I have studied extended theories of multiphase flow in porous media and their validity. For this purpose, I have employed pore-network modelling as a pore-scale simulator for quasi-static and dynamic conditions.

I could develop reliable models for the investigation of the extended Darcy law. The simulations have been compared with experiments and show good agreements.

In addition to extending the scientific collaboration among Utrecht University and Universität Stuttgart, we have developed valuable tools for testing theories, gaining new insights into the processes, and quantification of parameters which are difficult to measure in laboratorial experiments.