BioMesh3D

Introduction
What is BioMesh3D?

- Tetrahedral conforming meshing of volume data
- Specifications:
  - Conforming, tetrahedral from labels/segmentation
  - Adaptive
  - Quality of elements
  - Multimaterial (general case)
  - Subvoxel accurate
    - Smoothed or probabilistic labels
  - Part of a pipeline
    - Preprocessing, segmentation, surface processing, meshing, simulation
Current technology

- Variational formulation
  - Optimize point placements and then tetrahedralize
    - Off-the-shelf computational geometry
  - Sample structures in a hierarchy of interface types
    - points -> lines -> surfaces -> volumes
- Meyer et al., 2008
BioMesh3D
BioMesh3D – Properties

• Conforming
• Adaptive
• Quality elements
• Robustness
• Usability/parameters
• Run times
BioMesh3D – Software

• Open source release of tools
  o Preprocessing, meshing
  o Reliance on TetGen
  o Scripts to run whole volumes
    – Parameters within scripts
BioMesh3D – Software

- Meshing via a “portal”
- Thin web-based client
- Upload and monitor data
- Visualization and download results
Login Screen
Mesh Configuration
Visualizing Stages
BioMesh3D – Agenda

• Darrell S. – use in cardiac
• Moritz D. – use in brain
• Jonathan B. – next generation technology