



I Seminari su “Information Technology Outlook” – Dottorato di Ricerca in Informatica e Matematica

Prof. Marco Dorigo

IRIDIA, Université Libre de Bruxelles

Martedì 8 aprile 2014, ore 16.45, Sala Consiglio, 7° piano, Dipartimento di Informatica

SWARM ROBOTICS RESEARCH AT IRIDIA

Swarm robotics is about constructing and controlling swarms of autonomous robots that cooperate to perform tasks that go beyond the capabilities of the single robots in the swarm. In the talk, I will present the results of two large experiments in swarm robotics: Swarm-bots and Swarmanoid.

In Swarm-bots, I consider a swarm of s-bots, ground robots capable of connecting to, and disconnecting from, other s-bots. When they are connected to each other the s-bots become a single robotic system, a swarm-bot, that can move and change its shape. A swarm-bot can solve problems that cannot be solved by s-bots alone such as transporting heavy objects, moving on rough terrain, and passing obstacles such as holes or steps. I will show video recordings of experiments we performed to study coordinated movement, path formation, self-assembly, collective transport, shape formation, and other collective behaviours using the swarm-bot platform.

In Swarmanoid, I consider a heterogeneous swarm composed of three types of autonomous robots: flying, climbing and ground robots. These robots cooperate both physically and logically: climbing robots cannot move on the ground and are transported to the climbing location by ground robots, while the movements of the ground and climbing robots are guided by the flying robots. I will present the results of experiments in which the Swarmanoid robots cooperate in a search and retrieval task in a 3-dimensional environment.

Marco Dorigo received his Ph.D. in electronic engineering in 1992 from Politecnico di Milano, Italy, and the title of Agrégé de l'Enseignement Supérieur, from Université Libre de Bruxelles (ULB), in 1995. Since 1996, he has been a tenured Researcher of the fund for scientific research F.R.S.-FNRS of Belgium's French Community, and a Research Director of IRIDIA, ULB. He is the inventor of the ant colony optimization metaheuristic. His current research interests include swarm intelligence, swarm robotics, and metaheuristics for discrete optimization. He is the Editor-in-Chief of Swarm Intelligence. Dr. Dorigo is a Fellow of the IEEE and of ECCAI. He was awarded the Italian Prize for Artificial Intelligence in 1996, the Marie Curie Excellence Award in 2003, the Dr. A. De Leeuw-Damry-Boullart award in applied sciences in 2005, the Cajastur International Prize for Soft Computing in 2007, and an ERC Advanced Grant in 2010.