

Ricci Solitons, Spin Structures, and Me: A Mathematical Menage

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Gradient Ricci solitons constitute a special class of Riemannian manifolds which arise naturally out of the Ricci flow and whose metrics satisfy a generalized Einstein field equation; as such, geometers are keen to study them. I will discuss these manifolds (in dimension 4) from the perspective of a wide-eyed and inept beginner attempting to do research in the field (read: from the perspective of your author). By retracing my hesitant first steps to understanding, we will together stumble onto a suggestive interplay between these geometric structures and a subtle topological property called spin. This spin condition has a sinuous history, winding through geometry, topology, algebra, and (most suggestively) physics. I hope to have sufficient time to discuss its origins and weave this enigmatic topic into the narrative of my current research on Ricci solitons, which draws on (more-or-less) contemporary ideas from theoretical physics.