The Abdus Salam
**International Centre
for Theoretical Physics**

UNESCO
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ICTP Colloquium

Thursday, 13 September, at 4:30 PM

Randomness and Pseudorandomness

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Abstract:
Is the universe inherently deterministic or probabilistic? Perhaps more importantly - can we tell the difference between the two?
Humanity has pondered the meaning and utility of randomness for millennia. There is a remarkable variety of ways in which we utilize perfect coin tosses to our advantage: in statistics, cryptography, game theory, algorithms, gambling... Indeed, randomness seems indispensable! Which of these applications survive if the universe had no randomness in it at all? Which of them survive if only poor quality randomness is available, e.g. that arises from "unpredictable" phenomena like the weather or the stock market?
A computational theory of randomness, developed in the past three decades, reveals (perhaps counter-intuitively) that very little is lost in such deterministic or weakly random worlds. In the talk I'll explain the main ideas and results of this theory.