UTRIP 2025 (June 25 - August 5)
Hosting Laboratories Information & Project Topics

Chemistry members

Hosting Faculty Member(Title)	Research Topic & Research Description Special Academic Conditions Required for Research
Shin-ichi Ohkoshi (Professor)	We are working on the development of novel functional materials responding to light and electromagnetic waves and materials for solving environmental and energy issues. Various materials from metal complexes, such as Prussian blue, to metal oxides and metal alloys have been investigated by chemical synthetic approach. Regarding correlation phenomena of magnetism and light/electromagnetic wave, we have been promoting research on magneto-optical and nonlinear optical magnetism. By utilizing nano-scale chemical synthesis, novel functional materials were synthesized from abundant elements such as iron or titanium; epsilon-iron oxide, ε-Fe2O3, showing huge coercive field and high-frequency millimeter wave absorption, and lambda-titanium oxide, λ-Ti3O5, exhibiting photo-induced metal-semiconductor transition at room temperature as well as heat storage properties that proposes a novel concept of preserving heat energy for a prolonged period. We are working on environmentally friendly research with a view to technology applications contributing to big data, IoT, and renewable energy. **1）Prerequisite knowledge and/or specific skill(s) and its proficiency** Basics of inorganic chemistry and physical chemistry **2）Required study field(s)** Chemistry / Physics **3）Academic background or research project experience to be considered at selection** None **4）Selection and evaluation criteria, if any** None
Takeaki Ozawa (Professor)	Fluorescence Imaging and/or Optogenetic technologies Development of novel analytical methods and their application to single cell analysis **1）Prerequisite knowledge and/or specific skill(s) and its proficiency** Certification of the English ability to communicate on chemistry/biology research **2）Required study field(s)** Analytical chemistry, biology **3）Academic background or research project experience to be considered at selection** It is better for the student to have an experimental experience on molecular biology or cell biology. **4）Selection and evaluation criteria, if any** None

Hosting Faculty Member(Title)	Research Topic & Research Description Special Academic Conditions Required for Research
Keisuke Goda （Professor)	At Goda Lab, our primary mission is to develop "serendipity-enabling technologies" that align with Louis Pasteur's famous quote, "Chance (serendipity) favors the prepared mind." Our focus is on developing innovative tools for molecular imaging and spectroscopy by integrating photonics, nanotechnology, microfluidics, and data science. By utilizing these tools, we aim to discover unknown phenomena, elucidate mechanisms, and explore new applications in science, industry, and medicine. We employ theoretical, experimental, and computational techniques to tackle critical problems. Additionally, we are committed to cultivating the next generation of global leaders who will shape the world in the 21st century. We foster an international and interdisciplinary research environment that values flat human relationships, and we actively seek out talented individuals from any university or company, regardless of their field of study. **1）Prerequisite knowledge and/or specific skill(s) and its proficiency** 1. Applicants must possess foundational knowledge in molecular imaging, spectroscopy, photonics, nanotechnology, microfluidics, and/or data science, as our lab extensively works on integrating these domains to develop innovative tools. 2. Demonstrated skills in theoretical, experimental, and computational techniques are highly beneficial. 3. Ability to work in an international and interdisciplinary research environment with a cooperative mindset is crucial. 4. Applicants should be ready to engage actively in discovering unknown phenomena, elucidating mechanisms, and exploring new applications in science, industry, and medicine. **2）Required study field(s)** 1. We encourage applications from candidates majoring in fields related to, but not limited to, physics, chemistry, biology, data science, materials science, electrical engineering, mechanical engineering, chemical engineering, bioengineering, or a closely related field. 2. Given the interdisciplinary nature of our work, individuals from various scientific and engineering disciplines who possess a strong interest and background in the areas we focus on are welcome to apply. **3）Academic background or research project experience to be considered at selection** 1. Applicants should have a strong academic record with coursework or research experience that aligns with the areas of molecular imaging, spectroscopy, photonics, nanotechnology, microfluidics, and data science. 2. Experience in working on projects or research that involves theoretical, experimental, and computational techniques to solve critical problems is highly desirable. 3. Participation in projects that demonstrate the ability to discover, elucidate, and explore in science, industry, and medicine is an added advantage. **4）Selection and evaluation criteria, if any** 1. Academic Excellence: Strong GPA and coursework in relevant fields. 2. Research Experience: Prior involvement in projects or research in areas like molecular imaging, spectroscopy, photonics, nanotechnology, microfluidics, and data science. 3. Technical Skills: Proficiency in theoretical, experimental, and computational techniques related to our lab’s focus. 4. Interpersonal Skills: Ability to thrive in an international, interdisciplinary research environment with strong communication and collaboration skills. 5. Alignment with Lab’s Mission: Demonstrated interest and commitment to developing technologies that enable discovery and exploration in science, industry, and medicine. 6. Leadership Potential: Evidence of potential to become a future global leader in academia, industry, or entrepreneurship.
Hiroyuki ISOBE (Professor)	Nanocarbon molecular science based on macrocyclic structures. In this UTRIP program, student(s) will be involved in the research topic of the synthetic and physical organic chemistry of nanocarbon molecules. Student(s) will experience the design and synthesis of nanocarbon molecules, which will be characterized by NMR spectroscopy and mass spectrometry. Through these experiments, student(s) will learn the basic knowledge and skills to explore the frontier of nanocarbon molecular science. **1）Prerequisite knowledge and/or specific skill(s) and its proficiency** Basic experimental technique of synthetic organic chemistry and basic knowledge of organic chemistry **2）Required study field(s)** Organic chemistry and physical chemistry **3）Academic background or research project experience to be considered at selection** None **4）Selection and evaluation criteria, if any** None

Hosting Faculty Member(Title)	Research Topic & Research Description Special Academic Conditions Required for Research
Hiroki Oguri （Professor）	Our aim is to develop concise and flexible synthetic methods for creating functional molecules inspired by the structures, biosynthesis, and biological roles of natural products—viewed as evolutionary outcomes of life. In the UTRIP program, students will work on synthesizing natural product derivatives expected to be effective against infectious diseases and tumors. **1）Prerequisite knowledge and/or specific skill(s) and its proficiency** Basic knowledge of organic chemistry, and synthetic chemistry, and basic experimental technique of organic chemistry. **2）Required study field(s)** Organic chemistry, Synthetic chemistry, Chemical biology **3）Academic background or research project experience to be considered at selection** Students should have a basic knowledge of organic chemistry, synthetic chemistry and chemical biology. **4）Selection and evaluation criteria, if any** None
Taro HITOSUGI (Professor)	Studies on inorganic and organic solid materials. We are interested in both synthesis and functions. **1）Prerequisite knowledge and/or specific skill(s) and its proficiency** Basic understanding of physics and/or chemistry is required. **2）Required study field(s)** One of the following fields: physics, chemistry, computer science, mechanical engineering, electrical engineering, chemical engineering, mathematical science etc. **3）Academic background or research project experience to be considered at selection** Basic understanding of physics and/or chemistry is required. **4）Selection and evaluation criteria, if any** None