

# Oriol Colomés

## Curriculum Vitae

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### Education

- Mar. 2011 – **Ph.D. in Civil Engineering.**  
 Mar. 2016 Universitat Politècnica de Catalunya, Barcelona, Spain  
 - Dissertation: *Large scale Finite Element solvers for the large eddy simulation of incompressible turbulent flows*  
 - Advisor: Santiago Badia
- Sep. 2005 – **B.S/M.S. in Civil Engineering.**  
 Mar. 2011 Universitat Politècnica de Catalunya, Barcelona, Spain  
 - Final Project: *Footbridge over a railway station in Reus and urban planning of the former cargo area* (in catalan)  
 - Advisor: Joan Ramon Casas  
 - Thesis: *Damage analysis in impact problems* (in spanish)  
 - Advisors: Jose Muñoz, Jose Luis Curiel

### Professional development

- Feb. 2018 – **Emerging Leaders Institute program.**  
 Mar. 2018 Duke University, Durham, NC, USA
- Oct. 2015 – **Pg.C. in Innovation and R&D project management.**  
 Jul. 2016 Universitat Oberta de Catalunya, Barcelona, Spain

### Employment

- Jun. 2020 – **Delft University of Technology**, Delft, Netherlands.  
 present *Assistant Professor*  
 Assistant Professor at the Offshore Engineering Group of the Civil Engineering and Geosciences faculty.
- May. 2016 – **Duke University**, Durham, United States.  
 May. 2020 *Postdoctoral Associate*  
 Includes software development and research activities within the Computational Modeling Lab in the department of Civil and Environmental Engineering (CEE). Research topics: Uncertainty Quantification, Variational multiscale error estimators, solid dynamics, embedded Finite Element methods. (Advised by Prof. G. Scovazzi)
- Apr. 2011 – **Centre Internacional de Mètodes Numèrics en Enginyeria**, Castelldefels, Spain.  
 Apr. 2016 *CIMNE fellow and Generalitat de Catalunya fellow*  
 Includes software development and PhD research activities within the COMFUS group. Research topics: Variational multiscale methods for incompressible turbulent flows. (Supervised by Prof. S. Badia).  
 Teaching assistant from January 2013 to June 2015.

### Qualification for readership

- Mar. 2019 **Lecturer accreditation**, *Catalan University Quality Assurance Agency*, Spain.

### Awards and Fellowships

- October 2018 **Special Doctoral Award.**  
 Universitat Politècnica de Catalunya
- May 2017 **Early career travel award for the 14th U.S. National Congress on Computational Mechanics.**  
 United States Association for Computational Mechanics (USACM)
- October 2016 **Early career travel award. SIAM Conference on the Computational Science and Engineering (CSE17).**  
 Society for Industrial and Applied Mathematics (SIAM)
- Jan. 2013 – **FI-DGR doctoral fellowship.**  
 Jan. 2016 Generalitat de Catalunya

- Apr. 2013 – **AAD teaching fellowship.**  
 May 2013 Generalitat de Catalunya
- Oct. 2009 – **Enginycat teaching fellowship.**  
 Jun. 2011 Generalitat de Catalunya

## Teaching experience

- Sep. 2020 – **Delft University of Technology**, *Civil Engineering and Geosciences*, Delft, Netherlands.  
 present *Instructor*  
 Includes teaching and preparation of support material for the “Introduction to Computational Dynamics of Offshore Structures” course in Offshore and Dredging Engineering master.  
 (4 ECTS credits)
- Jan. 2013 – **Universitat Politècnica de Catalunya**, *EETAC*, Castelldefels, Spain.  
 Jun. 2015 *Teaching Assistant (2013/2014) and Instructor (2014/2015)*  
 Includes teaching and preparation of support material for the “Structures and Material Strength” course in Air Navigation Engineering and Airports Engineering degrees.  
 Main lecturer during 2014/2015 course (4.5 ECTS credits)
- Oct. 2009 – **Universitat Politècnica de Catalunya**, *ETSECCPB*, Barcelona, Spain.  
 Jun. 2011 *Teaching Assistant*  
 Includes practise lectures for the “Metric Geometry and Representation Systems” course in Civil Engineering degree.

## International research projects

- **Development of a Robust Numerical Scheme for Modeling Large Strain Deformations of Geological Structures** .  
 Project funded by ExxonMobil Corporate  
 Period: 01/01/2016 - 31/12/2019  
 Role: Postdoctoral researcher
- **Uncertainty Quantification in LES Computations of Turbulent Multiphase Combustion in a Scramjet Engine (ScramjetUQ).**  
 Project funded by the US Defense Advance Research Projects Agency (DARPA)  
 Period: 01/01/2016 - 31/12/2018  
 Role: Postdoctoral researcher
- **Computational Methods for Fusion Energy (COMFUS).**  
 Starting Grant, Ideas Programme  
 Project funded by the European Research Grant (ERC)  
 Reference: 258443  
 Period: 01/01/2011 - 31/12/2015  
 Role: Graduate researcher

## Publications

- O. Colomé, A. G. Main, L. Nouveau, G. Scovazzi, *A Weighted Shifted Boundary Method for free surface flow problems*, Journal of Computational Physics, Volume 424, January 2021.
- O. Colomé, G. Scovazzi, J. Guillemot, *On the robustness of Variational Multiscale error estimators for the forward propagation of uncertainty*, Computer Methods in Applied Mechanics and Engineering, Volume 342, December 2018, 384-413.
- O. Colomé, G. Scovazzi, I Sraj, O Knio, O Le Maître, *A Finite Volume Error Estimator Inspired by the Variational Multiscale Approach*, 2018 AIAA Non-Deterministic Approaches Conference, January 2018, 1178.
- G. Wang, G. Scovazzi, L. Nouveau, C. E. Kees, S. Rossi, O. Colomé, A. Main, *Dual-Scale Galerkin Methods for Darcy Flow*, Journal of Computational Physics, Vol 354, February 2018, 111-134.
- X. Zeng, G. Scovazzi, N. Abboud, O. Colomé, S. Rossi, *A dynamic variational multiscale method for viscoelasticity using linear tetrahedral elements*, International Journal for Numerical Methods in Engineering, 2017.
- O. Colomé, S. Badia, *Segregated Runge-Kutta time integration of convection-stabilized mixed finite element schemes for wall-unresolved LES of incompressible flows*, Computer Methods in Applied Mechanics and Engineering, Volume 313, January 2017, 189-215.

- O. Colomés, S. Badia, *Segregated Runge–Kutta methods for the incompressible Navier–Stokes equations*, International Journal for Numerical Methods in Engineering, Vol 105, 8 January 2016, 372-400.
- O. Colomés, S. Badia, J. Principe, *Mixed finite element methods with convection stabilization for large eddy simulation of incompressible turbulent flows*, Computer Methods in Applied Mechanics and Engineering, Volume 304, June 2016, 294–318.
- O. Colomés, S. Badia, R. Codina, J. Principe, *Assessment of variational multiscale models for the large eddy simulation of turbulent incompressible flows*, Computer Methods in Applied Mechanics and Engineering, Vol 285, 1 March 2015, 32-63.

## Papers in preparation or submitted

- G. Scovazzi, O. Colomés, N. Abboud, D. Valiveti, H. Huang, *A blended transient/quasistatic Lagrangian framework for salt tectonics simulations with stabilized tetrahedral finite elements*, Submitted.
- M. Lesueur, H. Ratzet, O. Colomés, *Permeability computation of high resolution  $\mu$ CTscan with an unfitted boundary method to improve accuracy*, Submitted
- O. Colomés, N. Abboud, N. Atallah, D. Valiveti, G. Scovazzi, *Simulating erosion and deposition processes in transient geomechanics: An arbitrary Lagrangian/Eulerian Shifted Boundary framework*, In preparation.

## Conferences, Workshops and Invited Talks

- Jul. 2019 O. Colomés, M. khalloufi, A. Main, L. Nouveau, G. Scovazzi, *Embedded Stabilized Methods for Free Surface Flow problems*, US National Conference on Computational Mechanics, Ausitn, Texas, USA
- Apr. 2019 O. Colomés, L. Nouveau, G. Scovazzi, *Embedded Stabilized Methods for Free Surface Flow problems*, FEF 2019, Chicago USA.
- Feb. 2019 O. Colomés, L. Nouveau, G. Scovazzi, *Embedded Stabilized Methods for Free Surface Flow problems*, SIAM-CSE, Spokane, Washington, USA.
- Jul. 2018 O. Colomés, G. Scovazzi, N. Abboud, N. Atallah, *Simulation of Geomechanical Processes Using Viscoelastoplastic Models for Solid Mechanics with Large Deformations*, 13th WCCM, New York, USA.
- Jun. 2018 O. Colomés, G. Geraci, M. S. Eldred and G. Scovazzi, *A Multilevel Monte Carlo approach with an embedded Error Estimator for Computational Fluid Dynamics applications*, ECCM-CFD, Glasgow, UK.
- Apr. 2018 O. Colomés, G. Scovazzi, J. Guillemot, *On the robustness of Variational Multiscale error estimators for the forward propagation of uncertainty*, SIAM-UQ, Garden Grove, California, USA.
- Jan. 2018 O. Colomés, G. Scovazzi, I Sraj, O Knio, O Le Maître, *A Finite Volume Error Estimator Inspired by the Variational Multiscale Approach*, AIAA SciTech, Orlando, USA.
- Aug. 2017 O. Colomés, *The Variational Multiscale method: from stabilization to uncertainty quantification*, Applied Mathematics Colloquium, UNC, Chapel Hill, USA
- Jul. 2017 O. Colomés, G. Scovazzi *Variational Multiscale Error Estimators for the Uncertainty Quantification of Mesh Discretization Errors*. US National Conference on Computational Mechanics, Montreal, Canada
- Jul. 2017 O. Colomés, S. Badia *Extremely scalable Finite Element solvers for turbulent incompressible flows through segregated Runge-Kutta schemes*. SIAM Anual Meeting, Pittsburgh, USA
- Mar. 2017 O. Colomés, G. Scovazzi *Mesh discretization error and uncertainty quantification: a variational multiscale approach*. USACM Uncertainty Quantification and Data-Driven Modelling workshop, Austin, USA.
- Feb. 2017 O. Colomés, G. Scovazzi *Mesh discretization error and uncertainty quantification: a variational multiscale approach*. SIAM Conference on Computational Science and Engineering, Atlanta, USA.
- May 2015 S. Badia, O. Colomés, P. Kus, A. Martin, M. Olm, J. Principe. *On a scalable multiscale/multiphysics finite element framework*. VI International Conference on Computational Methods for Coupled Problems in Science and Engineering, Venice, Italy.

- Apr. 2015 S. Badia, O. Colomé, P. Kus, A. Martin, M. Olm, J. Principe. *FEMPAR: A scalable multiphysics finite element framework*. 1st Pan-American Congress on Computational Mechanics, Buenos Aires, Argentina.
- Mar. 2015 S. Badia and O. Colomé. *Segregated Runge-Kutta time integrators for large scale simulations of turbulent incompressible Flows*. SIAM Conference on Computational Science and Engineering, Salt Lake City, USA.
- Jul. 2014 O. Colomé, S. Badia, R. Codina and J. Principe. *Variational multiscale large eddy simulation of turbulent incompressible flows*. 11th World Congress on Computational Mechanics, Barcelona, Spain.
- Oct. 2013 O. Colomé, S. Badia, R. Codina and J. Principe. *Variational multiscale large eddy simulation of turbulent incompressible flows*. 7th workshop on research in turbulence and transition, Terrassa, Spain.
- Nov. 2013 S. Badia, R. Codina, O. Colomé and J. Principe. *Variational multiscale Large Eddy Simulation of turbulent incompressible flows*. VMS 2013, Barcelona, Spain.
- Feb. 2013 J. Principe, S. Badia, R. Codina and O. Colomé. *Dynamic nonlinear variational multiscale modelling of turbulent flows*. Advances in Computational Mechanics, San Diego, California USA.
- Sep. 2012 S. Badia, O. Colomé, A. Martin, J. Principe. *Substructuring domain decomposition algorithms for parallel 3D fluid-structure interaction simulations*, ECCOMAS 2012, Vienna, Austria.

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## Reviewer in international Journals

- **Journal of Computational Physics**, Elsevier
- **International Journal for Numerical Methods in Fluids**, Wiley
- **Computers and Fluids**, Elsevier

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## Academic societies

- **Society for Industrial Applied Mathematics (SIAM)**, US
- **US Association for Computational Mechanics (USACM)**, US
- **Sociedad Española de Métodos Numéricos en Ingeniería (SEMNI)**, Spain

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## Patents

J. Castellón, O. Colomé. 2013. *Pre-fabricated structural element*. PCT/ES2014/070320, filed April 16, 2014, and issued December 11, 2014.