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Sean Gryb: Shape dynamics: the conformal backbone of general relativity

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Shape dynamics is an equivalent description of general relativity that is, itself, free of the local problem of time. Its discovery was motivated by Julian Barbour's relational program based on a precise interpretation of Mach's writings. The key features of shape dynamics that distinguish it from general relativity are: 1) that all local symmetries, which include local Weyl invariance of the spatial metric, are linear in the momenta and can be formally solved in any dimension, and 2) that the dynamics is generated by a single global Hamiltonian constraint. We will give a summary of the key features of shape dynamics and discuss some interesting future research directions including the possibility of quantizing and a promising link to gauge/gravity dualities.