

## Subdivision schemes for surface design, editing, and rendering

Subdivision schemes have recently gained greater popularity mainly due to the big success in animation movie production. In Pixar Animation Studios, for instance, surface subdivision algorithms constitute the core engine in the production of all animation films, from “Geri’s Games” (1997) to “Finding Nemo” (2003). However, resistance to adopting the surface subdivision approach by other industrial sectors remains. One of the biggest obstacles to its acceptance is the limitation of the current approach to only  $C^1$  surfaces of arbitrary topologies and desirable geometric shapes. A new approach, using matrix-valued templates, is introduced in this lecture. The key mathematical tool involves constructing refinable bivariate vertex splines on both regular and semi-regular triangulations. I will discuss some recent results from my joint work with Qingtang Jiang and Wenjie He, both of the University of Missouri-St. Louis.