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To Whom It May Concern:

This is a letter of recommendation for James Dolan, who is applying for a job at Quantinuum. Some of my very best work was done with Dolan, and he's the only person I've worked with who I'd call a "genius", able to routinely come up with ideas that completely take me by surprise. He is nonconformist to a degree that drives me crazy, yet nobody else tells me as many exciting new things. Working with him often consists of explaining problems and ideas, waiting, seeing what he comes up with, getting him to explain it, repeatedly pressing him on points that he hasn't fully worked out, and finally wrestling it down into a clear presentation.

The best example is our 1995 paper "Higher-dimensional algebra and topological quantum field theory", where we stated the Tangle Hypothesis, which is a general description of higher-dimensional string diagrams in terms of n-categories, and the TQFT Hypothesis, a conjectured classification of n-dimensional extended topological quantum field theories. The latter was later modified and rebranded as the Cobordism Hypothesis by Jacob Lurie, who in 2009 gave a 111-page proof sketch in his paper "On the classification of topological quantum field theories". Much work has been done on this topic since then, and the ideas continue to inspire plenty of new research on topological quantum field theory. Various generalizations have become important in topological quantum computing and condensed matter physics.

James Dolan has also done pioneering work on n-categories, homotopy theory, the mathematical foundations of Feynman diagrams, and other topics. His work on algebraic geometry is still unpublished, and to get some of it out into the world, I've been putting videos of a series of conversations on my YouTube channel.

James has also begun talking with Simon Burton about Simon's work on quantum computing. This could lead to some revolutionary developments if adequately supported:. I believe Simon just needs to focus Dolan's attention on some good problems, and novel ideas will emerge. They have a good relationship, so this can be done, but a financial inducement would help.

Sincerely,

John Baez