



SHORT COURSE ON QUANTITATIVE DIGITAL PATHOLOGY

University of Washington School of Medicine at South Lake Union, October 23 – 27, 2017

The 2017 Short-Course on Quantitative Digital Pathology is an intensive course focused on the principles, and methods used in stereology and image analysis to obtain accurate non-biased data from tissue sections. This is a unique opportunity to interact with experts in the field of stereology and image analysis. Students will be introduced to processes that dramatically improve the efficiency and accuracy of stereology and quantitative image analysis, such as whole slide digital imaging and powerful analysis software. The workshop is five days of lectures, interactive sessions and hands-on experience.

WORKSHOP GOALS

1. Participants will learn the principles behind the use of stereology and receive hands on training in the techniques used to accurately measure specific histologic and/or histopathologic features in an organ or tissue section.
2. Participants will learn when it is appropriate to use image analysis; how to develop protocols using image processing and segmentation; and will be introduced to the use of deep learning to increase the information obtained with image analysis.
3. Participants will learn how to design and conduct studies for stereology and image analysis.
4. Participants will be exposed to whole slide digital imaging on several state-of-the-art platforms including the Hamamatsu NanoZoomer® Digital Pathology System.
5. Participants will work with the faculty to develop protocols for analysis of their own digital images that will be generated during the workshop.

MAJOR TOPICS INCLUDE

STEREOLOGY (October 23rd to October 25th)

- Optical disector/fractionator
- Automated physical disector/fractionator
- Cavalieri's estimator for volume
- Cycloids/(Sine-weighted) test lines for surface
- Counting frames/Global Spatial Sampling for length
- Connectivity, Tensors and Spatial distribution
- Nucleator and Rotators for Local Stereology
- Virtual Slide-based Stereology
- Proportionator sampling
- Tissue deformation
- Ratios vs Totals
- How many Animals/Blocks/fields of view and counts?

IMAGE ANALYSIS (October 26th to October 27th)

- Image pre-processing: filters, color de-convolution
- Image segmentation: Thresholding, advanced pixel classifiers - Bayesian and K-means, contextual classifiers
- When to use image analysis
- Tissue Micro Array image analysis
- Tissue Sampling
- Image analysis protocols for sampling
- Virtual and Physical Multiplexing with immunohistochemical biomarkers
- Virtual Slide based Image Analysis
- Introduction to deep learning in digital pathology

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