

# TReactMech Short Course

October 10-12, 2018

Lawrence Berkeley National Laboratory  
Berkeley, CA 94720

## Instructors

Eric Sonnenthal and Torquil Smith

*Energy Geosciences Division  
Lawrence Berkeley National Laboratory  
1 Cyclotron Road, MS84R0171  
Berkeley, CA 94720*

# TReactMech Short Course

October 10-12, 2018

This course will provide a hands-on introduction to the coupled Thermal-Hydrological-Mechanical-(BioGeo)Chemical (THMCB) Simulator TReactMech. Sample problems include applications to hydrofracturing in unconventional hydrocarbon reservoirs and stimulation in Enhanced Geothermal Systems (EGS). These problems serve as prototypes for creating input files for new applications. The course will also include discussions of the underlying physical and chemical processes, as well as the mathematical and numerical approaches used.

## AGENDA

**Wednesday, October 10, 2018**

### **Afternoon Session**

*13:00 Introduction*

- Course objectives and outline
- Code installation on participant laptops and testing
- Installation of text editors and plotting software

*14:00 TReactMech basics*

- Overview of TReactMech
- Multiphase Heat and Fluid Flow
- Geomechanics
- Reactive-transport
- Discussion of heat and fluid flow input and output files
- Discussion of geomechanical input and output files
- Discussion of chemical input and output files

*15:30 Break*

*15:45 Problem No. 1*

- Problem overview
- Mesh generation
- Flow initialization
- Plotting initial results

17:00 *Adjourn*

## **Thursday, October 11, 2018**

9:00 ***Problem No. 1 - continued***

- Mechanics initialization
- Plotting initial results
- Injection Simulation (Fracture Stimulation)
- Plotting results and discussion

12:00 *Lunch*

13:00 ***Problem No. 2 – Enhanced Geothermal System stimulation***

- Problem overview
- Discussion of geomechanical input and output files
- Mesh generation
- Flow Initialization
- Plotting initial results
- Mechanics Initialization
- Plotting initial results

17:00 *Adjourn*

## **Friday, October 12, 2018**

9:00 ***Problem No. 2 – continued***

- Injection Simulation
- Plotting results and discussion

*12:00 Lunch*

*13:00 Adding Reactive Transport to THM Problems*

- Injection of a tracer
- Mineral dissolution-precipitation
- Porosity - permeability changes
- Open Discussion
- Class Evaluations

*17:00 Adjourn*