**D7 - Research Opportunity and Performance Evidence (ROPE) – Publications**

**i. Publication context and contribution**:

Verification of multi-agent systems (MAS) is fundamental if we are to build a society that can trust the agents we deploy in the world. However, verification of MAS is notoriously hard, both from a theoretical point of view and a practical point of view. The state-of-the-art theoretical results, from the 1970s until even very recently [C4], has been to assume some sort of hierarchy on the information available to the agents. However, in **2017 breakthrough** **work** [C2,C3] in D7 ii), I and my co-authors have shown how to do **complex analysis** of MAS without such restrictive hierarchical assumptions. This breakthrough charts a trajectory that will be pursued in this proposal in Aim 1.

I've teamed up with world experts in planning (Hector Geffner and Blai Bonet) and knowledge representation (Giuseppe De Giacomo) to studied general forms of planning that are variations of the problems I aim to address in this proposal [C5, C11]. The importance of this work is that it shows that the standard techniques (i.e., the belief space construction for dealing with imperfect information) do not work for complex (i.e., infinite-state) systems, and it presents **new ideas and techniques for dealing with these complex systems.** Integrating verification of MAS and planning theory and technology is the focus of Aim 2.

I've also worked in quantitative aspects of verification, including counting in MAS [J2, C7,C12], quantitative objectives in rational synthesis [C6] and verification of probabilistic systems [C26]. My work C6, for instance, is the first to treat the computation of equilibria for multiple agents whose objectives are a mix of qualitative and quantitative. The importance of quantitative aspects of verification is witnessed by the recent ERC grants on the topic of Orna Kupferman and Thomas Henzinger. My proposal pursues this quantitative aspect under Aim 3.

My work on verification of MAS in which there is no known bound on the number of participating agents [B1, C8, C13, C14, C15, C17, C18, C19] is relevant to many modern computing systems such as peer to peer networks, blockchain technology, etc. In particular, with my co-authors, we published a survey in 2015 of the field [B1] (30 citations on google scholar).

Most of my work before 2011 was more theoretical and laid the mathematical and algorithmic foundations for my expertise [BC1, C22 - C25, C27 - C30].

Publication conventions in my field insist that authors are ordered alphabetically, and that conferences are still the central venues for publishing one's work. This explains why my name is not often the first in the author list, and the focus on conference papers in my curriculum and in the list below. In the next section I list publications relevant to this proposal. Where available, I include the ERA conference ranking and CORE conference ranking (http://portal.core.edu.au/conf-ranks/), and the SJR letter ranking for journals at time of publication (http://www.scimagojr.com/journalrank.php, if a ranking is not available for the current year, then an average of the last 5 years is taken).