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## **Report of W.A.T.E.R. 2024 for EMI/IAHR**

### ***W.A.T.E.R. Summer School - 8th edition***

#### ***ICube, Strasbourg, July 1st -5 th , 2024***

The ICube laboratory of Strasbourg hosted the 8th edition of the W.A.T.E.R. Summer School, co-organised with Ubertone and the IAHR committee on Experimental Methods and Instrumentation. W.A.T.E.R. Summer School aims to train postgraduate students (doctoral students), researchers, and practitioners who already have a specific knowledge and skill level in fluid mechanics but seek advanced training in state-of-the-art measurement techniques.

The Local Organizing Committee led by Dr Anne Pallarès and Marie Burckbuchler kept the tradition of providing rich and high-quality scientific programs. The W.A.T.E.R. Summer School used a classroom and the hall of the ENGEES school, as well as various laboratory facilities of ICube and INSA Strasbourg laboratories for parallel hands-on sessions.

In the 8th edition of the W.A.T.E.R. Summer School, advanced notions on acoustic measurement methods, such as UVP, ADV and ABS, as well as optical-based techniques, such as PIV, PTV and OBS, were taught. Tracers techniques were also introduced, as well as a hydraulic energy test bench with an Archimedes screw. Thus, participants could discover and deepen their knowledge not only in velocity measurement techniques, but also in global useful knowledge in hydraulics like homogeneity, concentration, efficiency.

The 8th edition was organized and strengthened by members coming from a wide range of institutes and companies, local and from abroad:

- The Local Organisation Committee and lecturers:
  - Anne Pallarès (ICube / UHA)
  - Marie Burckbuchler (Ubertone)
  - Isabelle Charpentier (ICube/CNRS)
  - Philippe Schmitt (ICube/CNRS)
- Local lecturers:
  - Denis Funfschilling (ICube/CNRS)
  - Julien Laurent (ICube/ENGEES)
  - Leandro Duarte (ICube, ENGEES)
- Invited lecturers:
  - Rui Aleixo (IBW, Poland)
  - Margaret Chen (VUB, Belgium)
  - Rui Ferreira (IST, Portugal)
  - Nils Ruther (TUM, Germany)
  - Frank Michaux (iLA, Germany)

Twenty participants, coming from different universities representing twelve countries (Poland, Spain, Turquie, Belgium, Norway, Italy, France, New Zealand, Finland, the United Kingdom, Sweden, the

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Netherlands), gathered at ICube to learn more about the different measurement techniques with this international body of lecturers.

Some references about the different measurement techniques the participants would encounter during the workshop were sent to them in advance. A short introduction time was offered and taken by some lecturers to remind the participants about some basic principles.

Then, in groups of four participants, the students learned in hands-on exercises at different experimental stands to put in practice the theory and the handling of modern instrumentation techniques in fluid mechanics and hydraulic engineering. The practices varied from small to large flumes, suspension tanks, and educational setups with reactors and pipes. The PTV session was done on a data set of the 7th W.A.T.E.R. edition. An introduction to the FAIR data (findable, accessible, interoperable, reusable) was given on the first evening session in order to educate and encourage the students to publish their data.

A field trip to the Rohrschollen Island allowed the participants to enlarge their skills and enable a link from lab to field measurements. A walk through this natural reserve proposed two measurement stations: one with water quality sensing in a pond for an opening to citizen science (thanks to the “Vigie de l’eau” water analysis kit), and another one with field UVP measurement on the fish path of the local hydropower plant. Also, a guided tour by an EDF employee was given around the hydropower plant installations on this island: the dam, the turbines, the jamming elements catching and cleaning system, the fish paths and the lock.

Thanks to Marie Burckbuchler and Stéphane Fischer (Ubertone), the W.A.T.E.R. team could demonstrate innovative UVP and ADV instruments, and thanks to Frank Michaux (iLA 5150 GmbH), the team also presented an LED-PIV. The W.A.T.E.R. Summer School was initiated by Prof. Dr. Margaret Chen from Vrije Universiteit Brussel (Belgium) in 2016, and it was organized under the auspices of the IAHR Technical Committee on Experimental Methods and Instrumentation.

The 8th W.A.T.E.R Summer School was also organised thanks to the funds received by several organisms. The ZAEU (Zone Atelier Environnementale et Urbaine) sponsored the Ice Breaking evening. The FERED (Fédération de recherche en environnement et durabilité) helped to offer the coffee breaks to the participants during the workshop.

Funds from the « Initiatives d’excellence » IDEX of the Université de Strasbourg were also received.

And finally, an International Emerging Action (IEA) was granted: AAP IEA CNRS : “SediSenSeeds” (SEDISENSEEDS: Development of SEDiment SENSors and Experimental Education of Doctoral Students). This is an initiative led by Margaret Chen representing the Hydrology and Hydraulic Engineering of Vrije Universiteit Brussel - Faculty of Engineering, Belgium, and by Anne Pallares representing the Equipe Mécanique des Fluides of the Laboratoire ICube - Département de Mécanique, France. A large part of this grant was devoted to the W.A.T.E.R Summer School.

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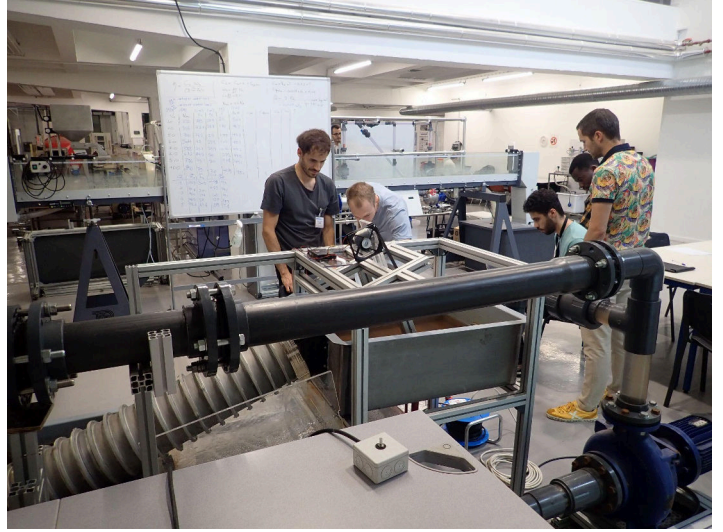
*Introduction to all the participant in the classroom at ENGEES (left) and Fair data seminar (right)*



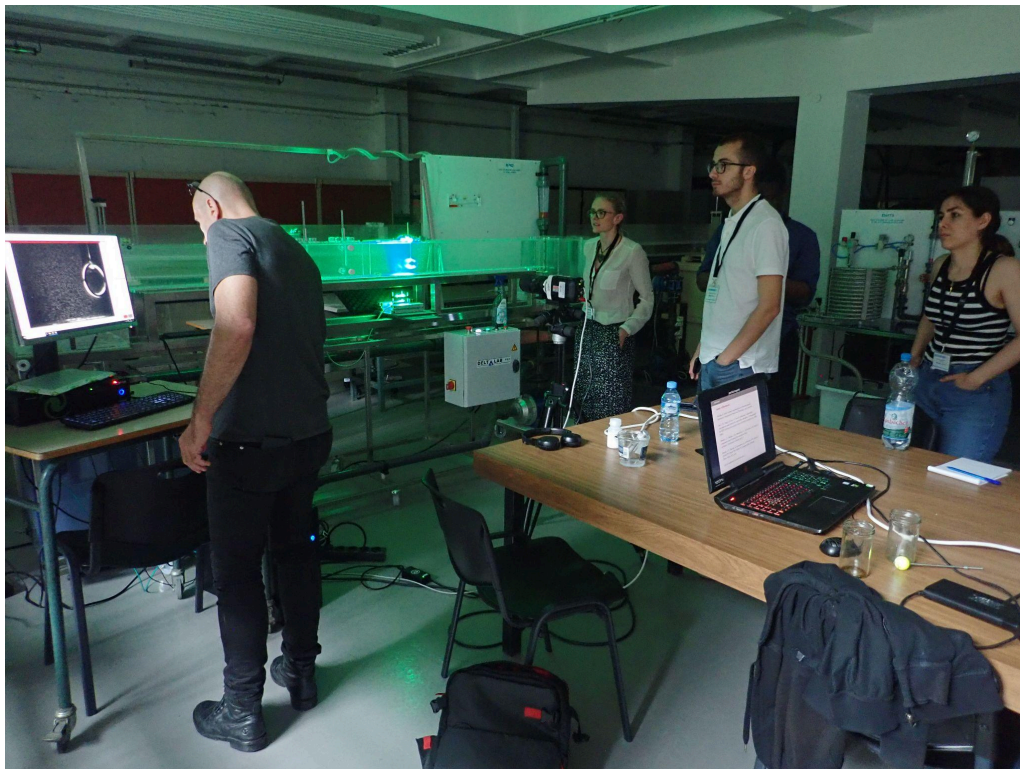
*Three pictures of the UVP/ADVP lab session*



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*Tracers lab session (left) and Hydraulic energy setup (right)*



*PIV setup (left) and SSC: optical vs acoustic setup (right)*



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*EDF guided visit - the lock and the dam*



*Field measurements: UVP on the fish path*



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*Lunches at Kooma at the Manufacture des tabacs*



*Workshop dinner - Flammkuchen!*

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*Group photo*



*Partners, Co-organisers, Funders*