



**2019 IEEE/OES TWELFTH
CURRENTS, WAVES,
TURBULENCE MEASUREMENT
AND APPLICATIONS
WORKSHOP (CWTMA)**

Catamaran Resort, San Diego 10- 13 March 2019

SUNDAY, March 10 6:00 – 8:30 PM Come join us for the CWTMA 2019 Icebreaker in the Toucan Room; Appetizers with two free drinks (beer, wine, soft drinks; cash bar option). Our thanks to Teledyne for being a sponsor.
Registration Desk Open – pick up your ID badge – Place your order for Wednesday lunch

Theme: “CWTMA in the 2020s”

MONDAY, 7:00 – 8:00 AM Continental Breakfast / Exhibits - Toucan Room

8:00 - 9:00 AM

**Introduction & Keynote
Macaw/Cockatoo Room**

Introduction: Rick Cole, General Chair, 12th CWTMA Workshop
IEEE-OES Sponsor: Mal Heron, OES Vice-President for Technical Activities
Discussion on CWTMA 2019 Papers to Xplore/JOE: Mal Heron, Sandy Williams

Invited Speaker: Professor Jennifer MacKinnon - Scripps Institution of Oceanography
“Tools for a Multi-Scale World”

9:00 - 10:20 AM

**Session 1: Student Papers I
Chair: Hugh Roarty**

(9:00 AM) A New Empirical Approach to Detect Surface Currents Using Doppler Marine Radar
Lisa Nyman, University of Miami
Bjoern Lund, University of Miami
Roland Romeiser, University of Miami
Hans Graber, University of Miami
Jochen Horstmann, Helmholtz-Zentrum Geesthacht

(9:20 AM) Currents, Waves and Turbulence Measurement: A view from multiple Industrial-Academic Projects in Tidal Stream Energy
Mairi Dorward, University of Edinburgh
Brian Sellar, University of Edinburgh
Chris Old, University of Edinburgh
Philipp Thies, University of Exeter

Monday, March 11 *(cont'd)*

(9:40 AM) Quantifying the Impact of Nonlinear Internal Waves on the Atmospheric Surface Layer

David Ortiz-Suslow, *Naval Postgraduate School*

Qing Wang, *Naval Postgraduate School*

John Kalogiros, *National Observatory of Athens*

Ryan Yamaguchi, *Naval Postgraduate School*

Sean Celona, *Scripps Institution of Oceanography*

Tony De Paolo, *Scripps Institution of Oceanography*

Eric Terrill, *Scripps Institution of Oceanography*

R. Shearman, *Oregon State University*

Pat Welch, *Oregon State University*

Ivan Savelyev, *Naval Research Laboratory*

(10:00 AM) Preliminary design and benchmarking of the microFloat: a buoyancy controlled float for coastal waterways

Trevor Harrison, *University of Washington*

Corey Crisp, *University of Washington*

Jessica Noe, *University of Washington*

Paul Murphy, *University of Washington*

James Joslin, *Applied Physics Laboratory*

Andrew Stewart, *Applied Physics Laboratory*

Tim Mundon, *Oscilla Power, Inc.*

Brian Polagye, *University of Washington*

10:20 - 10:50 AM
ORDERS FOR BOX LUNCH DUE

Breakout –Toucan

10:50 AM - 12:10 PM

Session 2: Student Papers II
Chair: Rick Cole

(10:50 AM) The impact of storm-induced coastal trapped waves on the transport of marine debris using high frequency radar data

Kelsey Brunner, *Stony Brook University*

Kamazima Lwiza, *Stony Brook University*

(11:10 AM) Remote Quantification of Nearshore Wave Energy Dissipation Rates from Coherent X-Band Radar Backscatter

Michael Stresser, *Helmholtz-Zentrum Geesthacht*

Jochen Horstmann, *Helmholtz-Zentrum Geesthacht*

(11:30 AM) TOWARDS IMPLEMENTING THE OPERATIONAL USE OF HIGH FREQUENCY RADAR WAVE PARAMETER ESTIMATIONS IN PUERTO RICO

Colin Evans, *University of Puerto Rico Mayaguez*

Miguel Canals, *University of Puerto Rico Mayaguez*

Monday, March 11 *(cont'd)*

(11:50 AM) Investigating the Effect of Changing Antenna Patterns on Surface Currents from HF Radar

Grant Mickelsen, *UCSB*

Brian Emery, *UCSB*

12:10 - 12:30 PM

**Feedback & Discussion;
Presentation of Awards
Chairs: Rick Cole and Hugh Roarty**

12:30 - 2:00 PM

Lunch - Outside

2:00 - 3:40 PM

**Session 3:
ADCPs & Acoustic Sensors I
Chair: Steve Anderson**

(2:00 PM) The Pinnacle Origin Story

Jerald Mullison, *Teledyne RDI*

Paul Wanis, *Teledyne RDI*

(2:20 PM) Backscatter Estimation using ADCPs - Twenty Years Later

Jerald Mullison, *Teledyne RDI*

(2:40 PM) Field Test Results from Ellipsoid ADCP Buoy Moored at the Edge of the Gulf Stream

Laura Fiorentino, *NOAAWOSICO-OPS*

Robert Heitsenrether, *NOAAWOSICO-OPS*

Michael Muglia, *Coastal Studies Institute*

Chung-Chu Teng, *NOAA*

(3:00 PM) Performance Improvement for ADCPs on Surface Buoys

David Velasco, *Nortek AS*

Sven Nylund, *Nortek AS*

(3:20 PM) Acoustic Currents and Tides in Unfriendly Environments, Cook Inlet, AK

Rick Cole, *RDSEA INTERNATIONAL, INC.*

Jeff Donovan, *University of South Florida*

Dave Olin, *Olin Hydrographic Solutions*

Dennis Mayer, *University of South Florida*

3:40 - 4:10 PM

Breakout -Toucan

Monday, March 11 *(cont'd)*

4:10 - 5:50 PM

**Session 4:
ADCPs & Acoustic Sensors II
Chair: Peter Spain**

(4:10 PM) Development of a scalable, modular high-resolution water velocity measurement instrument using actuated acoustic scanning

Samuel Harding, *Pacific Northwest National Laboratory*

Brian Sellar, *University of Edinburgh*

Mairi Dorward, *University of Edinburgh*

(4:30 PM) NDBC OWL WAVE SYSTEM DEVELOPMENT

Rodney Riley, *NDBC*

Candice Hall, *NDBC*

Randy Stewart, *NDBC*

David Wang, *Naval Research Laboratory*

Steven DiNapoli, *NDBC*

(4:50 PM) Single-Point Doppler Profiling, Deep and Shallow

Rick Cole, *RDSEA INTERNATIONAL, INC.*

Paul Devine, *Teledyne RD Instruments*

Jeff Kinder, *Down East Instrumentation*

Jeff Donovan, *USF Marine Science*

Jason Law, *USF Marine Science*

Dennis Mayer, *USF Marine Science*

Darryl Symonds, *Teledyne RD Instruments*

Robert Weisberg, *USF Marine Science*

(5:10 PM) Unwrapping surface-skimming Doppler sonar data, and separating waves from currents.

Jerome Smith, *Scripps Institution of Oceanography*

(5:30 PM) A new version (v4) of the SWIFT platform for waves, currents, and turbulence in the ocean surface layer

Jim Thomson, *University of Washington*

Melissa Moulton, *University of Washington*

Alex de Klerk, *University of Washington*

Joe Talbert, *University of Washington*

Sam Kastner, *University of Washington*

Maricarmen Guerra, *University of Washington*

Madison Smith, *University of Washington*

Michael Schwendeman, *University of Washington*

Seth Zippel, *University of Washington*

Sven Nylund, *Nortek*

END OF MONDAY'S SESSIONS

TUESDAY, March 12, 8:00 AM – 8:30AM

Breakfast in Toucan Room

8:30 – 8:40AM

Housekeeping: Chair: Rick Cole

8:40 - 10:20 AM

**Session 5:
Freshwater & Lagrangian Tracking
Chair: Jochen Horstmann**

(8:40 AM) Ocean Current Measurement in a Density Following Reference Frame

Rob Pinkel, *Scripps Institution of Oceanography*

Andrew Lucas, *SIO*

Michael Goldin, *SIO*

Matthew Alford, *SIO*

Jen MacKinnon, *SIO*

(9:00 AM) Droning the river

Marinus Schroevers, *Deltares*

Arjan Sieben, *Ministry of Infrastructure and Water Management*

Thijs Hasselaar, *Maritime Research Institute Netherlands*

(9:20 AM) Airborne Remote Sensing of Currents on the Yukon River

Steven Anderson, *Arete Associates*

Seth Zuckerman, *Arete Associates*

Peter Rusello, *Arete Associates*

(9:40 AM) Wave-induced Stokes drift measurement by high-frequency radars: Preliminary results

Cedric Chavanne, *UQAR-ISMER*

Abigaëlle Dussol, *UQAR-ISMER*

Dany Dumont, *UQAR-ISMER*

(10:00 AM) Horizontal advection critical for maintaining an Antarctic biological hotspot

Josh Kohut, *Rutgers University*

Peter Winsor, *University of Alaska, Fairbanks*

Hank Statscewich, *University of Alaska, Fairbanks*

Matthew Oliver, *University of Delaware*

Erick Fredj, *Jerusalem College of Technology*

Nicole Couto, *Scripps Institution of Oceanography*

Kim Bernard, *Oregon State University*

William Fraser, *Polar Oceans Research Group*

10:20 - 10:50 AM

Break in Toucan Room

Tuesday, March 12 (cont'd)

10:50 AM - 12:30 PM

**Session 6:
AUVs and Platforms
Chair: Roland Romeiser**

(10:50 AM) Collaboration with Current Meter Users
Albert Williams, Woods Hole Oceanographic Institution

(11:10 AM) Application of small, untethered Ocean Landers for Current, Wave, and Turbulence Measurements
Kevin Hardy, Global Ocean Design LLC
Chris Kontoes, Nortek USA

(11:30 AM) Turbulent mixing in freshwater lenses in the near-surface layer of the ocean laterally spreading as gravity currents
Alexander Soloviev, Halmos College of Natural Sciences and Oceanography/Nova Southeastern University
Egbert Schwarz, German Aerospace Center
Cayla Dean, Halmos College of Natural Sciences & Oceanography/Nova Southeastern Univ/
Hui Shen, Bedford Institute of Oceanography
William Perrie, Bedford Institute of Oceanography
Susanne Lehner, German Aerospace Center

(11:50 AM) Physical and Biochemical Structure Measured By APEX-EM Floats
Lynn (Nick) Shay, Rosenstiel School of Marine and Atmospheric Science University of Miami
Peter Fuze, Teledyne Marine

(12:10 PM) An Autonomous GNSS Wave Sensor Module for Deployment on Existing Buoy Infrastructure: Comparison and Validation of Co-located GNSS and Accelerometer Directional Wave Sensors
Scott Tobin, Xeos Technologies
Mitchell MacInnis, Xeos Technologies

12:30 - 2:00 PM

Lunch Outside

2:00 - 2:20 PM

**Session 7:
Platforms & HF Radar
Chair: Sandy Williams**

(2:00 PM) The Articulating Profiler
Fredrik Thwaites, WHOI
Brian Hogue, WHOI
Jeffrey O'Brien, WHOI
John Toole, Woods Hole Oceanographic Institution

Tuesday, March 12 (cont'd)

(2:20 PM) Time-Domain Motion Compensation of HF-Radar Doppler Spectra for an Antenna on a Moving Platform

Reza Shahidi, *Memorial University of Newfoundland*
Eric Gill, *Memorial University of Newfoundland*

(2:40 PM) First Results On Measuring Surface Current Velocities With WERA HF Radar in MIMO Configuration At Cape Hatteras

Roberto Gomez, *Helzel Messtechnik GmbH*
Anna Dzvonkovskaya, *Helzel Messtechnik GmbH*
Klaus-Werner Gurgel, *Institute of Oceanography - University of Hamburg*
Dana Savidge, *Skidaway Institute of Oceanography*
Thomas Helzel, *Helzel Messtechnik GmbH*
Leif Petersen, *Helzel Messtechnik GmbH*
Gabriel Matthias, *Skidaway Institute of Oceanography*

(3:00 PM) Microwave Radar Wave and Currents Measurement Analysis in the Gulf of Mexico

Daniel Mendelsohn, *RPS Metocean*
Luz Zarate, *RPS Group*
Pak Leung, *Shell Exploration & Production*
Keith Kurrus, *RPS Metocean*
Jonas Rostad, *Miros AS*

(3:20 PM) Measuring Heading in High Latitudes

Darryl Symonds, *Teledyne RD Instruments*
Paul Wanis, *Teledyne RD Instruments*
Paul Wanis, *Teledyne RD Instruments*
Adam Jackson, *ION*
Dale Lambert, *ION*

3:40 – 4:10PM

Break in Toucan Room

4:10 – 5:50 PM

**SESSION 8:
Remote Sensing
Chair: Eric Gill**

(4:10 PM) Current Retrieval from Moving Wave Patterns Seen by Spaceborne SAR

Roland Romeiser, *University of Miami RSMAS*
Hans Graber, *CSTARS, University of Miami*

(4:30 PM) Measuring The Effects of Hurricanes on Major Ocean Currents And Implications for Ocean Energy Devices

William Baxley, *Florida Atlantic University*
James VanZweiten, *Florida Atlantic University*
Nathaniel Small, *California Baptist University*

Tuesday, March 12 (cont'd)

(4:50 PM) Fiber Optic Distributed Temperature Sensing Measurements of Breaking Internal Waves

Andrew Lucas, *Scripps Institution of Oceanography*

Rob Pinkel, *Scripps Institution of Oceanography*

(5:10 PM) Real-time marine radar observations of internal waves and rip currents from a mobile tower

Merrick Haller, *Oregon State University*

David Honegger, *Oregon State University*

Randall Pittman, *Oregon State University*

Alexandra Simpson, *Oregon State University*

Annika O'Dea, *Oregon State University*

END OF TUESDAY'S SESSIONS

WEDNESDAY, March 13, 8:00 – 8:30AM

Breakfast in Toucan Room

8:30 – 8:40 AM

**Housekeeping:
Rick Cole**

8:40 – 10:20 AM

**Session 9:
Waves & Currents I
Chair: Mal Heron**

(8:40 AM) Using the Lomb-Scargle method for wave statistics from gappy time series

Marinna Martini, *U.S. Geological Survey*

Alfredo Aretxabaleta, *U.S. Geological Survey*

Christopher Sherwood, *U.S. Geological Survey*

(9:00 AM) Wind direction from Lidar measurement of wave slope asymmetry: Theory and preliminary analysis

Damien Josset, *NRL*

Yongxiang Hu, *NASA LaRC*

Floyd Hovis, *Fibertek, Inc.*

Carl Weimer, *Ball Aerospace*

Weilin Hou, *NRL*

Jacques Pelon, *Sorbonne Université*

Nicolas Pascal, *HYGEOS AERIS/ICARE*

Chris Michael, *NRL*

Wednesday, March 13 (cont'd)

(9:20 AM) CDIP: Maintaining a Robust and Reliable Ocean Observing Buoy Network

James Behrens, *Scripps Institution of Oceanography, UC San Diego*

Julie Thomas, *Scripps Institution of Oceanography, UC San Diego*

Eric Terrill, *Scripps Institution of Oceanography, UC San Diego*

Robert Jensen, *USACE-ERDC-CHL*

(9:40 AM) Doppler Scatterometry: a New Method for Measuring Ocean Currents and Winds

Ernesto Rodriguez, *Jet Propulsion Laboratory, California Institute of Technology*

Alexander Wineteer, *Jet Propulsion Laboratory*

Dragana Perkovic-Martin, *Jet Propulsion Laboratory*

(10:00 AM) Exploiting on-board data storage for improved wave sensing models for non-ideal buoy hulls

Timothy Crandle, *SeaView Systems Inc.*

Edward Celkis, *SeaView Systems Inc.*

Marla Isenstein, *SeaView Systems Inc.*

Lydia Gapp, *Murray State University*

10:20 - 10:50 AM

Break in Toucan Room

10:50 - 11:30 AM

**Session 10:
Waves & Currents II
Chair: Rick Cole**

(10:50 AM) SeaGuardII DCP Wave: Adaptive Tx pulse for wave measurements

Harald Tholo, *Xylem / Aanderaa*

Emilie Dorgeville, *Xylem / Aanderaa*

Richard Butler, *Xylem / Aanderaa*

(11:10 AM) Measurements of Surface Current Fields Using a Small Drone

Jochen Horstmann, *Helmholtz-Zentrum Geesthacht*

Ruben Carrasco, *Helmholtz-Zentrum Geesthacht*

Michael Stresser, *Helmholtz-Zentrum Geesthacht*

(11:30 AM) Evaluation of Wave Data from HF Radar by the National Weather Service

Hugh Roarty, *Rutgers University*

Al Cope, *National Weather Service*

Maeve Daugharty, *CODAR Ocean Sensors*

Siena Dante, *City College of New York*

Jared Klein, *National Weather Service*

Sarah Johnson, *National Weather Service*

Wednesday, March 13 *(cont'd)*

(11:50 AM) Difference between Surface Current Velocities Extracted from the Plus and Minus Bragg Sea Echoes of HF Radar

Xiongbin Wu, Wuhan University

Qihua Huang, Wuhan University

Lan Zhang, Wuhan University

Xianchang Yue, Wuhan University

12:10 – 1:00 PM

**Review & CWTMA 2023:
Chair: Sandy Williams**

END OF THE 2019 IEEE/OES/CWTMA WORKSHOP

Your Ordered Box Lunch is Available in the Toucan Room

Thank you for attending and participating. See you in 2023!

2:00 – 3:00PM

Business Meeting - All Delegates Welcome

**Chair: Hugh Roarty, OES Technology
Committee on Currents, Waves, Turbulence
Measurement and Applications.**