

NCI Initiatives in Image-Guided Interventions

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Presentation Outline

- 1. NCI Funding Initiatives in IGI**
- 2. Open Science Framework for Assessment of Technologies in IGI**

CIP/NCI Initiatives in IGI

- Novel Imaging Technologies (R21/R33)
- **Small Business [SBIR / STTR] IGI (R41-R44)**
- **Early Phase Clinical Trials (R21)**
- **Academic Industry Partnerships (R01)**
- **Quantitative Imaging Network (U01)**
- **Image-Guided Drug Delivery (R01)**

Academic-Industrial Partnerships

(R01) – [PAR-10-169]

- **Purpose: Development and Validation of Imaging Systems and Methods**
- **Requires Partnership between academic and industrial Co-PIs**
- **Includes investigations of IGI-systems**
- **Standard R01 Application Receipt Dates**
- **SEP Review (CSR)**

Early Phase Clinical Trials in Imaging & IGI

(R21) - [PAR-11-216]

- **Quick (2 yr) clinical trials of novel imaging and IGI**
- **Intended to accelerate the development of imaging and IGI modalities, methodologies, and agents through the early stages of clinical development - such as trials evaluating safety and preliminary efficacy**
- **Phase I & II studies to establish treatment parameters and early therapeutic efficacy**
- **SEP Review (CSR)**

Quantitative Imaging for Evaluation of Response to Cancer Therapies (U01) – [PAR-11-150]

- **Quantitative imaging of response to therapies, including IGI, to facilitate clinical decision making**
- **Development and implementation of QI methods and tools and their applications to current or pending Phase I/II clinical trials**
- **Funded teams join the Quantitative Imaging Network (QIN)**

Image-Guided Drug Delivery in Cancer

(R01) – [PA-09-253]

- **Development of integrated platforms for multifunctional and multiplexed oncologic IGDD systems**
- **Development of quantitative in-vivo imaging methods in IGDD in cancer**
 - **interrogate tumor/drug interaction**
 - **imaging studies of biodistribution, PK/PD, Tx response**
 - **perform imaging studies in non-human primates or large animal models for toxicity screening**

Image-Guided Cancer Interventions

PA-10-079 (SBIR); PA-10-080 (STTR)

- **Development and optimization of integrated cancer imaging and therapy systems**
- **Validation of integrated IGI systems through clinical evaluations**
 - Phase I: up to 2 years**
Total costs: \$150,000 per year
 - Phase II: up to 3 years**
**Total Costs: \$1,000,000 (clinical studies),
\$750,000 (otherwise)**

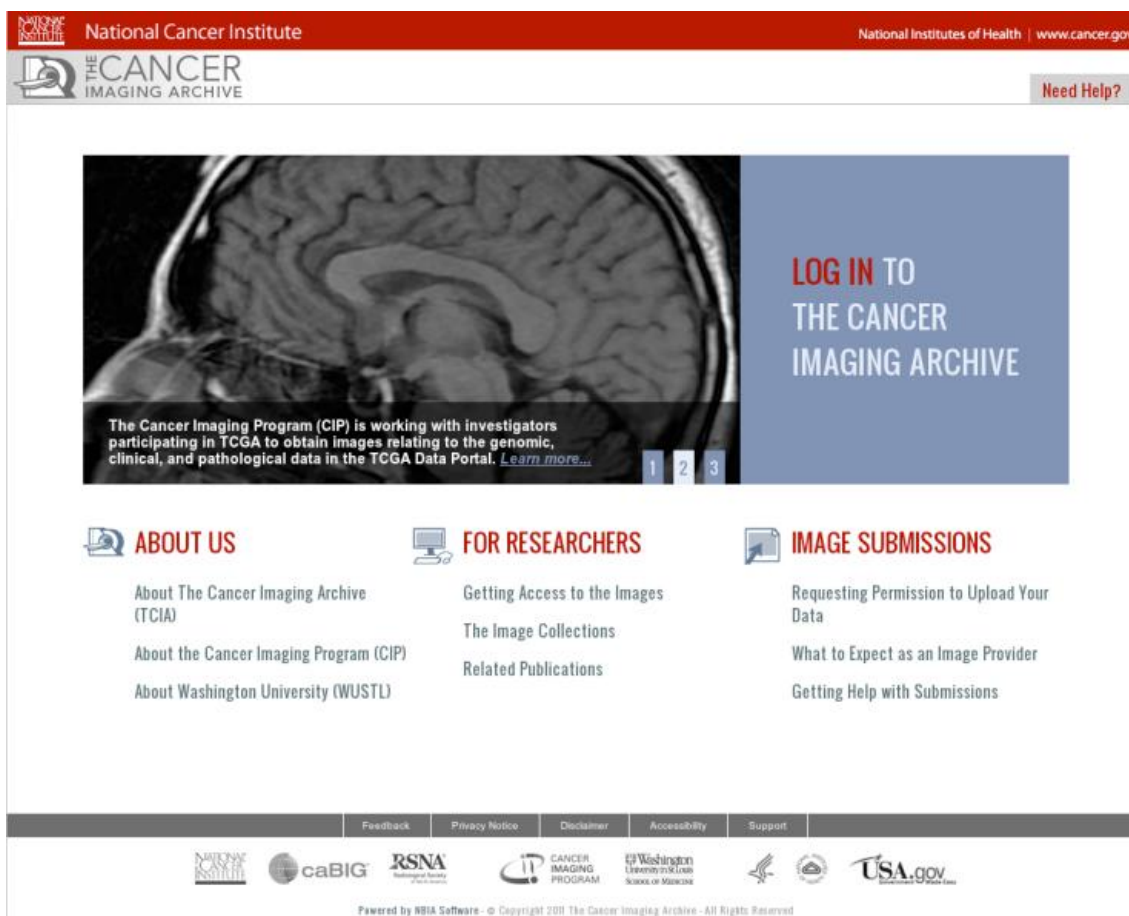
Other Initiatives

- **Bioengineering Research Funding Opportunities**
 - Exploratory Bioengineering Research Grants (EBRG) – PA-10-010
 - Bioengineering Research Grants (BRG) – PA-10-009
 - Bioengineering Research Partnerships (BRP) – PAR-10-234

- **Innovations in Biomedical Computational Science & Technology**
 - R21: PAR-09-219
 - R01: PAR-09-218
 - SBIR: PAR-09-220
 - STTR: PAR-09-221

TCIA: The Cancer Imaging Archive

<http://cancerimagingarchive.net>



The screenshot shows the homepage of the Cancer Imaging Archive (TCIA). At the top, there is a red navigation bar with the National Cancer Institute logo and the text "National Cancer Institute" on the left, and "National Institutes of Health | www.cancer.gov" on the right. Below this is a grey header with the TCIA logo and a "Need Help?" button. The main content area features a large banner with an MRI brain scan on the left and a blue box on the right containing the text "LOG IN TO THE CANCER IMAGING ARCHIVE". Below the banner, there are three columns of navigation links: "ABOUT US", "FOR RESEARCHERS", and "IMAGE SUBMISSIONS". Each column lists several links related to its category. At the bottom, there is a footer with a row of small icons for "Feedback", "Privacy Notice", "Disclaimer", "Accessibility", and "Support". Below this is a row of logos for the National Cancer Institute, caBIG, RSNA, the Cancer Imaging Program, Washington University in St. Louis School of Medicine, and the USA.gov logo. At the very bottom, there is a small line of text: "Powered by NBIA Software - © Copyright 2011 The Cancer Imaging Archive - All Rights Reserved".

National Cancer Institute
National Institutes of Health | www.cancer.gov

THE CANCER IMAGING ARCHIVE

Need Help?

LOG IN TO THE CANCER IMAGING ARCHIVE

The Cancer Imaging Program (CIP) is working with investigators participating in TCGA to obtain images relating to the genomic, clinical, and pathological data in the TCGA Data Portal. [Learn more...](#)

ABOUT US

- About The Cancer Imaging Archive (TCIA)
- About the Cancer Imaging Program (CIP)
- About Washington University (WUSTL)

FOR RESEARCHERS

- Getting Access to the Images
- The Image Collections
- Related Publications

IMAGE SUBMISSIONS

- Requesting Permission to Upload Your Data
- What to Expect as an Image Provider
- Getting Help with Submissions

Feedback | Privacy Notice | Disclaimer | Accessibility | Support

NATIONAL CANCER INSTITUTE | caBIG | RSNA | CANCER IMAGING PROGRAM | Washington University in St. Louis School of Medicine | USA.GOV

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TCIA: The Cancer Imaging Archive

Funded by CIP/NCI, is a large archive of clinical images of cancer accessible for download.

TCIA de-identifies, organizes, and catalogs the images for use by the research community.

The archive is already home to high value data sets including a growing collection of cases that have been characterized in the Cancer Genome Atlas (TCGA)

<http://cancerimagingarchive.net>

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Translational Research Support

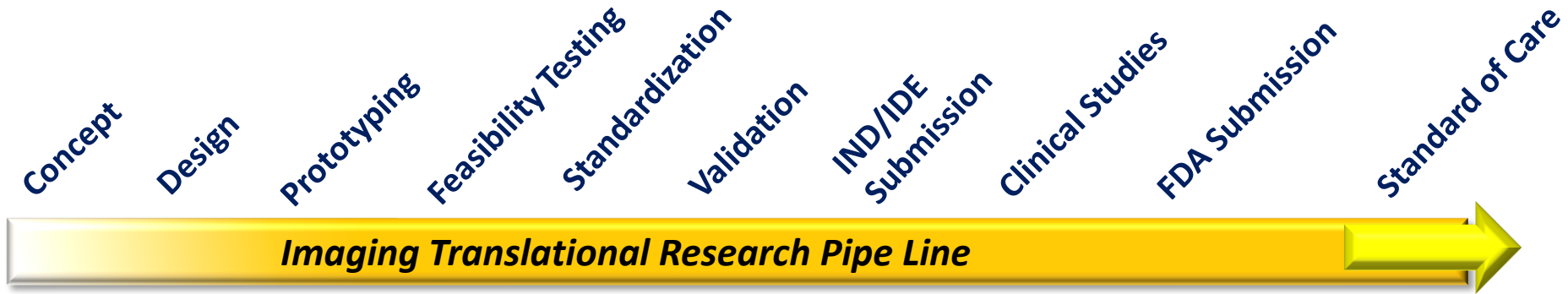


Image-Guided Cancer Interventions (SBIR/STTR)



Image-Guided Drug Delivery (R01)



Quantitative Imaging Network (U01)



Academic/Industrial Partnerships (R01)

Early Phase Trials (R21)



ACRIN (U01)



Technology Assessment Committee

[Chair: Hendee]

Work Group: Assessment of Technologies in IGI

[Chair: Farahani]

Task Groups (2013)

3D C-Arm
[Siewerdsen]

US-Guided Surgery
[Vosburgh]

Robotics-Assisted
Interventions
[Cleary]

MR-Guided Focused
Ultrasound
[Chopra]

Grand Challenges in Image Processing

Goals:

- 1. To initiate a collaboration between NCI and IP community to expand on the development of open source resources for automated cancer image segmentation.**
- 2. To build on such collaboration in future years in order to provide a more lasting and effective impact for challenge products**

NCI-ISBI Prostate Segmentation Challenge

Segmentation of prostate structures: Central gland (CG) and the peripheral zone (PZ) using NCI TCIA ~60 cases that have 3D prostate feature object mark-ups (as Slicer 3D .nrrd files)

- **40 training cases; 2 x 10 sequestered test cases**
- **10 test cases open during ISBI annual meeting (Apr 7-11; San Francisco, CA)**
- **Open and Closed Source competitions**
- **Evaluation Metrics: 95% Hausdorff Distance (HD) & Dice Similarity Coefficient against expert mark ups**

NCI-MICCAI 2013

Segmentation Challenges in Brain Tumors and Prostate

- 1. Segmentation of prostate structures: Neurovascular bundle (NV) and seminal vesicles**
- 2. Segmentation of GBM components**

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<http://imaging.cancer.gov>