## Course Registration Fees:

| | |
|---|---|
| Professionals | 900,00 €* |
| Academic researchers[#], public/government employees | 500,00 €** |
| Graduate students, Postdocs[§] | 200,00 €** |

*includes a free copy of the the textbook "Water centric sustainable communities", by V. Novotny et al. (2010), J. Wiley & Sons Eds., New York

** the textbook "Water centric sustainable communities", is NOT included in this discounted rate, but can be ordered at the time of enrollment at the special author's discount price of € 75,00

**# Researchers from the Lake Como School Partner Universities (Como, Insubria, Mi-Bicocca and Pavia) and GITISA associates can enroll at the discounted fee of 350,00 €.**

**§ School policy requires that PhD students/Postdocs from the Lake Como School Partner Universities be eligible, on a first-come basis, to free (7) or reduced-rate (150,00 €) enrollment (also available to GITISA associates). A certificate of enrollment/attendance is required.**

The registration fee includes lecture attendance, course materials, coffee breaks and on-site lunch buffets (off-site dinners are extra). Registration fees are subject to additional Italian VAT at the rate of 22%. The Registration fee must be paid in advance to the secretariat with online registration.

**The course attendance is limited to 50 participants on a first-come basis.**

**Course attendance entitles participants to obtain … CFP (Crediti Formativi Professionali) according to Italian requirements for practicing Professional Engineers. PhD Students can obtain an attendance certificate of 5 CFUs from the University of Pavia.**

## Accommodation

Accommodation will be provided according to specified requirements by the School Secretariat (see enrollment form). The School can provide 19 beds (in 1 to 4 beds rooms) onsite, at a cost of approx.. 30 €/night, on a first-come basis, preferable reserved for attending University students. Additional accommodation is available in the city of Como (15 min. by feet or 10 min. by bus from Villa Grumello) in 2* to 4* hotels at costs ranging from approx. 40 to 120 €/person-night. Additional information is available from the secretariat's website.

## Course Instructors:

**Andrea G. Capodaglio**, Ph.D., P.E. – Professor of Environmental Engineering at the University of Pavia. Member of the Management Committee of IWA's Watershed and River Basin SG, Director of the Advanced Environmental Technologies Laboratory (LabTA$^2$) of the University of Pavia, Member of the Scientific Advisory Board of AdMaS Research Centre (University of Brno, Czeck Rep.) and Associate Editor of the International Scientific Journals: Water Science & Technology (UK), Ambiente e Agua (Brazil) and Alexandria Science Exchange Journal (Egypt).

**Vladimir Novotny**, Ph.D., P.E. – Managing Partner, AquaNova LLC, Newburyport, USA, and Professor Emeritus, Marquette University (Milwaukee, WI) and Northeastern University (Boston, MA). Dr. Novotny published 14 books on water quality management, diffuse pollution and *Cities of the Future*. He is a member of the IWA International Steering Committee for the Cities of the Future and the primary author of the volume *Water Centric Sustainable Communities* .

**Steve Moddemeyer** - Principal with the architecture firm CollinsWoerman in Seattle, USA. He works internationally with planners, architects, developers, and NGOs to design and evaluate sustainable district strategies for infrastructure. He developed city-scale policies, strategies and best practices for green infrastructure and landscape for Seattle and other communities. He has managed the Cities of the Future Program for the International Water Association.

**David Vaccari, Ph.D., P.E., BCEE** – Professor and Director, Department of Civil, Environmental and Ocean Engineering, Stevens Institute of Technology, Hoboken, NJ, USA, Board Certified Environmental Engineer. Expert on biological treatment and phosphorus recovery from used water and on material resource flows in the economy.

## Course Secretariat

The Course Secretariat is managed by Fondazione Alessandro Volta.

WEBPAGE:

http://swec.lakecomoschool.org/

UNIVERSITÀ DI PAVIA

LAKE COMO SCHOOL OF ADVANCED STUDIES

# Sustainable Water-Energy Centered Communities

# (Cities Of the Future)

SHORT COURSE OFFERED AT THE LAKE COMO SCHOOL OF ADVANCED STUDIES - VILLA DEL GRUMELLO, COMO, ITALY, May 9-13, 2016

**Course Director:**

**Prof. Ing. Andrea G. Capodaglio, PhD., PE, Univ. of Pavia, Italy**

Instructors:
Prof. (Em.) Vladimir Novotny, PhD., PE, AQUANOVA LLC, USA (formerly NorthEastern University, Boston and Marquette University, Milwaukee, USA)
Mr. Steve Moddemeyer, CollinsWoerman, Seattle, USA
Prof. Dave Vaccari, PhD, PE, Stevens Inst. Of Technology, Hoboken, USA

Founding sponsor

fondazione cariplo

GITISA Gruppo Italiano di Ingegneria Sanitaria Ambientale

Operated by

FONDAZIONE ALESSANDRO VOLTA

### Objective of the Course

Participants will learn about and how to apply a new paradigm representing a major shift in the way new cities will be built and older ones retrofitted to achieve sustainable development and cyclic economy. A sustainable community will power itself with renewable sources of energy (wind, solar, water), conserve and reuse water, create the smallest possible ecological footprint, recover resources from used water and organic solids, reduce dramatically solid waste, and produce the lowest quantity of pollution possible that will not impair the ecology and environment and preserve them for generations. By restoring and developing a hydrologically and ecologically functioning landscape, communities will become resilient to increased flooding. Urban (green) infrastructure, resilient and functional landscape, and water resources will constitute one system.

### Who should attend?

Both entry level and senior water professionals, planners, urban landscape architects, developers; urban watershed and city managers; water reclamation utility managers, planners and technical staff members; graduate students in the environmental engineering and science, urban planning, and ecology fields.

### Course Location:

Lake Como School of Advanced Studies Villa del Grumello, Como, Italy. Placed in a central position within Europe, close to four international airports, it is hosted in an outstanding old noble palace located on the shoreline of beautiful Lake Como. The School is an international research facility running short term programmes on a wide range of interdisciplinary subjects, sharing a common focus on complex systems. The School attracts leading scholars in different fields including: physics, biology, economics, sociology, geopolitics, education, environmental and development studies, to engage in collaborative research. In small teams, visitors explore questions at the cutting edge of science and knowledge. In a context of globalization and in front of the increasing interaction between various kinds of networks, the analysis of complex systems offers insights into economic development, social cohesion and the environment on many geographical scales.

### IWA endorsement requested

The endorsement of IWA – Cities of the Future Initiative has been requested for this course.

### Course Program (approximately 28 lecture hours & case studies )

- Historic Paradigms of Water Management and Sewerage (Prof. Novotny)
  - Urban Metabolism and its Footprints – Cyclic economy
  - Drivers of Change
  - Paris 2016 (COP 21) sustainability goals
- The Fifth Paradigm of the Cities of the Future (Prof. Novotny)
  - Definition of urban sustainability for water, energy and solid waste management
  - Sustainability criteria
  - Triple bottom line
  - Urban streams restoration and daylighting, sustainable landscape
  - Distributed water/energy systems and integrated resource recovery
- Implementing urban resilience concepts at the local, cluster and regional levels (Mr. Moddemeyer)
  - Achieving sustainability through resilience in the Cities of the Future
  - Resilience definition and criteria (LEED, OPL, American Association of Landscape Architects)
  - Green (Low Impact Development-LID) stormwater infrastructure
  - How to implement resilience
  - Example project
- Water/Stormwater/Used Water Management (Prof. (Novotny)
  - Water footprint and water uses
  - Water conservation
  - Substitute sources of water
  - Recycle
  - Distributed water management systems
  - Stormwater capture and reuse (adapted LID/SUDS systems)
  - Integrated solids and water and energy management
- Core present and future technologies in the Water/Energy Nexus (Prof. Capodaglio)
  - Anaerobic systems – principle of the digestion process
  - Co-digestion of biologically degradable municipal and agricultural solids and liquids wastes with solids removed in used water treatment and algae produced in algal ponds
  - Microbial fuel cells producing electricity and bioelectrically assisted microbial reactors producing hydrogen
  - Pyrolysis and Gasification of residual solids from used water treatment and municipal solids waste
- The Nexus Between Nutrients and Water (Prof. Vaccari)
  - Global Cycles of Nitrogen and Phosphorus – Resources and Leaks
  - Conservation versus recycling and other interventions
  - Reuse as recycling
  - Nutrient removal technologies
  - Nutrient recovery technologies
- Water/Energy Nexus – Achieving Net Zero Carbon Footprint (Prof. Novotny)
  - Green House Gasses emissions and energy footprint
  - Water and energy recovery in distributed systems
  - Methane, hydrogen and electricity recovery – hydrogen fuel cells
  - Renewable energy sources and savings in urban settings
  - Integrated resource recovery facility as a power plant
- Cities of the Future examples and case studies in the world (Mr. Moddemeyer)

### Textbook:

V. Novotny et al. (2010) *Water centric sustainable communities,* J. Wiley & Sons, New York

### Course Language:

English