

REACT

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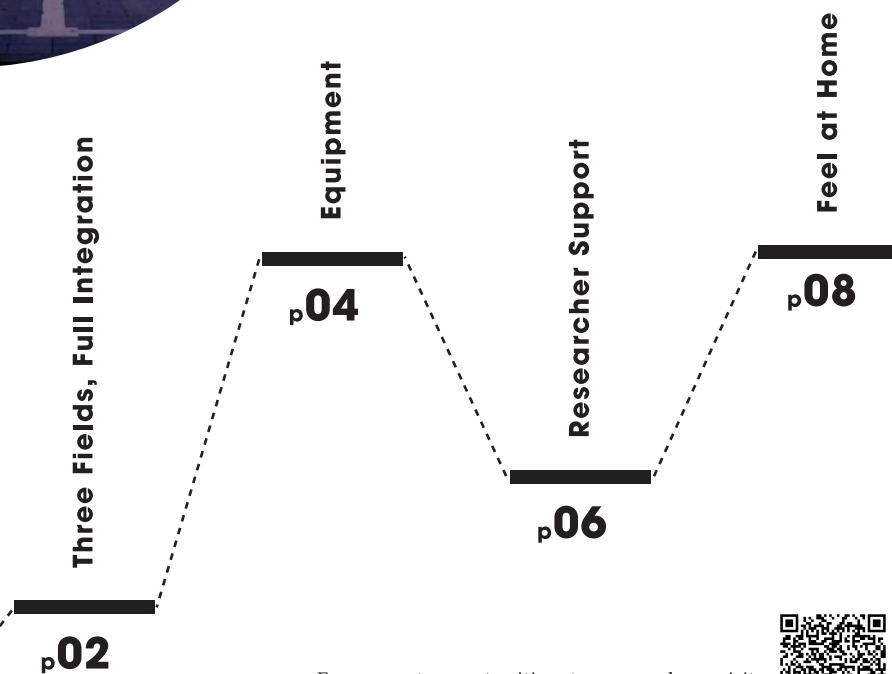
US

HOKKAIDO UNIVERSITY
INSTITUTE FOR CHEMICAL REACTION DESIGN AND DISCOVERY



We are looking for talented, young researchers to unfold their scientific potential at ICReDD (the Institute for **C**hemical **R**eaction **D**esign and **D**iscovery).

Focusing on letting our researchers pursue **original and innovative research**, we cultivate **close-knit collaborations** among committed scientists in a **wide variety of fields** to enable **new perspectives** to emerge.



For current opportunities at ICReDD, please visit:
<https://www.icredd.hokudai.ac.jp/opportunity/>



“ICReDD should be very interesting for young researchers with many high-quality groups in different fields working together. You can get a good experience from that. But it’s also easier to get a higher position that enables you more freedom and to apply for more grants.”

Andrey combines theory, computations and experiment for the design of novel functional materials for energy conversion and storage, nanocatalysis and the control of chemical processes by nanomaterials and atomic clusters.

Andrey Lyalin

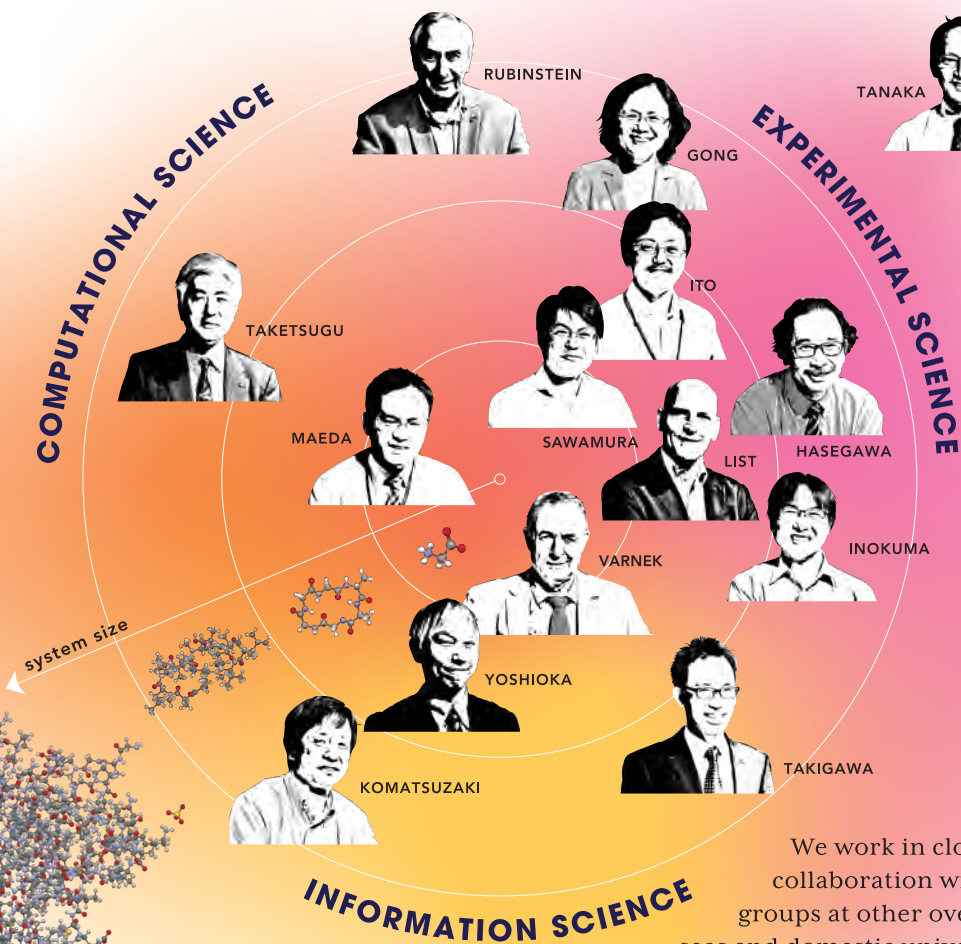
Specially Appointed
Associate Professor
at ICReDD



Three Fields

Full Integration

ICReDD was born out of the realization that the purposeful design of chemical reactions requires the fusion of quantum-chemical computations, information technology, modern experimental techniques, and the development of advanced materials to become parts of a diverse toolbox for truly integrated research. Our researchers come together in mixed offices and labs, with the expertise of each becoming a resource for the work of the other.



We work in close collaboration with groups at other overseas and domestic universities.

ICReDD researchers, a third of which are from outside of Japan, are thus not only well-connected within our research center, but are part of an international network of cross-disciplinary work.

“My own work is on visualizing reaction path maps, but I believe that sharing these images among researchers can serve as ‘glue’ that connects calculations, informatics, and experiments to design truly new reactions.”

Yuriko Ono

Specially Appointed
Assistant Professor
at ICReDD

Yuriko is trying to expand the possibilities of global reaction route mapping (GRRM) with approaches like the development of a massively parallel GRRM program for the large-scale reaction path search and the visualization of GRRM datasets for intuitive understanding.

Tasuku Nakajima

Research
Collaborator
at ICReDD

Tasuku is trying to functionalize polymeric materials through mutual inspirations of chemical reactions and materials. One example is creating materials that exhibit muscle-like growth.

“Influenced by researchers in other fields, I feel I can see the possibilities of my materials from a multifaceted perspective. This enables me to take my research to the next level, which is very exciting.”

Equipment

ICReDD offers open access to all equipment for cutting-edge research in computational science, information science and experimental science to all of our researchers. Our working spaces are shared to maximize cross-disciplinary communication and knowledge exchange.



Some highlights of our equipment include:

- Free-to-use experimental chemistry labs
- Free-to-use computer clusters
- NMR facility
- X-ray diffractometer
- Mass spectrometer
- Elemental analyzer
- Various material property analysis devices
- Multidimensional fluorescence microscope



“The mixed lab is very special. Being an experimentalist, it is very attractive to me to be able to easily exchange opinions with researchers from computation and information science. I think it is important to see the methods and skills of such people to expand my own methods.”

Kosuke Higashida

Specially Appointed Assistant Professor at ICReDD

Kosuke designs highly active organometallic catalysts through estimating activation energies of transition states by the use of DFT calculations.

Masumi Tsuda

Research Collaborator at ICReDD

Masumi studies the effect of chemical reactions on biomaterials in *in vivo* cell cultures to find novel medical applications, such as the development of personalized medicine by analyzing hydrogel-induced cancer stem cells.

“Through ICReDD we can purchase equipment that is necessary for advancing our research but is simply too expensive for a single lab and a single research grant. Being part of ICReDD is a great support.”

Support

Researcher

The Hospitality System

To support our international researchers with their daily life in Japan, our hospitality team helps with settling in and living your life in Sapporo. In addition, Hokkaido University offers free Japanese language classes at all levels, as well as various culture seminars.



Grants and Application Support

ICReDD offers start-up grants for newly appointed faculty to be able to work from the get-go. In addition, Hokkaido University offers administrative support for privately and government-awarded grants. As a result, our researchers can easily apply for many prestigious grants.



“There is a lot of support with settling in, even outside the work place, which makes a big difference. The ICReDD staff helped me a lot with getting accommodation, healthcare, opening bank accounts within a week. But they also helped me with my research funding applications. It’s a great help.”



Mikhail applies methods from graph theory and complex networks to the analysis of chemical reaction networks. This will allow him to better describe and understand the optimal routes of chemical reactions as well as get insights on reaction dynamics.

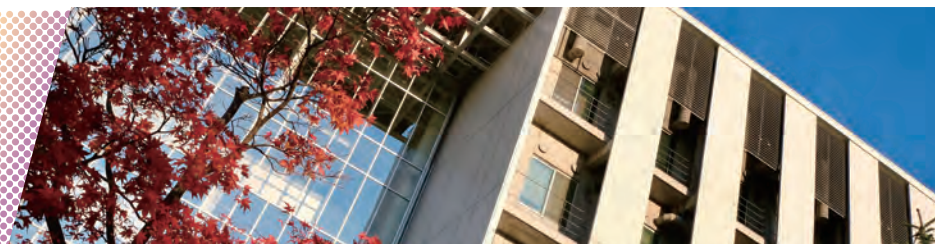
Mikhail Tsitsvero

Specially Appointed Assistant Professor at ICReDD

Feel at Home

Hokkaido University is one of Japan's top universities with a time-honored focus on chemistry and engineering, and so it is not a coincidence that Hokkaido University emeritus professor Akira Suzuki received his Nobel Prize for discovering cross-coupling reactions.

The university is located in Sapporo (population: 2 million), a very liveable and modern city in the North of Japan. Its geographic location means that the climate is mild while having four different seasons to enjoy outside. In addition, the city has an extremely low risk of being struck by natural disasters such as earthquakes, tsunamis or typhoons.



"I've been in Japan for quite a long time, but in every aspect life in Sapporo is pretty good. It's the best place for good food of all varieties. it's a very liveable city, it's super easy to find anything, but it's not crowded. For foreigners it's as easy to live here as in Tokyo."

Parantap Sarkar
Postdoctoral Fellow
at ICReDD

Parantap's research goal is to synthesize unique supramolecular architectures made of flexible and shapable "rope-like" molecules through novel chemical reactions.

Kenta uses material informatics to analyze the enormous amount of available data on crystal characteristics and create novel and useful crystal-based materials.

Kenta Kato
Postdoctoral Fellow
at ICReDD

"Compared to other big cities in Japan, the summer in Sapporo is nice because of low humidity, and there are several ski resorts in the city where you can enjoy winter sports. In addition, the rent is inexpensive even if the property is close to the city center and well equipped."



At the Institute for **C**hemical **R**eaction **D**esign and **D**iscovery (ICReDD), researchers from computational science, information science, and experimental science work together to achieve **in-depth understanding and efficient development of chemical reactions.**

Chemical reactions are a central process in nature. Controlling them has always been of utmost significance to sustaining human society, and it is only becoming more important the more highly engineered our environment and culture becomes. The mission of ICReDD is to **not leave the discovery and design of chemical reactions to serendipity or experience-guided intuition, but to enable humanity to purposefully craft chemical reactions to any design.**

About WPI

The World Premier International Research Center Initiative (WPI) was launched in 2007 by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) with the aim of achieving top-quality science, interdisciplinarity, globalization, and the reform of the research system at 13 highly supported research centers. ICReDD was established at Hokkaido University in October 2018.

