



Omar Alamoudi <omar.alamoudi@utexas.edu>

---

## GEO 391: Feedback on class proposal and presentation

---

Ketcham, Richard A <ketcham@jsg.utexas.edu>

Wed, Mar 20, 2019 at 5:47 PM

To: "omar.alamoudi@utexas.edu" <omar.alamoudi@utmail.utexas.edu>

Omar:

Good start on the proposal (if a bit tardy...). It would be good to do some more thinking about exactly what you want to extract from your CT data. Are you only interested in the fractures, or are other internal deformations interesting as well? I ask because, if it's only the fracture, it's not clear what you intend to do with the pre-fracture scan. If you are interested in bulk deformation by some sort of digital volume correlation scheme, then it can be advantageous not to have a too-homogeneous rock because it can be helpful for it to have features a correlation scheme can grab on to. What exactly are the "geometrical and morphological properties" you want to extract?

The answer to the preceding question will influence which numerical tools you want to try using or developing. If you want to include bulk deformation, some sort of digital volume correlation is probably the way to go. I've added to the "DVC" module in Canvas papers that introduce the two main approaches: Bay et al (1999) separates the volume into individual, distorted sub-boxes, while Roux et al (2008) use a more continuum approach. As for software, Avizo has DVC capabilities I have not tried, and I found a paper about a Python implementation (Tudisco et al 2017). If on the other hand you want to measure fractures, there are the approaches that we went over in class, which we can discuss; I'm trying to get some more fracture-measurement work implemented myself for EGU in a few weeks. I found a couple more papers on segmenting fractures, Deng et al. (2016) and Ramandi et al. (2017) that might also be useful; the latter is specifically aimed at getting at permeability in the end. I've put those in the "Fractures" module in Canvas.

Very good work on your class presentation on Voorn et al. You came to a thorough understanding and gave a good summary. Keep it up!

Cheers,

Rich

---

Richard Ketcham

First Mr. and Mrs. Charles E. Yager Professor

Director, High-Resolution X-ray CT Facility

University of Texas at Austin

Jackson School of Geosciences

2275 Speedway Stop C9000

Austin, TX 78712-1722

(O): 512-471-6942

<http://www.ctlab.geo.utexas.edu/>