TEXAS ★ STATE
UNIVERSITY ®
The rising STAR *of Texas*

Topology Seminar at Texas State

<u>When</u>: Tuesday, 2019, September 10, 12:30-1:50 p.m.,

<u>Where</u>: ENC 230

<u>Speaker</u>: Dr. Anton Dochtermann

Topic: Extendably shellable complexes
             and Simon's conjecture

<u>ABSTRACT</u>

A pure d-dimensional simplicial complex is 'shellable' if one can find an ordering of its facets $(F_1, ..., F_m)$ in such a way that each F_i intersect the previous collection in a pure codimension-one subcomplex. Shellable complexes include boundary complexes of polytopes and independence complexes of matroids, and shellability has important implications for the underyling topology and commutative algebra of such complexes . A natural question to ask is whether one can `get stuck' in the process of building a shelling order, and a shellable complex is said to be 'extendably shellable' if every shelling of a subcomplex can be extended. Relatively few extendably shellable complexes are known, and for instance an open conjecture of Simon posits that the k-skeleton of a simplex is extendably shellable. In joint work with Culbertson, Guralnik, and Stiller we prove that for all $d \geq 1$ a shellable d-dimensional simplicial complex with at most d+3 vertices is extendably shellable. The proof involves considering the structure of `exposed' edges in chordal graphs as well as a connection to linear quotients of quadratic monomial ideals.