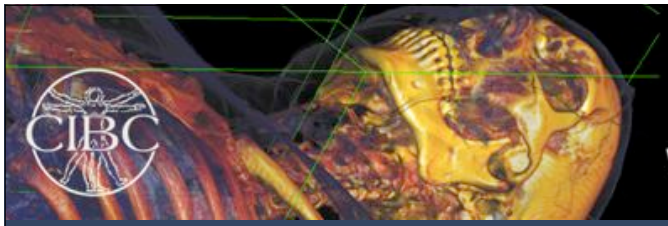


CENTER FOR INTEGRATIVE BIOMEDICAL COMPUTING

at the Scientific Computing and Imaging Institute

WORKSHOP AT EMBS 2011

Welcome!!

Welcome from Utah/Boston

Introduction

CIBC

Introduction

Center for Integrative Biomedical Computation

Goals

- Produce cutting edge software for biomedical researchers and clinicians
- Develop new techniques and algorithms in image processing, geometric modeling, simulation and visualization
- Carry out original research in segmentation, bioelectric field simulation, and visualization

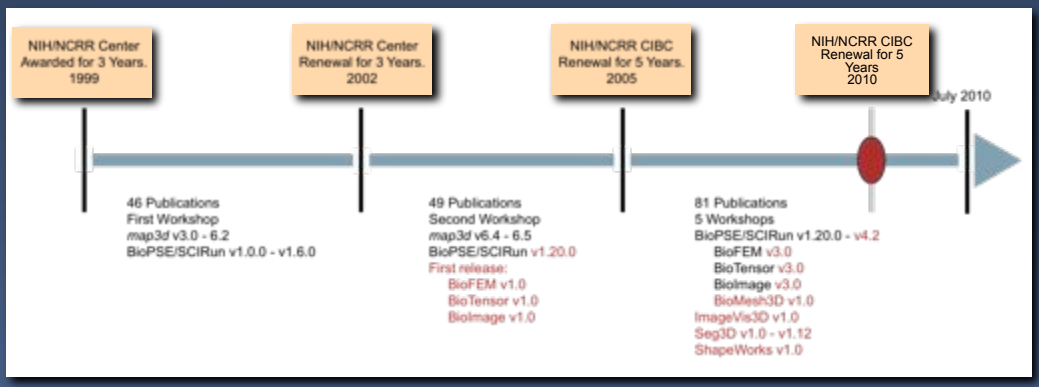
CIBC

Introduction

Center for Integrative Biomedical Computation

History of the CIBC

Introduction

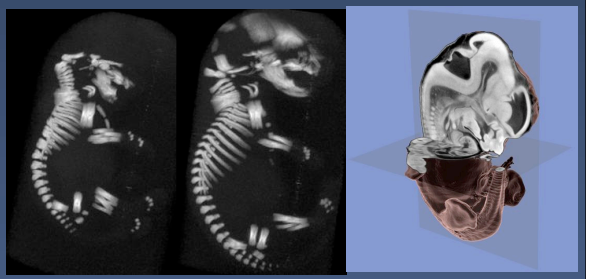


Center Goal

Introduction

To achieve scientific breakthroughs through the use of computational technology

Mario Capecchi
and Charles Keller



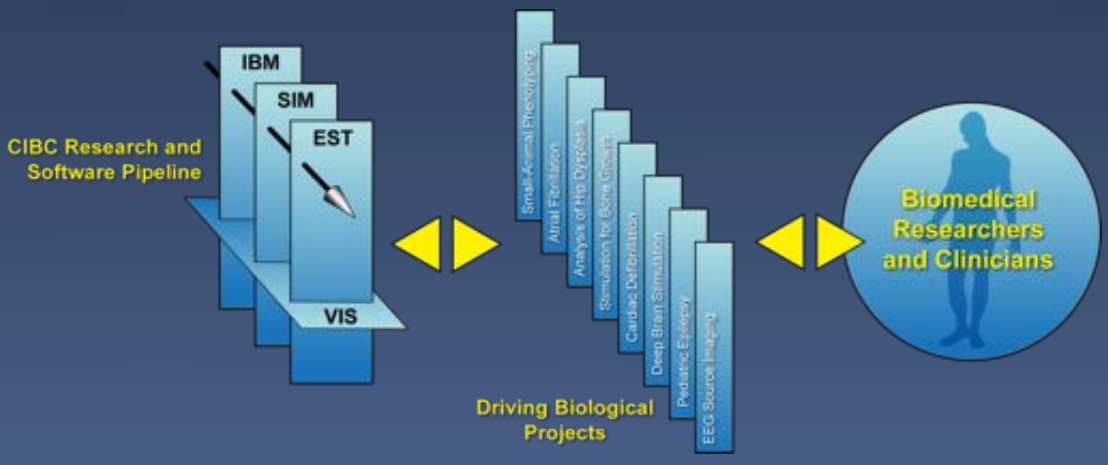
J.T. Johnson III, M.S. Hansen, I. Wu, L.J. Healy, C.R. Johnson, G.M. Jones, M.R. Capecchi, C. Keller.
PLoS Genetics, Vol. 2, No. 1, pp. 471--477, 2006.

Center Vision

Introduction

Center Organization

Introduction



Collaborations

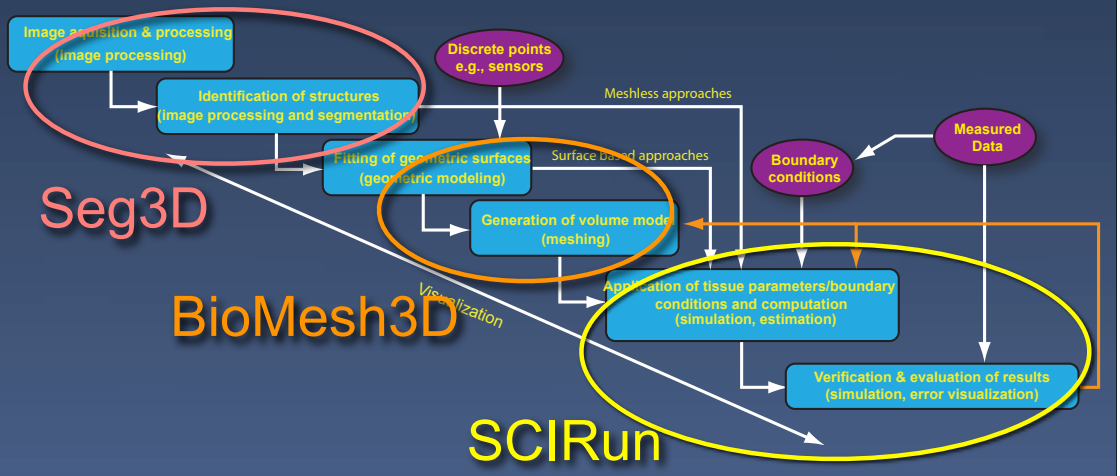
Essential to a P41

- Ensure relevance
- Provide motivation, guidance and feedback
- Metric for success (and renewal)

Challenge a P41

- Cannot receive funding
- Must remain motivated
- Must amplify impact of the Center

Workflow = Pipeline



ImageVis3D + *map3d*

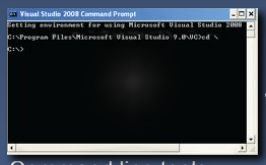
Center Software Infrastructure

Introduction

SCIRun (Prototype testing)

Seg3D (segmentation)

BioMesh3D (Meshing)

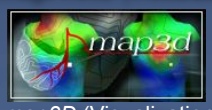


Command line tools

SCIRun Infrastructure
Core Layer
Algorithm Layer
Control Layer

ImageVis3D (Visualization)

Matlab/Python

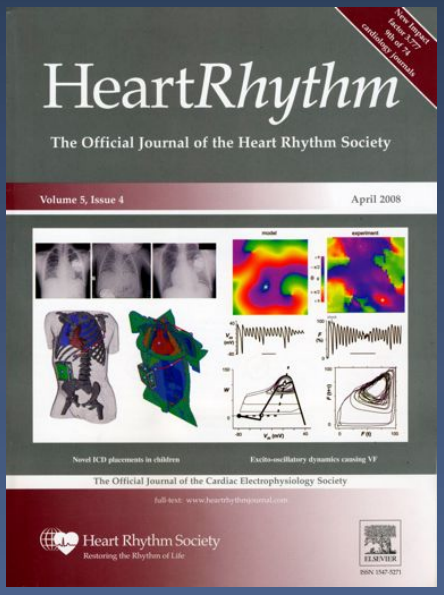


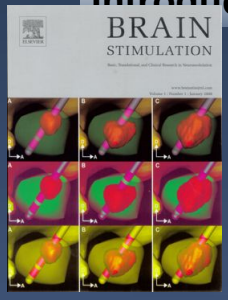
map3D (Visualization)

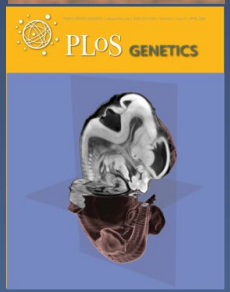
Flexible, Extensible Environment
Open Source Software (MIT Public License)
Problem Solving Environment (BioPSE)
PowerApps (Seg3D, ImageVis3D, BioMesh3D, Shapeworks)
Linux, Mac OSX, Windows

Biomedical Research Impact

Introduction







Clinical Impact

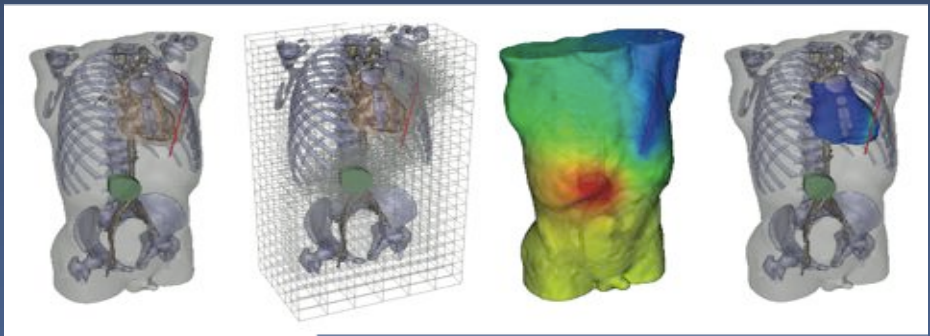
Introduction

Atrial Fibrillation

Clinical Impact

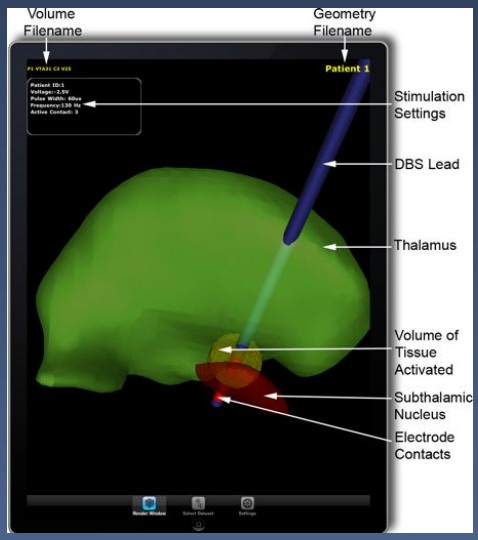
Introduction

Simulation of Defibrillation



Clinical Impact

Introduction

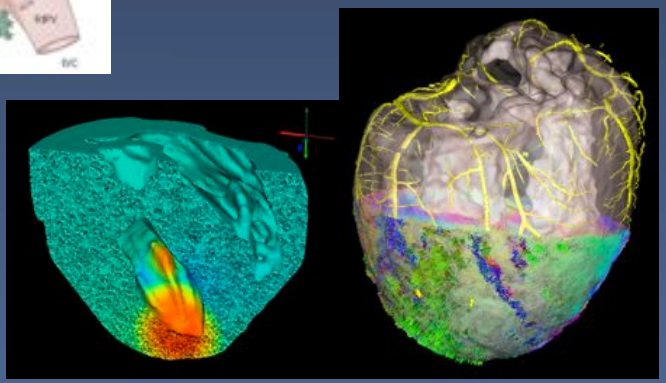


Deep Brain Stimulation

Clinical Impact

Introduction

Cardiac Arrhythmias & Ischemia

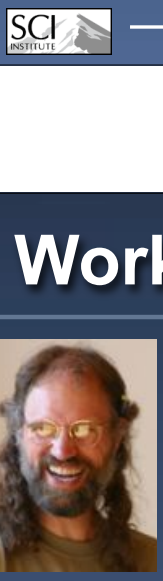


Key Center Personnel

PI's
- Chris Johnson
- Rob MacLeod
- Ross Whitaker
- Dana Brooks

Technical Management
- Liz Jurrus

Administrative Team
- Deb Zemek
- Greg Jones
- Corinne Garcia


Rob MacLeod


Dana Brooks

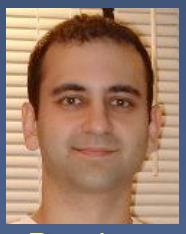

Josh Levine


Liz Jurrus


Tom Fogal


Ayla Kahn


Brett Burton


Burek Erem


Darrell Swenson


Jess Tate


Dafang Wang

Workshop People

Introduction

Schedule

Introduction

8:15 - 8:30	Introduction (Rob MacLeod, Dana Brooks)
8:30 - 8:45	Case Study I: Image based analysis of patients with atrial fibrillation (Rob MacLeod)
8:45 - 9:00	Demo I: Seg3D Demo and tutorial (Jess Tate)
9:00 - 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 + Burak Erem)
10:45 - 11:45	Lab II: Visualization with ImageVis3D and map3d
11:45 - 12:45	Lunch
12:45 - 1:00	Case Study III: Modeling of let and right atria in the heart (Rob MacLeod)
1:00 - 1:15	Demo III: BioMesh3D demo and tutorial: (Darrell Swenson, Josh Levine)
1:15 - 2:15	Lab III: Mesh generation with Biomesh3D
2:15 - 2:30	Break II
2:30 - 2:45	Case Study IV: Simulation of defibrillation (Jess Tate)
2:45 - 3:00	Demo IV: SCIRun demo and tutorial (Jess Tate)
3:00 - 4:00	Lab IV: Simulation with SCIRun
4:00 - 5:00	Open Lab
5:00 - 5:10	Summary and Wrap Up