NAIST

About NAIST

Nara Institute of Science and Technology (NAIST) was founded as a unique Japanese national university consisting solely of graduate schools in the three areas of information science, biological sciences, and materials science to redefine graduate-level education. In 2018, to push forward the boundaries of advanced science and technology, the three graduate schools merged to create the Graduate School of Science and Technology with Education Programs in the original three research areas and two of their interdisciplinary areas. At present, over 1,200 students—roughly 25% from overseas—are supervised by approximately 200 NAIST faculty.

With its cutting-edge facilities and a high student-to-faculty ratio, NAIST’s world-leading research and education are a direct result of its rich, global environment and supportive infrastructure. Moreover, NAIST’s faculty and students’ outstanding achievements are shared world-wide through patents, licenses, spin-off companies, and active international exchange. As a result, NAIST has quickly established itself as a world-class research and education center where young research scientists and engineers become tomorrow’s global leaders.

From its establishment, NAIST has developed education programs and research that begin with NAIST and spread across research fields through our extensive global network of NAIST graduates and international partner institutions. This network is not only key to our research activities, which are undertaken spanning the globe to promote collaboration at the forefronts of science and technology, but a central part of NAIST’s global education programming, allowing students to experience today’s international trends and environments.

NAIST eagerly promotes admission of students from both Japan and overseas who have strong basic academic capabilities, regardless of their academic backgrounds, and actively admits researchers, engineers and others currently working in society with strong enthusiasm for advanced scientific research and clearly defined aspirations for the future.

President’s Vision 2030

NAIST celebrated its 30th anniversary in 2021 and the newly appointed President, Dr. Kazuhiro Shiozaki, issued his vision of what NAIST should be in 2030. Upon the foundation laid by its prominent achievements over the past three decades, NAIST will build a campus community that strives for the new development in research and education through “co-creation” with diverse stakeholders. Please use the QR code to view the President’s Vision 2030 and find out how NAIST will pursue co-creation to fulfill its mission as a national postgraduate institution.

NAIST Timeline

1991 NAIST established on October 1st (Graduate School of Information Science)
1992 Graduate School of Biological Sciences and Information Technology Center established
1993 Research and Education Center for Genetic Information established
1994 Research Center for Advanced Science and Technology established
1996 Graduate School of Materials Science established
1998 Research and Education Center for Materials Science established
2002 Intellectual Property Division established
2004 NAIST became a National University Corporation, Industry-Government-Academia Collaboration Group established
2009 Gender Equality Promotion Office and Center for International Relations established
2010 Information Initiative Center and Research Center for Advanced Science and Technology established
2013 Career Services Office and Institute of Research Initiatives established
2015 Center for Strategy and Planning, Institute for Educational Initiatives and Institute of Research Initiatives established
2017 Data Science Center established
2018 Three original graduate schools merged to create Graduate School of Science and Technology
2021 Center for Digital Green-innovation established

NAIST Numbers

NAIST is an institute focused solely on graduate school education based on its research achievements in the leading fields of science and technology.

<table>
<thead>
<tr>
<th>NAIST Student Enrollment</th>
<th>NAIST Faculty and Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Master’s</strong></td>
<td><strong>Doctoral</strong></td>
</tr>
<tr>
<td>758</td>
<td>366</td>
</tr>
<tr>
<td>Total: 1225 (International students: 25%)</td>
<td>Total: 381 (International faculty and staff: 6%)</td>
</tr>
</tbody>
</table>

(As of November 2022)

High Percentage of External Revenue

FY2021 Revenue: Total 10.5 billion (JPY)

<table>
<thead>
<tr>
<th>Infrastructure, Other</th>
<th>8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition</td>
<td>3%</td>
</tr>
<tr>
<td>Administrative Salary</td>
<td>64%</td>
</tr>
</tbody>
</table>

High Allocation of Educational Research Funding

FY2021 Expenses: Total 9.9 billion (JPY)

| Educational Research Funding | 46% |
| Facilities, Etc. | 12% |
| Personnel | 2% |

(As of November 2022)

External Revenue Breakdown (Fiscal 2021)

\[ \text{External Revenue} = \text{Joint research with Industry, etc.} + \text{Enrollment research} + \text{Endowments} + \text{Other competitive research funding} + \text{Grants-in-aid for Scientific Research, etc.} \]

Location

NAIST is located in Ikoma City, in Japan’s historic Nara Prefecture. Home of the first official capital of Japan, Nara Prefecture has an incredibly rich history as a center for international trade and relations. In addition to its prolific ancient heritage, Nara Prefecture is also conveniently located in close proximity to Kyoto and Osaka, and just 60 minutes from Kansai International Airport.

NAIST (located in Kansai Science City)
NAIST’s Educational Structure

Graduate School of Science and Technology

The Graduate School of Science and Technology was established to remove existing barriers between academic fields to form a flexible educational structure where faculty from related areas come together to perform education at the forefronts science and technology and to introduce an educational system for basic and specialized knowledge to prepare students for studies in diverse areas, and to allow them to reach beyond their specializations utilizing the knowledge and skills they attained in their undergraduate education. Additionally, in order to meet the ever-changing needs of society and to achieve real-world applications, project-based learning and other practical educational projects led by invited researchers and engineers from private industry, etc. are incorporated into the curriculum. The specific objectives for the graduate education programs are:

The master’s course fosters graduates with specialized knowledge and training, a wide understanding of related interdisciplinary fields, and the ability to approach issues and phenomena holistically to lead the application and innovation of science and technology throughout society.

The doctoral course fosters international awareness, self-reliance, and independence and develops researchers and skilled engineers with high ambitions that will advance the boundaries of science and technology taking leading roles throughout global industry, academia and government.

Multidisciplinary-focused Education Programs

The five Education Programs of the Graduate School of Science and Technology span the three original fields of research at NAIST (information, biological and materials sciences) and include the developing interdisciplinary fields that emerge independent of traditional academic divisions to pursue current trends in science and technology. All laboratories belong to one or more Education Program and students choose the type of degree the will pursue depending on their studies and the focus of their research.

Education Programs

Education Programs facilitating research in leading-edge science and technology

Information Science and Engineering

A focused program fostering students to support our dynamic advanced information society, implementing further achievements in diverse fields. This program cultivates specialized knowledge and skills in computer hardware/information network technology, computer/human interaction and media technology, and computer systems to utilize robotics.

Biological Science

A focused biological science program which fosters students who are able to contribute to the development of human-kind and the conservation of the global environment through research and development related to the environment, energy, food and natural resources, and human health and longevity by equipping them with cutting-edge knowledge and skills in a wide range of fields, from the basic principles of life phenomena to the diversity of living organisms in animals, plants, and microorganisms.

Materials Science and Engineering

A focused program fostering students with foundational knowledge of materials science and advanced knowledge to fully utilize their expertise in a program spanning solid state physics, device engineering, molecular chemistry, polymeric materials and biomo-engineering, and undertake next generation science and technology to maintain affluent living and support societal development.

Data Science

An interdisciplinary program fostering students with a wide range of expertise in data- and AI-driven sciences in information, biological, and materials sciences, to find hidden ‘value’ and ‘truth’ through data processing, visualization, and analysis of huge amounts of data to contribute to science, technology, and societal development.

Digital Green-innovation

An information, biological, and materials sciences interdisciplinary program which fosters students with advanced expertise in these three fields which support society and the economy, as well as comprehensive backgrounds to understand the adjacent interdisciplinary research fields, especially the interdisciplinary fields that encompass green and digital fields. These students can approach issues from various perspectives throughout society and will lead the utilization of digital green science and technology, which continues to develop in the green and digital fields, and innovation in society.

Education Programs that can be selected for each Division

<table>
<thead>
<tr>
<th>Division</th>
<th>Information Science</th>
<th>Biological Science</th>
<th>Materials Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Science and Engineering</td>
<td>○</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological Science</td>
<td></td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Materials Science and Engineering</td>
<td></td>
<td></td>
<td>○</td>
</tr>
<tr>
<td>Data Science</td>
<td></td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Digital Green-innovation</td>
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<td>○</td>
</tr>
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</table>
Globalization at NAIST

The coordinated education and research activities necessary to produce researchers and engineers who push forward the boundaries of science and technology and are active participants in today’s global society, and the extensive organized support to ensure their success.

Top Global University Project

In October 2014, NAIST was selected for the Top Global University Project funded by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). For a period of ten years, MEXT supports NAIST and other outstanding universities in their efforts to reform institutional governance and collaborate with top universities worldwide in order to strengthen international competitiveness. Through the Top Global University Project, NAIST has committed to enhancing its international graduate courses by creating a double degree scheme, developing a new model for graduate education based on world-class research, reforming institutional governance and strategic agility, creating a campus environment that supports trans-disciplinary education and cultural diversity, and merging its three graduate schools into a single entity to establish new, flexible research fields.

International Student Enrollment
(As of November 2012)

- Armenia 1, Germany 6
- Belgium 1, Italy 1
- Czech Republic 1, Netherlands 1
- France 3, Russia 1
- Iran 2

- Algeria 1
- Burkina-Faso 1
- Côte d’Ivoire 1
- Egypt 1
- Ethiopia 1
- Kenya 2
- Madagascar 1
- Mauritius 1
- Morocco 1
- Nigeria 1
- Sudan 1
- Tanzania 3
- Tunisia 1
- Uganda 1

International collaborative research network

Overseas research laboratories

NAIST maintains two overseas research laboratories at partner institutions where our faculty reside to facilitate collaborative research and strengthen institutional ties.

- Université Toulouse III - Paul Sabatier (France)
- University of California Davis (USA)

On-campus international collaborative laboratories

There are two collaborative laboratories on campus where visiting faculty from international partner institutions lead research with young international researchers.

- Ecole Polytechnique (France)
- University of British Columbia (Canada)
- National Yang Ming Chiao Tung University (Taiwan)

Overseas education and research collaboration offices

In Asia, NAIST has established two overseas offices in Thailand and Indonesia as hubs for education and research collaboration to support its growing network of graduates and partner institutions, and maintains an office to promote collaboration projects in Indonesia as well.

- NAIST Indonesia Office (located in the Bogor Agricultural University Alumni Building)
- NAIST Thailand Office (located in the Kasetsart University Faculty of Engineering)
- UGM-NAIST Collaboration Office (located in the Gadja Mada University Biotechnology Research Center)

NAIST’s global campus

At NAIST, in order to develop global leaders in science and technology, we have focused on the globalization of our campus, including academic environments and campus facilities, while also restructing our education programming to respond to current global needs and trends in science and technology. These efforts have produced a truly unique on-campus community that is central to students’ and researchers’ experience at NAIST. With students from various cultures, fields and backgrounds studying and performing research under NAIST’s diverse faculty, our campus has become an international hub for both education and research in science and technology and we are maintaining and actively expanding our network of domestic and international partners to further promote our activities globally.

Division for Global Education

The Division for Global Education plans and implements programs including agreements and activities with overseas institutions, double degree programs, studying abroad, overseas faculty and staff development programs, and overseas offices.
Agreements on Academic Exchange with 108 Overseas Institutions in 28 Countries/Regions

NAST’s international network is centered upon our international partner institutions and the faculty and staff that continue to strengthen ties in both research and education. The academic agreements below are achieved through extensive collaboration and their contents cover areas including research collaboration, symposia, guest lectures, faculty and student exchange, and the sharing of scientific information and materials.

### Institution Level Agreements

**Asia**

- **Bangladesh**: Bangladesh University of Engineering and Technology
- **China**: Institute of Genetics and Developmental Biology, Chinese Academy of Sciences; Tsinghua University; Peking University; Zhejiang University; Beijing Normal University
- **India**: All College of Engineering; Indian Institute of Technology, Jadavpur; Indira Gandhi Delhi Technical University for Women
- **Japan**: Nagoya University; Tohoku University; University of Tsukuba; Aoyama Gakuin University
- **North Korea**: Harbin Institute of Technology
- **Malaysia**: University of Science, Malaysia; University of Malaya; University of Technology, Malaysia; Universiti Tun Hussein Onn Malaysia
- **Middle East**: Al-Quds University; Jordan University of Science and Technology
- **Vietnam**: Hanoi University of Science and Technology; Vietnam National University

**Europe**

- **Belgium**: Université Libre de Bruxelles; KU Leuven; Katholieke Universiteit Leuven; Universiteit Gent; University of Ghent; University of Antwerp; Universiteit Hasselt
- **Germany**: Technische Universität Berlin; German Research Centre for Artificial Intelligence; University of Bonn; University of Hamburg; University of Hildesheim; University of Oldenburg; University of Bremen; University of Kiel; University of Konstanz; University of Ulm; University of Regensburg; University of Tübingen; University of Passau
- **Italy**: University of Pisa; University of Rome; University of Florence; University of Bologna; University of Genoa; University of Bari
- **North America**: University of California, Los Angeles; University of Michigan; University of Illinois at Chicago; University of Toronto

**North America**

- **Canada**: University of British Columbia; University of Alberta; University of Saskatchewan; University of Manitoba
- **US**: Stanford University; University of California, Berkeley; University of California, Los Angeles; University of Illinois at Urbana-Champaign; University of Minnesota; University of Wisconsin-Madison

### Double Degree Programs

With the rapid progression of globalization, researchers are able to guide international collaborative research bringing together human resources and emerging technologies to tackle the issues facing humankind regardless of borders, for which the double degree program is designed to systematically develop human resources with an emphasis on the ability to conduct international joint research and to enhance international collaborative skills through education and research collaboration with international partner institutions.

In the double degree program, students are enrolled at NAST and one of our partner institutions and upon completing the program, following research guidance from both institutions’ faculty, receive degrees from both institutions. Currently, NAST offers doctoral course double degree programs with 7 international partner institutions and a master’s course double degree program with Kasetsart University.

**Partner Institutions and Research Areas**

- **Macquarie University**
  - **Australia**
  - Research Areas: All divisions (Biology, Biotechnology, Chemistry, Computer Science, Engineering, Mathematics, Physics, and Statistics)

- **Université Toulouse III - Paul Sabatier**
  - **France**
  - Research Areas: All divisions (Biochemistry, Biophysics, Computer Science, and Biology)

- **University of South Australia**
  - **Australia**
  - Research Areas: All divisions (Biotechnology, Chemistry, Computer Science, and Physics)

- **Chulalongkorn University**
  - **Thailand**
  - Research Areas: All divisions (Biotechnology, Computer Science, and Engineering)

- **Kasetsart University**
  - **Thailand**
  - Research Areas: All divisions (Biotechnology, Computer Science, and Engineering)

**School/Department Level Agreements**

**Asia**

- **China**: Institute of Biotechnology, Vietnam Academy of Science and Technology
- **Japan**: Faculty of Science, University of the Ryukyus
- **Korea**: Materials Science and Engineering

**Europe**

- **France**: University of Paris-Saclay
- **Germany**: University of Technology Munich
- **Italy**: University of Milano-Bicocca

**North America**

- **Canada**: University of British Columbia
- **US**: University of Michigan
- **UK**: Imperial College London
Student Support

A supportive research environment for students

Rated top-class for research among Japanese national universities

In 2021, of all the respected national universities, NAIST was ranked extremely high for both Grant-in-aid for Scientific Research funding received and number of papers published (both of these are per individual faculty member), being ranked second in both areas. Also, in the MEXT Intermediate Evaluation of the 3rd Mid-term Target Period, NAIST was one of two institutions whose education and research were both evaluated highly as “having made significant progress.” Furthermore, the average institutional research budget for each NAIST faculty member for the 2021 fiscal year was 6 million yen, far surpassing double the national average.

Personalized education and research advising for students

With a 5:1 student-to-faculty ratio (FY2021), half the 11:1 average ratio for Japanese national institutions, NAIST students are regularly able to take advantage of individual advising opportunities. In addition to the main supervising professor, students are also assigned at least one sub-supervising professor to allow for guidance from different fields and to facilitate a broad understanding of their research. Furthermore, NAIST’s campus is physically compact and the educational structure is organized to encourage collaboration and developments in both education and research across traditional academic fields.

Examination, enrollment and tuition fees

<table>
<thead>
<tr>
<th>Enrollment type</th>
<th>Examination</th>
<th>Enrollment</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s and Doctoral Program Students</td>
<td>JPY 30,000</td>
<td>JPY 282,000</td>
<td>JPY 267,900/semester (JPY 535,800/year)</td>
</tr>
<tr>
<td>Research Students</td>
<td>JPY 9,800</td>
<td>JPY 84,600</td>
<td>JPY 29,700/month</td>
</tr>
<tr>
<td>Special Research Students* (</td>
<td>—</td>
<td>—</td>
<td>JPY 29,700/month</td>
</tr>
<tr>
<td>Short-term Exchange Students)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Internship Students</td>
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</tr>
</tbody>
</table>

*Tuition may be waived for students from partner institutions.

A wide variety of financial support options

Japanese Ministry of Education, Culture, Sports, Science & Technology (MEXT) Scholarship

MEXT offers competitive, full scholarships to excellent overseas students and researchers to study in Japan and chosen students receive comprehensive support (Tuition and other fee exemption, monthly stipend, travel expenses) so they may focus on their studies and research. There are two types of MEXT scholarships, embassy and university recommendation. (International Priority Graduate Programs, etc.)

NAIST International Scholar Program

This program is offered to talented partner institution students to study at NAIST while being Research Assistants, gaining valuable, hands-on research experience. NAIST Scholars are exempted from tuition and other fee payment, and receive a research assistantship salary and receive a research assistantship salary and airfare to Japan.

Other government and private scholarships

Every year a select number of privately financed international students receive JASSO and other private scholarships exclusively for NAIST students. Additionally, multiple scholarships specifically for international students are offered by private companies and foundations.

Teaching and research assistantships

In addition to the NAIST International Scholar Program, NAIST actively supports exceptional students with teaching and research assistantships, where they receive a salary for taking on different roles in the lab and classroom.

Affordable on-campus housing

For international students studying in Japan, housing is an expensive and time-consuming issue. All full-time international students are eligible for on-campus housing with free internet access. Housing fees range from JPY 10,000 - JPY 15,000 for single, couple or family housing, which are about one third or less of average Japanese housing costs. A new apartment-style dormitory where Japanese and international students live together to foster cultural understanding opened in April 2021.

International Student Affairs Section (ISAS)

The International Student Affairs Section is the first office that international students deal with when they begin their procedures for studying at NAIST. Starting with admissions assistance and visa procedures, the International Student Affairs Section manages international student registration, offers administrative support for international students concerning their status in Japan and handles Japanese government and other scholarships. The experienced staff also offers advice to students as they live and study at NAIST. Additionally, the section works with a citizen group to maintain a Japanese language program and arranges Japanese cultural excursions every year.

Center for International Students and Researchers (CISSt)

CISSt was started as part of NAIST’s commitment to supporting its growing international community, which consists not only of students, but also students’ families, international researchers and faculty, and their families as well. CISSt cooperates with administration offices across the campus to offer support in areas both on and off campus, while also working with local government offices to assure the international community in and around NAIST are able to make the most of their time at NAIST and in Japan.
Life at NAIST

Living off-campus

My usual weekday

- 7:00 Workout/Japanese class
- 9:00 Family time
- 11:00 Classes & research
- 18:00 Family time
- 20:00 Assignments & research
- 21:00 Chores
- 21:30 Rest and relax

Life in Osaka

Living with my family in Osaka, we take advantage of the many areas for children to play and signed up for baby pool classes at our local municipal pool. That has allowed us to connect with other local and foreign families as well as with neighbors with babies. We usually walk a lot with a stroller, so it is nice to have safe-walking accessibility as well as parks nearby. We appreciate the easier access to supermarkets, baby goods stores and 24h combines.

On the weekends

More family time! Also exploring Osaka and the Kansai area, as well as meeting up with NAIST and family friends.

Student activities and events

Indonesian students performing in the Ikoma International Friendship Festival

Mixed culture dance performers at the International Stage Event

International students learning how to make Japanese sweets

Living on-campus

Life in the dormitory

With shared washers and dryers on each floor and furnished rooms with a balcony, the dormitory has all the basics to start. Despite the limited space, there was still room for me to personalize my living space. The key is utilizing vertical space!

On the weekends

I love traveling! As a nature junkie, I usually spend weekends traveling around Japan with friends. Some of my favorite experiences are:

- Skin diving in Ishigaki
- Hiking in Mt. Ishiuchi
- Cycling along the Shimanami-Kaido route
- Strawberry picking in Shizuoka
- Skiing in Hakuba, Nagano

Riza Rae PINEDA

3rd year doctoral student from the Philippines studying in the Mathematical Informatics Laboratory

My monthly budget

- Expenses:
  - Dormitory: JPY 10,000
  - Utilities: JPY 1,500-10,000
  - Mobile phone w/ data: 3,000
  - Food: 40,000
  - Hobbies: 30,000

Student comment

Don’t be shy to use your broken Japanese. Locals are very kind and usually are really appreciative that you try your best to speak in Japanese. The best way to learn a language is to practice it!
Careers after NAIST

Divison for Career Development (DCD)
Established in 2013, DCD provides a wide variety of career support to NAIST students who seek non-academic careers in Japan. In particular, a University Education Administrator (UEA) is employed specifically to support international students as they maneuver the unique and difficult to understand Japanese job hunting customs and procedures.

Career Support Programs for International Students

Career Guidance
Career guidance sessions to educate students on how to start and proceed with job hunting in Japan

Career Counseling
International student career consultation service available in English

Career Events
Career events for international students and HR/R&D divisions of Japanese companies with global vision

Reference materials for job hunting are available to read and borrow in our office. It is also possible to read the job hunting reports of our alumni.

99% of graduates looking for employment found positions

Life in Japan

Chengyan ZHAO, Ph.D.
Assistant Professor
Ritsumeikan University
Graduated Division of Information Science in 2021

When I first arrived in Japan in 2017, I still remember the excitement because I was starting a new chapter of life in another foreign country. I am impressed that Japan has a safe environment and good public transportation which makes foreigners living easy and comfortably. Whenever I have troubles, the people here are friendly and lend to help out. In my current workplace, co-workers always share their knowledge and experience with me. They slowly guide me so that I can understand my job well and grow as a valuable person in society. Sometimes, they also bring me out to try local Japanese seafood such as Khousei (a fish commonly found in Izu Peninsula) which is new thing for me! I don’t know how my future will unfold but the experience that I gained previously makes me feel glad to come to Japan for my studies and career.

Life in Japan

Yen Siang WONG, Ph.D.
Researcher
Sunstar Group
Graduated Division of Biological Science in 2022

When I first arrived in Japan as a graduate student, the only Japanese words I knew were greetings. Although it made me nervous at first, living in Japan is much easier than I expected. Being able to have a daily conversation is more than enough to comfortably settle down and enjoy day-to-day life. Japan is also one of the safest countries in the world. I am never worried even if I have to go out alone. The culture that is built on empathy and cutting-edge technology made me come to love Japan. I came to Japan with the intention of finishing my degree and returning to my home country, but I ended up falling in love with Japanese culture and decided to stay and work here.

My Experience at NAIST

The student support program at NAIST provides opportunities for students to develop their skills and encourages them to do so. During my time at NAIST, I had the opportunity to study English in the United States and work as an exchange researcher in Switzerland. I was able to complete research that was accepted by top-ranking conferences in my field and published in a well-known journal thanks to professors’ advice and advanced laboratory facilities. Furthermore, the diversity of nationalities among students creates a pleasant environment for both international and Japanese students. I had a terrific time throughout my study at NAIST and international friends also significantly improved my Japanese and English. Studying at NAIST provided me not just an education but also an opportunity for personal development.

Hear from our Graduates
Information Science

Computer Science Laboratories

Information Science

Areas of Research and Education

Information Science

17-20

Biological Science

21-23

Materials Science

24-25

Computing Architecture

Prof. Toshiki Nakahata
Affiliate Prof. Masami Kimura
Assoc. Prof. Prof. Benyuan Zhang
Assoc. Prof. Yeong Jin Kim
Assoc. Prof. Hoi Lau Lam

Our laboratory performs research and development of next-generation variable computing platforms for Society 5.0. In particular, devices, hardware, architecture, and software for image processing, scientific computing. AI computing platforms, and blockchain accelerators, by fusing Intel/Tohoku and various promoting non-von Neumann computers.

From custom circuits, GPUs, signal processing, audio systems, video systems, graphics systems, high-efficiency blockchains, high-efficiency image processing, system architecture simulators, reconfigurable architectures, approximate computing, hardware design, digital/analog circuits, FPGA, HLS, K- accelerators.

Dependable System

Prof. Michiho Inoue
Adjunct Prof. Fukuhiko Onaka
Assoc. Prof. Michito Shimizu
Assoc. Prof. Ryuta Sugita

Today’s information society is supported by various levels of advanced technology such as applications, systems, computers and VLSIs. The Dependable System Laboratory is pursuing research on safe and secure systems including distributed systems with hundreds of computers and VLSIs with billions of transistors. Dependability is a concept from the source of the user's view when systems can be used reliably and securely.

Tech-tolerant distributed systems, fault-tolerant distributed algorithms, self-stabilizing algorithms, mobile agent and robot algorithms, population protocols, distributed algorithms for shared memory systems, VLSI design for testability, machine-learning based test optimization, dependability of emerging memory systems, hardware Trojan detection.

Ubiquitous Computing Systems

Prof. Hisashi Tanaka
Associate Prof. Tomoyuki Kakutani
Associate Prof. Toshihiro Suzuki
Assoc. Prof. Tatsuya Kadoura
Assoc. Prof. Tomohide Hisamatsu

Ubiquitous computing systems provide users with more useful services at lower costs than ever before by processing, aggregating, and analyzing real-world data sensed with various sensors and by recognizing the physical situations of the real space. Our laboratory performs research and education for realizing novel technologies based on ubiquitous computing systems.

Smart homes, smart life, smart cities, context recognition, pervasive computing/ social/ mobile sensing, behavior change, Internet of Things, sensor networks, data mining, cyber-physical systems, edge computing.

Software Engineering

Prof. Ken'ichi Matsumoto
Affiliate Prof. Takeshi Orihara
Affiliate Prof. Hiroki Higa
Assoc. Prof. Katsuhito Nisshito
Assoc. Prof. Koichi Tanaka
Assoc. Prof. Soichiro Kato
Assoc. Prof. Hideaki Tanaka
Assoc. Prof. Katsuhiko Akiyama

Our laboratory performs research and education on the fundamental and innovative technological trends of software engineering, including how contemporary software development teams make and maintain software, especially when using open source software. Topics include code analysis at the project level for automated tool support, empirical mining software artifacts to test assumptions, and human communication at both project and larger ecosystem levels. We strive to build, use, and maintain software to benefit society.

Program analysis, programming education, open source software, software ecosystems, empirical studies, artificial intelligence, mining software repositories, software libraries, software security.

Software Design and Analysis

Prof. Higuma Iida
Assoc. Prof. Hideki Hirose
Visiting Prof. Toshio Takagi
Visiting Prof. Toshihiko Tanaka
Assoc. Prof. Yutaro Kadowa
Assoc. Prof. Tsuchida Hideko
Visiting Assoc. Prof. Kenichi Takahashi

We conduct research on the methods and technologies which support the design/development of software and cloud computing systems, focusing on the analysis/optimization of the software development process. Software technology is increasingly present in our daily lives, including various software-embedded machinery and electronic devices for homes, mobile telephones, and social infrastructures represented by cloud computing systems.

Software development processes, repository mining, software design & verification, cloud infrastructure design, software-defined networking (SDN).

Cyber Resilience

Prof. Yutaka Kadoya
Assoc. Prof. Yuto Tanaka
Assoc. Prof. Mokhtar Hassane
Affiliate Prof. Hiroshi Iwamoto
Affiliate Prof. Kazumasa Akiyama

Our laboratory pursues resilience of ICT-based society together with lab members and colleagues around the world. Our research spans from theoretical to practical, and spans across broad technical fields, from binary code, methodology, to even law. The pursuit of resilience (robustness) is an ongoing challenge and central to our mission.

Cybersecurity, Internet technology, IoT/CPS, privacy, edge computing, applied machine learning, software-defined technology, operating systems, distributed systems, industrial control systems (ICS).

Information Security Engineering

Prof. Yushi Hayashi
Assoc. Prof. Daikichi Fujimoto
Assoc. Prof. Shuji Kajikawa
Affiliate Assoc. Prof. Youngjo Kim

Our laboratory conducts research on methods to ensure hardware safety, which is the bedrock of system information security. We also research to ensure system-level security, including the upper layers. In addition to students from information science fields, we also accept students who major in electrical and mechanical engineering that wish to study the information field.

Hardware security, cryptographic hardware, embedded systems, side-channel analysis, electromagnetic information security, hardware Trojans, cyber-physical system security, random number generator, electromagnetic compatibility, signal/power integrity.

Internet Architecture and Systems

Prof. Koutaisi Fujisawa
Assoc. Prof. Istimuli Ali
Assoc. Prof. Masahiro Kajikawa
Assoc. Prof. Anja Endo
Affiliate Assoc. Prof. Shinya Kubo
Affiliate Assoc. Prof. Akira Tazaki

Our research goal is to realize the next-generation ICT infrastructure technologies and services beyond current systems such as the Internet, Wi-Fi networks, and cloud systems, which can be used securely and conveniently. In order to achieve this, our research methods are not only computer simulations but also using actual systems and equipment operated in Information Initiative Center (IIC).

Pervasive computing, ubiquitous computing, Internet of Things, disaster relief computing/networking, data centers, network operator, cyber security, high-performance computing, software-defined networking.

Media Informatics Laboratories

Natural Language Processing

Prof. Tsuyoshi Matsumoto
Assoc. Prof. Hiroaki Kameguchi
Research Assoc. Prof. Hidenori Shindo
Assoc. Prof. Hiroyuki Ouchi
Affiliate Assoc. Prof. Shigeo Higashiyama

We perform research on natural language processing, computational linguistics and machine learning. Our primary research areas are on the fundamental techniques for language analysis, language generation and information extraction, and on the end applications, such as machine translation, summarization, question answering and grammatical error correction. We also work for the language technologies interacted with other areas, e.g., geography and vision.

Natural language processing, computational linguistics, machine learning, syntactic analysis, semantic analysis, information extraction, language generation, language grounding, machine translation, summarization, geography and language, vision and language.
Augmented Human Communication

The HNC Laboratory pursues research to solve problems related to human communication based on speech and language, paralanguage, and non-verbal information. By applying various artificial intelligence technologies including deep learning, our lab is pursuing tasks that were previously not able to be solved.

Speech-to-speech translator, natural language processing, multi-lingual speech processing, dialog systems, brain analysis, information dissemination.

Social Computing

We are an interdisciplinary laboratory specializing in the usage of social media mining and natural language processing (NLP) technologies towards a wide spectrum social outcomes, ranging from medical informatics and mental health applications, to fake-news detection on Twitter and AI-powered conversation.

Social computing, web engineering, artificial intelligence, machine learning, natural language processing, medical informatics, computational social science.

Network Systems

The scope of our laboratory includes wireless technologies such as beyond 5G mobile communication systems, wireless power transfer systems, and radio sensors. We educate our students from theoretical and practical perspectives of wireless technologies to achieve our research goals.

Wireless communications, wireless power transfer, digital broadcasting, satellite communications, wireless sensors, multiple input multiple output, radio over fiber, dynamic changing, intelligent reflection surfaces, electromagnetic theory, modulation and signal detection.

Interactive Media Design

Our vision is to introduce augmented reality, interactive robots, and comfortable self-driving cars into the everyday lives of everyone on this planet. We aim to develop truly practical methods and systems using these technologies in cooperation with experts in various fields, focusing on medicine, sports, and industry.

Augmented reality, virtual reality, human computer interaction, human robot interaction, computer vision, computer graphics, tracking systems, safety systems, user interfaces, self-driving cars.

Optical Media Interface

The research topics in our laboratory include computer vision to understand scenes from visual information obtained by a camera, and computer graphics to generate rich visual information for humans. We are aiming to realize new interfaces that enable humans and machines to interact through optical media based on our cutting-edge research.

Computer vision, computer graphics, computation/photography, development of sensing systems, deep learning, optical measurement, unconventional cameras, image analysis, 3D shape reconstruction, digital fabrication.

Cybernetics and Reality Engineering

We conduct research to create the “tools of the future” to realize an inclusive society where all people can maximize their abilities and help each other. In particular, by manipulating various sensations such as vision, we aim to live more comfortably, more securely or more securely by offering “personalized reality” which empathizes with each individual.

Virtual and augmented reality, human augmentation, wearable computing, affective computing, cognitive science, psychology, computer vision, human and environmental sensing, artificial intelligence, display hardware.

Applied Informatics Laboratories

Human Robotics

We conduct research studies on the intellectualization of robots, understanding human perception-action loops based on information science, and human machine system/human robot collaboration by combining them. We are aiming to define the quality of operational feeling and emotional comfort in intelligent mechanical systems that interact with humans. Research questions include “What determines easiness of working with an artificial leg?”

Robotics, human machine systems, human modeling, cooperative control, biological cybernetics, shared control, motion perception, motion variability.

Robot Learning

Our laboratory performs research and educates students in robot learning (machine learning for robot intelligence), an interdisciplinary field of various fields such as machine learning, artificial intelligence, robotics, control engineering, signal processing, optimization, mechatronics.

Reinforcement learning, imitation learning, deep learning, active perception, smart manufacturing, human-assistive technology/assistive robots, DML interface, industrial applications, whole autonomy.

Large Scale Systems Management

The Large-Scale Systems Management Laboratory research aims to develop mathematical modeling and simulation techniques for optimal design, control and architecture of large-scale systems such as computer/communication networks, with the resulting systems achieve high performance, low vulnerability and high energy efficiency.

Queueing theory, game theory, machine learning, algorithms, graph theory, mathematical analytics, network optimization, blockchain, incentive mechanism design, data structure.

Mathematical Informatics

Our laboratory studies mathematical models in various fields such as computer science, mathematical biology, and engineering. Computer science includes machine learning and statistical science. Mathematical biology includes neuroscience, medical science, cognitive science, psychophysiology and bioinformatics/multivese. Engineering includes biomedical engineering, signal processing, computer vision and robotics. Mathematical models are everywhere!

Mathematical models, machine learning, mathematical biology, neuroscience, cognitive science, biomedical signal processing.

Imaging-based Computational Biomedicine

We conduct research and education on “computational biomedicine,” which aims to develop mathematical models of the structure and function of the human body and other living organisms, and artificial intelligence for medical diagnosis and treatment, by integrating deep learning and biological simulation with analysis of biomedical images.

Medical image analysis, virtual human body, computational anatomy, machine learning, deep learning, artificial intelligence, medical big data, biological simulation, computer assisted surgery, computer assisted diagnosis.

Computational Systems Biology

We are incorporating state-of-the-art data/modeling/manipulating techniques such as deep learning techniques to better our understanding of the system biology of plants. In collaboration with medical hospitals and other academic institutions, we are developing various biomedical technologies based on information technology and deep learning techniques.

System biology, metabolic pathways, drug discovery, digital biomarkers, medical image processing, deep learning, computer aided diagnosis, proactive healthcare.

Computational Behavioral Neuroscience

To understand humans, we build behavioral models based on the information processing mechanism of the brain, investigates the principles of human behavior through verification using experimental and data-driven approaches, and conduct educational research on its application to society.

Decision-making, computational models, reinforcement learning, neuroimaging, cognitive science, neuroeconomics, computational psychiatry, databases.

Collaborative Laboratories

Communication

Our laboratory performs research on machine learning and data mining methods that extract valuable knowledge from various types of data. In particular, we are interested in developing methods that can learn from incomplete data, such as a small amount of data, data with many missing values, aggregated data, and noisy data.

Machine learning, data mining, deep learning, meta-learning, social network analysis, learning from aggregated data, spatio-temporal analysis.

Computational Neuroscience

We aim to understand the human brain and to achieve new machine intelligence (artificial intelligence) based on brain information processing functions. We conduct research and educate students on computational neuroscience, cutting-edge machine intelligence and neurotechnology at ATR, an internationally recognized computational neuroscience center.

Computational neuroscience, machine intelligence, robot learning, brain machine interface, cognitive function, neuromarketing, computational psychiatry, statistical modeling, multi-modal brain imaging, brain decoding.

Humanware Engineering

Our laboratory performs research on Humanware, which essentially extends the abilities of humans and supports better human life by the combination of sensor data and knowledge processing. We explore new research areas such as smart houses and robots combined with human, social, and physical sciences.

Artificial intelligence, biomedical engineering, machine learning.

Symbiotic Systems

Our challenge is research and development of “symbiotic” systems that work in real applications to create social value. Currently we focus on the advanced image sensing and recognition technologies including "Fingerprint of Things" and object identification/autentication, which break through the limitation of existing AI technologies for real applications. We work on not only the algorithms but also additional methods and engineering for sensing, data collection and system usability design. Our final goal is to create social values by implementing and operating the new technologies with the real applications.

Symbiotic systems, image recognition, signal processing, Finger print of Things, pattern recognition, traceability, visual inspection, machine vision, robot vision.

Optical and Vision Sensing

Our laboratory performs research and educates students from both theoretical and practical perspectives, ranging from fundamental research to engineering. Our research results are applicable especially in the field of factory automation, healthcare, and social systems.

Physics-based vision, vision-based 3D measurement, sensor calibration, object detection/recognition, machine vision algorithms.
**Biological Science**

**Biological Science Laboratories**

**Functional Genomics and Medicine**

*Assist. Prof. Takahiro Ichise*

*Assist. Prof. Chisaki Kakehata*

*Assist. Prof. Eiichi Matsumoto*


**Tumor Cell Biology**

*Assist. Prof. Jun-ji Kato*

*Assist. Prof. Naoko Yonekura-Kato*

Focusing on molecular mechanisms controlling metastasis cell procreation, differentiation, and death. We conduct research on the regulation of the G1 phase of the cell cycle and carcinogenesis, and on hematopoietic stem and blood cell differentiation, proliferation, and tumorigenesis. Experimental systems used include (1) in vitro cell cultures of mouse and human cell lines, (2) in vitro induction of differentiation using ES cells, and (3) in vivo mouse models using knock-out and transgenic mice.

**Molecular Immunobiology**

*Assist. Prof. Taro Kawai*

*Assist. Prof. Daichi Okinari*

The innate immune system is the first line of host defense that detects invading pathogens. However, aberrant activation of innate immune responses is closely associated with exacerbation of inflammatory diseases. Our aim is to uncover mechanisms that control innate immune responses using tools of molecular and cell biology, bioinformatics, and genetically modified mice.

**Molecular Medicine and Cell Biology**

*Assist. Prof. Shuji Tanaka*

*Assist. Prof. Tatsuro Nomura*

Each type of cell has specific shapes that are determined by the plasma membrane. Our lab will focus on the mechanism connecting the membrane to the cytoskeleton for various cellular functions including migration, proliferation, and various events associated with morphological change. We will integrate cell biology, molecular biology, biochemistry, biophysics, and machine learning.

**RNA Molecular Medicine**

*Assist. Prof. Kazumasa Ohnaka*

*Assist. Prof. Ken Ishii*

*Assist. Prof. Masaaki Shimizu*

Our laboratory studies ligands and functions of regulatory small non-coding RNAs and tries to understand how they contribute to human health. We conduct bioinformatics analysis to extract important information from large amounts of sequencing data and perform biochemical experiments using cultured cells and model organisms to test hypotheses.

**Stem Cell Technologies**

*Assist. Prof. Akira Kusumi*

*Assist. Prof. Hiroto Takada*

*Assist. Prof. Atsushi Ishii*

Our goal is to understand the mechanisms of tissue development from the viewpoint of stem cell differentiation. We are also interested in the tissue regeneration process because the stem cells are activated and initiate differentiation upon damage.

**Developmental Biomedical Science**

*Assist. Prof. Noriko Sawa*

*Assist. Prof. Takuma Shinouchi*

Our laboratory is interested in developmental biology, and is focusing on the mechanisms by which the central nervous system is formed. In addition, we investigate how the established nervous system is maintained, and seek for new therapeutic methods for neurodegenerative diseases.

**Organ Developmental Engineering**

*Assist. Prof. Atsuo Isotani*

*Assist. Prof. Shinjiro Yui*

We are researching the formation of organs using interspecies chimeric animals in which mouse and rat cells coexist in one body. Through this research, we investigate the essential factors for organ development and the correct function of organs.

**Systems Biology Laboratories**

**Microbial Molecular Genetics**

*Prof. Shuoshu Yoshioka*

*Assist. Prof. Akihiko Yajima*

*Assist. Prof. Kazuo Kobayashi*

Genomic stability, mutations, RNA replication, DNA repair, biofilm formation, molecular biology, microbiology, cell biology.

**Microbial Interaction**

*Assist. Prof. Osakabe Wataru*  
*Assist. Prof. Yuki Kimura*  
*Assist. Prof. Akira Yonemura*  
*Assist. Prof. Yuki Morozumi*  
*Assist. Prof. Yukiko Nakano*

Microbial ecology, microbial interaction, protein-protein interaction, signal transduction, TLR signaling, environmental response, ER stress response, food fermentation, biomanufacturing, yeast.

**Environmental Microbiology**

*Prof. Shuoshu Yoshioka*

We study the unique metabolic capabilities of microorganisms at the cellular and molecular levels. Furthermore, we aim to develop technologies that contribute to solving environmental problems and the realization of a sustainable society by utilizing microbial functions. A recent focus is polyethylene terephthalate biodegradation.

**Structural Life Science**

*Prof. Tomokazu Suzuki*  
*Assist. Prof. Ryo Miyake*  
*Assist. Prof. Ken Kiozumi*

In cells, various proteins are involved in a variety of fundamental biological phenomena. To unveil such mechanisms coupled with dynamic interactions and structural changes of biomolecules, including proteins, we conduct basic research through structural biological analysis in combination with other newly developed methods.

**Gene Regulation Research**

*Prof. Yasuyuki Hirose*  
*Assist. Prof. Takahiro Matsumoto*  
*Assist. Prof. Ryotaro Aizawa*  
*Assist. Prof. Norihito Kishigawa*  
*Assist. Prof. Yukiaki Inaba*

We are clarifying the principles of animal development and growth using mice and zebrafish as model systems. We bring together various technologies, including genetics, molecular biology, bioimaging technology, pharmacology, bioinformatics, mathematical modeling, and nanotechnology to tackle the mystery of life.

**Systems Neurobiology and Medicine**

*Prof. Natsuki Hara*  
*Assist. Prof. Kenjiro Baba*  
*Assist. Prof. Takamori Minoguchi*  
*Assist. Prof. Kenjiro Baba*  
*Assist. Prof. Takamori Minoguchi*

The development of neuronal networks in the brain relies on multiple steps, including neuronal migration, polarity formation, axon guidance, synapse formation and synaptic plasticity. Our laboratory investigates the molecular mechanisms for these processes. We are also analyzing the mechanisms of cell migration, memory formation and cancer metastasis.

**Bioengineering**

*Prof. Ko Kato*  
*Assist. Prof. Shinya Yamawaki*  
*Assist. Prof. Tatsuru Nakayama*  
*Assist. Prof. Takehiro Kato*

In our laboratory, we are performing research and education on the development of basic technology for efficiently producing useful materials such as biopharmaceuticals in plants and the elucidation of the mechanisms controlling the phenotype of plants in order to contribute to society through biotechnology.

**Data-Driven Biology**

*Prof. Yuichi Sakuma*  
*Assist. Prof. Toshihiko Kikuchi*

Our laboratory analyzes experimental biological data to build quantitative mathematical models and provide feedback for experimental design. We work to progress the data using domain knowledge, and then use machine learning and mathematical models to extract novel knowledge.

**Collaborative Laboratories**

**Molecular Microbiology and Genetics**

*Visiting Prof. Masayukihiro Ichise*

Basic research and education activities focus on the development of a biofactory, a facility that integrates biomass conversion and environmentally friendly production of fuels and other useful chemicals. To achieve this, integrated omics analysis and metabolic engineering techniques are employed to develop new microbial functions. (Affiliation: Research Institute of Innovative Technology for the Earth (RITE))

Microbiology, molecular biology, genome engineering, culture engineering, metabolomics, analysis, metabolic engineering, systems biology, high-efficiency bioprocesses.
Materials Science

Core Laboratories

Bio-Process Engineering

Our laboratory promotes developmental research on high-performance and fast manipulation methodologies for biological materials, in which state-of-the-art laser technology is employed with microscale technologies. We have the world’s top activities on cell manipulation and processing by femtosecond laser and have attracted attention as a pioneer of laser applications for biotechnology.

Prof. Yosuke Nishiyama
Assoc. Prof. Yuki Takai
Prof. Yutaka Katori
Prof. Hajime Yamaoka

Solid-state Information Physics

Our laboratory is conducting interdisciplinary research into laser applications, from the design of original optoelectronic devices based on microelectronics technology to their applications. Specifically, we are developing novel photonic and optoelectronic devices and systems that make use of polarization, implement functional brain imaging devices, and intracranial color imaging, and visualize high-frequency electric fields.

Prof. Tomohiro Matsunaga
Assoc. Prof. Ko Hirata
Prof. Sadayuki Takada
Assoc. Prof. Yuji Hoshida
Assistant Prof. Takatoshi Aki
Prof. Yuta Takanashi

Quantum Photo-Science

We develop techniques to manipulate the quantum properties of various target systems, such as strongly-coupled cavity systems, composed of confined photons and molecules, and size-selective organic nanoparticles. We utilize various optical-based experimental approaches to clarify material properties from the viewpoint of quantum physics.

Assoc. Prof. Hirokazu Kikuchi
Assoc. Prof. Hiroshi Muto

Quantum Materials Science

This laboratory is working on optical functionality of nanostructured materials such as environment-conscious nanoparticles and impurity-related magnetic materials.

Prof. Shu Hirota
Assoc. Prof. Atsushi Yamashita

Photonic Device Science

In our laboratory, we are conducting cross-disciplinary research, from the design of original optoelectronic devices based on microelectronics technology to their applications. Specifically, we are developing novel photonic and optoelectronic devices and systems that make use of polarization, implement functional brain imaging devices, and intracranial color imaging, and visualize high-frequency electric fields.

Prof. Sae Ohtta
Assoc. Prof. Kiyotaka Suzuki
Assistant Prof. Hiroto Kaida

Information Device Science

In our laboratory, we are developing semiconductor materials and studying semiconductor processes and devices. We are also developing various semiconductor devices such as LSIS, and solar cells with the aim of creating and using energy that can be stored.

Prof. Takayuki Yonogiro
Assoc. Prof. Toru Kasukabe
Assoc. Prof. Daiki Nakahara
Prof. Takuma Kato

Applied Quantum Physics

Our laboratory studies catalysts and storage phophors for solar cell and solid state ionizing radiation detectors, and the covariance of synthesis of materials (single crystal, transparent ceramic, glass, organics-inorganic, polymer, and powder), photosynthesis and radiation detector properties.

Prof. Takayuki Yonogiro
Assoc. Prof. Toru Kasukabe
Assoc. Prof. Daiki Nakahara
Prof. Takuma Kato

Organic Electronics

Our laboratory pursues the development of novel electronic devices using organic materials based on applied physics and chemistry. Our unique research is that we develop original research tools to characterize organic thin films and low-dimensional materials, and realize entirely new fabrication methods and structures of devices which are distinctive from conventional ones.

Assoc. Prof. Takayuki Yonogiro
Assoc. Prof. Toru Kasukabe
Assoc. Prof. Daiki Nakahara
Prof. Takuma Kato

Core Laboratories (Cooperative)

Mesoscopic Materials Science

Our laboratory performs research and education on exotic devices utilizing new physical phenomena in the mesoscopic region that take advantage of thin film technology and computational science. Specifically, we are conducting research on novel semiconductor devices and new materials for energy conversion and carbon neutrality including photocatalysts and hybrid performance transistors.

Adjunct Prof. Yasuyuki Kitahara
Adjunct Prof. Hironao Tanaka
Adjunct Prof. Hironori Hattori

Sensory Materials and Devices

We are advancing our research on sensor and device-related fundamental technologies such as microfabrication, biotechnologies, image sensors, and tactile systems to be applied in the medical diagnosis field, as well as working on the integration of these technologies to realize high-performance biofunctional microsystem technologies (a PTAS Micro Total Analysis Systems).

Viewing Prof. Keita Kitamura
Viewing Prof. Masaki Marui
Viewing Prof. Tetsuya Furukawa

Photonic and Reactive Molecular Science

We group investigates light matter interactions to tackle innovative chemistry, promoting social progress and protecting the environment. We aim to cultivate students who have the intelligence to develop innovative technology. Our focus encompasses molecule-rich media for remote-controlled photo induced diverse molecular-scaled catalysis, conversion of light information as well as light energy with molecular photo-reaction. For this, we conduct advanced scientific research on synthetic organic chemistry, molecular photochemistry, fluorophores and photosensitive materials and dual light writing materials. Furthermore, from the perspective of organic chemistry, we aim to construct a new branch of green chemistry or the basis of carbon neutral, Biophotons, photo-triggered reactions, chromo, stereo/transition-selective catalysis, circularly polarized luminescence, transition metal catalysis, future displays, light emitting devices, lanthanides, fluorochrome chemistry, carbon neutral, green chemistry.

Prof. Toshiyuki Nakao
Assoc. Prof. Tatsuo Motoiri
Prof. Mihoko Yamaoka
Assoc. Prof. Matteo Leoni

Core Laboratories

Functional Organic Chemistry

Our laboratory focuses on development of functional organic materials including organic semiconductors, highly fluorescent dyes, and carbon nanomaterials. In particular, we are fascinated by beautiful and large organic structures with high symmetry. We are also interested in the control of self-assembled structures to achieve their synergistic performances.

Assoc. Prof. Naoki Arata
Assoc. Prof. Ryosuke Matsumi

Inorganic and Molecular Science

We are designing and synthesizing molecules which can act as machines at the nanoscale, including motors, gears and nanorobots. Thanks to the invention of light-emitting or electronic molecular machines, we can produce a controllable motion. We are also developing biologically active molecules by using natural molecular machines.

Assoc. Prof. Gonnoh Saito
Assoc. Prof. Katayama Tsuyoshi
Assistant Prof. Toshihiko Nishida

Core Laboratories (Cooperative)

Polymer Functional Science

Our laboratory performs research and educates students through drug discovery and formulation design for medical drugs. Especially, we are now exploring the innovative DDS platform to penetrate target ocular tissues efficiently by using synthesized new material or functional polymers, etc.

Prof. Kazuyoshi Sato

Ecomaterial Science

The Ecomaterial Science Laboratory, staffed by researchers of the Research Institute of Innovative Technology for the Earth (RITI), provide research and education on fundamental technologies to solve global warming issues. We endeavor to develop advanced materials for CO2 capture and H2 energy production, such as noble, amino-based materials.

Assoc. Prof. Munenori Yamasaki
Advisor Prof. Junichiro Kado
Advisor Prof. Manabu Yamamoto

Advanced Functional Materials

We focus on the nanostructure control of materials to realize next-generation products. An important challenge is the development of environmental consciousness material processing technology for all solid-state batteries and biodegradable polymers. Our laboratory is located in the Okayama Research Institute of Industrial Science and Technology. Momotnejima Center in Okayama city and cooperates with private industry companies, leading to rapid application of the developed materials into practical devices.

Prof. Sojiru Inoue
Senior Prof. Naoyuki Tani
Assistant Prof. Takeshi Ichii

Core Laboratories (Cooperative)

Supramolecular Chemistry

We are performing novel interdisciplinary research in chemistry and biology with particular emphasis on the role of supramolecular chemistry at molecular level, our laboratory focuses on development of precise control of molecules in drug discovery/design/application of bio-supramolecular using various analytical methods, protein engineering techniques, and organic synthesis.

Prof. Shu Hirota
Assoc. Prof. Takahiro Matsumi
Assistant Prof. Naoyuki Kobayashi
Assistant Prof. Toshiyuki Mochida

Complex Molecular Systems

Our laboratory focuses on the spontaneously self-assembling phenomena exhibited by complex molecular systems of proteins. Based on protein science and bioinformatics, we conduct research and education on the understanding of protein-molecular complex systems as potential targets for drug discovery and the development of next-generation protein-receptor complex molecules.

Prof. Hiroshi Kamikura
Assoc. Prof. Sachiko Tanao-
Assistant Prof. Yoshitaka Yamanaka
Assistant Prof. Kenyu Yonezawa

Nanomaterials and Polymer Chemistry

Based on the concepts of “molecular technology” and “process polymerization”, we prepare various polymer structures and create new polymer materials by controlling molecular design, polymer synthesis and polymer-polymer interactions. The target of our application is biocompatible materials, energy-related materials, and environmentally friendly materials.

Prof. Hiroshi Arai
Assoc. Prof. Tatsuo Ando
Assoc. Prof. Ryoji Chiba
Assistant Prof. Hiroyuki Yokota

Materials Informatics

In our laboratory, we study materials information. Our goal is to develop informations analysis methods and their applications to improve material properties. In material science, experiments and theories have developed by interacting with each other. We are particularly interested in the technology that integrates and utilizes.

Materials informatics, machine learning, conditional generative adversarial networks, data assimilation, computational quantum chemistry, first-principles calculation, photocatalysts

Core Laboratories (Collaborative)

Data Driven Chemistry

Chemoinformatics is a research area where chemical problems are tackled using tools coming from informatics. Our primary missions is to develop useful data analysis methodologies for experimental chemists/biologists by incorporating theory and data. The methods developed by our group have a wide range of applications from drug discovery to process control in chemical plants.

Prof. Yutaka Ushio
Assoc. Prof. Takeo Miyake
Assoc. Prof. Jesal Sward
Campus Map & Facilities

NAIST's campus is a compact area constructed to facilitate campus-wide research, education and interaction, where students, faculty and staff connect with each other daily. In addition to the on-campus housing for students, faculty, and staff, NAIST's secluded campus was created to assist students in focusing on their academic goals by offering support in a variety of areas. The campus's location close to Kyoto and Osaka allows for easy domestic and international travel.

1. Administration Bureau
2. Library
3. Interdisciplinary Frontier Research Complex No. 1
4. Millennium Hall
5. Guesthouse Setan
6. Information Science Complex / Information Initiative Center
7. Biological Science Complex / Research and Education Center for Genetic Information
8. Animal Experimentation Facility
9. Botanical Greenhouses
10. Materials Science Complex / Research and Education Center for Materials Science
12. Interdisciplinary Frontier Research Complex No. 1
13. Student Dormitories
14. Staff Residences
15. Administration Bureau Annex
16. Sports facilities
17. NAIST One-way Carsharing System
18. Rooms for childcare and reproductive health

Around Campus

NAIST Library
As Japan's first full-scale digital library, the NAIST Library is available online 24 hours a day throughout the year and the physical library is open 24 hours a day as well offering reference materials, study space, etc.

Health Care Center
The Health Care Center staff includes a doctor, nurses and counselors, and they offer medical examinations and assistance, health guidance and mental health counseling for students, faculty and staff.

Convenience Store
The on-campus convenience store is open seven days a week and, in addition to foods and beverages, stocks daily amenities and offers utility and other payment services.

Sports Facilities
NAIST maintains tennis courts, a basketball/volleyball court, a field for soccer/baseball and a room for table tennis, and the administrative offices offer rental equipment to students, faculty and staff.

NAIST One-way Carsharing System
As part of research being performed at NAIST, a car-sharing system featuring electric vehicles with 3 payment charging stations on campus which utilizes cryptocurrency has been established to assist the mobility of faculty, staff and students.

Cafeteria
The NAIST cafeteria offers a variety of inexpensive meal options for both lunch and dinner. Dishes range from traditional Japanese foods to western dishes such as spaghetti and curry.

Guesthouse Setan
The guesthouse offers reasonable short-term on-campus accommodations for visiting students, researchers, etc. to facilitate collaboration with both international and domestic partners.

Rooms for childcare and reproductive health
These rooms have been established along with various child and family care support programs as part of NAIST’s efforts to support female faculty and employees’ work-life balance.

Reaching NAIST from Domestic Airports

NAIST is only 1.5 hours away from the Osaka International Airport and the Kansai International Airport.

1. Osaka International Airport
   - Limited Express Haruka 60 min.
   - - Limited Express Narita 60 min.
   - Kintetsu Nara Line Express 35 min.
   - - Limited Express子弹列车
   - - Narita Express 60 min.
   - - JR Nara Kotsu Bus 40 min.
   - - JR Tokaido Shinkansen Nozomi 120 min.

2. Kansai International Airport
   - Limited Express Haruka 60 min.
   - - Limited Express Narita 60 min.
   - Kintetsu Nara Line Express 35 min.
   - - Limited Express子弹列车
   - - Narita Express 60 min.
   - - JR Nara Kotsu Bus 40 min.
   - - JR Tokaido Shinkansen Nozomi 120 min.