

ABSTRACT – Medical Imaging Technology Development Core

The objective of the Medical Imaging Technology Development Core (**MITDC**) is to build an infrastructure to support research of the junior research project leaders (**RPLs**) and overarching goal of this COBRE. The Core will be built based on the OU Advanced Medical Imaging Center (**OU-AMIC**), which has been supported by both the Gallogly College of Engineering University of Oklahoma (**OU**) Norman campus and the Stephenson Cancer Center of OUHSC campus since 2012. OU-AMIC includes 5 research laboratories and an established network between the engineering and clinical expertise to facilitate the interdisciplinary research. OU-AMIC provides a solid foundation for this MITDC to provide important resource for RPLs and pilot project awardees of the COBRE. The MITDC Core has 3 Specific Aims. **Aim 1:** We will implement an interdisciplinary management plan to build an optimal infrastructure to support translational medical imaging related cancer research. The Core will be co-directed by an experienced engineer and a physician researcher. An advisory board of senior engineering and physician researchers will be established to guide the development and operation of the Core. Existing imaging equipment and other tools will be integrated to serve COBRE projects, along with equipment and services available by industry and clinical collaboration. Monthly brainstorming meetings, on demand tours, round table discussions, and biannual open house workshops will facilitate interaction between members of the Core and researchers on both OU Norman and OUHSC campuses. These activities will allow the Core to better understand researcher needs and provide opportunities for researchers to learn new imaging technologies that can benefit their research. **Aim 2:** We will design and develop a series of investigative imaging tools and testbeds to provide researchers fast and cost-effective methods to test their innovative research concepts. Using testbeds of new imaging modalities, the researchers will be able to acquire preliminary data to validate their hypotheses without the expensive and time-consuming development of a fully equipped laboratory. Based on the research areas of the initially selected RPL projects and other junior researchers in the COBRE pool, the testbeds will include, but are not limited to, phase-contrast X-ray imaging, X-ray fluorescence tomography, digital pathology scanners, and special optical imaging devices. **Aim 3:** We will build an integrated computer server/network and provide new computer-aided quantitative image feature analysis schemes and software to support the RPLs and other researchers to conduct large data and deep transfer learning-based Radiomics studies. This will improve the efficiency and consistency of developing and validating quantitative image markers and/or machine learning prediction models developed by different projects. **In summary,** MITDC will provide a unique research service and supporting capability to enhance the overarching goal of this COBRE. It will not merely be a collection of imaging equipment in a distinct space, it will also allow us to fully network our current research expertise to better support the translational cancer research using medical imaging technology to benefit patients in the future.