*Department of* **MATHEMATICS & STATISTICS**

**UMBC** AN HONORS UNIVERSITY IN MARYLAND

# 6ᵀᴴ ANNUAL PROBABILITY AND STATISTICS DAY AT UMBC
### FUNDED BY NATIONAL SECURITY AGENCY

Workshop on
## *An Introduction to Bootstrap and Its Applications*
### presented by
### *Professor Jun Shao*
### *University of Wisconsin – Madison*

**Friday, April 20, 2012 ◆ 2:00pm – 5:45pm ◆ Room 105, Public Policy Building**
Registration is <u>FREE</u> but required! ◆ Registration Deadline: Friday, April 6, 2012
Registration Website: **www.umbc.edu/circ/hosting/ProbStatDay2012**

### *Speaker*
Professor Shao, a former Chair of the Department of Statistics at the University of Wisconsin at Madison and a Fellow of both the American Statistical Association and the Institute of Mathematical Statistics, is an Associate Editor of a number of international statistics journals and an author of the celebrated Springer book: *Mathematical Statistics*. Professor Shao is a leading expert on the theory and applications of bootstrap.

### *Abstract*
The bootstrap is a method of assessing statistical errors that can be applied to a wide range of problems. It replaces the traditional method based on theoretical derivations by repeatedly computing some statistics of interest. With modern and fast computers, the bootstrap has become a very popular method. The bootstrap is also more robust than the traditional method, since it does not use some explicit model assumptions required by the traditional method.

This workshop will provide a general introduction to the bootstrap methodology. It emphasizes how to correctly and efficiently apply the bootstrap in various problems. The theoretical basis for the bootstrap will also be explained.

### *Outline*
Lecture 1: Introduction
- motivation
- variance and distribution estimation
- generating bootstrap samples

Lecture 2: Bootstrap Confidence Intervals
- derivation and discussion of five different bootstrap methods
- comparison of accuracies among methods

Lecture 3: Special Topics
- bootstrap for dependent data
- bootstrap for stratified data
- bootstrap for imputed data