Title: Byproducts: exotic $\mathbb{R}^4$'s

Once Donaldson's exclusion appeared, it became clear that there must be exotic $\mathbb{R}^4$'s which are the smooth 4-manifolds homeomorphic but not diffeomorphic to $\mathbb{R}^4$. The talk will be started with construction of non-smoothable P_{E_8}-manifold, which has a historical importance in famous Poincare's conjecture, besides being a key in constructing our exotic manifolds. Afterwards uncountably many exotic $\mathbb{R}^4$'s will be constructed and it will be proved that they all have different smooth structures. If time permits, h-cobordism theorem and its failure in the dimension 4 will be stated, which helps us to exhibit another types of (small) exotic $\mathbb{R}^4$.