Curriculum Vitae

CHRISTOS PAPOUTSELLIS

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Research Gate Profile

CURRENT POSITION

September 2025 – ...	**Researcher**, Laboratoire d'Hydraulique Saint-Venant, Chatou, France **Academic Coordinator of master OFFWIND**, Ecole Nationale des Ponts et Chaussées, Institut Polytechnique de Paris
April 2025 – ...	**Adjunct Assistant Professor** Computational Science Research Center, San Diego State University, USA

RESEARCH INTERESTS

Applied Mathematics and Fluid Mechanics, waves in fluids, free-surface flows, stratified fluids, PDEs, numerical methods, dynamical systems, computational fluid dynamics, high performance computing, data analysis, oceanography, ocean and coastal engineering

EXPERIENCE

June 2023 – August 2025	**Assistant Research Scientist** Dpt. of Mechanical and Aerospace Engineering, University of California San Diego, USA *Modeling of nonlinear internal gravity waves*
March 2021 – March 2023	**Research Engineer** National Institute of Advanced Technologies of Brittany (ENSTA), Brest, France *Probabilistic analysis of nonlinear rolling of ships under irregular excitation.* *Development of global analysis methods*
January 2020 – January 2021	**Research Engineer** Institute of Fluid Mechanics of Toulouse (IMFT), France *Modeling of internal tides.*
March 2019 – October 2019	**Postdoctoral Researcher** Center for Research and Teaching in Environmental Geoscience (CEREGE) Marseilles, France *Modeling of seiches and internal waves in the sea of Marmara.*
October 2017 – October 2018	**Postdoctoral Researcher** École Centrale Marseille, Institut de Recherche sur les Phénomènes Hors Equilibre (Irphé) and Saint Venant Hydraulics Laboratory, Chatou, France *Modeling of depth-induced wave breaking in fully nonlinear free-surface potential flow.*

EDUCATION

2016 **PhD in Marine Hydrodynamics**
School of Naval Architecture and Marine Engineering
National Technical University of Athens, Greece

2012 **Master of Science in Mathematical Modeling in Modern Technologies** (2 years)
School of Applied Mathematics and Physical Sciences
National Technical University of Athens, Greece

2009 **Diploma in Applied Mathematics and Physical Sciences** (5 years)
Specialization : Mechanics of materials, Optoelectronics and Lasers
School of Applied Mathematics and Physical Sciences
National Technical University of Athens, Greece

DISSERTATIONS

- PhD Thesis: *Nonlinear water waves over varying bathymetry: Theoretical and numerical study using variational methods*, National Technical University of Athens, December 2016
  dspace.lib.ntua.gr/xmlui/handle/123456789/44741
- Master Thesis: *Nonlinear water waves: Comparison of different variational methods*, National Technical University of Athens, December 2012
- Diploma Thesis: *Numerical and experimental evaluation of spinal implants* (in Greek), National Technical University of Athens, January 2009

PUBLICATIONS

Peer-reviewed publications

1) **Ch. Papoutsellis**, D. Lucas, O. Schmidt, I. Shukla, K. M. Okun (2026) Obliquely Incident Shoaling Internal Gravity Waves Over Mildly Sloping Bathymetries, *Journal of Geophysical Research: Oceans*, 131, e2025JC022650, doi.org/10.1029/2025JC022650

2) **Ch. Papoutsellis**, M.Benoit (2025) On a high-order shallow-water wave model with canonical non-local Hamiltonian structure *Physica D: Nonlinear Phenomena*, 479, 134691, doi.org/10.1016/j.physd.2025.134691

3) **Ch. Papoutsellis**, Y-M Scolan, R. Hascoët (2024) Capsize criteria in beam seas: Melnikov analysis vs. safe basin erosion *Ocean Engineering*, 306, 118024, doi.org/10.1016/j.oceaneng.2024.118024

4) **Ch. Papoutsellis**, M. Mercier, N. Grisouard (2023), Internal tide generation from non-uniform barotropic body forcing *Journal of Fluid Mechanics*, 964, A20.632 doi:10.1017/jfm.2023.358

5) P. Henry, S. Özeren, N. Yakupolu, Z. Çakir, E. de Saint-Léger, O. Desprez de Gésincourt, A. Tengberg, C. Chevalier, **Ch. Papoutsellis**, N. Postacolu, U. Dogan, H. Karabulut, G. Uçarku, and M. N. Çaatay. (2021) Slow build-up of turbidity currents triggered by a moderate earthquake in the Sea of Marmara, *Nat. Hazards Earth Syst. Sci. Discuss.*, doi.org/10.5194/nhess-2021-323.

6) B. Simon, **Ch. Papoutsellis**, M. Benoit, M. Yates. (2019) Comparing methods of modeling depth-induced breaking of irregular waves with a fully nonlinear potential flow approach *Journal of Ocean Engineering and Marine Energy*, doi.org/10.1007/s40722-019-00154-7

7) G. Athanassoulis, C. Mavroeidis, P. Koutsogiannakis, **Ch. Papoutsellis** (2019) A numerical study of the run-up and the force exerted on a vertical wall by a solitary wave propagating over two tandem trenches, *Journal of Ocean Engineering and Marine Energy* doi.org/10.1007/s40722-019-00148-5

8) **Ch. Papoutsellis**, M. Yates, B. Simon, M. Benoit (2019) Modeling of depth-induced wave breaking in a fully nonlinear free-surface potential flow model, *Coastal Engineering* 154, 103579, doi.org/10.1016/j.coastaleng.2019.103579

9) Th. Papathanasiou, **Ch. Papoutsellis**, G. Athanassoulis (2019) Semi-explicit solutions to the water-wave dispersion relation and their role in the nonlinear Hamiltonian Coupled-Mode theory, *Journal of Engineering Mathematics*, 114 (1): 87114. doi.org/10.1007/s10665-018-09983-1

10) **Ch. Papoutsellis**, A. Charalampopoulos, G. Athanassoulis (2018) Implementation of a fully nonlinear Hamiltonian Coupled-Mode Theory, and application to solitary wave problems over bathymetry, *European Journal of Mechanics B, Fluids* 72: 199224. doi.org/10.1016/j.euromechflu.2018.04.015

11) G. Athanassoulis, K. Belibassakis, **Ch. Papoutsellis** (2017) An exact Hamiltonian coupled-mode system with application to extreme design waves over variable bathymetry, *Journal of Ocean Engineering and Marine Energy*. 3(4), 373383. doi.org/10.1007/s40722-017-0096-4, Special Issue: Rogue Waves

12) G. Athanassoulis, **Ch. Papoutsellis** (2017) Exact semi-separation of variables in waveguides with nonplanar boundaries, *Proceedings of the Royal Society A* 473:20170017, doi.org/10.1098/rspa.2017.0017

13) **Ch. Papoutsellis** (2015) Numerical simulation of non-linear water waves over variable bathymetry, *Procedia Computer Science* 66, 174 – 183, doi.org/10.1016/j.procs.2015.11.021

Preprints

1) **Ch. Papoutsellis**, G. Athanassoulis A new efficient Hamiltonian approach to the nonlinear water-wave problem over arbitrary bathymetry, 2017, arxiv.org/abs/1704.03276

Peer-Reviewed Conference Papers

1) *A new high-order shallow water model with canonical Hamiltonian structure* , 18è Journées de l'Hydrodynamique, November 22 - 24, 2022, Poitiers, France (`jh2022.sciencesconf.org/420564`)

2) *Assesment of the Melnikov method for the ship roll problem* (with Y-M. Scolan), 18emes Journées de l'Hydrodynamique, November 22 - 24, 2022, Poitiers, France (`jh2022.sciencesconf.org/413221`)

3) *Modélisation du déferlement dû à la bathymétrie dans un code de simulation des vagues non-linéaires et dispersives en zone côtière* (with M. Yates, B. Simon and M. Benoit), 16emes Journées de l'Hydrodynamique, November 27 - 29, 2018, Marseille, France

4) *Fully nonlinear modeling of nearshore wave propagation including the effects of wave breaking* (with M. Yates, B. Simon and M. Benoit), International Conference on Coastal Engineering, July 30 - August 3, 2018, Baltimore, Maryland, USA

5) *Interaction of solitary water waves with uneven bottom using a Hamiltonian Coupled-Mode System* (with G. Athanassoulis and A. Charalampopoulos), In 6th International Conference Frontiers of Nonlinear Physics, July 17 - 23, 2016, Nizhny Novorod - St. Petersburg, Russian Federation

6) *Nonlinear irrotational water waves over variable bathymetry. The Hamiltonian approach with a new efficient representation of the Dirichlet to Neumann operator*, (with G. Athanassoulis), In Proceedings of the International Conference DAYS on DIFFRACTION 2015, pp. 20 – 26, St. Petersburg, Russian Federation

7) *New Form of the Hamiltonian equations for the nonlinear water-wave problem, based on a new representation of the DtN operator, and some applications* (with G. Athanassoulis), In Volume 7: Ocean Engineering, page V007T06A029, St. John's, Newfoundland, Canada, 2015. ASME.

Peer-Reviewed Abstracts

1) *Oblique Shoaling of Nonlinear Internal Waves: SpaceTime Detection and Numerical Simulations*, 22-26 February 2026, Ocean Sciences Meeting, Glasgow, Scotland

2) *Internal tide generation with adjusted barotropic tidal flow: critical slopes and non-radiating topographies*, Singularities and attractors in rotating and stratified fluids, December 8-9 2022, IRPHE, Marseille France

3) *Internal tide generation due to topographically adjusted barotropic tide* (with M. Mercier and N. Grisouard), Geophysical Research Abstracts, Vol. 19, vEGU21-8707, 2021, EGU General Assembly 2021, Vienna, Austria

4) *Sediment mobilization excited by earthquakes in the sea of Marmara* (with P. Henry, C. Chevalier, N. Yakupolu, S. Özeren, N. Postacolu). 15th International Conference on Cohesive Sediment Transport Processes (INTERCOH 2019), Istanbul, Turkey, 13-17 October 2019

5) *Kinematics and dynamics of a solitary wave interacting with varying bathymetry and/or a vertical wall* (with G. Athanassoulis and A. Charalampopoulos), Geophysical Research Abstracts, Vol. 19, EGU2017-10716, 2017, EGU General Assembly 2017, Vienna, Austria

6) *New form of the Hamiltonian equations for the nonlinear water-wave problem, based to a new representation of DtN operator, and some applications* (with G. Athanassoulis and K. Belibassakis), Geophysical Research Abstracts, Vol. 15, EGU2013-13689-1, 2013, EGU General Assembly 2013, Vienna, Austria

Posters

1) *Hydrodynamic properties of non-linear internal waves in La Jolla coastal waters*, Ocean Sciences Meeting 2024, New Orleans, Louisiana, 2024

2) *Recording and modeling of water column oscillations in the Sea of Marmara* (with P. Henry, C. Chevalier, S. Özeren, N. Postacolu, N. Yakupolu, E. de Saint-Léger, O. de Gésincourt, Z. Çakir, M. Çaatay, A. Paté, L. Géli), Active Tectonics Research Group Meeting, October 15 - 18, 2019, Istanbul, Turkey

INVITED TALKS

- 15th American Institut of Mathematical Sciences Conference, July 2026 (invited)
- “Shallow-Water Modelling Via a Variational Approach: Derivation, Properties, and Numerics" SIAM Conference on Nonlinear Waves and Coherent Structures (NWCS26)
- “High-order modeling of long dispersive water waves” San Diego State University, Computational Science Research Center 2025

AWARDS

- PhD scholarship from National Technical University of Athens, July 2012 – July 2016
- Prize (300) from NTUA for the publication *Exact semi-separation of variables in waveguides with nonplanar boundaries* (with G. Athanassoulis), Proc. R. Soc. A, 473:20170017, 2017.
- Financement E4C (Energy4Climate) : 6 000 de budget mission et 4 000 pour un stage de M2

CONFERENCES

- “Validation of a new high-order shallow water model in variable water depth", International Conference on Coastal Engineering, May 17 - May 22, 2026, Galveston, Texas, USA
- “Oblique Shoaling of Nonlinear Internal Waves: Spacetime Detection and Numerical Simulations" Ocean Sciences Meeting AGU 2026, Glascow, Scotland
- “Internal tide generation with adjusted barotropic tidal flow: critical slopes and non-radiating topographies”, Singularities and Attractors in rotating and stratified fluids, 2022 IRPHE, Marseille, France

- “A new high-order shallow water model with canonical Hamiltonian structure" , 18è Journées de l’Hydrodynamique, November 22 - 24, 2022, Poitiers, France
- “Assesment of the Melnikov method for the ship roll problem", 18emes Journées de l’Hydrodynamique, November 22 - 24, 2022, Poitiers, France
- “Internal tide generation due to topographically adjusted barotropic tide ”, European Geosciences Union, General Assembly 2021
- “Fully nonlinear modeling of nearshore wave propagation including the effects of wave breaking", International Conference on Coastal Engineering, July 30 - August 3, 2018, Baltimore, Maryland, USA
- “Implementation and test of a modeling strategy for depth-induced breaking in fully nonlinear potential flow models", B’WAVES, May 28 - June 1, 2018, Marseille, France
- “Numerical simulation of non-linear water waves over variable bathymetry", 4th International Young Scientists Conference on Computational Science, June 25 - July 3 2015, Athens, Greece
- “Nonlinear irrotational water waves over variable bathymetry. The Hamiltonian approach with a new efficient representation of the Dirichlet to Neumann operator", International Conference DAYS on DIFFRACTION 2015, St. Petersburg, Russian Federation
- European Geosciences Union, General Assembly 2013, Vienna, Austria 7–12 April 2013
- International conference on Modern Mathematical Methods in Science and Technology, 3–5 September 2009, Poros, Greece

TEACHING

- 2003 – 2010 : Tutoring Mathematics and Physics for High School students (Private Sector)
- 2010 – 2017 : Tutoring Numerical Analysis and Partial Differential Equations for Undergraduate Students in Avakas Group (Private Sector)
- 2012 – 2016: Teaching assistant at the National Technical University of Athens (Courses, Laboratory Work and assistance in the supervision of Diploma theses). Courses: Probability Theory and Statistics: Applications in the marine environment, Ship dynamics and laboratory, Wave phenomena in the marine environment, Wavelet analysis, time-frequency analysis and applications
- 2021–2022 : Teaching assistant at ENSTA Bretagne: Fluid Mechanics (Wing theory), Variational Calculus, Partial Differential Equations, Mathematics for Engineers
- 2024 : Co-supervising final year students at École Centrale Méditerranée working on mathematical modeling of surface-wave propagation
- 2025– : Coordinator of the first year project in Ecole Nationale des Ponts et Chaussées, Institut Polytechnique de Paris
- June 2026–: Master thesis supervisor “Simulation of random sea states in the coastal zone"

JOURNAL REVIEW

- Studies in Applied Mathematics, Wiley
- Journal of Fluid Mechanics, Cambridge University Press
- Proceedings of the Royal Society A, Mathematics, Physics, Engineering
- Physica D: Nonlinear Phenomena, Elsevier
- Applied Ocean Research, Elsevier
- Water Waves, Springer
- Ocean Dynamics, Springer

- Scientific Reports, Nature
- Journal of Offshore Mechanics and Arctic Engineering, ASME

RESEARCH VISITS

- Basque Center of Applied Mathematics, Bilbao, Spain, *Simulation of phase transitions using the Allen-Cahn equation* 20-24 March 2022
- San Diego State University, Computational Science Research Center, CA,USA, *Structure-preserving schemes for hyperbolic and dispersive PDEs*, 8-15 May 2026