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SCHOOL OF MECHANICAL ENGINEERING SEMINAR

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Wolfson Building of Mechanical Engineering, Room 206

No robot is an island, no team an archipelago

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We live in opportune times. The centuries-old dreams of creating intelligent, programmable automatons—robots—are becoming reality. Recent years are seeing dramatically growing interest in robotics, by scientists and practitioners alike. Robots—from the molecular scale to tank-size—seem to appear everywhere: in production lines, in the battlefield, in hospitals, in warehouses, in homes, in fields; on the ground, on water, and in the air.

In this talk, I argue that to accelerate and maximize the impact of robotics, robots should operate in teams, rather than in isolation. Moreover, I argue that effective robot teams must dynamically adjust their teamwork, instead of relying on rigid pre-planned coordination schemes. This is not a mere philosophical argument: I will present algorithms, data structures, and computational techniques for facilitating such teamwork, and discuss analytical guarantees and empirical results that demonstrate the effectiveness of these contributions in a variety of cooperative robot teams, from the molecular to the vehicle scale; robot teams which move in formations, explore urban areas, play soccer, and patrol Israel's borders.

As a final note, I will also argue that what is true for robots, is true for roboticists. Accelerating the impact of robotics requires leaving behind rigid disciplinary bounds and pre-established division of labor within academic circles and in practice. Instead, roboticists should embrace multi-discplinary collaborations, opening up to biology, psychology, economics, and sociology as sources of inspiration and targets of influence.

About the speaker:

Gal A. Kaminka is a professor at the computer science department and the brain sciences research center, at Bar Ilan University (Israel), where he chairs the Bar Ilan University Robotics Consortium, and his MAVERICK research group. His research expertise includes multi-agent and multi-robot systems, teamwork and coordination, behavior and plan recognition, and modeling social behavior. He received his PhD from the University of Southern California (2000), spent time as a post-doctorate fellow at Carnegie Mellon University (until 2002), and a year as a Radcliffe Fellow at Harvard University's Radcliffe Institute for Advanced Study (2012). Prof. Kaminka was awarded an IBM faculty award and top places at international robotics competitions. He served as the program chair of the 2008 Israeli Conference on Robotics, and the program co-chair of the 2010 Int'l Joint Conference on Autonomous Agents and Multi-Agent Systems (AAMAS). He has served on the international executive bodies of IFAAMAS (International Foundation of Autonomous Agents and Multi-Agent Systems), the RoboCup Federation, and AAAI (Association for Advancement of Artificial Intelligence). He is the author or co-author of over 150 publications and 7 patents. He is the 2013 recipient of the Israeli national Landau Prize in exact sciences.