Research Projects

There are a number of activities testing science and tools against the image data collections found on The Cancer Imaging Archive. Are you interested in forming an ad-hoc research team around one of the other TCIA image collections? Contact us at help@cancerimagingarchive.net to discuss how we can encourage your research.

Challenge competitions

Data from TCIA collections have and continue to be used for image analysis challenges or competitions, e.g., image segmentation or tumor classification. Specific challenges leveraging our data are described below. Please note that the challenges are not managed by TCIA staff, and in many cases you will be sent to web sites that are not affiliated with TCIA to learn more about them.

- Data Science Bowl 2017 — In the United States, lung cancer strikes 225,000 people every year, and accounts for $12 billion in health care costs. Early detection is critical to give patients the best chance at recovery and survival. Using a data set of thousands of high-resolution lung scans from the National Lung Screening Trial provided by the National Cancer Institute, participants developed algorithms that accurately determine when lesions in the lungs are cancerous. This will dramatically reduce the false positive r

- IEEE VIP Cup 2018: Lung Cancer Radiomics-Tumor Region Segmentation — Segmentation and prediction are considered as critical steps among different processing tasks within the Radiomics pipeline, and are the focus of this competition. The 2018 VIP-CUP challenge is on segmentation and prediction of Lung Cancer Tumor region via screening Computed Tomography (CT) scans using an updated version of NSCLC-Radiomics data from TCIA. Images from several patients along with the annotations will be provided for training and validation purposes. The evaluation will be performe

- ISBI 2018 - Lung Nodule Malignancy Prediction Challenge — This challenge (http://isbichallenges.cloudapp.net /competitions/15 http://isbichallenges.cloudapp.net/competitions/15) intends to advance methods development on the current clinical impediment to assess nodules status for lung cancer screening subjects with consecutive scans. We invite ISBI 2018 participants to develop algorithms or re-package computational methods with potential clinical utility to identify malignancy. We will provide sequential low-dose CT (LDCT) scans at two screening interva

- LUNGx SPIE-AAPM-NCI Lung Nodule Classification Challenge — As part of the 2015 SPIE Medical Imaging Conference http://spie.org/x12166.xml, SPIE – with the support of American Association of Physicists in Medicine (AAPM) and the National Cancer Institute (NCI) – will conduct a "Grand Challenge" on quantitative image analysis methods for the diagnostic classification of malignant and benign lung nodules. The LUNGx Challenge http://spie.org/MI/special-events/Technical-Event will provide a unique opportunity for participants to compare their algorithms to t

- MICCAI 2014 Grand Challenges — MICCAI 2014 http://miccai2014.org/ will provide an excellent opportunity for a day long cluster of events in brain tumor computation (September 14, 2014). It will be composed of a workshop and radiologic and pathology image processing challenges that discuss and showcase the value of open science in addressing some of the challenges of Big Data in the context of brain cancer.

- MICCAI 2015 – Computational Brain Tumor Cluster of Events (CBTC) — The Computational Brain Tumor Cluster of Event (CBTC) 2015 will be held on Oct 9 in Munich, Germany, in conjunction with MICCAI 2015 http://www.miccai2015.org/. It http://www.miccai2015.org/will consist of a morning workshop and afternoon challenges. (see preliminary program here)

- MICCAI 2016 – Computational Precision Medicine — The Computational Precision Medicine (CPM) will be a full-day satellite event held on October 21 in Athens, Greece at MICCAI 2016 http://miccai2016.org/en /SATELLITE-EVENTS.html#cpm, composed of short workshops on advances in radio-path-omics and radiomics, and innovative challenges in CT radiomics, classification and nuclei segmentation in digital pathology, and mammographic CAD detection.

- MICCAI 2018 – Computational Precision Medicine — The Computational Precision Medicine (CPM) 2018 will be held on September 16, in Granada (Spain), in conjunction with MICCAI 2018 https://miccai2018.org/en /Default.asp. It http://www.miccai2015.org/will consist of a morning workshop and afternoon challenges. (further details will be provided in early June)

- Multimodal Brain Tumor Segmentation Challenge 2018 (BraTS) — BraTS 2018 utilizes multi-institutional pre-operative MRI scans and focuses on the segmentation of intrinsically heterogeneous (in appearance, shape, and histology) brain tumors, namely gliomas. Furthemore, to pinpoint the clinical relevance of this segmentation task, BraTS'18 also focuses on the prediction of patient overall survival, via integrative analyses of radiomic features

and machine learning algorithms. More information can be found at http://www.med.upenn.edu/sbia/brats2018.html http

- NCI-ISBI 2013 Challenge - Automated Segmentation of Prostate Structures — The National Cancer Institute's (NCI's) Cancer Imaging Program in collaboration with the International Society for Biomedical Imaging (ISBI) has launched a grand challenge involving prostate gland magnetic resonance imaging (MRI) data. The challenge will take place at the ISBI Symposium http://www.biomedicalimaging.org/2013/, April 7-11, 2013 in San Francisco, CA.

- NCI-MICCAI 2013 Grand Challenges in Image Segmentation — The National Cancer Institute's (NCI's) Cancer Imaging Program in collaboration with the 16th international conference on Medical Image Computing and Computer Assisted Interventions (MICCAI) 2013 has launched two grand segmentation challenges involving clinically relevant prostate structures and brain tumor components based on magnetic resonance imaging (MRI) data. The event will take place at MICCAI 2013 meeting (http://www.miccai2013.org/ http://www.miccai2013.org/) on September 22 in Nagoya,J

- PROSTATEx-2 Challenge 2017 — The American Association of Physicists in Medicine (AAPM), along with the SPIE (the international society for optics and photonics) and the National Cancer Institute (NCI), will conduct a part 2 "Grand Challenge" on the development of quantitative multi-parametric magnetic resonance imaging (MRI) biomarkers for the determination of Gleason Grade Group in prostate cancer. As part of the 2017 AAPM Annual Meeting, the PROSTATEx-2 Challenge will provide a unique opportunity for participants to compa

- PROSTATEx Challenge 2017 — SPIE, along with the support of the American Association of Physicists in Medicine (AAPM) and the National Cancer Institute (NCI), will conduct a "Grand Challenge" on quantitative image analysis methods for the diagnostic classification of clinically significant prostate lesions. As part of the 2017 SPIE Medical Imaging Symposium, the PROSTATEx Challenge will provide a unique opportunity for participants to compare their algorithms with those of others from academia, industry, and government in

- QIN Lung CT Segmentation Challenge — The goal of the CT segmentation challenge was to compare the bias (where possible) and repeatability of automatic, semi-automatic and manual segmentations for lung CT studies. Investigators from Columbia, MGH, Moffitt and Stanford identified 52 lung CT nodules and made available the data in DICOM format. Algorithm developers and users were requested to submit at least 4 repetitions of their algorithm for each nodule. A variety of image formats for the segmentation volumes were utilized including

[CIP TCGA Radiology Initiative](#)

The Cancer Genome Atlas (TCGA) http://cancergenome.nih.gov/ began in 2006 as a three-year pilot jointly sponsored by the National Cancer Institute (NCI) and National Human Genome Research Institute (NHGRI). The TCGA pilot project (focused initially on glioblastoma, ovary, and lung cancers) confirmed that an atlas of genomic changes could be constructed for specific cancer types. It also showed that national networks of research and technology teams working on related projects could pool their ef

- [TCGA Bladder Phenotype Research Group](#) — The Cancer Genome Atlas (TCGA) Bladder Phenotype Research Group is part of the Cancer Imaging Project https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative; an effort to build a research community focused on connecting cancer phenotypes to genotypes by providing clinical images matched to tissue specimens analyzed for The Cancer Genome Atlas (TCGA) http://canc

- [TCGA Breast Phenotype Research Group](#) — The Cancer Genome Atlas (TCGA) Breast Phenotype Research Group is part of the Cancer Imaging Project https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative; an effort to build a research community focused on connecting cancer phenotypes to genotypes by providing clinical images matched to tissue specimens analyzed for The Cancer Genome Atlas (TCGA) http://cance

- [TCGA Glioma Phenotype Research Group](#) — The Cancer Genome Atlas (TCGA) Glioma Phenotype Research Group is part of the Cancer Imaging Project https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative; an effort to build a research community focused on connecting cancer phenotypes to genotypes by providing clinical images matched to tissue specimens analyzed for The Cancer Genome Atlas (TCGA) http://cance

- [TCGA Head-Neck Phenotype Research Group](#) — The Cancer Genome Atlas (TCGA) Head-Neck Phenotype Research Group is part of the Cancer Imaging Project https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative; an effort to build a research community focused on connecting cancer phenotypes to genotypes by providing clinical images matched to tissue specimens analyzed for The Cancer Genome Atlas (TCGA) http://ca

- [TCGA-LGG Phenotype Research Group](#) — The Cancer Genome Atlas-Lower Grade Glioma (TCGA-LGG) Phenotype Research Group is part of the Cancer Imaging Program TCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative focused on analyzing images from the TCGA-LGG https://wiki.cancerimagingarchive.net/display/Public/TCGA-LGG collections. Images which correlate to the LGG tissue data in TCGA's Data Portal http://tcga-data.nci.nih.gov/tcga/tcgaHome2.jsp are continuing to be gathered for sub

- [TCGA-LIHC Phenotype Research Group](#) — The Cancer Genome Atlas-Liver Hepatocellular Carcinoma (TCGA-LIHC) Phenotype Research Group is part of the Cancer Imaging Program TCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative focused on analyzing images from the TCGA-LIHC https://wiki.cancerimagingarchive.net/display/Public/TCGA-LIHC collection. Multiple modalities of images, which correlate to the LIHC data in the TCGA Data Portal http://tcga-data.nci.nih.gov/tcga/tcgaHome2.jsp, ar

- [TCGA Lung Phenotype Research Group](#) — The Cancer Genome Atlas (TCGA) Lung Phenotype Research Group is part of the Cancer Imaging Program https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative focused on analyzing images from the TCGA- Lung Adenocarcinoma (LUAD https://wiki.cancerimagingarchive.net/display/Public/TCGA-LUAD) collection. Multiple modalities of images which correlate to the lung tissue

- TCGA Ovarian Phenotype Research Group — The Cancer Genome Atlas (TCGA) Ovarian Phenotype Research Group is part of the Cancer Imaging Project https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative; an effort to build a research community focused on connecting cancer phenotypes to genotypes by providing clinical images matched to tissue specimens analyzed for The Cancer Genome Atlas (TCGA) http://canc

- TCGA Prostate Phenotype Research Group — The Cancer Genome Atlas (TCGA) Prostate Phenotype Research Group is part of the Cancer Imaging Project https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiativ https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiativee https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative focused on analyzing images from the TCGA- Prostate Adenocarcinoma (PRAD https://wiki.cancerimagingarchive.net/display/Pub

- TCGA Renal Phenotype Research Group — The Cancer Genome Atlas (TCGA) Renal Phenotype Research Group is part of the Cancer Imaging Project https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+InitiativeTCGA Radiology Initiative https://wiki.cancerimagingarchive.net/display/Public/CIP+TCGA+Radiology+Initiative; an effort to build a research community focused on connecting cancer phenotypes to genotypes by providing clinical images matched to tissue specimens analyzed for The Cancer Genome Atlas (TCGA) http://cancer

- TCGA Research on the Cloud — In an effort to streamline IT and informatics resources used as part of various research projects, the Cancer Imaging Program (CIP) has deployed a cloud infrastructure on Amazon EC2. The following instructions summarize how to connect to your cloud computer once you've been assigned one as part of the CIP TCGA Radiology Initiative.

CPTAC Imaging Proteomics

The National Cancer Institute's Clinical Proteomic Tumor Analysis Consortium (CPTAC) https://proteomics.cancer.gov/programs/cptac is a national effort to accelerate the understanding of the molecular basis of cancer through the application of large-scale proteome and genome analysis, or proteogenomics. Data (genomics, proteomics, imaging), assays, and reagents are made available to the public as a Community Resource to accelerate cancer research and advance patient care.

- CPTAC Clinical Data API
- CPTAC Pathology Slide Downloads
- CPTAC SIG Webinars

Imaging Clinical Trials

Imaging Proteogenomics

Publications about TCIA Authored by the TCIA team

QIN ECOG-ACRIN Data Sharing

TCIA Sessions at RSNA

- RSNA 2016 Sessions Using TCIA
- TCIA Sessions at RSNA 2017
- TCIA Sessions at RSNA 2018
- TCIA Sessions at RSNA 2019

WUSM Center for Multiple Myeloma Nanotherapy