



## Antonia Larese

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### RÉSUMÉ

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A.L. I am Associate Professor of Hydraulic and Maritime Constructions and Hydrology at the University of Padova, Italy (2021), Hans Fischer Fellow at the Technical University of Munich's Institute of Advanced Studies (TUM-IAS), Germany (2021), and Rita Levi Montalcini Fellow (2018). I hold an MSc in Civil Engineering from the University of Padova, Italy (2006), and an MSc in Numerical Methods (2011) and Ph.D. in Structural Analysis (2012) from the Technical University of Catalonia (UPC), Spain. From 2008 to 2018, I worked at the International Center for Numerical Methods in Engineering (CIMNE) in Barcelona and served as a part-time lecturer at UPC's Civil Engineering School. My doctoral thesis received UPC's Special Doctorate Award and was a finalist for SEMNI's best Ph.D. thesis in numerical methods. I've been awarded prestigious fellowships, including the Hans Fischer Fellowship from TUM-IAS (2021-2025), the Rita Levi Montalcini Fellowship (2018-2021), the Juan de la Cierva Incorporation Scholarship (2016-2018), and the PDJ Scholarship (2014-2016).

My research focuses on Computational Mechanics and Fluid Dynamics, particularly Coupled Problems and Multiphysics simulations. I employ various numerical approaches, from finite elements to continuum-based particle methods, in both Lagrangian and Eulerian frameworks. My work involves developing and combining numerical techniques for analyzing coupled problems in free surface flows, non-Newtonian materials, and fluid-structure interaction, including unfitted techniques.

I've authored 21 journal papers, over 60 proceedings in international conferences, 4 monographs and book chapters and numerous technical documents. I am the Editor-in-Chief of *Advances in Computational Science and Engineering* (ACSE), edited by AIMS. I've been involved in 18 national and 7 European competitive projects and several private consultancies. I've served as principal investigator (PI) for two European and 3 national competitive projects.

I've delivered 13 plenary or keynote lectures at international congresses and 11 invited seminars or lectures at top European Universities and research institute and have mentored 33 master or degree theses.

My teaching experience spans a decade at UPC, covering undergraduate and master's courses in Mechanics of Materials (2009-18), Structural Analysis (2009-18), Finite Elements (2008-18), and Communication Skills (2015-17). Since 2019, I've taught Linear Algebra, Numerical Analysis at the School of Industrial Engineering and Computer Science, and Numerical Methods for Continuous Systems at the Master of Mathematical Engineering of the University of Padova.

Lastly, I am one of the developers of Kratos Multiphysics open-source platform.

## EMPLOYMENT POSITIONS

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- October 2021 –* **a) Associate Professor in Hydraulic and Maritime Constructions and Hydrology**  
Università degli Studi di Padova (Italy). Department of Mathematics “Tullio Levi Civita”  
**b) Hans Fischer Fellow**  
Technical University of Munich, Institute for Advanced Studies, TUM-IAS, (Germany), Chair of Structural Analysis.
- Oct 2018 – Sep 2021* **Ricercatore a tempo determinato RTBb - Assistant Professor (Rita Levi Montalcini Professorship) in Hydraulic and Maritime Constructions and Hydrology at UNIPD**  
Department of Mathematics “Tullio Levi Civita”, Università degli Studi di Padova (Italy).
- Jul 2015 – Jun 2016* **Personal Doctor Junior PDJ - Junior Professor, postdoc fellowship at UPC**  
Civil Engineering School of the Universitat Politècnica de Catalunya, UPC BarcelonaTech, Barcelona, Spain
- Sep 2013 – Jul 2015* **Associated lecturer at UPC (professore a contratto)**  
Civil Engineering School of the Universitat Politècnica de Catalunya, UPC BarcelonaTech, Barcelona, Spain
- Sep 2008 – Ago 2013* **Teaching Assistant at UPC**  
Civil Engineering School of the Universitat Politècnica de Catalunya, UPC BarcelonaTech, Barcelona, Spain
- Sep 2008 – Sep 2018* **Scientist at CIMNE**  
International Center for Numerical Methods Engineering (CIMNE), Barcelona Spain. Internal positions hold:
  - 2008 - Affiliated Scientist (internal agreement with UPC)
  - 2013 - Scientist
  - 2014 - Assistant Research Professor
  - 2015 - Affiliated Scientist (internal agreement with UPC)
  - 2017 - Associate Research Professor and Juan de la Cierva fellow

## EDUCATION

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- 2012* **PhD in Structural Analysis**  
Title of the thesis: “A coupled Eulerian-PFEM model for the simulation of overtopping in rockfill dams”. Advisors: E. Oñate, R. Rossi; Civil Engineering School, Universitat Politècnica de Catalunya, UPC BarcelonaTech, Barcelona, Spain
  - Special Doctoral Award 2014 delivered by UPC BarcelonaTECH
  - Finalist for the award for the best PhD thesis discussed in Spain in 2012 issued by the Spanish Association for Numerical Methods in Engineering (SEMNI)
  - Title homologated in Italy (2018) to Dottore di Ricerca
- 2011* **Máster en Métodos Numéricos para Cálculo y Diseño en Ingeniería**  
Title of the thesis: “Development of a numerical algorithm to simulate free surface problems in a variable porosity medium. An application to the analysis of flow-through rockfill dams”  
Fundació Politècnica de Catalunya, Barcelona, Spain

- 2006 **MSc in Civil Engineering (five years degree)**  
 Title of the thesis: "On the application of the Particle Finite Element Method (PFEM) in Civil Engineering" Thesis developed at CIMNE during an Erasmus interchange (Nov 2005 - Mar 2006).  
 Civil Engineering School, Università degli Studi di Padova, Padova, Italy and CIMNE, Barcelona, Spain Advisors: R. Scotta and E. Oñate (CIMNE)  
 • Final Mark: 110/110 cum laude e menzione al merito (special mention of the evaluation committee for the curriculum studiorum)  
 • Title homologated in Spain (2011) to the Spanish Ingeniero de Caminos Canales y Puertos
- 2000 **High School scientific degree**  
 Liceo scientifico A. Einstein, Piove di Sacco, Padova, Italy  
 • Final Mark: 100/100.

## AWARDS & FELLOWSHIPS

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- 01/10/2021 – present Hans Fischer Fellowship of TUM-IAS Fellow of the TUM institute for Advanced Studies, Munich, Germany.
- 01/10/2018 – 30/09/2021 Rita Levi Montalcini young researcher (Ranked 1st in engineering and architecture fields). Issued by the Italian Ministry of Research and University MIUR;
- 19/06/2017 – 30/09/2018 Juan de la Cierva Incorporación – (Ranked 1st in Civil Engineering) Post doctoral Grant issued by the Spanish Ministry;
- 01/07/2015 – 18/06/2017 PDJ2014 – (Ranked 1st in Civil Engineering) postdoctoral grant from the Catalanian regional government;
- 2014 Special Doctoral Award 2014 delivered by UPC BarcelonaTECH for the PhD thesis "A coupled Eulerian-PFEM model for the simulation of overtopping in rockfill dams";
- 2012 Finalist for the award for the best PhD thesis discussed in Spain in 2012 issued by the Spanish Association for Numerical Methods in Engineering (SEMNI);
- 2009 Outstanding Paper Award 2009 delivered by EMERALD for the paper "Validation of the Particle Finite Element Method (PFEM) for simulation of free surface flows".
- 05/2010 – 08/2010 Mobility scholarship Issuing body: Spanish Ministry of Science and Education
- 11/2006 – 08/2008 Beca predoctoral UPC recerca (UPC research doctoral grant) Issuing body: UPC
- 06/2006 – 10/2006 CIMNE scholarship Centre Internacional de Mètodes Numèrics en Enginyeria (CIMNE)

## HABILITATIONS

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- 12/11/2024 Italian habilitation to "Professore di I fascia" (Full Professor) in SC 08/A1 Hydraulic, Hydrology, Hydraulic and Maritime Constructions ICAR02
- 12/11/2024 Italian habilitation to "Professore di I fascia" (Full Professor) in SC 08/B2 Strength of Materials and Theory of Structures ICAR08
- 04/2018 Italian habilitation to "Professore di II fascia" (Associate Professor) in SC 08/A1 Hydraulic, Hydrology, Hydraulic and Maritime Constructions ICAR02
- 10/2018 Italian habilitation to "Professore di II fascia" (Associate Professor) in SC 08/B2 Strength of Materials and Theory of Structures ICAR08
- 2016 Spanish research habilitation necessary to apply to position of "Profesor Agregado" (Associate Professor) in 2016 by AQU (Spain)
- 2013 Spanish habilitation to "Profesor Lector" (Lecturer) by AQU (Spain)

**LANGUAGE SKILLS**

Language	Speaking	Understanding	Writing
Italian	Good	Good	Good
Spanish	Good	Good	Good
English	Good	Good	Good
French	Sufficient	Fair	-
Catalan	Sufficient	Good	Sufficient

**OUTREACH: INTERVIEWS  
AND VIDEOS**

- 03/2024 People of Math <https://www.youtube.com/watch?v=eBnFhDakgkA>
- 09/2023 Panelist at TriesteNEXT 2023 - Innovativa e green - la matematica fa bene alle imprese <https://www.triestenext.it/tc-events/innovativa-e-green-la-matematica-fa-bene-alle-imprese/>
- 05/2023 Interview at TUM-IAS, Germany <https://youtu.be/Lr1aGXO0ef0>

## SCIENTIFIC EXPERIENCE

### RESEARCH INTERESTS

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- Computational Mechanics;
- Computational Fluid Dynamics (CFD);
- Coupled Problems;
- Fluid Structure Interaction (FSI);
- Embedded/Immersed techniques for FSI;
- Particle methods;
- Non-Newtonian materials;

### PROJECTS

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#### INTERNATIONAL PROJECTS

1. MONUGEO- Modern numerical methods for high-fidelity simulation of geohazards. HORIZON-MSCA-2023-SE-01 - G.A. n. 101182721 01/03/2025-28/02/2029 - 1.269.600€ (Head of Unit).
2. ETP4HPC - European Technology Platform for High Performance Computing - European Research Networks 2024-26 <https://etp4hpc.eu/>
3. REACT- Digital Twins Of Civil StRucturEs And Protection Systems In A ClimAte Change PerspecTive. TUM-IAS, Munich, Germany 80.000€ plus a German Ph.D. scholarship 01/10/2021-30/09/2024 (PI of the project).
4. ExaQute- EXAscale Quantification of Uncertainties for Technology and Science Simulation. PI:R. Rossi, REA Ref H2020 FET-Future & emerging technologies G.A.n° 800898, 698.500,00 € 01/06/2018-31/05/2021.
5. T-MAPPP - Training in Multiscale Analysis of multi-Phase Particulate Processes Scientific coordinators: Larese, A.; Oñate, E.. REA, Ref: FP7 PEOPLE 2013 ITN–Grant Agreement n°607453, 324.273Eur, 14/03/2014. 14/03/2018 (WP leader)
6. TCAiNMaND - Tri Continental Alliance in Numerical Methods applied to Natural Disasters FP7-PEOPLE-2013-IRSES, Ref.: FP7- 612607, 235.200Eur, 01/01/2014 – 31/12/2017 (PI of the project)
7. FLOODSAFE - Assessment and Initial Steps for the Exploitation of a Simulation Software for the Study and Mitigation of the Effect of Floods on Constructions and Landscape REC Ref:ERC-PoC-2014 AdG n: 267521, 149.856Eur, 1/9/2015 – 31/8/2016
8. ULITES - Ultra-lightweight structures with integrated photovoltaic solar cells: design, analysis, testing and application to an emergency shelter prototype PI: Rossi, R. REA Ref: Program FP7-SME-2012 – Grant Agreement n°: 314891, 324.273Eur. 07/01/2013. 07/01/2015 (WP leader).
9. SAFECON - New Computational Methods for Predicting the security of constructions to Water Hazards accounting for fluid-soil-structure interactions. Scientific coordinator: Oñate, E. REC Ref: FP7 – Ideas (Advanced Grant) - Grant Agreement n°: 267521, 2.487.734Eur, 01/01/2011. 31/12/2015.

#### NATIONAL PROJECTS

1. HydroROM - Reduced order models of hydraulic protection systems for extreme water hazards - MUR-PNRR PRIN2022 2022PXYK5: 28/09/2023-27/09/2025; (PI of the project);
2. RETURN - multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate - MUR-PNRR Extended Partnership PE3 on Natural Risks Next-GenerationEU D.D. 1243 2/8/2022, PE0000005: 01/10/2021-31/03/2026;
3. iNEST - Interconnected Nord Est Innovation System (Spoke 9)- MUR-PNRR Ecosistema dell'Innovazione 01/10/2021-31/03/2026;

4. NEMESIS - NumERical MEthods for the Simulation of the impact of extreme hazards on Structures and landscape - University of Padova 39,376.70Eur 18/11/2020-31/05/2023 (PI of the project);
5. PITON - Particle-fluid-structure-InTeractiOn in Natural hazards – MIUR (Rita Levi Montalcini Project) – 215.173,66Eur – 01/10/2018-30/09/2021 (PI of the project);
6. GNCS2020 - Interpolazione e smoothing: aspetti teorici, computazionali e applicativi con un'enfasi all'elaborazione di immagini e all'analisi dei dati - Progetto GNCS2020-INdAM 09/03/2020-08/03/2021;
7. PRECISE - Numerical methods for PREdicting the behaviour of Civil StructurEs under water natural hazards – MINECO - BIA2017-83805-R – 125.000Eur- 01/01/2018 – 31/12/2020 (PI of the project);
8. EUIN2017 - Development of the ERC Starting Grant Proposal – MINECO - Europa Investigación EUIN 87969 – 10000Eur - 01/11/2017 -28/02/2018 (PI of the project);
9. HIRMA – Development and validation of a tool for defining the failure hydrogram in embankment dams considering the specific geomechanics MINECO – Ref. RTC – 2016-4967-5, 176 024Eur 01/09/2016- 31/08/2019;
10. ACOMBO - Development of a computational code for the analysis of thermo-mechanical behavior of arch dams MINECO, Ref: RTC-2015-3794-5, 194.723Eur, 01/09/2015 - 31/08/2018;
11. DIABLO - Development of an optimized code for the design of spillways with wedge-shaped blocks MINECO, Ref: RTC-2014-2081-5, 183.761Eur, 01/09/2014 - 31/12/2017;
12. VOLADAPT – New efficient and effective blasting process, in the sense of use of resources and raw materials, by predictive and adaptive techniques minimizing emission MINECO, Ref: RTC-2014-2237-5, 262.834Eur, 01/02/2014 - 31/12/2016
13. EACY - Enhanced accuracy computational and experimental framework for strain localization and failure mechanisms. M., MINECO Ref. MAT2013-48624-C2-1-P, 49.387Eur, 01/02/2014 - 31/12/2016
14. TIPSEN – BarcelonaKEY call for Projects
15. EDAMS – Numerical and experimental methods for the evaluation of safety and protection of embankment dams in overtopping scenarios Ref: BIA2010-21350-C03-01, 49.489Eur 01/10/2010. 01/10/2013
16. XPRES – Development of a method for the study of the failure process of overtopping rockfill dams by combining finite element and particle-based techniques. MEC, Ref: BIA2007-68120-C03-01, 179.080Eur, 01/10/2007. 01/10/2010
17. Ciudad Multidimensional LCM. Ciudad Multidimensional MEC Ref: Pyto: PSE-380000-2006-6, Subpto 27, 28, 140.013Eur, 01/01/2006.31/12/2009
18. STRUCT-LNG - Development of design tools for the structural calculation of liquefied gas transportation. MEC Ref: CIT-370300-2005-16, 76.526Eur, 01/01/2005. 31/12/2005

#### PRIVATE CONSULTING

1. ENI (20/07/2021-30/04/2022) Development of a mathematical and a numerical model to asses the sensitivity of the model of the channel to the material parameters and the geometry of the perforating well; PI M. Putti 50.000Eur;
2. ENI (03/05/2022-20/10/2022) Development of a model of a physical channel for high speed data tranfer through the mud column of a perforating well. PI M. Putti 79.928Eur;
3. CEPSA (2015-2017) Computational model for the simulation of enhanced oil recovery (EOR) laboratory experiments. Private consultancy;
4. Technical consulting for the Harbor of Barcelona for the failure of marine precast dike 01-06-2007 - 31-07-2007.

#### PUBLICATIONS

##### JOURNAL PAPERS

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21. Moreno-Martinez, L. Wüchner, R., Larese, A., A mixed stabilized MPM formulation for incompressible hyperelastic materials using Variational Subgrid-Scales Accepted by Computer Methods in Applied Mechanics and Engineering (2024)
20. Dehghan-Souraki, D., López-Gómez, D., Bladé-Castellet, E., Larese, A., Sanz-Ramos, M., Optimizing sediment transport models by using the Monte Carlo simulation and deep neural network (DNN): A case study of the Riba-Roja reservoir, Environmental Modelling & Software, 175 (2024) <https://doi.org/10.1016/j.envsoft.2024.105979>

19. Singer, V., Teschemacher, T., Larese, A., Wüchner, R., Bletzinger, K.-U., Lagrange multiplier imposition of non-conforming essential boundary conditions in implicit material point method, *Computational Mechanics*, Vol.73 p. 1311-1333 (2024), DOI: <https://doi.org/10.1007/s00466-023-02412-w>,
18. AlSofi, H., Larese, A., Padilla, I., Rossi, R., Scotta, R., Wüchner, R. Finite elements and finite volumes methods in wind engineering applications. *Advances in Computational Science and Engineering*.1 (2023) doi: 10.3934/acse.2023005 <https://www.aims sciences.org/article/doi/10.3934/acse.2023005>;
17. Singer, V.; Sautter, K.B., Larese, A., Wüchner, R.; Bletzinger, K.U.; A partitioned material point method and discrete element method coupling scheme, *Advanced Modeling and Simulation in Engineering Sciences*, 9(16), (2022); Impact factor: 1.01 (SJ) Q1.
16. Wriggers, W., Larese, A., Rung, T., Oñate, E. Assessment of simplified momentum equations for free surface flows through rigid porous media; (2023) *Experimental and Computational Multiphase Flow*, 5, 159-177; DOI: 10.1007/s42757-022-0133-y
15. Zorrilla, R., Larese, A., Rossi, R., A discontinuous Nitsche based Finite Element formulation for the imposition of the general Navier-slip boundary condition over embedded volumeless geometries, *International Journal for Numerical Methods in Fluids*, 93(9), 0271-2091, (2021) DOI: <https://doi.org/10.1002/flid.5018>
14. Chandra, B.; Singer, V.; Teschemacher, T.; Wuechner, R. and Larese, A. Nonconforming Dirichlet boundary conditions in Implicit Material Point Method by means of penalty augmentation, *Acta Geotechnica*, 16(8), 2315-2335 (2021) DOI: 10.1007/s11440-020-01123-3 Impact factor 4.350 (JCR) Q1.
13. Moran, R., Larese, A., Alves, R., Toledo, M.A., A procedure to design toe protections against extreme through-flows for rockfill dams *Engineering Structures*, 295, 400-412 (2019) <https://doi.org/10.1016/j.engstruct.2019.06.004>
12. Zorrilla, R., Larese, A., Rossi, R., A modified Finite Element formulation for the imposition of the slip boundary condition over embedded geometries, *Computer Methods in Applied Mechanics and Engineering* 353, 123-157(2019)
11. Iaconeta, I. Larese, A., Rossi, R., Oñate, E. A stabilized, mixed, implicit Material Point Method for non-linear incompressible solid mechanics problems; *Computational Mechanics* 175, 226-232,(2019) DOI 10.1007/s00466-018-1647-9
10. Iaconeta, I., Larese, A., Rossi, R., Guo, Z. Comparison of a Material Point Method and a Meshfree Galerkin Method for the simulation of cohesive-frictional materials, *Materials*, 10 , 1150, (2017) doi: 10.3390/ma10101150
9. Cotella, J., Rossi, R. and Larese A., Simulation of two and three-dimensional viscoplastic flows using adaptive mesh refinement *International Journal for Numerical Methods in Engineering*, 112,(11) 1636-1658 (2017) DOI: 10.1002/nme.5574
8. Larese, A. A Lagrangian PFEM approach for non-Newtonian viscoplastic materials. *Revista Internacional de Métodos Numéricos para cálculo y diseño en Ingeniería (RIMNI)* 33(3-4), p 307-317 (2017). DOI: <https://dx.doi.org/10.1016/j.rimni.2016.07.002>
7. Moreno, E., Larese, A. and Cervera, M. Modelling of Bingham and Herschel-Bulkley flows with mixed P1/P1 finite elements stabilized with Orthogonal Subgrid Scale, *Journal of Non-Newtonian Fluid Mechanics*, 28,pp 1-16, (2016). DOI: 10.1016/j.jnnfm.2015.12.005
6. Salazar, F., Irazabal, J., Larese, A. and Oñate, E. Numerical modelling of landslide-generated waves with the particle finite element method (PFEM) and a non-Newtonian flow model *International Journal for Numerical and Analytical Methods in Geomechanics* (2016) 40, pp 809-826. DOI: 10.1002/nag.2428
5. Larese, A., Rossi, R., Oñate, E., Finite Element Modeling of free surface flow in variable porosity media. *Archives of Computational Methods in Engineering* 22(4) (2015), pp 637-653 DOI: 10.1007/s11831-014-9140-x.
4. Larese, A.; Rossi, R.; Oñate, E.; Toledo, M.A.; Moran, R., Campos, H., Numerical and experimental study of overtopping and failure of rockfill dams. *International Journal of Geomechanics (ASCE)* 15 (4), art. no. 04014060 (2015) ISSN 1532-3641. DOI: 10.1061/(ASCE) GM.1943-5622.0000345.

3. Larese, A.; Rossi, R.; Idelsohn, S.R.; Oñate, E. A coupled PFEM-Eulerian approach for the solution of porous FSI problems. *Computational mechanics*. 50 - 6, pp. 805 - 819. (2012). ISSN 0178-7675. DOI: 10.1007/s00466-012-0768-9
2. Rossi, R.; Larese, A.; Dadvand, P.; Oñate, E. An efficient edge-based level set finite element method for free surface flow problems. *International journal for numerical methods in fluids*. 71-6, pp. 687-716 DOI. 10.1002/fld.3680, (2012). ISSN 0271-2091, DOI: 10.1002/fld.3680.
1. Larese, A.; Rossi, R.; Oñate, E.; Idelsohn, S., Validation of the Particle Finite Element Method (PFEM) for simulation of free surface flows. *Engineering computations*. 25 - 4, pp. 385 – 425 (2008), ISSN 0264-4401, DOI: 10.1108/02644400810874976.

## CONFERENCE PROCEEDINGS

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64. Dehghan Souraki, D., Blade, E., Larese, A., Enhancing Sediment Transport Model Accuracy and Efficiency with Artificial Intelligence IAHR RIVER FLOW 2024 12th International Conference on Fluvia Hydraulics, Liverpool 2-6 Sept 2024, Liverpool, UK;
63. Dehghan Souraki, D., Blade, E., Larese, A., DNN-Enhanced Predictive Modeling for Sediment Transport in Reservoirs: Riba-Roja Case Study 8th IAHR Europe Congress, 4-7 June 2024, Lisbon, Portugal;
62. Singer, V., Larese, A., Börst, A., Wüchner, R., Bletzinger, K.-U. Partitioned MPM-FEM Coupling Approach for Advanced Numerical Simulation of Mass-Movement Hazards Impacting Flexible Protective Structures, Proceedings of the 10th edition of the International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2023) Codice DOI <https://dx.doi.org/10.23967/c.coupled.2023.025>
61. Singer, V., Sautter, K., Larese, A., Wüchner, R., Bletzinger K.-U. Partitioned Coupling Approaches for the Simulation of Natural Hazards Impacting Protective Structures, Proceedings of the VIII International Conference on Particle-Based Methods (PARTICLES 2023) <https://dx.doi.org/10.23967/c.particles.2023.002>
60. Singer, V., Chandra, B., Wüchner, R., Larese, A., A staggered Material Point Method and Finite Element Method coupling scheme using Gauss Seidel communication pattern, IX International Conference on Computational Methods for Coupled Problems in Science and Engineering, Online 2021;
59. Larese, A., Chandra, B., Rossi, R., Wüchner, R., Coupled problems for the simulation of water related natural hazards and their interaction with structures, 3rd International Conference on Computational Engineering and Science for Safety and Environmental Problems, Japan, 2020;
58. Larese, A., Chandra, B., Rossi, R., Wüchner, R., Simulation of large mass movements and their interaction with protection structures using an implicit mpm-fem coupling and non-conforming boundary conditions, 14th World Congress in Computational Mechanics (WCCM) ECCOMAS Congress 2020, Paris, France;
57. Larese, A., Chandra, B., Rossi, R., Wüchner, R., Implicit MPM-FEM coupled model for the simulation of large mass movements and their interaction with protection structures, International Symposium on SPH and other particle-based continuum methods and their applications in geomechanics, 11-13 September 2019, Vienna, Austria;
56. Chandra, B., Larese, A., Bucher, P., Wüchner, R., Coupled Soil-Structure Interaction Modeling and Simulation of Landslide Protective Structures Proceedings of the VIII International conference on Coupled Problems in Science and Engineering, p 135-142 Sitges, Spain 3-5 June 2019;
55. Larese, A., Rossi, R., Salazar, F., Wüchner, R., Oñate, E., Computational models for the simulation of extreme environmental flows Proceeding of the 2nd International Conference on Natural Hazards & Infrastructure ICONHIC 23-26 June 2019 Crete Greece
54. Chandra, B., Larese, A., Iaconeta, I., Rossi, R., Wüchner, R., Soil-structure interaction simulation of landslides impacting a structure using an implicit material point method Proceeding of the MPM2019 8-10 January 2019 Cambridge UK
53. Amaya, J., Rossi, R., Larese, A., Pohl, M., A finite element implementation for the three variable Biot model and an introduction to its application to sugar cane milling processes. 2018 IEEE 38th Central America and Panama Convention, CONCAPAN 2018



52. Larese, A., Salazar, F., Iaconeta I., Rossi R., Oñate E. Particle methods for the simulation of free surface flows Proceeding of the 5th IAHR Europe Congress. New challenges in hydraulic research and engineering, 12-14 June 2018, Trento, Italy. (2018)
51. Larese, A., Salazar, F., San Mauro, J., Oñate, E., Toledo, M.A. Morán R., Advanced computational methods for dam protections against overtopping. Proceedings of the III 3rd International Conference on Protection against Overtopping 6-8 June 2018, Grange-over-Sands, UK (2018)
50. Larese, A., Salazar, F., Toledo, M.A., Oñate, E., Advanced numerical solutions for enhancing the safety of zoned rockfill dams in extreme scenarios, Proceeding of the International Workshop on overflowing erosion of dams and dikes on 11-15 December, 2017 Aussois, France (2017)
49. Larese, A., Rossi, R., Zorrilla, R., Wuechner, R., Oñate, E., Towards the Virtual Wind Tunnel. Proceedings of the International CAE conference, 2017, Vicenza, Italy.
48. Iaconeta, I., Larese, A., Rossi, R. and Oñate E., Simulation of granular flow problems with an implicit Material Point Method, V International Conference on Particle-Based Methods: fundamentals and applications: Hannover, Germany, (2017).
47. Larese, A., Iaconeta, I., Rossi, R. and Oñate E., Implicit grid-based and meshless MPM formulations. V International Conference on Particle-Based Methods: fundamentals and applications: Hannover, Germany, (2017).
46. Rossi, R. Larese, A., Iaconeta, I., Guo, Z. „An implicit meshless material point method algorithm Congress on Numerical Methods in Engineering - CMN 2017, Valencia, Spain (2017)
45. Iaconeta, I., Larese, A., Rossi, R. and Oñate E. An implicit material point method applied to granular flows using an irreducible and mixed formulation Congress on Numerical Methods in Engineering - CMN 2017, Valencia, Spain (2017)
44. Zorrilla, R., Rossi, Oñate, E., Larese, A. FSI simulation problems with embedded fluid formulation. Application to mud motors simulation and Virtual Wind Tunnel facility Congress on Numerical Methods in Engineering - CMN 2017, Valencia, Spain (2017)
43. Scotta, R., Stecca, E., Larese, A., Water towers undergoing dynamic actions: numerical solution of coupled FSI problem and applications 6th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPdyn), Rhodes, Greece, 15-17 June 2017
42. Larese, A.; Rossi, R.; Zorrilla, R., Wüchner, R., Oñate, E. Embedded techniques for FSI problems, VII International Conference on Coupled Problems in Science and Engineering, Rhodes, Greece (2017)
41. Iaconeta, I., Larese, A., Rossi, R., Oñate, E., An implicit material point method applied to granular flows. Procedia Engineering Proceeding of the 1st International Conference on the Material Point Method, Vol 175, 226-232 MPM 2017, Delft, Netherlands (2017)
40. Salazar, F., San Mauro, J, Larese, A., Irázabal, J., Morán, R., Oñate, E., Toledo, M.A. Applications of numerical methods in design and evaluation of overtopping protection systems. Proceeding of the 2nd International Seminar on Dam Protection Against Overtopping, Ft. Collins, Colorado, USA (2016)
39. San Mauro, J, Larese, A., Salazar, F., Morán, R., Toledo, M.A. Hydraulic and stability analysis of the supporting layer of wedge-shaped blocks, Proceeding of the 2nd International Seminar on Dam Protection Against Overtopping, Ft. Collins, Colorado, USA (2016)
38. Iaconeta, I., Larese, A., Rossi, R., Oñate, E., An implicit Material Point Method. Formulation and Validation Proceeding of the VII European Congress in Computational Methods in Applied Science and Engineering, Crete, Greece (2016)
37. Wriggers, W., Larese, A., Volkner, S., Oñate, E., Rung, T., Comparative study of granular soil models using particle and mesh based schemes Proceeding of the VII European Congress in Computational Methods in Applied Science and Engineering, Crete, Greece (2016)
36. Larese, A., Salazar, F., Rossi, R. and Oñate, E., The Particle Finite Element Method (PFEM) for problems in Geomechanics Proceeding of the IV International Conference on Particle-Based Methods: fundamentals and applications: Barcelona, Spain, (2015).

35. Iaconeta, I. , Larese, A., Celigueta, M. and Oñate, E., A comparison between continuum and discrete modelling of granular material. Proceeding of the IV International Conference on Particle-Based Methods: fundamentals and applications: Barcelona, Spain, (2015).
34. Alves, R.M. Morán, R., Toledo, M.Á., Irazábal, J. , Salazar, F., Larese, A., Análisis experimental y numérico del oleaje producido por la inestabilidad de laderas de embalses IV Jornadas de Ingeniería del Agua, Córdoba, (2015)
33. Gomez, B.M., De Simone, S., Rossi, R., Larese, A., Carrera, J. Development of a finite element code to solve thermo-hydro-mechanical coupling and simulate induced seismicity. Proceeding of the EGU General Assembly 2015, Vienna, (2015)
32. Fernández, S. Carrera, J., Rodriguez, .L., Benitez, J., Rossi, R., Larese, A. Analysis of seawater flow through optical fiber. Proceeding of the EGU General Assembly 2015, Vienna, (2015)
31. Larese, A.; Rossi, R.; Oñate, E. , Simulation of the beginning of failure in rockfill dams caused by overtopping . Proceeding of the 1st International Seminar on Dam Protection against Overtopping and Accidental Leakage, Madrid, Spain (2014).
30. Larese, A., Rossi, R., Wüchner, R., Al Sofi, H., Oñate E., FSI analysis of lightweight structures. Towards a virtual wind tunnel Proceeding of the 11th World Congress in Computational Mechanics, Barcelona, Spain (20-25/06/2014)
29. Rossi, R., Dadvand, P., Larese, A., Maireni N., Davari, M., Wüchner, R., Advances in the use of simplicial finite elements for flow problems Proceeding of the 11th World Congress in Computational Mechanics, Barcelona, Spain (2014)
28. Rossi R., Larese A., Dadvand P., Davari M., Scotta R., Lazzari M., Stecca E., Wuechner R., Baumgaertner D., Wolf J. High-Performance Embedded approaches for CFD simulation. Towards the Virtual Wind Tunnel. Proceeding of the International Symposium on Computational Wind Engineering CWE2014, Hamburg, Germany, (2014)
27. Larese, A.; Rossi, R.; Oñate, E. A combined Lagrangian-Eulerian technique for problems in geomechanics Proceeding of the V International Conference on Computational Methods for Coupled Problems in Science and Engineering, Ibiza, Spain, (17-19/06/2013).
26. Morán; R., Alves, R.; Toledo, M.; Larese, A.; Salazar, F. and Rossi, R. Procedimiento de diseño de protecciones tipo repié para evitar la rotura por deslizamiento en masa de presas de escollera sometidas a percolaciones extremas Proceeding of the III Jornada de ingeniería del agua, Valencia, Spain, (2013)
25. Larese, A.; Rossi, R.; Oñate, E. Simulación de presas de escollera en condiciones de sobrevertido Proceedings of the Congreso de Métodos Numéricos en Ingeniería CMN2013, Bilbao, Spain, (2013).
24. Salazar, F.; San Mauro, J.; Irazábal, J.; Larese, A.; Rossi, R.; Oñate, E.; Moran, R.; Toledo, M. El papel de los modelos numéricos en la investigación y el diseño de aliviaderos de presas. Proceeding of the Jornada Técnica Avances en Investigación Aplicada en Seguridad Hidráulica de Presas, Madrid, Spain (2013)
23. Morán, R.; Alves, R.; Toledo, M.; Salazar, F.; Larese, A. , San Mauro, J. Protecciones de presas mediante repiés de escollera y bloques en forma de cuña Proceeding of the I Jornada Técnica sobre Avances en investigación aplicada en seguridad hidráulica de presas, Madrid, Spain (2013)
22. Larese, A.; Rossi, R.; Oñate, E. Failure of rockfill dams during overtopping scenarios. A coupled level set-PFEM approach. Proceeding of the 6th European Congress on Computational Methods in Applied Sciences and Engineering Wien, Austria, (2012).
21. Larese, A.; Rossi, R.; Oñate, E. A visco-rigid model using PFEM for simulating the failure of non-cohesive granular material Proceeding of the II International Conference on Particle-Based Methods: fundamentals and applications: Barcelona, Spain, 26-28/10/2011.
20. Salazar, F.; Moran, R.; Rossi, R.; Larese, A. Numerical modeling of the hydraulic performance of Oliana dam spillway using Kratos . Proceedings of the: XI ICOLD Benchmark Workshop on Numerical Analysis of Dams.ISBN 978-84-695-1816-8, Valencia, Spain (2011).
19. Larese, A.; Rossi, R.; Oñate, E. Coupling Eulerian and Lagrangian models to simulate seepage and evolution of failure in prototype rockfill dams . Proceedings of the XI ICOLD Benchmark Workshop on Numerical Analysis of Dams..ISBN 978-84-695-1816-8, Valencia, Spain (2011).

18. Larese, A.; Rossi, R.; Oñate, E.; Toledo, M.; Moran, R.; Campos, H.; Lara, Á.; Viña, M. Theme B: simulation of the behavior of prototypes of rockfill dams during overtopping scenarios: seepage evolution and beginning of failure. Proceedings of the XI ICOLD Benchmark Workshop on Numerical Analysis of Dams. ISBN 978-84-695-1816-8, Valencia Spain (2011).
17. Rossi, R.; Larese, A.; Oñate, E.; Idelsohn, S.R. Simulating complex problems in civil engineering: the particle finite element method and beyond. Proceedings of Métodos numéricos em engenharia, Coimbra, Portugal (2011).
16. Larese, A.; Rossi, R.; Oñate, E. A combined PFEM-level set model to simulate the behavior of a rockfill dam in overtopping scenarios. Proceedings of the IV International Conference on Computational Methods for Coupled Problems in Science and Engineering. Kos, Greece, (20-22/06/2011).
15. Rossi, R.; Larese, A.; Oñate, E. On the simulation of rock-fill dam behaviour in overspill conditions. Proceedings of Multiphysics 2011. The International Society of Multiphysics. Barcelona, Spain (2011).
14. Salazar, F.; Rossi, R.; Moran, R.; Larese, A. Estudio de la capacidad de desagüe de aliviaderos con compuertas mediante modelación numérica: aplicación a la presa de Oliana. Proceedings of the II Jornadas de Ingeniería del Agua (JIA). ISBN 978-84-615-4023-5, Barcelona, Spain (2011)
13. Larese, A.; Rossi, R.; Toledo, M.; Oñate, E. Physical and numerical modelization of the behaviour of rockfill dams during overtopping scenarios. Proceedings of Dam Maintenance and Rehabilitation II. pp. 479 - 487. CRC Press, 2010. ISBN 978-0415616485, Zaragoza, Spain (23-25/11/2010).
12. Lechuga, C.; Lara, Á.; Berga, M.; Viña, M.; Toledo, M.; Morán, R.; Campos, H.; García, J.; Larese, A. Estudios sobre el comportamiento de presas de escollera ante vertidos por coronación. Proceedings of the IX Jornadas Españolas de Presas. ISBN 978-84-92626-68-7. Valladolid, Spain (2010)
11. Larese, A.; Rossi, R.; Oñate, E.; Toledo, M. Metodología de análisis de comportamiento de presas de escollera frente a un sobrevertido. Proceedings of the IX Jornadas Españolas de Presas. ISBN 978-84-92626-68-7, Valladolid, Spain (15-17/06/2010).
10. Larese, A.; Rossi, R.; Oñate, E. Overtopping in rockfill dams: a mixed Lagrangian Eulerian formulation. Proceedings of the IV European Conference on Computational Mechanics, Paris, France (17-21/05/2010).
9. Larese, A.; Rossi, R.; Oñate, E. Analysis of stability of earth dams in overtopping scenarios with the particle finite element method. Proceedings of Particle-based methods: fundamentals and applications (Particles 2009), ISBN 9788496736825. Barcelona, (25-27/11/2009).
8. Larese, A.; Rossi, R.; Oñate, E. A mixed Lagrangian and Eulerian FSI approach for simulation of overtopping on embankment dams. Proceedings of Computational Methods for Coupled Problems in Science and Engineering, Ischia.
7. Larese, A.; Rossi, R.; Oñate, E. Combinación de métodos Lagrangianos de elementos finitos y partículas (PFEM) con métodos Eulerianos para el análisis del comportamiento de presas de escollera durante un sobrevertido. Proceedings of Métodos Numéricos en Ingeniería, ISBN 9788496736665, Barcelona, Spain (29/06-02/07/2009)
6. Larese, A.; Rossi, R.; Oñate, E. Un método de cálculo para el estudio de la seguridad de presas de escollera durante un sobrevertido. Proceedings of the VIII Jornadas Españolas de Presas. ISBN 978-84-380-0406-7, Cordoba, Spain (26-28/11/2008).
5. Larese, A.; Rossi, R.; Oñate, E.; Idelsohn, S. Particle finite element method and level set method for the simulation of the failure of rockfill dams due to overtopping phenomena. Proceedings of the VIII World Congress in Computational Mechanics WCCM8-ECCOMAS : ISBN 9788496736559, Venice, Italy (30/06-4/07/2008).
4. Larese, A.; Rossi, R.; Oñate, E.; Idelsohn, S. Safety analysis of rockfill dams during overspill phenomena. Proceedings of the Symposium Operation, Rehabilitation and Up-grading of Dams. Bulgarian Committee on Large Dams, Sofia, Bulgari (2008).
3. Celigueta, M.A.; Larese, A.; Latorre, S. PFEM application in fluid structure interaction problems. Proceedings of the 4th Conference on advances and applications of GiD: the personal pre and post processor. ISBN 978-84-96736-52-8, Ibiza, Spain (8-9/5/2008).

2. Larese, A.; Rossi, R.; Oñate, E.; Idelsohn, S. Particle finite element method (PFEM) in hydraulic and geotechnical civil engineering. Proceedings of the GACM Colloquium on Computational Mechanics; Munich, Germany (10-12/10/2007).
1. Larese, A.; Rossi, R.; Idelsohn, S.; Oñate, E. On the validation of the particle finite element method (PFEM) for complex engineering fluid flow problems. Proceedings of the ECCOMAS CFD 2006. ISBN 90-9020970-0, Netherlands (2006).

## MONOGRAPHS

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4. Iaconeta, I., Larese, A., Oñate, E., Discrete-continuum hybrid modelling of flowing and static regimes. Monograph CIMNE (M188) ISBN: 978-84-945689-4-7 (2020)
3. Gracia, L., Salazar, F., Larese, A., Development of a computational tool for structural verification of dams. Monograph CIMNE (M162) ISBN: 978-84-945689-4-7 (2016)
2. Larese A., Oñate E., Rossi, R., A coupled Eulerian-PFEM model for the simulation of overtopping in rockfill dams. Monograph CIMNE M133 (2012) ISBN: 978-84-940243-6-8, B-29348-2012 (2012)
1. Larese A., On the application of the Particle Finite Element Method (PFEM) in Civil Engineering. Monograph CIMNE M98 (2006) ISBN: 84-96736-02-4, B-46523-2006. (2006)

## BOOK CHAPTERS

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3. Larese, A.; Iaconeta, I., Chandra, B., Singer, V., Implicit MPM and coupled MPM-FEM in geomechanics. In Point based numerical methods in geomechanics, ALERT Doctoral school 2020 pp153-188 (2020).
2. Larese, A.; Rossi, R.; Oñate, E., Simulation of the beginning of failure in rockfill dams caused by overtopping. Dam Protection against Overtopping and Accidental Leakage, Eds. Toledo, Moran and Oñate Taylor & Francis group London ISBN 978-1-138-02808-1, pp. 111-118, (2015).
1. Larese, A.; Rossi, R.; Oñate, E., Toledo, M.; Physical and numerical modelization of the behaviour of rockfill dams during overtopping scenarios. Dam Maintenance and Rehabilitation II. - Proceedings of the 2nd International Congress on Dam Maintenance and Rehabilitation, pp. 479 - 487. CRC Press, 2010. ISBN 978-0415616485 (2011).

## TECHNICAL REPORTS AND ANY OTHER SCIENTIFIC PRODUCTION

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2. Larese, A.; Oñate, E. CIMNE Verification of the validation analysis of Xfinas elements database. 01/2009.
1. Oñate, E.; Suarez, B.; Idelsohn, S.; Rossi, R.; Celigueta, M.A.; Larese, A. Trabajo realizado por CIMNE en relación con la rotura del muelle del Prat del puerto de Barcelona. 07/2007.

## TALKS

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### - INVITED KEYNOTES OR PLENARIES

- 07/2025 **Semiplenary** 4th International Conference on Computational Engineering and Science for Safety and Environmental Problems (COMPSAFE), Kobe, Japan
- 09/2024 Keynote Speaker, 4th International Workshop on Advances in Computational Mechanics (IWACOM), Fukuoka, Japan <https://www.jsces.org/IWACOM/4th/>;
- 06/2024 Invited speaker, International Conference on Modern Materials and Technologies, CIMTEC, Montecatini, Italy <https://2024.cimtec-congress.org/track-e> ;
- 09/2022 Senior **plenary** speaker to the GIMC SIMAI Young 2022, Pavia, Italy Title: "The Material Point Method and beyond";

- 10/2021 Keynote speaker, Computational Modelling for Future Research in Geoenvironmental Sciences (CMFRGS) (online) ;
- 12/2020 Keynote speaker, 3rd International Conference on Computational Engineering and Science for Safety and Environmental Problems (COMPSAFE), Japan, (online);
- 01/2020 Keynote speaker, Wonder Women in Cyber Security and Computer Science, University of Padua, Italy;
- 06/2018 Keynote speaker, PROTECTIONS 3rd International Seminar on Dam Protection against Overtopping and Accidental Leakage, Lake District, UK;
- 12/2017 Keynote speaker, the International Workshop on Overflowing Erosion of Dams and Dikes, Aussois, France. Title: "Advanced numerical solutions for enhancing the safety of zoned rockfill dams in extreme scenarios";
- 06/2017 **Plenary** speaker, COUPLED PROBLEMS 2017, Rhodes, Greece;
- 04/2016 **Plenary** speaker, CONIA 2016, El Salvador;
- 10/2015 Keynote speaker, MUMOLADE Michael School, Barcelona, Spain;
- 11/2014 Keynote speaker, 1st International Seminar on Dam Protection against Overtopping and Accidental Leakage PROTECTIONS, Madrid, Spain;
- 11/2011 Keynote speaker, XI ICOLD Benchmark Workshop on Numerical Analysis of Dams. Valencia, Spain;

#### - INVITED SEMINARS OR LECTURES

- 2023/10/07-08 Short Course on Particle-Based Methods in Engineering and Applied Science. The Material Point Method. Milan, Italy
- 2023/02/08 The Material Point Method for the simulation of water-related hazards and their interaction with critical structures, Invited seminar at MOX, POLIMI, Italy
- 2022/05/30 Simulation of extreme water hazards and their interaction with structures and protections systems, Invited seminar at the Department of Civil Engineering and Architecture, University of Pavia, Italy
- 2021/10/02-03 Short Course on Particle-Based Methods in Engineering and Applied Science. The Material Point Method. Hamburg, Germany
- 2021/07/07 Guest lecturer to the Advanced Finite Element Course, MSc in Computational Mechanics - COME, TUM, Munich, Germany (online)
- 2020/06/04 Invited speaker: Geomechanics and fluid-structural interaction applications using Kratos Multiphysic; COWI, Denmark
- 2019/01/17 Computational models and methods for the simulation of flow-related natural hazards and their interaction with structures. Guest speaker of the "BGCE research days" (BGCE: Bavarian Graduate school of Computational Engineering), Munich, Germany.
- 2018/07/23 Simulation of nonlinear behavior in fluids and solids by particle methods with a special focus on the Material Point Method (MPM), Invited seminar Chair of Structural Analysis, Technical University of Munich, Germany
- 2018/07/13 Computational models for the simulation of water natural hazards Invited Seminar Università degli Studi di Padova, Mathematical Department, Italy
- 2018/03 Computational models for the simulation of water natural hazards. Invited seminar, Politecnico di Milano, Italy

- 2016/10 Material Point Method for goehazards (8 hours post graduate course). Departamento ECA – Sección ingeniería del terreno, Civil Engineering School, Barcelona, Spain
- 2012/10 Finite Elements for Fluids with open source software (22 hours post graduate course). Invited by the Chair of Structural Analysis, Prof. Kai-Uwe Bletzinger, and by the Chair of: Computational Mechanics, Prof. Fabian Duddeck, of the Technical University of Munich (Germany)

#### **ORGANIZATION OF CONGRESSES/SEMINARS**

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- 2025/06 Chair of COUPLED2025 XI International Conference on Coupled Problems in Engineering
- 2022/05/23-27 Member of the organizing committee of 100 UMI 800 UNIPD, Padova, Italy
- 2021/06/13-16 Chair of COUPLED2021 IX International Conference on Coupled Problems in Engineering, Sardinia, Italy
- 2019/11 - present Organizer of NumLab Seminar series, University of Padua, Italy
- 2016/04 Organizer of the post graduate course "Short course on modelling in Oil&Gas" given by Eng. Raju Gandikota. Barcelona, Spain
- 2015/10 Co-Chair of the local organizing committee of the IV International Conference on Particle-Based Methods: fundamentals and applications, Barcelona, Spain
- 2015/09/28- 2015/10/06 Organizer of the postgraduate school "T-MAPPP summer school", Barcelona, Spain
- 2010-2018 Organizer of the CIMNE seminar series, Barcelona, Spain

#### **ORGANIZATION OF MINISYMPOSIA / SESSIONS**

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- International Conference on Computational Engineering and Science for Safety and Environmental Problems, 3rd ed. (2020) online, 4th ed. Kobe (2025) Japan, COMPSAFE
- International Conference on Coupled Problems in Science and Engineering, COUPLED (Editions 2019, 2021, 2023)
- World Congress in Computational Mechanics WCCM (2020)
- International Conference on Particle Based Methods. Fundamentals and Applications (Editions 2015, 2017, 2019, 2021, 2023)
- Congreso de métodos Numéricos en Ingeniería CMN Editions (2013, 2017)

#### **MEMBER OF EVALUATION PANELS AND COMMITTEE**

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- 2022-present Project reviewer as external expert for the European Research Council ERC (Consolidator and Advanced Grants);
- 2020-present Project reviewer as external expert for the Mexican National Council of Science and Technology CONACIYT; Call for "Frontier Science 2019";
- 2019-present Project reviewer as external expert for Mitacs Accelerate, Canada. Area of computational engineering applied to geotechnics.
- 2020-present Member of 10 PhD evaluation committees: UNIPD, POLIMI (MI), UPM (Madrid), UPC (Barcelona); U. of Pavia
- 2020-present Member of national and international 9 recruitment/promotion committees: 3 at SISSA, Italy (3 rtdA – assistant professors), 7 at UPC, Barcelona (3 assistant professors, 4 associate professors);

## EDITORIAL ACTIVITY

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- Editor in chief Advances in Computational Science and Engineering ACSE, American Institute of Mathematical Sciences AIMS. 2022, link to ACSE webpage
- Guest Editor Advanced Modeling and Simulation in Engineering Sciences, Springer. Special issue on Recent Advances in Hypercomplex Disaster Simualtions, 2022, Edited by Kenjiro Terada, Antonia Larese, Ethan Kubatko and Mitsuteru Asai
- Guest Editor Mathematical and Computational Applications, MDPI Special issue on Computational Methods for Coupled Problems in Science and Engineering, 2022, Edited by Simona Perotto, Gialuigi Rozza and Antonia Larese

## REVIEW ACTIVITY

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- Reviewer for CNAME (Q1), Journal of Hydraulic Engineering (Q1), Journal of Numerical Methods in Engineering (Q1), International Journal for Numerical Methods in Fluids (Q1), Acta Geotechnica (Q1) International Journal of Geomechanics (ASCE) (Q1), International Journal of Non-Linear Mechanics (Q1), Computational Particle Mechanics (Q1) Ocean Engineering (Q2), Coastal Engineering (Q1)

## MEMBER OF SCIENTIFIC COMMITTEES

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- 22nd Computational Fluid Conference CFC2023, Cannes, France
- International Conference on Coupled Problems in Engineering (Editions 2017, 2019, 2021, 2023, 2025)
- International Conference on Particle Based Methods. Fundamentals and Applications (Editions 2015, 2017, 2019, 2021, 2023, 2025)
- ECCOMAS Young Investigators Conference, (Editions 2017, 2021, 2025);
- International Conference on Dam Protection against Overtopping and Accidental Leakage (Editions 2014, 2020);
- XI ICOLD Benchmark Workshop on Numerical Analysis of Dams , Valencia, Spain (2011).

## SCIENTIFIC SOCIETIES OR INSTITUTES

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- 2020-present Fellow of the (Italian Group of Computational Mechanics (GIMC) of the Italian Association of theoretical and Applied Mechanics (AIMETA)
- 2020-present Fellow of the European Mechanics Society (EUROMECH)
- 2019-present Fellow of the Gruppo Nazionale Calcolo Scientifico (GNCS) of the Istituto di Alta Matematica (INdAM)
- 2021-present Fellow of the Italian Society of Applied and Industrial Mathematics (SIMAI)
- 2021-2022 Fellow of the Union of Italian Mathematics (UMI)
- 2015-present Fellow of the Young Investigators Section of the Spanish Association for Numerical Methods in Engineering
- 2014-present Fellow of the Spanish Association for Numerical Methods in Engineering (SEMNI)
- 2009-present Voting member of the Comité de Cálculo de presas of the Spanish Committee on Large Dams (SpanCOLD)
- 2012-present Member of the FLUMEN institute of the UPC
- 2008-2018 Member of the Continuum Mechanics Group (MC2) of the UPC, Barcelona Spain

## TEACHING

### MASTER COURSES

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2019 - present	Numerical Methods for Continuous Systems, Master in Mathematical Engineering, Università degli Studi di Padova (6ECTS)
2008-2018	Finite Elements - Master of Science in Computational Mechanics -Erasmus Mundus - – Civil engineering school UPC (5ECTS)
2008-2018	Finite Elements - Master on Numerical Methods in Engineering - – Civil engineering school UPC (5ECTS)
2014-2017	Industrial training - Master on Numerical Methods in Engineering – Civil engineering school UPC (15ECTS)
2015-2017	Communication skills - Master on Numerical Methods in Engineering - Civil engineering school UPC (5ECTS)

### UNDERGRADUATE COURSES

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2018-2019, 2021-present	Numerical Analysis – Industrial Engineering, Università degli Studi di Padova (6ECTS)
2018-2023	Linear Algebra –Industrial Engineering, Università degli Studi di Padova (9ECTS)
2019- 2020	Numerical Analysis – Computer Science, Università degli Studi di Padova (6ECTS)
2011-2018	Mechanics of Materials – Civil Engineering School – UPC (6ECTS)
2011-2018	Theory of structures - Civil Engineering School – UPC (6ECTS)
2008-2011	Structures- Civil Engineering School –UPC (12ECTS)

### DOCTORAL COURSES

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2020/09/28-10/01	ALERT doctoral school 2020 -"Point based numerical methods in geomechanics"
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### DIRECTION OF DOCTORAL THESIS

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2019/11/29	Ilaria Iaconeta (ESR fellow of ITN: T-MAPPP) Title of the thesis: Discrete-continuum hybrid modelling of flowing and static regimes. Universidad Polit�cnica de Catalunya, UPC-BarcelonaTech, Spain.
2024/02	Nicola Segala, Industrial PhD (Dott. in alta formazione UniPD) with the company 2F Water Venture.Title: "correlations between leak points in water supply systems and graph theory".
Ongoing:	
-	Nicol� Crescenzo, Title: "Advanced Numerical Methods for the Simulation of the Consequences of Extreme Hazards on Structures and Protection Systems" PhD in Computational Mathematics University of Padova (2022/01 - 2025/01).
-	Danial Dehghan, Title: "Accelerated Tools for 2D and 3D Numerical Modelling of Sediment Transport and Morphology Evolution in Rivers and Reservoirs. Case Study of Lower Ebro River" PhD in Civil Engineering, Technical University of Catalonia (2021/10 - 2024/10).
-	Andi Katili, PhD in Civil Engineering, Technical University of Munich (2023/09 - 2026/08).

### DIRECTION OF MASTER OR DEGREE THESES

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33. "Enhancement of a structural optimization simulation tool using Machine Learning" (01/2024) Giorgio Zamberlan, Advisors: M. Giacomini and A. Larese, Laurea Magistrale in Ingegneria Matematica, Università degli Studi di Padova, Italy
32. "A novel Shifted Boundary Method (SBM) for embedded domains based on Multi-Point Constraints" (07/2023) Nicolò Antonelli, Advisors: R. Rossi, R. Zorrilla and A. Larese, Laurea Magistrale in Ingegneria Matematica, Università degli Studi di Padova, Italy
31. "Non conforming boundary conditions in finite element and particle methods" (07/2022) Nicola Comerchi, Advisor: V. Singer A. Larese, Laurea Magistrale in Ingegneria Matematica, Università degli Studi di Padova, Italy
30. "Una formulazione Updated Lagrangian in spostamenti per fluidi incompressibili a superficie libera utilizzando MPM" (12/2021) Alessandro Contri, Advisor: A. Larese, Laurea Magistrale in Ingegneria Matematica, Università degli Studi di Padova, Italy
29. "Numerical Solution of Optimal Design Problems via a Dynamic formulation of Monge-Kantorovich Equation" (07/2021) Nicolò Crescenzo, Advisor: M. Putti, A. Larese, E. Facca, Laurea Magistrale in Ingegneria Matematica, Università degli Studi di Padova, Italy
28. Radial Basis Functions for the approximate solution of differential equations (12/2020) Angelica Crepaldi, Advisors: W. Erb, A. Larese, Bachelor in Mathematics (Laurea Triennale), Università degli Studi di Padova Italy.
27. Stabilized formulation using the Material Point Method (07/2020) Gloria Pietropolli, Advisor: A. Larese, Master of Science in Mathematics (Laurea Magistrale), Università degli Studi di Padova Italy.
26. Numerical Experiments on the stability of the Navier Stokes equations (07/2020) Andrea Gorgi, Advisor: M. Putti, A. Larese, Bachelor in Aerospace Engineering (Laurea Triennale), Università degli Studi di Padova Italy.
25. Numerical Shape Optimization. A Dynamic Monge-Kantorovich Approach (2019) Nicola Segala, Advisors: M. Putti, F. Piazzon, E. Facca, A. Larese, Laurea Magistrale in Matematica, Università degli Studi di Padova, Italy;
24. Soil structure interaction simulation using a coupled implicit material point- finite element method (2019) Bodhinanda Chandra, Advisors: R. Whuecner, A. Larese, Technical University of Munich (TUM), Germany;
23. Particle Methods in Civil Engineering (2018) Alba Navarro Casanova, Advisor: A. Larese, Master on Numerical Methods in Engineering ETSECCPB-UPC;
22. Numerical models for multi-phase flow in porous media for applications to oil engineering (2017) Cristina Más Trilla; Advisors: A. Larese, P. Becker, E. Oñate, Master in Civil Engineering ETSECCPB-UPC;
21. Coupled problems in dam engineering (2016) Maria de los Angeles Gonzalez, Advisors: A. Larese, P. Becker, Master on Numerical Methods in Engineering ETSECCPB-UPC;
20. FSI procedures for Civil Engineering Applications (2016) Rubén Zorrilla, Advisors: A. Larese, R. Rossi, Master on Numerical Methods in Engineering ETSECCPB-UPC;
19. Optimización de la simulación del contacto mecánico en procesos de estampación de chapas metálicas (2016) Marc Puigpinos, Advisors: F. Rastellini, A. Ejigo, A. Larese Master on Numerical Methods in Engineering ETSECCPB-UPC;
18. Desarrollo de una herramienta computacional para la comprobación estructural de presas (2016) Lorenzo Gracia, Advisors: F. Salazar, A. Larese, Master on Numerical Methods in Engineering ETSECCPB-UPC;
17. An algorithm for numerical modelling of Cross-Laminated Timber structures (2015) Gabriele D'Aronco, Advisors: R. Scotta, S. Oller, A. Larese Università degli studi di Padova (Italia);
16. Pre-process for Numerical Analysis of Cross-Laminated Timber Structures (2015) Alessandra Ferrandino, Advisors: R. Scotta, A. Larese Università degli studi di Padova (Italia);
15. Simulation of atmospheric effects with the DLR code Tau (2015) Laia Alcaraz Capsada, Tutors: R. Flores, R. Hinrich, A. Larese, Master on Numerical Methods in Engineering ETSECCPB-UPC;
14. Theoretical study and FEM/DEM particle analysis of piping (2015). Giuseppe Pizzinat Advisors: A. Larese and G. Cortellazzo (UniPD) Università degli studi di Padova (Italia);

13. Numerical simulation of the loads on wind turbine access platforms and comparison with large scale experiment (2014) Carlos Alvarez Abad; Advisors: A. Larese, Prof P. Ruol (UniPD); Prof L. Martinelli (UniPD). Master in Civil Engineering ETSECCPB-UPC;
12. An SPH Formulation for Incompressible Newtonian Free Surface Flows. (2013) Cem Karakaova; Advisors: A. Larese, R. Rossi (CIMNE). Master on Numerical Methods in Engineering ETSECCPB-UPC;
11. Evaluación de la seguridad estructural de la presa de Camarasa mediante un modelo de cálculo de elementos finitos. (2011) Eduardo Echeverría García. Advisor: A. Larese; Master en métodos numéricos para cálculo y diseño en Ingeniería;
10. Creación de una herramienta para la generación de fenómenos de oleaje en un código de elementos finitos (2014) Assis Araño TFG Ingeniería de la construcción ETSECCPB UPC;
9. Desarrollo de una interfaz para la imposición de condiciones de contorno variables para un código de elementos finitos (2014) Marc Busquets TFG Ingeniería de la construcción ETSECCPB UPC;
8. Proyecto de pasarela peatonal de conexión del barrio de Bellamar hasta la playa en Castelldefels (2014) Celia Castaño TFG Ingeniería de la construcción ETSECCPB UPC;
7. Simulación numérica de la filtración en escollera (2013) Antonio Lara Silva, TFC Caminos ETSECCPB UPC;
6. Validación del código Kratos para el cálculo estructural (2013) Joan Pere Ruiz Vidal, Castaño TFG Ingeniería de la construcción ETSECCPB UPC;
5. Projecte d'urbanització destinat a la creació d'una zona d'habitatges unifamiliars a la Vall Fosca (Lleida), (2012), Juan Salvador Latorre Sánchez, PFC Caminos ETSECCPB UPC;
4. Análisis de los fenómenos hidrodinámicos en escolleras con aplicaciones a presas de materiales sueltos, (2010), Raquel Juan Hernández, TFC Caminos ETSECCPB UPC;
3. Análisis numérico del proceso de filtración en presas de escollera, (2009) Tapia Navarro, Cristian TFC Caminos ETSECCPB UPC;
2. Analysis and numeric simulations of dynamic wind effect on Braga stadium (2008) Alberto Agostini. Università degli Studi di Padova (Italia);
1. Aeroelastic study of a bridge cross-section (2008), Enrico Stecca, Università degli Studi di Padova (Italia).

## INSTITUTIONAL RESPONSIBILITY

2024-present	Dean of the Master in Mathematical Engineering (Laurea Magistrale), University of Padova, Italy
2020-present	Representative for the University of Padova in the WORKING GROUP APRE - Civil Security for Society for the definition of the next framework programmes Horizon Europe
2020-present	Member of the Department Council of the Department of Mathematics, Università degli Studi di Padova, Italy;
2022 - present	Member of the commission for new technologies, Department of Mathematics, Università degli Studi di Padova, Italy
2019 - 2022	Member of the commission for spaces, Department of Mathematics, Università degli Studi di Padova, Italy
2013-2017	Head of the Master on Numerical Methods in Engineering of the ETSCCPB (Official master of the UPC). Responsible for the national and international accreditation process (EUR-ACE® Master), Barcelona, Spain;
2013-2017	Member of the commission for research and post graduate of the Civil engineering school of the UPC Barcelona, Spain;
2008-2018	Member of the board of study of the Master Erasmus Mundus in Computational Mechanics of the UPC-Ecole Centrale de Nantes- Swansea University- Stuttgart University;

2011-2013 Member of the Department council de RMEE of the UPC, Barcelona, Spain.

## DOCTORAL BOARDS

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2018-present Member of the Doctoral Board 35°, 36°, 37°, 38°, 39°, 40° cycles - Doctoral School in Mathematics (PhD in Mathematics and Computational Mathematics), Università degli Studi di Padova

2014- 2018 Member of the doctoral board in Structural Analysis and Civil Engineering Doctoral School - UPC-Barcelona TECH, Spain

## DOCTORAL COMMITTEES

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### EVALUATION COMMITTEE -

17/06/2024 Member of the evaluation committee for the thesis: "Lagrangian numerical modelling of wave-structure interaction" by Nicolò Salis, Advisor: Sauro Manenti, University of Pavia, Italy

03/12/2023 External reviewer for the thesis: "Development of a fully coupled hydro-mechanical multi-phase multi-physics SPH framework to model soil internal erosion" by Guodong Ma, Advisor: H.H. Bui, Monash University, Australia

09/10/2023 External reviewer for the thesis: "Development of multiscale reduced order models for the analysis of medical devices" by Augustina Giuliadori, Advisors: E. Soudah and J. Hernandez, Universidad Politécnica de Catalunya, UPC, Barcelona, Spain

22/04/2022 External reviewer for the thesis: "A computational impact analysis approach leveraging non-conforming spatial, temporal and methodological discretisations" by Peter Wilson, Advisors: F. Dilum and A. Scheuermann, Universidad of Queensland, Australia

21/12/2021 Member of the evaluation committee for the thesis: "The Local Maximum-Entropy Material Point Method" by Miguel Molinos, Advisors: M. Pastor and P. Navas, Universidad Politécnica de Madrid, UPM, Madrid, Spain

24/09/2021 Member of the evaluation committee for the thesis: "Numerical modelling of viscoelastic flows based on a log-conformation formulation" by Laura Moreno, Advisors: R. Codina, J. Baiges, Universidad Politécnica de Cataluña, UPC-BarcelonaTECH, Barcelona, Spain

21/12/2020 Member of the evaluation committee for the thesis: "A fully Lagrangian formulation for fluid-structure interaction between free-surface flows and multi-fracturing solids and structures" by Alejandro Cornejo, Advisors: E. Oñate, F. Zarate, Universidad Politécnica de Cataluña, UPC-BarcelonaTECH, Barcelona, Spain

07/2020 Member of the evaluation committee for the thesis: "Fluid Structure Interaction by means of Reduced Order Models" by Alexis Tello, Advisors: R. Codina, J. Baiges, Universidad Politécnica de Cataluña, UPC, Barcelona Spain

12/2019 Member of the evaluation committee for the thesis: "A particle finite element method for fluid related problems in civil engineering" by M.A. Celugueta, Advisor: E. Oñate, Universidad Politécnica de Cataluña, UPC, Barcelona Spain

03/2016 Member of the evaluation committee for the thesis: "Three-dimensional numerical simulation of large scale landslides" by F. Ferri, Advisors: U. Perego, M. Cremonesi, Politecnico di Milano, Italy;

05/2014 Member of the evaluation committee for the thesis: "Elementos finitos mixtos estabilizados para flujos viscoplásticos" by Elvira Moreno, Advisor: M. Cervera, Universidad Politécnica de Cataluña, UPC, Barcelona, Spain

### SELECTION COMMITTEE - (doctoral school)

02/2022 Member of the selection committee for the Doctoral Program at SISSA

05/2022 Member of the evaluation committee for the Doctoral Program at DM - UNIPD

## OTHER CREDITS

### FOREIGN EXPERIENCES

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- (In addition to the Spanish (13 years) and German (3 years) experiences)

2010/05-08 University of Wales, Swansea (UK). Visiting researcher under the supervision of Prof D. Peric. Work on development of a pressure sensitive visco-plastic non Newtonian model in PFEM.

### INTERNATIONAL COLLABORATIONS

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- Prof. Riccardo Rossi, Prof. Miguel Cervera, Prof. Eugenio Oñate, CIMNE-UPC, Spain
- Prof K.W. Bletzinger, Chair for Structural Analysis, Technical University of Munich, Germany
- Prof. Roland Wuechner Chair for Structural Analysis, Technical University of Braunschweig, Germany
- Prof. Miguel Angel Toledo, Dr. Rafael Moran, SERPA group, Technical University of Madrid, Spain
- Dr. Vahid Galavi, DELTARES, Delft, The Netherlands

### CAREER BREAKS

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27 Dec 2016 -17 Apr 2017 Maternity leave.

Padova, 10th December 2024

Antonia Larese