



Netted Sensors Community 2005 Workshop

Distributed Computing and Processing

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Brief Overview (1)

- **One working definition of a Netted Sensor System:**
 - A set of heterogeneous sensors that are connected together with communications capabilities to form a network that **collaborates** to solve a problem
- **Collaboration implies distributed**
 - Processing occurs both **across and between** layers of a network
- **This is not your “fathers signal processing”**
 - Strong coupling between signal/information processing, distributed computation, resource management, information management, and communications and networking
- **In the end, “success” is measured relative to the following two questions:**
 - What can be done of any practical value (i.e., detection, classification, tracking, sensor cueing, etc.)?
 - How do you deploy over extended periods of time to fit different operational needs (e.g., from days to months)?



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Brief Overview (2)

- **The following talks provide three different perspectives on collaboration within a netted sensors network:**
 - **Prof. Gaurav Sukhatme** discusses the concept of mobile networks (robots) that can adaptively observe, sample, and interact with the environment
 - **Dr. Chee Chong** discusses the issue of distributed tracking with small sensors under energy and communications constraints
 - **Dr. Ian Foster** discusses the advances in grid-based computation and the potential application of the Version 4 Globus Toolkit (GT4) to netted sensors



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Agenda

- 1400 – 1405 Session Introduction – Garry Jacyna (MITRE)
- 1405 – 1425 Professor Gaurav Sukhatme (Univ. Southern California)
"Towards a Networked Robotic Observatory"
- 1425 – 1445 Dr. Chee Chong (BAE Systems)
"Distributed Tracking in Sensor Networks"
- 1445 – 1505 Dr. Ian Foster (Argonne National Laboratory)
"Grid Technologies For Netted Sensors"
- 1505 – 1525 Round Table Discussions





Professor Gaurav Sukhatme

Gaurav S. Sukhatme is Associate Professor of Computer Science (joint appointment in Electrical Engineering - Systems) at the University of Southern California (USC). He received his undergraduate education at IIT Bombay in Computer Science and Engineering, and M.S. and Ph.D. degrees in Computer Science from USC. He is the co-director of the USC Robotics Research Laboratory and the director of the USC Robotic Embedded Systems Laboratory which he founded in 2000. His research interests are in multi-robot systems, networked robots, and sensor/actuator networks. He has published more than 120 papers in these and related areas. Sukhatme has served as PI on numerous NSF, DARPA and NASA grants. He is a member of AAAI, ACM, a senior member of IEEE, and a recipient of the NSF CAREER award. He has served on many conference program committees; he was program co-chair of the first Robotics: Science and Systems (RSS) conference and is the general co-chair for RSS 2006. He is the program co-chair for IEEE ICRA 2008. He is the Associate Editor of Autonomous Robots, and an Associate Editor of the IEEE Transactions on Robotics and Automation, both leading journals in robotics. He is on the editorial board of a leading magazine in ubiquitous computing, IEEE Pervasive Computing.



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Dr. Chee Chong

Chee Chong is Chief Scientist for the Fusion Technology and Systems Division for BAE Systems Advanced Information Technologies, formerly ALPHATECH. He participated in the Distributed Sensor Networks (DSN) program for the Defense Advanced Research Projects Agency (DARPA) in the 1980's and developed one of the first algorithms for distributed multiple hypothesis tracking. Since then he has been involved in distributed tracking, fusion and resource management for many different applications.

Prior to ALPHATECH, he was with Booz Allen and Hamilton, which acquired Advanced Decision Systems, and taught at the Georgia Institute of Technology. He received the S.B., S.M., and Ph.D. degrees in electrical engineering from the Massachusetts Institute of Technology. He is a co-founder of the International Society of Information Fusion (ISIF) and was its president for 2004. He has been on the organizing or program committees of the International Conferences of Information, and is the author or co-author of over one hundred conference papers, journal papers and book chapters.





Dr. Ian Foster

Dr. Ian Foster is Associate Division Director in the Mathematics and Computer Science Division at Argonne National Laboratory, and the Arthur Holly Compton Distinguished Service Professor at the University of Chicago. The co-editor with Carl Kesselman of "The Grid: Blueprint for a New Computing Infrastructure", he is an internationally recognized researcher and leader in the area of Grid computing. His Distributed Systems Lab at Argonne National Laboratory and the University of Chicago is a founding member of the Globus Alliance, the open source community that develops the Globus Toolkit, the open source software that has emerged as the de facto standard for Gridcomputing. Foster is also Chief Open Source Strategist at Univa Corporation, a company he founded with other Globus leaders to foster and promote the adoption of Globus in commercial environments. Foster is a fellow of the British Computer Society and AAAS. His awards include the GII Next Generation Award, the Lovelace Medal, and DSc Honoris Causa from the University of Canterbury, New Zealand.

