Nanoremediation: an innovative approach for the reclamation of polluted aquifers

7 March 2018, Politecnico di Torino

SITI - Sede operativa,
Corso Castelfidardo 30/a, Torino

Nanoremediation is an innovative technology employed for the cleanup of contaminated aquifers through the injection of engineered nanomaterials for the in-situ treatment of groundwater pollutants. Nanoremediation is a non-invasive and flexible approach, which can significantly reduce timings for the restoration of polluted sites, even in presence of strongly recalcitrant pollutants.

The seminar addresses the most recent advances in the field of nanoremediation, with a focus on the application of iron oxide nanoparticles for in situ **immobilization of heavy metals**. Particle stability, reactivity and mobility in groundwater systems will be discussed, including processes and modelling approaches to support the **design of field scale nanoremediation** applications. Highlights on last advances in particle detection and monitoring in the environment, and lessons learned from field applications will be also included. Finally, innovative approaches for the application of zerovalent iron and iron minerals to the decay of persistent contaminant will be presented.

The seminar is organized in the framework of the European Research Project **ReGround** (H2020, G.A. 641768): "Colloidal Iron Oxide Nanoparticles for the REclamation of Toxic Metal Contaminated GROUNDwater Aquifers, Drinking Water Wells, and River Bank Filtrations" (http://reground-project.eu/).

Speech schedule

14:00 - 14:10	**R. Sethi (**Politecnico di Torino) and **R. Meckenstock (**Duisburg Essen University) – *Introduction and welcome*
14:10 – 14:30	**S. Mohammadian (**Duisburg Essen University) – *Iron oxide nanoparticles for the remediation of heavy metal contaminated sites: The Reground project, experiences and perspectives*
14:30 – 14:45	**E. Smolders (**Catholic University of Leuven) – *Iron oxide reactivity and longevity in aqueous environment*
14:45 – 15:00	**C. Bianco** (Politecnico di Torino) – *Injection and transport of iron oxide nanoparticles in aquifer systems: model assisted design of field scale applications*
15:00 – 15:15	**A. Fritzsche (**University of Jena) – *Innovation in detection and monitoring of iron oxide nanoparticles in the environment*
15:15 – 15:30	**T. Tosco (**Politecnico di Torino) – *Iron oxide injection in two contaminated sites: results and lesson learnt from the field*
15:30 – 15:45	**D. Vione (**Università di Torino) - *Iron based nanoparticles for the degradation of persistent contaminants*
15:45 – 16:00	**D. Tobler (**University of Copenhagen) – *The METAL-AID project: layered double hydroxides and green rust nanoparticles for the in situ remediation of aquifers contaminated by chlorinated solvent*

A **poster exposition** will be held during the seminar. If interested in presenting a poster on Academic and Applied research, please submit an abstract of the project to the email address aqua@polito.it within 26/02/2018.

Short Course

The seminar will be opening the short course offered by Polito:

"MNMs: A MODELLING TOOL FOR NANOPARTICLE TRANSPORT IN POROUS MEDIA"
(7-8-9 March 2018).
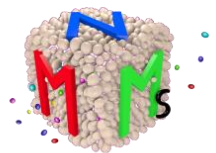
The course provides an insight into the **mechanisms governing colloidal transport** in saturated porous media under both **constant** and **transient hydro-chemical conditions**, with eventual **clogging** of the porous medium. Part of the course will be devoted to the practical use of **MNMs 2018** (**M**icro- and **N**anoparticle transport, filtration and clogging **M**odel - **S**uite), a **numerical tool** for the analysis of **laboratory tests** of solute and nanoparticles transport and for the **simulation** of particle injection at pilot scale.

Practical information

If interested, information can be found at https://areeweb.polito.it/ricerca/groundwater/events/
while registrations can be made at https://goo.gl/forms/CXqPsoTnfMi1fTiV2
Participants to the Modeling Lab are requested to bring their own laptop.

Overview and download to our software ca be found at
https://areeweb.polito.it/ricerca/groundwater/software/mnms-2015/