Each year the Advanced Imaging Research Center (AIRC) and The National Center for In Vivo Metabolism host a symposium on a topic relevant to work being carried out at the Center and also at UT Southwestern Medical Center. The purpose of the symposium is to provide information on research activities and training opportunities. Faculty, research staff, undergraduate, graduate and post doctoral students are all encouraged to attend. Past participants have included those from academia and industry around the country. Each symposium is devoted to training in which the latest developments at the Center are discussed.

There will be a poster competition for Students and Postdocs. All basic and translational research topics as well as clinical studies related to imaging and metabolism are welcome. Attendees are also encouraged to submit a one page abstract on a primary research interest. Poster and Abstract instructions are available on the registration page. Attendee and Speaker abstracts will be distributed in a booklet during meeting registration. The intent of the booklet is to outline attendee research interests and expertise to augment Investigator interaction. There will be prizes for the top Graduate Student and Postdoc posters.

Target Audience
This Symposium is intended for physicians, scientists and students with an interest in metabolic imaging of brain disease.

Purpose and Content
Abnormalities in metabolism are associated with many brain diseases. Despite advances in clinical diagnostic tools, limitations on current methods to characterize and visualize changes in brain functions and metabolism remain a significant barrier to understanding common brain disorders.

The Symposium was designed to advance our understanding of the role of metabolism in brain diseases and to explore new methods to image metabolic pathways in human patients. Basic concepts in metabolism as well as MRI, MR spectroscopy and hyperpolarized $^{13}$C MRI will be reviewed. Recent developments in imaging of brain diseases will be presented by internationally-recognized experts and by UT Southwestern faculty. Demonstrations of sample preparation and operation of hyperpolarized $^{13}$C MRI set-up will be available. This Symposium is supported by the National Institute of Heath - National Institute of Biomedical Imaging and Bioengineering (NIH-NIBIB: EB015908) and by the O’Donnell Brain Institute at the University of Texas Southwestern Medical Center.
**Educational Objectives**
Metabolic imaging plays important roles in the diagnosis and treatment of brain diseases. Upon completion of the Symposium, attendees should be able to:

- Describe basic principles of intermediary metabolism in the brain.
- Identify high-impact brain disorders that are caused by primary defects in metabolism.
- Describe fundamental principles and applications of CEST MRI.
- Describe the physiologic basis for functional MRI of the brain.
- Describe the potential role of hyperpolarized 13C MR in imaging compared to current clinical tools.

**Imaging Metabolism in Brain Disease**

**Wednesday, January 31, 2018**

**07:30 AM**  
*Breakfast & Registration*

**Morning Session 1**

08:30 AM  
Replacing Radiation in Metabolic Research  
Craig Malloy, MD  
*UT Southwestern Medical Center*

09:00 AM  
Hyperpolarized 13C: Basic Principles  
Jae Mo Park, PhD  
*UT Southwestern Medical Center*

09:30 AM  
Hyperpolarized 13C MRI: Early Clinical Applications  
John Kurhanewicz, PhD  
*UC San Francisco*

**10:00 AM**  
*Break*

**Morning Session 2**

10:30 AM  
Water: The Best Biomarker of Metabolism!  
Dean Sherry, PhD  
*UT Southwestern Medical Center*

11:00 AM  
CEST: Pulse Sequences and Chemical Specificity  
Elena Vinogradov, PhD  
*UT Southwestern Medical Center*

11:30 AM  
Cancer Prognosis by CEST  
Masaya Takahashi, PhD  
*UT Southwestern Medical Center*

**12:00 AM**  
*Lunch*

**01:00 PM**  
Convene in NG, Tour Group Assignment

01:15 PM - 2:45 PM  
*Facility Tour and Demos*

In vivo HP 13C MRI – Jeannie Baxter, RN; Jeff Litiker, PharmD; Crystal Harrison, PhD; Jae Mo Park, PhD; Jian-xiong Wang, PhD

Chemistry and Physics of Hyperpolarized MR – Charlie Khemtong, PhD; Gaurav Sharma, PhD

**Afternoon Session**

03:00 PM  
The Challenge of the Brain: Metabolism in Many Compartments  
Doug Rothman, PhD  
*Yale University*
Thursday, February 1, 2018

07:30 AM  Breakfast & Registration

Morning Session 1: Inborn Errors in Brain Metabolism

08:30 AM  Biochemical Basis of Neurodevelopmental Disorders  Andrea Gropman, MD  
Children’s National Health System

09:15 AM  Integration of Clinical, Genetic and Imaging Data for Evaluation of Inborn Errors  Ralph Deberardinis, MD, PhD  
UT Southwestern Medical Center

10:00 AM  Break

Morning Session 2: Brain Cancer

10:30 AM  MR Spectroscopy Studies of Brain Cancer  Sabrina Ronen, PhD  
UC San Francisco

11:15 AM  In Vivo Metabolomics of Brain Cancer  Changho Choi, PhD  
UT Southwestern Medical Center

12:00  Lunch

Afternoon Session 1: Imaging after Concussion

01:00 PM  MEG and MRI in TBI  Joe Maldjian, MD  
UT Southwestern Medical Center

01:45 PM  Brain Metabolism after Concussion  Brenda Bartnik-Olson, PhD  
Loma Linda University

02:30 PM  Break

Afternoon Session 2: Neurodegeneration

03:00 PM  MRI and PET for Evaluation of Age-Related Cognitive Decline  Prashanthi Vemuri, PhD  
Mayo Clinic

03:45 PM  MR Spectroscopy of Neuropsychiatric Disorders  Peter Barker, DPhil  
Johns Hopkins University

04:30 PM  Poster Award, Discussion, and Adjourn  Craig Malloy, MD

Discussion of Off-Label Use
Because this course is meant to educate the physicians with what is currently in use and what may be available in the future, there may be “off-label” use discussed in the presentations. Speakers have been requested to inform the audience when off-label use is being discussed.