

University of California, Berkeley
Industrial Cyber-Physical Systems (iCyPhy)
Mission Statement

The goal of iCyPhy (pronounced eye-sigh-fie) is to conduct pre-competitive research on architectures and design, modeling, and analysis techniques for cyber-physical systems, with emphasis on industrial applications. Cyber-physical systems integrate computing, networking, and physical components. Applications include transportation systems, automation, security, smart buildings, smart cities, medical systems, energy generation and distribution, water distribution, agriculture, military systems, process control, asset management, and robotics.

The CPS intellectual challenge is about the *intersection*, not the union, of the physical and the cyber. This intersection combines engineering models and methods from mechanical, environmental, civil, electrical, biomedical, chemical, aeronautical and industrial engineering with the models and methods of computer science and engineering. iCyPhy research is founded on the conviction that these models and methods do not combine easily, and that consequently CPS constitutes a new engineering discipline that demands its own models and methods.

iCyPhy is a collaborative effort between academia and industry. iCyPhy member companies provide financial support for research projects, interact collaboratively with researchers, and commercialize research results.

iCyPhy is committed to open publication and open-source release of software and hardware designs using a BSD-style license and will not seek IP protection for research results unless there is an overwhelmingly compelling case that IP protection is necessary for the results to have impact.

Specific current research directions include:

- Model-based design of cyber-physical systems.
- Highly dynamic networked systems (lifetime management, connectivity, adaptation).
- The Internet of things (IoT), swarm systems, edge computing, and smart gateways.
- Safety, privacy, and security for IoT.
- Synthesis and learning for cyber-physical system design and adaptation.
- Localization and location-aware services.
- Software and network architectures for heterogeneous distributed IoT applications.
- Integration of learning and optimization into safety-critical systems.
- Human-in-the-loop systems.
- Systems-of-systems design.
- Semantics of timed systems.

The iCyPhy board of directors is:

- Prabal Dutta (Associate Professor, UC Berkeley and U Michigan)
- Edward A. Lee (Robert S. Pepper Distinguished Professor, UCB)
- Alberto Sangiovanni-Vincentelli (Edgar L. and Harold H. Buttner Chair Professor, UCB)
- Sanjit Seshia (Professor, UCB)