



Summer school on “Measuring techniques for turbulent open-channel flows”

28th–30th July 2015, IST Alameda Campus, Lisboa, Portugal

Organized within the scope of project
SEDI TRANS FP7-PEOPLE-2013-ITN-607394, funded by the European Commission,
7th Framework Programme for Research, Technological Development and Demonstration

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Day 1, 28th July 2015

8 ^{:00} -8 ^{:30}	Registration and Welcome	
8 ^{:30} -9 ^{:30}	Introduction to particle-based methods: key principles and hardware Spatial and material flow description; challenges of turbulent flows; key PIV and PTV principles; tracer mechanics; necessary hardware; safety precautions	Rui Ferreira and Rui Aleixo
9 ^{:30} -10 ^{:15}	Introduction to Acoustic Doppler techniques Doppler principle and applications; probe configuration; signal optimization; turbulence from one-point flow description;	Mário Franca
10 ^{:15} -10 ^{:30}	Coffee break	
10 ^{:30} -11 ^{:15}	PIV software: from images to velocity maps Digital imaging; calibration; cross-correlation algorithms, moving/deformable IA; windowing and filtering; sub-pixel interpolation; validation techniques	Kenneth Kiger
11 ^{:15} -12 ^{:00}	PTV algorithms for fluid flow Seeding density; image enhancement; particle detection; tracking algorithms	Rui Aleixo
12 ^{:00} -13 ^{:00}	Lunch break	

13^{:00}-13^{:45} **Particle tracking for sediment mechanics**
Detection and tracking techniques for large bodies in viscous fluids **Benoit Spinewine**

13^{:45}-14^{:00} **Meeting the laboratory**
 Introducing methods, objectives and instrumentation for laboratory practice **Rui Ferreira**

14^{:00}-18^{:00} **Laboratory practice I. Experiments**
 ESRs, ERs and other participants organized in, at most, 5 groups of 4 elements; each group documents the experiments and collects sequentially PIV, ADV-Vectrino and high-speed video data

Sequence

Documentation; ADV1 ; ADV2 ; PIV ; HSV

G1	G2	G3	G4	G5
G2	G3	G4	G5	G1
G3	G4	G5	G1	G2
G4	G5	G1	G2	G3
G5	G1	G2	G3	G4

DINNER

Day 2, 29th July 2015

8 ^{:00} -8 ^{:45}	PIV data treatment Noise correction and despiking; database organization; calculation of turbulence variables from 2D maps of instantaneous velocities	Ana Margarida Ricardo and Rui Ferreira
8 ^{:45} -9 ^{:30}	ADV data processing Noise correction and despiking; calculation of turbulence variables from point measurements	Rita F. Carvalho
9 ^{:30} -10 ^{:30}	Eulerian and Lagrangian flow description from particle velocimetry data Basics of PTV software; open problems; data processing; calculation of statistics; upscaling	Francesco Ballio
10 ^{:30} -11 ^{:00}	Coffee break	
11 ^{:00} -11 ^{:30}	Advanced issues on PIV Stereo PIV, dual-plane PIV; scanning PIV; tomographic PIV...	Kenneth Kiger
11 ^{:30} -12 ^{:00}	Applications <i>Guest:</i> Turbulent flow within arrays of emergent cylinders	Ana Margarida Ricardo
	<i>Guest:</i> Hydrodynamics and morphodynamics of river confluences	Gokçen Bombar
12 ^{:00} -13 ^{:00}	Lunch break	
13 ^{:00} -18 ^{:00}	Laboratory practice I. Data processing Groups will process PIV, ADV and high-speed video addressing the problem given as assignment	

Day 3, 30th July 2015

9 ^{:15} -9 ^{:45}	Presentation of Hytech project	Francesco Ballio
9 ^{:45} -10 ^{:00}	Coffee break	
10 ^{:00} -12 ^{:00}	Group presentations G1 – PIV results, ADV results, PT results (15 + 9 min) G2 – PIV results, ADV results, PT results (15 + 9 min) G3 – PIV results, ADV results, PT results (15 + 9 min) G4 – PIV results, ADV results, PT results (15 + 9 min) G5 – PIV results, ADV results, PT results (15 + 9 min)	
12 ^{:00} -13 ^{:00}	Lunch break	
13 ^{:00} -15 ^{:00}	Feed back Groups will discuss instrumentation and data processing issues with SEDITRANS and invited researchers	
15 ^{:00} -15 ^{:30}	Awarding Diplomas and Closure	

Co-Sponsored by

IAHR - International Association for Hydro-Environment Engineering and Research, in the scope of activities of the Fluvial Hydraulics Committee



and

APRH – Associação Portuguesa dos Recursos Hídricos, in the scope of the activities of the Specialized Commission for Fluvial Hydraulics (Comissão Especializada em Hidráulica Fluvial)

**Registration and information**

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Registration fee: 100 euros

Fees apply only to non-SEDITRANS or non-Hytech members

Suggested accommodation

Hotel Turim Alameda

<http://www.turimalameda.com/>

Av. Rovisco Pais, 34, 1000-046 Lisboa, Portugal

Please send the reservation form by e-mail: groups@turimhoteis.com for Ana Correia / Joana Paulo.

Lecturers and invited speakers

Ana Margarida Ricardo, IST, Universidade de Lisboa
Benoit Spinewine, FUGRO-Belgium and UCL (member of SEDITRANS)
Francesco Ballio, Politecnico di Milano
Gokçen Bombar, Ege University
Kenneth Kiger, University of Maryland
Mário Franca, EPFL (member of SEDITRANS)
Ricardo Canelas, IST, Universidade de Lisboa
Rita F. Carvalho, Faculdade de Ciências, Universidade de Coimbra
Rui Aleixo, GHT-Photonics
Rui Ferreira, IST, Universidade de Lisboa (member of SEDITRANS)