



SAND2012-8921P  
Sandia National Laboratories

Operated for the U.S. Department of Energy by  
**Sandia Corporation**

**Karla V. Morris, Ph.D.**  
Senior Member of Technical Staff

P.O. Box 969  
Livermore, CA 94551-0969

Phone: (925) 294 3287  
Fax: (925) 294 2595  
Internet: knmorri@sandia.gov

October 15, 2012

Tom Filburn, Ph.D., Director  
Connecticut Space Grant Consortium  
University of Hartford  
200 Bloomfield Avenue  
West Hartford, CT

Dear Dr. Filburn:

It is my pleasure to write a letter in support of the proposal *Development of Undergraduate Level course for Engineering Analysis and Graduate Level course for Computational Fluid Dynamics* being submitted to the Connecticut Space Grant Consortium by Luz Amaya-Bower Ph.D. at Central Connecticut State University.

Undergraduate and graduate programs that introduce the fundamentals of engineering analysis and computational fluid dynamics provide professionals with the numerical expertise they require to give meaningful contributions early in their careers. Numerical methods provide the tools that facilitate the analysis of different engineering problems. Understanding the numerical techniques used to solve the partial differential equations of interest as well as the limitations, and uncertainties of the numerical solutions is extremely important and can only be achieved with a thorough knowledge of the basic fundamentals.

The material covered under the proposed curriculum is of relevance in National Laboratories, Industry and Academic research settings. Computational fluid dynamics (CFD) constitutes an integral part of the research process. Theoretical and experimental research is highly complemented through numerical predictive and modeling simulations, which expand our understanding of different multi-physics problems in regimes that are not always accessible experimentally. As part of the technical staff at the Combustion Research Facility at Sandia National Laboratories, I have been able to witness the impact of CFD when applied to areas related to fuel combustion, fuel injection and engine efficiency, all of which constitute a small sample of the possible areas of application of CFD.

In conclusion, I fully support the efforts of the Department of Engineering as they seek external funding support to further develop a curriculum designed to provide its students with the numerical and computational knowledge required to enable their contributions to engineering and science fields.

Sincerely,

Karla Morris Ph.D.  
Senior Member of Technical Staff