# Mathematical Sciences Colloquium


## Jim Isenberg

University of Oregon


### Tuesday, October 19, 3:30 p.m.

**J.R. Howard Hall, Room 254**

# Black Holes, the Big Bang, and the Cosmic Censor

Einstein's theory of general relativity predicts that in universes like ours, breakdowns in the physics (know as "singularities") generally develop, both on the cosmological and on the astrophysical scale. What we don't yet know is what the nature of those singularities is likely to be. Generally speaking, the singularities come in two types: the sort that involve everything being crushed in huge gravitational fields, and the sort that involve the breaking down of physical determinism. Which should we expect?

Roger Penrose has conjectured that only in very special cases does the evolving gravitational field force a breakdown in physical determinism. Generally, he suggests, we all get crushed. He has also conjectured that in almost all cases, when an astrophysical singularity forms, it is contained inside a black hole. These ideas have been called the Cosmic Censorship conjectures. We present some of the history of these conjectures, and we discuss some of the recent mathematical evidence that the Cosmic Censorship conjectures are true.


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