PhD Program
Graduiertenkolleg

Embedded Microsystems
04/2005 – 09/2009

A Joint Program of the Institutes of
Microsystem Technology IMTEK &
Computer Science IIF
of the Faculty of Applied Sciences
at the University of Freiburg

Sponsored by
German Science Foundation DFG
ENDRESS & HAUSER
MICRONAS AG
SICK AG

URL
http://www.imtek.de/ems

Summary

In the research prospects 2000+ the Max Planck
Association states: „In the future, numerous objects
of our daily life will contain embedded microsystems
with interfaces to people and wireless connection to
other objects. This requires reliable, highly meshed
systems that will exceed the dimension of what we
know today from the World Wide Web“ — Applica-
tions in medical diagnostics, instrumented homes,
manufacturing environments, and vehicles among
others demand a systematic development of meth-
ods for the design and the secure operation of such
embedded microsystems as well as the education of
highly qualified scientists in this area. The PhD pro-
gram „Embedded Microsystems“ at the University of
Freiburg strives for this goal.

The Faculty of Applied Sciences at the University of
Freiburg offers an ideal setting: the nationwide
unique combination of the Institute for Computer
Science IIF and the Institute for Microsystem Tech-
ology IMTEK. This constellation will lead to multiple
synergies providing a fresh perspective on the intri-
cate connection of software and hardware in miniatur-
ed technical systems. The thirteen research
fields of “Embedded Microsystems” investigate
development and test methods for software and
hardware under the demanding constraints imposed
by microsystems and their environments.

The educational program crosses the traditional bor-
derline between computer science and microsystem
technology and offers a sound basis for the progres-
sion towards a PhD degree in embedded microsys-
tems.

Jobs

From April 2005 to September 2009, the
PhD Program will involve up to

19 PhD students

financed by scholarships awarded for up to three
years. The PhD students will form an interdiscipli-
nary team working on the following topics

- Communication in embedded microsystems
  (main supervisor: Prof. S. Albers)
- Energy-efficient automation in distributed
  microsystems (Prof. C. Ament)
- Test methods for MEMS (Prof. B. Becker)
- Sensor data fusion for embedded microsystems
  (Prof. W. Burgard)
- Mixed-signal modelling and synthesis on FPAA
  and FPGA; Application specific microcontrollers
  (Prof. Y. Manoli)
- Self-diagnostics and self-calibration of embed-
ded microsystems; Integrated magnetic sensor
  systems for localization (Prof. O. Paul)
- Miniaturized, robust, and highly precise local
  positioning systems; Microsystems with wire-
  less communication (Prof. L. Reindl)
- Generation of minimal real-time operating sys-
tems for embedded microsystems (Prof. C.
  Scholl)
- Resource-aware program adaptation
  (Prof. P. Thiemann)
- Modular, decentralized, distributed microsys-
tems for instrumentation applications
  (Prof. G. Urban)
For Applicants

What we offer

- A hot topic of interdisciplinary character and high scientific and industrial relevance.
- Excellent technological, analytical, and computational infrastructure.
- An elaborate learning/teaching program combining the strengths of the two participating Institutes of Microsystem Technology IMTEK and of Computer Science IIS.
- Guidance by a team of two supervisors for each PhD student.
- Integration into the scientific and social network of IMTEK (ca. 200 members) and IIS (ca. 150 members).
- Opportunities to interact with guest lecturers and scientists and to spend part of your work in partner labs abroad.
- Complementary training activities by local small and medium enterprises

What we expect

For admission to the Graduate School, fulfillment of the general requirements of the PhD regulations of the Faculty of Applied Sciences is a prerequisite. In addition we expect:

- Exceptional achievements in your studies.
- Straightforward and fast completion of your studies.
- Age 28 at most (in agreement with DFG regulations).
- A convincing interview with potential PhD advisors of the PhD Program.

Once you are admitted to the PhD Program, we expect that you:

- Register with the Faculty of Applied Sciences as a PhD student (enabling you to apply for student healthcare insurance and other student benefits).
- Devote your full labor to the PhD Program.
- Attend the seminars and summer/winter schools of the PhD Program, including active participation and presentation.
- Proactively seek the communication and exchange of ideas with your fellow students and with your supervisors.
- Publish your results at conferences of your field of research and in the archival literature.

How you apply

Interested? Please check out the detailed application procedure on: [http://www.imtek.de/ems](http://www.imtek.de/ems)