Hydrodynamic modelling of Faraday wave and bouncing droplet coupling

Prof. Paul Milewski, University of Bath

Recent experiments by two groups, Yves Couder (Paris) and John Bush (MIT) have shown experimentally that droplets will bounce on the surface of a vertically vibrated bath (instead of coalescing with it), generating a Faraday-type wavefield at every bounce. From this state, a pitchfork symmetry breaking bifurcation leads to a "walking" state whereby the bouncing droplet is steadily "guided" by the self-generated wavefield - the droplet's pilot wave. Once this state is achieved a large array of interesting dynamics ensues with surprising analogies to quantum mechanical behaviour. I will present a coupled particle-fluid model that can can be used simulate the dynamics of this problem. This is joint work with John Bush, Andre Nachbin (IMPA) and Carlos Galeano (IMPA).