QIN

Quantitative Imaging Network

Volume 1 Issue 4 June 15, 2011

Special points of interest:

- **The summer schedule for Steering Committee conference calls:**
  - **June 20**
  - **July 18**
  - **August 15**
  - **September 19**

All calls are 11:00 AM EDT

Phone: 1-866-692-4541

Code: 8321122#

Inside this issue:

SharePoint Communication information 2

Artwork needed for report cover 2

The Cancer Genome Atlas and Cancer Imaging By Carl Jaffe 3

TCGA at Washington University By John Freymann 3

Canada/UK/US workshop to explore funding collaborations 4

Two new teams enter QIN

The seventh round of review completed in March 2011 has yielded to new teams for the QIN. The first is Johns Hopkins University, with a research team led by Richard Wahl, MD, Eric Frey, PhD, and Michael Jacobs, PhD. Rich and his team will be developing, optimizing, and validating multimodal approaches in quantitative imaging to predict and assess treatment response. The team will combine quantitative metrics from PET/CT, SPECT/CT, and MRI. They will first individually optimize the protocols, acquisition parameters, and imaging methods in order to create the most accurate and reliable knowledge of the reproducibility of the individual quantitative imaging parameters. The use of phantoms, realistic simulations, and repeat patient measurements will be part of the study. Methods for combining imaging methods will then be attempted. The combination of quantitative metrics will be used to assess treatment response per patient, per tumor, and intra-tumor.

The second team to join QIN is the Oregon Health and Science University. This team, headed by Wei Huang, PhD and Christopher Ryan, MD, will focus on the shutter-speed model as a superior method for pharmacokinetic DCE-MRI analysis. The shutter-speed model accounts for finite water exchange kinetic effects, and corrects the imaging that is usually underestimated by the standard-model. The team will compare the shutter-speed DCE-MRI with the standard model, diffusion-weighted MRI, and tumor size measurements for assessment of therapy response. The effects of data acquisition and processing schemes on DCE-MRI biomarker values will be investigated with the context of therapeutic monitoring.

The process for bringing a team into the QIN program is lengthy. After summary statements are released and scores are known, the applications with truly meritorious scores are prepared for presentation to the Scientific Program Leaders (SPL) by the lead program director. This involves summarizing the entire application to a single page. Assistance from the principal investigators is sought on this effort.

At a predetermined meeting of the SPL, the summary is presented and a decision is made. However, before the Grants Management staff can begin working on a Notice of Grant Award (NGA) the budget plan must be established by the lead program director. This amounts to applying standard reductions to the proposed budget. After the budget plan is completed, "Just in Time" information is sought and the paperwork completed.

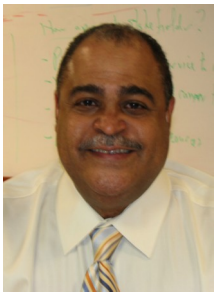
Greg Sorensen to head Siemens Healthcare in US & Canada

Greg Sorensen, MD has been appointed CEO of Siemens Healthcare in the US and Canada, effective June 1, 2011. Sorensen succeeds Randy Hill, who served as interim CEO.

Greg's research team was one of the newest members of the QIN enterprise. Is research focused on quantitative MRI of glioblastoma response to therapy. Bruce Rosen, MD, PhD will assume PI duties for MGH in the interim.

In his new position, Greg will be responsible for leading the marketing, sales, service and support functions for Siemens Healthcare in the US and Canada. This will include the entire healthcare portfolio, including medical imaging, therapy, health IT and laboratory diagnostics. He will be based at the Siemens Healthcare US headquarters in Malvern, PA.

The entire QIN program staff wishes Greg the best of success in his new endeavors, and we hope that in his new position he will interact with the QIN program on a regular basis.



George Redmond will serve as the coordinator of SharePoint communication for QIN.

QIN Communication to operate through SharePoint

The program staff members at NCI associated with the QIN program have decided to emphasize SharePoint as the vehicle for communication in QIN. SharePoint is an effective web location where important QIN information can be posted. We are hoping that the initial difficulties experienced by some QIN members will be reduced as the network becomes familiar with the details of the site.

To aid in the adoption of SharePoint, George Redmond, NCI Program Director, has been appointed Communication Coordinator for QIN. His job will be to design a plan for posting documents on the site and for making certain that all parts of the site are current.

A major part of Redmond's responsibilities will be to create a schema for naming files and folders so that their contents are obvious. Another responsibility will be to determine the minimum content for each folder. For example, in the new method a folder will be created for each teleconference for the steering committee and each working group. The minimum content in each folder will consist of the agenda for the meeting, the resulting minutes from the meeting, and a list of action items that must be addressed.

To assist in this process, Redmond will be asking each working group chair and the steering committee chairs to comply with a few simple rules. Meeting agendas, for example, must be created in a Word document and attached to e-mail reminders of the meeting. Agendas that are embodied in the e-mail text will be discouraged. With this process, the agendas can be posted directly on SharePoint under the correct working group or steering committee .

Naming conventions for files and folders is an essential part of making the SharePoint site successful. When the conventions are determined, they will be communicated to the QIN members. It is important that each member have full access to the site, and that he or she has the ability to post important documents. Doing so with the correct naming convention will be a help to everyone.

Some of the initial difficulties with SharePoint include the process of signing in each time. Added to that is the inconvenience of having to change the login password frequently. This is something that we in the federal government have had to deal with for a long time. Some tips on passwords might make this a bit easier. Many of us use passwords that can be updated quickly each time it is required. A password like AbCd=123 can be updated to AbCd=124.

The program staff at NCI hopes that SharePoint will become a useful tool for sharing information quickly. Many of the working groups are in the midst of writing consensus white papers for publication. Many different drafts will be passed back and forth, and SharePoint is a convenient place to post the versions as they develop. In addition, recent publications from the individual teams can be posted, creating a QIN electronic library. Remember, SharePoint is only available to QIN members, so information will remain secure.

More information regarding the use of SharePoint will be forthcoming from George Redmond soon.

Attention QIN principal investigators: If you have not yet sent your written input for the QIN network report, please do so as soon as possible.

Artwork for report cover sought

The first QIN annual report will be coming together after June 15, the date when all inputs were due from the teams. It will take a while to put everything in the same format and add in the sections written by the program staff. In addition, inputs are due from the working group chairs.

As a part of the finished report, we would like to have some artwork for the cover. Examples of the covers for two of the reports from another network run by the Cancer Imaging Program are shown. If you have something that would highlight the cover of the report, please send a high quality electronic version to the Program Director. Deadline for submission of the artwork is August 1, 2011. After that time, all material must go to the printer in order to be completed by mid-September.

The Cancer Genome Atlas and Cancer Imaging

By Carl Jaffe, MD

Driven by input from its scientific community, the Cancer Imaging Program (CIP) finds itself at the junction of two powerful scientific requisites; the need for cross-disciplinary research and inter-institutional data sharing to speed scientific discovery and reduce redundancy, and the need to improve imaging phenotype data to augment large scale genomic analysis.

CIP and the NCI Center for Bioinformatics have supported the development of tools that provide for the de-identification, submission and archiving of image data. These tools are instantiated as a public resource in several locations including the NCI CBIIT and The Cancer Imaging Archive, managed through a contract at Washington University, St. Louis, MO.

These archives offer the opportunity to encourage a new and emerging research community focused on connecting cancer phenotypes to genotypes by making available clinical images matched to the NIH TCGA (The Cancer Genome Atlas). TCGA began in 2006 as a three-year pilot program jointly sponsored by the NCI and the National Human Genome Research Institute (NHGRI). The TCGA pilot project (initially focused on glioblastoma, ovarian and lung cancers) confirmed that an atlas of genomic changes could be constructed for specific cancer types. It also showed that a national network of research and technology teams working on related projects could pool their efforts, create an economy of scale and develop an infrastructure for making the data publically accessible. Importantly, it proved that making the data freely available would enable distributed researchers to make and validate important discoveries. The success of that pilot project led the NIH to commit major new resources to TCGA to collect and characterize more than 20 additional tumor types.

As an opportunity to leverage that wealth of new biomedical knowledge, CIP committed substantial efforts to gather and place clinical diagnostic images that match genomically analyzed TCGA tissue cases in the Cancer Imaging Archive. CIP has encouraged an *ad hoc* image research team to study glioblastoma. The Cancer Imaging Archive now contains a TCGA/GBM collection with imagies from more than 150 cases whose molecular and clinical patient data can be accessed in the TCGA Data Portal. A multi-institutional team coordinated by Dr. Adam Flanders of Thomas Jefferson University including researchers from the University of Virginia, Emory University, Stanford University, the Henry Ford Hospital, and NCI CRR have demonstrated the advantages of such scientific collaboration by their rapid scientific progress and four abstracts presented in June 2011 at the American Society of NeuroRadiology meeting in Seattle, WA, with still more abstracts in the pipeline for future venues.

Presently, CIP is developing material transfer agreements with many of the TCGA Tissue Site Source institutions to recover and place in the Image Archive collections of diagnostic images that match genomic data now being deposited in the publically accessible TCGA Data Portal on breast, renal, and lung cancers.

The Quantitative Imaging Network program announcement is now PAR-11-150. This replaces the former announcement PAR-08-225. The new announcement can be found at http://grants.nih.gov/grants/guide/pa-files/PAR-11-150.html

The Cancer Imaging Archive (TCGA) at Washington University

By John Freymann, SAIC

The NCI Cancer Imaging Program is launching The Cancer Imaging Archive (TCIA), a web-accessible and unique clinical imaging archive, on June 17. TCIA, managed through a contract at Washington University, St. Louis, MO can be found at http://cancerimaging archive.net

The initial image archive collection focuses on high grade brain tumors from cases whose molecular and clinical data are archived on The Cancer Genome Atlas (TCGA), but will soon be augmented by images of breast, renal, lung, and colon cases from the TCGA project. The archive also includes the Lung Image Database Consortium (LIDC) data set, where lung lesions in patient images have been identified in a standardized manner. This archive offers opportunities for advancing translational research by giving image researchers access to tumor characteristics digitally. Experts can then develop algorithms for computer-aided diagnosis and correlate imaging results with gene expression.

TCIA uses NBIA as its platform. CIP was the initial sponsor of the Imaging Workspace of the NCI caBIG effort, and continues to provide leadership in the development of critical infrastructure in support of cancer imaging research. One of the early priorities of the workspace was to develop a way for distribution and hosting DICOM images. NBIA was created to fill this need. In fact, NBIA is a federated caGRID-compatible technology, and there are now a number of deployed instances of NBIA at other hosting sites. The Cancer Imaging Archive is just one among many. Washington University will have full staffing for the site.

NCI Staff participating in the QIN:

Dr. Robert Nordstrom
QIN Program Director
nordstrr@mail.nih.gov

Dr. Laurence Clarke
Branch Chief
QIN Science Officer
lclarke@mail.nih.gov

Dr. Gary Kelloff
Special Advisor
QIN Science Officer
kelloffg@mail.nih.gov

Dr. Pushpa Tandon
Program Director
Cancer Imaging Program
tandonp@mail.nih.gov

Dr. Huiming Zhang
Program Director
Cancer Imaging Program
zhanghui@mail.nih.gov

Dr. Barbara Croft
Program Director
Cancer Imaging Program
croftb@mail.nih.gov

Dr. Keyvan Farahani
Program Director
Cancer Imaging Program
farahank@mail.nih.gov

Dr. James Deye
Program Director
Radiation Research Program
deyej@mail.nih.gov

Mr. George Redmond
Communication Coordination
Cancer Imaging Program
redmondg@mail.nih.gov

Visit our CIP web site
http://imaging.cancer.gov

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Canada/UK/US workshop to explore funding collaboration

By Larry Clarke

The Canadian Institutes of Health Research's Institute of Cancer Research (CIHR-ICR), Cancer Research UK (CR UK) and the National Cancer Institute (NCI) USA are planning an imaging workshop to be held from June 29th to July 1st 2011 in London, at the Canadian High Commission Offices. The objective is to explore the role of imaging technologies for clinical decision making in cancer prediction, detection, diagnosis and treatment. During the workshop, leading academic scientists from each country will explore opportunities to combine expertise and resources in areas of synergy in order to provide added value and potential leveraging of funds.

The specific goals are to address the barriers to the translation of imaging technologies in personalized medicine approaches, and to explore mechanisms to translate and disseminate these technologies and devices more effectively. The long term goal is to facilitate commercially supported solutions, as required for future multi-platform, multi-site clinical trials. In addition, the workshop will explore how imaging can be specifically quantitatively correlated with other related laboratory methods such as genomics and, in the future, proteomics for both pre-clinical and clinical investigations. The latter laboratory methods may be required, for example, for clinical decision making with respect to patient stratification, prediction and/or measurement of response to therapy, or to support adaptive therapy strategies.

Workshop discussions will focus on the research needed to optimize and validate the performance and integration of new disease biomarkers using new, and emerging, laboratory and in vivo imaging platforms. The latter can image across different resolution scales from the molecular, to the cellular and organ level and poses many new challenges for validation, particularly if an array of molecular probes/agents/nano carriers is included. At present there is no international consensus on how to validate imaging technologies or related imaging standards for clinical performance and these factors are also a significant barrier for cost effective dissemination of imaging methods for developing nations, limiting the potential role of personalized medicine and therapy. For example, economic issues related to personalized medicine and the positive or negative impact of imaging need to be discussed from both a national and global perspective. The workshop will provide a forum to consider global solutions for the translation of imaging technologies addressing cancer control.

Specific Research Areas: Research areas to be covered will include, but not be limited to:

- Identifying the research needed to improve the clinical role of quantitative imaging within the context of pre-cancer, early cancer detection, diagnosis, staging, prediction and response to therapy, or image guided intervention and image guided drug delivery.
- Identifying the research needed to improve quantitative imaging in the preclinical and clinical setting, specifically as an enabling technology for discovery research such as drug discovery and in vivo systems biology, where these discoveries can be translated to clinical investigations.
- Identifying the barriers for translational research in cancer imaging and related laboratory correlation studies, and seek possible solutions as to how they can be addressed to help accelerate the regulatory approval and dissemination of these technologies by industry within Canada, the UK, and the US. These areas may include support for "open science validation strategies' where knowledge, methodologies, and data may be shared as public research resources. The open science strategies would normally be confined to validation methods for the imaging platforms, as opposed to discovery research or development of technology, to avoid IP related issues.

Anticipated deliverables: Deliverables are expected to include:

- A workshop report that will summarize the discussions and recommendations during the workshop and that will be made available to interested researchers and other parties in all three participating countries.
- A scientific paper for publication in top-tier journal
- A convincing argument, for the sponsoring funding agencies, that there would be a genuine value added in collaborative research that takes advantage of complementary expertise and existing resources and infrastructures in Canada, the UK and the US and that collaboration would advance the uptake of medical imaging as a tool for personalized medicine, more rapidly and effectively than the status quo.