

## **AggieRad, A Facility for the Characterization of Radioactive Materials and Molecular Compounds**

### **Lead Contact for RDF Application:**

Charles M. Folden III  
Associate Professor of Chemistry  
[Folden@comp.tamu.edu](mailto:Folden@comp.tamu.edu)  
979-845-1411

**Key Participating Units: College of Science and College of Engineering  
Letters of Support from College of Science, College of Engineering, College of Veterinary Medicine  
& Biomedical Sciences, College of Geosciences, and Texas A&M University at Galveston**

### **Key Team Members or Co-Investigators:**

Dr. Nattamai S. P. Bhuvanesh, Department of Chemistry, College of Science  
Dr. Jonathan D. Burns, Nuclear Engineering and Science Center, College of Engineering  
Prof. François P. Gabbai, Department of Chemistry, College of Science  
Dr. Lauren A. McIntosh, Cyclotron Institute, College of Science  
Prof. Michael Nippe, Department of Chemistry, College of Science  
Dr. Joseph H. Reibenspies, Department of Chemistry, College of Science  
Dr. Evgeny E. Tereshatov, Cyclotron Institute, College of Science  
Dr. Bryan E. Tomlin, Department of Chemistry, College of Science  
Prof. Sherry J. Yennello, Department of Chemistry, College of Science

**Amount requested: \$830,681**

### **Executive summary of this application to utilize Research Development Funds:**

Funding is requested for the creation of AggieRad, a user facility for the characterization of radioactive materials and molecular compounds. The absence of such a facility at Texas A&M has stymied the development of collaborations between a large group of scientists affiliated to our Nuclear Engineering and Chemistry departments, to our Cyclotron Institute, to our two nuclear reactors, and to the Translational Imaging Center. The proposed facility will take Texas A&M to the next level by providing a platform where radioactive materials can be handled and analyzed. This new platform will serve as a vector for collaborations between the above-mentioned units, enabling science, opening the door to new funding opportunities, and augmenting our ability to engage with Los Alamos, a national lab now managed by Texas A&M. Areas directly impacted by this application include those of nuclear forensics, nuclear fuel cycle research, medical imaging, and radiopharmaceutical research and development. To enable advances in these areas, we propose the acquisition of UV/Vis/NIR absorption and fluorescence spectrometers, an ATR IR spectrometer, and a Raman spectrometer. A Bruker-AXS Apex II X-Ray Diffractometer from the Chemistry X-Ray Diffraction Laboratory will be relocated to AggieRad where it will become a dedicated instrument for the structural analysis of crystals containing radioactive elements. For air-free sample preparation, we also request the purchase and installation of two gloveboxes equipped with freezers and optical fiber, electric cable feedthroughs, and HEPA filters. These will initially be used predominantly for transuranic research. The other capability that we would like to add is in the area of radiochemistry for which we propose the acquisition of a radio-HPLC system, a radio-TLC system, a preparative-HPLC system, a high-purity germanium gamma-ray detector, and a multi-chamber alpha detector. The creation of AggieRad will immediately augment the research programs of numerous groups on campus while at the same time fostering new collaborations and access to additional federal funding. AggieRad will be housed in the Elemental Analysis Laboratory (EAL) in the Teague Building where 800 ft<sup>2</sup> will be made available if this project is funded. The newly acquired instruments will be managed by Dr. Bryan Tomlin, a nuclear and radiochemist by training, who currently oversees the EAL. All instruments will be made available to users who will be charged for the use of each instrument. Altogether, this new facility will provide Texas A&M the ability to establish itself as a national leader in TRU and radiopharmaceutical chemistry.