Author: A. POUSSE
Università degli studi di Napoli "Federico II" (Italy)
Title: *"On the stability of co-orbital motion in the three-body problem"*

Abstract. The co-orbital motion, that corresponds to a particular domain of trajectories where two bodies (two exo-planets or a planet and an asteroid) gravitate around a star with the same period, possesses a very rich dynamics connected to the Lagrange's equilateral configurations L_4 and L_5 as well as to the Eulerian's aligned configurations L_1, L_2 and L_3. A major example in the solar system is given by the Trojan asteroids harboured by Jupiter in the neighbourhood of L_4 and L_5. A second astonishing configuration is given by the satellites of Saturn, Janus and Epimetheus that exchange their orbits every four years and whose dynamics is known as "horseshoe". Eventually, the "quasi-satellite" asteroids, recently observed harbouring several planets in the solar system, are associated with a new type of co-orbital dynamics whose motion, in a rotating frame with a planet, describe the trajectory of a remote retrograde satellite. The main goal of our work is to prove long time stability results for the above co-orbital dynamics. Therefore we shall sketch a rigorous proof (and up to our knowledge, the first one) of existence of the "horseshoe" dynamics over infinite times in the three-body problem thanks to KAM theory.

Joint work with P. Robutel (1) and L. Niederman (1,2)
(1) IMCCE - Observatoire de Paris
(2) Université Paris XI