# Schedule

**Agenda**

| | | |
|---|---|---|
| 8:30 - 8:45 | Introduction | Rob MacLeod |
| 8:45 - 9:00 | Case Study I: Image based analysis of patients with atrial fibrillation | Rob MacLeod |
| 9:00 - 9:15 | Demo I: Seg3D demo and tutorial | Rob MacLeod & Ayla Khan |
| 9:15 - 10:00 | Lab I: Segmentation with Seg3D | |
| 10:00 - 10:15 | Break I | |
| 10:15 - 10:30 | Case Study II: Visual Comparison of Deep Brain Stimulation Parameters | Tom Fogal |
| 10:30 - 10:45 | Demo II: ImageVis3D/map3d demo and tutorial | Tom Fogal & James Hughes |
| 10:45 - 11:30 | Lab II: Visualization with ImageVis3D and map3d | |
| 11:30 - 11:45 | Case Study III: Statistical shape modeling in orthopedics | Manasi Datar |
| 11:45 - 12:00 | Demo III: ShapeWorks demo and tutorial | Liz Jurrus & Manasi Datar |
| 12:00 - 12:45 | Lab III: Shapeworks | |
| 12:45 - 1:45 | Lunch | |
| 1:45 - 2:00 | Case Study IV: Geometric modeling of the heart and head | Rob MacLeod & Moritz Dannhauer |
| 2:00 - 2:15 | Demo IV: BioMesh3D demo and tutorial | Moritz Dannhauer & Seyhmus Guler |
| 2:15 - 3:00 | Lab IV: Mesh generation with BioMesh3D | |
| 3:00 - 3:15 | Break II | |
| 3:15 - 3:30 | Case Study V: Simulation of brain potentials from transcranial stimulation | Rob MacLeod & Moritz Dannhauer |
| 3:30 - 3:45 | Demo V: SCIRun demo and tutorial | Moritz Dannhauer & Seyhmus Guler |
| 3:45 - 4:30 | Lab V: Simulation with SCIRun | |
| 4:30 - 4:40 | Summary and wrap Up | Rob MacLeod |
| 4:40 - 5:25 | Open lab | |

# Visual Comparison of Deep Brain Stimulation Parameters

Christopher Butson, Georg Tamm, Sanket Jain,
*Thomas Fogal*, Jens Krüger

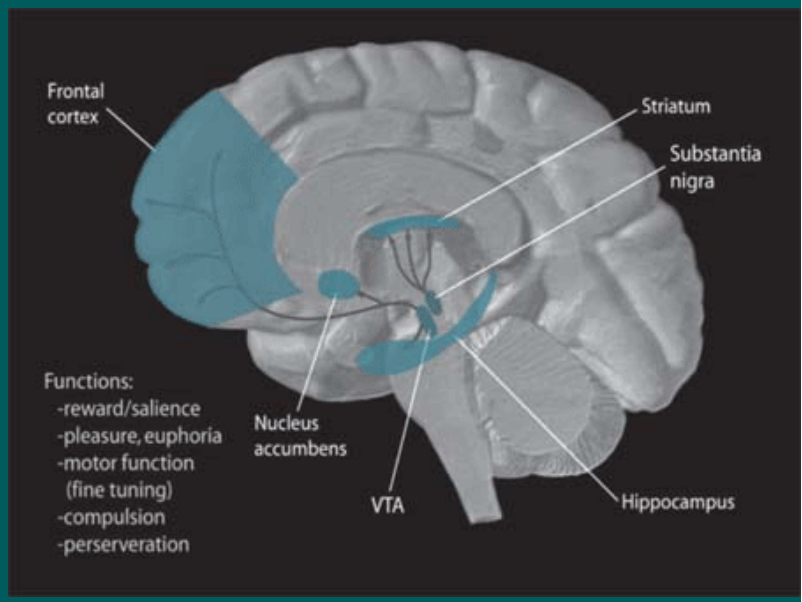
# Team

Bioengineering

MDs

Computer Science

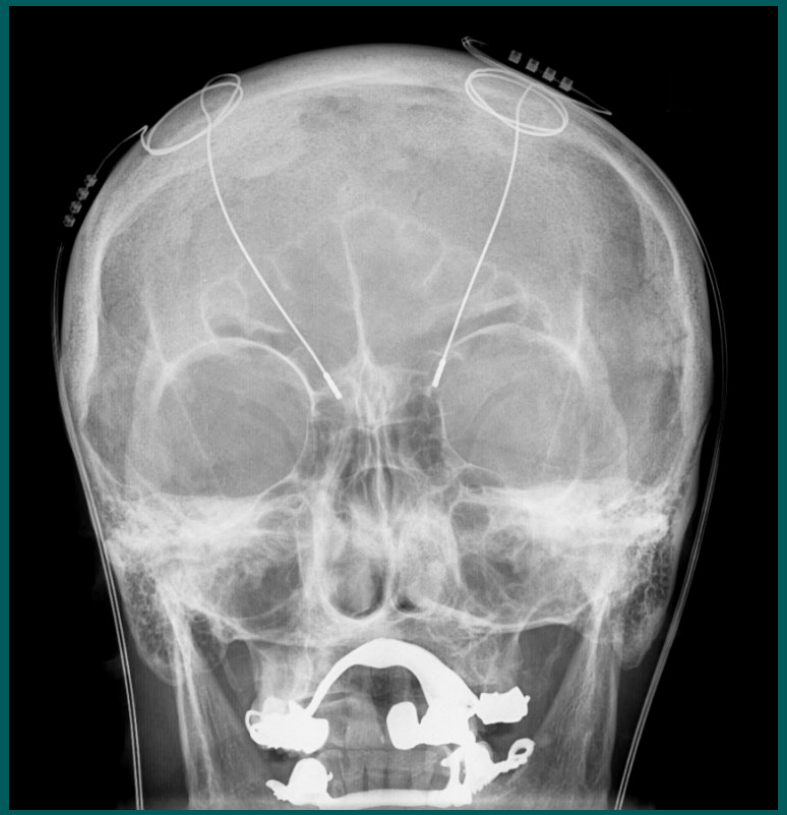
# Motivation

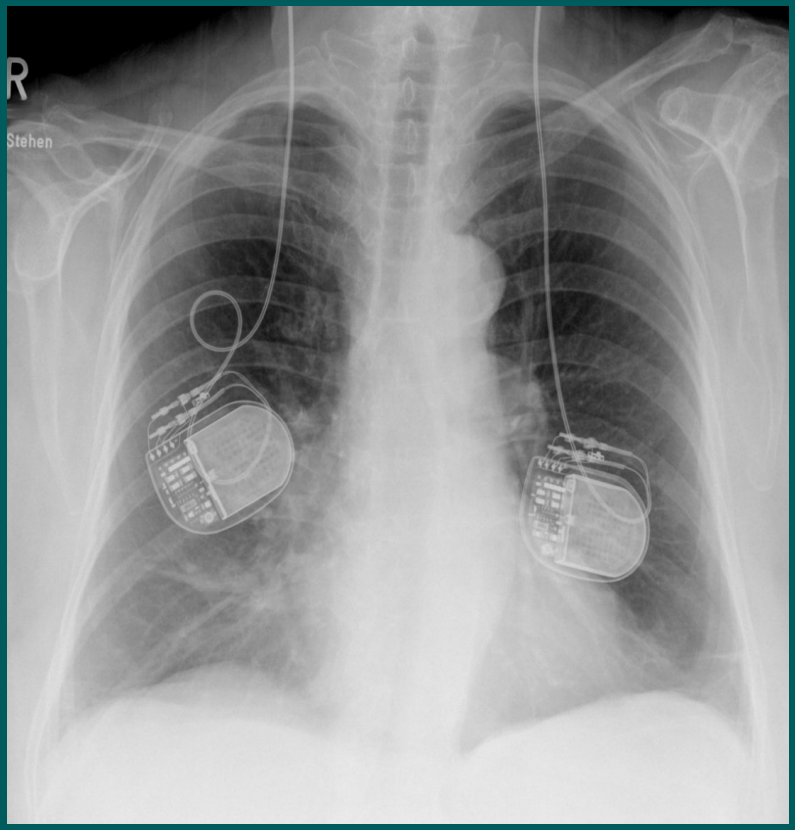

Frontal cortex
Striatum
Substantia nigra
Functions:
-reward/salience
-pleasure, euphoria
-motor function (fine tuning)
-compulsion
-perserveration
Nucleus accumbens
VTA
Hippocampus

# Clinical Relevance

- 14th leading cause of death (US)!
- ~500k to a million effected
- ~55k new diagnoses / year
  - Aging population...
- Generally treated via drugs

# Deep Brain Stimulation





# DBS Effects

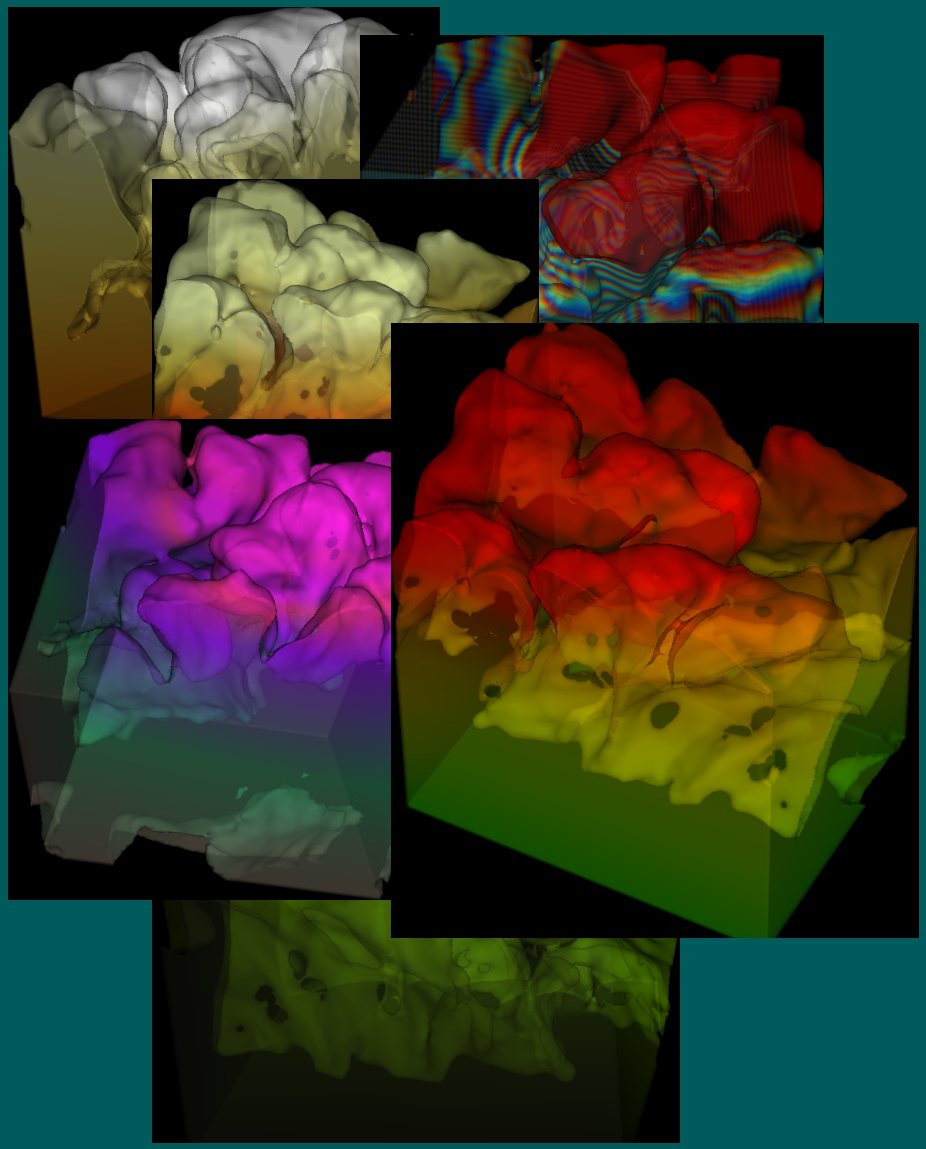
# DBS Challenges

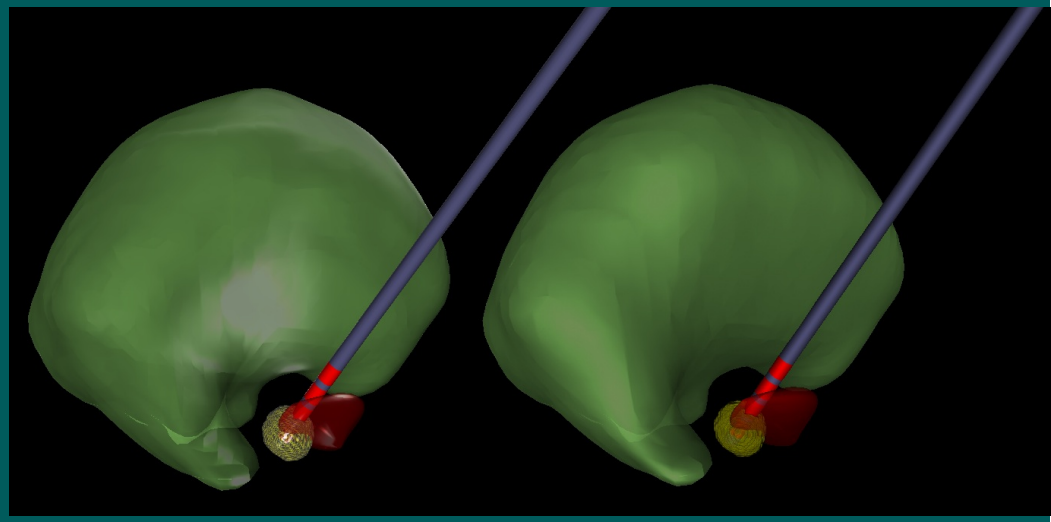
# DBS Challenges (Continued)



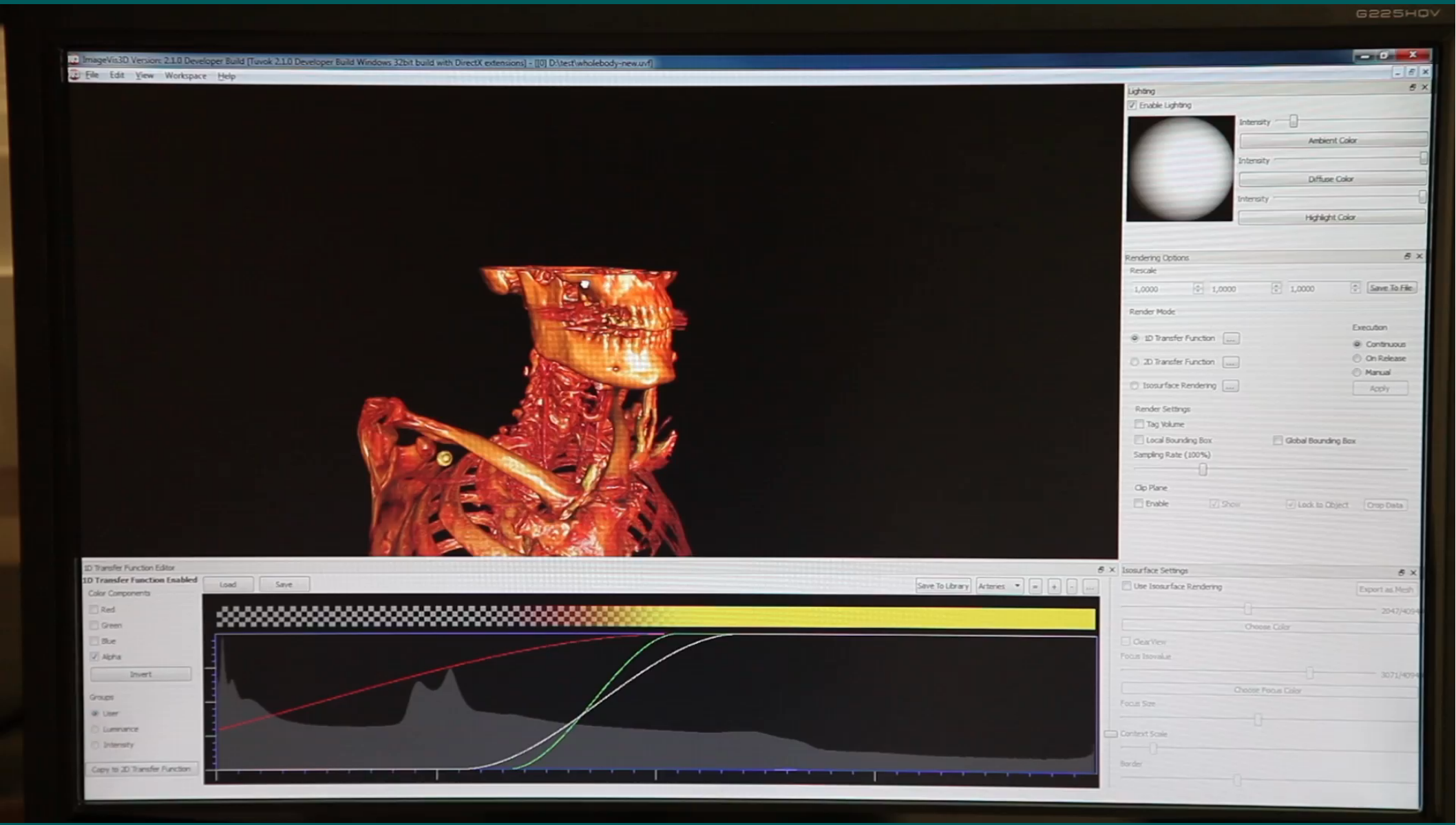
K. Hunka, et al. J. Neuroscience Nursing, vol. 37, pp. 204-210, 2005.

# *Visual* Comparison

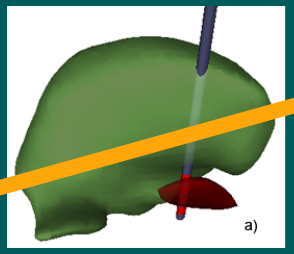


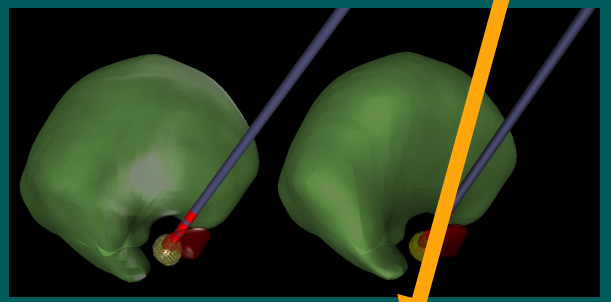


# ImageVis3D

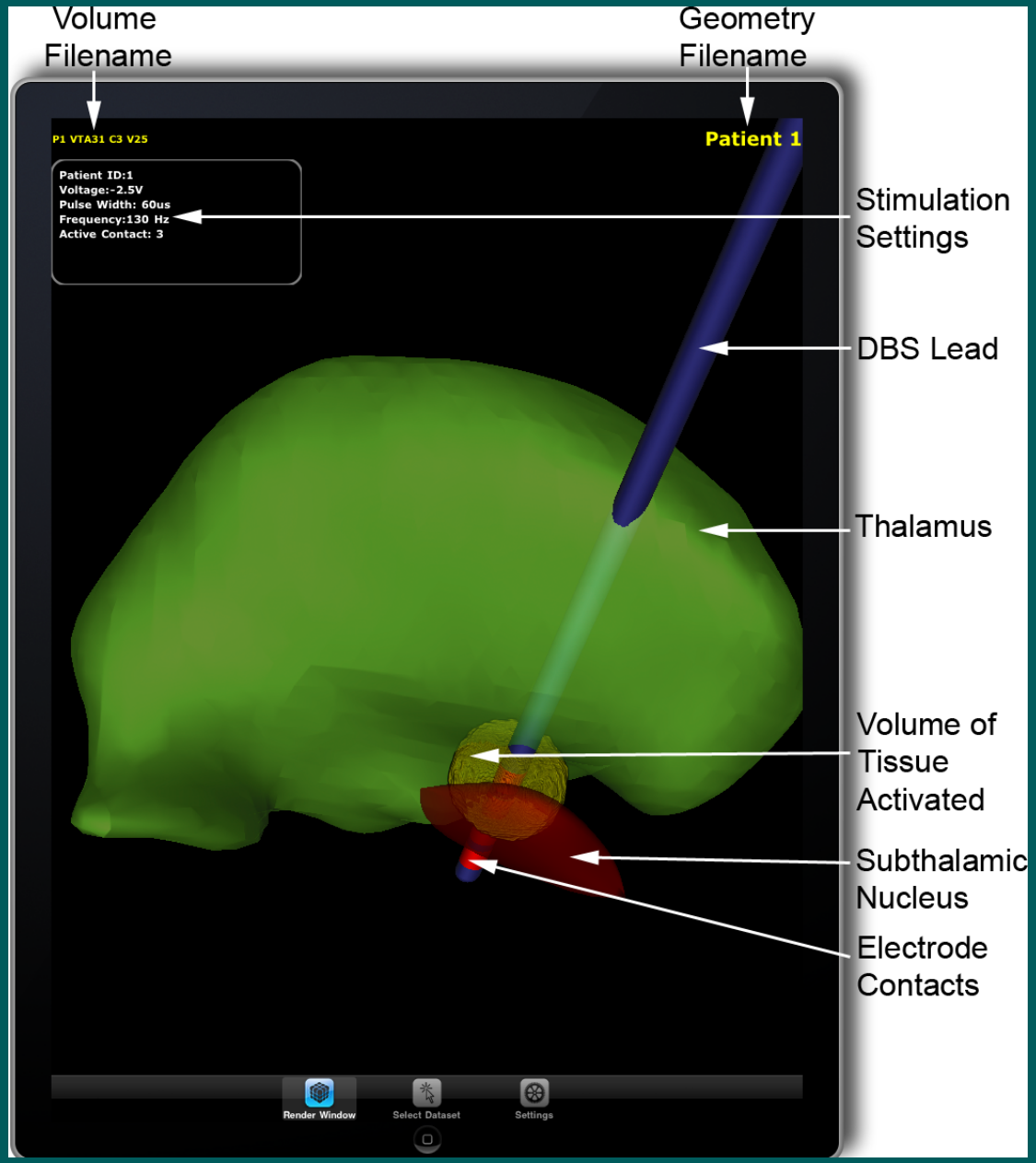

ImageVis3D Version: 2.1.0 Developer Build (Tuvok 2.1.0 Developer Build Windows 32bit build with DirectX extensions) - [0] D:\test\wholebody-new.uvf
File Edit View Workspace Help
Lighting
Enable Lighting
Intensity
Ambient Color
Diffuse Color
Highlight Color
Rendering Options
Rescale
Save To File
Render Mode
1D Transfer Function
2D Transfer Function
Isosurface Rendering
Execution
Continuous
On Release
Manual
Apply
Render Settings
Tag Volume
Local Bounding Box
Global Bounding Box
Sampling Rate (100%)
Clip Plane
Enable
Show
Lock to Object
Crop Data
1D Transfer Function Editor
1D Transfer Function Enabled
Load
Save
Color Components
Red
Green
Blue
Alpha
Invert
Groups
User
Luminance
Intensity
Copy to 2D Transfer Function
Save To Library
Arteries
Isosurface Settings
Use Isosurface Rendering
Export as Mesh
Choose Color
Clear View
Choose Focus Color
Focus Size
Context Scale
Border

# Pipeline



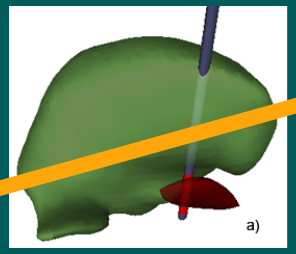



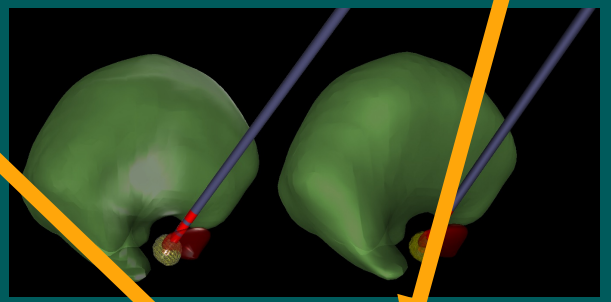

# DBS Solution



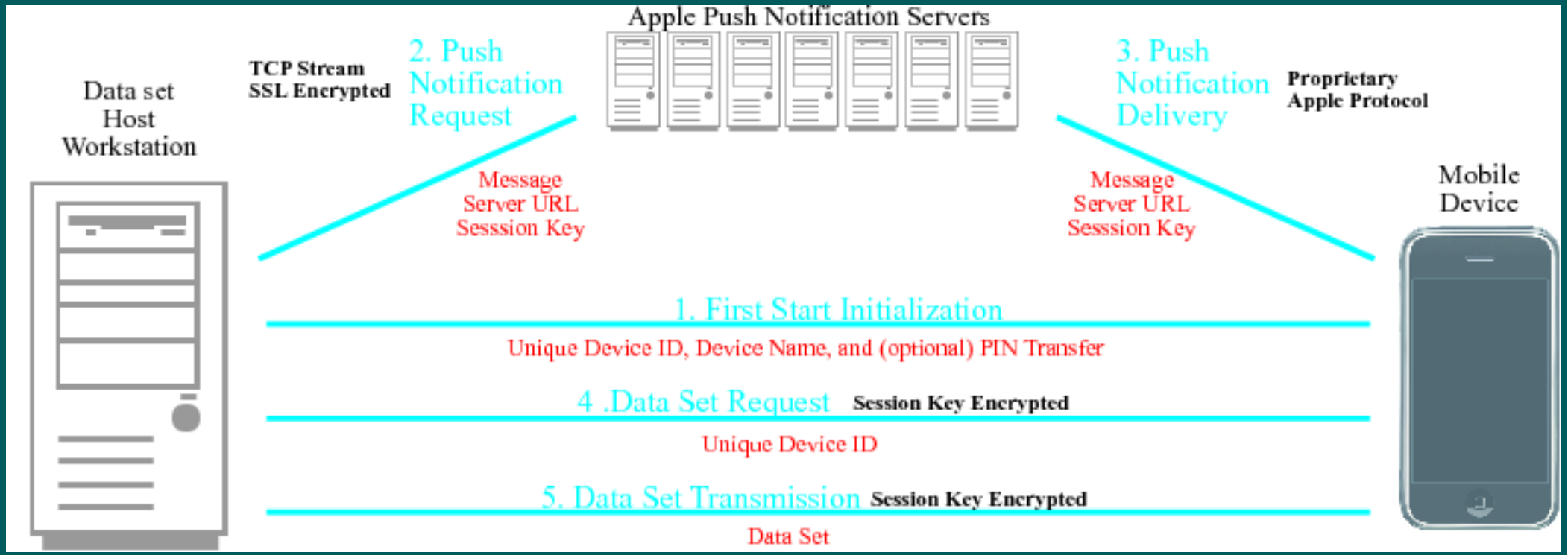

- DBS programming: 4 hours → 4 minutes!

# Pipeline

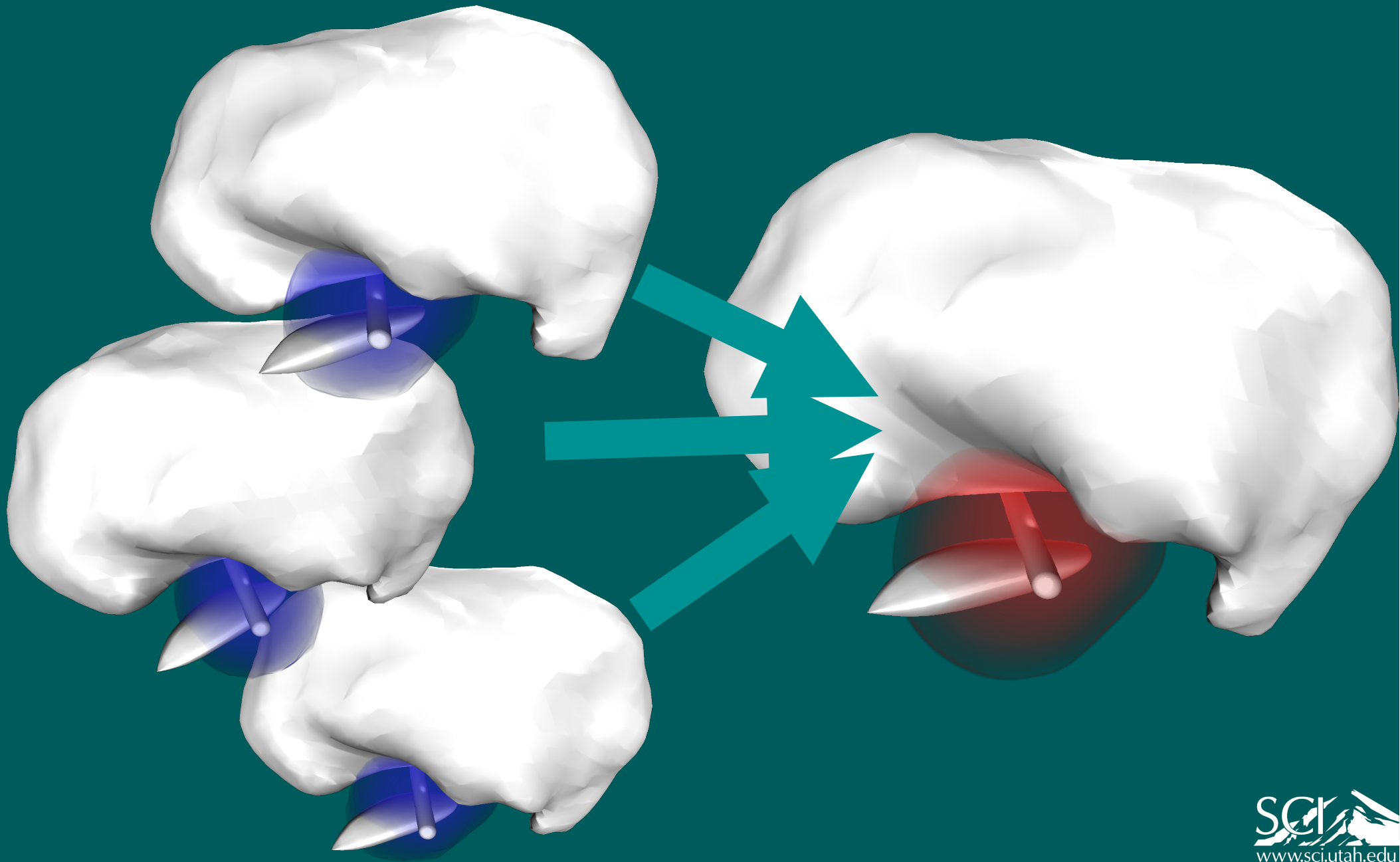



# Data Notification



λAtlas Generation

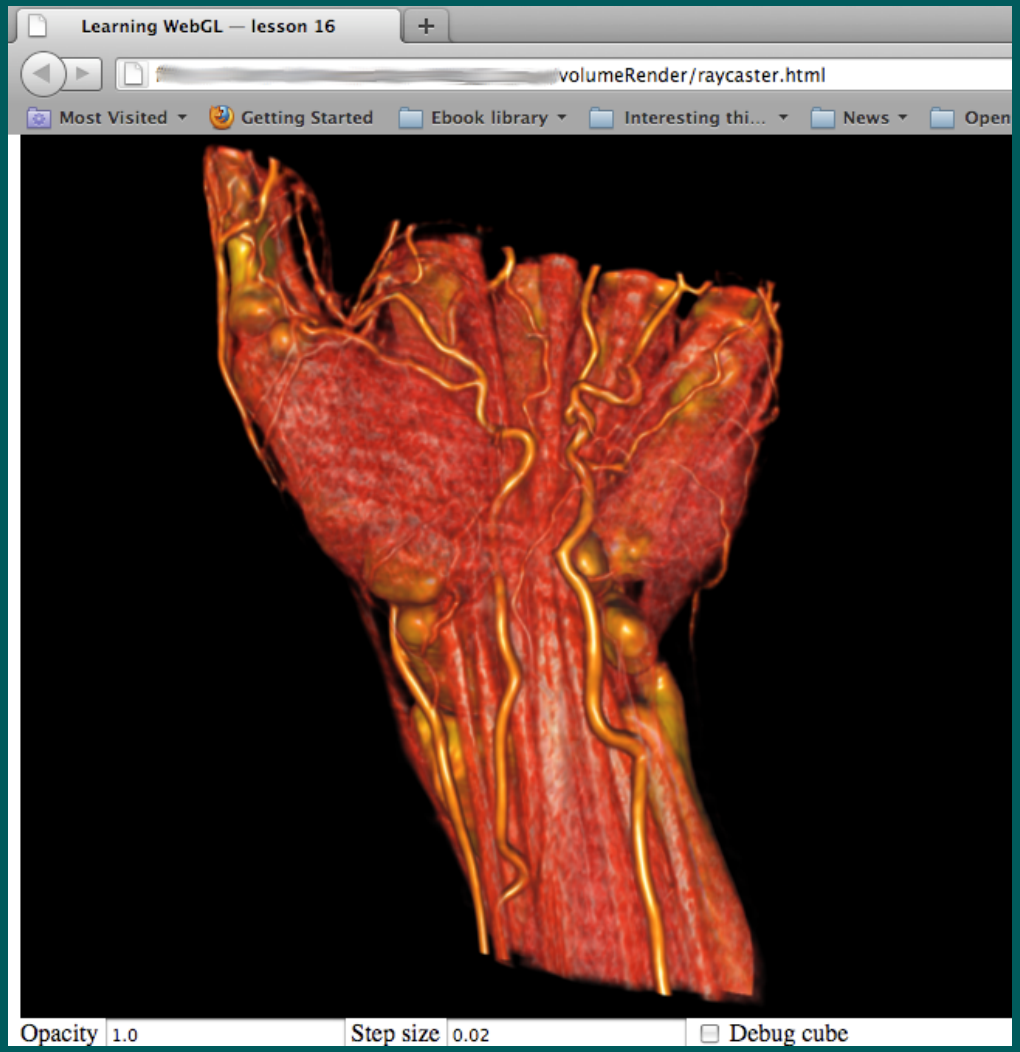


# Summary

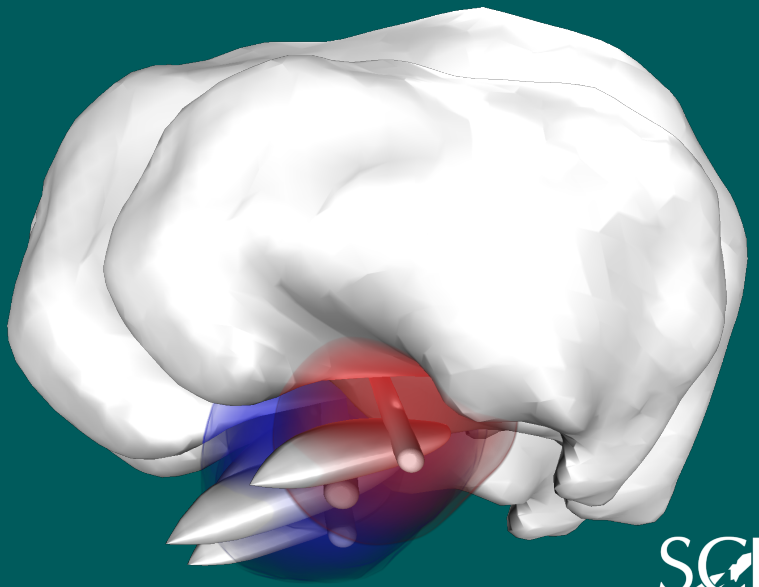

cot 5°
γ
ϕ°
sinh 3°
ln 10°
√90°
e°
π°
sec 83°
log 9876°
e²
ϕ⁴
∛130°


ImageVis3D
Mobile

# λFuture







# Questions?

# ImageVis3D Demo

- General intro to what a tfqn is (in the abstract), **ther**
- Ditto 2dtf, isosurface, meshing, etc.