Graduate Program for

Real-World Data Circulation Leaders

Program for Leading Graduate Schools
Nagoya University

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GRADUATE PROGRAM FOR
REAL-WORLD DATA CIRCULATION LEADERS
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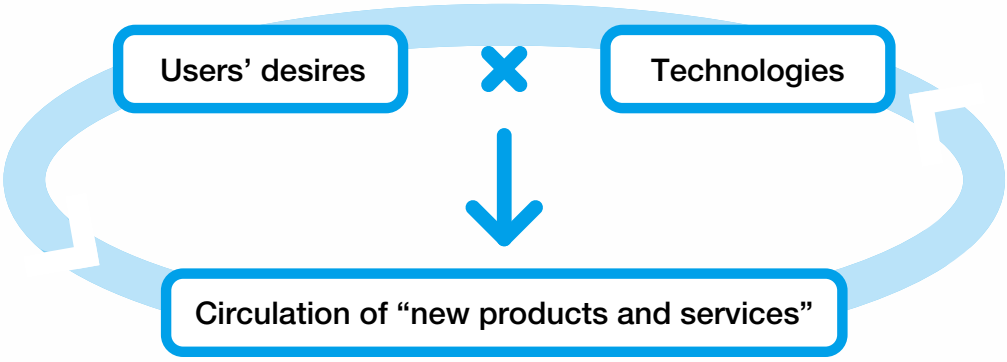
Recognizing and building circulation

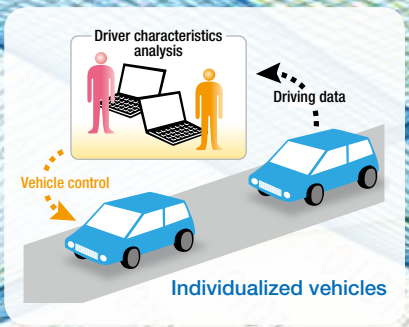
Industries around the world are in the midst of globalization. Even markets in emerging countries involve the whole world in their development, production, and business activities. To extend its global reach and improve its competitive edge by manufacturing products and services with true social values, such as convenience, joy, health, or affluence, Japan must be aware of what is happening around the world. However, manufacturers alone cannot unilaterally create such fundamental values. Instead, the “desires of users” must be reflected in manufacturing activities to produce valuable products and services.

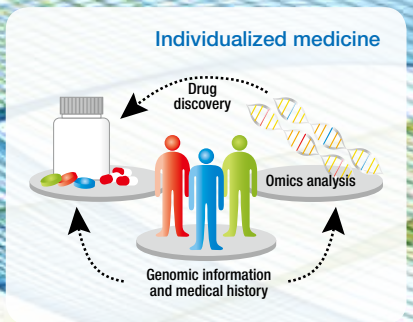


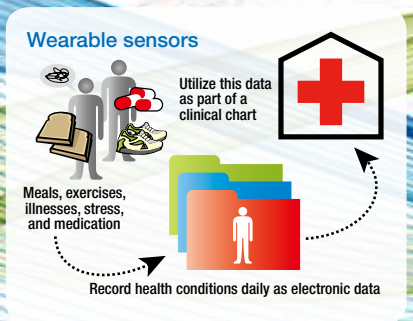
The process to develop innovative products and services is the same as that to create social values. However, skilled individuals are needed to integrate “users’ desires” and “technologies”, which is why Nagoya University has launched the “Graduate Program for Real-World Data Circulation Leaders.” This program will produce industrial leaders capable of creating true social values.

Examples of Real-World Data Circulation

Most people are unaware that interrelated data is ubiquitous. Leveraging the large-scale data of seemingly irregular phenomena may provide opportunities to begin new businesses or industries.

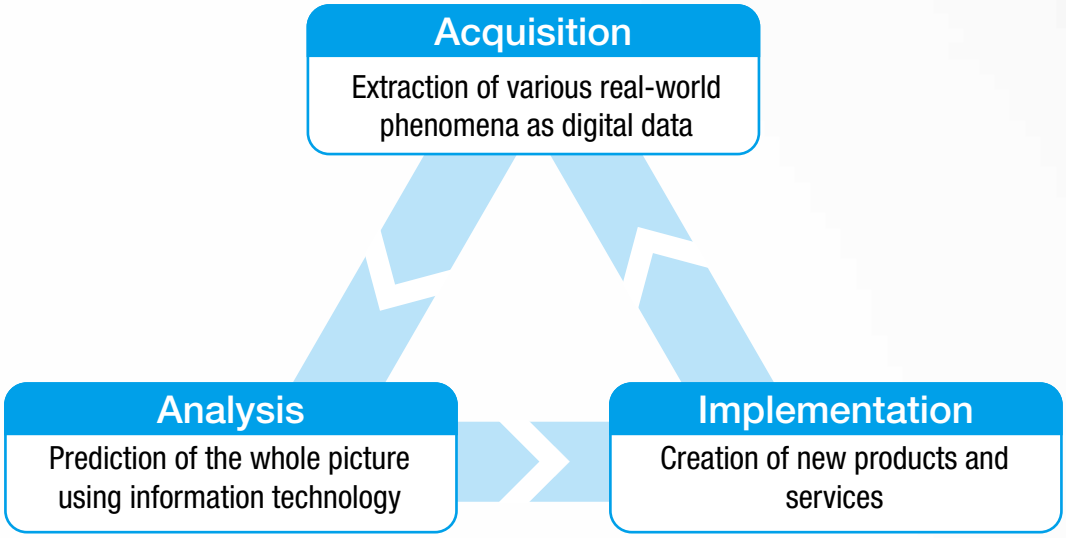






Real-World Data Circulation as an academic field

The field of Real-World Data Circulation encompasses engineering, information science, medicine, and economics to integrate acquisition, analysis, and implementation of data. This program will produce experts who can generate circulation processes to create social values.
Acquisition involves observing digital data of real-world phenomena to understand users' desires. Analysis evaluates this data using information science, and implementation uses the results to develop innovative products and services. In addition to developing a comprehensive understanding of the above three functions, students in the program will systematically study methodologies in fields that deal with fundamental values of convenience (engineering), joy (information science), health (medicine), and affluence (economics).



Becoming an industrial leader through experience

This program provides practical corporate and overseas experiences, enabling students to elucidate, connect, and generate circulations.

01 Acquisition of real-world data

Students will choose primary and secondary areas from three fields: mechanical engineering, social sciences, and humanities.

02 Analysis of real-world data

Students will study various analysis techniques and data utilization methods for real-world data in a cross-disciplinary manner.

03 Implementation of real-world data

Students will learn methods to implement analysis results through case studies of Real-World Data Circulation. During their senior year, external program partners (corporations) will provide practical case studies.

04 Real-world work

Students will gain industrial knowledge through opportunities such as internships and participation in industry–academia–government projects. Additionally, students will gain international experience by participating in summer schools and collaborative research with our international partners.

Curriculum

Through a specially designed curriculum, students will acquire:

1

Fundamental knowledge in Real-World Data Circulation

Real-world data always contains noise and errors, and sometimes even contradictory data. Thus, interpreting data using an appropriate analysis method is crucial. In addition, knowledge about how to implement the analysis results is necessary to develop practical products and services. This program will equip students with a broad knowledge in engineering, information technology, medicine, and economics, as well as interdisciplinary knowledge in measurement principles for various phenomena and analytical methods for real-world data.

2

Comprehensive understanding to recognize data circulation within various technologies that drive the world

To elucidate the circulation of real-world data on their own, students will gain an understanding of various technologies and be exposed to actual Real-World Data Circulation in many different situations. Additionally, research activities and lab work will provide students with opportunities to engage in Real-World Data Circulation.

3

Skills to create new values

The ability to conduct research and development backed by creativity is essential to create Real-World Data Circulation that leads to new social values. Moreover, specialists from multiple disciplines have to work together as a cohesive team. Students will acquire these abilities through on-the-job assignments.

Curriculum structure

Although this program has three components, the core of the program is real-world work, which allows students to accumulate practical experiences in and out of Japan. The coursework provides basic knowledge, while thesis work allows students to incorporate their experience and knowledge into a Ph.D. dissertation.

Coursework

Fundamental knowledge of Real-World Data Circulation

Real-world work

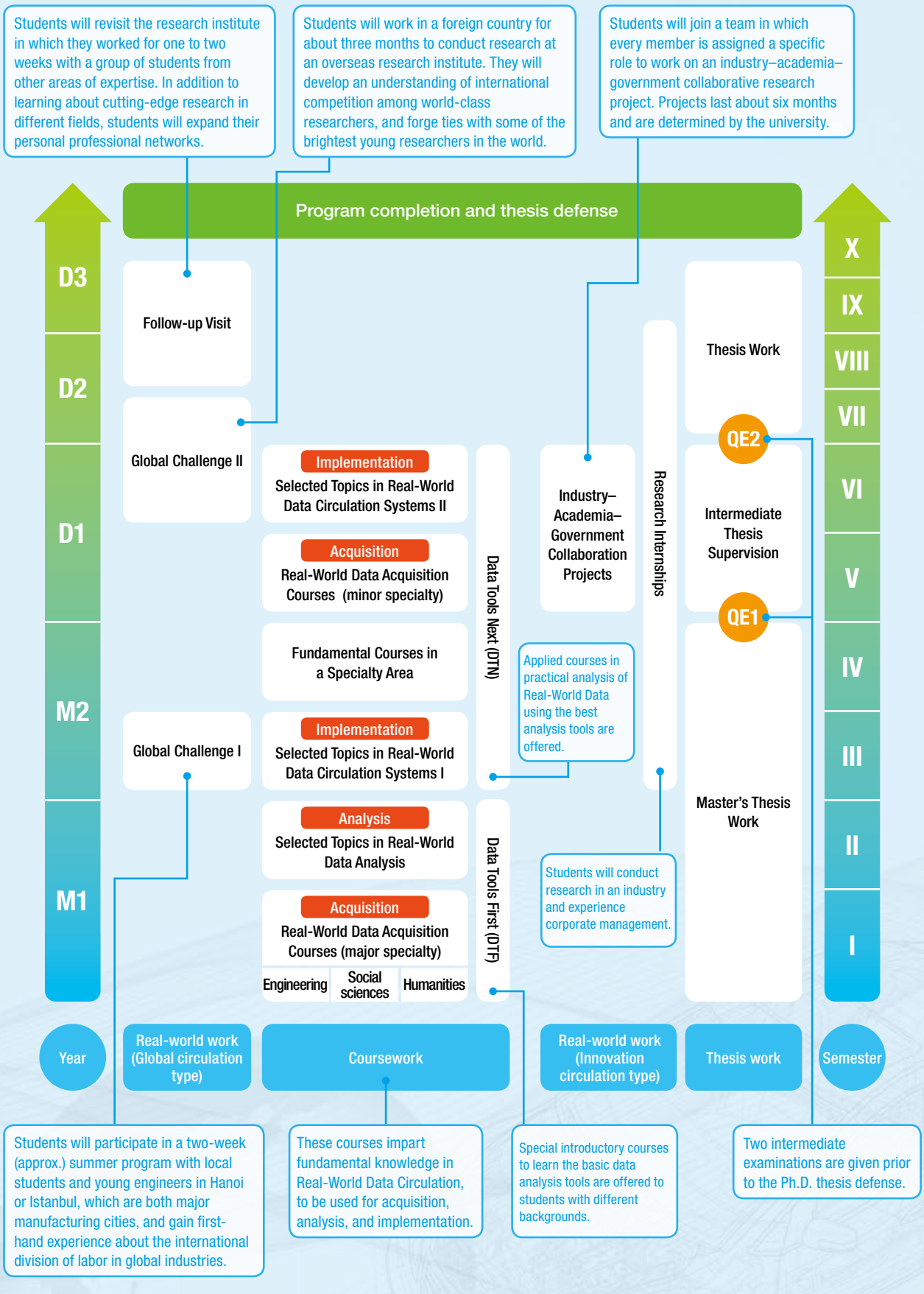
Innovation circulation (industrial hands-on experiences) and global circulation (international hands-on experiences)

Thesis work

Culmination of the program into a Ph.D. thesis

Program overview

- The curriculum allows students to simultaneously accumulate practical experiences and acquire fundamental knowledge.
- Coursework covers fundamental knowledge in Real-World Data Circulation, which is taught in the order of data acquisition, data analysis, and data implementation.
- Two qualifying examinations (QE) are given to assess students' level of achievement.


Students will revisit the research institute in which they worked for one to two weeks with a group of students from other areas of expertise. In addition to learning about cutting-edge research in different fields, students will expand their personal professional networks.
Students will work in a foreign country for about three months to conduct research at an overseas research institute. They will develop an understanding of international competition among world-class researchers, and forge ties with some of the brightest young researchers in the world.
Students will join a team in which every member is assigned a specific role to work on an industry–academia–government collaborative research project. Projects last about six months and are determined by the university.
Program completion and thesis defense
D3
D2
D1
M2
M1
X
IX
VIII
VII
VI
V
IV
III
II
I
Follow-up Visit
Global Challenge II
Global Challenge I
Implementation
Selected Topics in Real-World Data Circulation Systems II
Acquisition
Real-World Data Acquisition Courses (minor specialty)
Fundamental Courses in a Specialty Area
Implementation
Selected Topics in Real-World Data Circulation Systems I
Analysis
Selected Topics in Real-World Data Analysis
Acquisition
Real-World Data Acquisition Courses (major specialty)
Engineering
Social sciences
Humanities
Data Tools Next (DTN)
Data Tools First (DTF)
Applied courses in practical analysis of Real-World Data using the best analysis tools are offered.
Industry–Academia–Government Collaboration Projects
Research Internships
Students will conduct research in an industry and experience corporate management.
Thesis Work
QE2
Intermediate Thesis Supervision
QE1
Master's Thesis Work
Year
Real-world work (Global circulation type)
Coursework
Real-world work (Innovation circulation type)
Thesis work
Semester
Students will participate in a two-week (approx.) summer program with local students and young engineers in Hanoi or Istanbul, which are both major manufacturing cities, and gain first-hand experience about the international division of labor in global industries.
These courses impart fundamental knowledge in Real-World Data Circulation, to be used for acquisition, analysis, and implementation.
Special introductory courses to learn the basic data analysis tools are offered to students with different backgrounds.
Two intermediate examinations are given prior to the Ph.D. thesis defense.

A cutting-edge study environment

Cutting-edge facilities and information technology devices enable new ideas to spontaneously evolve between students from a broad range of disciplines.

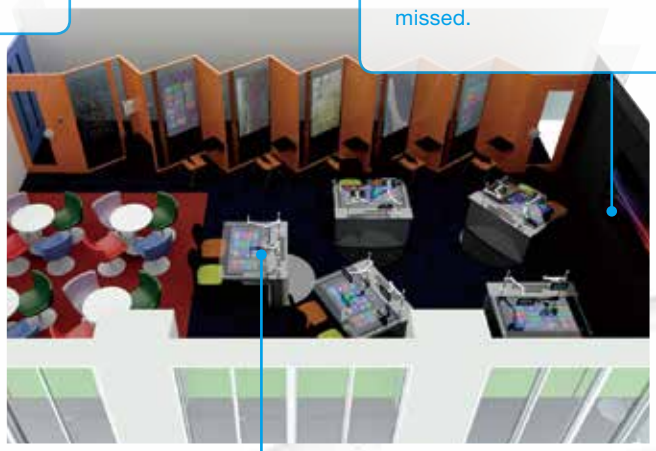
A place where creativity thrives

Leaders' saloon

The leaders' saloon is only available to program students. It is a cutting-edge facility with a specially designed interior layout containing original information devices only found at Nagoya University. The cafe space can be used for voluntary exchanges of ideas with other program participants from different disciplines.

Wall-sized whiteboard

Thoughts can easily be jotted down.



84-inch 4K display

No "rich content" is missed.

Digital poster panels

A wall-projected screen can be controlled on the wall.

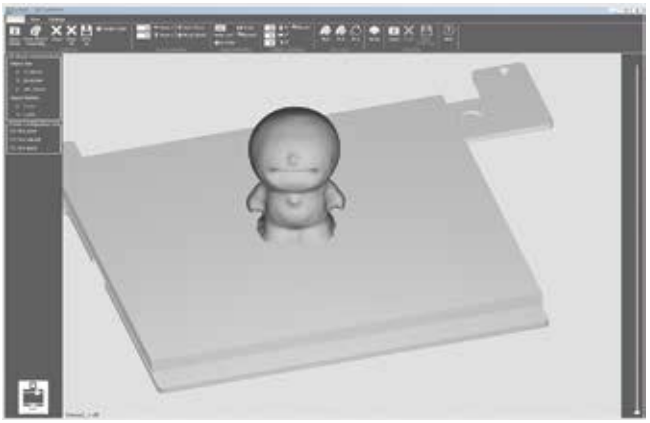
Discussion tables

The tables are specially designed for this facility.
A window display, which can be used as a touchscreen, can be projected onto the tables.

A home of endless possibilities

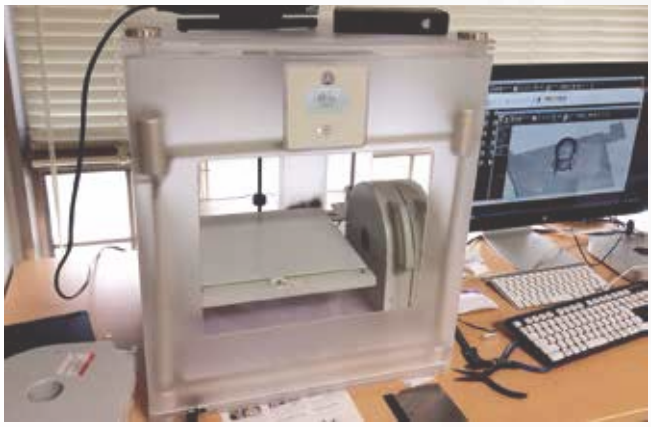
Leaders' studio

The leaders' studio is equipped with three-dimensional (3D) modeling equipment and 3D printers so that students' ideas can be physically realized.



3D modeling software

3D modeling software can be used to generate a data file for 3D printing.



3D printer

These 3D printers can produce fairly complex 3D shapes in color.

"Open study environment" provides multi-faceted support to students' activities

e-Agora

This program features our own electronic portfolio system (e-portfolio) called e-Agora, which saves and organizes students' studies as blogs and documents. Each student can review and share what he or she has learned with other students, faculty members, and colleagues in the network.

Features of e-Agora

1. Students can save and organize their studies [academic marks, discussions on e-Agora (described later), seminar reports, and papers].
2. Students can share their portfolio with others, including faculty members and other students.
3. Students can discuss with other students and faculty members on SNS.
4. Students' portfolio can be shared with our industrial partners to build students' careers.

Staff Members

Program leader

Yushu Matsushita, Trustee (General Affairs, Education, Organizational Reform, Academic Information Infrastructure) and Vice-President, Nagoya University

Program coordinator

Kazuya Takeda, Professor, Department of Intelligent Systems, Graduate School of Informatics

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