



## Fall School 2019 – Reactive Transport Modelling

**When?** Monday October 7<sup>th</sup> – Friday October 11<sup>th</sup>

**Where?** Haus auf der Alb, Bad Urach

### Who?



This fall the third generation of the RTG Ph.D. candidates met up with microbiologists and applied mathematicians to spend several days and discuss main applications of numerical reactive transport modeling.

After a quick introductory session of all the participants, the Monday stage was given to Dr. Holger Pagel (University of Hohenheim), who explained the general concept of solving **coupled ordinary differential equations** with MATLAB. A combination of lectures and exercises (a concept maintained throughout the week) enhanced the understanding of the subject matter.

On Tuesday, Dr. Adrian Mellage (University of Tübingen) extended our understanding of **enzyme kinetics** and how different parts of a reaction chain can inhibit or catalyze each other. In the evening he presented results of his Ph.D. research in the field of analyzing geophysical and biogeochemical data using numerical models.

Wednesday morning Prof. Dr.-Ing. Olaf Cirpka (University of Tübingen) discussed with the audience how mass transfer and **isotope fractionation** can be translated to mathematical equations. In the afternoon the whole group went on a socializing hike along the Hohenurachsteig.

Invited guest lecturer Dr. Brian Ingalls (University of Waterloo) highlighted on Thursday how mathematical methods can be implemented to investigate various aspects of **(micro-)biological systems**. It was fascinating to see how many different processes can be described and investigated by the same equations and mathematical tools. In the evening he presented his current research dealing with the **optimal design** of reaction network experiments derived from sensitivity analysis.

Finally transport was implemented on Friday by Olaf Cirpka. The morning part involved one-dimensional **reactive transport problems**, while the afternoon session focussed on two-dimensional applications of the numerical methods.