

Division of Electrical Engineering and Computer Science	Research field	Microelectronics	Lab. ID EC07
Laboratory web site	http://www.merl.jp/		
Research subjects			
MeRL (Microelectronics Research Lab.) focuses on the system architecture, large scale integration (LSI) circuitry, and the applications of LSI systems. Significant research challenges in our research projects are driven by the future applications of microelectronics, for example, energy harvesting wireless sensor network, esthesia sensors, high-precision analog-to-digital converters, and extreme low-power circuits for IoT. The application systems are developed to demonstrate the practicality of the proposed technology. The LSI system designed by the students can be fabricated by the semiconductor manufactures.			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
The students in the research group can propose his own research project through the literature research, patent search, and discussion about the novelty, feasibility, usefulness, and cost-efficiency, and so on. The research project may be revised and revisited when you are in the course. All students are required to participate the weekly presentation of the research and the weekly lecture of the literature in turn. The joint-meeting with other laboratories will be held a few times a year to view and discuss the results of the research from a different view point. If you obtain the basic data on your research, you can apply the patent with help of the supervisor and the IP expert of Kanazawa university technology license organization. There are many students who have his patents and is involved in a collaboration with other laboratory or industry.			
Daily life in the laboratory, etc.			
Personal working desk with a personal computer and a notebook is available for every student. The prototyping room of circuit boards and software, and measurement room open for the student anytime a 24 hours a day. Thus, any idea you hit upon should be tried to implement the electronic system by using the facilities. If you cannot implement it with the conventional technologies, you may find the challenge to be addressed in your research project. Our research group administrate the Hokuriku branch of Very Large Scale Integration Design and Education Center (VDEC), which is the inter-university organization for LSI research in Japan. The computer-aided design (CAD) software is licensed by VDEC and you can develop an original LSI with CAD tools and the advanced facilities in VDEC.			
Message or comments by the laboratory faculty staffs			
We put more emphasis on the proposal and experimental production of application system of the invented LSI or circuit technology. The students should work together and share the technical information with each other. The interaction between the students, the laboratories, the universities, and the institutions will help you to be full of idea in the research field. You will have the chance to be acquainted with the students and researchers of other universities or other countries through the VDEC community. Many international students are enrolled in this research group.			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2020.9	Welding point quality detection method based on image processing and neural network		
2020.3	Design of Low Frequency Wireless Power Transfer using Class-C Power Amplifier		
2020.3	Design of CMOS temperature sensor array for tactile sensor		
2019.9	Ultra-Low-Voltage High Efficiency Rectifier Circuit Design using 65nm SOTB for Energy Harvesting		
2018.9	Research on spoken language identification between japanese and mandarin based on deep neural network		
2018.3	Energy harvesting using electrolytic corrosion in reinforced concrete		
2018.3	Development and evaluation of fixed point insect observation system using insect sound discrimination system		
2018.3	Proposal of quantum circuit generation method using high-level language		
2018.3	Evaluation of the power generation characteristics of reinforced concrete structure		
2018.3	Design of antenna used for millimeter-wave CT		
Recent Doctoral theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2020.9	Performance Evaluation of Wireless Sensor Network with LPWA for Medical applications		
2018.9	A Study of Limited Resources and Security Adaptation in Wireless Sensor Network		
2018.9	Development of Triangular Microstrip Antenna for Sensor Application Using Circularly Polarized-Synthetic Aperture Radar		

2016.3	Use of MOS Gas Sensors with Temperature Modulation-Specified Detection Point for Potential Identification of Soil Status Using Electronic-Nose Principle
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