

# Blended Course 2025

## Introduction to Applied Groundwater Flow modelling with GW Vistas

March 10<sup>th</sup> – May 8<sup>th</sup>, 2025

### Course overview

The training course *Introduction to Applied Groundwater Flow Modeling* will take place at the SYMPLE school in Vetralla, Italy, with the option of participating online. The course is divided into three parts: the first is theoretical and entirely conducted online, the second part is a blend of online and on-site attendance, emphasizing practical applications of MODFLOW models. A final session, focused on a pumping test analysis and a dewatering project, will commence on-site and continue online later on.

The course will cover essential practical criteria necessary for constructing a numerical flow model. This includes topics like defining parameters, boundary conditions and inputs, both in stationary and transient conditions. Practical applications using MODFLOW packages will be demonstrated through explanatory lectures and computer exercises facilitated by the proprietary GUI Groundwater Vistas 8. Each participant will have access to Groundwater Vistas for a duration of 2 months.

To ensure accessibility and flexibility, all course sessions, whether conducted online or on-site, will be recorded. These recordings will be uploaded to our e-learning platform, allowing participants to review the material at their convenience.

### Info & Registration

#### What is included

- Access to live lessons (both in classroom and remotely)
- Software and installation instructions provided before the course
- Material to carry out the exercises
- Access to our [e-learning platform](#) to watch again the recorded lessons
- *APC credits* for Italian Geologists
- Coffee breaks and light lunches

#### Costs

*SYMPLE is an Accredited Training Organization, VAT is not due (art. 10 DPR 633/72)*

- Regular: 800 €
- IAH/SGI: 600 €
- Students/ECHN: 400 €
- Free online access for the attendees of the 4<sup>th</sup> ed. of the [SYMPLE School](#)
- Installments available

#### Remote/Live Attendance

The course can be attended remotely or on site. The venue is located [in Vetralla \(VT\)](#), Italy (60 km from Rome).



**Register** 

Seats are limited to 15 participants  
Register preferably before 30.01.2025

March 10<sup>th</sup> – May 8<sup>th</sup>, 2025

## Preliminary Programme

### March 10 (on-line) Session 1 – 4h

- \* **Preliminary checks of computer setup**
- \* **Introduction to Course**
  - a) Objectives and Overview
  - b) History of MODFLOW
- \* **Elements of Flow Modeling**, intro.
  - a) Review of quantitative hydrogeology
  - b) Governing equation and finite difference
  - c) Input parameters

### March 11 (on-line) Session 2 – 4h

- \* **Elements of Flow Modeling**, cont.
  - d) Boundary conditions
  - e) Grid design
  - f) Steady-state and transient conditions
- \* **Basic flow modeling with MODFLOW**, specific input packages and solvers (intro)

### March 12 (on-line) Session 2 – 4h

- \* **Basic flow modeling with MODFLOW**, specific input packages and solvers (cont.)
- \* **Overview of calibration and uncertainty**
- \* **Example USGS MODFLOW model**

### March 17 (blended) 9 am - 1 pm / 2:30 pm - 6:30 pm CET

- \* **Lab 1**
  - Introduction to Groundwater Vistas Interface
  - Basic MODFLOW model construction – grid design, boundary conditions, and properties
- \* **Lab 2**
  - Basic MODFLOW model construction – from 2D to 3D and steady state to transient
  - Class demonstration of finite difference method

### March 18 (blended) 9 am - 1 pm / 2:30 pm - 6:30 pm CET

- \* **Lab 3**
  - Particle Tracking with MODPATH
- \* **Lab 4 and Lab 5**
  - Groundwater/Surface Water Interactions using Advanced Packages (STR, LAK, SFR2)
- \* **Lab 6**
  - Simulation of Multi-Node wells with MNW/MNW2

### March 19 (blended) 9 am - 1 pm / 2:30 pm - 6:30 pm CET

- \* **Lab 7**
  - Robust NWT solver for MODFLOW
- \* **Lab 8**
  - Analysis of Water Budgets and simulating Sources of Water to Wells
- \* **Lab 9**
  - Manual approaches to Sensitivity Analysis and Calibration // Discussion of PEST
- \* **Lab 10**
  - Lecture: Modeling Guides (USGS/Haitjema)
  - Lecture: Common Modeling Errors
  - Lecture: Overview of Advanced MODFLOW Packages + Versions + Transport

### March 20 (blended) 9 am - 1 pm

- \* **Modeling projects and homework**
  - Analysis of Pumping test with MODFLOW model (*to be continued independently*)
  - Dewatering problem: flow model construction, manual calibration, application, budget, and source analysis (*to be continued independently*)

### May 8 (online) Closing session and discussion

"Intensive" courses can be a bit overwhelming, especially for those diving into numerical modeling for the first time. We propose a follow-up: on the final day of the course, an independent exercise is assigned, challenging participants to apply the acquired concepts and techniques autonomously.

This post-course activity allows participants to revisit recorded sessions and seek assistance from us, thereby facilitating a self-assessment process. It is an effective way to see where you stand and figure out which parts are giving you a bit of trouble. The final session of the course is strategically scheduled approximately one month later, to give a better opportunity to assimilate the course material previously presented.

March 10<sup>th</sup> – May 8<sup>th</sup>, 2025

## Trainers

**Daniel Feinstein** has worked in the field of quantitative hydrogeology for over 30 years. He studied ground-water modeling at the New Mexico Institute of Mining and Technology and at the University of Wisconsin-Madison before working as a consultant on remediation projects for Papadopoulos & Associates and Geraghty & Miller. In 1997 he joined the USGS where he specializes in interpretive studies involving regional ground-water modeling, simulation of groundwater/surface-water interactions, and simulation of transport of natural contaminants. His research interests include statistical models which emulate process-driven simulations of groundwater age or stream depletion by wells, and transport models which forecast heat flow under climate change. Mr. Feinstein is an adjunct professor at the Geosciences Department of the University of Wisconsin-Milwaukee and teaches modeling courses in Italy.

**Francesca Lotti**, PhD, is a consultant hydrogeologist and Vice-President of Kataclima srl Società Benefit. In 2021 she started SYMPLE, an Innovative Start-Up, together with 4 other partners. She has 20 years of experience in field investigations and numerical modeling with MODFLOW and FEFLOW of contaminated sites, mines, geothermal plants, coastal aquifers, dewatering projects and more. She collaborates with national and international research institutions and companies. From 2001 to 2014 she carried out research at the University of Tuscia; since 2008 she is professor at the University of Camerino, where she has followed numerous MSc and PhD theses students.



*We live in a wonderful place,  
surrounded by wild woods and  
nearby the Volcanic Lake Vico...*

*For accommodation suggestions  
and "[how to get there](#)" advises,  
just ask us!*

