

**5 INTERNATIONAL SUMMER SCHOOL
MANAGED AQUIFER RECHARGE
MARISS 2023
03/07 - 14/07
DRESDEN, GERMANY**

Hochschule für Technik und
Wirtschaft Dresden
University of Applied Sciences

HTW_D

MONDAY, 03/07, ROOM Z 146a

08:30 REGISTRATION

09:00 Welcome and introduction to MARISS

Cristina Sandhu

09:15 Keynote speech: Riverbank filtration research at the HTW Dresden

Thomas Grischek

09:45 Keynote speech: Groundwater in a changing environment

Catalin Stefan

10:15 COFFEE/TEA BREAK

SESSION 1: MAR SOLVING THE GLOBAL WATER CRISIS

10:30 MAR as a response to the local water crisis: what means social equity and community participation in MAR?

Helen Barbosa, Södertörns University, Sweden

10:45 Aquifer storage and recovery using horizontal wells in brackish aquifers

Simon Kreipl, TU Delft, Netherlands

SESSION 2: MAR DEALING WITH POLLUTANTS

11:00 MAR as a possible shortcut for harmful per- and poly-fluoroalkyl substances into groundwater systems and drinking water supplies

Tabea Mumberg, University of Gothenburg, Sweden

11:15 PHOTO SESSION

11:30 LUNCH BREAK

SESSION 3: MAR APPLICATIONS WORLDWIDE: MEKONG DELTA, VIETNAM

12:30 Development of an integrated toolkit for the assessment of water and land resources supporting Master Planning for the Mekong Delta

Thi Huong Tran, NAWAPI, Vietnam

12:45 Opportunities for the application of ASR in the Mekong Delta

Ha Hai, NAWAPI, Vietnam

13:00 The impact of climate conditions and pumping strategies on the groundwater system in the Mekong Delta

Kim Hung Nguyen, National Central University Taiwan/ Vietnam

SESSION 4: GROUNDWATER MANAGEMENT AND OPTIMIZATION

13:15 Modelling a conversion of confined to unconfined aquifer flow: a groundwater management tool

Awodwa Magingi, University of Free State, South Africa

13:30 Groundwater management strategies for sustainable use: a case study of Ghana

Agyei Kyeremeh, European University of Lefke, Cyprus

13:45 Evaluation of different agricultural scenarios for sustainable groundwater use in Konya Closed Basin

Onur Cem Yologlu, Bogazici University, Turkey

14:00 Optimization of a decentralized dry toilet
Cornelia Hauelsen, Zurich University of Applied Sciences, Switzerland

14:15 Hydrogeological characteristics of deep aquifers

Zohreh Hosseini, Shiraz University, Iran

14:30 COFFEE/TEA BREAK

SESSION 5: GROUNDWATER MODELLING AND DSS TOOLS

15:00 Isotopic techniques: support tool for MAR

Chau Truong Viet, NAWAPI, Vietnam

15:15 Quantitative characterization of unconsolidated sediments using X-ray tomography and End-member modelling

Abdelrhim Eltjani, University of Szeged, Hungary

15:30 Increasing groundwater drought resilience in Flanders: quantifying the added value of real-time groundwater flow rate measurements in groundwater models

Lara Speijer, Vrije University Brussel and VITO, Belgium

SESSION 6: MAR APPLICATIONS WORLDWIDE: INDIA, JORDAN, VIETNAM

15:45 Study of RBF in combination with onsite chlorine generation system to ensure safe drinking water supply in a rural community, India

Fazlur Rahman, Bineswar Brahma Engineering College, India

16:00 MAR and climate adaptation in Binh Dinh, Vietnam

Hue Nguyen, Vietnam National University, Vietnam

16:15 The assessment of the impact of SLM technology Marab on the groundwater recharge in Jordan

Mahmoud Ali, TH Köln, Germany

18:00 WELCOME DINNER

Meeting place: BBQ, Bautzner Str. 58, 01099 Dresden

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TUESDAY, 04/07, ROOM Z 146a

10:00 Hydraulic aspects and management of clogging

Thomas Grischek

11:30 LUNCH BREAK

12:30 Well design

Thomas Grischek, Cornelius Sandhu

14:00 Design of RBF schemes and site selection concept

Cornelius Sandhu

15:30 COFFEE/TEA BREAK

16:00 LAB: Hydraulics and clogging

Thomas Grischek, Cornelius Sandhu, Fabian Musche

WEDNESDAY, 05/07

**7:30-18:00 Technical excursion to Waterworks Görlitz,
Saxony**

Meeting place: HTW Dresden venue front building

Agenda: visit of groundwater recharge basins, riverbank filtration well gallery along the River Neisse, horizontal collector well and water treatment facilities, sightseeing in Görlitz

THURSDAY, 06/07, ROOM Z 824

09:00 MAR in coastal aquifers

Cristina Sandhu

10:30 COFFEE/TEA BREAK

10:45 MAR in coastal aquifers applications

Cristina Sandhu

12:00 LUNCH BREAK

ROOM Z 146a

13:00 MAR site assessment using geophysical methods

Seyed Morteza Mousavi

14:00 Group project on MAR design and site selection

Thomas Grischek, Cornelius Sandhu

15:30 COFFEE/TEA BREAK

16:00 Group project on MAR design and site selection

Individual work

FRIDAY, 07/07, ROOM Z 824

09:00 Numerical modelling of MAR schemes

Thomas Reimann, Cornelius Sandhu

10:30 COFFEE/TEA BREAK

10:45 Numerical modelling of MAR schemes applications

Thomas Reimann, Cornelius Sandhu

12:00 LUNCH BREAK

13:00 Water quality modelling

Thomas Reimann, Cornelius Sandhu

14:30 COFFEE/TEA BREAK

15:00 Web-based numerical modelling and optimisation of MAR

Catalin Stefan, Jana Glass

16:30 Group project on MAR design and site selection

Individual work

SATURDAY/SUNDAY

Individual work and sightseeing in Dresden/Saxony

MONDAY, 10/07, ROOM Z 146a

09:00 Water quality aspects

Thomas Grischek

10:30 COFFEE/TEA BREAK

10:45 Pathogen removal during MAR/RBF

Cornelius Sandhu

12:00 LUNCH BREAK

13:00 Testfilter experiment for defining BDOC under climate change

Elnaz Zehtabian

13:30 Investigation of transport behaviour of microplastic in riverbed sediments

Jiaxing Ding

14:00 COFFEE/TEA BREAK

14:30 LAB: Water quality aspects

Cornelius Sandhu, Fabian Musche, Cindy Rau, Jiaxing Ding, Claudia Dienemann, Richard Achilles

16:30 Group project on MAR design and site selection

Individual work

TUESDAY, 11/07, ROOM Z 146a

09:00 Behaviour of organic micro-pollutants (OMPs)

Hilmar Börnick

10:30 LAB: Analytical methods and lab experiments to determine the attenuation rates of OMPs

Hilmar Börnick

12:00 LUNCH BREAK

13:00 LAB: Batch, column and channel experiments

Fabian Musche, Jiaxing Ding, Elnaz Zehtabian

15:00 Group project on MAR design and site selection

Individual work

WEDNESDAY, 12/07

**09:00 - 15:00 Technical excursion to Waterworks
Dresden-Hosterwitz, Saxony**

Meeting place: HTW Dresden venue front building

15:00 Group project on MAR design and site selection

Individual work

**MANAGED AQUIFER RECHARGE:
SOLVING THE GLOBAL WATER CRISIS
THROUGH NATURAL PROCESSES**

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THURSDAY, 13/07, ROOM Z 146a

09:00 Regulations, policies, guidelines, quality standards and risk assessment

Catalin Stefan

10:30 COFFEE/TEA BREAK

10:45 MAR for mitigation of fluoride rich groundwater

Elango Lakshmanan

12:00 LUNCH BREAK

13:00 Post-treatment of RBF water for drinking water supply: monitoring and disinfection

Martin Wagner

14:30 MARISS exam

MARISS Team

15:30 COFFEE/TEA BREAK

16:00 Group project presentations (pro Team 15 minutes)

MARISS Team

FRIDAY, 14/07, ROOM Z 146a

09:00 MAR Debate: discussion of open questions

MARISS Team

10:30 MARISS 2023 closing ceremony

Thomas Grischek, Cristina Sandhu

13:30 FAREWELL LUNCH

**Meeting place: Altes Wettbüro, Antonstraße 8,
01097 Dresden**

Venue

Hochschule für Technik und Wirtschaft Dresden
Friedrich-List-Platz 1, 01069 Dresden

www.htw-dresden.de, mariss@htw-dresden.de

MARISS TEAM

Prof. Dr.-Ing. Thomas Grischek, HTW Dresden, Head of the Water Sciences Division, has expertise in groundwater management, water supply, bank filtration, artificial groundwater recharge, removal of iron, manganese, organic micropollutants.

Cristina Sandhu, HTW Dresden, MARISS Coordinator, has expertise in unsaturated zone and groundwater recharge modelling, software development, analytical methods.

Dr.-Ing. Cornelius Sandhu, HTW Dresden, has expertise in bank filtration, groundwater management and removal of pathogenic microorganisms.

Dr.-Ing. Thomas Reimann, TU Dresden, has expertise in hydraulics and transport in karst aquifers, development and application of numerical models, hydraulics and solute transport in aquifers and transition zone between saturated and unsaturated zones.

Dr. Catalin Stefan, TU Dresden, has expertise in artificial groundwater recharge, integrated water resources management and decision support systems for sustainable water management.

Dr. Hilmar Börnick, TU Dresden, has expertise in analytical methods for the determination of organic micropollutants in water, its degradation and sorption during drinking water treatment.

Dr. Jana Glass, TU Dresden, has expertise in planning, management, and optimisation of MAR, software development and web tools.

Dr. Martin Wagner, DVGW-Technologiezentrum Wasser (German Water Centre), has expertise in online sensor development and application, disinfection strategies, data science and machine learning.

Elnaz Zehtabian, HTW Dresden, has expertise in RBF horizontal collector well design, testfilter experiments and geohydraulic modelling.

Jiaxing Ding, HTW Dresden, has expertise in particle transport in channels and during RBF clogging, and microplastics.

Fabian Musche, HTW Dresden, has expertise in MAR field and lab work, RBF well construction.

Claudia Dienemann, HTW Dresden, has expertise in water quality assessment flow cytometry and algae measurements, agriculture.

Cindy Rau, HTW Dresden, has expertise in water chemistry, organic micropollutants and microplastics.

Invited speakers

Prof. Elango Lakshmanan, India, has expertise in hydrogeological and geological mapping and investigations of groundwater seepage, groundwater modelling

Dr. Seyed Morteza Mousavi, Canada/Iran, has expertise in groundwater hydrology, numerical methods in water resources, environmental and marine geotechnics.

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