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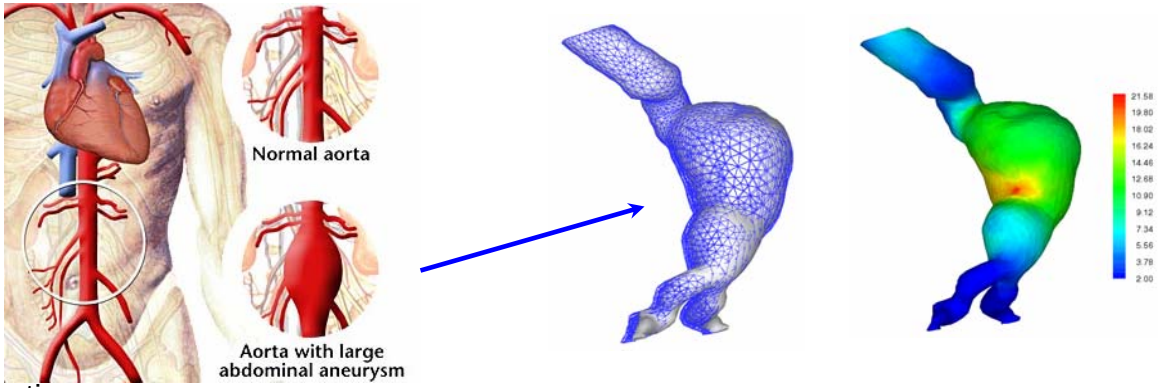
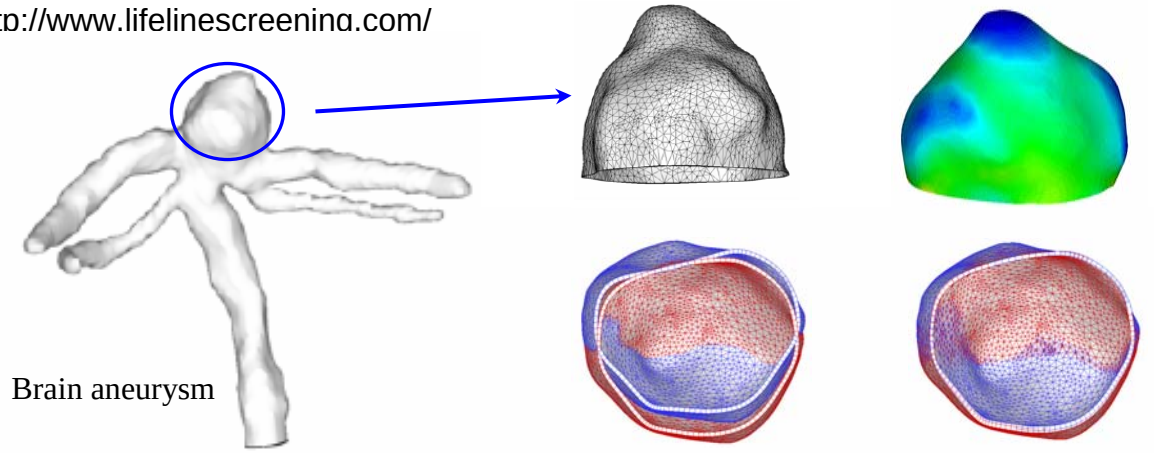
Aneurysm Mechanics

- Inverse elastostatics



Aortic aneurysm
http://www.lifelinescreening.com/



Brain aneurysm

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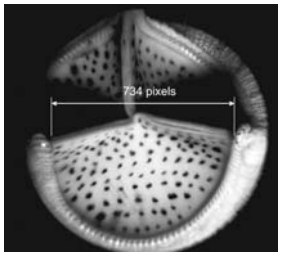
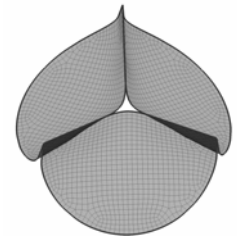
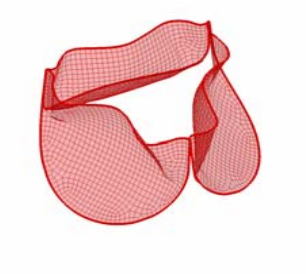
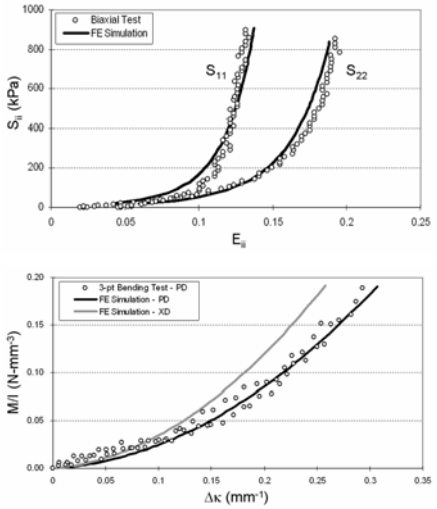
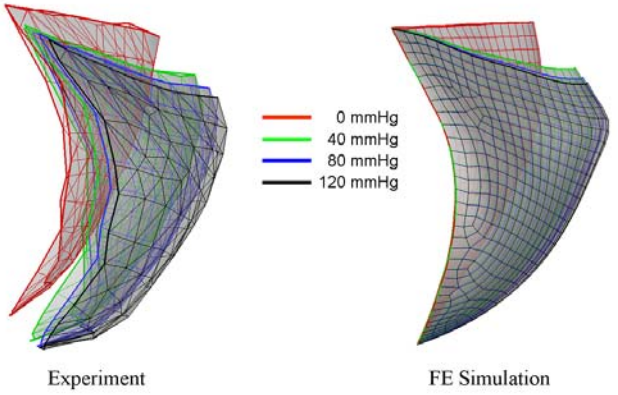
Heartvalve dynamics











Comparison with experiments. Left: stress-strain behavior; Above: deformed shape

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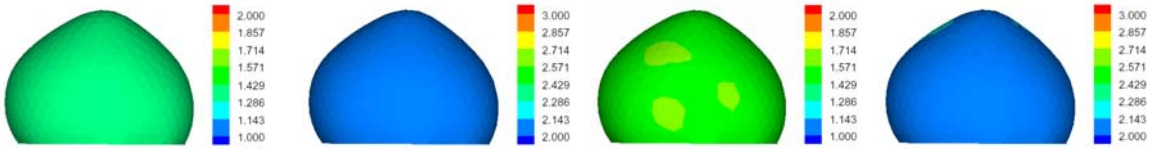
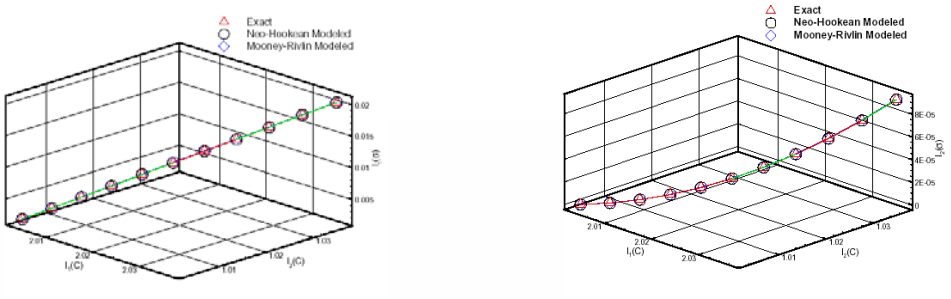
Inverse Problems

- Identification of membrane elastic properties

Goal: Identify elastic properties from 4D medical images
Method: Inverse elastostatic + regression



Example: parameter distributions delineated in this approach



Comparison of predicted stress-strain curve with input data

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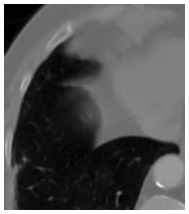
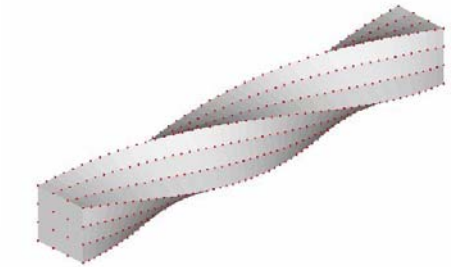
Discrete Methods

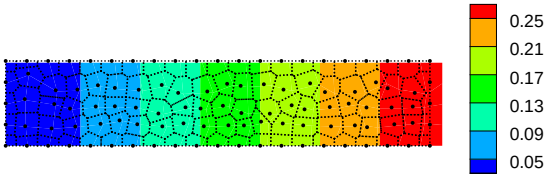
- Discrete gradient Method

Goal: perform stress analysis directly on image-derived discrete model



Method: Discrete gradie Galerkin method





Examples of point-based simulation. Left: twist of a bar; Right: patch test