

# CURRICULUM VITAE

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*Professor Emeritus, National Technical University of Athens (NTUA)*

**2023**

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## EDUCATION

- 1982:     **Ph.D. in Naval and Marine Hydrodynamics**  
School of Mechanical Engineering,  
Department of Naval Architecture and Marine Engineering,  
National Technical University of Athens  
Dissertation title: "*Study of unsteady free-surface flows with the aid of variational principles. Part A: Inviscid flows. Part B: Viscous flows*".
- 1977:     **Diploma of Naval Architecture and Marine Engineering,**  
School of Mechanical Engineering,  
Department of Naval Architecture and Marine Engineering,  
National Technical University of Athens

## PROFESSIONAL EXPERIENCE

- 2021-today   **Professor Emeritus (NTUA)**
- 1997-2020   **Professor**  
School of Naval Architecture and Marine Engineering  
National Technical University of Athens
- 2014-2017   **Research Professor**  
St. Petersburg State University of Information Technologies, Mechanics  
and Optics (ITMO University)
- 2004         **Visiting Professor**  
Centre for Ships and Ocean Structures  
[Center of Excellence associated with the  
Norwegian University of Science and Technology],  
Trondheim, Norway
- 1992-1996   **Associate Professor**  
Department of Naval Architecture and Marine Engineering,  
National Technical University of Athens
- 1990-1995   **Researcher** (under contract)  
Institute of Computational and Applied Mathematics,  
Foundation For Research and Technology HELLAS, Heraklion, Crete
- 1987-1992   **Assistant Professor**  
Department of Naval Architecture and Marine Engineering,  
National Technical University of Athens
- 1984-1987   **Lecturer**  
Department of Naval Architecture and Marine Engineering,  
National Technical University of Athens

## TEACHING EXPERIENCE

### UNDERGRADUATE COURSES

**Ship Dynamics** (since 1984)

**Probability Theory and Statistics with Applications in the Maritime Environment**  
(since 1995)

**Stochastic Modeling and Forecasting of Maritime Systems** (elective)

**Wave Phenomena in the Sea Environment** (elective)

**Applied Functional Analysis (with emphasis on engineering problems)** (elective)

### GRADUATE COURSES

**Main courses, continuously taught for about 20 years**

#### **1. Modeling of the Continuum**

which, in 2018, was transformed into

##### **1a. Optimization problems and variational principles of Mathematical Physics**

This course contains three modules:

(A) Elements of Nonlinear Analysis: Nonlinear functionals and operators in metric linear spaces, Functional derivatives (Volterra, Gâteaux, Fréchet, Hadamard), Some theorems of Calculus in Infinite Dimensional Spaces, Extremization of functionals. constraint optimization, Noether's Theorems.

(B) Analytical (Variational) Mechanics: Constraints, Classification of Constraints, Holonomic and Nonholonomic Systems, the Principle of Virtual Work, Lagrange Equations for Holonomic Systems, Potentials, Appell Equations for Nonholonomic Systems, Gauss-Gibbs Principle, Hamilton Principle, Hamiltonian Equations, Symmetries and Conservation Theorems, Canonical Variables and Transformations.

(C) Variational Principles of Mathematical Physics: each year we focus on one of the subjects, Solid Mechanics, or Fluid Mechanics, or Electromagnetism, studying the fundamental equations and various Variational Formulations of the corresponding continuum field.

#### **2. Stochastic Modeling of Macroscopic Phenomena and Processes**

which, in 2018, was transformed into

##### **2a. Non-Markovian Stochastic Functions. Stochastic Dynamics**

This course starts with a quick review of Measure-Theoretic Probability, focused on the construction of Probability Measures from premeasures on semi-algebras of sets, and proceed with the following three modules:

(A) Elements of the general theory of Stochastic Functions: The Hierarchy of finite-dimensional probability distributions, Kolmogorov's Theorem on the existence of a Cylindrical Measure, Inadequacy of Kolmogorov's Theorem, the Doob's Approach, Transferring the Probability Measure in convenient function spaces, Separable stochastic functions.

**(B) Calculus of Stochastic Functions:** Stochastic limits in Probability, in  $L^2$  sense, and with Probability 1. Continuity, differentiability and integrability of stochastic functions in all three senses, Theorems of  $L^2$ -Calculus, connection with Calculus with Probability 1.

**(C) Ordinary Differential Equations with generic random (non-delta-correlated) excitation.** Difficulties from the non-Markovian character of the responses. Liouville equation and Stochastic Liouville equation, The response as a functional (operator) on the time history of excitation. Variational equation of ODEs using Volterra functional derivative, The Characteristic functional, Decoupling techniques, the Furutsu-Novikov Theorem and some extensions of it, Derivation of pdf-evolution equations for the responses of Dynamical Systems (generalized FPK Equations for non-Markovian response pdfs). The joint response-excitation approach. General discussion on the formulation and the various types/levels of solution to Stochastic Dynamics Problems. Reflections to Stochastic Continuum Theories.

**Other course, taught several times in the past**

**3. Wave Phenomena in the Sea Environment**

**4. Non-linear waves (focusing on water waves)**

**5. Wavelet Analysis, Harmonic Analysis and Applications**

## ACADEMIC ADMINISTRATIVE EXPERIENCE

- 2010-2011 **Representative of the NTUA Academic staff member Association in the Senate**
- 2009-2010 **Director of Ship and Marine Hydrodynamics Section** of the School of Naval Architecture and Marine Engineering (NTUA)
- 2007-2009 **Representative of the NTUA Academic staff member Association in the Senate**
- 2007-2009 **Representative of the NTUA Academic staff member Association in the Rectorial Council**
- 2007-2009 **Representative of the NTUA Academic staff member Association in the Research Committee of NTUA**
- 2006-2016 **Member of the NTUA Senate Committee of the University Premises and Facilities**
- 2005-2007 **Dean of the School** of Naval Architecture and Marine Engineering
- 2005-2020 **Member of the Interdepartmental Administrative Committee of the Graduate Program “*Applied Mathematical Sciences*”**
- 2004-2020 **Member of the Interdepartmental Administrative Committee of the Graduate Program “*Mathematical Modelling in Modern Technologies and Financial Engineering*”**
- 2002-2003 **Director of Ship and Marine Hydrodynamics Section** of the School of Naval Architecture and Marine Engineering (NTUA)
- 2001-2002 **Director of Ship and Marine Hydrodynamics Section** of the School of Naval Architecture and Marine Engineering (NTUA)
- 2000-2003 **Deputy Member of the Research Committee of NTUA**
- 2000-2003 **Member of the Senate Committee for Basic Research**
- 1999-2020 **Member of the Interdepartmental Administrative Committee of the Graduate Program “*Naval and Marine Technology and Science*”**
- 1988-1990 **Representative of the Academic staff of the School of Naval Architecture and Marine Engineering in the Senate**
- 1988-1990 **Member of the Senate Committee for University Publications**
- 1988-1990 **Member of the Senate Library Committee**

I am a member of the General Assembly of the School of Naval Architecture and Marine Engineering since 1984, and I have participated in various Committees of the School.

## FIELDS OF SCIENTIFIC INTEREST

- Free-surface hydrodynamics and wave-body interaction problems, including ship motions and loads, and ship wave resistance.
- Analytical dynamics and variational principles for hydromechanical systems containing bodies (rigid or elastic) and liquid with a free surface and/or interfaces.
- Partial differential equations, with emphasis on exterior (unbounded-domain) problems.
- Wave phenomena in the sea, including surface gravity waves, acoustic waves in water column and elastic waves in the sea bottom (modelling, mathematical theory, numerical methods).
- Wavelets and time-frequency techniques for studying wave propagation and scattering. Wavelet-Galerkin and Gabor-Galerkin techniques for solving wave propagation problems.
- Stochastic modelling and analysis of environmental parameters. Wave climate.
- Stochastic dynamics of mechanical and hydromechanical systems. Probabilistic characterization of the responses of dynamical systems. Stochastic wave propagation in the sea.
- Inverse problems associated with wave phenomena in the sea, including ocean acoustic tomography.
- Integrated software packages concerning the sea environment (geographical background, wind and surface waves).

## SUPERVISING OF DOCTORAL DISSERTATIONS

The following people have completed or are in progress of completing their Doctoral Dissertations at National Technical University of Athens, under my supervision<sup>(1)</sup>:

### A. Finished

1. **1990** C.G. Politis<sup>(2)</sup>: "Theoretical analysis of the wave-body interaction problem with emphasis on the low-frequency and large time asymptotics".
2. **1992** G.N. Makrakis<sup>(3)</sup>: "Elastic Wave Propagation in a half plane with a hole".
3. **1995** A.A. Theodoulidis<sup>(4)</sup>: "Steady free-surface flows around a finite obstacle or an applied pressure system. Linear and non-linear problem".
4. **1995** T.H. Soukissian<sup>(5)</sup>: "Methods of long-term analysis and prediction of sea wave climate".
5. **1999** Ch.N. Stefanakos<sup>(6)</sup>: "Nonstationary stochastic modelling of time series with applications to environmental data".
6. **2000** A. Prospathopoulos<sup>(7)</sup>: "Three-dimensional acoustic scattering from axisymmetric obstacles or inclusions in oceanic wave guides".
7. **2004** Th.P. Gerostathis<sup>(8)</sup>: "Wave propagation in the nearshore/coastal environment using models appropriate for parallel processing".
8. **2006** P.N. Gavriliadis<sup>(9)</sup>: "Theoretical and numerical exploitation of the moment problem with applications to the probabilistic prediction of stochastic responses of dynamical systems".
9. **2008** K.S. Politis: "Modeling and numerical solution of wave propagation problems in the sea by means of wavelets and Gabor frames"

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<sup>(1)</sup> In the following footnotes, the current positions (affiliations) of these Doctors are given.

<sup>(2)</sup> Professor, Department of Naval Architecture, University of West Attica.

<sup>(3)</sup> Profesor, Dept. of Applied Mathematics, University of Crete, and Researcher at the Institute of Applied and Computational Mathematics, Foundation of Research and Technology, Heraklion Crete.

<sup>(4)</sup> Assistant Professor, Department of Naval Architecture, University of West Attica.

<sup>(5)</sup> Researcher (permanent position) at Hellenique Center for Marine Research.

<sup>(6)</sup> Senior Research Scientist, Department of Fisheries and New Biomarine Industry, SINTEF Ocean AS, Trondheim, Norway.

<sup>(7)</sup> Researcher at Hellenique Center for Marine Research (Technical Scientist).

<sup>(8)</sup> Associate Professor, Department of Naval Architecture, University of West Attica.

<sup>(9)</sup> Researcher and Special Education Staff at National Technical University of Athens.



10. 2012 G.D. Gikas: “Nonlinear system modeling and identification of an onshore oscillating water column-wave energy converter, using Volterra series and Hilbert-Huang transform”
11. 2013 S.-I. C. Tsantili<sup>(10)</sup>: “Two-time response excitation theory for non linear stochastic dynamical systems”
12. 2016 Ch.E. Papoutsellis<sup>(11)</sup>: “Nonlinear Water Waves over varying bathymetry. Theoretical and numerical study using variational methods”
13. 2020 K.I. Mamis<sup>(12)</sup>: “Probabilistic responses of dynamical systems subjected to Gaussian coloured noise excitation. Foundations of a non-Markovian theory”

## B. In progress

- Z. Kapelonis “Propagation and scattering of waves in stochastic media”
- K. Mavroeidis “Variational study of Non-linear Rotational Free-surface Flows (rotational water waves)”
- N. Nikolettatos-Kekatos “Numerical Solution of Non-local, Non-linear Evolution Equations Arising in Stochastic Dynamics (Probabilistic Responses)”
- A. Pavlou “Extreme Value Analysis of Input and Output of Nonlinear Oscillators”

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<sup>(10)</sup> Post Doctoral Researcher, SEMFE, NTUA, and Mathematics Teacher in Marasleio Secondary School of Athens, Greece

<sup>(11)</sup> Post Doctoral Researcher, École Nationale Supérieure de Techniques Avancées (ENSTA), Bretagne, France

<sup>(12)</sup> Post Doctoral Researcher, Department of Mathematics, North Carolina State University, USA

## PARTICIPATION IN GRADUATE PROGRAMS

I am participating to the Following Interdepartmental-Interdisciplinary Graduate Programs of NTUA (as Instructor giving Courses and as a Member of the Administrative Committee):

- ***“Naval and Marine Technology and Science”***  
**School of Naval Architecture & Marine Engineering**, in collaboration with four more Schools of NTUA (Mechanical Engineering, Rural and Surveying Engineering, Electrical and Computer Engineering, Applied Mathematics and Physics), the Department of Physics of the National Kapodistrian Univ. of Athens, and the Hellenic Center for Marine Research.
  
- ***“Mathematical Modelling in Modern Technologies and Financial Engineering”***  
**School of Applied Mathematics and Physics**, in collaboration with three more Schools of NTUA (Naval Architecture & Marine Engineering, Electrical and Computer Engineering, and Chemical Engineering) and the National Centre of Scientific Research "DEMOKRITOS".
  
- ***“Applied Mathematical Sciences”***  
**School of Applied Mathematics and Physics**, in collaboration with two more Schools of NTUA (Naval Architecture & Marine Engineering and Mechanical Engineering).

## SUPERVISING OF MASTERS' THESES

The following people have completed their Masters' Theses at National Technical University of Athens, under my supervision (**incomplete list**):

- |      |                 |   |
|------|-----------------|---|
| 1997 | J.N. Burkow     | “Methods for obtaining the probability structure of the response of linear systems subject to stochastic excitations” <sup>(13)</sup> |
| 2000 | I. Perivolaris  | “Stochastic modelling of turbulence: Basic notions and dynamical equations”   |
| 2002 | I. Georgiou     | “Spectral representation of waves in shallow waters over general topography”  |
| 2002 | K. Politis      | “Wavelets: Basic theory & applications to the solutions of partial differential equations”  |
| 2002 | G. Sgouros      | “Wavelets: Basic theory & applications to Hydroacoustics”   |
| 2002 | Sp. Volonakis   | “Three-dimensional imaging of the sea bed using multibeam side sonar”   |
| 2005 | M. Chatzinaki   | “Kernel density estimations and regression analysis with application to wave data”  |
| 2007 | Chr. Tsamalis   | “Stochastic models of pollutants' diffusion in the atmosphere”  |
| 2007 | G.D. Gikas      | “Aspects of Modern System Theory with Emphasis on Generic Approximate Representations. Application to Wave Energy Devices”            |
| 2008 | D. Boskos       | “Spectral Representation of non-Stationary Second Order Random Processes”   |
| 2008 | P. Spilioti     | “Application of Hamilton's Principle to Dimensionally Non-Uniform Mechanical Systems”   |
| 2008 | A. Portokalakis | “Stochastic Processes of Independent Values and Independent Increments (of second order)”   |
| 2008 | Ch. Tsalis      | “Probability distributions of wave characteristics in a random sea”   |

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<sup>(13)</sup> Student of Norwegian University of Science and Technology, who spent a semester at NTUA in the context of ERASMUS programme.

- 2011 Z. Kapelonis “Acoustic Wave Propagation in Stochastic Marine Environments”
- 2011 G. Momferatos “Study of inertial particle motion in isotropic incompressible turbulence”
- 2011 S. Papassavvas “Averaged equations in coastal hydrodynamics. The concept of radiation stresses”
- 2011 E. Boultzis “Compactness, Fixed Point Theorems, and Applications to Economics”
- 2012 Ch. Malliopoulos “Local Trigonometric Bases and their Applications to the Segmentation of Continuous Speech”
- 2012 Ch. Papoutsellis “Nonlinear water waves: Comparisons of different variational methods”
- 2015 S. Katsimardou “Positive Definite Functions and Karhunen-Loeve Theorem”
- 2015 A. Aveklouris “Integral Approximation of Multidimensional pdfs and Its Connection With Large Sample Theory”

## **MEMBER OF SCIENTIFIC SOCIETIES AND INTERNATIONAL COMMITTEES**

I have been / I am member in the following Scientific Societies And International Committees

- **ISSC Environmental Committee I.1**, International Ship and Offshore Structures Committee (Member of Committee I.1 (Environment) for the periods 1991-1994, 1994-1997, 1997-2000)
- **SNAME**, Society of Naval Architects and Marine Engineers
- **ASA**, Acoustical Society of America
- **SIAM**, Society of Industrial and Applied Mathematics
- **AMS**, American Mathematical Society
- **AAAS**, American Association for the Advancement of Science
- **NYAS**, New York Academy of Science
- **ASME**, American Society of Mechanical Engineers
- **MPS**, Mathematical programming Society
- The New York Academy of Sciences
- Technical Chamber of Greece
- Σύλλογος Διπλ. Ναυπηγών Μηχανολογών Μηχανικών
- Hellenic Institute of Marine Technology
- Hellenic Institute of Acoustics

## **REVIEWER**

I have been reviewer in various International Scientific Journals, including the following ones

- Acta Acoustica
- Applied Mathematics and Computation
- Journal of Fluid Mechanics
- Journal of Acoustical Society of America
- Journal of Computational Acoustics
- Journal of Computational and Applied Mathematics
- International Journal for Numerical Methods in Fluids
- International Journal of Non-Linear Mechanics
- Ocean Engineering
- Oceanologia (Polish Academy of Sciences)
- Proceedings of the Royal Society, series A
- Probabilistic Engineering Mechanics
- Theoretical and Applied Climatology

I have been reviewer in various International Scientific Conferences, including the following ones

- **IMAM**, International Maritime Association of the Mediterranean Congresses
- **ISOPE**, International Society of Offshore and Polar Engineering Conferences
- **OMAE**, Offshore Mechanics and Arctic Engineering Conferences
- **Waves 2005** (June 20-24, Brown University, Long Island, USA)

## INVITED SPEAKER IN CONFERENCES – WORKSHOPS – SEMINARS

- **November 2000. International Workshop on Rogue Waves**  
[SeaTech Week 2000], held in Brest, France, on 29-30 November 2000.  
*Title of presentation:* "A complete modal expansion of the wave potential and its application to linear and nonlinear water-wave problems" (co-authored by K.A. Belibassakis).
- **June 2001. Greek Conference in Applied Mathematics**  
(in honour of Professor Constantin Dafermos at the occasion of his 60<sup>th</sup> birthday), held in Heraklion, Crete, on 22-24 June 2001).
- **June 2004. "Mathematical Modeling in Physical Sciences and Modern Technologies: New developments and Challenges"**.  
A workshop organized by the Department of Mathematics of the Aegean University, held in Karlovasi, Samos, on 12 June 2004
- **July 2004. Days of Diffraction 2004. International Seminar**  
held in St. Petersburg, Russia, on June 29-July 3, 2004.  
*Title of presentation:* "A Gabor-Galerkin approach for solving infinite-energy problems with constrained-at-infinity admissible functions" (co-authored by K.S Politis).
- **October 2004. Workshop on Very Large Floating Structures**  
held in Trondheim, Norway, on 28-29 October 2004, at Centre of Excellence for Ships and Ocean Structures (CeSOS).  
*Title of presentation:* "A general variational formulation of the hydro-elastic problem with application to VLFS over variable bathymetry" (co-authored by K.A. Belibassakis).
- **November 2004. Conference on Applied Mathematics**  
held in Heraklion, Crete, on 4-6 November 2004,  
Organised by FORTH (Foundation for Research and Technology – Hellas), in honor of Professor Giannis Papadakis, on the occasion of his retirement.  
*Title of presentation:* "Numerical solution of acoustic wave propagation in complex ocean waveguides by means of rapidly-convergent local mode series in conjunction with a Gabor-Galerkin scheme" (co-authored by K.S Politis).
- **July 2005. Conference on Nonlinear Dispersive Wave Phenomena**  
Held in Anogia Academic Village, Crete, on 9-15 July 2005  
Organized by the Foundation for Research and Technology-Hellas (Institute of Applied and Computational Mathematics) in collaboration with the University of Crete (Department of Mathematics)  
*Title of presentation:* "Water Wave propagation in non-uniform ocean waveguides. Transversal semi-separation and coupled-mode models in the propagation direction"

- **September 2005. One Day Waves Workshop. Annual Meeting on Waves at Reading.** Held in Reading UK, on 16 September 2005. Organised by the Department of Mathematics, University of Reading U.K.  
*Title of presentation:* “A Consistent Coupled-Mode Model for Non-Linear Water Wave Problems. Application to steady traveling waves”
- **December 2005. Seminar of Differential Equations in Theory and Applications** of the Department of Mathematics of the Faculty of Information Technology, Mathematics and Electrical Engineering of NTNU, Trondheim, Norway, Lecture delivered on 16 December 2005,  
*Title of presentation:* “New Partial Differential Equations Governing the Evolution of Response-Excitation Joint Probability Distributions for Nonlinear Systems, Under General Stochastic Excitation” (co-authored by Th.P. Sapsis).
- **February 2006. Seminar of Theoretical and Applied Mechanics**, Institute for Fundamental Technological Research, Polish Academy of Sciences, Warsaw Poland. Lecture delivered on 13 February 2006,  
*Title of presentation:* “New Partial Differential Equations Governing the Response-Excitation joint Probability Distributions for Nonlinear Systems, Under General Regular Stochastic Excitation” (co-authored by Th.P. Sapsis).
- **September 2009. International Conference on Fluid-Structure Interactions. Special Symposium in honour of Professor W.G. Price.** School of Engineering Sciences, University of Southampton UK.  
*Title of presentation:* “A novel coupled-mode theory with application to hydroelastic analysis of thick, non-uniform floating bodies over general bathymetry” (co-authored by K.A. Belibassakis).
- **September 2009. International Conference on Stochastic Methods in Mechanics: Status and Challenges. A Conference organized in honour of Professor K. Sobczyk.** Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland.  
*Title of presentation:* “Generalized FPK equations for non-linear dynamical systems under general stochastic excitation” (co-authored by I-S. C. Tsantili, Th.P. Sapsis).
- **July 2013. BIRS**
- **July 2013. Hellenic Centre of Marine Research**
- **SEMFE Seminar**
- **TEI Workshop**
- **August 2015. Cargese, Corse**
- **May 2016. MIT**

- **April 2017. Melbourne University, Australia**
- **May 2017. Wellington University, New Zealand**



## RESEARCH PROJECTS

### *A. As Scientific Responsible*

- 1985-1986 "Transient free-surface flows".  
(Sponsored by the GSRT<sup>(14)</sup>-Greece )
- 1987-1990 "Design spectra and wave potential of Greek seas".  
(Sponsored by the GSRT-Greece)
- 1989-1993 "Wave propagation and scattering in continuous media with a free surface".  
(Sponsored by the GSRT-Greece)
- 1989-1993 "Long-term statistical analysis of wave characteristics and ships and structures responses in Greek seas".  
(Sponsored both by the GSRT-Greece and the **Marine Technology and Development Company**)
- 1990-1992 "Wind-wave atlas of the Greek Seas".  
(Sponsored by the **Hellenic Navy**)
- 1991-1996 "Wave propagation and scattering in the sea environment. Direct and inverse problem".  
(Sponsored by the GSRT-Greece)
- 1993-1996 "Systematic study of hydroacoustic characteristics of the Aegean Sea (AMPHITRITI).  
(Sponsored by the **Hellenic Navy**)
- 1993-1996 "Probabilistic methodology for coastal site investigation based on stochastic modeling of wave and currents (WAVEMOD)".  
(Associate Partner, Sponsored by the **E.C., DGXII**)
- 1994-1996 "Atlas of wave energy resource in Europe (WERATLAS)".  
(Main Partner, Sponsored by the **E.C., DGXII**)
- 1996-1998 "**Satellite uses: a common course for engineering and sea-conditions studies (SUCCESS)**".  
**Funding:** Training and Education Programme of the European Community, DG XII (NTUA budget: 7.500,00 Euro).  
**Status:** Partner
- 1996-1998 "**Rational calculation of ship loads in waves, based on the wave climate along ship route.**"

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<sup>(14)</sup> GSRT: General Secretariat of Research and Technology

- Funding:** General Secretariat of Research and Technology, Greece (NTUA budget: 4.305.000 GRD).  
**Status:** Subcontractor to the Hellenic Register of Shipping, S.A.
- 1997-2000      **“A European-wide offshore/nearshore statistical toolbox and data base for timely wave climate assessment” EUROWAVES).**  
**Funding:** European Commission DGXII, MAST 3 Programme, (NTUA budget: 420.382,00 Euro).  
**Status:** Partner
- 1998-2000      “Nearshore wave forecasting model (Couple\_WAVEMODE/POSEIDON)”. (Sponsored by the **OCEANOR-Oceanographic Company of Norway ASA**)
- 1998-2000      “Mediterranean Atmospheric Mercury Cycle System (MAMCS)”, Mercury over Europe (MOE) Project. (Subcontractor to the University of Athens).  
(Sponsored by the **E.U., DGXII**)
- 1998-2003      “Wind and Waves Mediterranean Atlas (MEDATLAS)”.  
(Sponsored by the **Western European Union, WEAO Research Cell**)
- 2000-2001      "Study of non-uniform electro-magnetic wave guides, with curved boundaries and variable parameters". (ARCHIMIDES Project)  
(Sponsored by the **EPISEY/NTUA**)
- 2000-2003      "Estimation of extreme metocean events", INTAS 1999  
(Sponsored by **EU, DGXII**)
- 2001-2003      "An advanced lightweight architecture for a Digital Library of scientific collections (**ARION**)".  
(Sponsored by the **E.U., Proposal: IST 2000 - III.1.4**)
- 2002-2004      **"Development and application of Validated Geophysical Ocean Wave Products from ENVISAT ASAR and RA-2 Instruments" (ENVIWAVE)**  
(Sponsored by the **E.U., EESD**)
- 2002-2007      HRAKLEITOS «Modeling and numerical solution of wave propagation problems in the sea, using wavelets»  
(Sponsored by Operational Programme for Education and Initial Vocational Training (O.P. "Education"), **Greek Ministry of National Education and Religious Affairs.**
- 2004-2007      "Development of a nested scheme combining a local coastal wave model with a global one, and validation (**ESPEN - EPAN**)".

(Sponsored by the **NCMR**, National Center for Marine Research)

- 2005-2007      PYTHAGORAS «Study of wave-current interaction problems in inhomogeneous sea environment and applications »  
(Sponsored by Operational Programme for Education and Initial Vocational Training (O.P. "Education"), **Greek Ministry of National Education and Religious Affairs**.)
- 2006-2007      LEYKIPOS «Determination of the response probability distributions of non-linear dynamical systems, subject to general stochastic excitation, and applications»  
(Sponsored by **Research Committee, NTUA**)

**To be completed**

## ***B. As Researcher***

- 1985-1986 "Hydrodynamic analysis of offshore floating structures".  
(Sponsored by the **GSRT-Greece**. Scientific Responsible: T.A. LOUKAKIS)
- 1990-1993 "Enhanced Acoustic Tomography and its Applications to Circulation and Deep Convection in the Western Mediterranean (THETIS)".  
(Sponsored by the **E.E.C., DGXII** Scientific Responsible: J.S. PAPANADAKIS)
- 1992-1993 "Wave studies and development of resource evaluation methodology".  
(Sponsored by the **E.E.C., DGXII**. Scientific Responsible: M. T. PONTES)
- 1993-1996 "A pilot tomography system for monitoring the Western Mediterranean Basin (THETIS 2)".  
(Sponsored by the **E.E.C., DGXII** Scientific Responsible: J.S. PAPANADAKIS)
- 1996-1998 "Development of a methodology for the optimization of the design of harbour works.  
(Application to the harbours of Kavala, Alexandroupolis and Porto Lagos)"(Sponsored by the **GSRT-Greece**. Scientific Responsible P.F. MATSOUKIS)
- 2001-2003 "Advanced Decision Support for Shiprouting based on Full-scale Ship-specific Responses as well as Improved Sea and Weather Forecasts including Synoptic, High Precision and Realtime Satellite Data (SEAROUTES)", Proposal No. GRD1-2000-25812.  
(Sponsored by the **E.U., DGXII**, Scientific Responsible: Th. LOUKAKIS)
- 2012-2015 THALIS «Estimating the effects of climate change on sea level and wave climate of the greek seas, coastal vulnerability and safety of coastal and marine structures»  
(Sponsored by **NSRF 2007-2013**)

## EDUCATIONAL AND TRAINING PROJECTS

1998-1999 "Research and technology activities in Marine Environment"  
(Sponsored by the **GSRT-Greece**)

## BILATERAL COLLABORATION PROJECTS

1989-1990 "Theoretical and experimental methods for assessment of seakeeping qualities of ships and floating structures".  
**Greece-Bulgaria** [Athanassoulis-Kishev]. (Sponsored by the **GSRT-Greece**)

1991-1992 "Theoretical and numerical study of the non-linear wave resistance of ships".  
**Greece-France** [Athanassoulis-Lenoir]. (Sponsored by the **GSRT-Greece**)

1993-1994 "Nonlocal closure conditions for wave equations in exterior domains".  
**Greece-Israel** [Athanassoulis-Givoli]. (Sponsored by the **GSRT-Greece**)

1998-1999 "Development of new techniques for the prediction of wave conditions in the coastal environment".  
**Greece-Romania** [Athanassoulis-Matulea]. (Sponsored by the **GSRT-Greece**)

2000-2002 "Evolution of surface ocean waves in coastal zones. Theoretical analysis, validation and prediction".  
**Greece-Poland** [Athanassoulis-Massel]. (Sponsored by the **GSRT-Greece**)

2003-2005 "Intergrated software package "Metocean Toolbox".  
**Greece-France** [Athanassoulis-Prevosto]. (Sponsored by the **GSRT-Greece**)

2007-2008 Ανάπτυξη μεθόδου συζευγμένων ιδιομορφών για τον υπολογισμό της επαγόμενης πίεσης και ροής σε πορώδη πυθμένα, από θαλάσσιους κυματισμούς, σε περιοχές μεταβαλλόμενης βαθυμετρίας». **Greece-Poland** [Athanassoulis-Massel]. (Sponsored by the **GSRT-Greece**)

## CONSULTANCY WORKS

- 2000                    *"Caspian Wave Study"* [Work performed on behalf of **Oceanor A.S.A.**, sponsored by Azerbaijan International Operating Company, - operated by **BP Amoco**, May 2000]
- 2001                    *"Wind and wave conditions in Canary Islands in June, 9-12 2000"* [Work performed on behalf of **Registro Italiano Navale (RINA)**, Scientific Research Section, January 2001]
- 2001                    *"Wave conditions off the NW coast of Spain (Galicia) in February, 26-28 2001"* [Work performed on behalf of **Registro Italiano Navale (RINA)**, Scientific Research Section, March 2001]
- 2001-2002            *"Development of World Waves Software for an area in Tierra del Fuego, Argentina"*, [Work performed on behalf of **Oceanor A.S.A.**]
- 2002                    *"Study of the wave energy potential in the nearshore area of South-Eastern Evia island"*, [Work performed on behalf of **Centre of Renewable Energy Sources, (CRES)**, Greece, January 2002]
- 2005                    *"Determination of the significant wave height in sea areas around the Cyprus island, where Ro-Ro passenger ships are routed departing from ports of Cyprus with destination various ports in the Mediterranean"* [Work performed on behalf of Department of Merchant Marine, Cyprus Democracy, Greece, December 2005]

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### A1. Academic works

- [A1.1] G.A. ATHANASSOULIS, **Diploma Thesis**, "Part 1: Application of the conformal mapping technique to the representation and investigation of a new family of ship sections". "Part 2: Generalized added masses and damping coefficients of two-dimensional rigid bodies oscillating in an inviscid liquid with or without a free surface". Department of Naval Architecture and Marine Engineering, National Technical University of Athens, June 1977 (250+93 pp.) (in Greek)
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### A3. Chapters (or Sections) of books

- [A3.1] G.A. ATHANASSOULIS, **"Analytical dynamics of wave-body interaction"**, Chapter 3 in the book *"Mathematical Techniques for Water Waves"*, edited by Prof. B.N. Mandal, Computational Mechanics Publications, 1997, pp. 79-154
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- [A3.6] G.A. ATHANASSOULIS, Ch.N. STEFANAKOS, S.F. BARSTOW, “**A methodology for integrating wave data from different sources permitting a multiscale description of the wave climate variability**”, A section in the book "*Advances in the Applications of Marine Climatology, The Dynamic Part of the WMO Guide to the Applications of Marine Meteorology*", WMO/TD – No. 1081, JCOMM Technical Report No. 13, pp. 187-198, 2003, Available through <ftp://ftp.wmo.int/Documents/PublicWeb/amp/mmop/documents/JCOMM-TR/J-TR-13-Marine-Climatology/JCOMM-TR-13.pdf>

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- [B.6] **G.A. ATHANASSOULIS**, P.D. KAKLIS, C.G. POLITIS, "The limiting values of added masses of a partially submerged cylinder of arbitrary shape", **Journal of Ship Research**, Vol. 32, No 1, March **1988**, pp. 1-18
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- [B.26] **G.A. ATHANASSOULIS**, K.A. BELIBASSAKIS, "A consistent coupled-mode theory for the propagation of small-amplitude water waves over variable bathymetry regions", **Journal of Fluid Mechanics**, Vol. 389, June **1999**, pp. 275-301

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**A. Publications in Conference Proceedings (full paper's review)**  
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<sup>(17)</sup> HSTAM: Hellenic Society of Theoretical and Applied Mechanics.

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- [D.5] G.A. ATHANASSOULIS, E.K. SKARSOULIS, "Wave climate of Greek seas: Annual wave height isopleths", **2<sup>nd</sup> Congress of Environmental Science and Technology**, pp. 754-761, Molyvos, Mytilini, September **1991** (in Greek, English abstract)
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- [D.13] G.A. ATHANASSOULIS, T.H. SOUKISSIAN, Ch.N. STEFANAKOS, "Long-term variability and its impact to the extreme value prediction from time series of significant wave height", **4<sup>th</sup> International Workshop on Wave Hindcasting and Forecasting**, Banff, Alberta, Canada, pp. 343-358, October 16-20, **1995**
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- [D.21] G.A. ATHANASSOULIS, K.A. BELIBASSAKIS, E.L. LIVADITI, "An enhanced coupled-mode theory for sound propagation over an arbitrary bottom topography", **Proceedings of the 4<sup>th</sup> European Conference of Underwater Acoustics, ECUA 1998**, Vol. II, pp. 667-672, September 1998, Rome, Italy
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- [D.34] G.A. ATHANASSOULIS, K.A. BELIBASSAKIS, and Th. GEROSTATHIS, "A coupled-mode theory for the scattering of acoustic waves from localised 3D scatterers superimposed over a parallel bathymetry, Proc. of the **5<sup>th</sup> European Conference on Underwater Acoustics, ECUA 2000**, Vol. 1, pp. 9-14, 10-13 July 2000, Lyon, France [PDF, 73 Kb]



- [D.35] M. SCLAVO, G.A. ATHANASSOULIS, S. BARSTOW, L. CAVALERI, "An efficient approach to wave climate analysis in coastal waters", **6<sup>th</sup> International Workshop on Wave Hindcasting and Forecasting**, pp. 224-235, Monterey, California, 6-10 November **2000**, Meteorological Service of Canada.
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- [D.45] K.A. BELIBASSAKIS, G.A. ATHANASSOULIS, “A unified theory for non-linear steady travelling waves in constant, but arbitrary, depth”, **6<sup>th</sup> International Conference on Dynamical Systems, Differential Equations and Applications (AIMS)**, June 25 – 28, **2006**, Poitiers, France

## **E. Final and Interim report of R & D projects (selected)**

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