UCD MAT 280: Macdonald Polynomials and Crystal Bases

Macdonald polynomials form a two parameter basis for the ring of symmetric functions and have a very rich structure. For example, (nonsymmetric) Macdonald polynomials can be understood as eigenvectors of certain operators. In special limits they relate to Demazure characters. Recently, their structure has also been related to crystal bases, which originally came from the representation theory of quantum groups. This course will investigate these exciting new connections!

- Symmetric functions, in particular Macdonald polynomials
- Combinatorics of Coxeter groups, weak and strong Bruhat order, quantum Bruhat graph
- Crystal graphs, Demazure crystals
- Models for crystals