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**Scott J Baldridge\*** ([baldridge@math.lsu.edu](mailto:baldridge@math.lsu.edu)), 380 Lockett Hall, Department of Mathematics, Baton Rouge, LA 70803-4918. *The strange polynomial invariant of trivalent ribbon graphs and its even stranger categorification.* Preliminary report.

In 1971, Roger Penrose described an abstract tensor system that could be used to calculate the number of 4-face colorings of a planar trivalent graph, i.e., the four color theorem is true if this number is always nonzero for bridgeless trivalent planar graphs. In this talk, I will show how to construct a new polynomial invariant of a graph that evaluates to this number at one. I will then described a homology theory whose graded Euler characteristic is this polynomial and explain why it is so bizarre. This homology theory is similar but different than Kronheimer and Mrowka's instanton homology for webs. Like their homology, one may ask if there is a gauge theoretic version of it.

This talk is based on my paper, "A new cohomology theory for planar trivalent graphs with perfect matchings." (Received January 17, 2022)