



Toshiaki Munakata
Director

A Message from the Director

The Center for Scientific Instrument Renovation and Manufacturing Support (CRM) had been relaunched in April 2014 through the reorganization of its preceding body, Renovation Center of Instruments for Science Education and Technology. After the pioneer work for establishing the new organization by Professor Toshihiro Tanaka, the first Director of the new Center in 2014 and 2015, including the relocation of the Manufacturing Support Division to new Interdisciplinary Research Building, as of April 2016, I was honored to succeed Professor Tanaka and now serve as the Director of the Center. Professor Hidetoshi Kobayashi of the Graduate School of Engineering Science became Deputy Director.

The CRM consists of two divisions, Research Facilities Renovation Support Division and Manufacturing Support Division, and has been providing supports for research and educational activities in Osaka University as a campus-wide support facility under the three principle objectives and missions below:

- (1) Administrate campus-wide information on research equipments and instruments and promote their shared-use
- (2) Promote "reuse" of research equipments and instruments for their effective use
- (3) Support research and educational activities through providing machining and glasswork services.

Due to the recent austere financial situation, it has been increasingly difficult for national universities maintain and improve their research infrastructure. Coping with the difficult circumstances, universities are strongly requested to self-manage maintaining their research infrastructures and make a roadmap for improving them with mid- and long-term outlooks. Osaka University Master Plan for the Maintenance and Improvement of Research Infrastructure had been laid down as a basic guideline in mid- and long-term spans and the CRM has been working along with the university headquarter to accomplish the goal of the master plan.

The Research Facilities Renovation Support Division thus has been further promoting the campus-wide reuse and shared-use of research equipments and instruments in addition to the assembling their campus-wide information to promote their shared-use and further enhance the effective use of the university's research assets. It is now an important task for the Osaka University to establish a comprehensive campus-wide shared-use system for research equipments and instruments, and we shall contribute for its establishment.

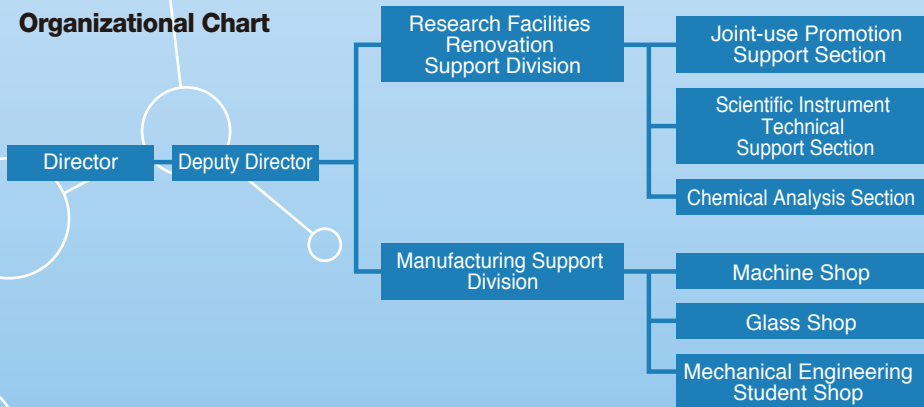
Through our craftsmanship at the machine and glass shops in Manufacturing Support Division, we have continued supporting educational and research activities in Osaka University for more than a half century since the inauguration of the Manufacturing Center in 1966, the forerunner of the division. Even nowadays the request from campus-wide researchers for our craftsmanship remains high. The services providing by the division are machining and glassworks for the prototyping, modification, and repair of experimental devices and instruments. In addition, Student Shop, a shop to do-it-yourself for students, staffs, and researchers, is also available and we have been continuously adding enhancements to the shop for easier and better user environment through adding high-performance machine tools and making expensive tools available for loan. The Manufacturing Support Division pledges continuous enhancement of our services and supports to meet customers' need.

Although we are a small facility, it is our sincere desire to better serve students and researchers at the entire Osaka University to assist their educational and research activities through providing more effective and advanced aids and services by hearing our customers' voices. We wish your continued support and kind encouragement for us.

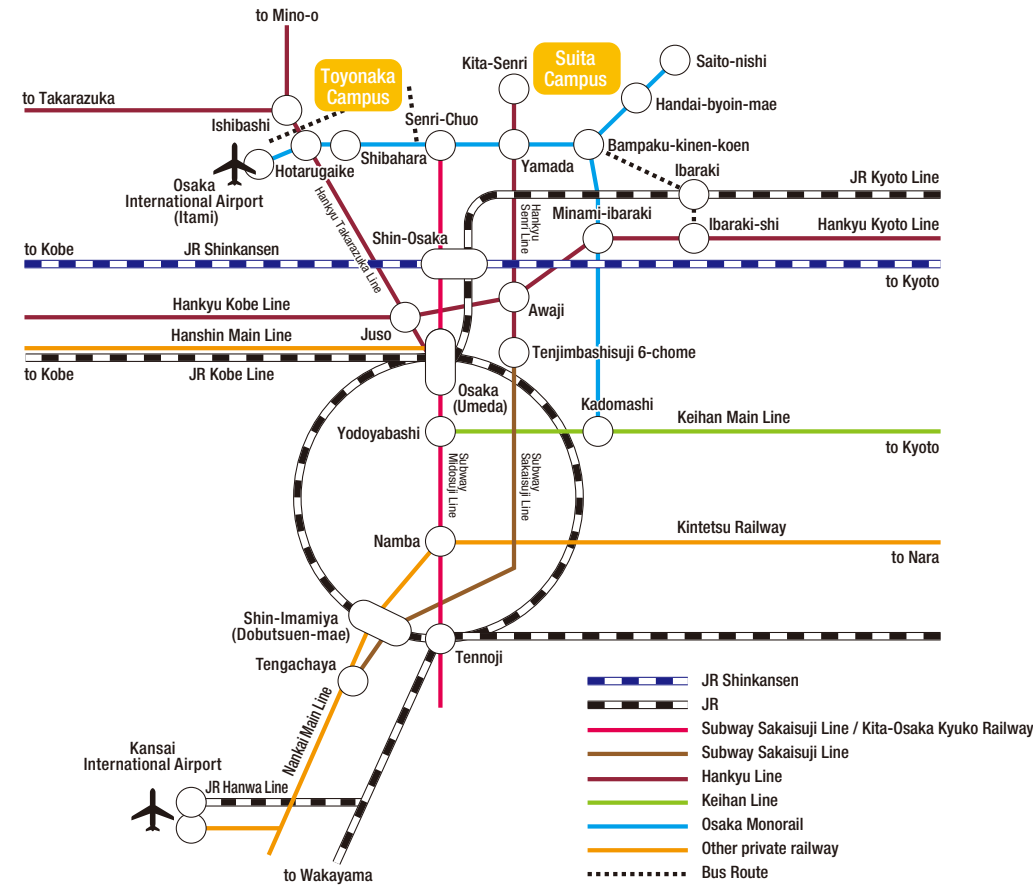
History

- 1966 The Manufacturing Center inaugurated as an on-campus joint education and research facility
- 2007 Progressively reorganized the Manufacturing Center and established the Renovation Center of Instruments for Science Education and Technology
- 2014 Reorganized into the Center for Scientific Instrument Renovation and Manufacturing Support

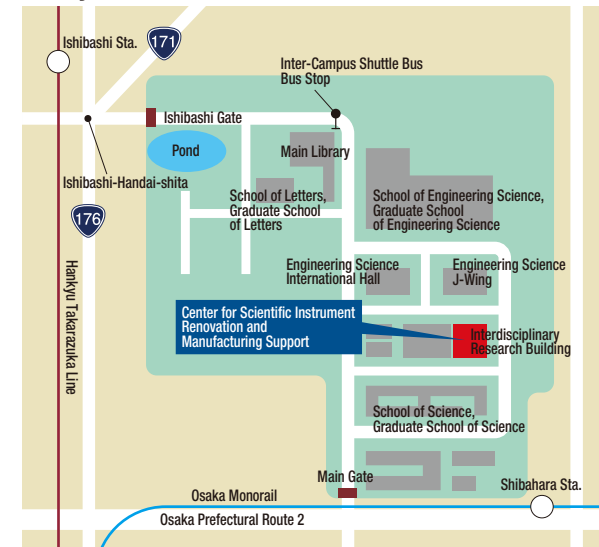
Organizational Chart



ACCESS



Toyonaka District



1-2, Machikaneyama-cho, Toyonaka-shi, Osaka 560-0043 Japan
Tel: 06-6850-6709, Fax: 06-6850-6052

Transport Access

- By Rail:
- About 1.5km (25-min. walk) from Ishibashi Station on the Hankyu Takarazuka Line
 - About 500m (8-min. walk) from Shibahara Station on the Osaka Monorail

Suita District



8-1 Mihogaoka, Ibaraki-shi, Osaka 567-0047 Japan
Tel: 06-6879-4781, Fax: 06-6879-4781

Transport Access

- By Rail:
- About 1.7km (30-min. walk) from Kita-Senri Station (final stop) on the Hankyu Senri Line
 - About 1.2km (20-min. walk) from Handai-byoin-mae Station on the Osaka Monorail
- By Bus:
- Hankyu Bus
Board the bus bound for Handai-Honbu-mae or Ibaraki Mihogaoka at Senri-Chuo
Board the Handai-byoin Route at Kita-Senri
 - Kintetsu Bus
Board the bus bound for Handai-Honbu-mae (via JR Ibaraki Station) at Hankyu Ibaraki-shi Station
For all bus routes it is about 1km (15-min. walk) from Handai-Honbu-mae bus stop



Center for Scientific Instrument Renovation and Manufacturing Support

Osaka University

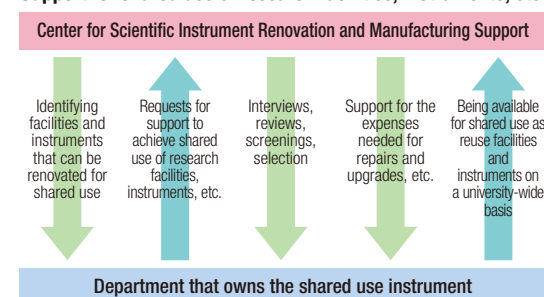


In the Research Facilities Renovation Support Division, we are making the following efforts to facilitate shared use of on-campus facilities and instruments and provide the technical support necessary for carrying out research, and to provide administrative support, such as the use of instruments and facilities.

1. Efforts to effectively use university assets

Based on the "Master Plan for Maintenance and Improvement of Osaka University Facilities," the division provides support for improving and enhancing education and research environments, including facility maintenance, by renovation, restoration, repair and upgrading of facilities and instruments used for education and research throughout the campus. This support makes the repaired and upgraded instruments available to the entire university through shared use of resources as reuse facilities and instruments.

Support for shared use of research facilities, instruments, etc.



2. Efforts to provide users of reuse facilities and instruments with technical support for acquiring and improving their knowledge and technical skills

We regularly hold various short courses, seminars, and other events to help users of reuse facilities and instruments learn and improve specialized and practical knowledge and techniques relating to instrumental (instrument-based) analysis. These short courses and seminars go beyond just providing technical information on the utilization of reuse facilities and instruments and promote exchange of information and views with the instructor and among participants, and serve as a forum for valuable interaction between students, researchers and technicians in various fields. Technical staff are also deployed to provide training for the use of the instrument, technical guidance, advice, consultation and other assistance to meet the needs of users.

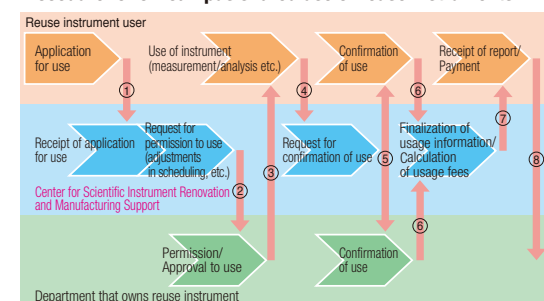


3. Efforts to promote shared use

Users' Convenience has been improved by adopting our own online reservation system. To improve convenience even further, a feature has been added for reviewing, changing and canceling reservations from a person's own page on the system, and an inquiry feature has been introduced as a new communication tool. This feedback function enables close bidirectional communication with users.

Also, to promote the use of reuse facilities and instruments, the relevant information is disseminated and furnished using public relations tools such as brochures and a website.

Procedure for on-campus shared use of reuse instruments



* The Research Facilities Renovation Support Division of this center acts as the point of contact, provides support needed by those who require instruments, and supports the promotion of on-campus research activities.

4. Efforts to support research activities of international students and foreign researchers

We are working to develop the use environment by preparing English versions of brochures with information about reuse instruments and the English website, and establishing support organization as the point of contact for support services by staff with English language skills. Through the provision of these support services, we are supporting the research activities of international students and foreign researchers at the university.

5. Efforts to promote the utilization of the University's assets

Through the online "Recycle Bulletin Board" on the center's website, we are aiming at effective utilization of research and education facilities, instruments or other equipment that are no longer needed. In order to reduce the environmental impact and overall cost by reusing existing assets owned by the university and promote its effective utilization even further, we are aiming at effective utilization of its assets by setting up a recycle bulletin board for people outside the university, and providing information through our website on a broadly disseminated basis.

6. Efforts to contribute to local communities and society

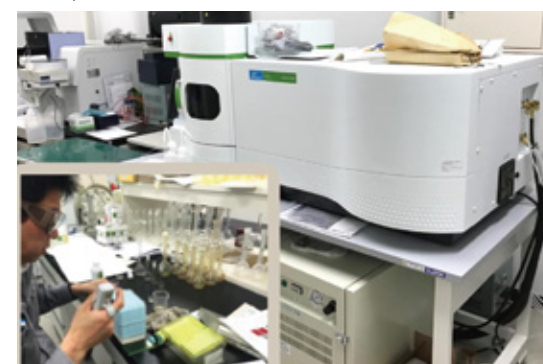
Some reuse facilities and instruments are available for use by people outside the university and through contract-based analysis we support research and development at universities, research institutions, companies, and other organizations, and promote the use of reuse facilities and instruments. Furthermore, we not only perform contract-based analysis, we also strive to contribute to local communities and revitalize society in our area through utilization of reuse facilities and instruments in areas by providing consultation on analytical techniques and technical assistance while observing what is going on by being present.

7. Efforts to build cooperative relationships between universities supported by the Facility Support Center Development Program

The initiative is to promote cooperative relationships between universities participating in the Facility Support Center Development Program and we are working collaboratively between the universities to solve issues related to the promotion of shared use of facilities and instruments by effectively utilizing the each university's strengths such as technologies and know-how and networks in the region.

8. Efforts to support research activities by providing chemical analysis services (Toyonaka Campus)

As one of the research support activities offered by the Research Facilities Renovation Support Division, qualitative and quantitative analysis of the elements contained in a sample (primarily consist of metallic elements) shall be carried out at the request of the users.



Regarding on-campus shared use of reuse instruments available to the entire university

As of October 2016, 104 instruments are available for shared use by teaching staff, researchers and students as reuse facilities and instruments on a university-wide basis to support research and education activities. The center acts as the point of contact for their users and deal with user requirements regarding shared use of facilities and instruments. The following provides a summary of reuse facilities and instruments.

<p>Nuclear magnetic resonance (NMR) spectrometer</p>  <p>NMR spectrometers with a variety of capabilities, ranging from 200 MHz to 700 MHz, either for liquids or solids (or both), are available. The multinuclear and two-dimensional NMR capabilities are available, and also with the photo-irradiation system changes in reaction kinetics can be measured.</p>	<p>Mass spectrometer (MS)</p>  <p>Various ionization techniques are available such as MALDI, ESI, APCI, FAB, and DART. FTICR-MS are also available for high-to-ultrahigh mass resolution and very high mass accuracy measurements. Furthermore, different MS/MS analyses are feasible using CID, ETD, and ECD, depending on the purpose of the analysis.</p>	<p>X-ray diffractometer (XRD)</p>  <p>Various X-ray diffraction methods are available to enable measurement capability across a wide range of samples, such as single crystals, powders, thin films, and ultramicrocrystals and applied to characterization of crystal state and structure, and determination of particle size distribution. The optics attachment is available to micro-area X-ray diffraction measurement of small areas of less than one square millimeters.</p>	<p>Elemental analysis instrument (ICP, EPMA, WDX, etc.)</p>  <p>By using various analytical instruments, qualitative and quantitative analysis, ranging from screening analysis to precision analysis, is also permitted. When ICP is employed, high-precision trace-element analysis can be carried out with high sensitivity at the ppb level.</p>						
<p>Electron spin resonance (ESR) spectrometer</p>  <p>This instrument is used for highly sensitive detection of radicals and transition metals, identification of radical molecular species, and structural and quantitative analysis. Some ESR instruments allows the measurement of temperature variation at ultra-low temperatures.</p>	<p>Spectrometer (IR, Raman, UV/Vis/NIR)</p>  <p>Variable-temperature studies can be carried out with FT-IR spectrometer equipped with a cryostat or heated cell. The FT-IR measurement is also performed using the ATR method and high-sensitivity reflection method (RAS method). FT-IR microscopic analysis of a microscopic area can also be performed using an FT-IR equipped with an infrared microscope.</p>	<p>Surface analysis instrument (XPS, SIMS, etc.)</p>  <p>XPS provides information about elemental composition and chemical bonding state in the range of several nms from the outermost surface. It can also be used to examine the element distribution in the depth direction. SIMS has the capability of identification and determination of trace impurity elements at the ppb level. The technique also provides elemental depth profiles over a wide range of depths from several nm to several tens of μm.</p>	<p>Electron microscope (TEM, SEM (FE-SEM))</p>  <p>FE-SEM can be used not only for the observation of specimens, but also for the elemental analysis of the sample in combination with EDS. In addition to morphological observation, TEM can be used to observe electron diffraction patterns that are indicative of their crystal structures. The various types of sample preparation instruments are available for the preparation of samples for examination in the TEM and SEM.</p>						
<p>Other instruments</p> <table border="0"> <tr> <td> <p>Spectrometer Circular dichroism (CD) spectrometer Stopped-flow system Fluorescence spectrophotometer</p> </td> <td> <p>Morphological observation instrument Scanning probe microscope (SPM) Atomic force microscope (AFM)</p> </td> <td> <p>Biotechnology-related instrument DNA sequencer Micro-array analysis system Surface plasmon resonance (SPR) spectrometer Flow cytometer</p> </td> </tr> <tr> <td> <p>Thermal analysis instrument Isothermal titration microcalorimeter (ITC) Differential scanning calorimeter (DSC), etc.</p> </td> <td> <p>Imaging instrument Magnetic resonance imaging (MRI) instrument Fluorescence imaging system Deconvolution microscope</p> </td> <td> <p>Instrument used for protein experiments Chromatography system Analytical ultracentrifuge</p> </td> </tr> </table> <p>In addition to the above instruments, our broad portfolio includes laser devices, machine tools and other instruments.</p>				<p>Spectrometer Circular dichroism (CD) spectrometer Stopped-flow system Fluorescence spectrophotometer</p>	<p>Morphological observation instrument Scanning probe microscope (SPM) Atomic force microscope (AFM)</p>	<p>Biotechnology-related instrument DNA sequencer Micro-array analysis system Surface plasmon resonance (SPR) spectrometer Flow cytometer</p>	<p>Thermal analysis instrument Isothermal titration microcalorimeter (ITC) Differential scanning calorimeter (DSC), etc.</p>	<p>Imaging instrument Magnetic resonance imaging (MRI) instrument Fluorescence imaging system Deconvolution microscope</p>	<p>Instrument used for protein experiments Chromatography system Analytical ultracentrifuge</p>
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If you would like to use reuse instruments, please fill in the application form through the following website. Furthermore, if you have any questions about analytical techniques and instruments or if there are points that you would like to clarify or discuss, please feel free to contact us via contact form on our portfolio page.
<https://www.reno.osaka-u.ac.jp/reuse-cam/>

Regarding shared use of reuse instruments also available to off campus users

Some reuse instruments (19 instruments as of October 2016) and analytical testing services, which are performed with their instruments and conducted by skilled staff, are available upon request to off campus users to perform local and social contribution activities through collaboration with the industry and working with the community. If you would like to use reuse instruments (those available to off-campus users), please fill in the application form through the following website.

<https://www.reno.osaka-u.ac.jp/reuse-offcam/>

Located in the Toyonaka Campus, the Manufacturing Support Division, actively carried on the projects of the former Manufacturing Center, has been providing services for prototyping and remodeling of research and experimental equipments and instruments and/or their parts through machining and glass works on-request from campus-wide reserachers, as well as student classes and technical training courses for machining and glassworks. In addition, the division also operates a Mechanical Engineering Student Shop where students, staffs, and reserachers can work on their own fabrication projects using various machining tools with supports from technical staff.

Machining and Glasswork Services

■ Machining Service

The Main Machine Shop offers custom machining and fabrication services of metal and resin components and equipments as requested in addition to a welding and minor repair services. The shop owns various types of NC and CNC machining equipments to meet diverse request from researchers on machining/fabrication and modification of their experimental apparatus and components. Vacuum leak testing service is also available through the Open Workshop.



■ Glasswork Service

The Main Glass Shop offers services such as custom glass product manufacturing and repairs and mechanical processing of glass/ceramic materials. The shop can craft not only dewar flasks, which is essential components in low-temperature experiments, but also a wide range of glassworks covering from general glass products to mechanical processing and fabrication with fine ceramic materials.



Supporting On-Campus Do-It-Yourself Fabrication

■ Open Workshop (Student Shop)

The Student Shop is an open workshop where students, staffs, and researchers can work on their own fabrication projects using various machining tools. Technical staff members are always present to provide guidance and advice on how to operate machine tools and how to fabricate parts designed by users. Machining equipments such as lathes, vertical milling machines, horizontal milling machines, contour machines, band saws, and drilling machines are available and most types of fabrication processes can be completed in the shop. Users must undergo a safety training session prior to using equipments in the shop.

When users come upon special fabrication processes which are difficult for the users to complete (e.g., welding and discharge machining), users can ask technical staffs in the shop for on-the-spot assistance. In addition, an array of large-size and specialized tools is also available.



Technical Training Courses

Technical training courses are held during every summer and spring break in order to improve fabrication techniques for students (B4 / graduate students), staffs, and researchers. Machining and glasswork courses are available. The courses are designed so that participants can acquire general fabrication and machining skills necessary to make custom items for their research.

Content of the Courses (4 days long each)

Machining Course	Machining with lathes and milling machines: Threading, cap nut machining, round bar step milling, block milling, grooving, pocket machining, etc.
Glasswork Course	Connection of glass pipes with different diameters, making T-pipes, U-pipes, traps, etc.

Safety Training Sessions

The sessions are required to use the Student Shop and are offered at the beginning of summer break every year. Please contact us in case you would like to use the Student Shop and need to have the session rather than having scheduled sessions.

Stock Room

Materials and supplies necessary for experiments, such as metal and glass materials, electronic parts, vacuum and piping/tubing components are available on charge basis. Please visit our website for more information.