

Our degree program has a strong focus on applied engineering and practical experience. Students can gain practical experience, develop and test new algorithms, and become a member of one of the several groups at Offenburg that are performing research in the field of communication and media engineering.

The list below is a subset of the research activities of some of CME's faculty members. You may refer to the specific website for more information. You are also invited to browse through the relevant parts of our university's website. A good entry point may be <http://www.iaf.fh-offenburg.de/>. Although a large part of the website is in German (due to cooperation with many German companies), it should be always possible to get involved there with English proficiency.

## Telecommunication

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### – Prof. Dr.-Ing. Elke Mackensen

<b>Title</b>	Embedded Systems
<b>General Statement</b>	An overview of assembler language, of building up embedded systems and how to work with them.
<b>Topics</b>	<ul style="list-style-type: none"> <li>Introduction to assembler language</li> <li>Program shell</li> <li>Bus-structures</li> <li>Defining storage areas</li> <li>Organization of memory and registers</li> <li>X86 instruction set reference</li> <li>Understanding the assembly process</li> <li>Parts of an assembly language program</li> <li>General instructions</li> <li>Flowcharts</li> <li>Interrupts and services</li> <li>Control break processing</li> <li>Processing a program</li> <li>Branching and looping</li> <li>Compare instructions</li> <li>Special loops for timing</li> <li>Building and using of a stack</li> <li>Macros</li> <li>Flags, introduction to arithmetic instructions</li> <li>Logical instructions</li> <li>Binary operations</li> <li>Number systems</li> <li>Binary, hexadecimal and decimal arithmetic</li> <li>Working with strings</li> <li>ASCII reference table</li> <li>Procedures</li> <li>Heading out to C</li> </ul>

	<p>Input/output Addressing</p> <p>Planning and building of embedded systems Hardware of the microcontroller Coming up first time with electric power Coming up with the first operating system Communication with ones own pc Types of memory External hardware connected with the ports Working with serial ports A/D-controller Building of an embedded system with external peripherals</p>
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– **Prof. Dr.-Ing. Axel Sikora**

<b>Title</b>	Embedded Systems and Communication Electronics
<b>General Statement</b>	Embedded Systems are the platform for ubiquitous computing. In addition, Embedded Systems are increasingly interconnected and are the building blocks of the internet of things.
<b>Topics</b>	<p>algorithm and protocol development and simulation operating systems and platforms for communication, e.g. Android, Embedded Linux, TinyOS</p> <p>embedded system design for wired and wireless devices</p> <p>embedded internet and embedded web services</p> <p>evaluation, integration and optimization of standard protocols like ZigBee, EnOcean Radio Protocol, Wireless M-Bus, WLAN, GPRS/UMTS, and many more</p>

**Media & Computer Science**

– **Prof. Dr.-Ing. Andreas Christ**

<b>Title</b>	Mobile Computing
<b>General Statement</b>	<p>Mobile devices with their increasing computing power, input/output capabilities and network connection possibilities can be used for new types of applications. The design of system architecture is of importance to create apps with client-server functionality.</p>
<b>Topics</b>	<ol style="list-style-type: none"> <li>1. Mobile Learning: Mobile Language Learning Game</li> <li>2. Architecture of device independent communication</li> </ol>

	3. Communications structures and system architecture for Smart Grids for small scale renewable energy systems
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<b>Title</b>	Electromagnetics field simulation for microwave and millimeter wave applications
<b>General Statement</b>	Modern communications and measurement systems often are running at microwave and millimeter wave frequencies. The numerical simulation of the device properties is very important to determine the system properties in advance.
<b>Topics</b>	Research on radar applications for material inspection

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– **Prof. Dr. rer. nat. Klaus Dorer**

<b>Title</b>	RoboCup
<b>General Statement</b>	3D simulation league soccer robots team
<b>Topics</b>	<ul style="list-style-type: none"> <li>▪ Behavior based robotics</li> <li>▪ Machine learning</li> <li>▪ Simulated two legged robots</li> <li>▪ Teaching robots soccer</li> </ul>

<b>Title</b>	Attractive
<b>General Statement</b>	Agent based transport optimization
<b>Topics</b>	<ul style="list-style-type: none"> <li>▪ LTL/FTL transport optimization</li> <li>▪ agent based systems</li> <li>▪ optimization algorithms</li> </ul>

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– **Prof. Dr. phil. Robert Gücker**

<b>Title</b>	Tacit Knowing
	We know more than we can tell (Michael Polanyi)
	Polanyi was interested in acts of insight and action itself

<b>General Statement</b>	<p>Centrepieces of his approach are acts of gaining knowledge and insight, action itself, reasoning and perception</p> <p>Thus tacit knowledge is an activity, which could be better described as a process of knowing ?</p> <p>Tacit Knowing Tacit Knowing is a synonym for intuitive mastery, or knowing how to do something</p>
<b>Topics</b>	<p>Research (Professor Dr. Robert G?cker)</p> <p>Transmitting and acquiring Tacit Knowing by means of new media and Web 2.0 Tools in Higher Education (e.g. Web 2.0 Mentoring: Peer to Peer)</p> <p>in Vocational Education and Training (e.g. Bloggen, Bilden, Bauen: Neue Wege in der Bauausbildung)</p> <p>based on a growing understanding of the concept of Tacit Knowing (qualitative research paradigm)</p>

– **Prof. Dr. rer. nat. Tom R?debusch**

<b>Title</b>	Computer-Supported Cooperative Work and E-Learning Systems
<b>General Statement</b>	<p>The Internet connects hundreds of millions of computers, and, more importantly, billions of people.</p> <p>The research field Computer-Supported Cooperative Work (CSCW) looks at how these people may communicate, work together and share content. Special attention is paid to the application of CSCW principles to support learning in university scenarios.</p>
<b>Topics</b>	middleware for CSCW systems, synchronous/asynchronous and explicit/implicit cooperation in computer networks, e-learning support for classroom settings, Web-based systems

– **Prof. Dr. Volker S?nger**

<b>Title</b>	<ol style="list-style-type: none"> <li>1. E-Learning in Computer Science</li> <li>2. Big data</li> </ol>
<b>General Statement</b>	<ol style="list-style-type: none"> <li>1. E-Learning can help to improve learners motivation and learning results especially in Computer Science, because animations or interactive applications fit very well for typical IT tasks, like designing algorithms or creating programs</li> <li>2. Nowadays web-based systems have to handle immensely large masses of data.</li> </ol>

	Hence new data models for efficient storage and retrieval have to be developed together with corresponding algorithms
<b>Topics</b>	<ol style="list-style-type: none"> <li>1. Animation, Interactive learning application, Learning by exploration, experimental learning</li> <li>2. NoSQL-databases: Key-value databases, Column-oriented databases, Graph databases, Document-oriented databases, BASE, Map-Reduce</li> </ol>

– **Prof. Dr.-Ing. Claudia Schmidt**

<b>Title</b>	E-Learning and Computer Science
<b>General Statement</b>	E-Learning Applications can be used to visualize abstract topics and thus support the learning process. Especially abstract algorithms of Computer Science are well suited for interactive learning applications. Research interests include all factors that support learning like interactivity, feedback and motivation.
<b>Topics</b>	<p>During the last years several learning applications have been developed in Computer Networks, Software Engineering and basic Computer Science Algorithms (<a href="http://mi-learning.mi.fh-offenburg.de">http://mi-learning.mi.fh-offenburg.de</a>).</p> <p>Additionally, a learning game for Software engineering was designed and implemented.</p> <p>Based on these applications, research efforts comprise several factors that support an efficient learning process in Computer Science as well as usability in E-Learning applications.</p>