SAI Facility News and Updates

1. **Facility move:** We are planning to move the facility starting in the week of 4/14.
   - Most of the imaging systems including **PET/CT, SPECT/CT, CNT-CT, Scanco-CT, ultrasound, and optical** systems will be moved to the new location within that week. We are expecting about one to two weeks of downtime for these modalities. We will update you with more information on shut-down and re-opening time for each individual system when we have more details. For now, please do not plan any imaging studies using these systems between 4/14 – 4/25. If you have to do imaging on these systems within these two weeks, please contact us now and we can discuss the arrangement.
   - For the 9.4T MRI scanner, the benchmarking and dissembling work by the vendor will start on 4/20, and the physical move of the system will be around 4/26. Due to the substantial dissembling, installation and construction work for the magnet, there will be about 5-6 weeks of downtime for 9.4T MRI system. Please do not plan any 9.4T MRI studies from 4/19 to the end of May. We will update you about the magnet move and re-installation once the work starts.
   - The imaging lab inside the Genetic Medicine will keep its normal operation schedule and will not be affected by the move.

2. There will be a **ribbon-cutting ceremony** for the new Marsico Imaging Research Building on March 27th. You are welcome to stop by the new building and take pictures.

3. **Updating animal protocol:** Once the facility moves to the new building, PIs who have studies involved with animal imaging in our facility will need to amend their animal protocols to reflect the changes of imaging location. We will let you know the new room number for protocol amendment in the near future.

4. **Housing for imaging animals:** The vivarium inside the new Imaging Building will not be ready when we move the facility. All the imaging animals will be still housed in the current Marry Ellen Jones facility or Thurston Hall Facility.

5. **Training:** The optical imaging training will be on the first Monday of each month from 2-3:30 PM. Please check the following link for updates: [http://www.med.unc.edu/bric/safety-and-training](http://www.med.unc.edu/bric/safety-and-training).
The New Home of the Imaging Facility

In a few months, the imaging facility will be relocated to the new home in the Marsico Imaging Research Building. This $265 million building is the only new public building fully funded by the state in 2009, and will be the largest research building on the UNC campus. The new building will have 7 stories above and two stories below ground, for a total of 342,000 sq. It will house research labs and the core facilities of several highly interdisciplinary programs and centers, including the BRIC, Center of nanomedicine, Center for drug discovery, Marsico Lung Center, and Cancer Center.

Several major features of the new imaging home will further strengthen the imaging capabilities in the BRIC:

— First, the overall space for imaging will be increased from currently ~3000sq to ~33,000 sq, — an increase of more than 10-fold! The new space will have the human imaging unit on the first floor, the animal imaging facility (Fig. 2b, blue box), and radiochemistry facility (Fig. 2b, yellow box) on the sub-basement floor.

— A fully automated animal housing facility capable of accommodating 3000 small rodents and 18 large animal cages will be available in the new building (Fig. 2a, red box), greatly facilitating longitudinal animal studies. The facility is dedicated for housing animals with imaging needs. Total of eight surgery procedure rooms will be available inside the animal facility.

— The building will house a full scale 17MeV cyclotron for the production of radioisotopes which will greatly enhance molecular imaging capability in the Center. Along with the cyclotron is the radiopharmaceutical lab that is designed to have the capability of providing radiopharmaceutical compounds for human imaging applications.

— A 7-Tesla whole body MRI system will be housed in the subbasement of the building. The 7T system will be one of the first few available in the US. The increased sensitivity and enhanced contrast mechanisms at such high magnetic field strength should provide insight to disease mechanisms, especially in neuroscience and cancer.
The small animal imaging facility will be located in the sub-basement of the new building. All the imaging modalities will be centrally housed in one unit. Figure 3 illustrates the imaging lab arrangement within the facility suite.

The new facility will have the following improved features:

- A dedicated space for 9.4T MRI console with animal preparation counter top.
- Radiochemical fume hood installed in the PET/CT lab for possible volatile radioactive probe study.
- Pneumatic tube directly connected to the PET/CT lab for instant delivery of radioactive compounds from cyclotron facility to the PET/CT lab.
- Two procedure rooms equipped with snorkel and surgery lamps dedicated for surgery procedures involved in imaging studies.
- Dedicated housing space for radioactive animals available to facilitate longitudinal PET/SPECT imaging studies.
- Dedicated elevator from the animal facility on the basement to the animal imaging facility on the subbasement floor for easier transportation of imaging animals.

The new building will solve several problems that we are currently facing in the old facility, such as housing radioactive animals, and radiochemistry lab, etc. It will be a positive change for the animal imaging facility to reach its full potential. If you have any comments or suggestions on the new animal imaging facility, email to bricsa@med.unc.edu.
Imaging Study Highlights

- **MR Imaging of lung functionality using hyperpolarized Xenon gas ventilation**

  Conventional MRI is not able to do lung imaging due to low proton signal within lung. Imaging with hyper-polarized [129]Xe gas has been developed to monitor lung functionality. In the study, the mouse was ventilated with hyperpolarized natural abundance [129]Xe gas, MR signal from hyperpolarized [129]Xe was collected for respiration gated imaging. The left image was taken with signal collected only in 3 minutes, which can be used to measure the functional lung volume. (Courtesy of Dr. Tamara Bronca)

- **Fluorescence imaging to determine the biodistribution of a superoxide dismutase (SOD) particle**

  Near-infrared (NIR) fluorescence imaging with Dylight-745 fluorophore was used for biodistribution studies to compare the biodistribution of SOD nanoparticles before and after crosslinking. Images on the left represent fluorescence images at 24hours after injection of free fluorophore (A), non-cross-linked particles (B), and cross-linked particles (C), indicating extended blood circulation time after crosslinking of SOD particles. (Courtesy of Yuhang Jiang, Vivek Mahajan, and Dr. Alexander Kabanov)

- **Longitudinal PET imaging on tumor-targeting Zr-89 labeled antibody**

  With more than 3 days of radioactive half life, Zr-89 is a perfect positron emitter radioisotope for imaging long circulating compounds or particles. Above images show PET imaging on tumor-bearing mice for over three days with Zr-89 labeled antibody targeting on FAP-expressed tumor. (Courtesy of Dr. Thad Wadas)
SAI User Advisory Committee

The members of the committee are:

- Crews Fulton, Ph.D. (Dept. Pharmacology and Psychiatry)
- Anna Spagnoli, Ph.D. (Dept. Pediatrics)
- Scott Williams, Ph.D. (Dept. Pathology)
- William Kim, Ph.D. (Dept. Urology Oncology)
- Anka Veleva, Ph.D. (Dept. Biomedical Engineering)

The committee will meet two times each year. If you have any concerns, questions, or comments, you can also contact our committee members, and we will discuss that in the committee meetings.

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