

# UTCT Vision Statement and Five-Year Plan

August 29, 2017

## Vision Statement

We will leverage our history of innovation and leadership in X-ray tomographic imaging for the geosciences to drive new research; provide the geoscientific and wider scientific community access to the highest quality CT data and research support; develop and demonstrate best practices in CT data processing, analysis, curation, and dissemination; train the next generation of geoscientists in the incredible opportunities from CT; and foster and develop the national and international CT community.

## Five year plan

We will enact this vision by remaining at forefront in CT data acquisition, processing, and application to geoscientific problems, and leading in the development and dissemination of best practices in CT data interpretation and curation. Specific areas for initiative will include:

### Instrumentation

- ❖ We will replace our Zeiss/Xradia scanner, probably with a Versa 520 with diffraction, but also surveying other fast-developing technologies. We will seek funding through NSF-MRI starting in 2018, but continue exploring other avenues as that depends on passing a UT-wide competition for limited submissions.
- ❖ We will upgrade our North Star scanner to achieve faster scanning at higher resolution in support of larger-sample and 4D research, taking advantage of its modular design. Possibilities include: a high-brightness source; an additional gantry for detector motion that allows mosaic scans for larger fields of view and sub-pixel overlapping for improved resolution; a new flat panel detector with some combination of higher resolution, frame rate, and efficiency; and a better linear detector array (LDA). Funding requests will be incremental.
- ❖ We will continuously pursue possibilities for allied instruments, such as the X-ray transparent compression cell being developed by Assistant Professor Nicola Tisato, and potential acquisition of a specialized core scanner in collaboration with the JSG methane hydrate project.

### CT research and data processing

- ❖ We will continue to seek new opportunities to broaden and deepen the application of CT data across the geosciences, as well as allied fields such as planetary science and archaeology.
- ❖ We will continue to develop and disseminate innovative approaches to general and application-specific CT data processing and analysis issues (e.g., rings, PVE measurement of grains and fractures).
- ❖ We will define a sustainability and dissemination path for UTCT software, including source code. An early question is whether to with IDL, or convert to other platform, such as SciPy and/or Dragonfly; conversion will require funding support.

### Education and community leadership

- ❖ We will increase the frequency of UTCT short courses, for which demand remains high.

- ❖ We will build on the success of first North American ToScA meeting by helping organize biannual meetings, developing the North American CT community.
- ❖ We will pursue an RCN to expand and coordinate these activities, including ToScA support, MSA Short Course organization, and community efforts on data reporting and dissemination.

#### Data curation

- ❖ We will continue to explore possibilities for DigiMorph evolution, working to forge meaningful data management collaborations with TACC and Texas Digital Libraries. Solution will be evaluated with respect to sustainability, ease-of-use, accessibility for both research and general communities, and cost.
- ❖ Within two years, we will define our next DigiMorph model (hardware, software, scope, and funding), and within five complete migration.