

2005 IEEE Swarm Intelligence Symposium

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The second IEEE symposium on Swarm Intelligence (SI) was hosted at the Westin Hotel in Pasadena (USA) from June 8 to 10. Local organization was performed by members belonging to different academic institutions, including the Jet Propulsion Laboratory (JPL), the École Polytechnique Fédérale de Lausanne (EPFL), the California Institute of Technology (Caltech), and the University of Southern California (USC). The symposium started on June 8 with a day of tutorials, followed by a mixed single- and double-track conference from June 9 to June 10. The event started up with three well-attended talks which covered theoretical aspects of SI as well as two of the most successful combinatorial optimization techniques based on the SI paradigm: *Analyzing swarms: a stochastic systems approach to studying swarm behavior* by Kristina Lerman (see picture) and Tadd Hogg; *Fundamentals and applications of Ant Colony Optimization (ACO)* by Marco Dorigo; and *Fundamentals and applications of Particle Swarm Optimization (PSO)* by James Kennedy and Russell Eberhart. The registration fees in combination with additional industrial sponsorship enabled us to fund two keynote speakers. This significantly enhanced and raised the profile of the event: Tanya Pankiw (*The Honey Bee Foraging Behavior Syndrome: Quantifying the Response Threshold Model of Division of Labor*) and Marco Dorigo (*Swarm-bot: An Experiment in Swarm Robotics*).

Of the 118 submitted contributions, 49 were accepted for oral presentation (27 in single-track and 22 in double-track sessions), with a further 16 papers accepted as posters, giving an oral acceptance rate of about 41%. In the proceedings, contributions accepted for oral presentation were represented by 8-page papers while posters were accompanied by a correspondingly shorter 4 page paper. Papers employed a variety of algorithms and methods based on SI principles, with PSO being the most popular technique for solving hard optimization problems. A number of contributions focused on control techniques and algorithms for distributed embedded systems such as swarms of robots or wireless networks (ad-hoc and sensor).

IEEE SIS-05 distributed three awards. The best paper award, sponsored by the International Society of Artificial Life (ISAL), went to Marco Mamei and Franco

Zambonelli for their paper entitled *Physical Deployment of Digital Pheromones through RFID Technology*, work that combined modern radio tagging technology with one of the stigmergic mechanisms widely used by the SI community in a very innovative way. The best application paper award, sponsored by AntOptima SA, was assigned to Maxim Peysakhov and William Regli for their paper entitled *Ant Inspired Server Population Management in a Service based Computing Environment*, a contribution focusing on the application of an original quorum sensing algorithm, inspired by *Leptothorax Albipennis* ants, to service management in ad-hoc wireless networks. Finally, the award for the best student paper, also sponsored by ISAL, went to Simon Garnier and colleagues for their paper entitled *Collective Decision-Making by a Group of Cockroach-like Robots*, an experimentally well-supported work that showed how it is possible to transport an aggregation model derived from cockroaches to the distributed control of a robotic platform.



The conference attracted 87 delegates from 19 countries, with 10 of those from industry and the remainder from either academic institutions or governmental research laboratories. A further industrial presence at the symposium was the well-attended concluding event where the audience could discuss issues of interest with a diverse panel of experts from industry: Eric Bonabeau (Icosystem Inc., Boston, USA), Rodney Goodman (InfInID Technologies Inc., Pasadena, USA), Joe Rothermich (Natural Selection Inc., La Jolla, USA) and Hobson Lane, (Northrop Grumman Inc., Redondo Beach, USA).

This symposium could not have taken place without the help of numerous people and organizations. We would like to thank the IEEE Computational Intelligence Society for renewing its support to this second symposium on SI and all our industrial sponsors for having allowed the conference to further achieve excellence in the program. We would like to thank the IEEE Communication and Robotics and Automation Societies for having technically co-sponsored this

event. Jennifer Lambert was one of our main contacts at IEEE and professionally guided us through the financial decisions that we had to make. Okyay Kaynak as chair of conference also provided valuable advice on organization details while Paul Flikkema (organizational chair), Andrew A. Gray (financial chair), and Jafar Adibi (local arrangement chair) made sure these suggestions were put in place. Kristina Lerman and Aram Galstyan ensured that all the issues relative to the publication of proceedings were well handled. The powerful on-line review system (START V2), which greatly simplified the process, was developed by Rich Gerber. The program committee, chaired by Luca Maria Gambardella, did an excellent job in reviewing all the submitted papers, and ensuring that the quality of accepted papers will provide a firm foundation for future SI symposia. Lastly, but by no means least, we would like to acknowledge the contributions of Robert Marks and David Fogel. We would like to thank both of them for having trusted us as organizers of the second SIS and for having endorsed the idea of a strongly interdisciplinary conference, spanning from theoretical foundation to embedded systems via purely algorithmic contributions. Bob and David have also been a constant source of advice and support, which we found to be invaluable.

While the feedback from delegates was very positive (the size and the informal atmosphere of the symposium promoted intensive discussions inside and outside the conference rooms, see picture), the SI field has still a long way to go before becoming mature and self-contained. In SIS 05, we managed to gather researchers working in very different sub-areas of SI for the first time and we hope that this example will be followed in future editions of SIS. For 2006, the CIS conference committee has decided to support SIS 2006 to be held in Indianapolis, Indiana, USA in May. For 2007, the approval for SIS 2007 in Hawaii has already been granted. As general co-chairs it was our great pleasure to organize the event; we thoroughly enjoyed it, and look forward to future symposia with great anticipation.

