**COLLOQUIUM**

Department of Computer Science and Engineering

University of South Carolina

### **Computational Tools for Data Assimilation**

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# Abstract

The task of providing an optimal analysis of the state of the atmosphere requires the development of novel computational tools that facilitate an efficient integration of observational data into models. We introduce variational and statistical estimation approaches to data assimilation. We discuss important computational aspects including the construction of efficient models for background errors, the construction and analysis of discrete adjoint models, new approaches to estimate the information content of observations, and hybrid variational-ensemble approaches to assimilation. Data assimilation results for several real problems are used to illustrate the power of the proposed methods.

**Adrian Sandu** obtained the Diploma in Electrical Engineering - Control Systems from the Technical University Bucharest, Romania, M.S. in Computer Science and Ph.D. in Applied Mathematical and Computational Sciences from The University of Iowa. He worked as a computer programmer (ICI Bucharest), instructor (T.U. Bucharest), TA&RA (U. Iowa), postdoctoral research associate (Courant Institute of Mathematical Sciences). Between 1998-2003 he served as a faculty in the Department of Computer Science at Michigan Tech. In 2003 he joined Virginia Tech's Department of Computer Science. Sandu's research interests are in the area of computational science and engineering.