MALDIVES SUMMER SCHOOL

on submarine and coastal geohazards

18TH – 27th November, 2024

MaRHE center (https://marhe.unimib.it/)

Magoodhoo, Faafu Atoll, Maldives

The school provides practical training in emerging creative technologies applied to geo-hazards, delivered by leading experts from international universities.

Applications are open to postgraduate students keen to experience Virtual Reality as a ground-breaking tool for 3D digital geomorphological mapping in coastal areas and submerged environments. To learn more and registration contact: info.bridget@unimib.it

Application deadline: 20th July 2024

BridgET (Erasmus + KA220-HED) - https://bridget.unimib.it/

Bridging the gap between the land and the sea in a virtual Environment for innovative Teaching and community involvement in the science of climate change-induced marine and coastal geohazards

The BridgET Learning, Teaching, and training activities

BridgeET is an EU project funded by the 2021-2027 ERASMUS+ Key Action 2 programme "*KA220-HED Cooperation partnership in Higher Education*". The project *aims* at *addressing a growing demand for highly skilled professionals in the coastal and marine geosciences sector, who can be innovative in the analysis, interpretation and representation of geological and environmental data in 3D.*

On-land, environmental reality-based 3D models can now be generated through the aid of unmanned aerial vehicles (UAV), while depth measurements, acquired with echosounders, provide a core data set for the creation of high resolution digital elevation model (DEM) of the seabed. However, the incessant advancement in underwater robotic systems and ocean technologies is significantly renewing field studies in marine geoscience, with important implications for industry (e.g., oil and gas, renewable energy, etc.), marine spatial planning and effective implementation of coastal and offshore geohazard management practices. Today, a detailed mapping of coastal and submarine environments, and their representation in photorealistic three-dimensional (3D) images, has become more feasible thanks to recent improvements in using Uncrewd Aerial Systems (UAS), Remotely Operated Vehicles (ROVs) and the Structure form Motion (SfM) digital photogrammetry image processing technique. New research approaches and techniques have also allowed a seamless combination of multisource terrestrial and marine geospatial data, improving our capability to examine seabed and coastal 3D surfaces and associated geological data. Furthermore, 3D models can be experienced in Virtual Reality (VR), providing a cognitive breakthrough and the potential to launch a new generation of studies as well.

In this context, the main *goal* of **BridgET** will be accomplished with dedicated summer schools for postgraduate students, delivered by leading experts from different European universities. The summer schools will entail an overview of the most advanced techniques used to collect geospatial and geophysical data in coastal and offshore environments, spanning from traditional acoustic mapping (multibeam echo-sounder bathymetry and backscatter, shallow seismic reflection profiling) and seafloor imaging techniques (ROV) to UAS and geological fieldwork on-land. We will present techniques used to integrate multi-source and multi-scale elevation and geological data sets into a continuous digital terrain model (DTM), a practice that represents a major gap in coastal management, where climate change, rising sea levels, tectonic and marine geohazard of different nature are considerable environmental issues. Data exploration and analysis will be performed through the medium of VR, to improve student engagement in the investigation and spatial understanding of coastal and submarine environments.

The BridgET European partnership

The interdisciplinary European partnership of the **BridgET** project is made up by marine geoscientists and professionals with tracked expertise in 3D geological mapping, geohazard assessment and climate-driven impacts in tectonically and/or climatically sensitive areas. Each academic institution has existing postgraduate courses in natural/environmental/marine sciences that include marine geoscience topics. By implementing innovative methods of 3D immersive teaching and training activities during the summer schools, **BridgET** *aims* at improving an inclusive and innovative teaching of marine geoscience for MSc students. Research in marine geoscience, as well as offshore industry, is moving fast on the basis of continuous technological and digital advances that foster the acquisition of geospatial data and their 3D representation, visualization, modelling and interpretation. The academic world has not kept up with the same pace in implementing these innovations in teaching modules. The complementarity of the competences of the BridgET partnership aims at creating an efficient synergy that can prepare MSc students for an increasingly competitive labour market and an increasingly diverse audience. The partnership includes leading expert from 6 Universities and 2 Research Institutions, and the private company Orthodrone, which has distinguished experience in offering aerial services for business and research projects.

- Christian-Albrechts-Universitaet Zu Kiel - CAU, Germany (PI Prof. Sebastian Krastel, *sebastian.krastel@ifg.uni-kiel.de*)
- National and Kapodistrian University of Athens - NKUA, Greece (PI Prof. Paraskevi Nomikou, *evinom@geol.uoa.gr*)
- Universita' degli studi Di Milano-Bicocca - UniMiB, Italy (PI Prof. Alessandra Savini, *alessandra.savini@unimib.it*)
- Universita Ta Malta - UoM, Malta (PI Dr. Adam Gauci, *adam.gauci@um.edu.mt*)
- Universite De Liege - UoL, Belgium (PI Prof. Hans Havenith, *hb.havenith@uliege.be*)
- Universitetet I Tromsoe – UiT, Norges Arktiske Universitet, Norway (PI Prof. Giuliana Panieri, *giuliana.panieri@uit.no*)
- Istituto Nazionale Di Astrofisica - INAF, Italy (PI Dr. Fabio Vitello)
- Istituto Nazionale Di Geofisica E Vulcanologia - INGV, Italy (PI Dr. Danilo Reitano)
- OrthoDrone GmbH, Kiel, Germany (PI CEO Jury Klusak)

Summer School Content

The Maldives Summer School is a 10-day intensive, full-time school for MSc students, that involves ca. 80 hours' hands-on program in practical activities. In addition to providing experience in the use of acoustic technologies for seafloor surveying, the summer school touches on current best practices, appropriate survey design and logistics to carry out advanced geomorphological mapping in tectonically and volcanically sensitive coastal regions.

The third summer school of BridgET project will be held in Magoodhoo, Faafu atoll (Republic of Maldives) at the MaRHE center. It will include a variety of field activities, classroom lessons, practical training on the use of advanced geophysical acoustic devices (on-board a dedicated vessel), and work sessions on data processing using dedicated software.

The students will learn how to integrate multiscale and multisource marine and terrestrial dataset in order to provide thematic maps, and 3D environmental models for immersive exploration of submarine and coastal geohazards.

At the end of the course, students will be able to:

- Plan the collection of terrestrial and submarine geospatial and environmental dataset using a wide range of technologies (UAS, multibeam echosounder, ROV)
- Process multi-scale acoustic data and RGB imagery to generate digital elevation models (DEM) and orthomosaics for the on-shore, near-shore and off-shore regions.
- Recognise Key-geomorphic/geological elements for marine and coastal geohazard assessment in coral reef environments.
- Provide a general overview of the geological hazard exposure and disaster risk awareness in coastal areas.
- Model, visualise and communicate 3D environmental data through advanced solutions that include the use of immersive and virtual reality technologies.

Students completing the **Summer School** will be given a certificate of practices and knowledge. The representatives of each university involved in the BridgET project, will assess the student's performance during the summer school, in order to award CFU to the student, if this is provided for in the degree course in which the student is enrolled.

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COSTS COVERED by BridgET Erasmus+ project

The cost of the summer school is covered by Erasmus+ project BridgET

Covered costs include:

- flight to/from Male
- accommodation
- food
- lessons and activities provided for the internship program
- access to licences for the use of dedicated software
- Business VISA

Following costs are **NOT** included:

- Transfer from Male to Magoodhoo (~200€)
- any passport/ID cars renewal expenses
- expenses for Covid test (if required)
- anything else not specified above

WE ALSO REMIND YOU THAT:

DATES ARE APPROXIMATE AND ARE SUBJECT TO A CHANGE (± 2 days max) UP TO 15TH August, depending on the availability of the flights and of the support vessel for the activities to be carried out at sea

STUDENTS ADMISSION CRITERIA

To be eligible for the BridgET Erasmus+ summer school, the applicant must be:

- holder of a recognized primary degree in areas related to Physical and Earth Sciences (a minimum of three years' study at a university (i.e., 180 ECTS), or equivalent according to the European regulations).
- **enrolled in** one of the MS courses of **one of the six universities included in the BridgET partnership**.
- enrolled in one of the MS courses offered by the university of origin, which can provide recognition of the activities carried out during the school, within the student's career, through the assignment of CFU or another type of recognition provided in the student's study plan.

Application procedure

Candidates must fill in the application form and send it with all supporting documents in digital form, including the relevant certificates and transcripts of previous studies, to info.bridget@unimib.it, from no later than 20th July. Only complete applications will be assessed. Incomplete applications may be rejected without further notification. A complete application consists of:

- Personal information about the applicant (family name, name, date of birth, place of birth, nationality, address) as reported in the *registration form*.
- Diploma and transcripts (diploma supplement or list of the subjects taken during the study and correspondent marks).
- Motivation letter / video (in English) – the letter/video should present the applicant's motivation to enroll the Summer School, including the competencies and skills he/she would like to achieve, future perspectives and aspirations after the Master course.
- CV with information about relevant experience and professional training (relevant courses, workshops, seminars, etc. can also be included).
- Certificate (auto certification) of enrolment in a Master's degree course of one of the 6 universities that are part of the BridgET partnership.

Application Deadline: 20th July

Selection process: between 20th July – 1st August

Notification to candidates: after 1st August

Student Selection Procedure and Criteria

All applications will be first pre-screened for formal requirements. Only complete applications will be assessed. Incomplete applications may be rejected without further notification, as well as the applications of candidates not meeting the admission criteria.

Complete applications will be assessed against three criteria:

a) Academic track record: Academic records will be assessed taking into account the relationship between the applicant academic career and the Summer School objectives and contents.

b) Educational/Professional and research experience: Educational, work and research experience will be considered if directly related to the Masters' contents. Research scholarships and internships will also be considered.

c) Motivation letter (2 pages max)/video (3 minutes max)

Criteria	Maximum score
Academic track record	40%
Educational/Professional and research experience/CV	25%
Motivation letter/video	35%

The evaluation of the candidate's motivation to participate in the summer school, will include candidate's professional expectations and the goal of the summer school, as well as the match between the candidate's previous knowledge and the content of the summer school.

The applicant academic record will preferably include studies in the following topics: Physical Geography/geomorphology, Maths/Statistics, Marine Geosciences topics.

Admission Procedure

All applicants will receive written communication informing them of the outcome of their application by 10th August.

The communication will include:

- the final starting date and duration of the summer school and relevant practical information.
- Student rights and obligations, particularly the student administrative, financial, and academic obligations concerning his/her attendance to the summer school activities, as well as the consequences for not respecting these obligations.

Maldives Summer School – MaRHE center **18 – 27 November 2024**

APPLICATION FORM

FULL NAME (as reported on the passport) _____

PLACE AND DATE OF BIRTH _____

NATIONALITY_____

ADDRESS_____

Passport n°_____ expiration date: _____

ATTENDING THE _____ (MS course attending)

UNIVERSITY: _____

ACADEMIC YEAR _____

e-Mail: _____

Tel.: _____

ALLERGY OR FOOD INTOLLERANCE ☐ No ☐ Yes (if so, please specify)

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CHRONIC DISEASE ☐ No ☐ Yes (if yes, please specify)

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Place and date_____ ___/ ___ / _____

SIGNATURE OF THE STUDENT

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