1145-05-609 **Nicholas A. Loehr***, 225 Stanger Street, 460 McBryde Hall, Blacksburg, VA 24060-0123, and **Kyungyong Lee** and **Li Li**. *Chain decompositions for q, t-Catalan numbers.*

The q, t-*Catalan numbers* $C_n(q, t)$ are polynomials in q and t that reduce to the ordinary Catalan numbers when $q = t = 1$. These polynomials have important connections to representation theory, algebraic geometry, and symmetric functions. Work of Garsia, Haglund, and Haiman has given us combinatorial formulas for $C_n(q, t)$ as sums of Dyck lattice paths weighted by area and dinv. This talk continues an ongoing quest for a bijective proof of the symmetry property $C_n(q, t) = C_n(t, q)$.

We conjecture some structural decompositions of Dyck objects into infinite chains that can be paired up to prove the symmetry of some coefficients in $C_n(q, t)$. The chains are built from certain initial objects by applying an operator that increases dinv by 1 and reduces area by 1. A remarkable feature of these chains is that they do not depend on n but explain the joint symmetry for all n simultaneously. The chain construction leads to a combinatorial proof that for $0 \leq k \leq 9$ and all n, the terms in $C_n(q, t)$ of total degree $\binom{n}{2} - k$ obey the required symmetry property. (Received September 11, 2018)