

Micro-CT WORKSHOP 2018 Philadelphia

Workshop Agenda

Thursday August 24th

9:00-9:15am **INTRODUCTION:** Meeting Introduction

9:15-10:15am **FUNDAMENTALS OF MICRO-CT:** In this session we will teach the underlying principles of micro-CT, reconstruction, and basic image analysis. Learning the physics and algorithms will help you better understand how a change in your experimental setup or scan/reconstruction parameters will influence your results.

You Will Learn:

- How X-rays are produced
- Limitations to X-ray production
- How X-rays interact with matter
- How X-rays are detected and factors that influence the signal-to-noise ratio, as well as the basic concept behind the reconstruction process

10:15-10:30am **COFFEE BREAK**

10:30-12:00am **COMPLEX ROI CREATION: (HANDS-ON)** Selecting the portion of the image which you want to analyze is the first critical step in conducting quantitative analysis. Using the proper tools will allow you to efficiently and effectively select regions-of-interest (ROI).

You Will Learn:

- How to select a reference mark
- Geometric Transformation
- Create multiple ROIs in single dataset
- Using Bitwise operations to select ROI
- Advanced use of Shrink-Wrap ROI

12:00-1:00pm **LUNCH:** Served by Hotel

1:00-1:30pm: **WHAT'S NEW:** A brief summary of the new hardware and software features development during the last year will be presented.

You Will Learn: To be announced at the time of the meeting.

1:30-2:30pm: **ADVANCED THRESHOLD: (HANDS-ON)** There is more than one way to segment datasets. While Global Thresholding is the most common, other advanced options may be more appropriate for your samples.

You Will Learn:

- What Adaptive Thresholding is
- How each Adaptive Thresholding function differs
- What Otsu Auto-Selection Thresholding is
- When it is appropriate to use Adaptive or Otsu Thresholding

3:00-3:30pm: **Tips and Tricks for Sample Mounting:** Sometimes the most difficult part of micro-CT scanning is mounting the sample. We will have an open discussion about sample preparation and sample mounting

4:00-4:30pm: **Special Considerations for *In Vivo* Scanning:** Discuss the particular challenges with live animal imaging and other considerations. *In vivo* scanning is different and presents special challenges.

4:30-5:00pm **New Functions in DataViewer (from June 2017 updates onwards):** Dataviewer is an essential tool for micro-CT users regardless of the field of study. We will show the latest updates for attendees to follow along.

You Will Learn:

- Image based sorting
- Multi-VOI function
- 3D distance function
- And more

5:00-7:00pm **COCKTAIL RECEPTION:** Served by Hotel

Friday August 24th

9:00-10:00am **IMAGE ARTIFACTS:** This session will build on the previous day's topic of Micro-CT Fundamentals. We will study how to recognize image artifacts, and ways to prevent or minimize the influence of artifacts on results.

You Will Learn:

- Ways to minimize beam hardening
- How to deal with pixel noise
- Recognizing misalignment in images and ways to correct
- Identifying unusual artifacts

10:00-10:15am **COFFEE BREAK**

10:15-11:00am: **IMAGE FILTERING OPTIONS:** Sometimes there is a benefit to filter or smooth the data in order to accomplish the desired results. This session will focus on best ways to smooth data.

You Will Learn:

- When it is appropriate to filter or smooth images
- Smoothing in NRECON reconstruction
- Tools within the FILTER macro
- Despeckling to improve image without smoothing

11:00-12:00pm **MODEL CREATION FOR 3D PRINTING, CAD and FINITE ELEMENT (FE) SIMULATION:** Guest speaker from Synopsys will demonstrate how the Simpleware Software Platform can be used to create a model suitable for 3D printing, CAD and FE Simulation.

You Will Learn: Considerations for creating useful models and workflow for 3D printing, CAD, or FE

12:00-1:00pm **LUNCH:** Served by Hotel

1:00-2:00pm **PULLING IT ALL TOGETHER (SESSION 1): (HANDS-ON)** We will walk through an example analysis that requires utilizing advanced features previously discussed.

2:00-2:30pm **Q&A AND SURVEY**

2:30pm **MEETING CLOSE**

**Exact topic sessions subject to change at the time of the event.*