The topic of the lecture are theoretical studies of divalent carbon(0) compounds which have the general formula \( \text{CL}_2 \), where \( L \) is a \( \sigma \) electron donor. The chemical bond between the ligand \( L \) and carbon is a \( L \rightarrow C \) donor-acceptor bond which means that the carbon atom in \( \text{CL}_2 \) carries two electron lone pairs. Experimentally known examples where \( L = \text{PR}_3 \) are carbodiphosphoranes (CDP) which have already been synthesized in 1963. The donor-acceptor model \( L \rightarrow C \leftarrow L \) nicely explains widening of the bonding angle when \( L \) becomes a better \( \pi \)-acceptor:

A theoretically predicted new class of divalent carbon(0) compounds are carbodicarbenes \( \text{C} (\text{NHC})_2 \) (1) where NHC = \( \text{N}^- \)-heterocyclic carbene which have become synthesized in the meantime. The latter compounds are related to tetraaminoallenes 2 \( (R = \text{NX}_2)^3 \) . The calculations predict that divalent carbon(0) compounds have promising chemical properties particularly as ligands in transition metal complexes which should be investigated with experimental methods. We also report about heavier group-14 species \( \text{EL}_2 \) \( (E = \text{Si} - \text{Pb})^6 \) and group-15 homologues \( (\text{N}^+)_2 \). Very recently, the group-13 homologue \( (\text{BH})(\text{CAAC})_2 \) where CAAC is a cyclic (alkyl)(amino)carbene has become synthesized.8

The calculations predict that divalent carbon(0) compounds have promising chemical properties particularly as ligands in transition metal complexes which should be investigated with experimental methods. The title of the lecture is "Carbenes, Carbones and Group-13 and Group-15 Homologues." The seminar is scheduled for 7th December 2011 (Wednesday) from 11am to 12.30pm at NTU SPMS CBC Building Level 2, Conference Room.