



Hungary-Romania
Cross-Border Co-operation
Programme 2007-2013

Two countries, one goal, joint success!

European Union
European Regional Development Fund



“Realization of Hungarian-Romanian R&D Laboratory for the Development of
Major Projects in Polluted Terrain Cleaning”

HURO/0802/100

Short survey on bioremediation data acquisition and simulation capabilities



Tiberiu Vesselényi

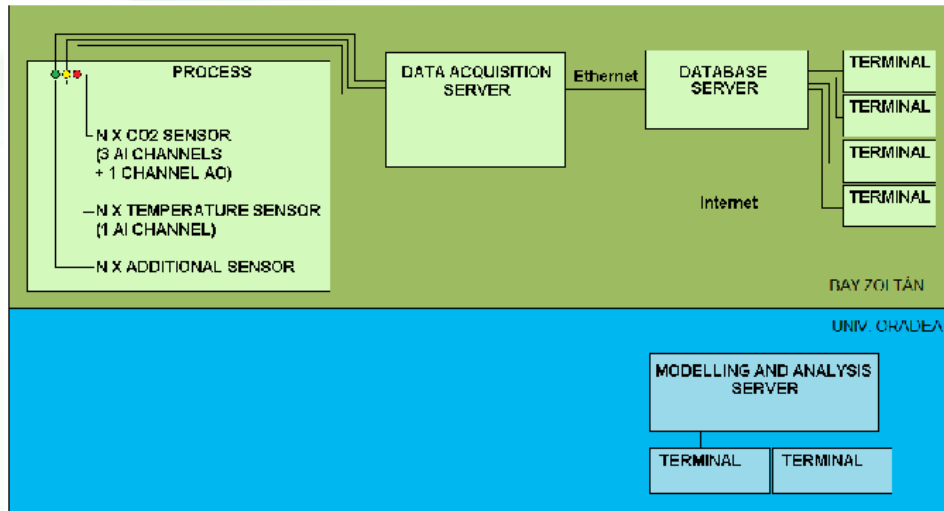
University of Oradea
Romania

14 December 2012 – University of Oradea

Outline

1. Bioremediation data acquisition
2. Simulation capabilities given by Micromodel project.

1. BIOREMEDIATION DATA ACQUISITION

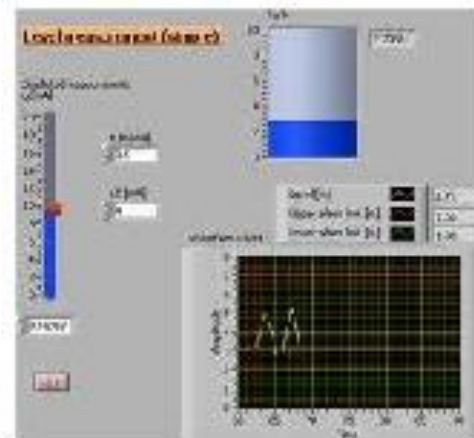


DATA ACQUISITION SYSTEM USED IN MICROMODEL LABORATORY



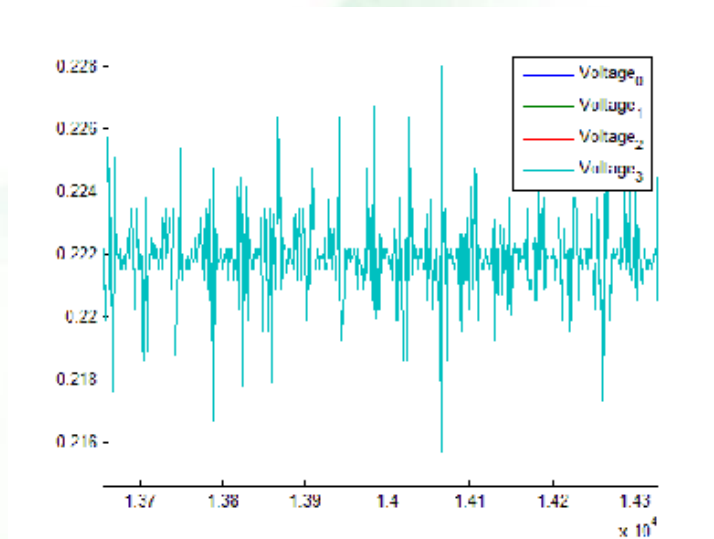
1. NI PXI-8102 Celeron T3100 1.9 GHz Controller, Windows 7 32-Bit For NI PXI Embedded Controllers
2. NI PXI-6221 (16 Analog Inputs, 24 Digital I/O, 2 Analog Outputs)
3. NI PXI-2575 196 ch Multiplexer

Data acquisition software: Labview.



www.ni.com

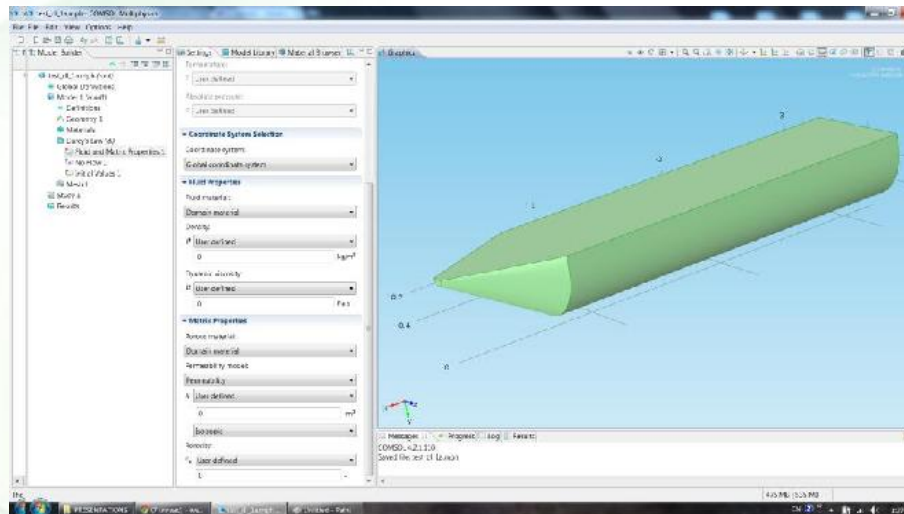
Acquired data is filtered and processed



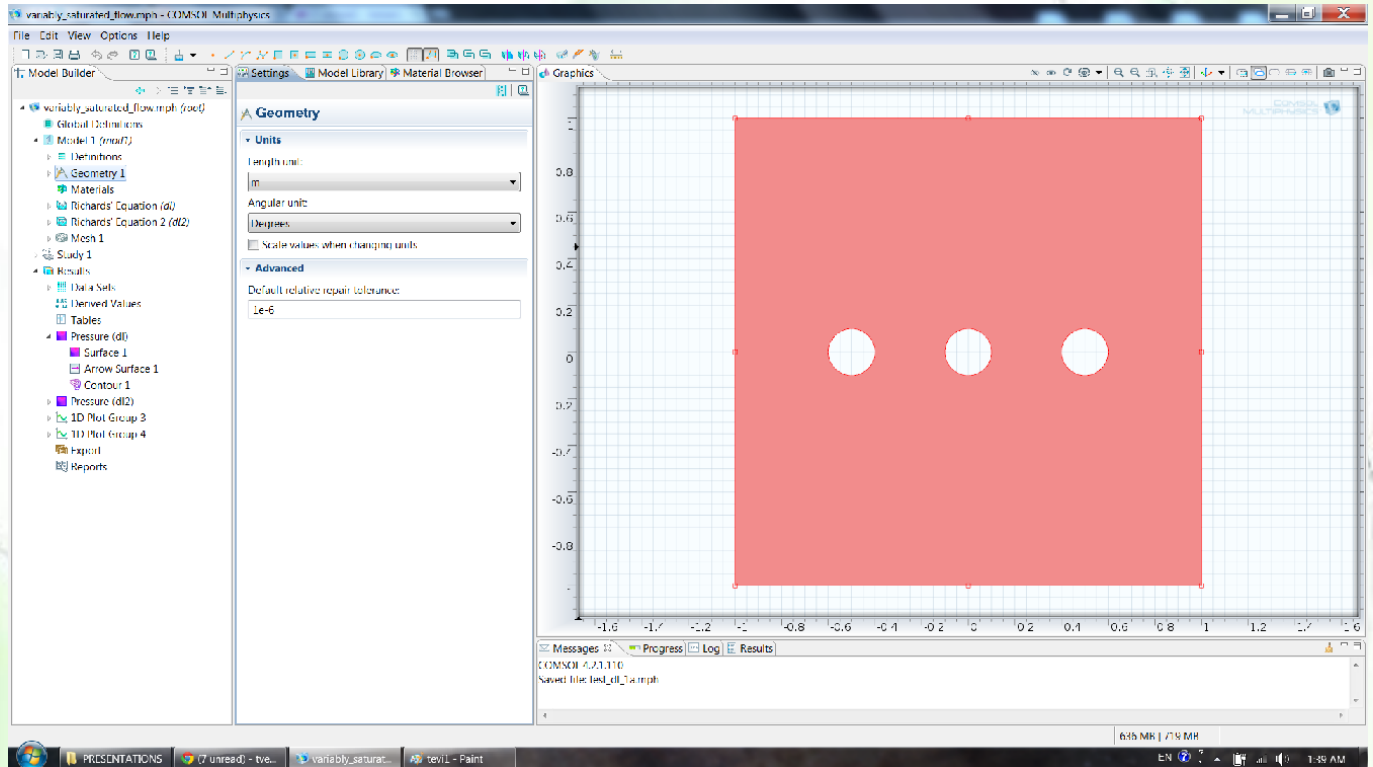
2.SIMULATION CAPABILITIES GIVEN BY THE MICROMODEL PROJECT.

COMSOL - Subsurface Flow Modelling

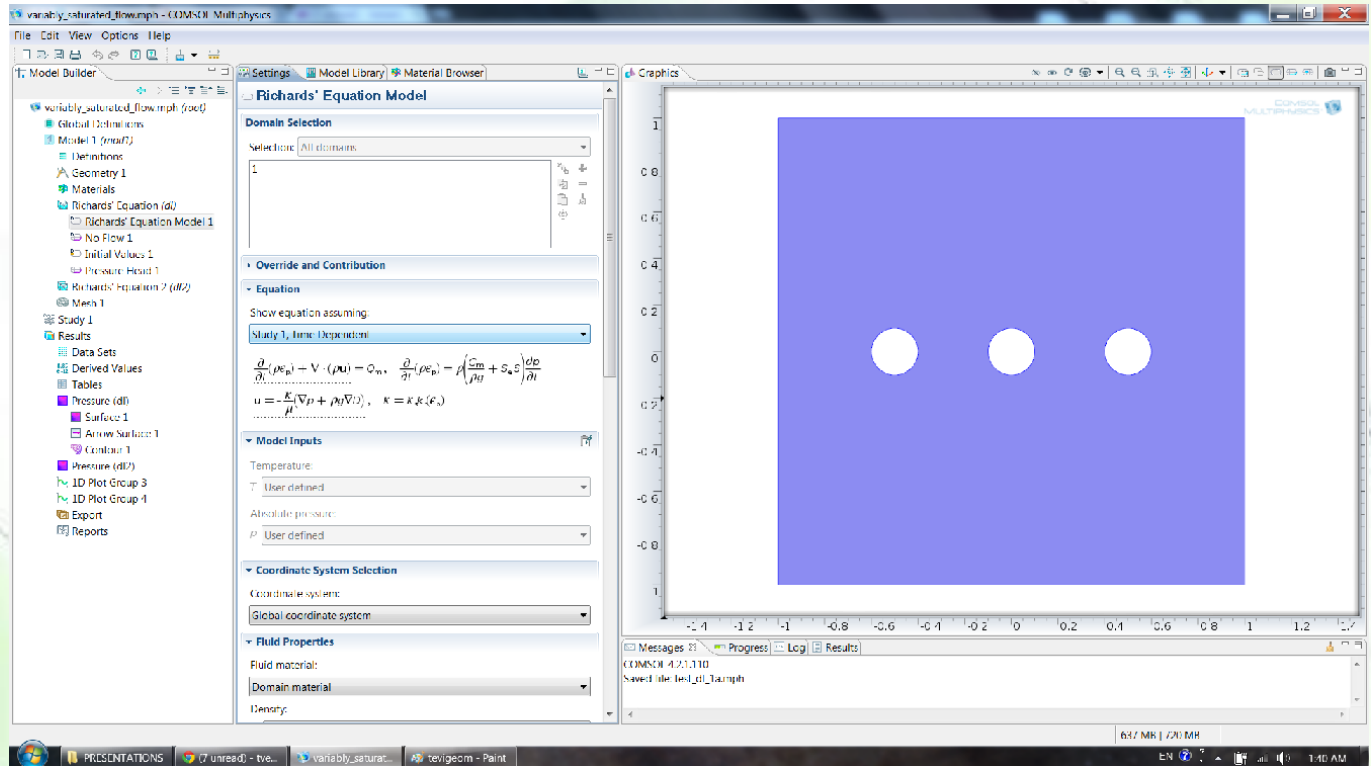
<http://www.comsol.com/products/4.3/#subsurfaceflow>,



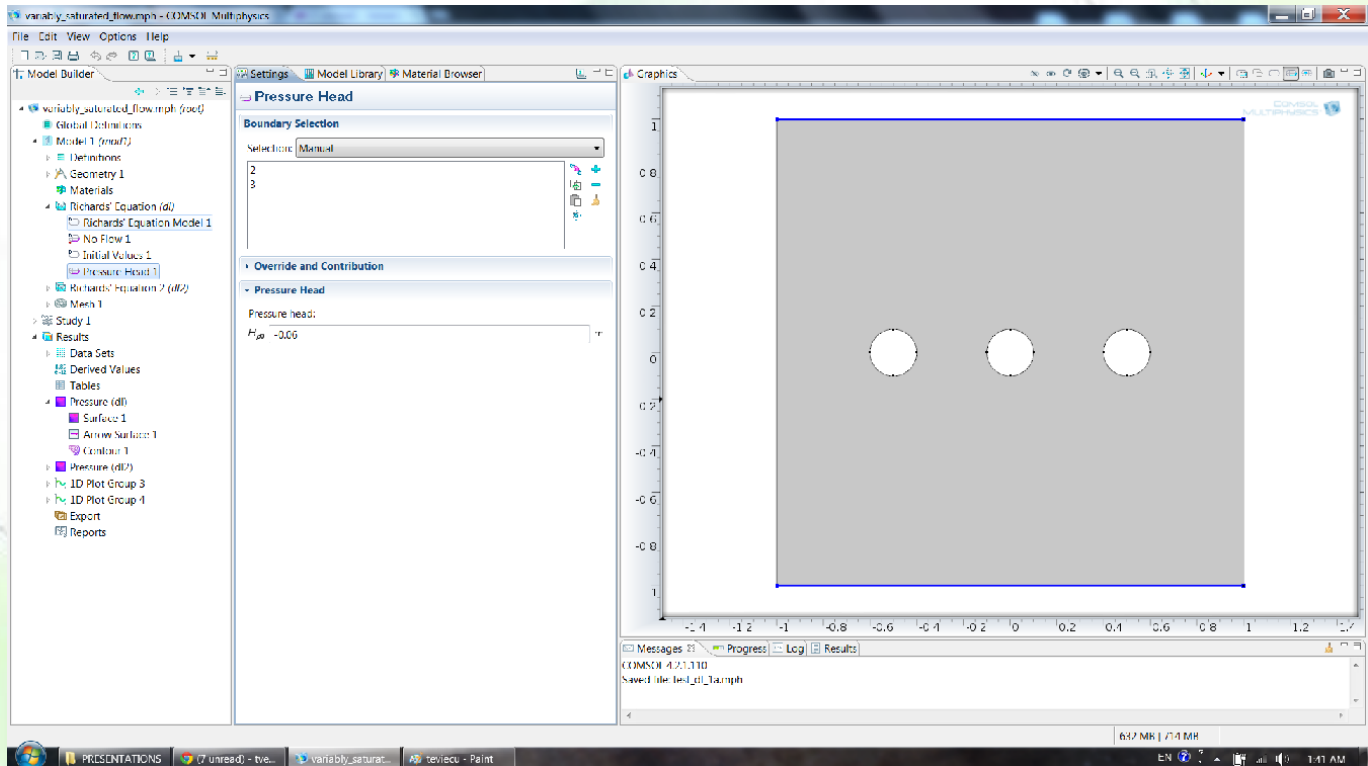
Model geometry



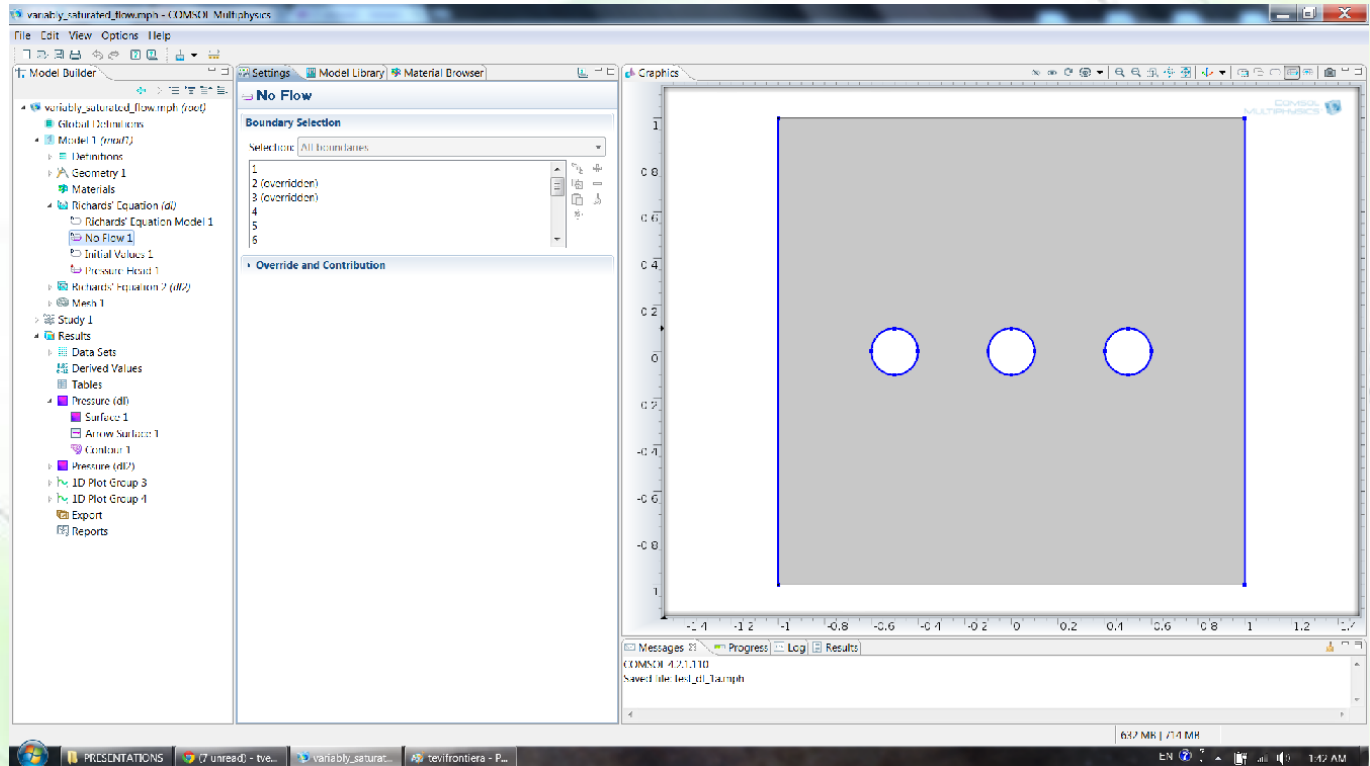
Model definition



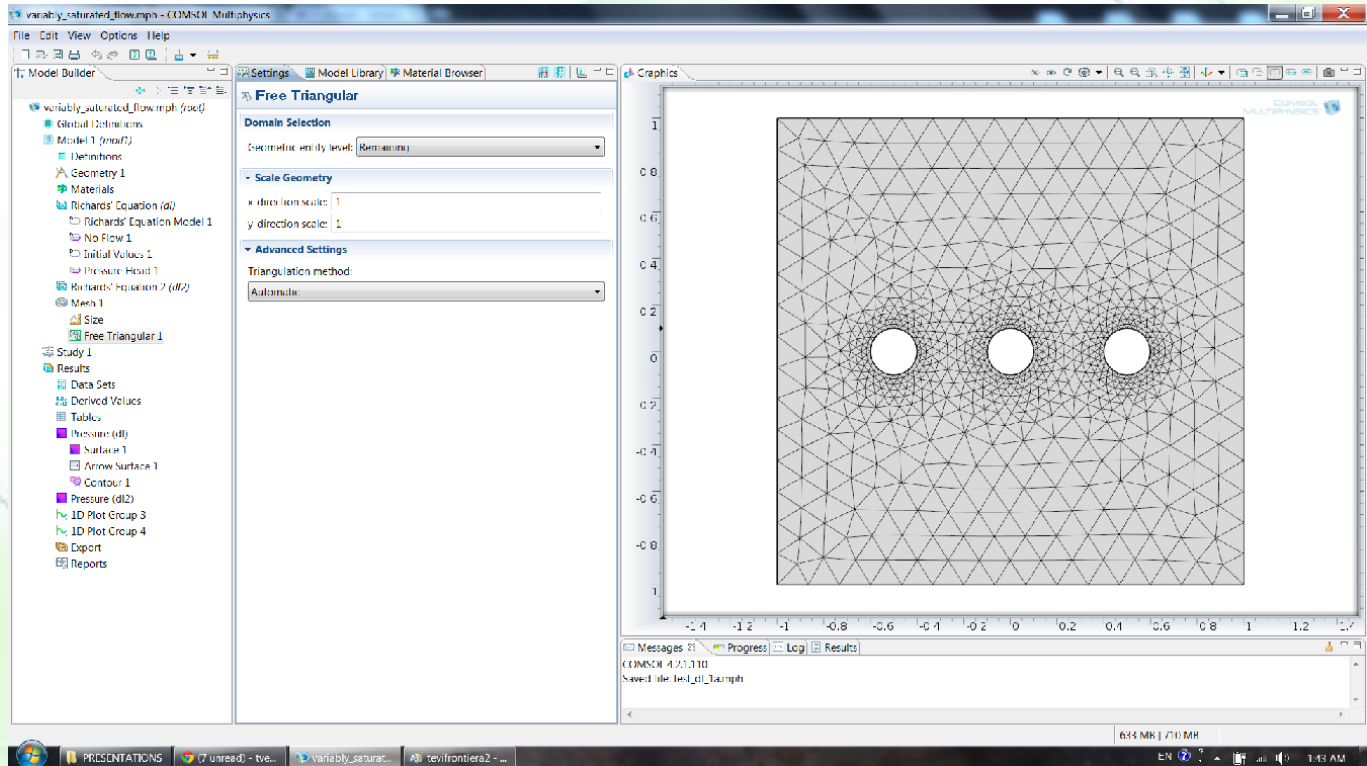
Model boundary 1



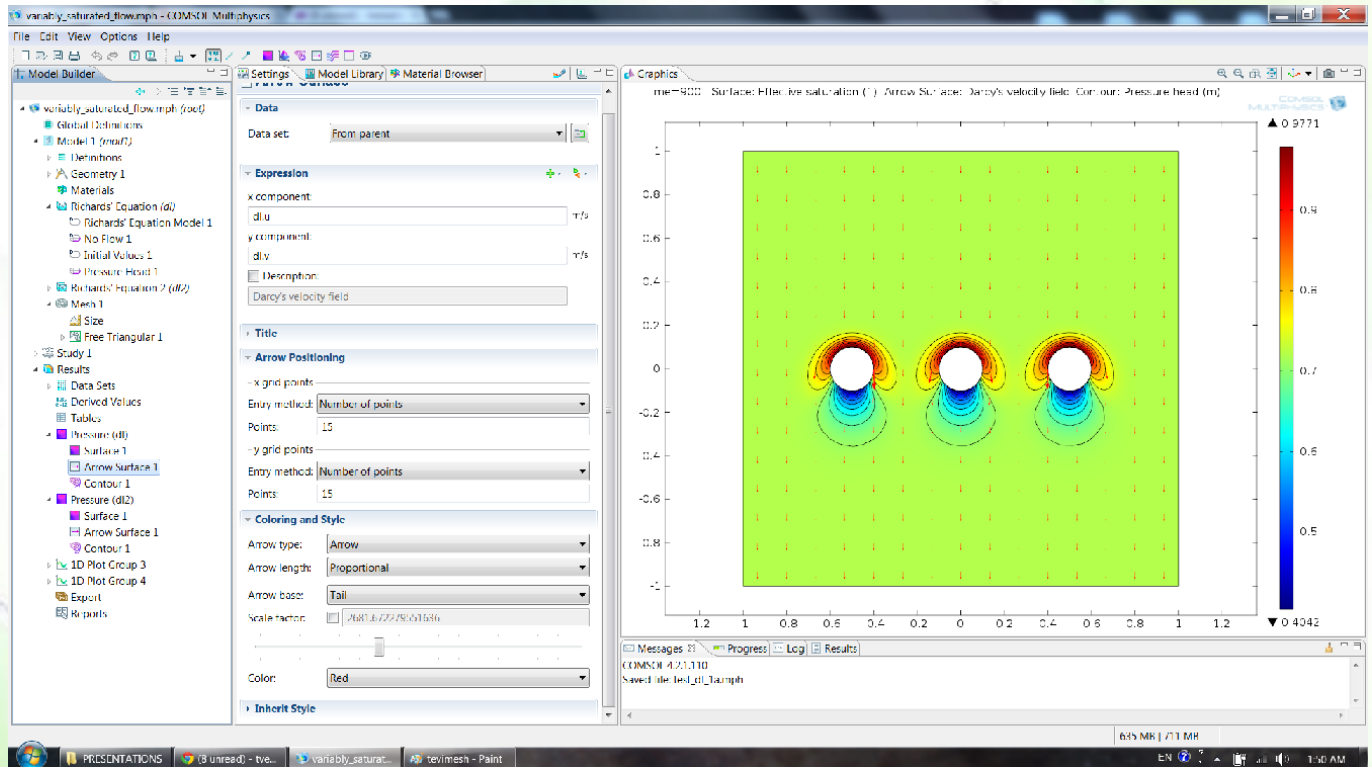
Model boundary 2



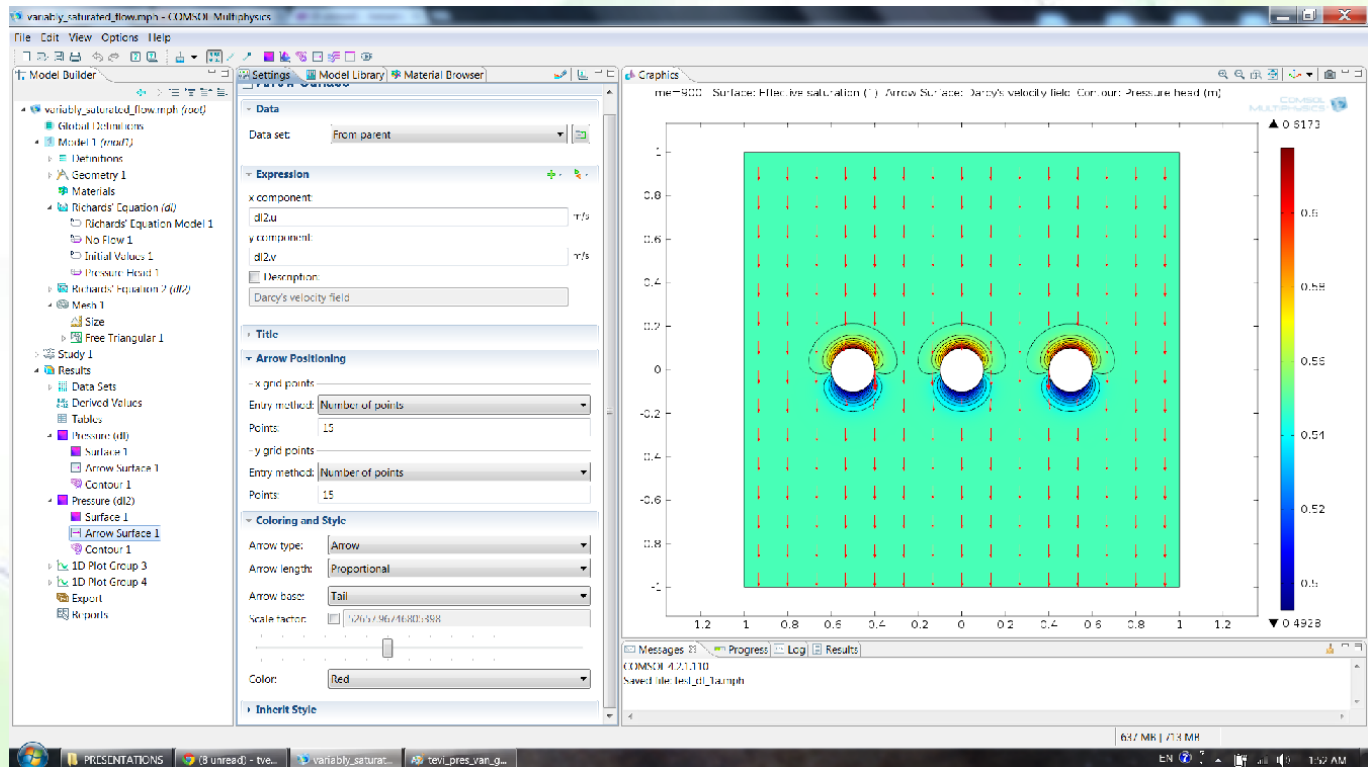
Mesh



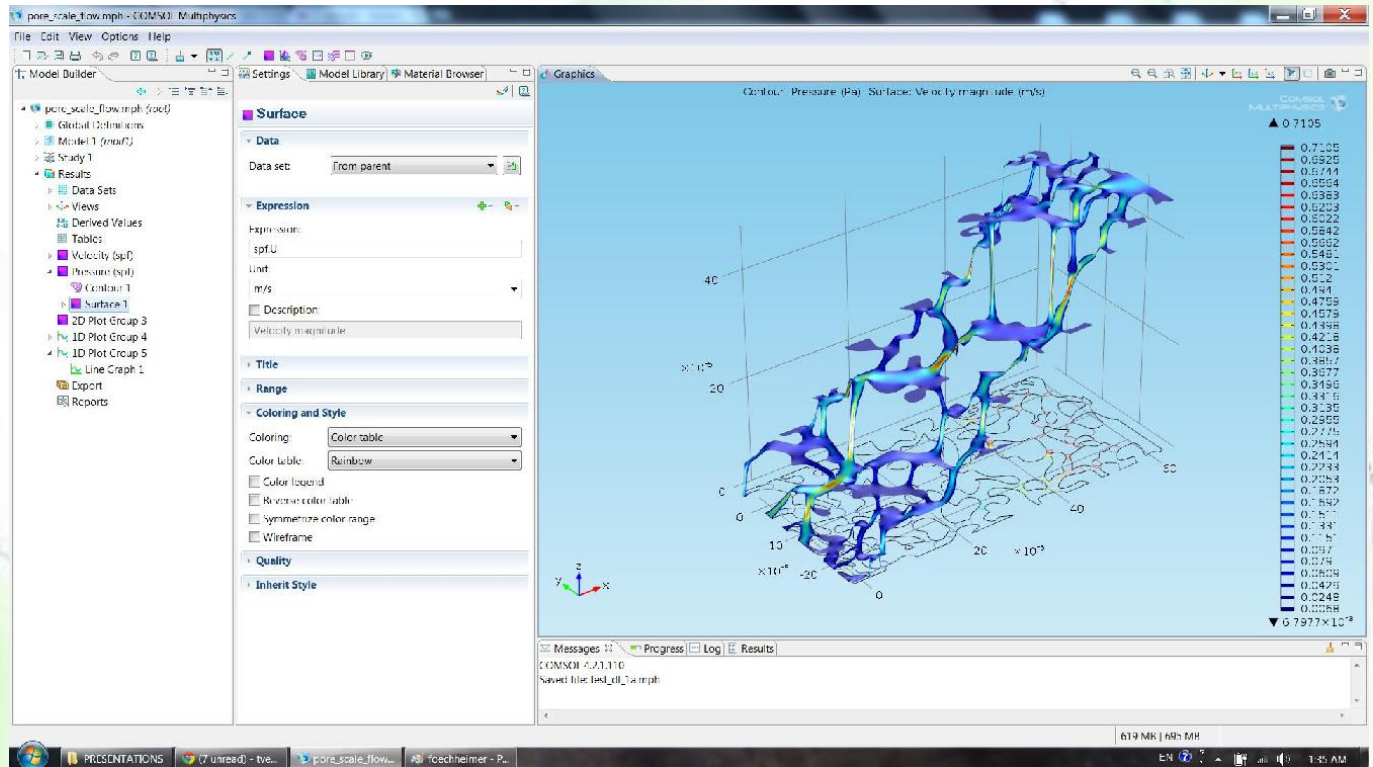
Study results – van Genuchten



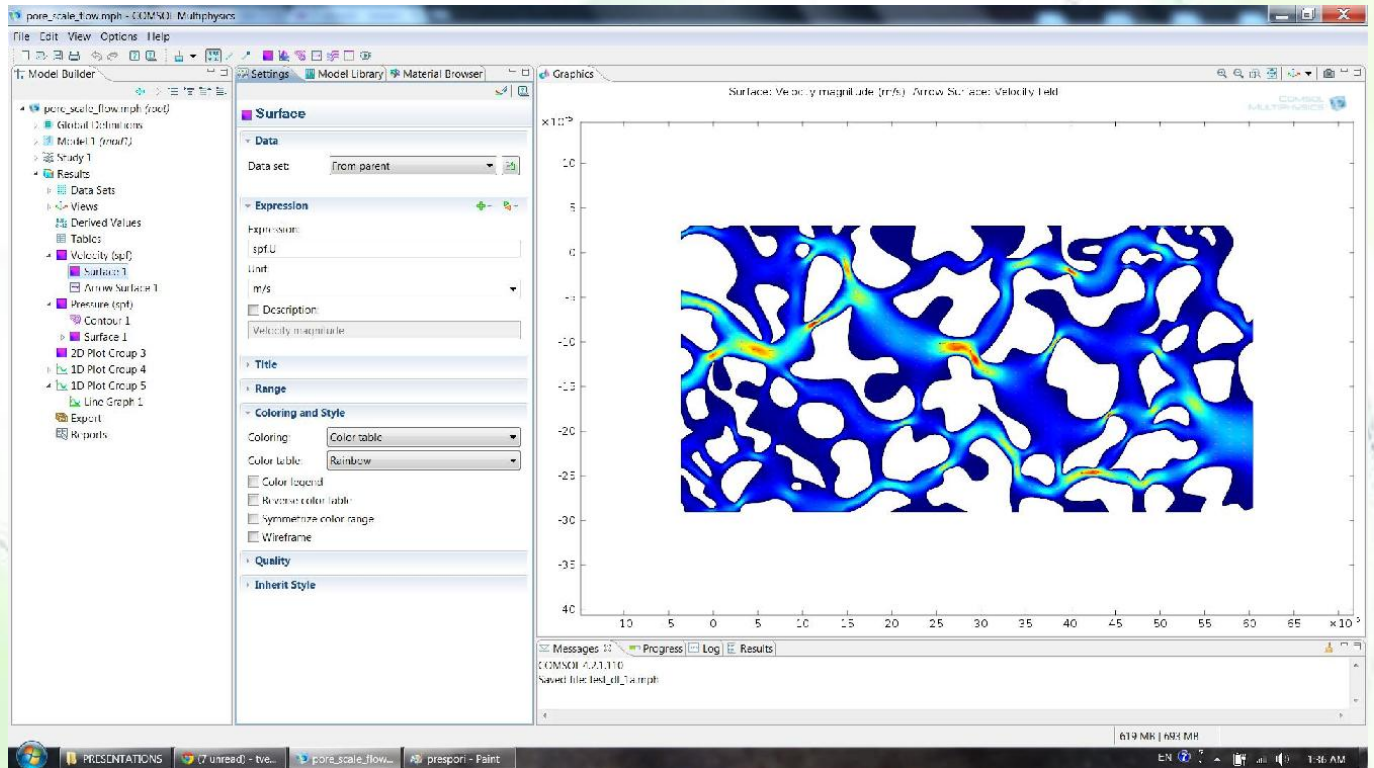
Study results – Brooks and Corey



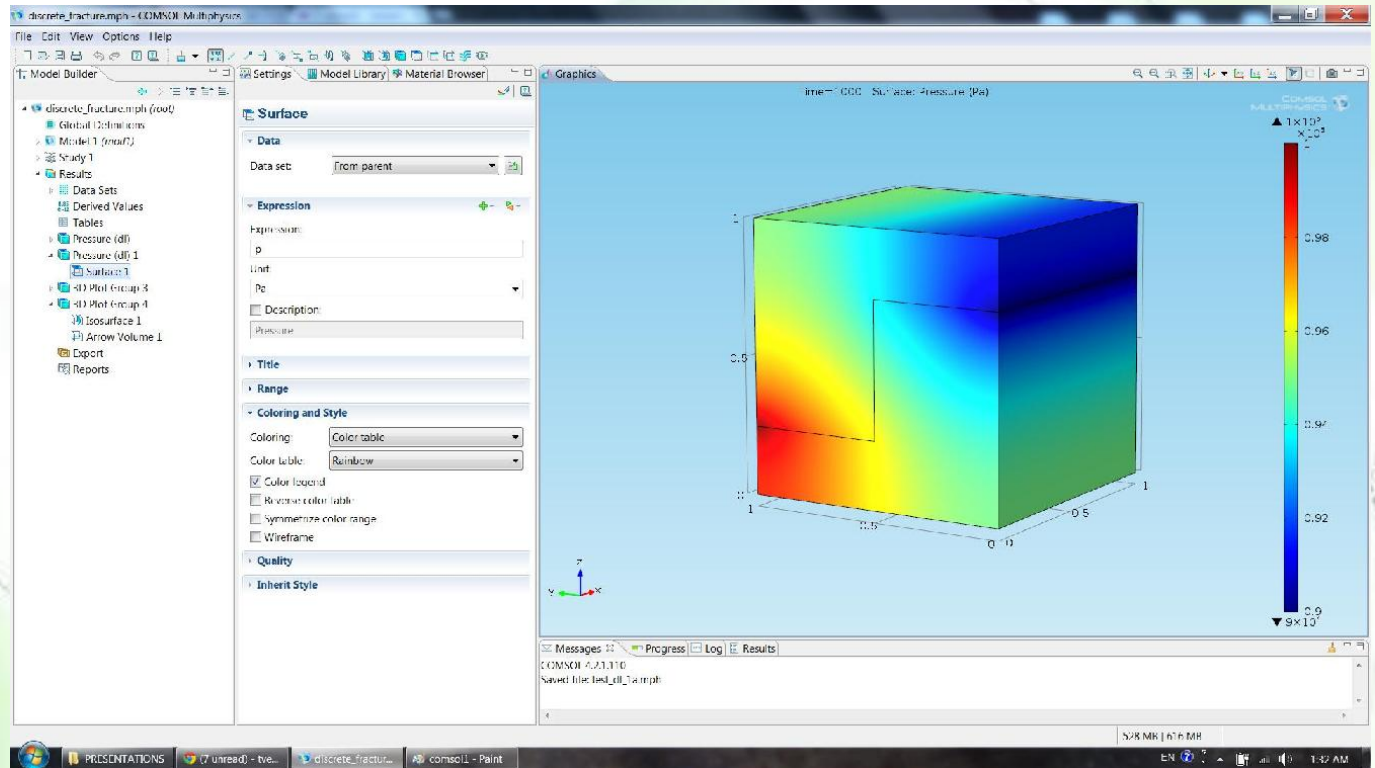
Porous media pressure



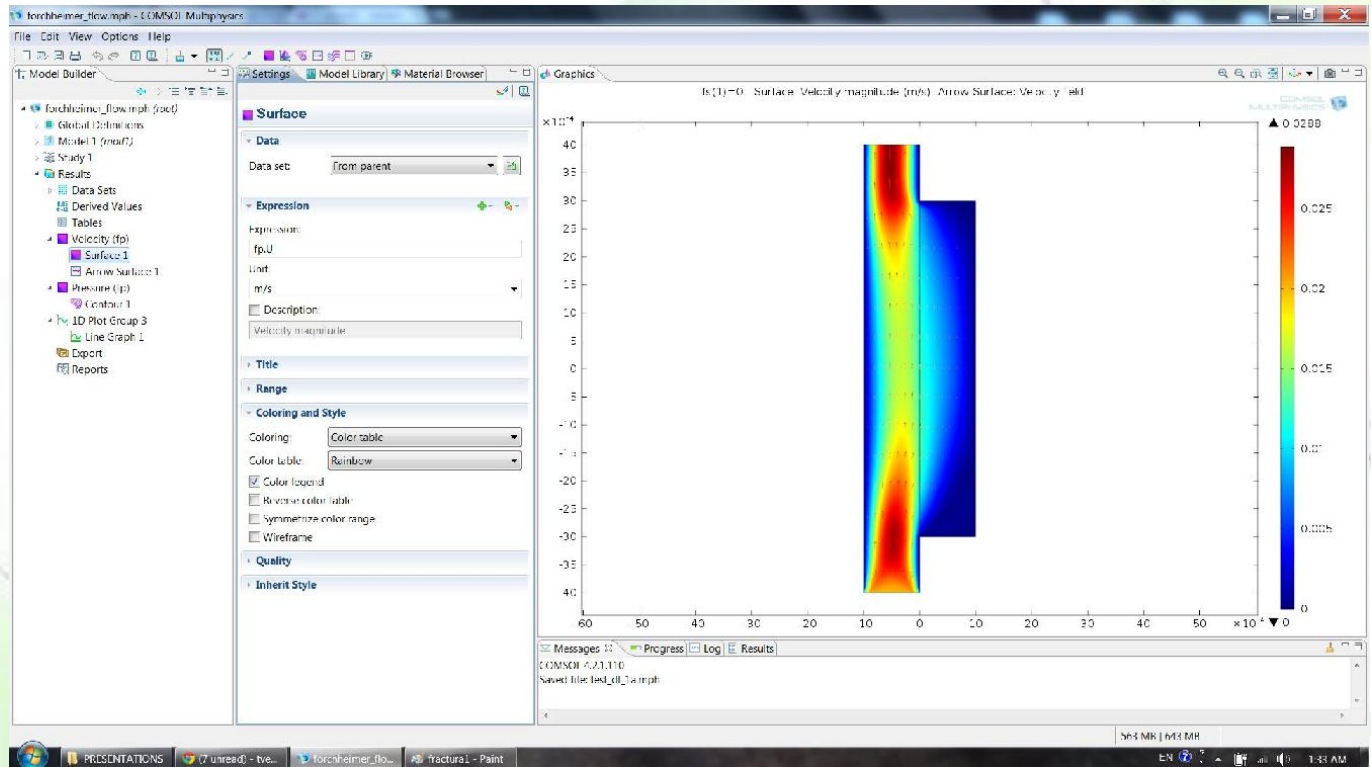
Porous media velocity



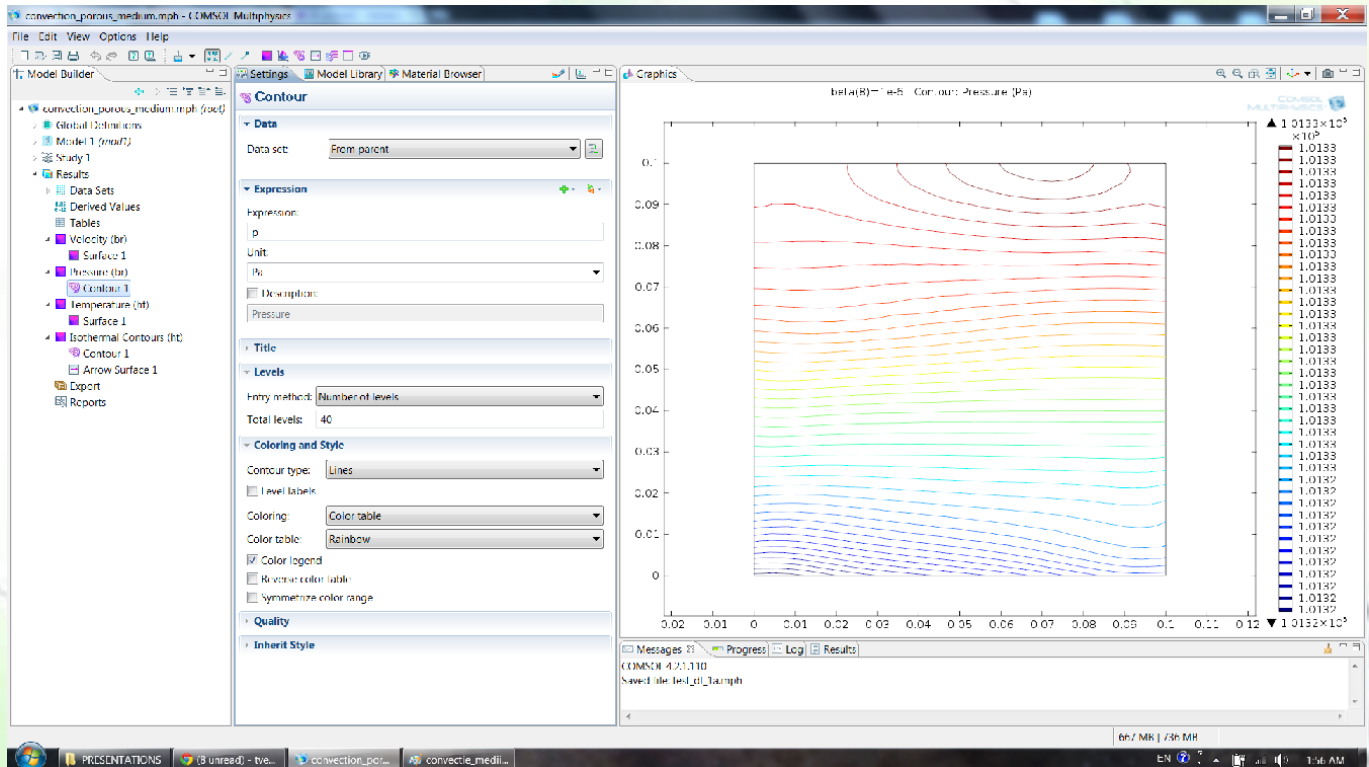
Porous media with fracture



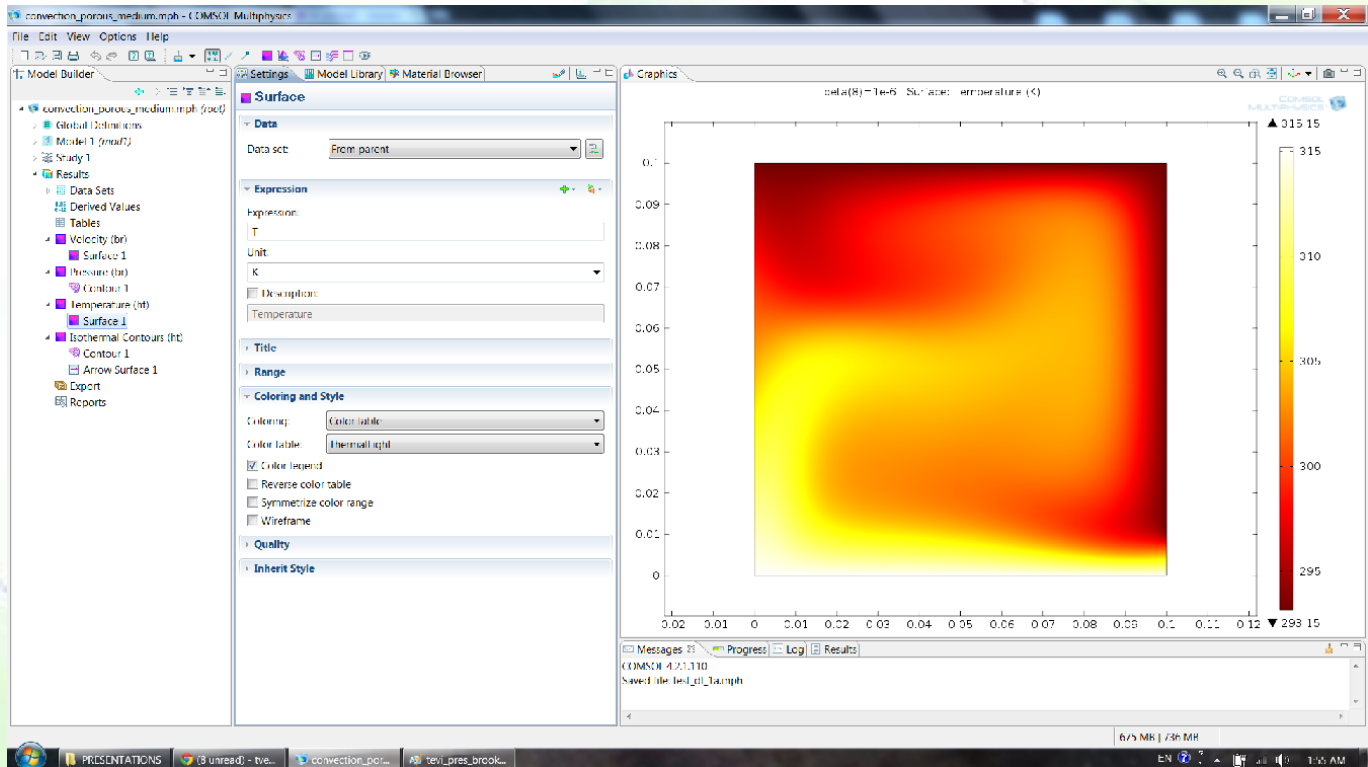
Forchheimer flow



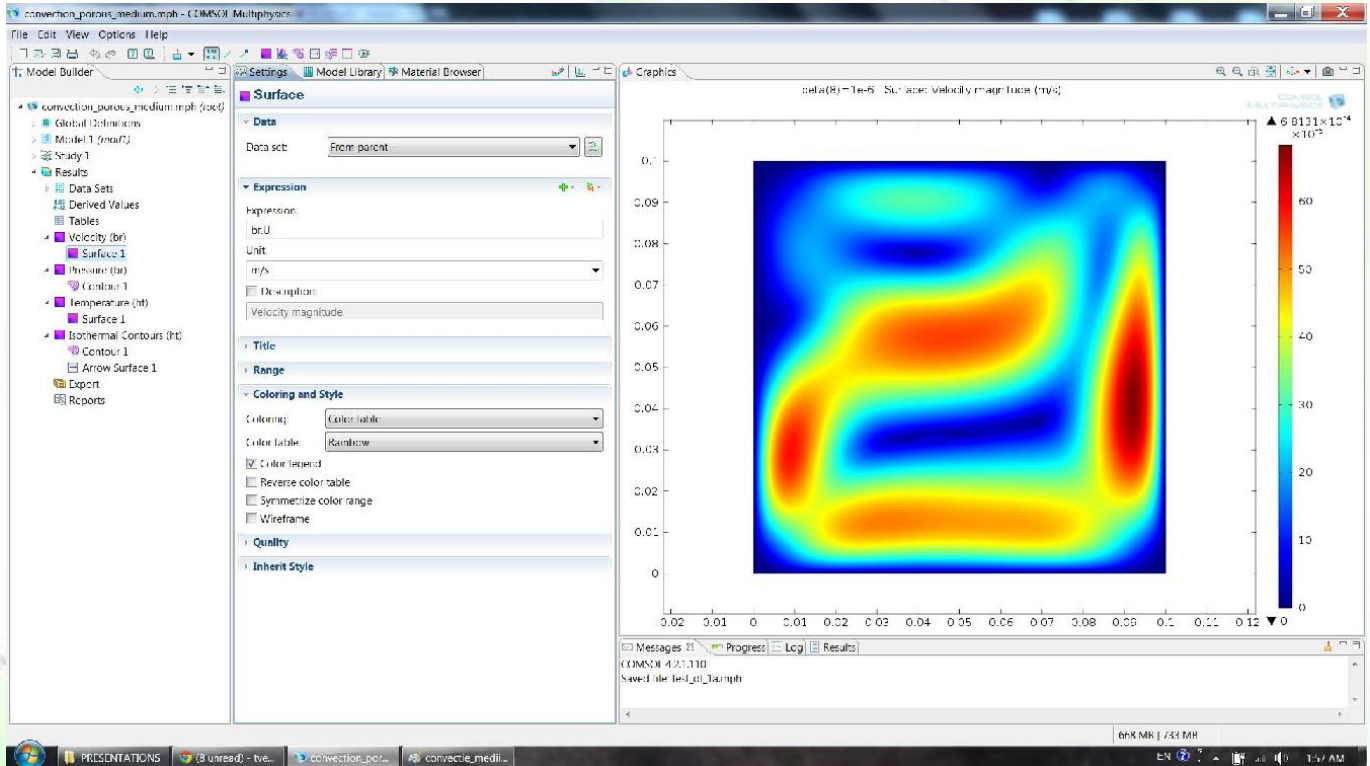
Convection model – pressure



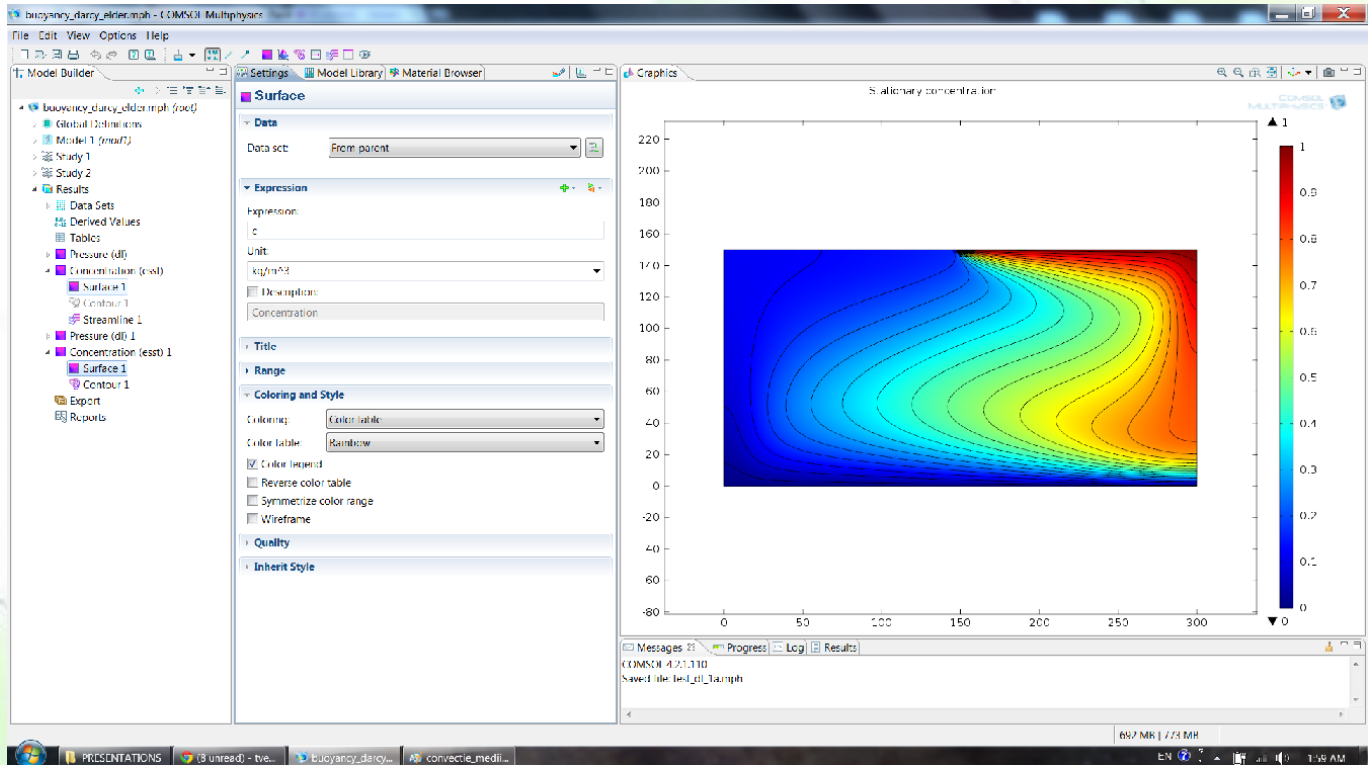
Convection model - temperature



Convection model - velocity



Solute transport



Thank You for Your attention!