Master of Science
Embedded Systems Engineering

Prof. Dr. Jürgen Wilde

Faculty of Engineering

October 15th 2019

Albert-Ludwigs-Universität Freiburg

UNI
FREIBURG

The Faculty of Engineering

- Founded in 1995

- Faculty of Engineering consists of
  - Department of Computer Science
  - Department of Microsystems Engineering
  - Department of Sustainable Systems Engineering (founded 2015)
- More than
  - 50 professors & group leaders
  - more than 450 employees,
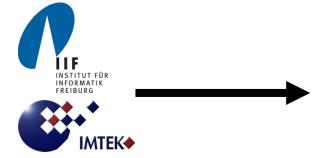 - more than 1900 students

Embedded Systems at the Faculty of Engineering

- Embedded Systems Engineering (ESE) touches all of our core competencies

- Cooperation of professors and lecturers from the departments of Computer Science (CS) and Microsystems Engineering (MSE) as well as external experts

22 Laboratories at IMTEK

- **MEMS Applications**
  Prof. Dr. Roland Zengerle
- **Assembly and Packaging Technology**
  Prof. Dr. Jürgen Wilde
- **Bio- and Nano-Photonics**
  Prof. Dr. Alexander Rohrbach
- **Biomedical Microtechnology**
  Prof. Dr. Thomas Stieglitz
- **Biomicrotechnology**
  Prof. Dr. Ulrich Egert
- **Chemistry and Physics of Interfaces**
  Prof. Dr. Jürgen Rühe
- **Design of Microsystems**
  Prof. Dr. Peter Woias
- **Electrical Instrumentation**
  Prof. Dr. Leonhard Michael Reindl
- **Gas Sensors**
  Prof. Dr. Juergen Woellenstein
- **Materials Process Technology**
  Prof. Dr. Thomas Hanemann

- **Micro- and Material Mechanics**
  Prof. Dr. Christoph Eberl
- **Microactuators**
  Prof. Dr. Ulrike Wallrabe
- **Microelectronics**
  Prof. Dr. Yiannos Manoli
- **Micro-optics**
  Prof. Dr. Hans Zappe
- **Microsystems Materials**
  Prof. Dr. Oliver Paul
- **Nanotechnology**
  Prof. Dr. Margit Zacharias
- **Optical Systems**
  Prof. Dr. Carsten Buse
- **Sensors**
  Prof. Dr. Gerald Urban
- **Simulation**
  Prof. Dr. Lars Pastewka
- **Smart Systems Integration**
  Prof. Dr. Alfons Dehé
- **Systems Theory**
  Prof. Dr. Moritz Diehl

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20 Chairs/research groups at IIF

- **Algorithms and Complexity**
  Prof. Dr. Fabian Kuhn
- **Bioinformatics**
  Prof. Dr. Rolf Backofen
- **Algorithms and Data Structures**
  Prof. Dr. Hannah Bast
- **Computer Architecture**
  Prof. Dr. Bernd Becker
- **Operating Systems**
  Prof. Dr. Christoph Scholl
- **Embedded Systems**
  tba
- **Software Engineering**
  Prof. Dr. Andreas Podelski
- **Programming Languages**
  Prof. Dr. Peter Thiemann
- **Foundations of AI**
  Prof. Dr. Bernhard Nebel
- **Autonomous Intelligent Systems**
  Prof. Dr. Wolfram Burgard
- **Machine Learning**
  Prof. Dr. Frank Hutter

- **Neurorobotics**
  Prof. Dr. Joschka Boedecker
- **Cognitive Computation**
  apl. Prof. Dr. Marco Ragni
- **Brain State Decoding Lab**
  Dr. Michael Tangermann
- **Graphics Data Processing**
  Prof. Dr. Matthias Teschner
- **Computer Vision and Image Processing**
  Prof. Dr. Thomas Brox
- **Databases and Information Systems**
  tba
- **Networks and Telematics**
  Prof. Dr. Christian Schindelhauer
- **Communication Systems**
  Prof. Dr. Gerhard Schneider
- **Gender Studies in STEM**
  Prof. Dr. Anelis Kaiser

What is special @ the Faculty of Engineering?

- Unique combination of Computer Science and MSE

- Interdisciplinary study program

- Great infrastructure:
  cleanrooms, laboratories, computer pools, WiFi, tele-teaching facilities, own engineering library

- Close contact to
  - Faculties of Biology, Chemistry, Medical Science, Physics, Materials Science
  - Uniklinik (University hospital Freiburg)
  - 5 local Fraunhofer Institutes
  - industrial enterprises

- Numerous contacts to the industry

Embedded Systems
and where to find them

- Automotive engineering
- Bio/Medical technology
- Smart homes
- Telecommunications
- Media and consumer electronics
- Controlling and regulation in manufacturing processes
- Aerospace …

Quellen: wikipedia bzw. TF

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General program structure

Structural principles of all study programs at the faculty

- 30 ECTS per semester

- 30 hours work load per credit point

- All programs are organized in modules

- A module can consist of one or several courses

- Performance evaluation after the semester

The Master program ESE is…

- generally an international study program
  - Most courses are offered in English
  - But some elective courses in German only

- a mixture of compulsory courses (to build a common ground for the students) and electives

- flexible: The study plan provides the frame, which you fill up with courses
  ($\rightarrow$ when you do them is up to you)

- customizable: A big variety of elective courses in Concentration areas and a Personal Profile allow for individual specialization

More details on course structure etc.

- … will be explained by Ms. Nopper after this part of the welcome/introduction meeting is done

- Some topics covered in „Administrative stuff":
  - Structure of the study program (mandatory courses, elective area)
  - Course and Assessment types
  - How to build your own individual study plan
  - Some basics on the examination regulations

Plagiarism / intellectual honesty

- Plagiarism is:
  - Using someone else's texts, pictures, reports, data, solutions, whatever….
  - ... without giving the **source**
- Sources include:
  - Books, the internet, colleagues, …
- To make it clear:
  - Plagiarism is illegal
- The simple „if...then" loops:
  - If you plagiarize...(once)
  - … then you fail
  - If you plagiarize repeatedly (=twice)
  - … then your academic career is over.
- Conclusion: Intellectual honesty is important!

Quelle: TF

Problems with your studies?

- If you have any questions or problems:
  Act immediately and do not procrastinate!

- Contacts & info sources:
  - Official information sources by university, faculty and study program
  - academic advising
  - Lecturers / assistants /mentors (face-to-face or via e-mail)
  - Fachschaft (departmental student committee)
  - Information centers like the Student Service Center, Office of Student Services etc.
  - fellow students

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Some thoughts to share…

- **A Master' program in Germany**
  - You have to organize your courses … and your life
  - You have to register for your courses on your own
  - We challenge you from the first day on to assess given knowledge…
  - …and to transfer given knowledge from one course to another
  - We will show you many aspects of embedded systems and their applications to broaden your knowledge and increase the oppurtunites for an exciting career.

- **That means for you…**
  - YOU have to take the initiative to ASK, ASK and read until you understand
  - WE give you the overview, YOU have to learn the details

The art of living

Enjoy being a student!

It is helpful to

- structure your day
- have unstructured free time
- meet colleagues
- keep up with your work
- occasionally relax and get out

Don't forget

- Family
- Friends
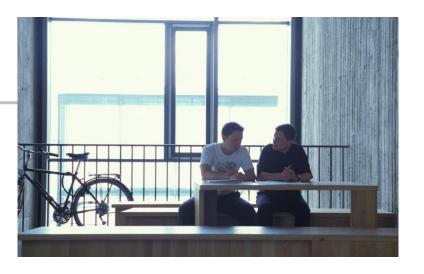- Sports
- Culture
- Autumn leaves…

Quelle: TF / M. Diehl / Mellar

Moreover…

- Buy textbooks

- Contact your mentor

- Form study groups

- Poke around in the laboratories

- Find an MSc thesis advisor early on

- Stay registered

- Get enough sleep

Quelle: TF

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Mentoring

- **Every student has a faculty mentor**
  - A professor as a contact person
  - Assigned by the Dean of Studies
- **Student's contact for:**
  - Problems, questions, clarifications, job searches, recommendations, or just general advising

Also here for your questions: Academic advisors

Contact information:

- Martina Nopper
  (mainly Computer Science)
  Bld. 101, room 02-013a
  Phone: +49 (0) 761 / 203 – 8169

- Frank Goldschmidtböing
  (mainly MSE)
  Bld. 102, room 01 075
  Phone: +49 (0) 761 / 203 – 7496

- E-mail:
  studienberatung@ese.uni-freiburg.de

- https://www.tf.uni-freiburg.de/en/study-programs/counseling
  → Academic Advising ESE

Further contact points at our faculty

- ## Examination Office
  - Susanne Stork & Anne-Julchen Müller
  - https://www.tf.uni-freiburg.de/en/study-programs/counseling
    → Examinations Office Faculty of Engineering

- ## Student Advising on general matters
  - Ursula Epe
  - https://www.tf.uni-freiburg.de/en/study-programs/counseling
    → Program coordination and general study advice

- ## Fachschaft: (departmental student committee)
  - http://fachschaft.informatik.uni-freiburg.de

Advising@Service Center Studium

learning strategies
failed exams
doubts
change of degree
changes
personal crises
graduation coming up
scholarships
motivation
decision-making
exam pressure

International Admissions and Services (IAS) and Central Academic Advising (ZSB) at Service Center Studium is your first resort for all information and advice concerning your studies

**at Sedanstr. 6
(b/n Uni library and theatre)**

ZSB / IAS @ SCS

Information

Clearing / first information

- Where to go to …?
- Whom to talk to if…?
- How do I…?
- daily info desk

**Hotline
0761 / 203-4246**

Advising

…on any topic concerning your studies

- confidential
- impartial
- professional
- open and scheduled consultation hours

Workshops

Smalls groups (mostly in German), topics such as:

- Doubts / hard choices
- Dealing with (study) stress
- Time and self-management
- Masters degree or job search?

www.zsb.uni-freiburg.de www.ias.uni-freiburg.de

And after graduation?

- **In Industry**
  - Find out what you like during your MSc program
  - Use job portals and company websites to monitor the market
  - Visit career workshops to gather tips how to apply
  - Go to recruiting fairs
- **Phd. as research assistant**
  - Perform a research project (on your own)
  - Look for an open position
  - Apply
  - Get paid for the PhD project
  - Take on responsibility as project assistant
  - Support your professor in educational tasks
  - Duration: 3-5 years

Thank you very much for your attention !

Now on to Ms. Nopper for the administrative stuff…