# Hydraulic Measurements & Experimental Methods Conference

University of New Hampshire

Durham, NH | July 9-12, 2017

## Cooperating Organizations

AMERICAN ACADEMY OF WATER RESOURCES ENGINEERS
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ASCE

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AIRH
International Association for Hydro-Environment Engineering and Research
Supported by Spain Water and IWHR, China

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# Contents

# Welcome to HMEM

The organizing committee for the Hydraulic Measurements and Experimental Methods 2017 Conference (HMEM 2017) is excited to welcome you to the leading international conference on the development of new techniques for collecting, processing, and interpreting hydraulic data. Attending this conference will put you in touch with recent developments in the rapidly developing fields of hydraulic measurements and research. You will interact with academics, research scientists, and practitioners who collect and manage a wide variety of water resources data. There will be opportunities to share your recent work and to hear from experts in many specialized areas of hydraulics.

Our keynote speaker, Dr. Merrick Haller (Oregon State University), will kick off the conference with a plenary discussion of the use of radar remote sensing for the analysis of estuarine / riverine fronts and tidal jets. Later in the conference, we are fortunate to have the honor of hosting the Hunter Rouse Hydraulic Engineering Award lecture.

Dr. Robert Wells of the USDA-ARS-National Sedimentation Laboratory and Dr. Henrique Momm of Middle Tennessee State University will lead an eight hour workshop entitled “Philosophy, concepts, and Techniques for Drone Surveys of Terrain.” The workshop will include discussion of uses of small flying vehicles for obtaining photographic terrain data, issues surrounding deployment, and procedures for data analysis including establishment of ground truth and assessment of data quality.

Drs. Wells and Momm both have extensive practical experience in the use of drones and photogrammetry for collection and quantification of topographic data.

The Technical Tour will include a visit to Hubbard Brook Experimental Forest, which is one of the longest-operated experimental

watershed study sites in the United States. Hubbard Brook is where acid rain was discovered and now features a variety of research efforts, including simulated ice storms. A second stop will allow participants to view the Suncook River in Epsom, New Hampshire, which experienced a large avulsion in 2006 and is still undergoing substantial adjustment and erosion.

We are excited to announce that a subset of the authors who present at the conference will be invited to expand their extended abstracts into full-length papers and submit them for a peer-reviewed special issue of the Journal of Hydraulic Engineering. This will provide the possibility of sharing your work with a worldwide audience while enhancing its exposure by grouping it with other selected papers from the conference.

As with previous editions of the HMEM conference we have selected a venue that lends itself not only to insightful technical discussions, but to outdoor activities, recreational opportunities, and family participation as well. The University of New Hampshire is a world-class public research land, sea, and space-grant university. Located just ten miles from the scenic, historic, and cultural coastal town of Portsmouth, New Hampshire, the main campus in Durham features an ocean engineering laboratory, stormwater research center, aquaculture and hydropower testing facilities, and the world's largest boundary-layer wind tunnel facility. Sandy ocean beaches, crystal-clear lakes, and breath-taking mountain vistas lie nearby.

Thank you for joining us at the University of New Hampshire for a rewarding conference in an exciting location.

**Conference Steering Committee**

- Daniel Wren, Chair
- David Admiraal, Co-Chair
- Anne Lightbody, Secretary

**HMEM Conference Committee**

- Anne Lightbody
- David Admiraal
- JR Rigby
- Connie Svoboda
- Juan Gonzalez-Castro
- Yavuz Ozeren
- Colin Rennie
- Chris Rehmann
- Tracey Vermeyen

# Keynote Lectures:
# Opening Plenary Speaker

**Dr. Merrick Haller** earned his Ph.D. in Civil Engineering from the University of Delaware in 1999. His graduate work focused on experimental measurements and the modeling of rip current instabilities. He has been on the faculty in the Coastal & Ocean Engineering program within School of Civil & Construction Engineering at Oregon State University (OSU) since 2001. Before coming to OSU in 2001, he spent two years in a research position in the remote sensing industry. Dr. Haller's group conducts research involving the remote sensing of waves and currents in nearshore and estuarine environments. Processes of particular interest include surf zone rip currents, internal hydraulic jumps, and tidal intrusion fronts near the mouths of estuaries. His group maintains several operational, radar-based, wave observation stations and conducts frequent field studies as well. He is a firm believer in the use of remote sensing coupled with numerical modeling and in situ observations to establish a synoptic understanding of hydrodynamic processes.

**Opening Plenary:** *Sensing the Ocean with Marine Radars*

During the past 10 years, algorithms for extracting ocean information from marine radar image sequences have reached considerable maturity. These data have shown utility for the sensing of both ocean surface processes as well as certain information from within the water column. Applications include directional wave spectra, ocean winds, and nearshore bathymetry and current mapping. Our recent work has concentrated on the sensing of rip currents in the nearshore zone, the intratidal and intertidal dynamics of internal hydraulic jumps, and the tracking of tidal intrusion fronts at the mouths of estuaries. This talk will describe the existing methodologies and demonstrate their use, as well as present the latest developments from our long term observing stations, our progress in the numerical modeling of radar imaging, and describe our upcoming field campaigns. Finally, we will discuss areas of needed future work.

**Dr. Fotis Sotiropoulos** serves as the Dean of the College of Engineering and Applied Sciences (CEAS) and Professor of Civil Engineering at Stony Brook University (SBU), since October 2015. Prior to joining SBU Dr. Sotiropoulos was the James L. Record Professor of Civil, Environmental and Geo-Engineering, and Director of the St. Anthony Falls Laboratory at the University of Minnesota, Twin Cities (2006-2015). Prior to that, Dr. Sotiropoulos was on the faculty of the School of Civil and Environmental Engineering at the Georgia Institute of Technology, with a joint appointment in the G. W. Woodruff School of Mechanical Engineering (1995-2005).

His research focuses on simulation-based engineering science for fluid mechanics problems in environmental, geophysical, renewable energy and biological applications. Funded by the National Science Foundation, the Department of Energy, the National Institutes of Health, the Sandia National Laboratories, private industry, and other state and federal agencies, Sotiropoulos has raised over $35M in externally-sponsored funds for research and research facility development and renovation. He has authored over 170 peer reviewed journal papers and book chapters, is a Fellow of the American Physical Society (APS), has twice won the APS Division of Fluid Dynamics Gallery of Fluid Motion, and is a recipient of a Career Award from the National Science Foundation.

His research results have been repeatedly featured on the cover of prestigious peer-reviewed journals, including the ASCE Journal of Hydraulic Engineering, Water Resources Research and Physics of Fluids. Sotiropoulos is also a 2014 distinguished lecturer of the Mortimer and Raymond Sackler Institute of Advanced Studies at Tel Aviv University and is serving or has served on the editorial boards of several journals.

**Hunter Rouse Hydraulic Engineering Lecture:** Hydraulic Engineering in the Era of Big Data & Extreme-Scale Computing

*"Recent advances in computational algorithms coupled with exponentially growing computing power pave the way for developing a powerful simulation-based engineering science framework for tackling a broad range of real-life hydraulic engineering flows. Multi-physics simulations taking into account complex waterway bathymetry, energetic coherent structures, turbulence/sediment interactions and morphodynamics, free-surface effects and flow structure interaction phenomena are now well within reach and are beginning to impact engineering practice. I will review such progress and offer specific examples highlighting the enormous potential of simulation-based engineering science to supplement and dramatically augment the insights that can be gained from physical experiments. I will also discuss major computational challenges that lie ahead but also underscore the enormous opportunities to take advantage of advanced algorithms, powerful supercomputers and big data to tackle societal challenges in restoration of aquatic environments, sustainable mitigation of the impacts of global environmental change, and development of efficient and environmentally compatible renewable energy systems."*

*- Dr. Fotis Sotiropoulos*

**Philosophy, Concepts, and Techniques for Drone Surveys of Terrain**

Sunday, July 9, 2017
8:00 a.m. – 5:00 p.m. | Piscataqua Room

Dr. Robert Wells of the USDA-ARS-National Sedimentation Laboratory and Dr. Henrique Momm of Middle Tennessee State University will lead an eight hour workshop entitled "*Philosophy, Concepts, and Techniques for Drone Surveys of Terrain*."

The workshop will include discussion of uses of small flying vehicles for obtaining photographic terrain data, issues surrounding deployment, and procedures for data analysis including establishment of ground truth and assessment of data quality. Dr. Wells and Dr. Momm both have extensive practical experience in the use of drones and photogrammetry for collection and quantification of topographic data.

**ADA Compliance**
The University of New Hampshire in Durham, New Hampshire is barrier-free in compliance with the Americans with Disabilities Act (ADA). While ASCE/EWRI will make every effort to meet the needs of the physically challenged, accommodations cannot be guaranteed without prior notification.

**Attendee Packets**

The packet you receive at the registration desk includes your name badge, event tickets, PDH information, and general announcements.

**Badge Policy**

Your name badge is your admission to the Conference. Please wear your badge at all times while in the Conference area of UNH. ASCE recommends removing your badge when leaving the Center. Where tickets are required, please bring them with you as you will not be admitted without one.

**Conference Attire**

The dress code is business casual. Meeting room temperatures will vary, so wear layered clothing to ensure your personal comfort. We also recommend attendees wear comfortable shoes.

**Medical Emergencies**

In case of emergencies the Wentworth-Douglass Hospital is located at: 789 Central Avenue, Dover, NH 03820
(603) 742-5252

**No Smoking Policy**

Smoking is strictly prohibited inside and on the grounds of any University residence facility. ASCE supports a "No Smoking" policy. Smoking is prohibited in the UNH facilities and all venues holding ASCE events.

**Post-Conference Evaluations**

An electronic evaluation will be sent out to all attendees immediately following the conference.

**Professional Development Hours (PDHs)**

You may earn up to 28 PDHs, nationally recognized units of record, by attending conference technical sessions. Please note that there are differences from state to state in continuing education requirements from professional engineering licensure. Each state licensing board has the final authority to approve courses, credits, PDHs and other methods of earning credits in that state. ASCE does not keep record of credits earned.
Submit your credits to the licensing board and regularly check for specific continuing education requirements in the jurisdictions that affect professional engineering licensure and the ability to renew licensure. Certificates will be provided upon request at the conclusion of the Conference. For details on your state's requirements please go to:
www.ncees.org/licensure/licensing_boards.

**Recording Policy**
Video or audio recording of any education session is strictly prohibited without prior written permission from both ASCE and the session presenter(s).

**Weather in Durham, New Hampshire**

The average high for the month of July is 85° F and the average low is 59°.

**UNH Tours**

**Walking Tour** - UNH Fluids Facilities
Monday, July 10 - 12:30 - 1:45 p.m.
Wednesday, July 12 - 12:00 - 1:30 p.m.

Visit the Jere A. Chase Ocean Engineering Laboratory, which is equipped with state-of-the-art testing facilities for underwater/ocean engineering to support research in the areas of ocean engineering, ocean mapping, ocean acoustics, hydrogeology, and hydrographic surveying. Tour also includes the Flow Physics Facility, which, at 300 feet long, is the world's largest scientific quality boundary-layer wind tunnel facility.

**Bus Tour** - UNH Stormwater Center.
Wednesday, July 12 - 3:30 - 5:00 p.m.

Visit the UNH Stormwater Center's field site, a unique technical resource for stormwater practitioners unlike any other stormwater research site in the country. The site is designed to allow direct, side-by-side comparison of different stormwater treatment technologies. Satellite research sites are used to test several additional treatment technologies, including different types of porous pavements. To date, the research facility has collected detailed performance data on over 80 storms, and has evaluated over 30 different types of stormwater treatment systems. The UNH Stormwater Center serves as a technical resource for water managers, planners, and design engineers in New England and throughout the United States.

## Monday, July 10

| | |
|---|---|
| 7:30 a.m. - 12:00 p.m. | Registration \| Piscataqua Foyer |
| 8:00 - 10:00 a.m. | Exhibitor Set Up |
| 8:30 - 9:00 a.m. | Breakfast |
| 9:00 - 10:00 a.m. | Opening Plenary Session |
| 10:00 - 10:30 a.m. | Networking Break (Exhibit Hall) |
| 10:30 a.m. - 12:00 p.m. | Concurrent Technical Sessions |
| 12:00 - 1:30 p.m. | Buffet Lunch (Exhibit Hall) |
| 12:30 - 1:45 p.m. | Walking Tour - UNH Fluids Facilities |
| 2:00 - 3:00 p.m. | Concurrent Techincal Sessions |
| 3:00 - 3:30 p.m. | Networking Break (Exhibit Hall) |
| 3:30 - 5:00 p.m. | Concurrent Technical Sessions |
| 6:00 - 8:00 p.m. | Dinner Event |

## Tuesday, July 11

| | |
|---|---|
| 8:00 - 8:30 a.m. | Breakfast (Exhibit Hall) |
| 8:30 - 10:00 a.m. | Concurrent Technical Sessions |
| 10:00 - 10:30 a.m. | Networking Break (Exhibit Hall) |
| 10:30 a.m. - 12:00 p.m. | Concurrent Technical Sessions |
| 12:00 - 2:00 p.m. | Rouse Awards Luncheon |
| 2:00 - 3:00 p.m. | Concurrent Techincal Sessions |
| 3:00 - 3:30 p.m. | Networking Break (Exhibit Hall) |
| 3:30 - 5:00 p.m. | Concurrent Technical Sessions |
| 5:30 - 7:00 p.m. | Networking Reception (Exhibit Hall)<br>Dinner on Own |

## Wednesday, July 12

| | |
|---|---|
| 8:00 - 8:30 a.m. | Breakfast (Exhibit Hall) |
| 8:30 - 10:00 a.m. | Concurrent Technical Sessions |
| 10:00 - 10:30 a.m. | Networking Break (Exhibit Hall) |
| 10:30 a.m. - 12:00 p.m. | Concurrent Technical Sessions |
| 12:00 - 1:30 p.m. | Buffet Lunch (Exhibit Hall) |
| 12:30 - 1:30 p.m. | Walking Tour - UNH Fluids Facilities |
| 1:30 - 3:00 p.m. | Concurrent Techincal Sessions |
| 3:00 - 3:30 p.m. | Networking Break (Exhibit Hall) |
| 3:30 - 5:00 p.m. | Concurrent Technical Sessions |

## Thursday, July 13

| | |
|---|---|
| 9:00 a.m. - 3:00 p.m. | Technical Tour \| Meet in the Piscataqua Foyer |

| |
|---|
| Conclusion of Conference |

## Sunday, July 9

**Workshop**
8:00 a.m. – 5:00 p.m. | Piscataqua Room

*Philosophy, Concepts, and Techniques for Drone Surveys of Terrain*
Dr. Robert Wells, USDA-ARS-National Sedimentation Laboratory
Dr. Henrique Momm, Middle Tennessee State University

## Monday, July 10

**Opening Plenary**
9:00 – 10:00 a.m. | Strafford Room, Memorial Union Building

*Sensing the Ocean with Marine Radars*
Dr. Merrick Haller, Oregon State University

Track 1 – Imagery and Remote Sensing
10:30 a.m. – 12:00 p.m. | Squamscott Room

Session 1.1: Laboratory PIV Measurements I
Moderator: Jay Lacey

*Refractive Index Matched PIV Measurements of Flow around Interacting Barchan Dunes in a Novel Flume Environment*
Nathaniel Bristow

*Studying Turbulent-Sediment Interactions in Sediment-Laden Flows Using Two-Phase Particle Image Velocimetry (PIV)*
Hadis Matinpour

*Effects of Relative Submergence on the Wake around a Wall-Mounted Spherical Obstacle*
Seyed M. Hajimirzaie

Track 2 – Environmental Measurements
10:30 a.m. – 12:00 p.m. | Piscataqua Room

Session 2.1: Bedforms and Morphology
Moderator: JR Rigby

*Measurement of Water and Bed Surface Shapes Using the Moving Optical Cutting Method for Sandbars with Long Wave Length*
Tsuyoshi Hoshino, Hiroyasu Yasuda

*Using Detailed Surface Topography to Classify Dune Beds in a Laboratory Flume*
Daniel G. Wren

*Observation of Bed Form Using ADCP*
Atsuhiro Yorozuya

Track 3 – Modeling, Structures and Acoustic Measurements
10:30 a.m. – 12:00 p.m. | Cocheco Room

Session 3.1: Model Validation Measurements
Moderator: Tony Wahl

*Validation of Numerical Hydrodynamic Models Using Recent Field Measurements in the Schelde-Estuary*
Yves Plancke, Ir

*HPG Util: A Software Utility for Automating the Creation of Hydraulic Performance Graphs using HEC-RAS*
Blake J. Landry, Nils Oberg

*Use of CFD to Analyze Edge Effects in Laboratory Testing of Coanda-Effect Screens*
Hajrudin Dzafo

*A New Data Assimilation Technique of Water Level for 1-D Unsteady River Flow Analysis*
Jin Kashiwada, Yasuo Nihei

Track 1 – Imagery and Remote Sensing
2:00 – 3:00 p.m. | Squamscott Room

Session 1.2: Laboratory PIV Measurements II
Moderator: Nathaniel Bristow

*Comparison of Velocity and Turbulence Statistics Obtained Using a Profiling Nortek Vectrino Profiler (Victrino II) and Stereo Particle Image Velocimetry*
Jay Lacey

*Investigation of Flow Characteristics Inside a Developing Scour Hole in the Vicinity of a Vertical Retaining Wall*
Nasser Heydari

Track 2 – Environmental Measurements
2:00 – 3:00 p.m. | Piscataqua Room

Session 2.2: ADCP Measurements
Moderator: Daniel Wren

*Using Acoustic Doppler Current Profiler (ADCP) to Charaterize Bed Morphology and Sediment Transport over Dunes at the Ctalamochita River (Córdoba, Argentina)*
Carlos Marcelo Garcia

ADCP's *Capabilities in Measuring the Bed Load Velocity: A Confirmation by Means of Image Velocimetry Under Controlled Conditions*
Slaven Conevski

*Measurement and Modeling of Hydrodynamic Impacts from Hydrokinetic Turbines in Canals*
Josh Mortensen

Track 3 – Modeling, Structures and Acoustic Measurements
2:00 – 3:00 p.m. | Cocheco Room

Session 3.2: Dam Removal and Dam Break
Moderator: Yavuz Ozeren

*Data Management for Dam Break Analysis for 450 River Miles*
Christine Emilie Suhonen

*Dam-Break Flow Measurements Of Granular-Liquid Mixtures in a Channelized Reservoir*
Luc Rémi Rébillout

*Laboratory Experiments and Numerical Simulations of Non-Channelized Dam-Break Flow*
Mustafa Siddik Altinakar

Track 1 – Imagery and Remote Sensing
3:30 – 5:00 p.m. | Squamscott Room

Session 1.3: Large Scale Velocimetry I
Moderator: Martin Detert

*Stereo-Imaging Based LSPIV System for Three-Dimensional Free-Surface Reconstruction and Discharge Measurement*
Wei Li, Qian Liao

*Large Scale Feature Tracking Velocimetry for Retrieving Velocity of Surface Waters*
Carlo Zuniga Zamalloa, Blake J. Landry

*Large Scale, High Resolution, Surface Velocity Measurements using an Infrared Quantitative Imaging System*
Seth A. Schweitzer, Edwin A. Cowen

*Large Scale PIV Measurement of Natural River Discharge with Water Depth Determined by Surface Turbulence Distribution*
Tong Jin, Qian Liao

Track 2 – Environmental Measurements
3:30 – 5:00 p.m. | Piscataqua Room

Session 2.3: Bedload Measurements I
Moderator: David Admiraal

*Estimating Bedload Transport along the Gravel-Bedded Trinity River using In-Situ and Boat-Mounted Hydrophones*
Mathieu D. Marineau

*Accounting for Flow Noise and Boundary Effects in Bed Load Estimation from Sediment-Generated Noise*
J.R. Rigby

*Deployment of a Hydrophone Based Passive Acoustic Bedload Monitoring Surrogate*
Bradley Goodwiller

*Signal Processing of Bedload Transport Impact Amplitudes on Accelerometer Instrumented Plates*
Wayne O. Carpenter

Track 3 – Modeling, Structures and Acoustic Measurement
3:30 – 5:00 p.m. | Cocheco Room

Session 3.3: Hydraulic structures
Moderator: Connie Svoboda

*Obtaining Static Pressure Measurements with Piezometer Plates in Hydroturbine Performance Tests*
Bryan Heiner

*Laboratory Depth Measurement in Nappe Flow Regime of Stepped Spillways using High-Speed Camera*
Amirmasoud Hamedi

*Discharge Capacity of Coanda-Effect Screens and the Combined Influence of Gravitational, Surface Tension, and Viscous Effects*
Tony L. Wahl

*Real-Time Flood Monitoring Network in the Colville River Delta, Alaska; A Case Study*
Garrett C. Yager

**Monday Poster Presentations**
8:30 a.m. – 5:00 p.m. | Huddleston Room

*ADCP Intercomparison for Evaluation of Discharge Measurement*
Sinjae Lee, Jaehyun Song, Chanjoo Lee, Donggu Kim, Sanghwa Jung

*Analysis of Turbulent Flow Characteristics around the Bar in a Braided River Model*
Mohammad Amir Khan, Nayan Sharma

*Identifying Inundation Process in an Urban District Based on Rainfall Simulation and Hydraulic Model Experiments*
Dong Sop Rhee, Yong-Uk Ryu

*Estimates of Spatial Shear Stress Distribution From Acoustic Doppler Current Measurements in Submerged Bedrock Canyons*
Gustavo Pacheco Tomas

*Scanning Sonar Applications for Hydraulic Structure Inspections*
Tracy B. Vermeyen

*Investigation of the Effect of Submerged Vanes on Longitudinal Coefficient*
Mahmood Shafai Beestan

*Stereoscopic Reconstruction of Granular Bed in a Laboratory Via Added Binary-Color Texture*
Carlo Zuniga Zamalloa, Blake Landry

*Multiple Methods For Quantifying Topography and Stage-Volume Relationships For Rangeland Stock Ponds*
Mary H. Nichols

*Feasibility Test of Eco-hybrid Rolling Mat for Bank Protection by Stream-scale Experiment*
Un Ji

*Using Sediment Fingerprinting Technique to Apportion the Stream Bed Sediment Sources in an Urban Watershed*
Kritika Malhotra

*Using Remote Sensing Methods to Study Changes In Sediment Transport and Geomorphology Associated with Dam Removal in the Coastal Zone*
Alexandra D. Evans

*Fiber Optic Sensors for Monitoring Hydrokinetic Turbine Structural Loads*
Budi Gunawan

## Tuesday, July 11

Track 1 – Imagery and Remote Sensing
8:30 – 10:00 a.m. | Squamscott Room

Session 1.4: Large Scale Velocimetry II
Moderator: Blake Landry

*Airborne Image Velocimetry under Urban Conditions*
Martin Detert

*Use of Large-Scale Particle Image Velocimetry (LSPIV) for Continuous Streamflow Gaging During Flood Events*
Frank Lee Engel

*Remote Predictions of Bed Shear Stress and Mean Streamwise Velocity Profiles*
Erika Johnson

*Innovative Flow Measurement Technology for Stream Discharge near Hydraulic Structures: Wide-angle Oblique Automated Streamflow Imaging System (WI-OASIS)*
Yuli Liu

Track 2 – Environmental Measurements
8:30 – 10:00 a.m. | Piscataqua Room

Session 2.4: Bedload Measurements II
Moderator: JR Rigby

*Measuring Sediment Transport in an Ephemeral Stream; Physical and Surrogate Data Collection*
David Richard Varyu

*Variability of Coarse Bedload Transport: Continuous Measurement Using a Surrogate Method*
Robert C. Hilldale

*Advances in Sediment Tracking using Radio Frequency Identification Transponders: A Purpose-Built Flume and Ggyroscopic Tags*
John Hufnagel, Elli Papangelakis, Bruce Macvicar

*Measurement of Gravel Bed Load Using Impact Plates*
Roger Kuhnle

Track 3 – Modeling, Structures and Acoustic Measurements
8:30 – 10:00 a.m. | Cocheco Room

Session 3.4: Hydraulic Structures II
Moderator: Chris Rehmann

*Testing the Third Set of Locks on the Panama Canal Project*
Norman F. Perkins

*Flow Monitoring at Hinged-Gate Weir of Variable Crest Elevation*
Seyed M. Hajimirzaie

*Drawdown Analysis - A Means to Accurately Measure Flow through a Highway Culvert*
Alexander William Mann

Track 1– Imagery and Remote Sensing
10:30 a.m. – 12:00 p.m. | Squamscott Room

Session 1.5: Large Scale Velocimetry III
Moderator: David Admiraal

*Quantitative Spatial and Temporal Monitoring of River Ice using Shore-based Oblique Imagery*
Saber Ansari

*Flood Chasers: a Crowd-sourced Data Project for Quantifying Flash Flood Events*
Antoine Patalano

*RiverEye Bathymetry Retrievals (REBaR): A Remote Sensing Approach to Bathymetry and Discharge Estimation in Rivers*
Peter J. Rusello

Track 2 – Environmental Measurements
10:30 a.m. – 12:00 p.m. | Piscataqua Room

Session 2.5: Suspended Sediment Transport
Moderator: Daniel Wren

*Application of Acoustic Doppler Technology in Estimating Suspended Sediments*
Daniel Wagenaar

*Acoustic Time-Series Data as Surrogates for Concentrations of Suspended Sediment, Nutrients, and Bacteria in an Urban Stream within Rock Creek National Park, Washington D. C.*
Joseph M. Bell

*Characterizing Suspended-Sediment Flux in a Large River Confluence by Means of Fixed-Vessel ADCP and LISST Measurements*
John Eric Petrie

*Monitoring the Effects of River Crossing Construction in Special Areas of Conservation*
Patrick Purcell

Track 3 – Modeling, Structures and Acoustic Measurements
10:30 a.m. – 12:00 p.m. | Cocheco Room

Session 3.5: ADCP Measurements and Evaluation
Moderator: Stephanie Moore

*Rating Curves for Dispersion Coefficients*
Chris R. Rehmann, Meredith L. Carr, Yuqi Song

*Field Evaluations of RiverPro and RioPro ADCPs: Preliminary Results and Implications for Future Work*
Kevin A. Oberg

*Fundamental Hydraulics of Flow Cross-sections in Natural Rivers: A Preliminary Analysis of a Large Data Set of Acoustic Doppler Flow Measurements*
David Bjerklie

**Hunter Rouse Hydraulic Engineering Award Luncheon and Lecture**
12:00 – 2:00 p.m. | Strafford Room, Memorial Union Building
*Hydraulic Engineering in the Era of Big Data and Extreme-Scale Computing*
Dr. Fotis Satiropoulos, Stony Brook University

Track 1 – Imagery and Remote Sensing
2:00 – 3:00 p.m. | Squamscott Room

Session 1.6: PIV/PTV Data Processing and Error Analysis
Moderator: Peter Russelo

*Use of Synthetic Flow Fields for Evaluating LSPIV Errors*
Nicolás F. Guillen

*LPTV Processing Techniques for Challenging Field Lighting Conditions*
David M. Admiraal

*Use of LSPIV Assessing Urban Flash Flood Vulnerability*
Nicolás F. Guillen

Track 2 – Environmental Measurements
2:00 – 3:00 p.m. | Piscataqua Room

Session 2.6: Suspended Sediment Transport
Moderator: David Admiraal

*Advances in Estimating Suspended-Sediment Concentration from Multiple-Frequency, Down-Looking Acoustic Doppler Current Profilers: Missouri River Focus*
Molly S. Wood

*Dual Frequency Acoustic Monitoring of Sediment Transport in a Remote Ice-Affected River*
Stephanie A. Moore

*Sediment Transport in the Schelde-estuary: the Challenge of Performing Good Measurements in Challenging Conditions*
Yves Plancke

Track 3 – Modeling, Structures and Acoustic Measurements
2:00 – 3:00 p.m. | Cocheco Room

Session 3.6: Uncertainty and Bias in Flow and Discharge
Moderator: Juan Gonzalez-Castro

*Quantifying the Site Selection Effect in the Uncertainty of Moving-Boat ADCP Discharge Measurements*
Aurélien Despax

*Uncertainty Analysis of Index Velocity Meters and Discharge Computations at the Chicago Sanitary and Ship Canal near Lemont, Illinois*
James J. Duncker

*A Comparison of Seven Methods for Estimating the Uncertainty in Stage-Discharge Rating Curves*
Chris Gazoorian, Kiang Julie

Track 1 – Imagery and Remote Sensing
3:30 – 5:00 p.m. | Squamscott Room

Session 1.7: Satellite and Aerial Flow Measurements
Moderator:Yavuz Ozeren

*Verifying Satellite-Derived Discharge Using UAS- and Ground-Based Radars*
John Fulton

*Airborne Bathymetric LIDAR and Infrared Imaging of Riverine Environments*
Steven P. Anderson

*Use of a UAV Mounted Infrared Camera for Measuring Thermal Plumes at Power Plants*
Daniel Gessler

*Dye Tracing Method Using Aerial Imagery by the Drone*
Il Won Seo

Track 2 – Environmental Measurements
3:30 – 5:00 p.m. | Piscataqua Room

Session 2.7: Environmental Hydraulics
Moderator: Connie Svoboda

*Measurements of the Transverse Mixing Coefficient Using an Acoustic Doppler Current Profiler*
Lauren E. Schwab, Chris R. Rehmann

*Turbulence Measurements in the Benthic Boundary Layer of a Very Large Lake*
Cary David Troy, David Cannon

*Linking High-Resolution Topography, Hydraulic Field Measurements, and Numerical Modeling to Understand Fluvial Transport Processes And Nitrate Retention in the Suncook River, NH*
Anne Lightbody

*Mean Flow Measurement of a Weak Bubble Plume from a Single Submerged Orifice*
Scott A. Socolofsky, Binbin Wang

Track 3 – Modeling, Structures and Acoustic Measurements
3:30 – 5:00 p.m. | Cocheco Room

Session 3.7: Uncertainty in ADCP Flow and Discharge I
Moderator: Kevin Oberg

*Uncertainty Analysis of Multiple Transects ADCP Discharge Measurements by Moving Boat ADCP*
Federico Flores Nieto

*Bias Correction of Edge Discharge Algorithms used in ADCP Measurements*
Juan Antonio Gonzalez-Castro

*Assessing Discharge Measurement Uncertainty Between Two Models of ADCP*
Stephanie A. Moore, Elizabeth C. Jamieson

*A New Approach to Estimating the Total Uncertainty of Moving-Boat ADCP Streamflow Measurements*
Hening Huang

## Wednesday, July 12

Track 1 – Imagery and Remote Sensing
8:30 – 10:00 a.m. | Squamscott Room

Session 1.8: Wave-Related Measurements
Moderator: JR Rigby

*Flexible-Baseline Imaging Stereo Technique for Surface Wave Measurements*
Chin H. Wu

*Wave Measurements Along an Estuary with Heavy Ship Traffic*
Dieter Meire

*Laboratory Experiments of Wave Induced Embankment Erosion*
Yavuz Ozeren

*The Effect of Wind Stress on Water-Surface Velocity in River Areas*
Kie Hai

Track 2 – Environmental Measurement
8:30 – 10:00 a.m. | Piscataqua Room

Session 2.8: Environmental Hydraulics II
Moderator: Daniel Wren

*Flume Measurements on the Lateral Diffusion of Suspended Sediment between Flexible Vegetation and Open Water*
Kaisa Västilä

*Flow Measurements over Vegetation Patches in Stream Scale*
Yong-Uk Ryu

*Field Measurement of Characteristics of Natural Seep Bubbles and Implication to the Methane Dissolution*
Binbin Wang, Scott A. Socolofsky

*Secondary Circulation Pattern for Reversing Flow in a Tidally Influenced River Meander*
Colin D. Rennie, Eldo Santos

Track 3 – Modeling, Structures and Acoustic Measurements
8:30 – 10:00 a.m. | Cocheco Room

Session 3.8: Uncertainty in ADCP Flow and Discharge II
Moderator: John Fulton

*An Update on Velocity Bias Caused by Flow Patterns around Acoustic Doppler Current Profilers and Tethered Boats*
David S. Mueller

*Uncertainty Assessment of Elemental Error Sources for ADCP Discharge Measurements using GUM framework in a Controllable Field Observation*
Dongsu Kim

*Characterization of Uncertainty in the Measuring of Bottom Transport using ADCP*
Dieter Meire

*Error Assessment for Spatio-Temporally Averaged Moving Vessel ADCP Measurement in a Large Laboratory Channel*
Budi Gunawan

Track 1 – Imagery and Remote Sensing
10:30 a.m. – 12:00 p.m. | Squamscott Room

Session 1.9: Dam and Reservoir Issues
Moderator: Anne Lightbody

*High Frequency Monitoring of Environmental Variables Applied to 3D Model Calibration*
Lais Ferrer Amorim, Rodolfo Scarati Martins, Cristiane Araújo Amaro

*Comparison of Reservoir Inflows Predicted from Times Series Models and Satellite-Radar-Altimetry-Based Rating Curves*
Yunus D. Salami

*Analysis of the Performance of an Alternative Device Dredging Small Dams*
José Alfredo González, Joselina Espinoza

*A Study on the Evacuation Safety at Inundated Stairs by using the Real-Scale Hydraulic Model Experiment*
Myounghwan Kim

Track 2 – Environmental Measurements
10:30 a.m. – 12:00 p.m. | Piscataqua Room

Session 2.9: Sediment Transport Issues
Moderator: Renee Vandermause

*Structure-from-Motion as a Low-Cost, Rapid-Assessment Tool for Monitoring Stream Bank Erosion*
Matthew J. Cashman

*Effects of Velocity Filters on the Particle Entrainment Prediction*
Panayiotis Diplas, WuRong Diplas

*Techniques for Coarse Bed Material Sampling for a Large River in Challenging and Remote Conditions*
Ryan Kilgren, Bill Fullerton, Renee Vandermause

*Sedimentary Layer Thickness Estimated using a Sub-Bottom Profiler at the Narrow Segment of the Yoshino Rive*r
Shoji Okada

Track 3 – Modeling, Structures and Acoustic Measurements
10:30 a.m. – 12:00 p.m. | Cocheco Room

Session 3.9: Data Quality Assessment
Moderator: Connie Svoboda

*Accuracy of Velocity and Discharge Evaluated by Using a Dynamic Interpolation and Extrapolation Method Under Various Conditions*
Yasuo Nihei

*Impact of the Sampling Duration on the Uncertainty in Discharge Measurements Acquired with Acoustic Doppler Velocimeters*
Marian Muste

Track 1 – Imagery and Remote Sensing
1:30 – 3:00 p.m. | Squamscott Room

Session 1.10: Evaluation of Data Quality
Moderator: David Admiraal

*Evaluating Uncertainty in Field Flow Measurement of Large Scale Flows using the Dye Dilution Method*
Philip S. Stacy

*Data Quality Inspection of Water Level Measurements by Means of a Digital Elevation Model Variogram Analog*
Joe David Guggenberger, Andrew Curtis Elmore

*Development of Geostatistical Parameters for the Interpolation of Groundwater Elevation*
Joe David Guggenberger, Andrew Curtis Elmore

*Estimating Water Quantity in a Poorly-Gaged Reservoir Using Water Surface Heights from Satellite Radar Altimetry and Simplified In Situ Hydrological Parameters*
Yunus D. Salami

Track 2 – Environmental Measurements
1:30 – 3:00 p.m. | Piscataqua Room

Session 2.10: Sediment Monitoring and Modeling
Moderator: Ryan Kilgren

*Real-Time Pier Scour Monitoring in the Arctic; Challenges and Solutions*
Garrett C. Yager

*Varying Bathymetric Data Collection Methods and their Impact on Sediment Load Calculation*s
Tim Sullivan, Ian Kiraly, Gary S. Lemay

*Sediment Fingerprinting to Identify the Sources of In-Stream Sediment in an Urban Watershed*
Kritika Malhotra

*Development and Application Study of Sediment Transport Formula in Taiwan's Rivers*
Chung-Ta Liao

Track 3 – Modeling, Structures and Acoustic Measurements
1:30 – 3:00 p.m. | Cocheco Room

Session 3.10: Acoustic Measurements and Analysis
Moderator: Anne Lightbody

*Backscatter Estimation Using Broadband Acoustic Doppler Current Profilers*
Jerald Mullison

*Visualizing and Analyzing ADCP and CFD Data Using Python and Other Open Source Tools*
Gary S. Lemay, Jr, Matt Denno

*Dynamic Sampling for Acoustic Point Velocity Measurements*
Carlos Marcelo Garcia

Campus Bus Tour
3:30 – 5:00 p.m.

## Thursday, July 13

Technical Tour
9:00 a.m. – 3:00 p.m.
Hubbard Brook Experimental Forest and the Suncook River

# NOTES

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