

Curriculum Vitae

# CHRISTOS PAPOUTSELLIS

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[Research Gate Profile](#)

## PERSONAL DETAILS

Date of Birth: March 12, 1984  
Nationality: Greek

## CURRENT POSITION

June 2023 – **Assistant Project Scientist**  
... University of California San Diego, USA

## RESEARCH INTERESTS

Mathematical modeling for fluid mechanics, free-surface waves, internal waves, dynamical systems, coastal and ocean engineering, oceanography

## EXPERIENCE

March 2021 – March 2023	<b>Postdoctoral Researcher</b> National Institute of Advanced Technologies of Brittany (ENSTA), Brest, France Subject: <i>Probabilistic analysis of nonlinear rolling of ships under irregular excitation.</i> <i>Development of global analysis methods</i>
20-24 March 2022	<b>Visitor</b> Basque Centre of Applied Mathematics, Bilbao, Spain Subject: <i>Simulation of phase transitions using the Allen-Cahn equation</i>
January 2020 – January 2021	<b>Postdoctoral Researcher</b> Institut of Fluid Mechanics of Toulouse (IMFT), France Subject: <i>Modelling of internal tides.</i>
March 2019 – October 2019	<b>Postdoctoral Researcher</b> Centre for Research and Teaching in Environmental Geoscience (CEREGE) Marseille, France Subject: <i>Modelling of seiches and internal waves in the sea of Marmara.</i>
October 2017 – October 2018	<b>Postdoctoral Researcher</b> École Centrale Marseille, Institut de Recherche sur les Phénomènes Hors Equilibre (Irphé) and Saint Venant Hydraulics Laboratory, Chatou, France Subject: <i>Modelling of depth-induced wave breaking in fully nonlinear free-surface potential flow.</i>

## EDUCATION

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| 2016 | <b>PhD in Marine Hydrodynamics</b><br>School of Naval Architecture and Marine Engineering<br>National Technical University of Athens, Greece   |
| 2012 | <b>Master of Science in Mathematical Modelling in Modern Technologies</b> (2 years)<br>School of Applied Mathematics and Physical Sciences<br>National Technical University of Athens, Greece  |
| 2009 | <b>Diploma in Applied Mathematics and Physical Sciences</b> (5 years)<br>Specialization : Mechanics of materials, Optoelectronics and Lasers<br>School of Applied Mathematics and Physical Sciences<br>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  
<https://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  
<http://dspace.lib.ntua.gr/handle/123456789/38248>
- 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. <https://arxiv.org/abs/1702.04777>

## PUBLICATIONS

Peer-reviewed publications

- 1) **Ch. Papoutsellis**, M. Mercier, N. Grisouard, 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)
- 2) Henry, P., Özeren, S., Yakupoğlu, N., Çakir, Z., de Saint-Léger, E., Desprez de Gésincourt, O., Tengberg, A., Chevalier, C., Papoutsellis, C., Postacıoğlu, N., Dogan, U., Karabulut, H., Uçarkuş, G., and Çağatay, M. N.: Slow build-up of turbidity currents triggered by a moderate earthquake in the Sea of Marmara, *Nat. Hazards Earth Syst. Sci. Discuss.* [preprint], <https://doi.org/10.5194/nhess-2021-323>, in review, 2021.
- 3) 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*, <https://doi.org/10.1007/s40722-019-00154-7>
- 4) G. Athanassoulis, C. Mavroeidis, P. Koutsogiannakis, **Ch. Papoutsellis** *A numerical study of the run-up and the force exerted on a vertical wall by a solitary wave propagating over two tandem trenches*, 2019, *Journal of Ocean Engineering and Marine Energy*. <https://doi.org/10.1007/s40722-019-00148-5> (<https://arxiv.org/abs/1907.11085>)
- 5) **Ch. Papoutsellis**, M. Yates, B. Simon, M. Benoit *Modeling of depth-induced wave breaking in a fully nonlinear free-surface potential flow model*, *Coastal Engineering* (2019) 154, 103579, <https://doi.org/10.1016/j.coastaleng.2019.103579> (<https://arxiv.org/abs/1910.08982>)

- 6) Th. Papathanasiou, **Ch. Papoutsellis**, G. Athanassoulis. *Semi-explicit solutions to the water-wave dispersion relation and their role in the nonlinear Hamiltonian Coupled-Mode theory*, Journal of Engineering Mathematics, (2019) 114 (1): 87–114. <https://doi.org/10.1007/s10665-018-09983-1> (<https://arxiv.org/abs/1802.07963>)
- 7) **Ch. Papoutsellis**, A. Charalampopoulos, G. Athanassoulis. *Implementation of a fully nonlinear Hamiltonian Coupled-Mode Theory, and application to solitary wave problems over bathymetry*, European Journal of Mechanics B, Fluids (2018) 72: 199–224. <https://doi.org/10.1016/j.euromechflu.2018.04.015> (<https://arxiv.org/abs/1710.10847>)
- 8) G. Athanassoulis, K. Belibassakis, **Ch. Papoutsellis**. *An exact Hamiltonian coupled-mode system with application to extreme design waves over variable bathymetry*, Journal of Ocean Engineering and Marine Energy. (2017) 3(4), 373–383. <https://doi.org/10.1007/s40722-017-0096-4>, Special Issue: Rogue Waves
- 9) **Ch. Papoutsellis**, G. Athanassoulis. *Exact semi-separation of variables in waveguides with nonplanar boundaries*, Proceedings of the Royal Society A (2017) 473:20170017, <https://doi.org/10.1098/rspa.2017.0017> (<https://arxiv.org/abs/1702.04777>)
- 10) **Ch. Papoutsellis**. *Numerical simulation of non-linear water waves over variable bathymetry*, Procedia Computer Science (2015) 66, 174 – 183, <https://doi.org/10.1016/j.procs.2015.11.021>

#### Preprints

- 1) **Ch. Papoutsellis**, A new high order shallow water wave model (in preparation)
- 2) **Ch. Papoutsellis**, Yves-Marie Scolan, Assessment of Melnikov curves for the ship-roll problem in harmonic and random beam seas (to be submitted to Ocean Engineering)
- 3) **Ch. Papoutsellis**, P. Henry, C. Chevalier, Hydrodynamic simulation of tsunamis and seiches due to earthquakes in a closed basin: The Sea of Marmara Example (in preparation)
- 4) **Ch. Papoutsellis**, G. Athanassoulis *A new efficient Hamiltonian approach to the nonlinear water-wave problem over arbitrary bathymetry*, 2017, (<http://arxiv.org/abs/1704.03276>)

#### Peer-Reviewed Conference Papers

- 1) *A new high-order shallow water model with canonical Hamiltonian structure*, 18<sup>e</sup> Journées de l’Hydrodynamique, November 22 - 24, 2022, Poitiers, France (<https://jh2022.sciencesconf.org/420564>)
- 2) *Assesment of the Melnikov method for the ship roll problem* (with Y-M. Scolan), 18<sup>emes</sup> Journées de l’Hydrodynamique, November 22 - 24, 2022, Poitiers, France (<https://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<sup>emes</sup> 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 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
- 2) *Sediment mobilization excited by earthquakes in the sea of Marmara* (with P. Henry, C. Chevalier, N. Yakupoğlu, S. Özeren, N. Postacioğlu). 15th International Conference on Cohesive Sediment Transport Processes (INTERCOH 2019), Istanbul, Turkey, 13-17 October 2019
- 3) *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
- 4) *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) *Recording and modeling of water column oscillations in the Sea of Marmara* (with P. Henry, C. Chevalier, S. Özeren, N. Postacioğlu, N. Yakupoğlu, E. de Saint-Léger, O. de Gésincourt, Z. Çakir, M. Çağatay, A. Paté, L. Géli), Active Tectonics Research Group Meeting, October 15 - 18, 2019, Istanbul, Turkey

## CONFERENCES

- **Talk:** “Internal tide generation due to topographically adjusted barotropic tide”, European Geosciences Union, General Assembly 2021
- **Talk:** “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
- **Talk:** “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
- **Talk:** “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
- **Talk:** “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

## JOURNAL REVIEW

- Water Waves, Springer
- Studies in Applied Mathematics, Wiley
- Journal of Fluid Mechanics
- Water, Geosciences, MDPI
- Journal of Offshore Mechanics and Arctic Engineering, ASME

## 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
- Master 2 Courses, Partial Differential Equations and scientific computing, October 2008-May 2009, University Paris-Sud XI, Orsay, France
- Summer School in Mathematics for Biomedical Engineering, June 2006, University of Warwick, United Kingdom

## INTERNSHIPS

- Network Administration, Municipality of Lesvos, Greece, June-July 2005
- C++ programming, 4M-Advanced Technical Software Systems, Athens, Greece, September 2002-January 2003

## COMPUTER SKILLS

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

## LANGUAGES

- Greek: Native
- English: Fluent
- French: Fluent

## REFERENCES

### **Prof. Michel Benoit**

Saint-Venant Hydraulics Laboratory  
(Ecole des Ponts ParisTech, EDF R&D)  
Laboratoire National d'Hydraulique  
et Environnement (LNHE)  
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### **Dr. Marissa Yates**

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### **Dr. Matthieu Mercier**

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### **Prof. Gerassimos Athanassoulis**

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### **Professor Yves-Marie Scolan**

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