



Co-funded by the  
Erasmus+ Programme  
of the European Union

## **REPORT OF PROGRAM**

### **“UTM-UNICT Bilateral Research Program – MARE Staff and Student Mobility Program at University of Catania (18<sup>th</sup> July to 31<sup>st</sup> July 2023)”**

#### **Overview:**

One of the deliverables of the Erasmus+ project "Marine Coastal and Delta Sustainability for Southeast Asia (MARE)" for EU funding under the Erasmus+/ Key Action 2 - Capacity Building in Higher Education is to have student and staff attachment programmes at the partner universities. The 14-day research attachment programme at University of Catania (UNICT), Italy from 18 July 2023 to 31 July 2023 was participated by two PhD students, Khor Wei Han (Faculty of Mechanical Engineering) and Lavine Wong (Faculty of Civil Engineering). The programme was initiated to assist and strengthen collaborative efforts between UTM and UNICT for joint research initiatives in coastal vulnerability assessment and marine renewable technologies. The students were given the opportunity to discuss the research topics with their field supervisors, Prof. Dr. Daniele La Rosa and Prof. Dr. Pietro Scandura, to acquire additional input to strengthen their research methodologies and gain exposure to the available software, laboratory facilities, and techniques best suited to their specific research topics.

#### **Objectives:**

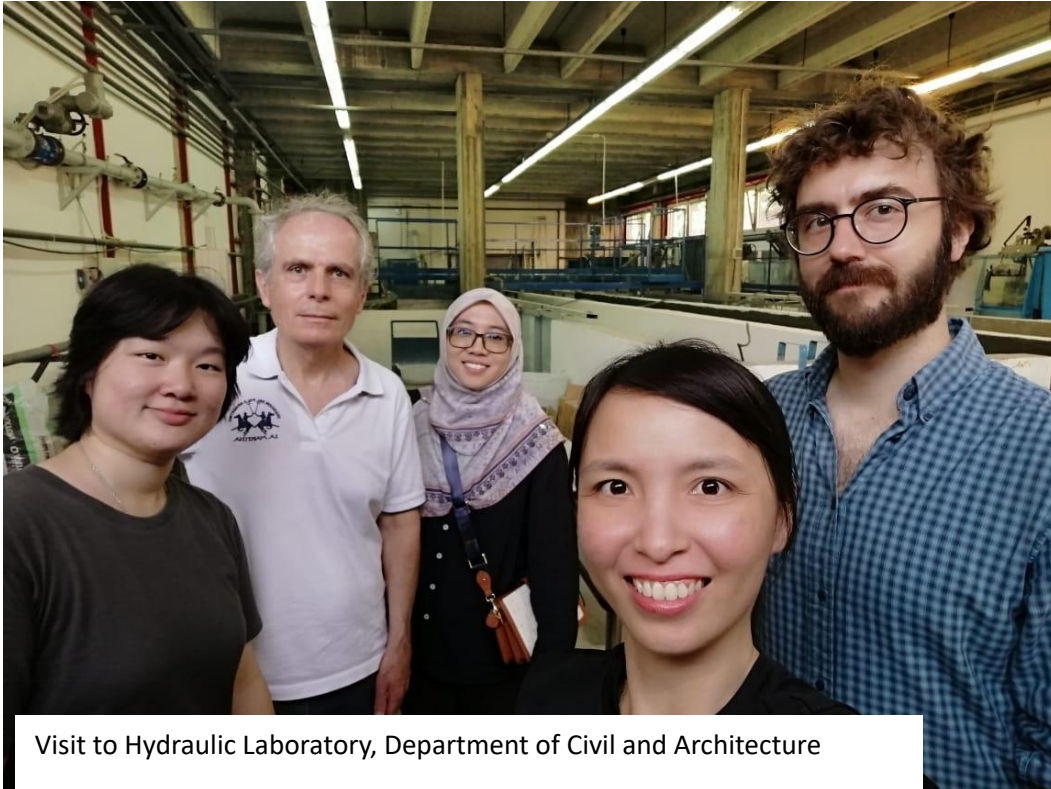
- To assist and strengthen collaborative efforts between UTM and UNICT for joint research initiatives
- To discuss current research activities and propose refinements of upcoming research activities
- To acquire additional input to strengthen research methodologies for research students.

**Program Schedule:**

<b>Date</b>	<b>Time</b>	<b>Program/Activities</b>
19 <sup>th</sup> July 2023	9.00	Introduction to the School and faculty
	12.00	Lunch
	14.00	Visit UNICT facilities
20 <sup>th</sup> July 2023	9.00	Presentation by Prof Dr Pietro Scandura
	12.00	Lunch
	14.00	Presentation by Dr. Farah Ellyza binti Hashim
21 <sup>st</sup> July 2023	9.00	Presentation by research students
	12.00	Lunch
	14.00	Discussions
22 <sup>nd</sup> July 2023 to 29 <sup>th</sup> July 2023		Discussion and daily work to improve research methodology
30 <sup>th</sup> July 2023	14:00	Presentation on proposed improvements

### **Detail Report:**

During day 1 to day 3, the students were exposed to campus tour and visited the Hydraulic laboratory, Department of Civil and Architecture. Presentation of interest areas of research was given by Prof Dr Pietro Scandura and Dr Farah Ellyza binti Hashim.





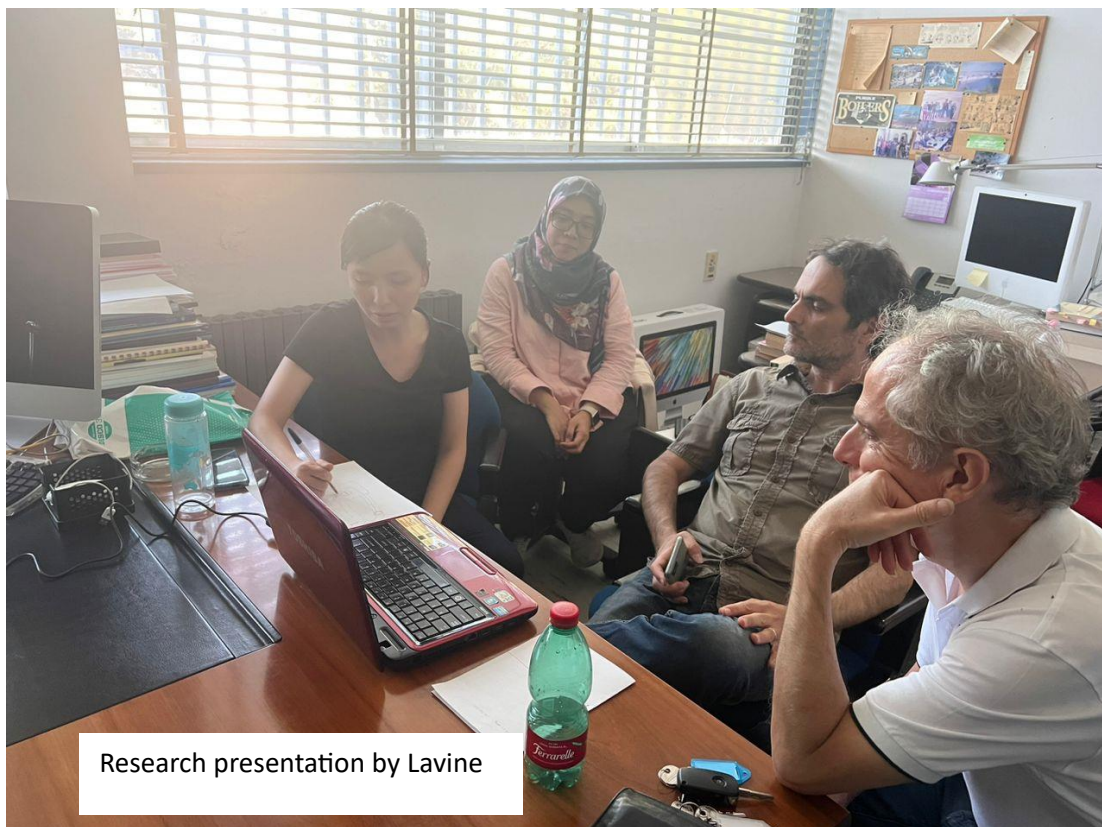
Visit to Department of Civil and Architecture



*Presentation of research work By Dr. Farah Ellyza*



The students were also given opportunities to present their work in detail to brief field supervisors on the general work done and suggestions on how to improve current research work based on ideas given.



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Throughout the following days, the students were tasked to work out a proposal in based on the suggestions given by field supervisors to improved on specific related areas in their current research. The research topic by Khor Han Wei which is *Regular Wave-induced Sloshing of Floating Photobioreactor in Microalgae Cultivation* is currently based on the utilization of regular waves for wave-induced sloshing. Her research works is mainly on experimental study on the effects of sloshing on mixing and mass transfer while hypothesizing that wave-induced sloshing produces sufficient mixing and mass transfer for the cultivation of microalgae. Suggestion was given to conduct numerical simulation for visualization of fluid free surface in the photobioreactor and hydrodynamic properties and to use non-inertial reference system for the numerical simulation.

The research topic by Lavine Wong which is *Improved Basset-boussinesq-oseen Formulation in Modelling Spherical Floating Object Trajectory* is currently based modelling spherical floating object behaviour experimentally and numerically whereby spherical object are treated as a particle in numerical simulation. The current research works intends to improve the existing equation which numerically captures difference in submergence of floating object trajectory. Suggestion was given to design and conduct experimental investigation of drag coefficient of fully floating and partial floating spherical objects.

Both students were allowed to access the facilities of the department daily and a workspace was provided to search for related papers based on the suggestions given. At the end of the program, a simple proposal and presentation was conducted based on the findings of the students based on the recommendation provided by the supervisor. Future improved works includes numerical simulation of sloshing in photobioreactor and conducting experimental works to obtain drag of fully floating object whereby specimen may require modification of object using hollow aluminium with increasing density based on thickness of shell which may be taken to consideration to proceed back at the main university of the students.

**Supervisor 1 Signature:**



**Supervisor 2 Signature:**

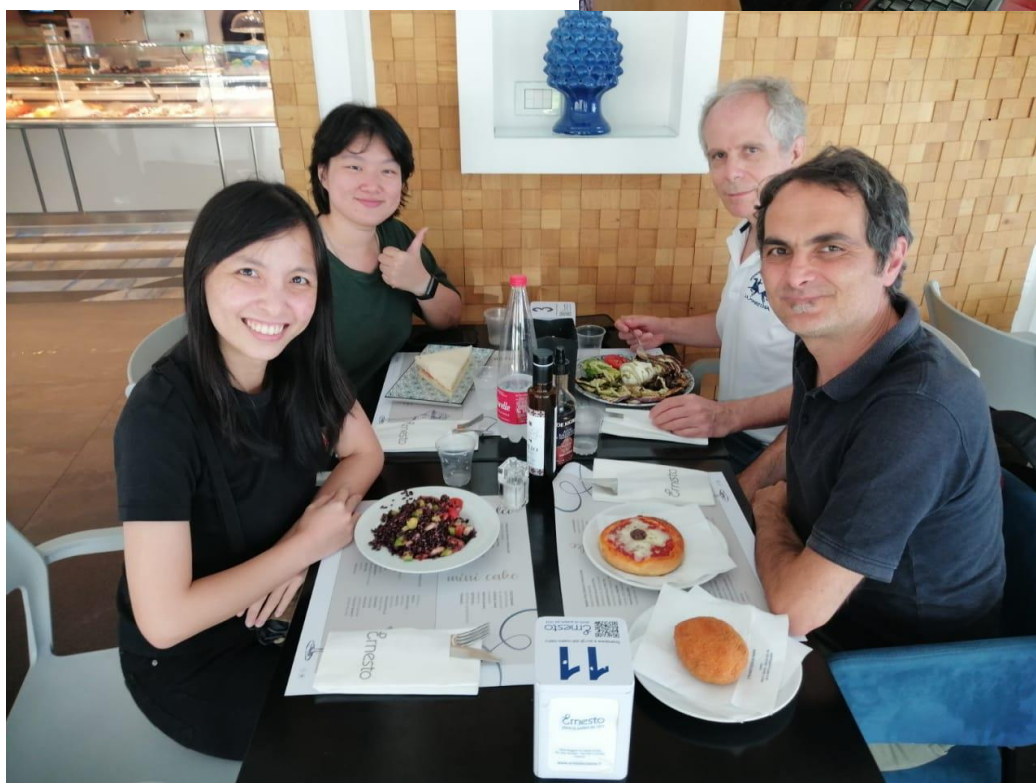


## Appendix:



Daily activity work at workspace provided





Final presentation of proposal and discussion on research topic  
based on suggestion by supervisor





Discussion sessions over meals with supervisors



Visiting city of Catania during the weekends