Smooth Extrapolation of Unknown Anatomy

- Estimate a full model of a patient from partial anatomy for surgical planning and/or intraoperative navigation
- Existing work is surface-based:

  - Incomplete Patient Surface
  - Statistical Shape Model
  - Estimated Structures
  - Projection
  - Copy & Paste Structure Replacement
  - Smooth Deformation of Estimated Regions

CT Image Source: JHU APL

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- **What Students Will Do:**
  - Extend the processing to extrapolate volume data (e.g. CT) in an efficient manner
  - This will allow for intraoperative X-Ray based navigation with incomplete CT
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• What Students Will Do:
  – Extend the processing to extrapolate volume data (e.g. CT) in an efficient manner
  – Evaluate the methods using traditional atlas criteria as well as with a 2D/3D registration simulation

• Deliverables:
  – C++ Source Code
  – Source Code Documentation
  – Report comparing the speed of execution and accuracy of the various approaches

• Size group: 1-2

• Skills:
  – C++, Image Processing, CIS 1 PA5

• Mentors:
  – Robert Grupp (grupp@jhu.edu), Prof. Taylor