# Are Your Computer Simulations Accurate?

If you've asked yourself this question, you may be interested in the new graduate course:

## Verification and Validation in Scientific Computing (AOE/CS/ME 6444)

Spring Semester 2012, 3 credit hours (also offered online)
M-W-F 9:05-9:55 am, Randolph Hall Rm. 220, Virginia Tech

**What is it**: Verification and Validation (V&V) methods provide a formal framework for assessing the accuracy and reliability of scientific and engineering simulations. When combined with uncertainty quantification methods, V&V can provide estimates of the predictive capability of scientific computing. In the course, you will learn about:

- verification – the mathematical correctness of a numerical solution relative to the solution to the original differential equations
- validation – the physical correctness of a model relative to the real-world value (i.e., experiments); also how to conduct validation experiments
- uncertainty quantification – how to propagate different types of uncertainty from different sources through a simulation
- predictive capability – how to incorporate uncertainties arising from the modeling and simulation process in the simulation prediction

**Who should take it**: Graduate students in any discipline where numerical solutions to differential equations are used to simulate physical, chemical, or biological systems. Examples include: computational mechanics, computational fluid dynamics, thermal analysis, astrodynamics, groundwater transport, electronic circuit modeling, molecular dynamics, etc.

**Prerequisites**: Knowledge of any scientific computing discipline and a basic course in numerical methods for differential equations are recommended.

**About the instructor**: Dr. Chris Roy is an Associate Professor in the Aerospace and Ocean Engineering Department and is a co-author (with W. L. Oberkampf) of the book *Verification and Validation in Scientific Computing*, Cambridge University Press, Cambridge, 2010.

For more information: www.aoe.vt.edu/people/webpages/cjroy/VVCS.html

*For the online class, register for AOE/CS/ME 6444  CRN: 18793*