National Cancer Institute

CIP ITDB IGIB
Open Science Models

Larry Clarke
Branch Chief ITDB, IGIB

Program Staff:
Bob Nordstrom, Keyvan Farahani
Pushpa Tandon, Huiming Zhang
Houston Baker, George Redmond
Yantian Zhang

CIP Contractors
John Freymann, Justin Kirby

Cancer Imaging Program
Lung Workshop: May 3rd 2012

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

CANCER IMAGING PROGRAM

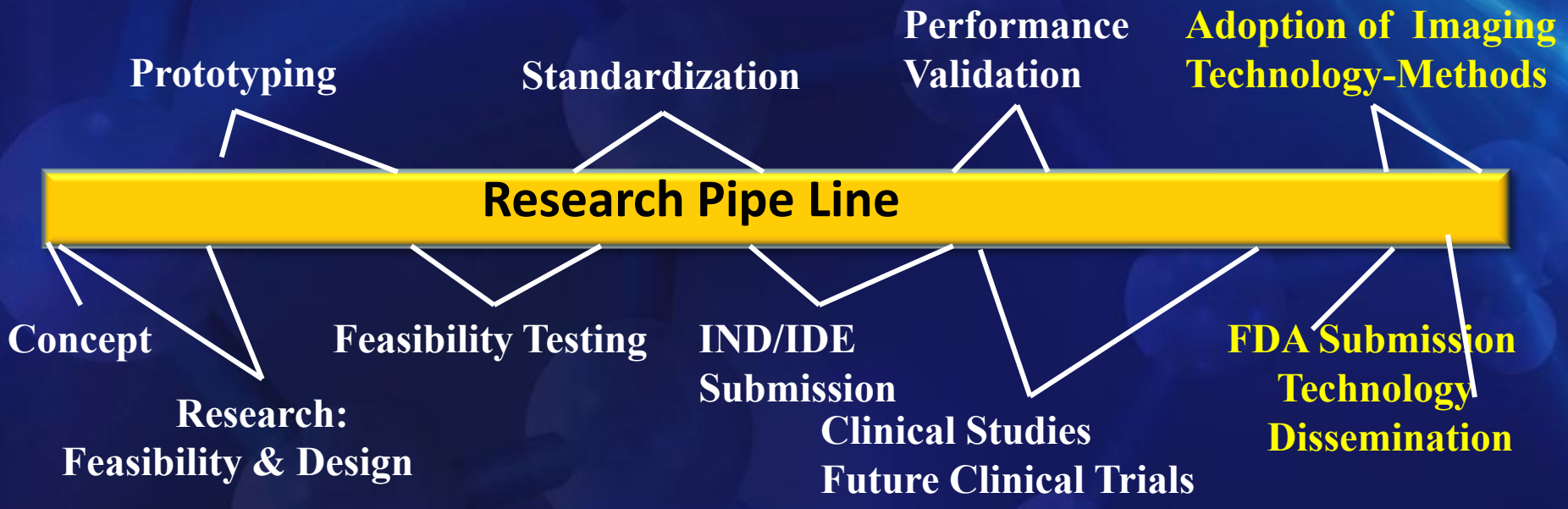
Branch Mission (CIP: ITD and IGI)

Develop & validate functional-molecular imaging & IGI platforms for:

1. Multi-center clinical trials
2. Imaging as an "enabling" technology for discovery research

Critical Issues:

1. Promotion of "open science" models for validation
2. Examples: QIN, NTR, RIDER contracts, IGI planned



The QIN Mission-MAP: Now 14 sites

To improve the role of quantitative imaging for clinical decision making in oncology by the development and validation of data acquisition, analysis methods, and tools to tailor treatment to individual patients and to predict or monitor the response to drug or radiation therapy.

Goal: Reach a critical number of sites…same organ/modality

National Cancer Institute

QIN (U01) Working Groups:

Open Science within the network, later as public resource

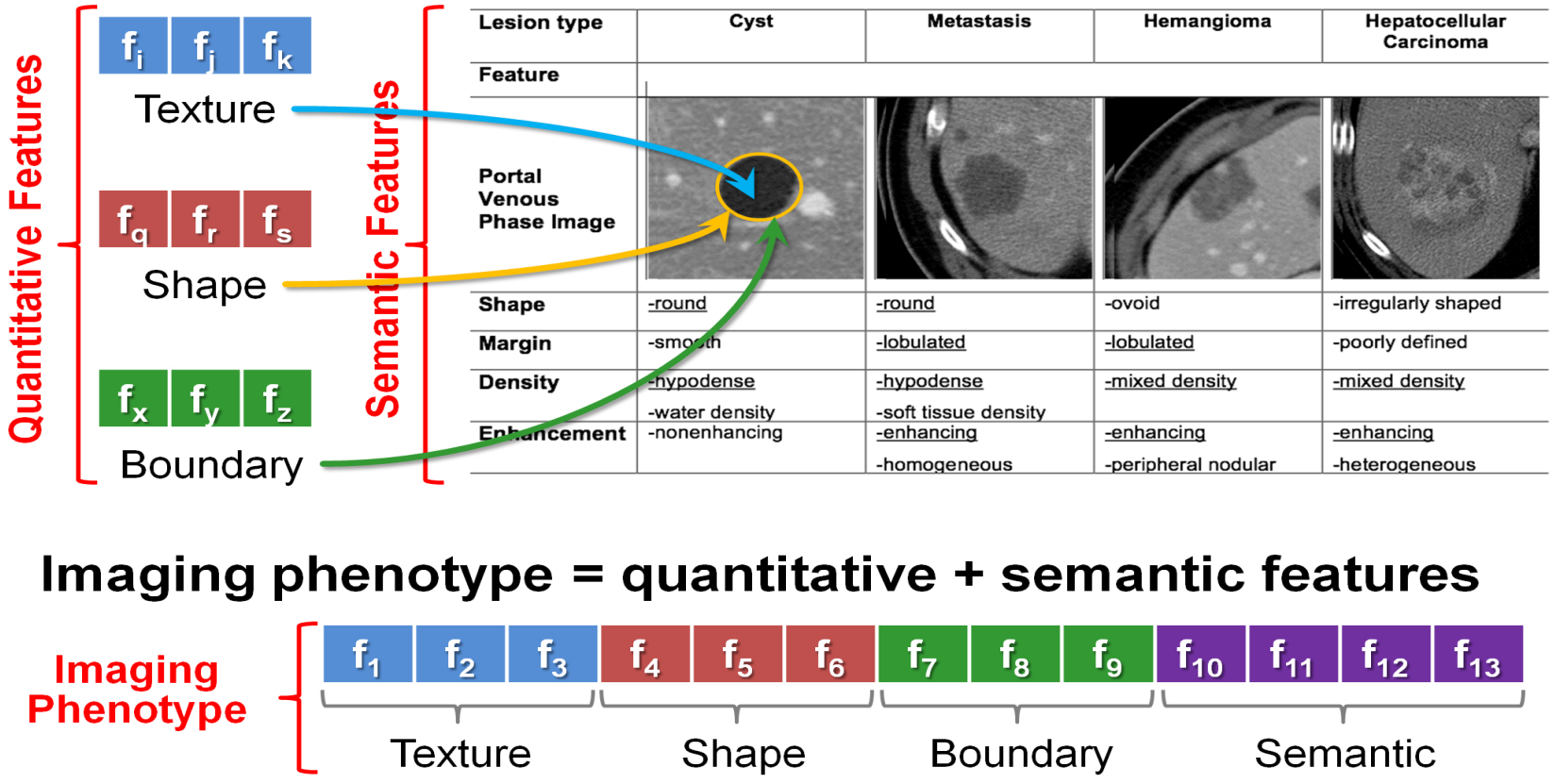
- **Informatics: Tasks: Leveraging CBIIT workspace**
  - Leverage resources and tools (AIM, AVT, 3D Slicer, . …)
- **Harmonization of data collection:**
  - Phantoms-measurement-uncertainty problem (CT, PET CT, DWI)
  - Harmonization across platforms (PET CT, DWI MRI)
- **Image analysis and performance metrics: Tasks**
  - Comparing CT , DCE MRI, PET CT methods
  - Exploring operator independent and pixel based methods
- **Clinical trials: Tasks**
  - Exploring NCI national drug trials
  - Defining requirements for work flow, future collections
- **Industrial Outreach [U01-R01 (AIP)]**
  - Software companies: participate in software development
  - ACRIN, RSNA QIBA, AAPM, ISMRM, SNM

Informatics & Data Sharing

QIN: Network IT Resource Leveraging

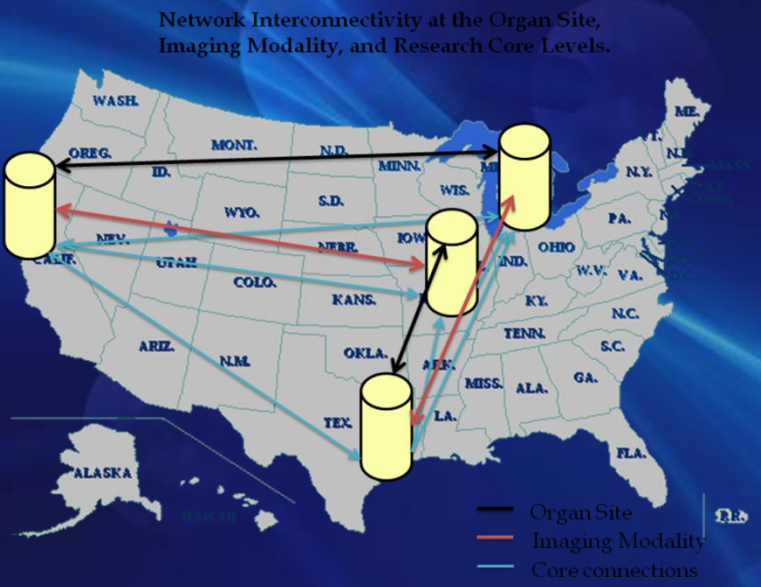
Moffitt: CT and PET CT
Feature extraction-Imaging-Genomics
Cornell: R01: CT Volume Algorithms
Industry: Definiens, Siemens, GE;

Stanford: CT: Semantic structure
R01: Informatics - and 'omics'
TCIA: Data sharing in progress
NIH BIRN, **CR UK, CIHR**



Network for Translational Research (NTR):
Optical Imaging in Multimodal Platforms
Open Science Translational Research Efforts

- **Four centers**
  - Two studying cancers of GI tract.
  - Two studying breast sentinel lymph node staging.
- **Five network-wide cores**
  - **Standards & Compliance**
  - **Chemistry Probes & Guided Therapy**
  - **Information Technology**
  - **Instrumentation & Industrial Relations**
  - **Validation & Clinical Studies**
- **Associate Members (AM's)**
  - 10 sites, leveraged funds (R01's)



Stanford University
University of Michigan
Washington University
Uni- Texas Health Science

Image Guided Interventions (IGI) Modeled after NCI RIDER

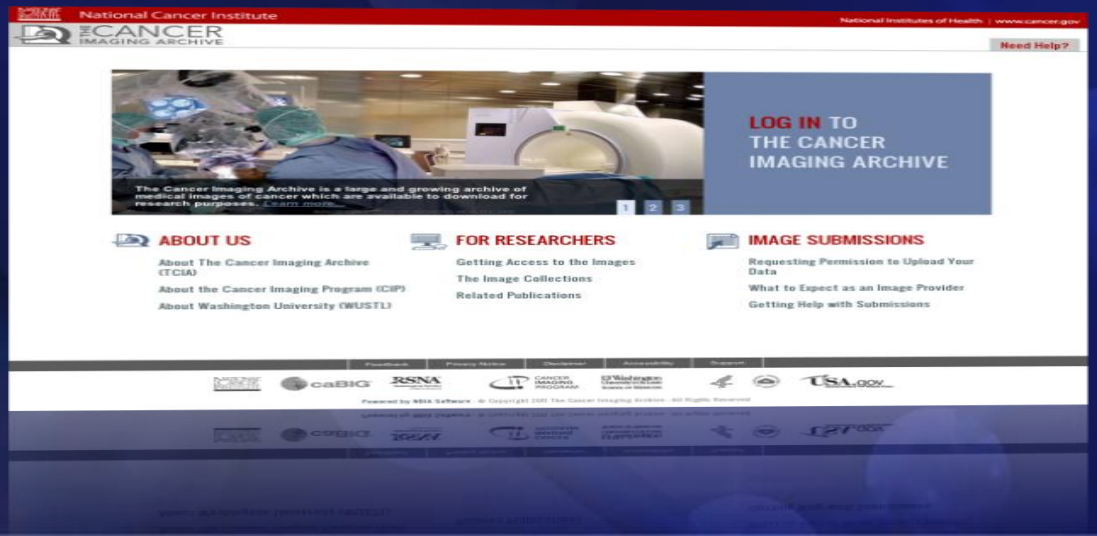
- IGI critical for
  - Biopsy: tumor heterogeneity, ‘omics’, response evaluation, TCGA
  - Surgical oncology
  - Minimally invasive therapies
  - Drug delivery: micro and nanoplatforms

- Planned IGI Open Science Strategy (2011-2014)
  - Open science: Methods & Standards, Toxicity & Biodistribution
  - Challenge.gov Prize Competition: Software tools-TCIA
  - Data and Tool Sharing: Academic centers… and TCIA

Informatics & Data Sharing

The Cancer Imaging Archive(TCIA)

- TCIA is hosted at Washington University
- QIN PI's currently sharing data/tools with the network
- QIN is planning on providing open access to phantom (2012) and later clinical trial data (2013 beyond)
- NCI is seeking leveraging of support across NCI, NIH and internationally (CIHR, CR UK etc)



Informatics & Data Sharing

TCIA: Collections Available

There are over 15 different institutions already providing data to TCIA since it was announced in June of 2011

TCGA Open Access

GBM//Duke
GBM//Emory
GBM//MDA
GBM//Henry Ford
GBM//UCSF
BRCA//MSKCC
BRCA//Roswell Park
BRCA//UPMC
LUAD//WUSTL

QIN: Currently Within the Network

Breast//Vanderbilt *
Head-Neck//Iowa *
Head-Neck//UPMC *
Phantom//UW *
Phantom//Maastro *
Brain//UPMC *
Prostate//BWH *

Outreach Open Access

LIDC-IDRI//CIP
Lung CT: LSS*
Breast-Diagnosis//BU
Prostate-Diagnosis//BU
QIBA: Phantom Data
IGI: Planned

CBIIT (caBIG)

NBIA, XIP, Tools (Complementary Public Resource)

Color Codes: Available – In Progress
* Indicates Restricted Access: Apply for access