



Welcome Back



Boston CIBC Workshop 2009
Northeastern University
January 18 and 19 2009
Day Two

Center for Integrative Biomedical Computing

Goals

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

NCRR and P41's: BTRC program

roduction

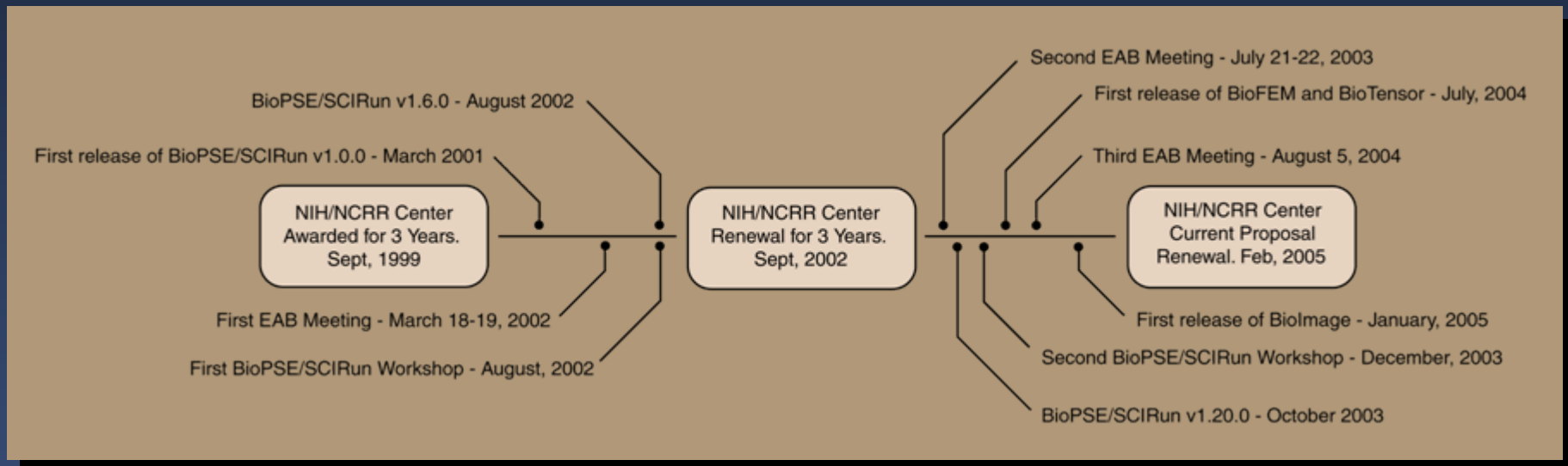
The screenshot shows the NCRR website with the following content:

- Navigation:** SEARCH NCRR: [input] GO
- Quick Links:** NCRR Home > Biomedical Technology > Biomedical Technology Research Centers
- Center for Integrative Biomedical Computing:** NCRR Home > Biomedical Technology > Biomedical Technology Research Centers > Informatics Resources
- ON THIS PAGE:** Research Emphasis • Resource Capabilities • Publications
- SEE ALSO:** Imaging Technology • Informatics Resources • Optical and Laser Technology • Technology for Structural Biology • Technology for Systems Biology • Program Information
- Biomedical Technology Links:** Staff Contacts, Program Areas, Resource Directory, Funding Opportunities
- Center for Integrative Biomedical Computing:** University of Utah, 50 South Central Campus Drive, Room 3490, Salt Lake City, UT 84112-9205, www.sci.utah.edu/cibc
- Grant No. P41 RR012553**
- Research Emphasis:** The overall goal of the Center for Integrative Biomedical Computing (CIBC) is to develop integrated problem-solving environments that make advanced computational tools available to biomedical scientists. The specific core areas of interest are image processing and geometric modeling, simulation, and visualization. The center also pursues advanced research in technical and biophysical approaches to electrophysiology and bioelectric field problems in cardiology and neurology.
- Current Research:** The focus of research within the CIBC is to develop new approaches to solving problems in image processing; visualization of scalar, vector, and tensor fields; and simulation of electrophysiology and bioelectric fields from the heart and brain.
- Resource Capabilities:**
- Methods:** The resource methods are organized by cores, with one core dedicated to each of image processing and geometric modeling, simulations, visualization, and integrated software environments. Within each core, several computational methods either have been implemented or are in the process of being developed.
- Instruments:** None. The center provides software to the biomedical research community.
- Software:** The main focus of the center is the research and development of state-of-the-art software for image processing and geometric modeling, simulation, and visualization, including not just individual tools but also integrative problem-solving environments. The target domains for this software are a variety of biomedical research areas that span a wide range of scales, from subcellular to whole organisms. Specific applications include bioelectric fields, genetics, and feature characterization from medical images. Specific software tools, organized by core areas, include the following:



History of the Utah NCRR P41

Introduction



Software development

Applications focus on bioelectric fields

Driven by collaborations

Renewal submission: May, 2009

CIBC Organization

Introduction

Technical Cores

- Image processing and geometric modeling
- Mathematical modeling and simulation
- Visualization
- **Biomedical Problem Solving Environment: BioPSE**

Some changes in the works

- **Core on computation (GPGPU's etc.)**

CIBC Software Goals

Introduction

Extend SCIRun BioPSE

- More functionality
- More portability
- More modularity

Build bridges

- To libraries
- To programs
- To data sources

Support Collaborations

- Dedicated solutions leading to
- Generalized application programs

Collaborations

Introduction

Essential to a P41

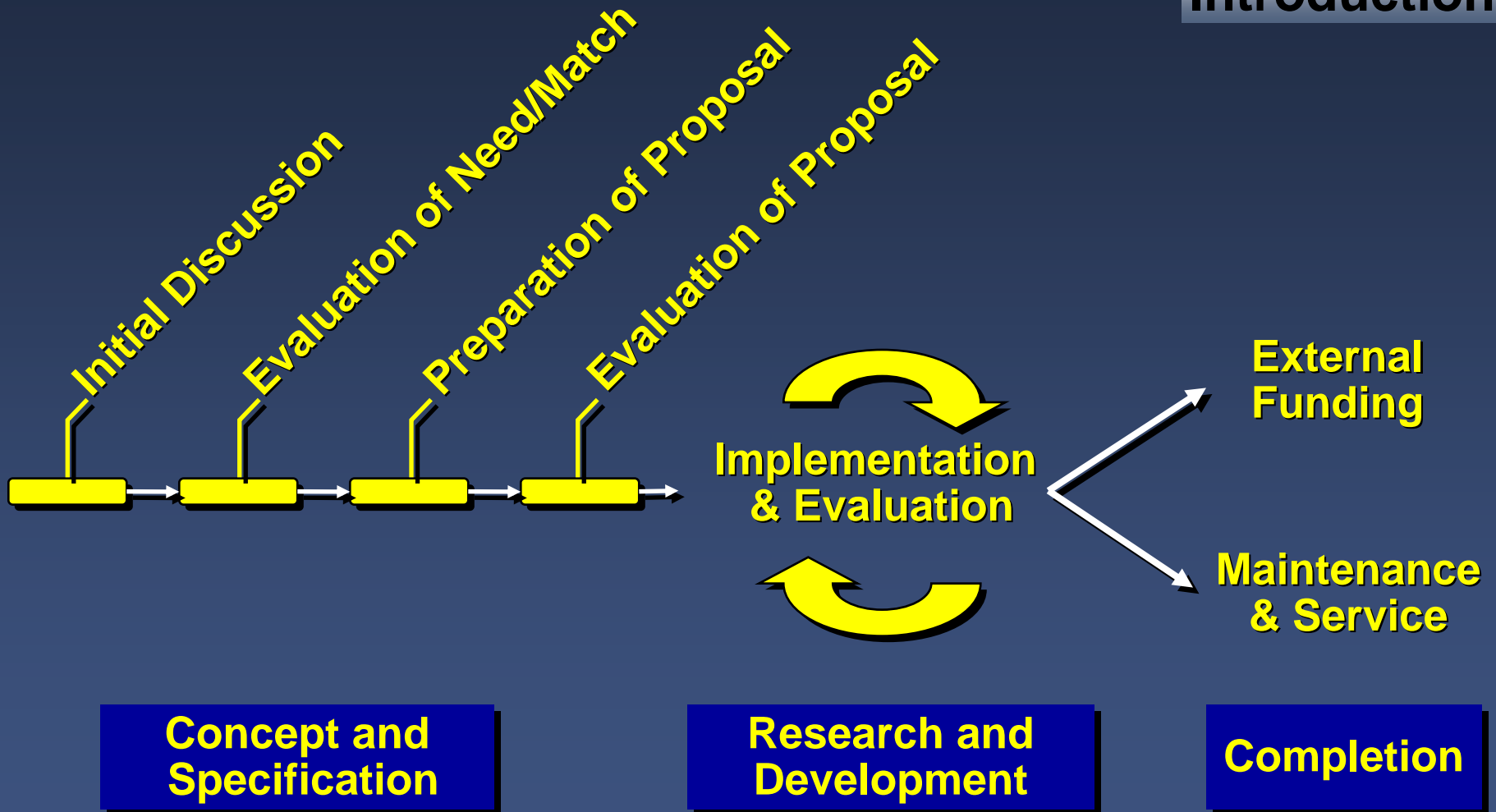
- Ensure relevance
- Provide motivation, guidance and feedback
- Metric for success (and renewal)

Challenge for a P41

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

Collaboration Lifecycle

Introduction



Collaboration Management

Introduction

Create collaboration hierarchy

- Primary and secondary: dynamic

Link to cores

- Identify common needs across collaborations
- Match software to users (functionality, interface, platform)

Communicate

- Identify key people
- Create PI-led collaboration teams
- Establish regular meetings/visits

Current Primary Collaborators

Introduction

1) Visualization and analysis of small-animal images

- Mario Capecchi Lab, Uof U
- Charles Keller, CCRI, UTHSCSA

2) Microscopy image analysis and visualization

- Mark Ellisman, NCMIR, UCSD

3) Multiscale electrophysiological modeling

- Craig Henriquez Lab, Duke University

Current Primary Collaborators

Introduction

4) Epilepsy localization via EEG source using MRI imaging

- Scott Makeig, UCSD, and Greg Worrell, Mayo Clinic
- Simon Warfield, Children's Hospital Boston

5) Simulation of cardiac defibrillation non-standard settings including pediatrics

- John Triedman, Children's Hospital Boston
- Matt Jolley, Stanford

Current Secondary Collaborators

Introduction

Bioelectric Fields

- David Isaacson (RPI)
- Dirar Khoury (Baylor)
- Cameron MacIntrye (Cleveland Clinic)
- Bruno Taccardi (UofU)

Image-based Anatomy

- John Bridge (UofU)
- George Chen (MGH)
- Robert Marc (UofU)
- Vasilis Ntziachristos (TUM)
- Stephen Wong (Methodist Hospital)
- Chi-Bin Chein (UofU)
- Paul Thompson (UCLA)

Current Secondary Collaborators

Introduction

Multiscale Tissue Modeling

- **Alonso Moreno (UofU)**
- **Chuck DiMarzio (NEU)**

Technical Exchange

- **Mark Ellisman (UCSD)**
- **Ron Kikinis (SPL)**
- **Les Loew (UCHC)**
- **CF Westin (SPL)**
- **Carsten Wolters (Münster)**
- **Al Johnson (Duke)**
- **Andrew McColloch (UCSD)**

Key Center Personnel

Introduction

PI's

- Chris Johnson
- Rob MacLeod
- Ross Whitaker
- Dana Brooks

Technical Management

- Jeroen Stinstra
- Dave Weinstein

Administrative Team

- Deb Zemek
- Greg Jones

Key Center Personnel

Introduction

Staff Scientists/PostDocs

- Jeroen Stinstra
- Allen Sanderson
- Jens Krüger

Software Engineering

- Jeroen Stinstra
- Ayla Hlan

Developers

- Jeroen Stinstra
- Ayla Khan
- Tom Fogal

Students

- Josh Blauer
(Afib Imaging)
- Darrell Swenson
(Meshing/Ischemia)
- Burak Erem
(Inverse problems)
- Josh Cates
(Shape statistics)
- Sila Kurugol
(Segmentation of skin and esophagus)

Media Team

- Erik Jorgensen
- Chems Touati
- Nathan Galli

Purpose of the Workshop

Introduction

Describe our software

Use our software

Improve our software

Develop relationships

Boston Workshop Personnel

Introduction

PI

- Dana Brooks

Workshop Leader / Staff Scientist

- Jeroen Stinstra

Developer Team

- Ayla Khan
- Tom Fogal

PhD Student Teaching Assistants

- Burak Erem
- Sila Kurogol

Schedule Today

Introduction

Monday, 19th January (SCIRun workshop):	
9:00 - 9:30	Overview CIBC Center & Software Download (Dana Brooks & Ayla Khan)
9:30 - 10:00	SCIRun Basics Part 1 (Jeroen Stinstra)
10:00 - 10:20	SCIRun Lab 1 (Ayla Khan)
10:20 - 10:40	- Break -
10:40 - 11:10	SCIRun Basics Part 2 (Jeroen Stinstra)
11:10 - 12:00	SCIRun Lab 2 (Ayla Khan)
12:00 - 1:00	- Lunch Break -
1:00 - 2:00	SCIRun: Creating a model in SCIRun (Jeroen Stinstra)
2:00 - 2:20	- Break -
2:20 - 4:00	SCIRun Lab 3 (Jeroen Stinstra & Ayla Khan)

Memo (to self)

Introduction

Please turn cell
phones/pagers on
vibrate