

Flavia Tauro

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| CONTACT INFORMATION | Via San Camillo de Lellis 01100 Viterbo Dipartimento per l'Innovazione nei sistemi Biologici, Agroalimentari e Forestali Università degli Studi della Tuscia | <i>E-mail:</i> flavia.tauro@unitus.it <i>Website:</i> www.mechydrolab.org |
| PERSONAL INFORMATION | Date of Birth: December 27, 1985 | |
| PRESENT APPOINTMENT | Ricercatore a Tempo Determinato Tipo a), Dipartimento per l'Innovazione nei sistemi Biologici, Agroalimentari e Forestali, Università degli Studi della Tuscia, Viterbo, Italy | |
| EDUCATION | “Sapienza” University of Rome, Rome, ITALY Doctorate of Philosophy, Hydraulic Engineering, May 2014 <ul style="list-style-type: none">• Dissertation: “Fluorescent particle tracer for surface hydrology”• Advisors: Prof. Salvatore Grimaldi and Prof. Maurizio Porfiri New York University Polytechnic School of Engineering, Brooklyn, NY 11201, USA Doctorate of Philosophy, Mechanical Engineering, May 2014 <ul style="list-style-type: none">• GPA: 4.00/4.00 Massachusetts Institute of Technology, Cambridge, MA 02139, USA M.Eng., Civil and Environmental Engineering, June 2009 <ul style="list-style-type: none">• Thesis: “Chilean Glacial Lake Outburst Flood Impacts on Dam Construction”• Advisor: Prof. Eric Adams “Sapienza” University of Rome, Rome, Italy M.Sc. (“Laurea Specialistica”), Environmental Engineering, November 2009 <ul style="list-style-type: none">• Final Grade: 110/110 summa cum laude “Sapienza” University of Rome, Rome, Italy B.Sc. (“Laurea”), Environmental Engineering, July 2007 <ul style="list-style-type: none">• Thesis: “Identification of Rainfall Thresholds for Flood Warning in the Mignone Basin”• Advisor: Prof. Francesco Napolitano• Final Grade: 110/110 summa cum laude | |
| RESEARCH INTERESTS | Experimental Hydrology, Surface Hydrology, Hydrological Tracers, Flow Visualization, Environmental Sensing, Image analysis | |
| HONORS AND AWARDS | <u>Primary</u> <ul style="list-style-type: none">• 2014 Gruppo Italiano di Idraulica Award for Doctoral Thesis in Water Engineering (This € 1,500 award is given yearly to one recent doctoral graduate in Water Engineering).• 2014 Soroptimist Club of Rome - Award for an Excellent Woman Researcher in Hydrology (This € 1,500 award is given yearly to one recent woman graduate in science).• 2013 – 2014 American Geophysical Union Horton (Hydrology) Research Grant (This one-year \$10,000 grant is awarded based on evaluation of a National Science Foundation-style short proposal.) | |

- 2013 Honors Center of Italian Universities (H2CU) Hydrology Award (This award is given yearly to one excellent H2CU alumnus in Hydrology)
- H2CU scholarship: tuition support at the Massachusetts Institute of Technology (\$40,000 per academic year), Academic year 2008 – 2009

Complementary

- Travel grant support to attend the American Geophysical Union Fall Meeting, December 2013
- Invited young researcher at the “H2CU Highlights in New York City” for the 2013 Year of Italian Culture in the USA (invited presentation and paper), May 2013
- Awarded installation at the “Designing the Future at BLDG 92” program: one year-display of winning design at the “Brooklyn Navy Yard: Past, Present and Future” exhibit, Brooklyn, NY, USA, 2012 (This program is a rotating exhibit featuring cutting-edge products from New York State graduate institutions).
- Awarded the Complimentary Registration for the 2011 International Union of Geodesy and Geophysics Conference, Melbourne, Australia.

JOURNAL PUBLICATIONS

Published and Accepted

1. Tauro F., Pagano C., Phamduy P., Grimaldi S., Porfiri M.: “Large scale particle image velocimetry from an unmanned aerial vehicle”, accepted for publication in *IEEE Transactions on Mechatronics*.
2. Tauro F., Porfiri M., Grimaldi S.: “Orienting the camera and firing lasers to enhance large scale particle image velocimetry for stream flow monitoring”, *Water Resources Research*, **50**(9), 7470–7483, 2014.
3. Tauro F., Grimaldi S., Porfiri M.: “Unraveling flow patterns through nonlinear manifold learning”, *PLoS ONE*, **9**(3), e91131, 2014.
4. Tauro F., Rapiti E., Al-Sharab J. F., Ubertini L., Grimaldi S., Porfiri M.: “Characterization of eco-friendly fluorescent nanoparticle-doped tracers for environmental sensing”, *Journal of Nanoparticle Research*, **15**(9), 1884, 2013.
5. Tauro F., Porfiri M., Grimaldi S., : “Fluorescent eco-particles for surface flow physics analysis”, *AIP Advances*, **3**(3), 032108, 2013.
6. Tauro F., Mocio G., Rapiti E., Grimaldi S., Porfiri M.: “Assessment of fluorescent particles for surface flow analysis”, *Sensors*, **12**(11), 15827–15840, 2012.
7. Tauro F., Grimaldi S., Petroselli A., Rulli M. C., Porfiri M.: “Fluorescent particle tracers for surface flow measurements: a proof of concept in a semi-natural hillslope”, *Hydrology and Earth System Sciences*, **16**(8), 2973–2983, 2012.
8. Tauro F., Grimaldi S., Petroselli A., Porfiri M.: “Fluorescent particle tracers for surface flow measurements: a proof of concept in a natural stream”, *Water Resources Research*, **48**(6), W06528, 2012.
9. Tauro F., Pagano C., Porfiri M., Grimaldi S.: “Tracing of shallow water flows through buoyant fluorescent particles”, *Flow Measurement and Instrumentation*, **26**(August 2012), 93–101, 2012.
10. Grimaldi S., Petroselli A., Tauro F., Porfiri M.: “Time of concentration: a paradox in modern hydrology”, *Hydrological Sciences Journal*, **57**(2), 217–228, 2012.
11. Tauro F., Aureli M., Porfiri M., Grimaldi S.: “Characterization of buoyant fluorescent particles for field observations of water flows”, *Sensors*, **10**(12), 11512–11529, 2010.

CONFERENCE
PAPERS

Accepted

1. Grimaldi S., Petroselli A., Nardi F., Tauro F.: “Analisi critica dei metodi di stima del tempo di corrivazione”, XXXII Convegno Nazionale di Idraulica e Costruzioni Idrauliche, September 14–17, 2010, Palermo, Italy.
2. Tauro F., Porfiri M., Grimaldi S.: “Fluorescent particles as a novel sensing technology for in-situ measurements of water flows”, ASME 2011 Student Professional Development Conference, April 1–2, 2011, Philadelphia, PA.
3. Grimaldi S., Tauro F., Petroselli A., Porfiri M.: “Studio preliminare di un tracciante innovativo con particelle fluoeriscenti per le misure di velocità su versante”, Convegno di Medio Termine dell’ Associazione Italiana di Ingegneria Agraria, September 22–24, 2011, Belgirate, Italy.
4. Tauro F., Aureli M., Porfiri M., Grimaldi S.: “Buoyant fluorescent particles as a novel sensing technology for field observations of water flows”, 2011 Dynamic Systems and Control Conference, October 31–November 2, 2011, Arlington, VA.
5. Tauro F., Pagano C., Porfiri M., Grimaldi S.: “Fluorescent particle image tracking procedure for shallow water flow tracing”, 2012 Dynamic Systems and Control Conference, October 17–19, 2012, Fort Lauderdale, FL.
6. Grimaldi S., Tauro F., Petroselli A.: “Studio preliminare di un tracciante con particelle fluoeriscenti per le misure di velocità superficiali”, XXXIII Convegno Nazionale di Idraulica e Costruzioni Idrauliche, September 10–15, 2012, Brescia, Italy.
7. Tauro F., Grimaldi S., Porfiri M., Petroselli A.: “Fluorescent particles for non-intrusive surface flow observations”, *Procedia Environmental Sciences*, **19**, 895–903, 2013.
8. Tauro F.: “Towards novel observations in hydrology”, *AGU Hydrology Newsletter*, November 2013, p. 15–18, (Invited paper).
9. Tauro F.: “Fluorescent particle tracer for surface hydrology”, *H2CU Magazine*, accepted for publication, 2013 (Invited paper).
10. Tauro F., Grimaldi S., Porfiri M.: “A topological framework for flow characterization and identification”, 2014 Dynamic Systems and Control Conference, October 22–24, 2014, San Antonio, TX.
11. Pagano C., Tauro F., Grimaldi S., Porfiri M.: “Development and testing of an unmanned aerial vehicle for large scale particle image velocimetry”, 2014 Dynamic Systems and Control Conference, October 22–24, 2014, San Antonio, TX.

CONFERENCE
PRESENTATIONS/
POSTERS

Accepted

1. Tauro F., Porfiri M., Grimaldi S.: “Fluorescent particles as a novel sensing technology for in-situ measurements of water flows”, ASME 2011 Student Professional Development Conference, April 1–2, 2011, Philadelphia, PA, podium presentation.
2. Tauro F., Grimaldi S., Porfiri M.: “Characterization of buoyant fluorescent particles for hydrological field studies”, IUGG 2011 (International Union of Geodesy and Geophysics Conference), June 28–July 7, 2011, Melbourne, Australia, presentation #1858.
3. Tauro F., Grimaldi S., Porfiri M., Petroselli A., Rapiti R., Cipollari G., Mocio G., Capocci I.: “Fluorescent particle tracers in surface hydrology: proof of concepts in natural stream and hillslope”, EGU 2012 (European Geosciences Union), April 22–27, 2012, Vienna, Austria, presentation #3233.
4. Capocci I., Mocio G., Insogna F., Tauro F., Petroselli A., Rapiti R., Cipollari G., Grimaldi S., Porfiri M.: “Fluorescent particle tracers for surface hydrology: development of a sensing station for field studies”, EGU 2012 (European Geosciences Union), April 22–27, 2012, Vienna, Austria, poster #145.
5. Tauro F., Grimaldi S., Rapiti E., Porfiri M.: “Fluorescent particle tracers for surface hydrology”, AGU 2012 (American Geophysical Union), December 3–7, 2012, San Francisco, California, USA, poster #H31G-1202.

6. Grimaldi S., Tauro F., Rapiti E., Porfiri M.: “Fluorescent beeswax for surface flow velocity observations”, AGU 2012 (American Geophysical Union), December 3–7, 2012, San Francisco, California, USA, poster #H11I-1295.
7. Tauro F., Martínez-Carreras N., Wetzel C.E., Hissler C., Barnich F., Frentress J., Ector L., Hoffmann L., McDonnell J. J., Pfister L.: “Fluorescent diatoms as hydrological tracers: a proof of concept percolation experiment”, EGU 2013 (European Geosciences Union), April 7–12, 2013, Vienna, Austria, poster #7687.
8. Tauro F., Porfiri M., Rapiti E., Grimaldi S.: “Synthesis and characterization of environmentally friendly fluorescent particle tracers”, EGU 2013 (European Geosciences Union), April 7–12, 2013, Vienna, Austria, poster #8283.
9. Martínez-Carreras N., Wetzel C.E., Frentress J., Tauro F., Coles A., Ector L., McDonnell J. J., Hoffmann L., Pfister L.: “New insights into hydrological connectivity in the hillslope-riparian-stream system through the use of terrestrial diatoms”, EGU 2013 (European Geosciences Union), April 7–12, 2013, Vienna, Austria, poster #10920.
10. Tauro F.: “Novel observations in hydrology”, H2CU Highlights in New York, May 17, 2013, New York, New York USA, invited presentation.
11. Tauro F., Grimaldi S., Porfiri M., Petroselli A.: “Image analysis tools for non-intrusive surface flow observations”, Soil-Plant-Atmosphere System: Applications and Challenges, June 19–21, 2013, Napoli, Italy, poster presentation.
12. Grimaldi S., Tauro F., Porfiri M., Petroselli A.: “A novel tracer based on the observation of fluorescent particles”, IAHS - IAPSO - IASPEI Joint Assembly, July 22–26, 2013, Gothenburg, Sweden, poster #Hw07PS.07.
13. Pagano C., Tauro F., Porfiri M., Grimaldi S.: “Quadrotor helicopter for surface hydrological measurements”, AGU 2013 (American Geophysical Union), December 9–13, 2013, San Francisco, California, USA, poster #H43H-1577.
14. Tauro F., Olivieri G., Porfiri M., Grimaldi S.: “An innovative experimental setup for Large Scale Particle Image Velocimetry measurements in riverine environments”, EGU 2014 (European Geosciences Union), April 27–May 2, 2014, Vienna, Austria, poster #16555.
15. Tauro F., Porfiri M., Petroselli A., Olivieri G., Rapiti R., Grimaldi S.: “Large scale particle image velocimetry for river flow observation: a case study on the Tiber river”, ICID 2014 (International Commission on Irrigation & Drainage), September 14–20, 2014, Gwangju, Korea.
16. Tauro F., Porfiri M., Petroselli A., Olivieri G., Rapiti R., Cipollari G., Grimaldi S.: “Misura di velocità superficiali di un corso d’acqua con telecamera”, XXXIV Convegno Nazionale di Idraulica e Costruzioni Idrauliche, September 8–10, 2014, Bari, Italy.
17. Tauro F., Porfiri M., Petroselli A., Olivieri G., Grimaldi S.: “Monitoring surface water velocity using a camera: a case study on the Tiber River”, 6th IAHS-EGU International Symposium on Integrated Water Resources Management, June 4–6, 2014, Bologna, Italy.
18. Tauro F., Grimaldi S., and Porfiri M.: “Reverse engineering of flow patterns through nonlinear manifold learning”, 8th Annual Machine Learning Symposium, New York Academy of Sciences, March 28, 2014, New York, NY.

TEACHING
ACTIVITY

Meccanica dei Fluidi (Ingegneria Industriale, Università degli Studi della Tuscia, Viterbo, Italy)

REVIEWING
ACTIVITY

Journal Reviewer for: *Journal of Hydroinformatics*, *Hydrological Sciences Journal*, *International Journal of Digital Earth*, *International Journal of Water Resources and Environmental Engineering*, *International Journal of Physical Sciences*

Conference Reviewer for: *IEEE International Conference on Information Systems and Technologies 2011 (Jiangsu, China)*, *2012 (Wuhan, China)*, *IEEE International Conference on Advanced Robotics 2011 (Tallinn, Estonia)*

POST-GRADUATE
EXPERIENCE

1. Research Assistant/ Ph.D. Student, Department of Mechanical and Aerospace Engineering, New York University Polytechnic School of Engineering, Brooklyn, NY, USA
August 2010 – May 2014

Research supported by National Science Foundation grants CMMI-0745753, CMMI-0926791, CMMI-1129820 and by the Office of Naval Research grant N00014-10-1-0988 awarded to Dr. M. Porfiri; by the MIUR Project PRIN 2009 N.2009CA4A4A awarded to Dr. S. Grimaldi; and by H2CU

- Conducted experiments on synthesis and microscopic characterization of novel tracing systems for hydrological studies
- Collection, processing, and analysis of hydrological observations performed with imaging technologies in outdoor environments
- Design and development of flow visualization experiments for experimental fluid mechanics in controlled laboratory conditions
- Data-driven analysis of flow visualization experiments through machine learning algorithms
- Design and development of an aerial vehicle equipped with sensing systems for hydrological observations
- Helped with proposal writing

Student mentoring

- Emiliano Rapiti, M.Sc. 2012 (synthesis and characterization of eco-friendly fluorescent particles for hydrological observations)
- Ilaria Capocci, M.Sc. expected 2014 (experiments and image data analysis of hydrological observations with novel tracing systems on semi-natural hillslope)
- Christopher Pagano, B.Sc./M.Sc. 2014 (design and development of a miniature water tunnel for experimental fluid mechanics; data acquisition with novel hydrological tracing systems; and design and development of a smart aerial platform for environmental observations)
- Gabriele Mocio, M.Sc. expected 2015 (experiments and image data processing of hydrological observations with novel tracing systems on natural and artificial streams)
- Giorgio Olivieri, M.Sc. expected 2015 (acquisition and processing of hydrological observations in natural streams through non-intrusive methodologies)
- Edwin Augustin, M.Sc. 2016 (design and development of an artificial rainfall simulator)

Outreach Activities

- Contributed to the design, development, and delivery of the STEM energy curriculum included in the “Science of the Smart Communities” project in collaboration between the NYU-Poly Center for K-12 STEM Education, the Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia, and the New York Academy of Sciences to foster interest of Malaysian middle schoolers towards scientific/engineering careers.
- Assisted exhibit development for the World Science Festival in June 2012 and 2013
- Assisted exhibit development for the NYU-Poly Research Expo in June 2013

Teaching Experience

- Course: Mechanics of Materials Laboratory (overall course evaluation: 4.5/5.0)
 - Prepared theoretical and experimental activities
 - Assigned and corrected homework reports
 - Maintained weekly office hours for one-on-one interactions with students
2. Visiting Ph.D. Student, Department of Environment and Agro-biotechnologies, Centre de Recherche Public Gabriel Lippmann, Belvaux, Luxembourg
October – November 2012
- Designed protocols for the fluorescence functionalization of diatom frustules and living cultures
 - Conducted feasibility experiments in laboratory controlled conditions to assay the resilience of fluorescence functionalized diatoms to external agents
 - Designed and performed percolation experiments with fluorescent diatoms as hydrological tracers on undisturbed soil samples from natural watersheds in Luxembourg
3. Research Engineer, Department of Mechanical and Aerospace Engineering, New York University Polytechnic School of Engineering, Brooklyn, NY, USA
November 2009 – July 2010
- Conducted research on the use of highly visible spheres as surface hydrological tracers through laboratory controlled experiments
 - Supervised an undergraduate student on the design and development of a miniature water channel for laboratory experiments with environmental tracers
 - Helped with proposal writing
4. Research Assistant, US Army Engineer Research and Development Center, Concord, MA, USA
Summer 2009
- Developed portfolio management framework to assess the sustainability of water resources infrastructures in the New England
 - Conducted sensitivity analysis to assess the risk to climate change of water infrastructures in the United States of America
 - Applied portfolio theory to non-systematic risks associated with critical water infrastructure

AFFILIATIONS

International Association of Hydrological Sciences (IAHS): June 2011-present. Executive team member of the MOXXI (Measurements and observations in the XXIst Century) working group.

American Geophysical Union (AGU): August 2012-present

Ordine degli Ingegneri della provincia di Roma: N. A34208

LANGUAGES

Fluent in English

Italian mother tongue