## 情報通信工学課程／Department of Information and Communication Engineering

### 教員紹介／Teaching Staff

| 職位／Title | 氏名／Name | 学位／Education | 研究内容／Research |
|---|---|---|---|
| Professor | YUAN Qiaowei | Doctor of Engineering | Our research aims to smartly connect power and information through electromagnetics. We work on antennas, wireless communications, and wireless power transfer, with a particular focus on highefficiency MIMO-WPT systems and matching and rectifying circuits.<br>Our activities also include electromagnetic numerical simulation, AI-aided antenna design, radio-frequency measurement, and the evaluation of battery-free platforms such as Mini 4WD cars and drones, bridging theory and practical implementation. |
| Professor | KAWANO Koichi | Doctor of Information Sciences | My research focuses on developments and applications of information technologies using satellite remote sensing, satellite image processing, computer network, database, and other types of information processing to help people monitor the earth environment.<br>Principal areas of interest are disaster monitoring of Northeast Asia（forest fire, dust and sandstorm, snow, sea ice, and etc）, developing algorithms for category extraction and its visualization, and constructing large scale database of satellite images. There are about 140,000 scenes of NOAA AVHRR images since 1981. |
| Professor | KIDO Hiroshi | Doctor of Engineering | I am engaged in a study of auditory impression of the utterance. The following is a study of expression associated with auditory impression example.<br>Japanese expressions associated with the voice quality of male adults were extracted by a series of questionnaire surveys and statistical multivariate analysis. By applying a statistical clustering method and a correlation analysis to the results of the questionnaires, eight bipolar expressions and one unipolar expression were obtained. They constituted high-pitched /low-pitched, masculine/feminine, hoarse/clear, calm/excited, powerful/weak, youthful/ elderly, thick/thin, tense/lax, and nasal, respectively. |
| Professor | KUDOH Eisuke | Doctor of Engineering | Mobile communication system（i.e. smart phone, WiFi）becomes very familiar. We study on mobile radio communication and its applied technologies like IoT（Internet of Things）. For example, we visualize radio signals by using the inexpensive microcomputer board. We also estimate location using Zigbee sensor network and perform wireless transmission experiment using a software defined radio system. |
| Professor | SATO Atsushi | Doctor of Engineering | My research has concentrated on the development of near-infrared solid-state lasers for laser radar remote sensing. The laser radar using a laser transmitter operating in the eye-safe wavelength region around 2 microns provides carbon dioxide profiles and wind velocity profiles with high measurement precision. |
| Professor | SUZUKI Kenichi | Doctor of Information Sciences | My major research topics include computer architecture and memory systems.<br>The most essential components of a modern computer are microprocessor and memory. In order to achieve successive performance improvement of the computer system, both of the processor and memory must be developed continuously. In my laboratory, we are making efforts to obtain the structure of microprocessor and memory that realizes a low-power and high performance computer system. |
| Professor | TAMURA Hideki | Doctor of Engineering | For practical applications of the ultrasonic motors and the multi-axial monolithic vibrational gyrosensors, the piezoelectric resonators with degenerated or coupled multiple modes are studied.<br>In addition, under the large strain for the high-power application, the piezo-resonator produces nonlinear effect and deteriorates its properties; therefore, we have studied the high-power characterization method of the resonator to assist the suitable structural design and material selection. |
| Professor | TSUNODA Hiroshi | Doctor of Information Sciences | Computer networks have been basic information infrastructure of our daily life.The network management is an important but a difficult task because of the complexity of the computer network, and various security incidents like illegal accesses are increasing. In order to solve various security problems, I am engaged in research on network management and security management. Currently, I am working on reliable logging architecture, mutual node monitoring system for sensor networks, and intrusion detection mechanism based on traffic monitoring. |
| Professor | TOMITA Isao | Doctor of Science | In the present photonic networks, high-speed, broadband signals propagate through optical fibers. I have been studying photonic devices that generate broadband signals, photonic modulators that generate high-speed signals, and wavelength converters made of semiconductors and ferroelectrics that change wavelengths to prevent signal collisions and mixing in the photonic networks. To improve device performances, e.g., optical-modulation efficiency and wavelength-conversion efficiency, I have also been studying micro-confinement structures of the photonic signals. The use of the micro-structured devices with improved performances will make it possible to achieve high-throughput networks. |
| Professor | NAKAGAWA Tomoko | Doctor of Science | The main area of my research activity is 3-dimensitonal structure of the solar wind magnetic field, solar wind interaction with the planets and moon, and improvement of calibration and noise reduction of electromagnetic measurement from spacecraft. |
| Professor | MATSUDA Masahiro | Doctor of Engineering | conduct research and development on network systems consisting of embedded devices, servers, and clients, focusing on database systems. I have a proven track record in both software development and network-related hardware development. Additionally, I have co-developed products such as network microcontroller boards in collaboration with companies.<br>I emphasize practical engineering and aim to design systems capable of withstanding real-world operations. |
| Professor | MIURA Naoki | Doctor of Engineering | My research interests focus on cognitive neuroscience using functional MRI and NIRS, and its application to cognitive engineering. In particular, I am interested in problems arising in human-machine interactions, such as human errors, and in social interactions between humans and humans. To understand the cognitive mechanisms underlying these interactions, experimental studies are conducted using several neuroimaging techniques. |
| Associate Professor | INOUE Masashi | Doctor of Science | My research interests include analysis and modeling of human communication in both face-to-face and online interactions. I am currently working on the analysis and modeling methods and development of intelligent interactive systems. Additionally, I have investigated how people use different media, such as video or text, for communication. I aim to apply my findings on cognitive and behavioral processes to professional dialogue and situated communication, such as interactions during events and local activities. |

TOHOKU INSTITUTE OF TECHNOLOGY

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| Associate Professor | KITA Hajime | Doctor of Science | Radio waves are emitted from natural phenomena such as lightning, solar flares, and planetary auroras.<br>We can detect them using a radio telescope, a specialized antenna which receives radio waves. Our laboratory is investigating planetary magnetospheres and the interaction between the planets and the sun.<br>Using a variety of radio observation technology, we are primarily observing the time-spatial variation of Jupiter's magnetosphere. Additionally, we study exoplanetary systems with the goal of finding common phenomena between planets. We strive to understand planetary science as well as develop radio observation technology. |
| Associate Professor | NAWATA Kouji | Doctor of Engineering | ・THz-wave generation and detection based on nonlinear wavelength conversion<br>・THz-wave sensing applications: real-time gas sensing, and imaging<br>・Development of near infrared lasers for efficient NIR-THz-wave conversion<br>・Design of PPLN crystal for effective NIR-THzwave conversion<br>・Development of tunable, narrowband OPG sources using KTP crystal |
| Associate Professor | YAMAKI Shunsuke | Doctor of Engineering | My main research interests include construction of high performance digital signal processing systems.<br>Digital signal processing is one of the techniques to process signal data, such as acoustic signals, image signals, and video signals. In order to construct high performance digital signal processing systems for any signal data existing around us, my research activities especially focus on design of high accuracy digital filters, development of high accuracy signal matching techniques, application to biological signal analysis, application to artificial intelligence,　and so force. |
| Lecturer | NGUYEN Vanduc | Doctor of Computer Science and Engineering | Technology is changing the way we learn, play, and communicate. My research focuses on developing smart communication systems that benefit human being using VR, AI, and advanced communication technologies. Specifically, we are conducing research on AI robots that can communicate and support various daily tasks with people, telepresence systems that make you feel like you are in a certain place instead of the actual place, and virtual space where you can hang out with your friends as if you were in the same room. |