Mission

Swarm Lab Research Centers is committed to advancing the state of the art in cyber-physical systems (CPS) foundations and applications in the Internet of Things (IoT). Our mission includes designing and developing new methodologies, software, and hardware, and educating the next generation of engineers.

The Lab

The Swarm Lab is a research unit within the Department of Electrical Engineering and Computer Sciences at UC Berkeley. The lab is a partnership of UCB researchers, leading electronics companies, and government research agencies seeking to foster the creation and distribution of exciting applications of large swarms of sensors and actuators through the adoption of an open and universal platform. The Swarm Lab builds on the strengths of Berkeley in integration and in building bridges between different fields.

This critical-mass combination of UC Berkeley researchers, leading corporate sponsors, and government funding agencies is instrumental in making truly significant, innovative advances possible.

THE UBIQUITOUS SWARM LAB
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FACULTY THEMES

The center focuses on research revolving around the following themes:

Human Intranet

The Human Intranet center is focused on integrating humans into cyber-physical applications and developing new mechanisms for humans to interact with and leverage technology.

Industrial Cyber-Physical Systems (iCyPhy) & Dynamic Distributed Systems (DDS)

Dynamic and Distributed Systems is focused on networking technology for next generation Internet applications with an emphasis on how to adapt Internet technology for secure and safety-critical environments and how to manage highly dynamic systems.

Industrial Cyber-Physical Systems (iCyPhy) focuses on design, modeling, and analysis techniques for CPS and IoT with emphasis on industrial applications and on formal, verifiable techniques. It is commited to developing open-source software supporting the design and implementation of verified, secure, reliable, and robust systems.

Specific Research Includes:

- Human-in-the-loop systems
- Systems-of-systems design
- Semantics of timed systems
- Model-based design of cyber-physical systems
- Highly dynamic networked systems
- The Internet of Things (IoT)
- Edge computing, fog computing, and smart gateways
- Time-sensitive networking
- Safety, privacy, and security for IoT
- Learning and synthesis for cyber-physical systems
- Localization and location-aware services
- Learning and optimization in safety-critical systems

Swarm Lab Faculty Directors:
(alphabetical, top left to right)

Professors Ana C. Arias, Bernhard Boser, Björn Hartmann, John Kubiatowicz, Edward Lee, Michel Maharbiz, Eric Paulos, Kristofer Pister, Jan Rabaey and Claire Tomlin

UC BERKELEY
SWARM LAB 2.0

Membership

Swarm Lab membership provides access for member companies to faculty and graduate students involved in a large interdisciplinary research effort which seeks to foster the creation and distribution of exciting applications of large swarms of sensors and actuators through the adoption of an open and universal platform.

Members also benefit from the external collaborations of the Lab. The Swarm Lab is all about integrative research - making swarms a reality through the creation of an open platform vision. To this end, the lab works closely with other leading Berkeley labs (CITRIS, BSAC, BWRC, TRUST, RISELab, BIDS). It is driven by a set of application domains carefully selected based on research challenge, faculty and company interest, and potential global impact.

Benefits include:

- Direct access to Swarm Lab faculty and their graduate students
- Opportunity to send one industrial researcher to work at the Swarm Lab as a part of our research team
- Open access to all research projects within the Swarm Lab iCyPhy/DDS Theme
- Priority access to students for internships and full time employment
- Attendance at Swarm Lab semi-annual theme and plenary research reviews
- Early access to new web publications including new journal papers, conference presentations, retreat presentations, thesis and seminar webcasts
- On-site faculty briefings
- A seat on the Swarm Lab Board of Advisors
- Attendance at the Berkeley EECS Annual Research Symposium (BEARS)

To learn more about membership, please contact Ken Lutz, lutz@berkeley.edu, 510-642-6237.