Greg Kuperberg

Title: *Buildings, spiders, and geometric Satake*

Abstract: Louis Kauffman is a special description of the Jones polynomial and the representation theory of $U_q(\mathfrak{sl}(2))$in which each skein space has a basis of planar matchings. There is a similar calculus (discovered independently by myself and the late François Jaeger) for
each of the three rank 2 simple Lie algebras A_2, A_2, and G_2.
These skein theories, called ``spiders'', can also be viewed as Gröbner-type presentations of pivotal categories. In each of the four cases (optionally also including the semisimple case $A_1 \times A_1$, the Gröbner basis property yields a basis of skein diagrams called ``webs''. The basis webs are defined by an interesting non-positive curvature condition.

I will discuss a new connection between these spiders and the geometric Satake correspondence, which relates the representation category of a simple Lie algebra to an affine building of the Langlands dual algebra. In particular, any such building is $\mathrm{CAT}(0)$, which seems to explain the non-positive curvature of basis webs.

(Joint work with Joel Kamnitzer and Bruce Fontaine.)