3D to 2D Human Heart Transformation

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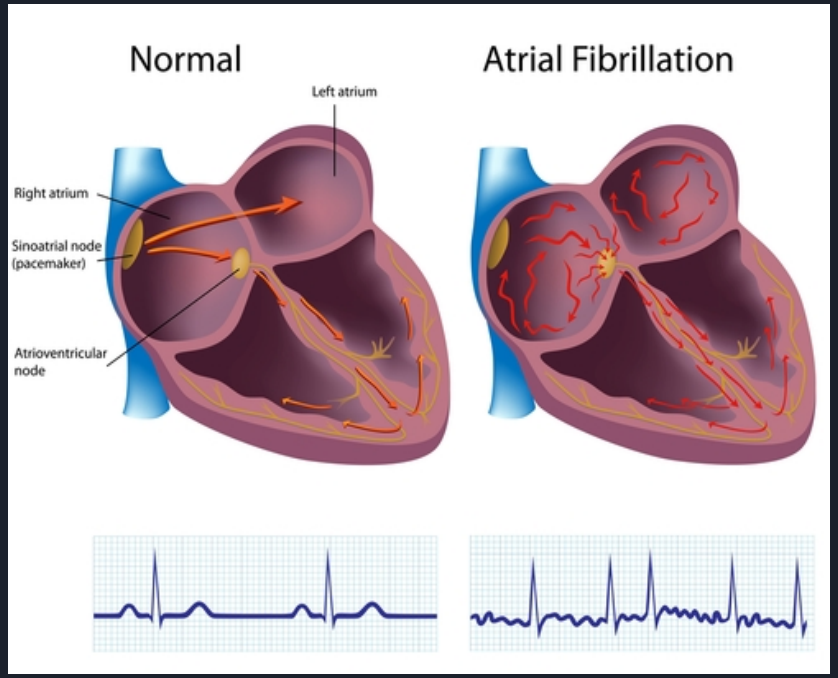
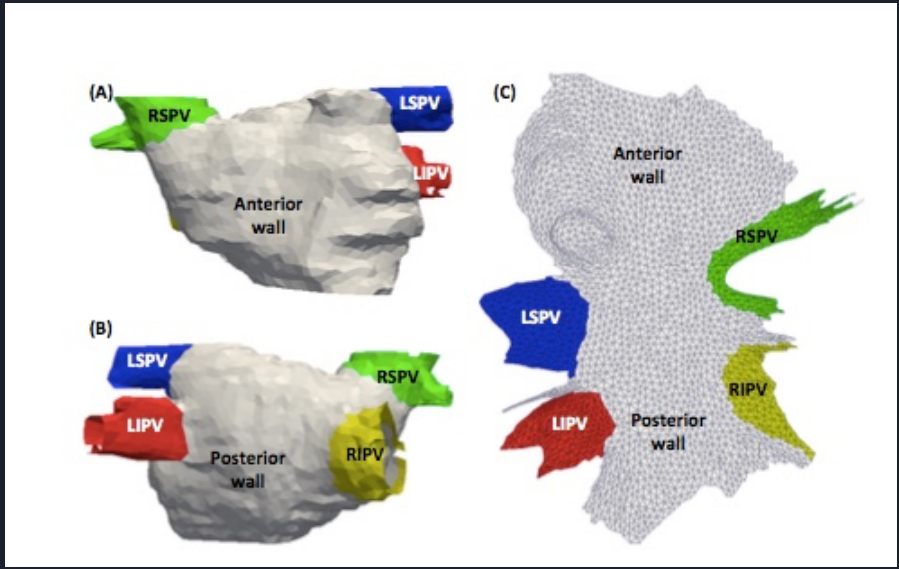
- Biotechnology, Design and Society Major
- I-SENSE REU
- Conducting research under Dr. Ghoraani

ATRIAL FIBRILLATION



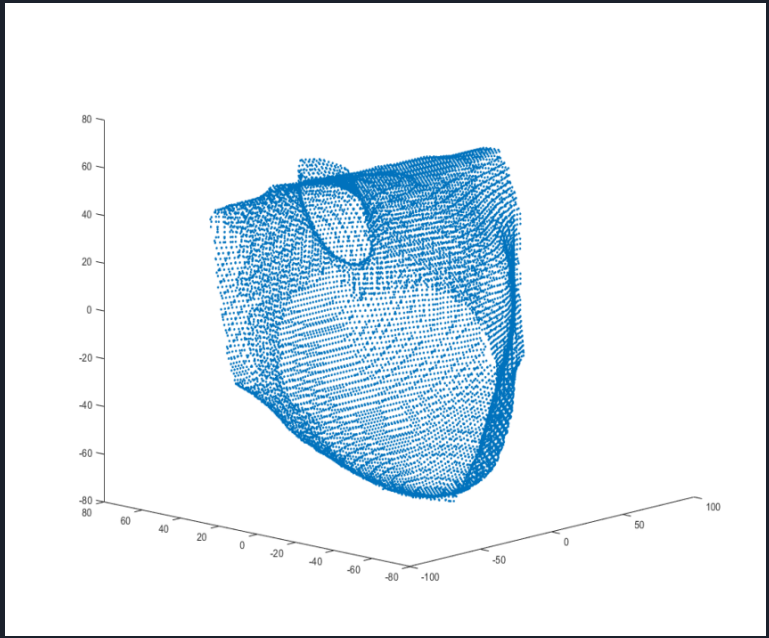
- Type of heart arrhythmia
- Increases chance of stroke up to five times
- Catheter treatments locate the source of AF
- Accurate 2D maps of the heart are needed for the treatments

TRANSFORMATION PROCESS

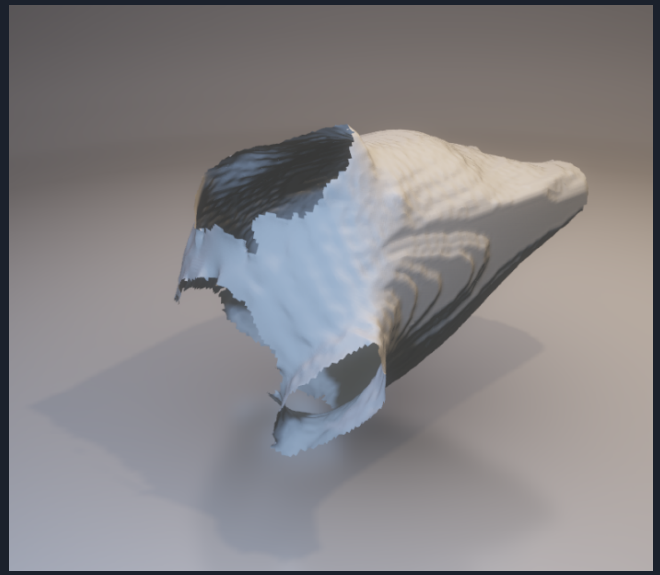


- Process of Caroline Roney
  - Utilizes mesh model
  - Fast marching algorithm
  - Sammon multidimensional method

OUR PROCESS

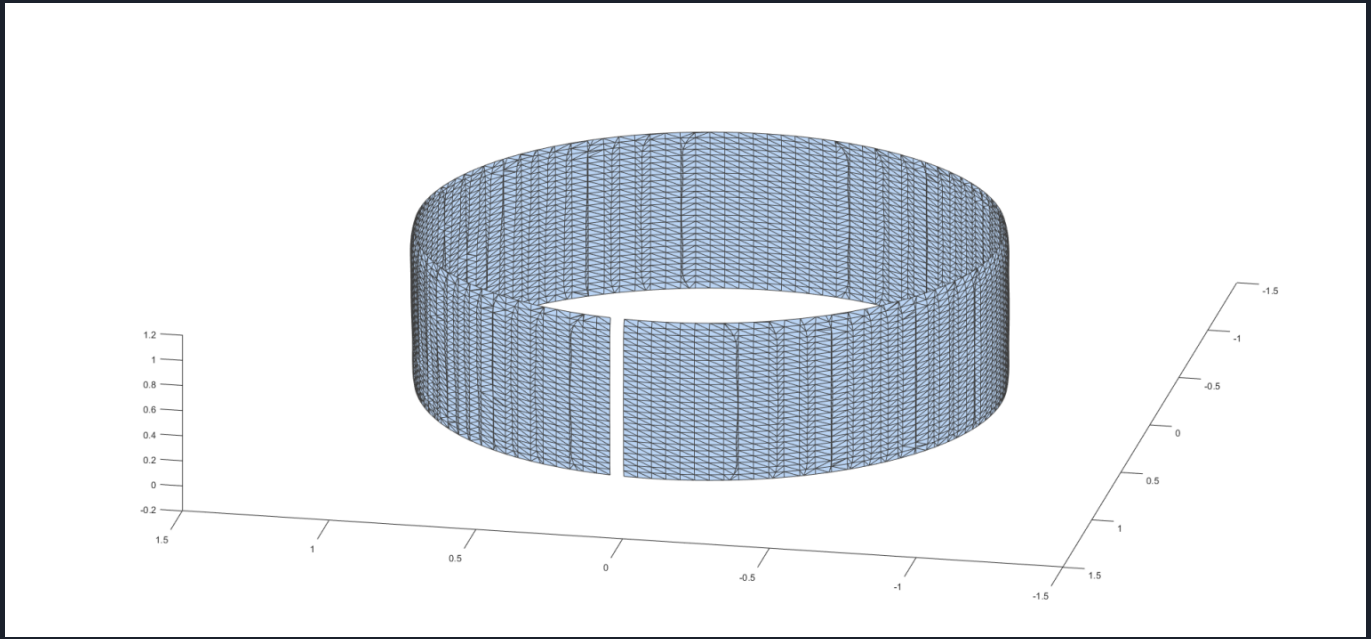


- Binary volume data process
  - High resolution binary data means higher accuracy
  - Perform fast marching algorithm
  - Use built in MATLAB mdscale with Sammon
- Challenges
  - Resolution of data
  - Defining the boundaries for mdscale

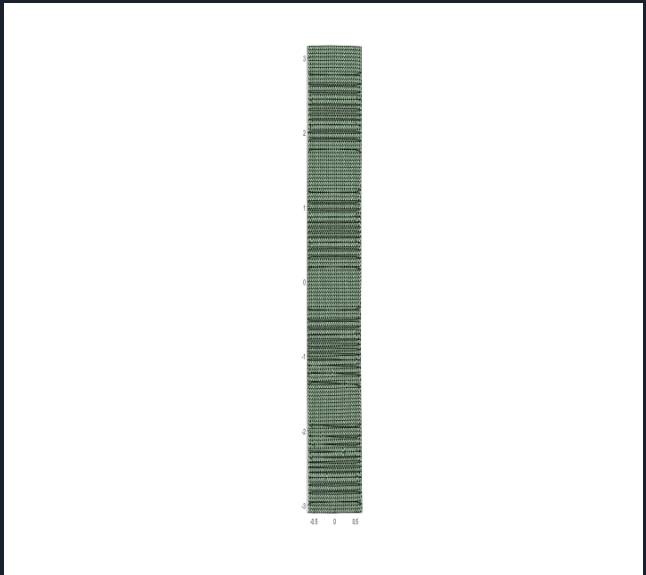


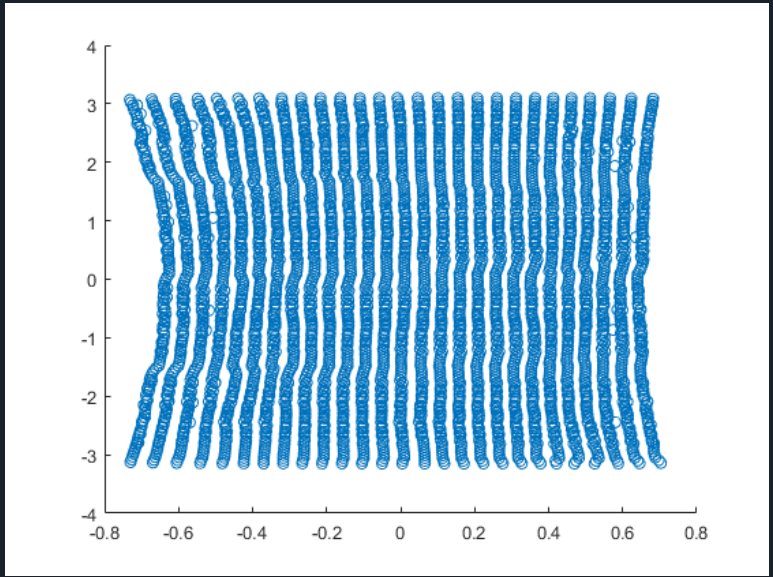
- Mesh data process
  - Create a mesh from existing heart data
  - Perform cuts along the mesh to define boundaries
  - Perform fast marching algorithm
  - Mdscale with Sammon criterion

CYLINDER MODEL

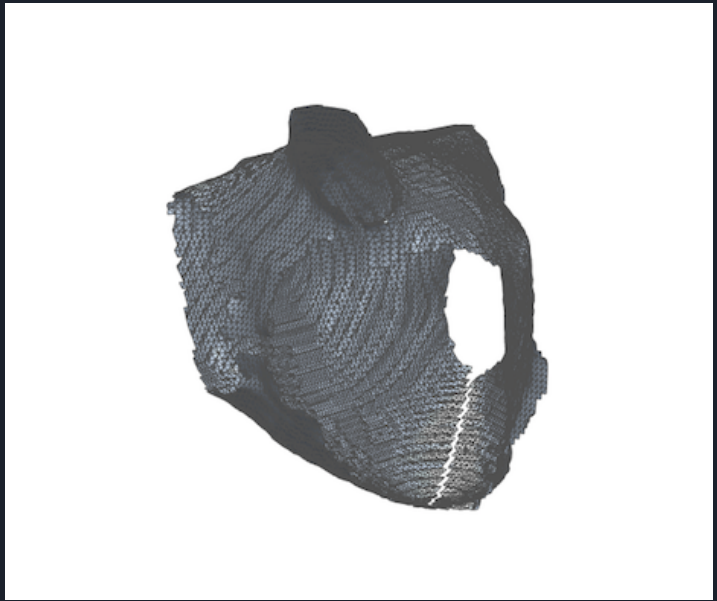


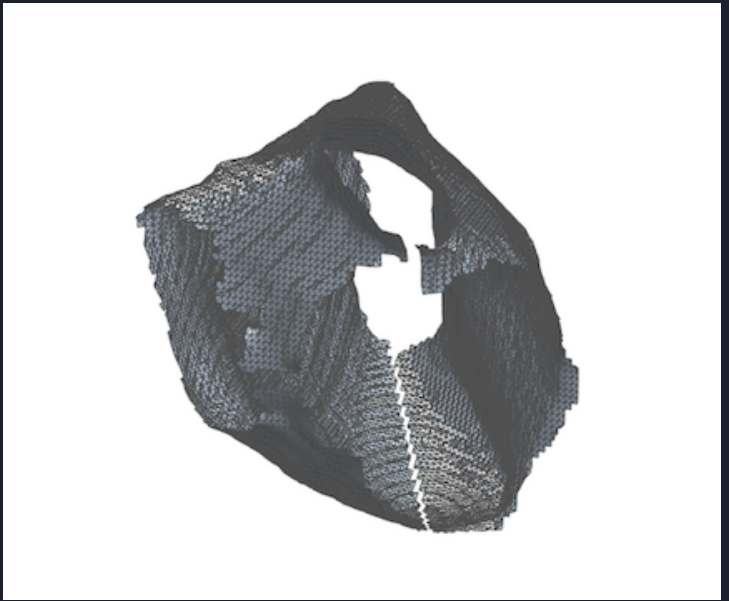
CYLINDER MODEL



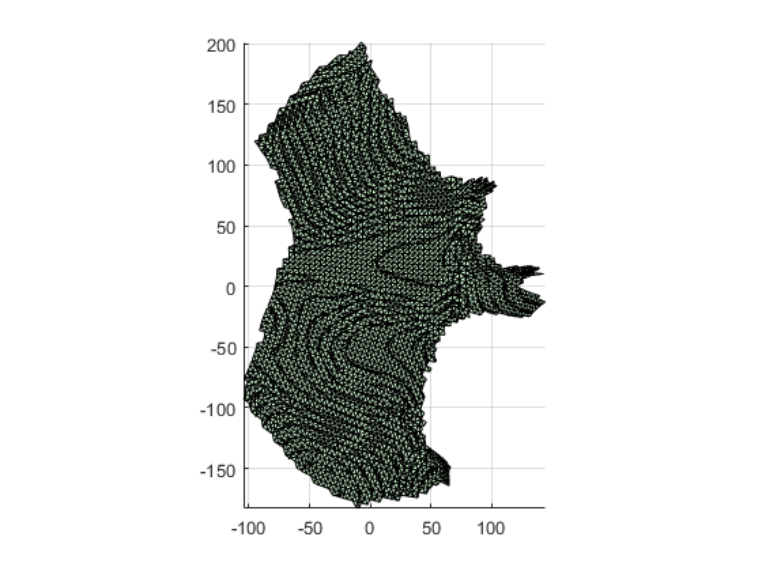


HEART MODEL





HEART MODEL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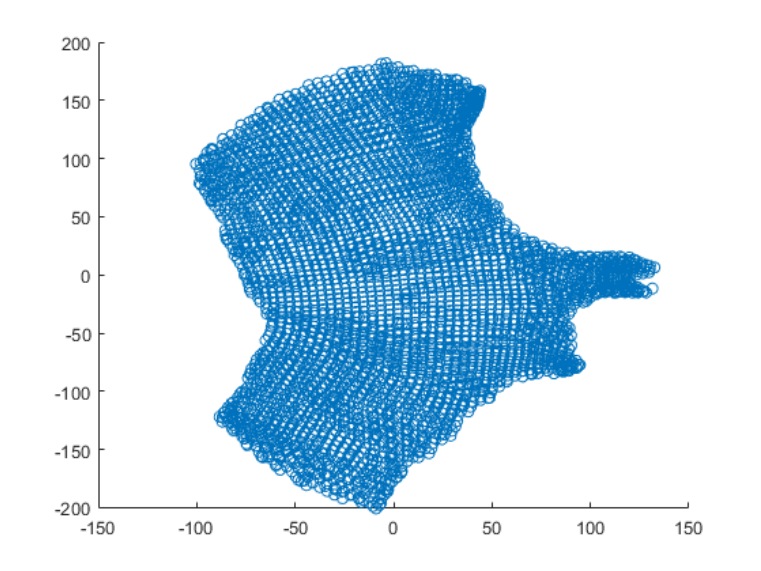
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FUTURE WORK

- Applying the 2D map of the heart towards catheter guiding algorithms