

# DISTINGUISHED LECTURER SERIES

THE INSTITUTE FOR SYSTEMS RESEARCH

Friday, March 14

## Swarm Intelligence

Eric Bonabeau, Icosystem Corp., Cambridge, Mass.



The computer age's centralized mindset has successfully produced machines that have changed our lives. A central unit processes and dispatches information, while a memory stores it. Simple and powerful. But today's computer isn't the only possible tool for computing. Machines can process information in other ways. One way is "swarm intelligence." Forget centralization and control. Forget programming. Forget the concept of a big, omniscient computer. Think of a hive, or an anthill. Social insect colonies aren't centrally controlled; they're composed of thousands or even millions of insects with limited cognitive repertoires. Individually, one insect can't do much, but collectively, social insects can achieve great things—build a nest, forage for food, take care of the brood, allocate labor, and so on. The collective intelligence of social insects, swarm intelligence, offers a powerful new model for computing. At a time when the world grows so complex that no single human being can understand it, when information, and not the lack of it, threatens our lives, when users can no longer master bloated software, swarm intelligence offers an alternative way of designing computing systems. In swarms, autonomy, emergence, and distributed functioning replace control, preprogramming, and centralization. Applications to manufacturing scheduling, supply chain optimization, routing and others will be presented.

### Biography

Dr. Eric Bonabeau is the chief scientist at Icosystem Corp., a Cambridge, MA-based "idea incubator" that uses complexity science to invent new technologies. Prior to his current position, Dr. Bonabeau was the CEO of Eurobios, a joint venture with Cap Gemini Ernst & Young applying the science of complex adaptive systems to business issues. He has been a research engineer with France Telecom R&D, an R&D engineer with Cadence Design Systems, and the Interval Research Fellow at the Santa Fe Institute. He is the author of more than one hundred science articles and three books (*Intelligence Collective*, Hermès, 1994; *Swarm Intelligence in Natural and Artificial Systems*, Oxford University Press, 1999; and *Self-Organization in Biological Systems*, Princeton University Press, 2001). Dr. Bonabeau is also co-editor-in-chief of *Advances in Complex Systems* and a member of the editorial and scientific committees of more than twenty-five international journals and conferences. He graduated from Ecole Polytechnique, France, holds a telecommunications engineering degree from Telecom Paris, a post-graduate degree in applied mathematics and a PhD in theoretical physics, both from Paris X University.

### Logistics

Friday, March 14, 2003

*Lecture*

10:00 a.m.

Judith Resnik Lecture Hall

1202 Glenn L. Martin Hall

University of Maryland, College Park, MD 20723

*Roundtable discussion*

2:00 p.m.

2168 A.V. Williams Building

### Remaining lectures in the series

Friday, April 18

#### Scientific Discovery through Advanced Computing

Dr. Alan J. Laub, head of the Scientific Discovery through Advanced Computing (SciDAC) Program at the Department of Energy (on leave from UC Davis).

**Current information:**  
[www.isr.umd.edu/ISR/about/dls.html](http://www.isr.umd.edu/ISR/about/dls.html)

**Questions?**  
Call 301-405-6615

The  
Institute for  
**Systems**  
Research



A. JAMES CLARK  
SCHOOL OF ENGINEERING