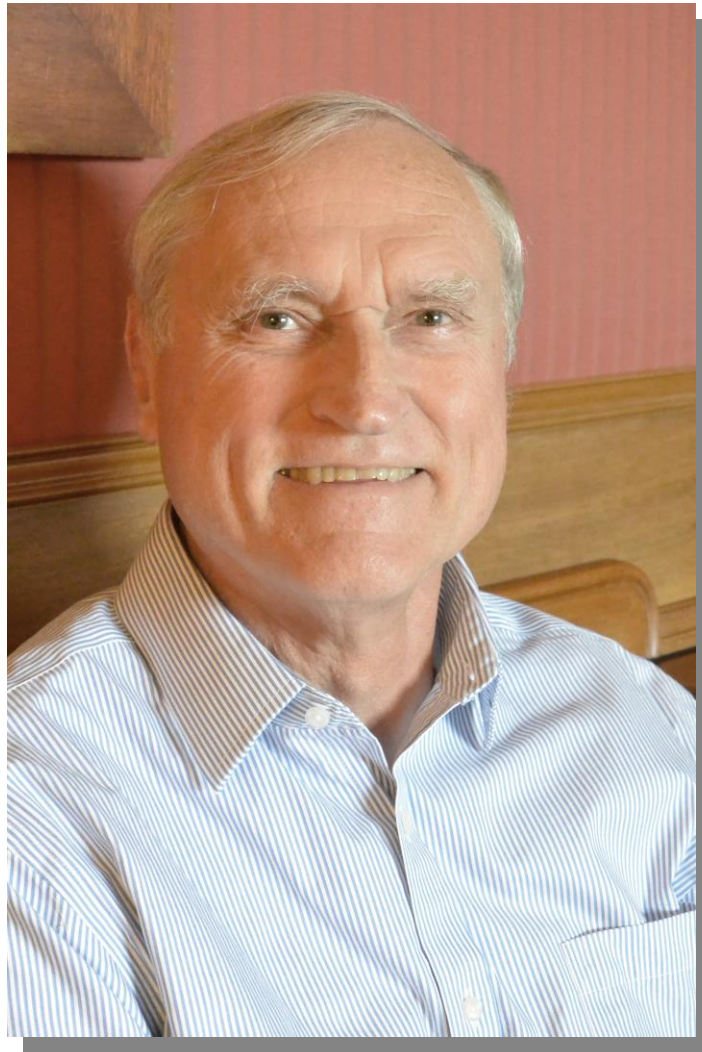




2019 Distinguished Lecture Series

Geometric Aspects of the Einstein Equations



Richard Schoen – UC Irvine

Lecture 1: Tuesday, November 5, 2019, 3:00 – 3:50 p.m. MS 6627

The Geometry of Spacetime - This lecture will give an introduction to the Einstein equations and their initial value formulation. We will focus especially on geometric conditions which are implied by the equations, and we will introduce the idea of gravitational energy and mass.

Lecture 2: Wednesday, November 6, 2019, 3:00 – 3:50 p.m. MS 6627

The General Positive Mass Theorem - This lecture will discuss the ADM mass and its positivity proofs. The original theorem was for four dimensional spacetimes, but there is also a natural version in higher dimensions which is important for mathematical applications as well as in physics arising from string theory. There are some subtle issues in the general theorem, which we will discuss.

Lecture 3: Thursday, November 7, 2019, 3:00 – 3:50 p.m. MS 6627

The Problem of Quasi-Local Mass in General Relativity - There is no notion of mass density for the gravitational field, so the problem of ascribing a reasonable definition of mass or energy to a finite region of spacetime does not have a unique solution. We will describe and compare various quasi-local mass quantities, which have been useful in general relativity. We will also discuss comparison-type theorems for polyhedral surfaces, which have been developed over the past few years and how these relate to quasi-local masses.