

Berkeley Algebraic Statistics Seminar

Organizer(s): Andrew Critch and Shaowei Lin

Wednesday, 2:00–3:00pm, 939 Evans

Nov 9 **Luke Oeding**, UC Berkeley

Tensors and implicitization

Often the algebraic varieties that come up in Algebraic Statistics occur naturally in ambient spaces that are tensor products of many vector spaces. Unfortunately, the dimension of a tensor product grows exponentially with the number of factors, and this can quickly cause computer calculations on these varieties to fail. On the other hand, since their constructions are often so natural, these varieties often have nice symmetry groups that we can exploit to help us understand the variety even when the number of variables is large.

I will introduce a particular example that came up in computer vision, which also has an interpretation related to context-specific independence models. Using this example as a guide I will show how a mixture of basic Algebraic Geometry, classical Representation Theory and Numerical Algebraic Geometry can be used to do implicitization - i.e. to find the defining equations of the algebraic variety. Moreover I do this without using Groebner bases. This is joint work with Chris Aholt and Jon Hauenstein.