



# PRESIDENTIAL DREAM COURSE

## PUBLIC LECTURE

### Data Integration in Multiscale Simulations

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**Friday, September 21, 3:30 p.m. – 4:30 p.m.**

**Physical Sciences Building Room 108**

*Abstract:* In this talk, I will discuss several data integration techniques in multiscale simulations. I will give a brief overview of multiscale simulation concepts that will be used. These multiscale techniques are designed for problems when the coarse grid does not resolve scales and contrast. I will describe the relation between multiscale and upscaling methods. I will describe three data integration techniques. The first one, Bayesian multiscale modeling, will sample basis functions and incorporate available data. In the second approach, we will use deep learning techniques to design and modify existing multiscale methods in the presence of data and nonlinearities.

*Bio:* Yalchin Efendiev obtained his Ph.D. degree from Caltech in 1999. He came to Texas A&M University as an Assistant Professor in 2001, moving up to Associate Professor in 2005 and Full Professor in 2008. He is now the Director of Institute for Scientific Computation and the Mobil Chair in Computational Science of Texas A&M. He is the Principal Editor of Journal of Computational and Applied Mathematics and serves in the editorial boards of several other journals. He is an AMS Fellow, a keynote speaker at the Annual Meeting of International Porous Media Society in 2015, and a 45-minute invited speaker at the International Congress of Mathematicians at Seoul in 2014.

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