

**Bernd Sturmfels**, UC Berkeley and MPI-MIS Leipzig

CONVEXITY IN TREE SPACES

*Abstract:* We study the geometry of metrics and convexity structures on the space of phylogenetic trees, here realized in terms of ultrametrics. The CAT(0)-metric of Billera-Holmes-Vogtman arises from the theory of orthant spaces. While its geodesics can be computed by the Owen-Provan algorithm, geodesic triangles are complicated. We show that the dimension of such a triangle can be arbitrarily high. Tropical convexity and the tropical metric behave better. They exhibit properties desirable for geometric statistics, such as geodesics of small depth.

*This talk is based on a joint work with Bo Lin, Xiaoxian Tang, and Ruriko Yoshida.*