Oklahoma State University

Topology Seminar

Title

Towards the efficient construction of spherical morphs.

Speaker: Christian Howard, UIUC

Date: Nov 4, 2025
Time: 4:00 PM
Room: MSCS 514

Abstract: Given two isomorphic geodesic embeddings of a planar graph on the sphere, a morph between these embeddings is an isotopy where edges are constrained to be geodesics at each intermediate embedding. Cairns [Ann. Math 1944] constructively proved a morph exists between any two isomorphic spherical triangulations when geodesics are further constrained to be shortest-paths. An algorithmic interpretation of his proof leads to a morph with exponential complexity in the worst case, which is not ideal for computation. Since then, Awartani & Henderson [Trans. AMS 1987] and Kobourov & Landis [JGAA 2006] have described special cases for triangulations that lead to spherical morphs with polynomial complexity. However, an efficient morphing strategy for general spherical triangulations—let alone more general spherical embeddings—still remains elusive.

We present some of our current progress towards these ends and share various open problems and conjectures.