# Understanding Black Hole and Galaxy Co-evolution Using Extragalactic Surveys

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**Abstract**

Observations indicate that supermassive black holes (SMBHs, 10^6-10^9 Msun) dwell at the centers of most local galaxies. Scaling relations between SMBH mass and several large-scale properties of the host galaxies point to a co-ordindated growth of galaxies and their central engines over cosmic time: they "co-evolve".

Who is the leading actor on the cosmic stage: the black hole or the galaxy or did they grow together? How did the first black holes form?

To address these questions, in this talk I will present my work testing these co-evolution scenarios, focusing on active SMBHs. I will use the extraordinarily rich multiwavelength dataset of the Cosmic Evolutionary Survey (COSMOS). I will concentrate on the highest energy data available, the X-ray ones, from the surveys I have led using both the Chandra and NuSTAR NASA satellites. These data provide us with a unique and powerful tool to find and study accreting SMBHs in the distant Universe.