Discrete series representations and Toeplitz operators.

A natural object of study in analysis is the space of holomorphic square-integrable functions on bounded domains of complex finite dimensional spaces. These are the Bergman spaces and their study combines complex and functional analysis. Using the orthogonal projection onto the Bergman spaces one can define the so-called Toeplitz operators. These are of particular interest for bounded symmetric domains. In the first part of the talk we will introduce all these objects and their relevant properties. In particular, we will show that the bounded symmetric domains can be associated to a special type of Lie groups: the semisimple noncompact Lie groups.

In the second part of the talk we will see that the Bergman spaces on bounded symmetric domains provide irreducible representations that form the holomorphic discrete series of the associated Lie groups. This fact allows to make use of representation theory to study Toeplitz operators. We will show that this can be used to prove the existence of numerous commutative C*-algebras generated by Toeplitz operators.