Abstract: A wormhole is a geometry which connects two widely separated regions of space-time. Wormholes appear ubiquitous in the traditional approach to quantum gravity as a path integral over a space of geometries. I will study a simple theory of gravity – three dimensional general relativity with a negative cosmological constant – where the effects of wormholes can be made completely precise. In the context of AdS/CFT, this has a remarkable implication: Einstein gravity is dual to an ensemble average of two dimensional conformal field theories, much like a spin glass or other system with quenched disorder. I will describe this average explicitly. This provides the first controlled realization of a classic idea of Coleman: in a theory of gravity with wormholes, the coupling constants of nature are random variables.

“The Uses and Abuses of Wormholes”

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