



## LOCATION & DATE

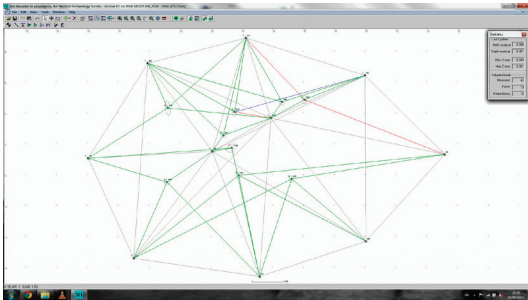
Cultural Centre, Tkon, Croatia  
27 - 30 September 2017

## ACCOMMODATION

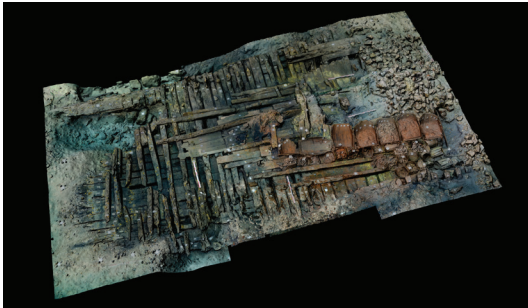
Institute for Maritime Heritage ARS NAUTICA, Kuntrata 5, Tkon  
e-mail: [ars.nautica.institute@gmail.com](mailto:ars.nautica.institute@gmail.com)

## WORKSHOP DIRECTORS

Dr Kotaro Yamafune, A.P.P.A.R.A.T.U.S. Ll.c.  
Dr Irena Radić Rossi, University of Zadar  
Dr Nikola Mišković, University of Zagreb

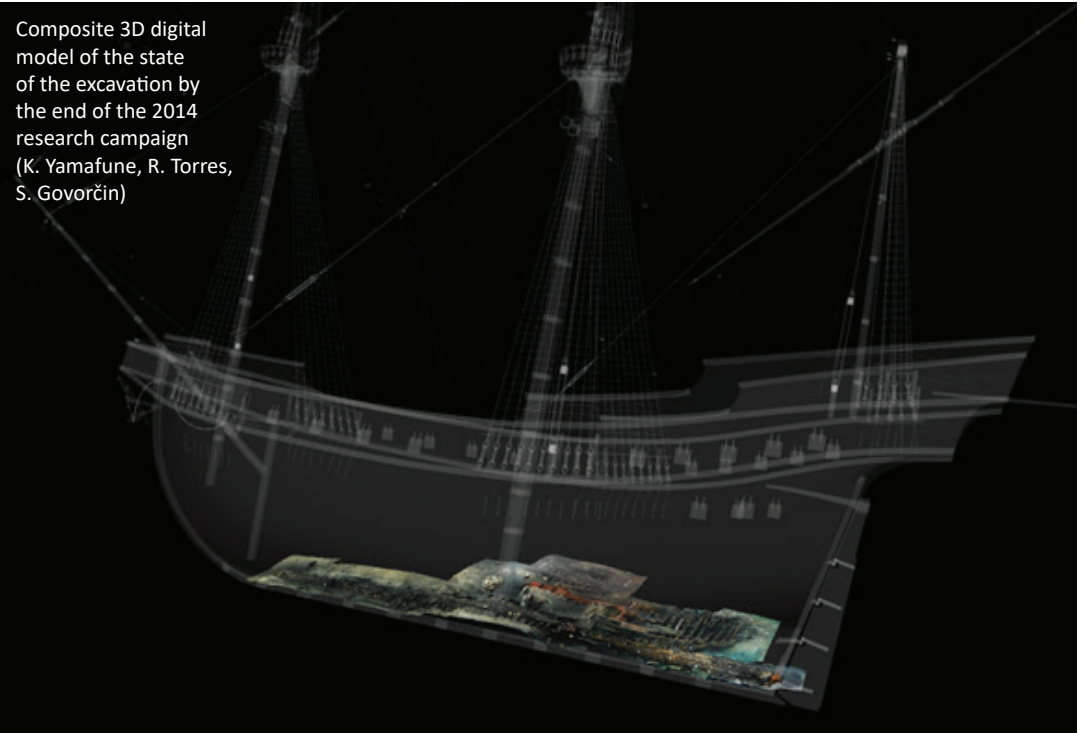


Local coordinate network of the Gnalić shipwreck site (R. Torres, K. Yamafune).



Position of the excavated part of the hull within the ideal representation of a hull of a 16th c. ship (K. Yamafune)

Composite 3D digital model of the state of the excavation by the end of the 2014 research campaign (K. Yamafune, R. Torres, S. Govorčin)



During the past decade, photogrammetry rapidly evolved from a sophisticated skill practiced by a small group of devoted experts with appropriate equipment and special software, to a broadly available tool, which could be managed by anybody, with no restrictions regarding the educational level, professional background or virtual modelling experience.

Photogrammetry is now a common, indispensable tool, which in skilful hands can result in an excellent product in the part of the working process for which it is designed. Although technological upgrades continue to improve the hardware, software and accuracy of photogrammetric recording, the true innovation lies

in avoiding overreliance on photogrammetry, but instead striving to understand its drawbacks and limitations. Simply performing photogrammetry as the end goal of an underwater excavation is not sufficient.

Considering the stated premises, the International Field Workshop Photogrammetry in Underwater Archaeological Research - Theory and Practice aims at introducing the participants to the theory and practice of the photogrammetric photo and video recording, for the needs of underwater archaeological research, taking into consideration all its advantages and constraints.



**Kotaro Yamafune** received his Bachelor of Arts degree in history from Hosei University in Tokyo in 2006. He enrolled in the Nautical Archaeology Program in the Anthropology Department at Texas A&M University in September 2009 and received his Master of Arts degree in August 2012. He continued his studies in the Texas A&M University Nautical Archaeology Program and earned his doctorate in May 2016. His research interests include shipbuilding in Medieval Europe and the European Age of Discovery, and ship reconstruction both manually and through the use of digital tools such as 3D modelling software. He also focuses on photogrammetric recording of submerged cultural heritage, including shipwreck sites. He expands his study interest to museology for nautical and maritime archaeology. In September 2016, he founded A.P.P.A.R.A.T.U.S. Llc. (*Agency of Photogrammetry and Photography for Archaeological Analysis on Terrestrial and Underwater Sites*), and became its president. Currently he is helping both terrestrial and underwater archaeological projects and providing workshops in many countries using his skills of photogrammetry.

**LECTURER:** Kotaro Yamafune, A.P.P.A.R.A.T.U.S. Llc.

**ASSISTANT:** Katarina Batur, research assistant, University of Zadar

**OFFICIAL LANGUAGE:** English

## PROGRAMME

**Tuesday, 26<sup>th</sup> September 2017** - Arrival of the participants

### **Wednesday, 27<sup>th</sup> September 2017 – INTRODUCTION**

8:00 Breakfast  
9:00 Welcome speech and presentation of the programme  
9:30 Introduction to Photogrammetric Recording  
11:00 Coffee break  
11:30 Photography for Photogrammetry  
13:00 Lunch break  
16:00 Photo-shooting practices  
17:30 Coffee break  
18:00 Processing photos  
20:00 Dinner

### **Thursday, 28<sup>th</sup> September 2017 – ARCHAEOLOGICAL PHOTOGRAMMETRY**

8:00 Breakfast  
9:00 Photogrammetry from Videos  
10:30 Coffee break  
11:00 Artefacts photogrammetry (Capturing 360)  
12:30 Lunch break  
16:00 How to Scale-constrain 3D models  
17:30 Coffee break  
18:00 How to take measurements from 3D models  
20:00 Dinner

### **Friday, 29<sup>th</sup> September 2017 – SKILLS ON ARCHAEOLOGICAL SITES**

8:00 Breakfast  
9:00 How to create local coordinate system under water  
10:30 Coffee break  
11:00 Trilateration (Site Recorder)  
12:30 Lunch break  
16:00 TriClosure (PhotoScan)  
17:30 Coffee break  
18:00 Creating 3D models using both methods  
20:00 Dinner

### **Saturday, 30<sup>th</sup> September 2017 – CONVERTING 3D MODELS INTO ARCHAEOLOGICAL DATA**

8:00 Breakfast  
9:00 Underwater Photography for Photogrammetry  
10:00 Generating orthophotos  
Coffee break  
11:30 Generating General Elevation Maps  
12:00 Lunch break  
13:30 Generating Section Profiles in Rhinoceros  
16:00 Generating Sketch-like Drawings from Orthophotos  
17:30 Coffee break  
18:00 Using Points Bases Deviation Analysis Software (CloudCompare)  
20:00 Dinner

**Sunday, 1<sup>st</sup> October 2017** - Departure of the participants

### **ANNOUNCEMENT:**

1<sup>st</sup> – 8<sup>th</sup> October 2017

Breaking the Surface 2017 International interdisciplinary field workshop of maritime robotics and applications - <http://bts.fer.hr/>

The accommodation of the participants is provided in the research base of the Institute for Maritime Heritage ARS NAUTICA, Kuntrata 5, Tkon. The total cost per participant is 125 eur / 935 hrk (food not included).



**SVEUČILIŠTE U ZADRU**  
**UNIVERSITY OF ZADAR**



### ORGANIZATION:

**University of Zadar, Zadar, Croatia**

**Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia**

**A.P.P.A.R.A.T.U.S. Llc., Japan**

**Institute for Maritime Heritage ARS NAUTICA, Tkon, Croatia**

### ADDITIONAL SUPPORT:



MUNICIPALITY  
OF TKON

**THE WORKSHOP IS ORGANIZED IN THE FRAMEWORK OF THE  
CROATIAN SCIENCE FOUNDATION PROJECTS:**

**AdriaS - Archaeology of Adriatic Shipbuilding and Seafaring (IP-09-2014-8211)**

**EXCELLABUST - Excelling LABUST in marine robotics**





## INTERNATIONAL FIELD WORKSHOP: PHOTOGRAMMETRY IN UNDERWATER ARCHAEOLOGICAL RESEARCH - THEORY AND PRACTICE

27 - 30 September 2017

### APPLICATION FORM

Surname: \_\_\_\_\_

Town: \_\_\_\_\_

First name: \_\_\_\_\_

Telephone: \_\_\_\_\_

Address: \_\_\_\_\_

e-mail: \_\_\_\_\_

Postcode: \_\_\_\_\_

Professional / Student status: \_\_\_\_\_

(submit to [ars.nautica.institute@gmail.com](mailto:ars.nautica.institute@gmail.com))