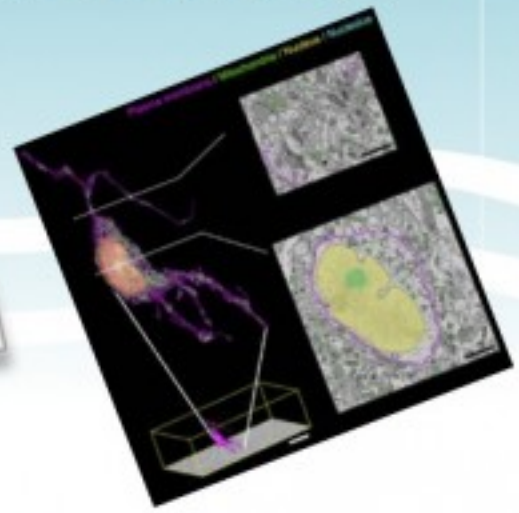
NBCR SUMMER TRAINING PROGRAM 2016

Data to Structural Models



Agenda

Day 1, Monday August 1st: Introduction to NBCR image analysis and segmentation tools. Segmenting large electron tomographic image volumes.

Day 2, Tuesday August 2nd: Creating high-quality triangular and tetrahedral meshes for numerical analysis from segmented image volumes with GAMer and Blamer.

Day 3, Wednesday August 3rd: Using HexBlender to generate, refine and visualize high-quality hexahedral Lagrange and cubic Hermite meshes from segmented tomographic image volumes.

Day 4, Thursday August 4th: Least squares fitting of three-dimensional anatomic models of geometry and structure using *Continuity*.

Day 5, Friday August 5th: Open consultation on attendees' project by instructors and NBCR scientist.

NBCR

NBCR is pleased to offer a Summer Training Program (STP) August 1st to 5th, 2016 on the theme of image-based meshing and structural modeling. This week-long intensive program will introduce 12-20 students to principles, methods, and NBCR tools for generating high-quality three-dimensional meshes for numerical analysis in multi-scale modeling of subcellular, cell, tissue, and organ biophysics.

Structural models will be derived from structural data obtained primarily from 3D imaging modalities, including electron tomography, multi-photon and confocal microscopy, and whole-body medical imaging modalities like CT and MRI.

The course will include: (1) automated and manual segmentation and annotation strategies; (2) improving the quality of surface meshes and generating volumetric meshes with GAMer; (3) using Hex-Blender to construct 3D models; and (4) developing high-order finite-element meshes, including patient-specific organ models with Continuity. The resulting meshes will be suitable for a range of biophysical modeling applications from stochastic Monte Carlo and Brownian Dynamics models to subcellular and whole-cell transport models to whole-organ biomechanics and electrophysiology that will be the topics of future NBCR training programs. In consultation with the course organizers, those accepted into the program will be encouraged to bring and work with their own data sets.

To register for this workshop please visit nbcr.ucsd.edu