John A. Lynch Lecture Series

Strings, gauge theories and gravity

Juan Maldacena, Ph.D.

Institute for Advanced Study, Princeton

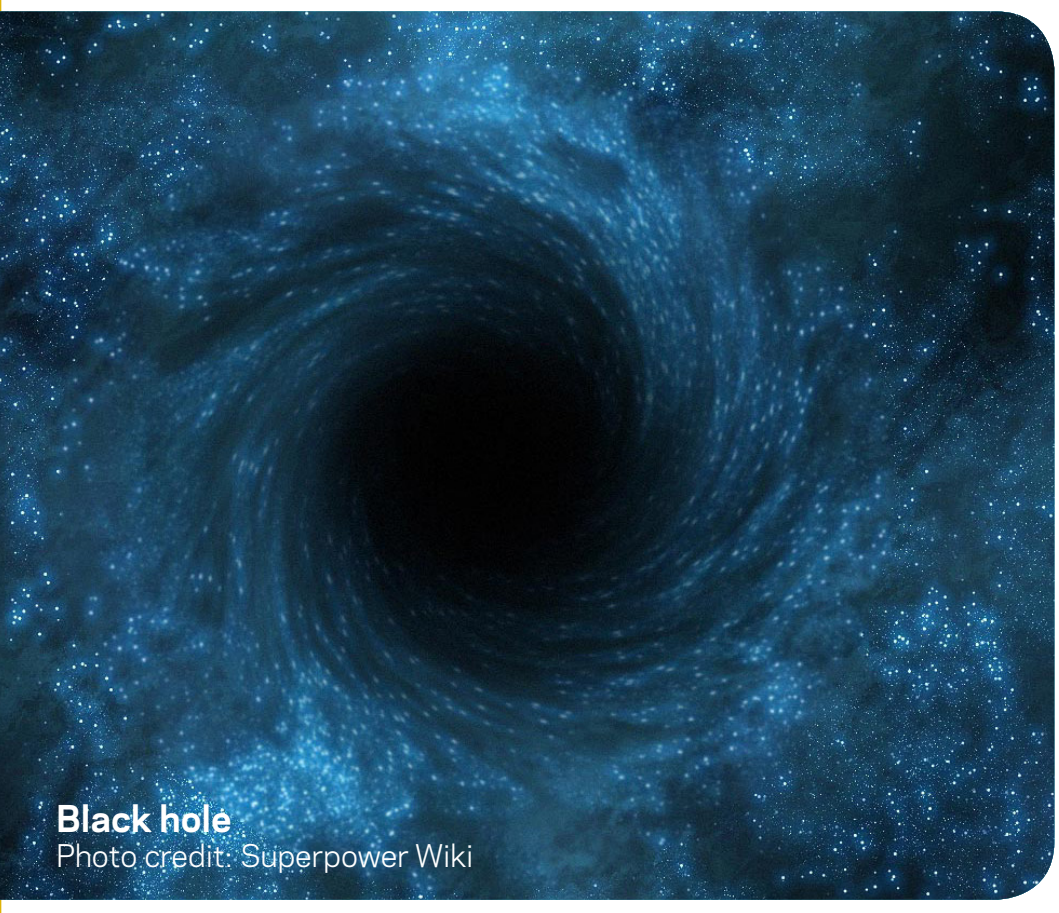
WEDNESDAY, NOVEMBER 6

4:00 PM

127 NIEUWLAND SCIENCE HALL

Reception to follow

Juan Maldacena's work focuses on quantum gravity, string theory, and quantum field theory. He has proposed a relationship between quantum gravity and quantum field theories that elucidates various aspects of both theories. He is studying this relationship further in order to understand the deep connection between black holes and quantum field theories, and he is also exploring the connection between string theory and cosmology.



Black hole
Photo credit: Superpower Wiki

Gauge theories, such as the one describing strong interactions, contain string-like excitations.

String theory is a theory describing the quantum dynamics of strings. The simplest versions of string theory live in a ten-dimensional space time. Prof. Maldacena will explain how these strings are intimately connected to the strings that appear in four-dimensional gauge theories.

The four-dimensional gauge theory gives rise to a string-like excitation that lives in ten dimensions. The ten-dimensional space is curved in such a way that its quantum dynamics is equivalent to that of a four-dimensional quantum field theory. This relation is useful to understand strongly interacting gauge theories. It can also be used to explain some quantum aspects of black holes.

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This lecture is also sponsored by the Department of Physics.