

ANNUAL REPORT - Experimental Methods and Instrumentation (EMI)

A. Division name: Hydraulics

Committee name: Experimental Methods and Instrumentation (EMI)

Reporting period: Aug 2009 – June 2010 (EMI was formed in Aug 2009)

B. Mission statement / Long range objective

The mission of the Experimental Methods and Instrumentation (EMI) committee is *to promote new experimental methods, instruments, measurement techniques, and data analysis routines for both laboratory and field hydro-environment studies as well as to coordinate international activities in this dynamic area.*

With respect to laboratory systems, special emphasis is given to the development of new capabilities for studying fundamental hydraulic phenomena and their interactions with other associated environmental processes such as aquatic ecosystem functioning. The central focus is on non-intrusive methods such as methods employing acoustic and optically-based instruments.

With respect to field systems, EMI activities emphasize design and implementation of multi-process and multi-scale observational and experimental studies, employing both remote and in-situ measurement techniques. Such studies incorporate the most advanced instruments connected in real-time data acquisition networks that can be linked to data models and numerical simulation tools, to underpin resource management policies.

To enhance implementation of new measurement technologies into research and practice, EMI continues its efforts in linking manufacturers, designers, and users (scientists and monitoring agencies).

C. Committee Membership

1. Number of committee membership: Membership is unclear to us at this time. We have not received information from IAHR regarding members joining EMI. A total of 29 people attended the inaugural EMI meeting at the Vancouver Congress in August 2009.

Primary affiliation:

Secondary affiliation:

2. Leadership Team:

Chair:

Colin Rennie, crennie@genie.uottawa.ca, Dept. Civil Engineering, University of Ottawa

Vice-Chair.

Jochen Aberle, j.aberle@tu-bs.de, Leichtweiss-Institut fuer Wasserbau, Abteilung

Wasserbau, Technische Universitaet Braunschweig

Past-Chairs:

Clifford Pugh, cliffordapugh@aol.com

Vladimir Nikora, v.nikora@abdn.ac.uk, Engineering Dept., University of Aberdeen

Secretary:

Cristiana DiCristo, dicristo@unicas.it, Laboratorio di Ingegneria delle Acque, Universita degli studi di Cassino

Members :

David Admiraal, dadmiraal@unlnotes.unl.edu, Dept. Civil Engineering, University of Nebraska-Lincoln

Ichiro Fujita, ifujita@kobe-u.ac.jp, Research Center for Urban Safety and Security, Kobe University

Marian Muste (co-opted member), marian-muste@uiowa.edu, Iowa Institute for Hydraulic Research, University of Iowa

3. Name and composition of Working Groups

Meetings group (leader: Cristiana Di Cristo)

Database group (leader: Joachim Lengricht)

Website group (leader: Jochen Aberle)

Publications group (leader: Ichiro Fujita).

D. Affiliation with other professional associations

The EMI committee works closely with the ASCE-EWRI Hydraulic Measurements and Experimental Methods (HMEM) committee. EMI Leadership team member David Admiraal is the current HMEM Chair. Furthermore, EMI and HMEM jointly organize the Hydraulic Measurements and Experimental Methods conference once every five years.

E. Report on activities in reporting period***Committee meetings***

1) The inaugural committee meeting was held at the Vancouver Congress in August 2009.

2) Members of the leadership team have met in person and by e-mail in subsequent months. In particular, C. DiCristo, V. Nikora, and J. Aberle met at the *First European Congress of the IAHR (Edinburgh, UK, 4–6 May 2010)* and discussed various issues related to short range plans (see below).

Specialty conferences

1) *33rd IAHR Congress, Vancouver, August 2009.*

The previous Hydraulic Instrumentation Section committee was heavily involved in the Vancouver Congress.

- a) 187 abstracts submitted to *Track A.5 Laboratory Experiments, Field Studies, Instrumentation, & Hydraulic Modeling* (Track Chair V. Nikora, supported by J.Aberle and C.Rennie)
- b) 125 abstracts submitted to Theme E. *Advances in Hydroinformatics for Integrated Watershed and Coast Management* (Convenor M. Muste)
- c) two Master's classes
 - MC-I: Uncertainty Analysis in Hydrosience (M. Muste, convenor and instructor)
 - MC-II: Turbulence in natural and constructed waterways (V. Nikora , instructor)

2) *EOS Topical Meeting on “Blue” Photonics – Optics in the Sea (Aberdeen, Scotland, UK, August 2009)*. “Blue” Photonics was focused on all aspects of optics and light in the oceans from basic optical phenomena to complex instrument design, for example, for monitoring of plankton or decommissioning of oil rigs. It was a forum for scientists and engineers to discuss these topics, to develop ideas for their own work, and build up a network of colleagues for future interaction. V. Nikora was member of the Organising Committee.

3) *First European Congress of the IAHR (Edinburgh, UK, 4–6 May 2010)*: V. Nikora was a member of the Organising Committee. Many members of EMI participated at the conference.

4) *7th International Symposium on Ultrasonic Doppler Methods for Fluid Mechanics and Fluids Engineering, Gothenburg, Sweden April 7-9 2010*. C. Rennie was a member of the Scientific Committee for the conference

(Continuing) education activities: workshops, training seminars, courses, etc.

1) *NATIONAL TELFORD INSTITUTE WORKSHOP - Advances in Flow, Density and Sediment Measurement Techniques in the Laboratory and the Field (University of Dundee, UK, 05/06 October 2009)*. The purposes of this Workshop were (i) to invite international specialists working at the forefront of measurement techniques on laboratory and field scales respectively to update the Telford flow community on recent developments and opportunities in equipment, instrumentation, specifications etc in their specialist fields and (ii) to utilise this information to assemble one or more combined bids for funding pools or packages of instrumentation having a common purpose but shared around the Scottish Telford centres with common access. Techniques for the point and synoptic measurement of turbulent flow velocity, flow vorticity, solute density (salinity), temperature, were included. V. Nikora was member of the Organising Committee.

Working Group meetings and output

The *Meetings Group* has been very busy with organizing several conferences and workshops (see above and below).

The *Publications Group* has organized a special issue on Large Scale Particle Image Velocimetry (LSPIV) methods to be published in the Journal of Hydro-Environment Research (JHER). Authors were selected and invited to submit papers. The papers are currently in the review process.

The *Website Group* has updated the IAHR EMI webpage. This work is ongoing.

The *Database Group* held several meetings with Hydralab for collaborative development of a web-based database for hydraulic instrumentation. This initiative is still ongoing, but has run into some hurdles due to uncertain funding for Hydralab.

Publications: proceedings; papers for IAHR Journals; state-of-the-art papers; monographs; books

As noted above, a special issue in JHER is in process.

Contacts with other organizations

EMI has been working with HMEM to organize the upcoming HMEM conference to be held in 2012.

F. Short range plans (1 to 2 years)

Specialty Conferences

1) *River Flow 2010 (Braunschweig, Germany, 8-10 September 2010)*: EMI-members are involved in the organisation of the conference (J. Aberle is Secretary of the Local Organizing Committee, K.-U. Graw is member of the Local Organizing Committee, and V. Nikora is a member of International Scientific Committee for this conference. V. Nikora will serve as a Master for the Master Class on Flow – Vegetation – Sediment Interaction). EMI is involved in the organization of two sessions focussing on innovative field and laboratory instrumentation.

2) *Gravel-Bed Rivers VII Conference (Tadoussac, Canada, 6- 10 September 2010)*: the EMI chair C. Rennie is a member of the Scientific Committee for this conference. GBR7 will focus on fundamental aspects of gravel-bed rivers. Measurement techniques and methods is a topic of the conference. Some EMI members will be keynote speakers (V. Nikora, M. Muste) or primary discussants (C. Rennie).

3) *International Symposium on Hydraulic Physical Modeling and Field Investigation (Nanjing, China, 13-15 September 2010)*: Many EMI members are part of the international advisory committee, and have reviewed papers. Furthermore, the Meetings Group selected two of the keynote speakers (K. Blankaert, R. Ettema).

4) *American Geophysical Union Fall Meeting, Dec 13-17, 2010*. Special Session has been proposed by C. Rennie (co-conveners J. Brasington and D. Vericat), entitled “Advances in Monitoring Fluvial Morphodynamics”.

5) *Hydraulic Measurements and Experimental Methods 2012*: To be co-sponsored by IAHR EMI and ASCE-EWRI-HMEM. C. Rennie is a member of the organizing committee.

6) *Second European IAHR Congress*. EMI will be involved in the organization of the topic *Measuring techniques and experimental issues* (J.Aberle, C.diCristo).

IAHR World Congress Brisbane

1) EMI intends to organize special sessions within the regular conference program. Specific special topics will be solicited for abstract submission, and EMI members will review abstracts.

2) EMI is considering organizing a workshop on instrumentation, which would involve both instrument manufacturers and research users. A similar workshop was held at the Thessaloniki conference. The goal would be to put manufacturers and users in the same room to discuss a) applications of emerging instruments and b) user needs for development of new instruments. EMI would identify suitable manufacturers for the Brisbane conference, preferably those with branch offices in Australia.

3) Student workshop on bend flows with groynes, in which G. Constantinescu (Chair, Fluid Mechanics committee) would discuss numerical modelling aspects and C. Rennie (Chair, EMI) would discuss experimental approaches. This session could be jointly sponsored by the two committees.

(Continuing) education activities: workshops, training seminars, courses, etc.

1) *XXX International School of Hydraulics (Wiejce, Poland, 2010, 14- 17 September 2010)*: The school had the sponsorship from the IAHR and the overall theme of this edition is “Experimental methods and techniques in hydraulic research.” The state-of the art instrumentation and methods of data acquisition and processing will be discussed during the School. Topics related to free surface hydraulics, groundwater flows, pressurized liquids will all attract the interest of the audience. The EMI Meeting Group leader C. Di Cristo is an invited speaker.

Working group activities

Please see above for the main activities of the working groups.

Publications

1) The special issue on LSPIV will carry forth from the review stage to the final publication stage.

2) EMI is considering organizing an edited IAHR monograph on topics relevant to EMI. Initial ideas include use of acoustic instruments in the lab (open channel flows) and the field (rivers).

3) Considering a Hydrolink issue devoted to instrumentation.

Contacts with other organizations

Please see above for interaction with ASCE-EWRI-HMEM.

Remarks