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Luc Lapointe and **Jennifer Morse*** (morsej@math.miami.edu), Department of Math,
University of Miami, Coral Gables, FL 33124. *k-Schur functions, Macdonald polynomials, and
quantum cohomology.*

The k -Schur functions arose in our study of an open problem on Macdonald polynomials, and were conjectured to satisfy properties that refine classical ideas in symmetric function theory such as Pieri rules, Kostka numbers, the Young lattice and Young tableaux. We have recently proven these conjectures, illustrating that the k -Schur functions refine the Schur functions in a combinatorial sense. More generally, we have discovered that the k -Schur functions also play a geometric role that mimics the Schur function role in the cohomology of the Grassmannian. It turns out that the k -Schur functions are connected to quantum cohomology, and their Littlewood-Richardson coefficients are 3-point Gromov-Witten invariants. This leads to a new approach to the open problem of finding a combinatorial interpretation for these constants. (Received September 28, 2005)