

Curriculum Vitae

CHRISTOS PAPOUTSELLIS

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CURRENT POSITION

September 2025 – **Researcher**, Laboratoire d’Hydraulique Saint-Venant, Chatou, France
... **Academic Coordinator**, 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, water waves, waves in fluids, surface waves, internal waves, PDEs, dynamical systems, computational fluid dynamics, numerical methods, high performance computing, data analysis, oceanography, ocean and coastal engineering

EXPERIENCE

June 2023 – **Assistant Research Scientist**
August 2025 Dpt. of Mechanical and Aerospace Engineering, University of California San Diego, USA
Modeling of nonlinear internal gravity waves

March 2021 – **Research Engineer**
March 2023 National Institute of Advanced Technologies of Brittany (ENSTA), Brest, France
Subject: *Probabilistic analysis of nonlinear rolling of ships under irregular excitation.*
Development of global analysis methods

January 2020 – **Research Engineer**
January 2021 Institute of Fluid Mechanics of Toulouse (IMFT), France
Subject: *Modeling of internal tides.*

March 2019 – **Postdoctoral Researcher**
October 2019 Center for Research and Teaching in Environmental Geoscience (CEREGE)
Marseilles, France
Subject: *Modeling of seiches and internal waves in the sea of Marmara.*

October 2017 – **Postdoctoral Researcher**
October 2018 École Centrale Marseille, Institut de Recherche sur les Phénomènes Hors Equilibre (Irphé) and Saint Venant Hydraulics Laboratory, Chatou, France
Subject: *Modeling of depth-induced wave breaking in fully nonlinear free-surface potential flow.*

EDUCATION

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|------|--|
| 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

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.

PUBLICATIONS

Peer-reviewed publications

- 1) **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
- 2) **Ch. Papoutsellis**, Y-M Socolan, 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
- 3) **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](https://doi.org/10.1017/jfm.2023.358)
- 4) 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.
- 5) 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
- 6) 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

- 7) **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
- 8) 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
- 9) **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
- 10) 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
- 11) 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
- 12) **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**, D. Lucas, O. Schmidt, I. Shukla, K. M. Okun (2025) Obliquely Incident Shoaling Internal Gravity Waves Over Mildly Sloping Bathymetries (under revision)
- 2) **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* , 18^è 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), 18^{emes} 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), 16^{emes} 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) *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
- 2) *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
- 3) *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
- 4) *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
- 5) *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

TALKS

- “High-order modeling of long dispersive water waves” San Diego State University, Computational Science Research Center 2025 
- “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 undergraduate students École Centrale Méditerranée working on mathematical modeling of surface-wave propagation

JOURNAL REVIEW

- Studies in Applied Mathematics, Wiley
- Journal of Fluid Mechanics, Cambridge University Press
- Physica D: Nonlinear Phenomena, Elsevier
- Applied Ocean Research, Elsevier
- Water Waves, Springer
- Scientific Reports, Nature
- Water, Geosciences, MDPI
- Journal of Nonlinear Modeling and Analysis, Global Science Press
- 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

OTHER ACADEMIC ACTIVITIES

- One World Meeting of Young Mathematicians in Fluid Dynamics, June 17 – 18, 2021 (online)
- Spring School in Nonlinear Partial Differential Equations, May 30 – June 6 2012, Brussels, Belgium
- Summer School in Computational Fluid Dynamics, 20 – 24 July 2009, School of Chemical Engineering, National Technical University of Athens, Greece
- Summer School in Mathematics for Biomedical Engineering, June 2006, University of Warwick, United Kingdom

COMPUTER SKILLS

- Programming Languages: MATLAB, Fortran, Python, Julia, C++
- Math Software: *Mathematica*
- Simulation Software: ANSYS, MITgcm, CROCO (oceanic modeling system)
- Computer-Aided Design: SOLIDWORKS
- Text: $\text{\LaTeX}$, MS Word

Last update: October, 2025