



TEXAS A&M UNIVERSITY

Nuclear Solutions Institute

NSI seminars are designed to promote interaction between the different units that comprise the Nuclear Solutions Institute. Speakers will be discussing current topics in a way that is accessible to non-experts.

From Isotopes to Images: Novel Radiometals for PET Imaging

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Monday, March 25, 2019 at 3:00 P.M.

CYCL 228

Refreshments at 2:45 P.M.

With the expansion of approved ^{18}F based agents for medical imaging using positron emission tomography (PET), low energy (11-24 MeV) cyclotrons are now used at many commercial and academic centers to produce isotopes for medical imaging. The energy of these machines is ideal for isotope production via (p,n), (p, α) and in some cases (p,2n) reactions. Using the UAB TR24 cyclotron, our group has focused on the development of reaction routes, target materials and the separation chemistry of isotopes to expand the toolbox of nuclear imaging agents. These have included transition metals such as ^{52}Mn , ^{55}Co , ^{89}Zr , $^{43,47}\text{Sc}$ and ^{45}Ti . Additional research has developed chemistry to incorporate these isotopes into new imaging radiopharmaceuticals for preclinical or clinical research. In particular, our group has been exploring the use of ^{89}Zr radiolabeled antibodies for imaging of cell surface receptor expression in preclinical models and in clinical trials of metastatic breast cancer patients. Recent work has also resulted in new radiochemistry techniques for the development of new $^{43,47}\text{Sc}$ and ^{45}Ti radiopharmaceuticals for oncologic applications.

Alternative nuclear reactions via heavy ion bombardments can further expand the toolbox of radionuclides available for medical applications. For example, recent collaborative work has focused on the production of radionuclides via ^{14}N induced reactions at the Texas A&M Cyclotron Institute. This novel approach may provide complementary pathways for medically important radionuclides that are currently unavailable via other means.