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# ASTARTE - PEARL - TANDEM JOINT SUMMER SCHOOL

3-7 June 2016  
Technical University of Crete  
Chania, Greece



Technical  
University  
of Crete



# UPDATED INFORMATION

[WWW.ASTARTE-PROJECT.EU](http://WWW.ASTARTE-PROJECT.EU)

[WWW.ASTARTE-PROJECT.EU/INDEX.PHP/SUMMER-SCHOOL-2016-COPY.HTML](http://WWW.ASTARTE-PROJECT.EU/INDEX.PHP/SUMMER-SCHOOL-2016-COPY.HTML)

## JOINT SUMMER SCHOOL

This joint summer school will bring together graduate students, early career scientists and/or professionals with different backgrounds, who work in the fields of coastal hazards (tsunamis, extreme rainfall, storm surge, sea level rise), flood risk management, climate change, forecasting and early warning and disaster risk reduction.

This summer course will be a great opportunity for the participants to learn from distinguished scientists/professionals in lectures, and also from each other through field trips and discussion sessions.

The school will focus on coastal hazards, coastal management and resilience. It aims at answering the question:

### **What can we do now and in the future to mitigate the impact of natural hazards?**

The school is a unique opportunity to put together three different research communities from three different running collaborative projects: ASTARTE, PEARL and TANDEM.

## Objectives

The fundamental aim of this summer school is to improve the participants' theoretical and methodological knowledge on coastal hazards.

### ***Transmit and foster knowledge:***

The fundamental aim is to contribute to participants' theoretical and methodological knowledge on coastal hazards. It will bring together students, young scientists, early career professionals and experts with different backgrounds from 20 countries, to discuss the latest developments in research, recent hazard events and how scientific products can be used to establish better and more efficient mitigation measures.

### ***Growth of an international network and support of coastal resilience:***

The joint summer school combines three research projects with 60 partner institutions from 20 countries. The students will have access to a growing international network of professionals, universities and research institutes working on coastal hazards. A growing and younger community is raising awareness and further supports resilience.

### ***Providing holistic perspective by an international & interdisciplinary program:***

Coastal hazards such as (tsunamis, extreme rainfall, storm surge, sea level rise) will be discussed to improve flood risk management, forecasting, early warning and disaster risk reduction. These topics will focus on physical, engineering and social sciences aspects. Altogether the school provides a perfect opportunity to learn from experts of the different fields (lecturers, invited speakers, etc.) and from other participants.

### ***Teaching theoretical concepts, hands-on approach and field trips:***

The students will be invited to come to TUC to learn through theoretical and practical lessons the complexity of natural processes in combination of human activities. The conceptual structures will be taught in theoretical lessons and also hands-on, through games, where students will be challenged to use their problem solving capabilities. Two field trips will take place to demonstrate the geological evidence of recent events.

## Enrolment and Accreditation

**Scholarships from EGU were distributed to the top ten students that enrolled by 2016.**



Students will get **6 ECTS** for successful participation in the joint summer school.

### Target Group

Graduates and PhD students: Natural Sciences and Engineering, preferably Geophysics, Oceanography, Civil Engineering and Coastal Hazards

### Travel information

Please book your flights to Chania Airport, Crete (CHQ).

There are low costs options from Athens to Chania (e.g. Ryanair has 3 connections/day).

## Accommodation and Transportation

The organization committee made a reservation in 2 hotels nearby the venue. There is a bus connection between the hotels and the Technical University of Crete. The walking distance is about 2.8 km from [Hotel Akrotiri](#) and 2 km from [Hotel Monte Vardia](#).

Three different accommodation categories are available:

4 x Single room (Hotel Akrotiri) for 6 nights incl. breakfast: Price per person **210 €**

12 x Double room (Hotel Akrotiri) for 6 nights incl. breakfast: Price per person **144 €**

8 x Double room (Hotel Monte Vardia) for 6 nights incl. breakfast: Price per person **155 €**

## Meals

The University canteen is available for meals free of charge.

A social dinner will be offered by the organization.

## Other useful information

Students are kindly requested to bring their own laptop.

# Summer School Preliminary Programme

**From hazards to mitigation: Applying appropriate methods to raise resilience for coastal communities.**

## **Learning Objectives:**

1. In-depth understanding of the basic framework of flood risk management; and for conceptualizing the components of coastal flood risk systems; Comparison and discussion of the terms “hazard”, “vulnerability”, “risk”.
2. In depth understanding of generation processes and trigger mechanisms of extreme hydro-meteorological events and tsunamis
3. Identification of main principles of coastal hazard forecasting, early warning and emergency planning
4. Development of awareness on the relationship of coastal risk management with related disciplines in applied and social sciences and administration;
5. Introduction to methods for modelling tsunamis and storm surges
6. Getting acquainted with GIS techniques to development of suitable products and information for authorities.
7. Identify and explain the most common coastal hazards related management problems and solutions.
8. Building structural and social resilience against coastal hazards through on of mitigation measures.

# Preliminary Programme Scheme

| Day 1 – 3 Jun 16                |  |  |
|---------------------------------|--|--|
| Topic: Hazard & Risk Assessment |  |  |
| 9:00 – 9:15                     | <i>Opening and Welcome</i>   | Ahmet Yalciner (METU)  |
| 9:15 – 10:00                    | <i>Assessing flood risk through a holistic framework, the PEARL approach</i>   | Zoran Vojinovic (UNESCO – IHE)   |
| 10:00 – 10:45                   | <i>Connecting flood risk science and research to policy and practice: IWA's role</i>   | Pritha Hariram (IWA)   |
| 10:45 – 11:00                   | Break  |  |
| 11:00 – 12:30                   | <i>Hazards, Processes, Frequencies and Magnitude: Tsunamis and tsunami hazard assessment</i>   | Costas Synolakis (TUC)   |
| 12:30 – 13:30                   | Lunch  |  |
| 13:30 – 14:00                   | <i>Flood risk assessment in urban environment due to multiple stressors and different scenarios, tools enhancing/assisting decision support procedures</i>   | Christos Makropoulos (NTUA)  |
| 14:00 – 14:30                   | <i>Understating coastal stressors resulting in wave overtopping discharge and wave run-up starting from offshore waves processes until shallower water regions</i>   | Vicky Tsoukala (NTUA)  |
| 14:30 – 15:00                   | Break  |  |
| 15:00 – 15:45                   | <i>Recent tsunami events in Chile 2010, 2014 and 2015, what we have learnt from these events?</i>  | Bernardo Aliaga (UNESCO – IOC)   |
| 15:45 – 17:15                   | <i>GIS Products for Coastal Management &amp; with An introduction to “Image processing for coastal management”</i>   | Lemonia Ragia (TUC)<br>(with Konstantia Moirogiorgou & Vasillis Paravolidakis) |
| 17:15 – 17:30                   | Break  |  |
| 17:30 – 18:00                   | <i>Workshop: Introduction, description of case studies and perspectives, identification of the working groups. 3 minutes stand-up presentations of each student about their studies regarding the topics of the summer school.</i> | Ahmet Yalciner & Nilay Dogulu (METU)   |
| 20:00                           | Dinner - Social Event  |  |



# Preliminary Programme Scheme

Day 2 – 4 Jun 16

**Topic: Modelling**

|               |  |  |
|---------------|--|--|
| 9:00 – 10:30  | <i>Tsunami Modelling and Data Products:<br/>Relative importance of non-linearity in the propagation, and presentation of different relevant mathematical models<br/>&amp;<br/>An overview of models for Tsunami simulations, with attention to the numerical treatment of depth averaged equations</i> | Michel Benoit (IRPHE)<br><br>&<br><br>Mario Ricchiuto (INRIA)  |
| 10:30 – 11:00 | Break  |  |
| 11:00 – 12:30 | <i>Models and tools for flood risk modelling and management</i>  | Zoran Vojinovic (UNESCO – IHE)                                 |
| 12:30 – 13:30 | Lunch  |  |
| 13:30 – 14:15 | <i>Tsunami warning and novative modeling forecasting methodologies</i>   | Audrey Gailler (CEA/DAM)<br>&<br>Francoise Schindel  (CEA/DAM) |
| 14:15 – 15:00 | <i>Introduction to coastal morphological changes induced by tsunamis. The coastal uplift of the 365 tsunami in Crete</i>   | Gerassimos Papadopoulos (NOA)                                  |
| 15:00 – 15:30 | Break  |  |
| 15:30 – 17:30 | <i>Workshop: Internal discussions of individual working groups with experts</i>  |  |

# Preliminary Programme Scheme

Day 3 – 5 Jun 16

## Topic: Coastal Management and Resilience

|               |   |  |
|---------------|---|--|
| 9:00 – 9:45   | <p><i>Structural Resilience in Coastal Hazards</i></p> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Types, stability and functionality of Coastal Defence Structures</li> <li>3. Examples of Marine Hazards in terms of their impacts on coastal structures</li> <li>4. Examples of Structural solutions and their performance against different marine hazards</li> <li>5. Recent trends for resilient coastal structures</li> </ol> | Ahmet Yalciner (METU)                      |
| 9:45 – 10:30  | <p><i>Social Resilience on Hazards</i></p> <ol style="list-style-type: none"> <li>1. Introduction to community resilience</li> <li>2. Risk perception and preparedness models</li> <li>3. Resources and capacities for social resilience</li> <li>4. Examples of community resilience building implementations</li> </ol>   | Nuray Karanci (METU) & Canay Doğulu (METU) |
| 10:30 – 11:00 | Break   |  |
| 11:00 – 12:30 | <p><i>Decision making processes and spatial/urban planning affecting cities' vulnerability, communities risk perception and preparedness against flood risk</i></p>   | Jörn Birkman (UNU – EHS)                   |
| 12:30 – 13:30 | Lunch   |  |
| 13:30 – 15:30 | <p><i>Workshop: Tsunami forecasting; Community Modeling Interface for Tsunamis (ComMIT)</i></p>   | Utku Kânoğlu                               |
| 15:30 – 16:00 | Break   |  |
| 16:00 – 17:30 | <p><i>Workshop: Internal discussions and preparation of presentations &amp; Working group presentations and Outcome Synthesis of the Workshop discussions and results</i></p>   | Ahmet Yalciner & Nilay Dogulu (METU)       |
| 17:30 – 18:00 | <p><i>Discussion session: Feedback from participants and evaluation of the summer school activities</i></p>   |  |
| 18:00         | Closing   |  |

# Preliminary Programme Scheme

## Day 4 – 6 Jun 16

Full day | Christos Makropoulos (NTUA)

Field Trip to case study site **Rethymno**:

Walk along the coast from Marina to Port Facilities (through the Old Venetian Harbour) of the city of Rethymno during which:

- several outlets of rivers/drains/canals that cross the city and are important vectors of floods will be seen (interaction of coastal and inland pressures)
- we will see and discuss issues of sediment transport
- the problem of wave overtopping in the harbor will be described and damages will be seen
- reference to future protection measures and structures (submerged breakwaters, etc.) that are under planning and construction will be made and visualised

Then we will move towards the Old City and especially Loggia which is where water accumulates during precipitation events. Walk through Arkadiou Street, and discuss the Kamaraki stream and the damages which have occurred there.

Visit to the flood control dams, Plataniou river or the Dam of Potamon (to be confirmed).

We plan to test and present the App FIND (Finding Inaccessible people in Natural Disasters) ASTARTE's project ubiquitous framework for natural disasters by Luis Carriço (ASTARTE) in cooperation with local authorities (Civil Protection).

Also, we plan to visit the water management or civil protection authorities or actors to discuss with the students plans and actions during a flood event.

A "background info pack" will be provided.

# Preliminary Programme Scheme

## Day 5 – 7 Jun 16

|          |                              |
|----------|------------------------------|
| Full day | Gerassimo Papadopoulos (NOA) |
|----------|------------------------------|

Field trip in the coastal archaeological site of **Phalasarna, NW Crete**:

Phalasarna was a Roman-Hellenistic harbor which today is situated about 100-200 m inland. A large part of the harbor has been revealed thanks to the excavation works directed by the dedicated archaeologist Dr Elpida Hatzidaki in the last 25 years or so. The great geoscientific interest is that it has been supported that the NW part of Crete was uplifted by about 6.5 m with the big (estimated magnitude 8.5) earthquake of 21 July 365 AD. Due to this impressive uplift the Phalasarna harbor is today situated inland. It is historically documented that this earthquake caused an equally large tsunami that flooded eastern Mediterranean coastal sites causing a high death toll and destruction in Alexandria and elsewhere. Tsunami sediment deposits were found and described in publications since 1992. Other co-seismic movements which are evident in the area may explain sea level changes in the harbor during historical times. A likely event that affected the area was the large tsunamigenic earthquake of ca. 66 AD.

In this full-day field trip we will visit the famous archaeological site of Phalasarna, about 60 km to the west of Chania. From the bus stop we will walk for about 10 min. to reach the archaeological area. Lunch can be taken in the nearby tavernas while swimming is a possibility in the afternoon.

An introductory lecture will be given on day 2 – 4 Jun 16, to provide necessary background information.

## **Attention to Summer School Participants**

*Dear ASTARTE-PEARL-TANDEM Summer School Participants,*

*You will be given the opportunity to present summary of your current research during the workshop component of Summer School in Crete. We are expecting you to make a 3-min stand up presentation (with maximum 3 slides) on description of any event or on your research dealing with different aspects of coastal hazards and flood risk management related to Summer School theme.*

*Your presentation should briefly summarize the research, its theoretical/conceptual framework, methodology/design, and significance. Later during the end day workshops you will have the chance to discuss your experience together with all participants and to share your opinions/ideas on others' research overall providing a multi-, inter-, and/or transdisciplinary learning environment.*

*We are looking forward to a fruitful discussion sessions.*

**Ahmet Cevdet Yalciner and Nilay Dogulu**

Coordinators of workshops during Summer School

## Lecturers (under construction)



### Ahmet Yalçiner

Middle East Technical University , METU  
Ankara, Turkey

*Professor of Coastal and Harbour Engineering Division in Department of Civil Engineering at METU Turkey. He carried out intensive research on mathematical modeling in analysis of tsunami generation, propagation, coastal amplification and inundation for oceans and marginal seas with numerous case studies and benchmark problems. He is the chair person of UNESCO Intergovernmental Coordination Group for the North-eastern Atlantic, the Mediterranean and connected seas Tsunami Warning and Mitigation System (UNESCO/ICG/NEAMTWS). He has co-authored the development of Tsunami Modelling Tool NAMI DANCE. He is an expert on field surveys on marine hazards and expert in 3-D physical modeling on the stability of coastal structures under extreme wave conditions. Professor Yalçiner and his working group have jointly authored more than 120 scientific publications and he participated in more than 60 international scientific conferences on coastal and ocean engineering.*

### Nuray Karanci & Canay Doğulu

Middle East Technical University (METU)  
Ankara, Turkey

#### **Nuray Karanci**

*Full Professor at the Department of Psychology of the Faculty of Arts and Sciences of METU. Her research interests include psychological impact of disasters, preparedness and mitigation behaviours for disaster management, community awareness and training programs for disaster awareness and management. Involved in various projects in disaster/earthquake preparedness and mitigation.*

#### **Canay Doğulu**

*Doctorate student in Social Psychology Program of the Department of Psychology at METU. Her research interests include system justification and terror management processes in gender and disaster contexts; honor; preparedness and mitigation for and community resilience to disasters. Involved in various projects in disaster/earthquake preparedness and mitigation.*



### Bernardo Aliaga

UNESCO – IOC Intergovernmental Oceanographic Commission  
**Paris, France**

*Tsunami Program specialist at IOC-UNESCO. He contributed to the task of helping Indian Ocean Member States to build an Indian Ocean Tsunami Warning and Mitigation System after the Indian Ocean tsunami in December 2004, and more recently was project manager of the recently launched Multi-Hazards Early Warning System in Oman. He contributes to strengthen National Tsunami Warning and Mitigation Systems in Colombia, Chile, Peru and Ecuador, and contributes to put in place national capabilities for coastal hazards including tsunami in Haiti and Dominican Republic, as well as in Central America countries. He also contributed to the development of tsunami community preparedness in Thailand.*



### Zoran Vojinovic

UNESCO-IHE Institute of Water Education  
Delft, The Netherlands  
Project Coordinator PEARL

*Associate Professor of Urban Water Systems at UNESCO-IHE with over 20 years of combined on-the-ground and academic experience working in various aspects of water industry in New Zealand, Australia, Asia, Europe, Central and South America and the Caribbean.*

*Zoran holds a Honorary Professor position at the Centre for Water Systems, University of Exeter, UK and he is a Visiting Professor at the School of Civil Engineering, University of Belgrade, Serbia. He is also Guest Faculty at AIT Bangkok, Thailand.*

*Zoran is Editor in Chief for Journal of Hydroinformatics and he authored/co-authored four books, over 100 journal and conference papers, book chapters, and professional engineering reports.*

## Lecturers (under construction)



### **Gerassimos Papapopoulos**

National Observatory of Athens, NOA  
Athens, Greece

*Researcher with the Institute of Geodynamics, National Observatory of Athens, since 1995, Research Director since 2002 and Head of the Hellenic National Tsunami Center (HL-NTWC) since 2014. He served at the Earthquake Planning and Protection Organization (EPPO) from 1985 to 1994 and was Adjunct Professor of Geology & Geophysics at the Dept. of Civil Engineering of the Hellenic Air Force Academy (1983-2005). His research interests fall in seismology and the science of tsunamis. He directed a long number of national and European research projects and has published more than 150 scientific papers receiving more than 2300 citations.*



### **Costas Synolakis**

Technical University of Crete, TUC  
Chania, Crete, Greece

*Professor of Natural Hazards at the School of Environmental Engineering at the Technical University of Crete. Elected in 2016 as **the 45th member of the Academy of Athens**. Costas Synolakis' research studies the impact of natural hazards, and particularly tsunamis and extreme flooding events on beaches. He has participated or led 30 scientific expeditions in 21 countries, practically in all oceans and seas. Professor Synolakis, his students and co-workers, have jointly authored about 110 research papers in peer reviewed journals, including the Proceedings of the Royal Society, the Proceedings of the National Academy of Sciences, Physical Review Letters, Science and Nature, and they have presented about 250 papers in conferences and abstracts in the European Geosciences Union and the American Geophysical Union.*



### **Mario Ricchiuto**

French National Institute for Computer Science and Applied Mathematics (INRIA)  
Rocquencourt , Les Chesnay  
INRIA's PI for *TANDEM*

Research scientist at Inria. PhD in applied science from the Université Libre de Bruxelles in 2005.

His field of expertise is computational fluid dynamics. He is one of the main developers of the class of methods known as Residual Distribution, with contributions ranging from very fundamental aspects concerning the formulation of the method, to its applications in external aerodynamics, multiphase flows and coastal hydrodynamics.

He is the founder and leader of the Inria team CARDAMOM, member of the editorial board of Computers & Fluids, and co-organizer of several international workshops and schools.

He currently coordinates the EU-OceaneraNET projet MIDWEST, on the hydrodynamics of wave energy converters, and leads Inria's activities in the TANDEM project.



### **Michel Benoit**

Institut de Recherche sur les Phenomenes Hors-Equilibre (IRPHE) and Ecole Centrale Marseille  
Marseille, France

## Lecturers (under construction)



### **Christos Makropoulos**

Dept. of Water Resources, School of Civil Engineering  
National Technical University of Athens  
Athens, Greece

*Assistant Professor in Hydroinformatics at the School of Civil Engineering of NTUA and the Chief Information Officer of KWR WaterCycle Research Institute in the Netherlands. He is a Visiting Fellow in the Centre for Water Systems of the University of Exeter, the co-Editor in Chief of Urban Water Journal and a member of the Editorial Board of the Journal of Hydroinformatics. He is an expert in hydroinformatic tools and methods for urban water management with an emphasis on distributed water infrastructure and whole city modelling. His work focuses on risk analysis, uncertainty quantification, multi-objective evolutionary optimization, decision support and long-term policy scenario development. He has authored more than 100 journal and conference papers and book chapters and is a reviewer for 15 academic Journals. He is a Fellow of the UK Higher Education Academy and a Fellow of the Royal Geographical Society. He is currently a Member of the joint IWA/IAHR Hydroinformatics Steering Group Management Committee.*

### **Pritha Hariram**

Water Quality/ WASH Specialist  
International Water Association, IWA

*Experienced environmental scientist specialising in drinking water and wastewater quality and treatment management. She has expertise in hazard analysis and risk management of drinking water and wastewater systems to safeguard public health. She is experienced in source water monitoring, treatment works design and management, distribution system operation and maintenance and consumer use, and is also skilled in contractor and civil construction management. She is also an experienced water supply, sanitation and hygiene (WASH) specialist having worked on humanitarian relief and development projects in the Asia Pacific region.*



### **Vicky Tsoukala**

National Technical University of Athens, NTUA  
Athens, Greece

*Assistant Professor, teaching and researching in marine hydraulic engineering and harbour works, coastal dynamics and coastal structures and environmental impact assessment of harbour and coastal Works. Her field of expertise include environment and development and experimental hydraulics.*



### **Jörn Birkman**

United Nations University, Institute for Environment and  
Human Security, UNU-EHS  
Bonn, Germany

*Head of the Vulnerability Assessment, Risk Management and Adaptive Planning Section and Academic Officer at the United Nations University Institute for Environment and Human Security. He holds a PhD in Spatial Planning from the Dortmund University and a post-doctoral degree in Geography (Habilitation) from the University of Bonn. His research interests include vulnerability, sustainable development and environmental assessment, with expertise in socio-economic trends and environmental degradation at sub-national, local and household scale. He was a lead author on the IPCC Special Report "Managing the Risk of Extreme Events and Disasters to Advance Climate Change Adaptation" and the IPCC Fifth Assessment Report chapter "Emergent Risks and Key-Vulnerabilities." He is also involved in vulnerability assessment in coastal and flood-prone communities in Indonesia and Vietnam and coordinates the development and testing of indicators to measure vulnerability to floods, heat waves, droughts, and sea level rise in Germany, Egypt and Indonesia.*



## Lecturers (under construction)



### **Utku Kânoğlu**

Middle East Technical University , METU  
Ankara, Turkey

*Associate Professor at the Department of Engineering Sciences in Middle East Technical University. His research investigates the coastal effect of tsunamis through analytical, experimental and numerical modeling and field surveys. He is involved in several national and international (European Union funded) projects; has given training in international courses on tsunami numerical modelling for UNESCO-IOC; he was visiting scientist at the United States National Oceanic and Atmospheric Administration Center for Tsunami Research (NCTR) at the Pacific Marine Environmental Laboratory, Seattle Washington, US for the summers of 2004-2013. At NCTR, he actively took part in the development of real-time forecasting capabilities.*

### **Audrey GAILLER**

Commissariat à l'énergie atomique et aux énergies alternatives (CEA- France).

*Staff member at CEA's Laboratory of Geophysics for 6 years, she started her research in marine Geophysics at the University of Nice (France) and collected experience in numerical modeling in wide-angle seismic especially. Her recent primary expertise is tsunami simulation with respect to Early Warning and Hazard Assessment. She takes an active part in the implementation of simulation systems for tsunami wave propagation forecasting within the French tsunami warning center.*



### **LEMONIA RAGIA**

Technical University of Crete, TUC  
Chania, Crete, Greece

*After completing her doctoral thesis, she was a Postdoctoral Fellow at Knowledge Discovery Team, Fraunhofer Institute for Autonomous Intelligent Systems (IAIS now) working on spatial data mining. After that, she worked as a senior research scientist at the Computer Science Department of the Technical University of Aachen, Germany working in the area of spatial data bases and data integration. After being at the database group at Microsoft Research, she was Maitre Assistant at the University of Geneva, Switzerland working on location based services and 3D modelling of spatial data in the Advanced Systems Group. She was a Visiting Professor at the University of Toronto, Canada working on high performance visualization of spatial information in the Dynamic Graphics Project. Now she is working in the Technical University of Crete at the Natural Hazards, Tsunami and Coastal Engineering Laboratory.*



### **François SCHINDELÉ**

Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA- France) CENALT Coordinator ,

*25 years of experience on tsunami warning systems and tsunami hazard assessment, currently coordinator of the CENTre d'ALerte aux Tsunamis (CENALT), he started his research on tsunami warning systems at the head of the Centre Polynésien de Prévention des tsunamis. He contributes to the Pacific, Indian Ocean and North-eastern Atlantic tsunami warning systems and is the Past Chairman of Intergovernmental coordination group of the Pacific tsunami warning system, and of the North-eastern Atlantic and Mediterranean tsunami warning system. He participated in several European projects, including GITEC, GITEC-TWO and Astarte, and is the leader of the Work Package that focus on early warning in the Astarte project.*

## About the projects



[www.astarte-project.eu](http://www.astarte-project.eu)

FP7 Grant No:603839

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Tsunamis are low-frequency but high impact natural disasters. The ultimate goal of ASTARTE is to achieve a higher level of tsunami resilience in the NEAM (North East Atlantic & Mediterranean) region, to improve preparedness of coastal populations and, ultimately, to save lives and assets.

Coastal floods are regarded as one of the most dangerous and harmful of all natural disasters. The PEARL project aims at developing adaptive risk management strategies for coastal communities focusing on extreme hydro-meteorological events, with a multidisciplinary approach integrating social, environmental and technical research and innovation.



[www.pearl.fp7.eu](http://www.pearl.fp7.eu)

FP7 Grant No:603663

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[www.tandem.cea.fr](http://www.tandem.cea.fr)

Grant No.: French

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TANDEM is a project dedicated to the appraisal of coastal effects due to tsunami waves on the French coastline, with a special focus on the Atlantic and Channel coastlines where french civil nuclear facilities have been operating for about 30 years.

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