

Executive Summary  
Texas A&M University, College Station

## Computational Fluid Dynamics for Nuclear Applications Curriculum Development to Facilitate Nuclear Energy in the 21<sup>st</sup> Century

With the expected addition of first-of-a-kind reactor systems to the U.S. nuclear fleet and successful continued operation of current reactors, the need for a large workforce to facilitate nuclear safety in the 21<sup>st</sup> century is clearly evident. These specialists must have strong technical backgrounds and possess the intellectual capabilities to develop solutions for new and unanticipated safety issues that nuclear systems will present.

To address this need, courses of tailored computational fluid dynamics (CFD) for nuclear field applications are proposed at the Department of Nuclear Engineering at Texas A&M University to create a development program that will prepare a cadre of motivated and capable nuclear engineers. The new course program will be sustainable and flexible, dedicated to producing engineers that are equipped to solve a diverse array of challenging engineering problems using advanced CFD tools combined with a deep understanding of the physical phenomena encountered. This goal will be accomplished by designing the academic instruction to include a unique combination of multi-disciplinary illustrative examples drawn from current research topics. The courses will address the major aspects of nuclear safety but also will include new areas not traditionally offered in U.S. universities, namely, physics-based CFD analysis for nuclear applications. This course will also be developed with input from global interactions with international CFD communities. In addition, our interaction with CEA in Grenoble and Saclay in the computational in the CFD field will be extended and enhanced. This synergy has already resulted in hosting a group of CEA researchers at Texas A&M to offer a short course in CATHARE training and CFD (STAR-CD, TRIO, NEPTUNE) programs to our students. This international interaction would provide our students with a unique experience in exposure to global activity in CFD in nuclear field. This includes new areas that are not offered in U.S. Universities.

The CFD course development activities will be performed in year one and are intended to constitute a stand-alone project, with the activities in years two and three to be performed pending funding availability.