# Winter School 2010

**The Chinese University of Hong Kong**

*January 24-30, 2010*

*Room 1009, 10/F., William M.W. Mong Engineering Bldg., CUHK*

## Randomness in Computation and Communication

*By*

**Prof. Andrej Bogdanov**

**Prof. Lap Chi Lau**

**Prof. Shengyu Zhang**

*Department of Computer Science and Engineering*

*The Chinese University of Hong Kong*

**Abstract:**

We will talk about the role of randomness in the design of algorithms and communication protocols. Often, randomness allows us to achieve computational tasks that are otherwise impossible (or quite difficult) -- as long as we are willing to give the wrong answer on very rare occasions.

First, we will see some elegant combinatorial algorithms that make use of randomness. We will then describe how in certain cases the randomness can be eliminated without affecting the algorithm, and outline a general method for "derandomizing" algorithms. Finally, we will show that in the design of communication protocols randomness plays a fundamental role: certain communication tasks can be achieved using randomness but not without it.

**Biography:**

**Andrej Bogdanov** is an assistant professor in the computer science and engineering department.. He was a postdoctoral researcher at ITCS at Tsinghua University. He received his B. Sc. in mathematics from MIT in 2000, his M. Eng. in electrical engineering and computer science from MIT in 2001, and his Ph. D. in computer science from UC Berkeley in 2005. Before coming to Tsinghua he was a postdoc at the Institute for Advanced Study in Princeton and the DIMACS center at Rutgers University. Andrej's research interests are in computational complexity, including pseudorandomness, average-case complexity, and arithmetic complexity.

**Lap Chi Lau** is an assistant professor in the computer science and engineering department. He obtained his PhD in computer science from the University of Toronto. His research is in discrete algorithms and combinatorial optimization.

**Shengyu Zhang** received his B.S. in Mathematics at Fudan University in 1999, his M.S. in Computer Science at Tsinghua University in 2002, and his Ph.D. in Computer Science at Princeton University in 2006. After working in NEC Laboratories America for a summer, and in California Institute of Technology for two years as a postdoc, he joined The Chinese University of Hong Kong as an assistant professor in Department of Computer Science and Engineering.

Zhang's main research interest is quantum computing, computational complexity such as query complexity and communication complexity, and algorithm designing for networks related problems.