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I did my thesis at the Institut de Recherche en Astrophysique et Planétologie in Toulouse, under the supervision of Natalie Webb. During my thesis, I applied several methods to discover potential intermediate-mass black holes hidden in the X-ray source catalogues of the *XMM-Newton*, Swift and Chandra satellites, black holes that are still largely unobserved but that are nonetheless crucial for explaining the formation of supermassive black holes. To this end, I developed a highly versatile algorithm for the automatic classification of X-ray sources, which is now being used as part of the XMM2ATHENA project. My thesis shows the untapped potential of X-ray and multi-wavelength archive data, which the XMM2ATHENA project resolves wonderfully by making the most of the *XMM-Newton* catalogue. To exploit the synergy between participatory science and machine learning, I also created the CLAXSON participatory science website (<https://xmm-ssc.irap.omp.eu/claxson>) with Natalie Webb and Mickaël Coriat, enabling the general public to classify X-ray sources themselves in order to improve future classification algorithms and perhaps make some serendipitous discoveries. I'm now a postdoc at the University of Barcelona on a new subject, looking for massive star mergers in nearby galaxies.