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HydroLink

Verfügbar unter/Available at: <https://hdl.handle.net/20.500.11970/109371>

Vorgeschlagene Zitierweise/Suggested citation:

Chen, Margaret; Aleixo, Rui; Ferreira, Rui; Franca, Mário (2017): W.A.T.E.R.: An IAHR-Emi event dedicated to the learning of advanced measurement techniques. In: HydroLink 2017/2. Madrid: International Association for Hydro-Environment Engineering and Research (IAHR). S. 54-55. https://iahr.oss-accelerate.aliyuncs.com/library/HydroLink/HydroLink2017_02_37th_IAHR_Congress.pdf.

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W.A.T.E.R.: AN IAHR-EMI EVENT DEDICATED TO THE LEARNING OF ADVANCED MEASUREMENT TECHNIQUES

BY MARGARET CHEN, RUI ALEIXO, RUI FERREIRA & MÁRIO FRANCA

The Experimental Methods and Instrumentation committee (EMI) promotes several initiatives, targeting different audiences, to advance the use of experimental techniques in hydraulics research. The first Workshop on Advanced measurement Techniques and Experimental Research (W.A.T.E.R.), was premiered by the EMI and it gave PhD students, young researchers and technicians the opportunity to learn about state-of-the-art instrumentation and measurement techniques. The first edition took place between 1st and 5th August 2016 at the Flanders Marine Institute in Oostende, Belgium.

It is essential for young researchers to learn and get acquainted with state-of-the-art measurement techniques. Such opportunity is rare. Hence, the IAHR-EMI Leadership Team proposed the organization of a new event where training in state-of-the-art instrumentation and measurement techniques could be offered to the participants. The Leadership Team members who participated actively in the organization and the development of the teaching material of the event are: Margaret Chen (Hydrology and Hydraulic Engineering department – Vrije Universiteit Brussel); Rui Aleixo (EMI chair and GHT Photonics); Rui Ferreira (Instituto Superior Técnico, Universidade de Lisboa); Mário Franca



Figure 1. W.A.T.E.R. group photo in front of the Flanders Marine Institute (photo by Flanders Marine Institute)

(Laboratoire de Constructions Hydrauliques – Ecole polytechnique fédérale de Lausanne). To increase the W.A.T.E.R. scope and technical level, other lecturers for specific topics were invited: Tine Missiaen from University of Ghent and Vera Van Lancker from Royal Belgium Institute of Natural Sciences.

In W.A.T.E.R., topics related to the fundamentals of hydraulic measurements were covered. These included working principles of image analysis methods with emphasis on particle image velocimetry and particle tracking velocimetry (PIV and PTV respectively); basics of acoustic Doppler velocimetry; measurement

of sediment concentration and fluxes; bottom profiling and bed topography (including conductivity, temperature and depth (CTD) measurements); principles regarding the reproduction of fluvial geomorphology processes in the laboratory; and data post-processing and visualization. Laboratory setups where the measurement techniques were demonstrated and applied, and field measurements made on board of the Research Vessel (RV) Simon Stevin, were also part of the hands-on approach of the W.A.T.E.R. summer school. The manufacturer I.L.A. GmbH provided a PIV system for use and demonstration during the W.A.T.E.R. Summer School. Frank Michaux,

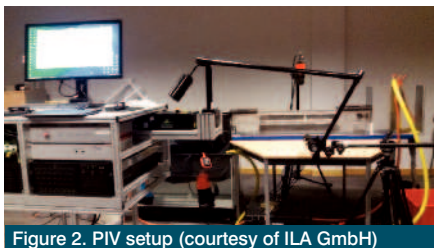


Figure 2. PIV setup (courtesy of ILA GmbH)

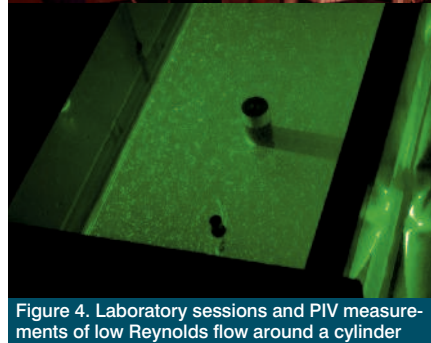


Figure 4. Laboratory sessions and PIV measurements of low Reynolds flow around a cylinder



Figure 5. Session of data processing and discussion of results



Figure 6. W.A.T.E.R. social events



Figure 3. W.A.T.E.R. on board of the research vessel Simon Stevin (photo by Flanders Marine Institute)

from I.L.A. GmbH, was present during the workshop, providing a fully operational PIV system and support for PIV measurements.

The first edition attracted PhD students and young researchers mainly from Europe and Asia. In total six countries were represented. For the laboratory sessions, the students were divided into four groups. They were given assignments with different measuring tasks to perform. The students learned to acquire data in practice and to solve both theoretical questions and practical issues. On the final day, for the evaluation, each group presented its results in front of the class, and answered questions asked by the lecturers and colleagues. The following lively discussion took place in an open and creative atmosphere. The W.A.T.E.R. summer school counted for three ECTS credits (ECTS: European Credit Transfer and accumulation System).

Besides the training it offered, this event allowed young researchers and PhD students to interact with experienced researchers in an informal and open atmosphere. Social activities were organized every night which facilitated professional exchange, as well as bonding between the young researchers. A successful and exciting event was the "cooking night", where each group was challenged to prepare a dish for a common dinner.

The feedback received from this first event was highly positive and encouraging. A second edition is now being organized by the same team. It will take place again in Oostende in October 2017. ■

The W.A.T.E.R. summer school website is:
<https://watersummerschool.wordpress.com/>



Margaret Chen is Professor of Hydrology and Hydraulic Engineering, Vrije Universiteit Brussel. Her expertise is

associated with both in-situ experiment and model simulation of integrated multi-scale hydrodynamics, morphodynamics, and sediment dynamics linked to climate variability and flood defense; hydraulic and structure-process interaction in particular linked to port and harbor development; and physical processes including wind, wave and tide related to coastal safety. She is the promoter for several ongoing estuarine and coastal research projects involving both modeling and monitoring sand banks, beach nourishment and dune-beach-shoreface system. She is a member of the leadership team of the Experimental Methods and Instrumentation Committee of IAHR.



Rui Aleixo has a PhD in Engineering Sciences from Université catholique de Louvain, Belgium. After a post-doc in the National

Center for Computational Hydroscience and Engineering (USA) he joined the Fluid Mechanics for the Built and Natural Environment Group of CERIS, Instituto Superior Técnico, where he participated in the development of MiCas and in the development of imaging techniques. He is currently working in the University of Bologna on Acoustic Doppler signal processing. He is the IAHR Experimental Methods and Instrumentation committee (EMI) chair for the period 2015-2017. As EMI chair, he co-organized the W.A.T.E.R. Summer School and HydroSenSoft 2017 conference.



Rui Ferreira is Associate Professor of Instituto Superior Técnico, Universidade de Lisboa and a CERIS senior

researcher. For the past 20 years, he has been involved in experimental research in fluvial, estuarine and coastal processes, development of laboratory instrumentation and mathematical modelling of free-surface flows, including the coordination of the development of PIV and bedload measuring systems and of mathematical modelling tools such as STAV model (<http://www.fluidmechenv.tk/>). He is Associate Editor of two international journals and has participated in the organization of several scientific events, including River Flow 2006. He is a member of the leadership teams of the Fluvial Hydraulics Committee and of the Experimental Methods and Instrumentation Committee of IAHR.



Mário Franca is Research and Teaching Associate at the Laboratory of Hydraulic Constructions of the École polytechnique fédérale de

Lausanne, holds a position as Assistant Professor (on leave) at the New University of Lisbon, and is senior member of the Marine and Environmental Sciences Centre (Coimbra). His domain of activity includes hydraulic processes within the river basin. His research focus on fluvial turbulent flows; sediment transport; fluvial morphodynamics; density currents; and hydropower production in supply networks. He belongs to IAHR leadership teams of Experimental Methods and Instrumentation and Fluvial Hydraulics committees.



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Ministry of Regional Municipalities and Water Resources (MRMWR), Kyoto University Japan, Technical Univ. Berlin (TUB), Int. Ass. of Hydro-Environment Eng. and Res. (IAHR), Duqm Special Econ. Zone Authority, Global Alliance of Disaster Res. Inst. (GADRI), etc.