September 22: Xuhua He (MIT), "The total positivity of the De Concini-Procesi compactification."

The notion of total positivity was first introduced by Schoenberg for invertible matrices, as positivity of all the minors. Lusztig generalized the definition of total positivity to split reductive groups over the real numbers. He also defined the totally positive part for flag varieties. Although the definition is elementary, many of the properties rely on the theory of canonical basis and are thus non-elementary.

I will talk about the closure $\overline{G_{>0}}$ of the totally positive part of a reductive group in its "wonderful group compactification" (the so-called De Concini-Procesi compactification). I will show some properties of $\overline{G_{>0}}$, which are analogous to the properties of the total positivity of the group and its flag varieties. I will also give an explicit description of $\overline{G_{>0}}$. The proofs are based on the theory of canonical basis and the parametrizations of the totally positive part of the flag varieties.