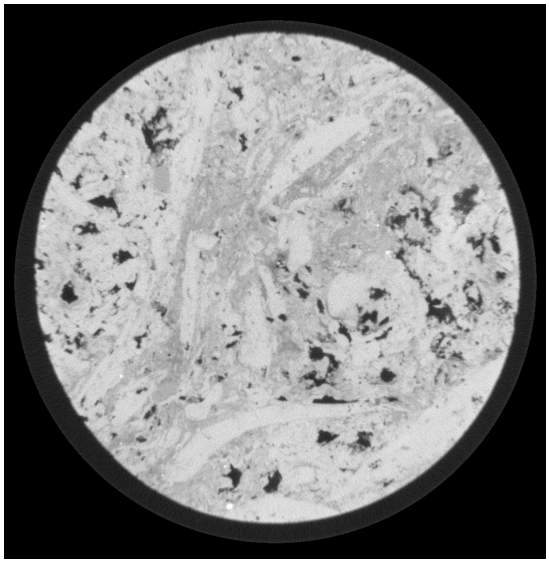
Porous Media: from Experimental Images to Networks, Topology, and Performance

Advisors: Linda Cummings, Jonathan Jaquette & Lou Kondic

This project connects the structure and performance of porous media, a problem relevant to applications ranging from secondary oil recovery to the design of better batteries. The project is conducted jointly with experimental research groups in Brazil, Argentina, and Switzerland that provide detailed information about material structure via high-resolution CT scans; the figure below shows an example. These scans are then analyzed using tools from computational topology that quantify porous materials. The quantification is carried out using persistent homology, an established method for quantifying images as well as networks. This interdisciplinary project involves further development of computational methods and image analysis, with extensions to include machine learning and further development in big data, statistical analysis, and data reduction techniques.



Support: NSF (current), ACS (current).