residual Distribution which belongs to the class of multidimensional upwind schemes. To enhance the resolution of important flow feature such as bore development or small scale flooding, we use a dynamic mesh adaptation based on a redistribution of mesh nodes or r -adaptation (r - stands for relocation). The proper combination of this method with the flow solver is usually referred to as Moving Mesh Method. Among the many different moving mesh algorithms available we propose an Arbitrary Lagrangian Eulerian (ALE) form of the SWEs which elegantly permits to evolve the flow variables from one mesh to the updated one.

May/2016

Visiting student at LABORATOIRE D'HYDRAULIC SAINT-VENANT, lectricit de France R&D, Chatou.

Education

Sep/2009-Jul/2013

MSc in Aeronautical Engineering at POLITECNICO DI MILANO. GPA: 102/110.

Mar/2012-Oct/2012

Internship at INRIA Bordeaux Sud-Ouest.

Feb/2011-Jul/2011

Student Exchange Program at ISRAEL INSTITUTE OF TECHNOLOGY.

Sep/2006-Sep/2009

BSc in Aerospace Engineering at POLITECNICO DI MILANO. GPA: 98/110.

Jul/2006

High school diploma at Liceo Scientifico E.FERMI, Bari. GPA: 100/100.

Personal skills and competences

Mother tongue

Italian

Other tongues

English: 2004 FCE, 2008 TOEFL.

French.

Computer Skills

OS: Windows, Linux. Programming Languages: Fortran, C, C++, Matlab, Python

Publications

[under review] L. A., H. Beaugendre, L. Cirrottola, A. Froehly, M. Lorini, L. Nouveau and Mario Ricchiuto. h-and r-adaptation on simplicial meshes using MMG tools. Chapter in SEMA-SIMAI Springer Series - Oubay Hassan 60th birthday.

preprint <https://www.math.u-bordeaux.fr/~mricchiu/cardamom.pdf>

[1] L.A and M. Ricchiuto. Well balanced residual distribution for the ALE spherical shallow water equations on moving adaptive meshes. *Journal of Computational Physics* 405 109173, 2020. <https://doi.org/10.1016/j.jcp.2019.109173>

[2] A.G. Filippini, L. A., P. Bonneton and M. Ricchiuto. Modeling analysis of tidal bore formation in convergent estuaries. *Eur. J. Mech. B Fluids*, 73 55-68, 2018. <https://doi.org/10.1016/j.euromechflu.2018.01.001>

[3] L. A. and M. Ricchiuto. r-adaptation for Shallow Water flows: conservation, well balancedness, efficiency. *Computers and Fluids* 160 175-203, 2017. <https://doi.org/10.1016/j.compfluid.2017.10.026>

[4] P. Bonneton, A.G.Filippini, L. A., N. Bonneton and M. Ricchiuto. Conditions for tidal bore formation in convergent alluvial estuaries. *Estuarine, Coastal and Shelf Science*. 172, 121-127, 2016. <https://www.sciencedirect.com/science/article/pii/S0272771416300191>

[5] L. A., M. Ricchiuto and R. Abgrall. An ALE formulation for explicit Runge-Kutta Residual Distribution. *Journal of Scientific Computing*, 190(34):1467-1482, 2014. <https://doi.org/10.1007/s10915-014-9910-5>

Conferences

[1] L. A., M. Ricchiuto, A. Filippini and R. Pedreros. Well-Balanced Discontinuous galerkin scheme for the shallow water equations in spherical geometry for storm-surge applications. American Meteorological Society, 34th Conference on Hurricanes and Tropical Meteorology, May 2021 Virtual meeting.

- [2] L. A., M. Ricchiuto and R. Pedreros. Well-Balanced Discontinuous galerkin scheme for the shallow water equations in spherical geometry. World Congress on Computational Mechanics (WCCM-ECCOMAS), January 2021 Virtual meeting.
- [3] L. A., J. Rohmer, A. Lemoine and R. Pedreros. Rupture-based tsunami stochastic simulations SIAM Conference on Uncertainty Quantification, March 2020 Munich, Germany (canceled).
- [4] L. A., J. Rohmer, A. Lemoine and R. Pedreros. Computing initial waveforms for rupture-based tsunami stochastic simulations. Journee OpenTurns, June 2019 Paris, France.
- [5] L. A. and M. Ricchiuto. A Residual Distribution method for the Shallow Water equations in ALE framework on the sphere. European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS), June 2018 Glasgow, Scotland.
- [6] L. A. and M. Ricchiuto. ALE moving mesh tsunami simulations. Application to the case study of the Tohoku tsunami. SIAM Geoscience, September 2017 Erlangen, Germany.
- [7] L. A. and M. Ricchiuto. An ALE moving mesh method on the sphere for tsunami wave propagation and inundation. PDEs on the sphere 2017, Apr 2017 Paris, France.
- [8] L. A. and M. Ricchiuto, r-adaptation strategies for wave runup on complex bathymetries. European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS), Jun 2016 Crete Island, Greece.
- [9] L. A., A.G. Filippini, P. Bonneton and M. Ricchiuto, Modelling analysis of tidal bore formation in convergent estuaries. 36th International Association for Hydro-Environment Engineering and Research (IAHR) World Conference, Jun 2015 The Hague, Netherlands. 2015.
- [10] L. A. and M. Ricchiuto, Well Balanced ALE: on time dependent mesh adaptation for shallow water flows. GAMM 86th Annual Scientific Conference, Mar 2015 Lecce, Italy.
- [11] L. A. and M. Ricchiuto, Well-balanced ALE: a framework for time dependent mesh adaptation for the shallow water equations. SIAM Conference on Nonlinear Waves and Coherent Structures, Aug 2014 Cambridge, UK.
- [12] R. Abgrall, L. A. and M. Ricchiuto, ALE formulation for explicit Runge-Kutta Residual Distribution. Procs of Finite Volumes for Complex Applications VII, Jun 2014, Berlin; Fuhrmann, Ohlberger and Rohde Eds., Springer Proceedings in Mathematics and Statistics 77, 2014.

Technical Report

- [1] S. Lecacheux, L. A., R. Pedreros, D. Idier and J. Lousior, Numerical modelling of waves and 3D circulations in the Fort-de-France bay. Final Report BRGM/RP-69025-FR, 2019.

Consapevole che, ai sensi dell'art.76 del DPR 445/2000, le dichiarazioni mendaci, la falsità negli atti e l'uso di atti falsi sono punite ai sensi del Codice penale e delle leggi speciali vigenti in materia, dichiara sotto la propria responsabilità: che quanto dichiarato nel seguente curriculum vitae et studiorum comprensivo delle informazioni sulla produzione scientifica corrisponde a verità

Luca Arpaia

04/04/2021