Rajandrea Sethi, Ph.D. is Associate Professor of Groundwater Engineering in the Department of Environment, Land and Infrastructure Engineering (DIATI), Politecnico di Torino. His studies focus on field of groundwater engineering and in particular on flow and contaminant transport modeling, remediation technologies development, sampling techniques and environmental nanotechnologies. Since 2006, in the framework of several projects, founded by Italian government and by EU (AQUAREHAB and NANOREM), he has been focusing on the application and transport of micro- and nanoscale iron particles for the remediation of contaminated aquifer systems. He is also currently responsible for the aquifer monitoring in the framework of the MOSE Project for the defence of the Lagoon of Venice from high tides. He is the coordinator of the Environmental Nanotechnology Laboratory.

Tiziana Tosco, Ph.D. is Assistant Professor at DIATI in the Groundwater Engineering Group. Her research activities are mainly devoted to modelling flow and transport phenomena in saturated porous media, with a particular focus on colloid transport and on the rheology of non Newtonian fluids for environmental applications. She developed freeware software for colloid transport simulation and wellhead capture zones.

Carlo Bianco, M.Sc. is a PhD candidate at DIATI, Politecnico di Torino, in the Groundwater Engineering Group. His studies mainly focus on macro-scale modelling of colloid transport phenomena in saturated porous media and software development for micro- and nanoparticles transport simulation.

Registration and fees
A maximum number of 25 participants will be accepted.
Registration can be performed via Interpore website: (https://www.interpore.org/events/short-course-on-nanoparticle-transport-in-porous-media).

<table>
<thead>
<tr>
<th></th>
<th>Interpore members</th>
<th>Otherwise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>180 €</td>
<td>200 €</td>
</tr>
<tr>
<td>Academia</td>
<td>220 €</td>
<td>250 €</td>
</tr>
<tr>
<td>Industry</td>
<td>350 €</td>
<td>400 €</td>
</tr>
</tbody>
</table>

Venue
Room "Giotto"
Congress Center Padova "A. Luciani"
via Egidio Forcellini 170a, 35128 Padova

Map and directions: http://www.paduaconferencecenter.com/contacts/map.php
### Course Program

The course provides an introduction to colloid transport in saturated porous media and introduces to **MNMs 2014** (*Micro- and Nanoparticle transport, filtration and clogging Model - Suite*). MNMs 2014 can be applied for direct and inverse simulation in 1D and radial systems of solute and colloid transport processes under constant or transient hydro-chemical conditions, with eventual clogging of the porous medium.

#### Part 1: Theory and background
- Introduction to transport phenomena in saturated porous media: advection, dispersion, equilibrium adsorption (retardation), non equilibrium linear adsorption (theory)
- Mechanisms of colloid interaction (DLVO, extended DLVO): theory and examples of interaction potentials calculation (theory + interactive examples of DLVO calculation)

#### Part 2: 1D modeling
- Introduction to modeling tools for solute and particle transport in porous media: **MNMs** (*Micro-and Nanoparticle transport, filtration and clogging Model - Suite*): Short description of interface and model structure;
- Insight on colloid/porous medium interaction mechanisms: linear deposition, blocking, ripening, straining (in parallel, theory and examples using MNMs).

#### Part 3: Practical use of MNMs
- MNMs examples and tutorial for particle transport simulations in 1D domains:
  - predictive simulations (calculation of breakthrough curves from known parameters);
  - experimental data fitting (determination of model parameters from lab breakthrough curves);
  - Case studies of column transport tests, including forward (predictive) and inverse (fitting) modeling of experimental results.

#### Part 4: Radial and 3D modeling
- MNMs for the simulation of particle injection in radial geometry (radial tool);
- MNM3D (RT3D-based) for particle transport simulation in 3D domains.

### Practical information

An overview of the software can be found at [http://areeweb.polito.it/ricerca/groundwater/software/MNMs.php](http://areeweb.polito.it/ricerca/groundwater/software/MNMs.php)

The course information and flyer can also be downloaded at: [http://areeweb.polito.it/ricerca/groundwater/corsi/corsi_e.html](http://areeweb.polito.it/ricerca/groundwater/corsi/corsi_e.html)

Participants are expected to have basic knowledge of groundwater hydrology. Participants are asked to bring their own laptop (Windows XP or later installed).