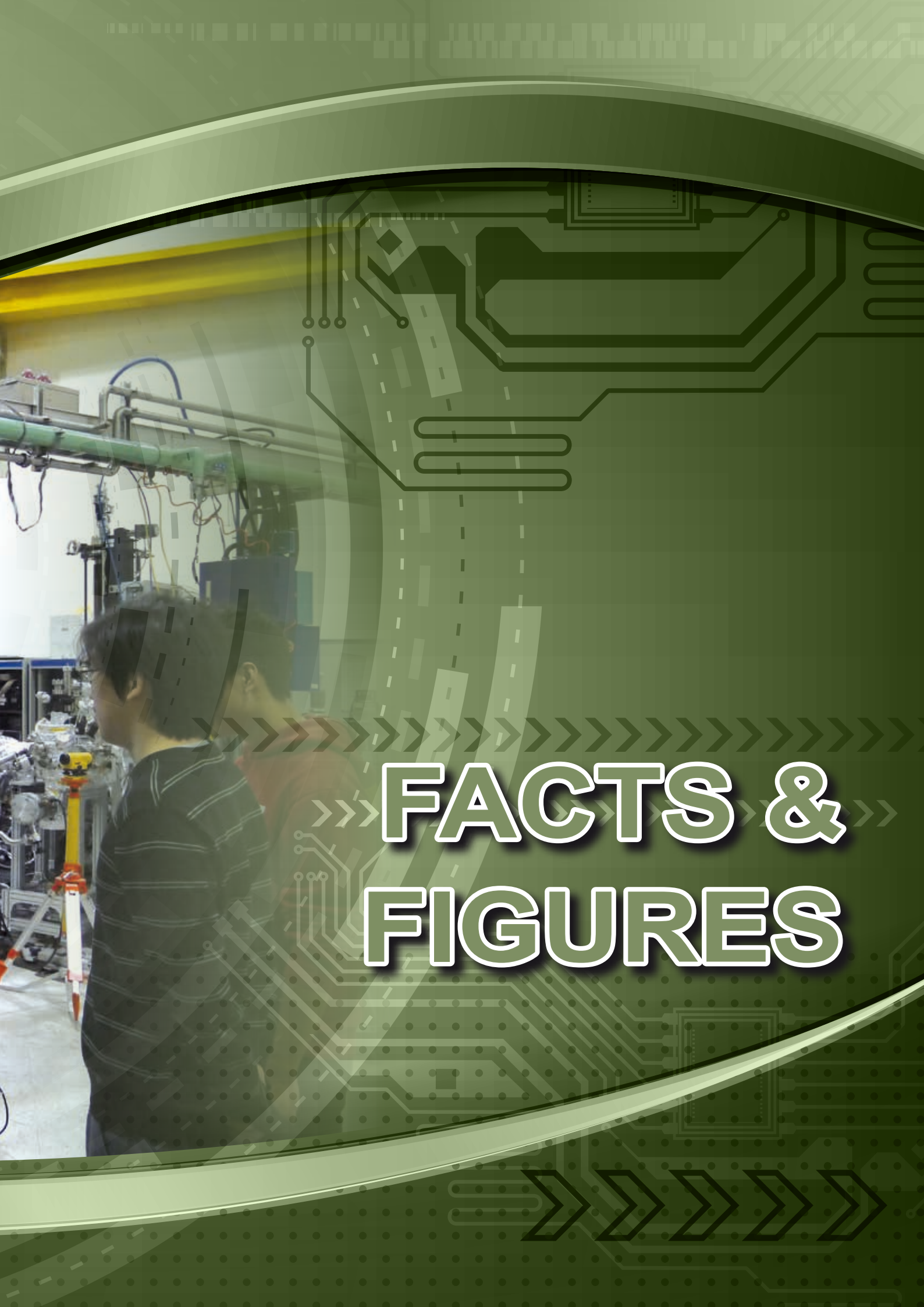
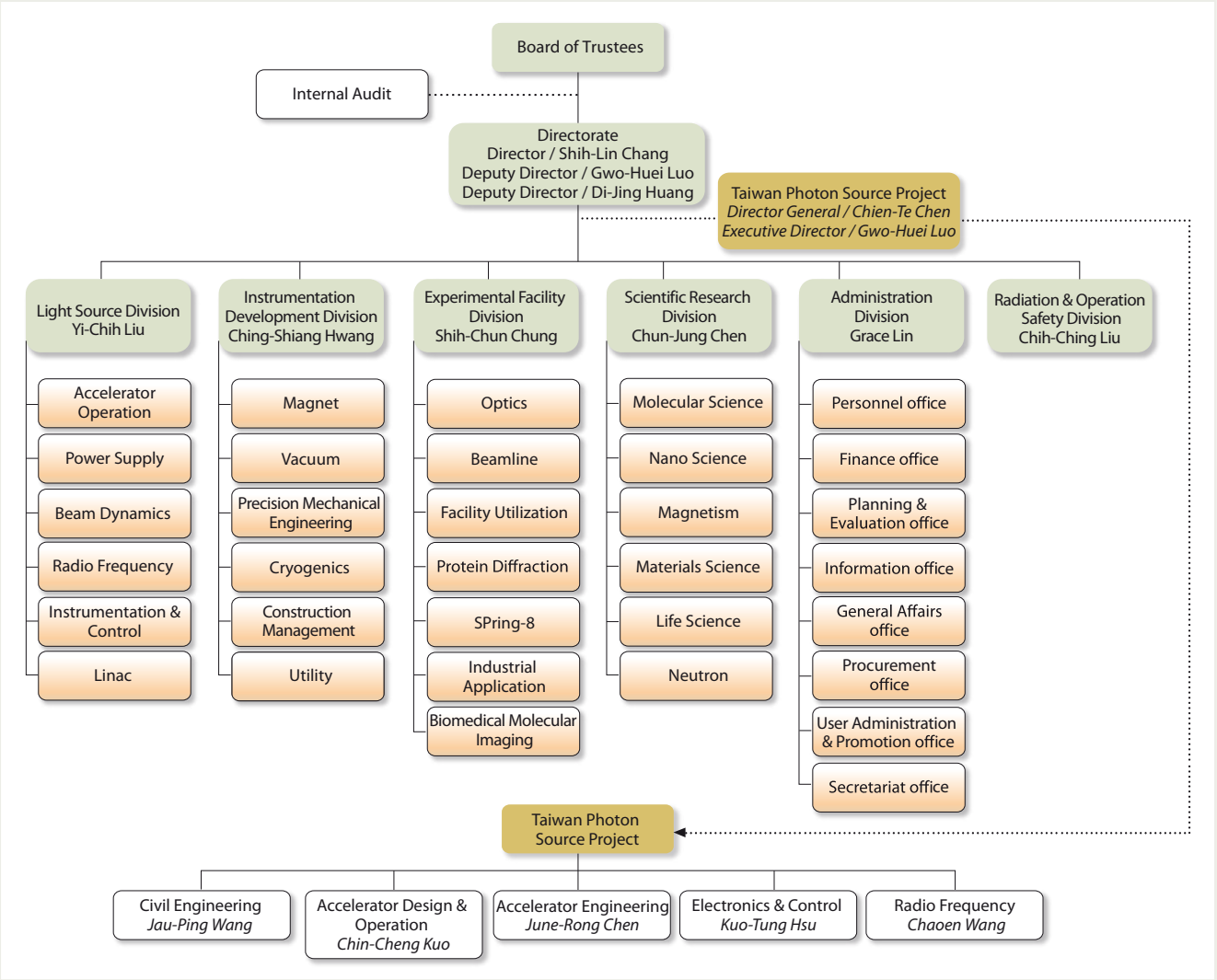


FACTS & FIGURES

Organization



Board of Trustees

Lih J. Chen (Chairperson), National Tsing Hua University
San-Cheng Chang, Minister of Ministry of Science and Technology
Shih-Lin Chang, NSRRC
Chien-Te Chen, NSRRC
Bon-Chu Chung, Academia Sinica
Michael M. C. Lai, Academia Sinica
Yuan-Tseh Lee, Academia Sinica
Sheng-Hsien Lin, National Chiao Tung University
Chung-Yuan Mou, National Taiwan University
Shie-Ming Peng, National Taiwan University
Yuen-Ron Shen, UC Berkeley, USA
Lee C. Teng, ANL, USA
Samuel C. C. Ting, CERN, Switzerland
Andrew H.-J. Wang, Academia Sinica
Yu Wang, Academia Sinica

2012-2014 SAC

Keith Hodgson (Chairperson), SLAC, USA
Tai-Chang Chiang, UIUC, USA
Wolfgang Eberhardt, DESY/CFEL, Germany
Atsushi Fujimori, Todai, Japan
Tetsuya Ishikawa, RIKEN Harima Institute SPring-8, Japan
Chi-Chang Kao, SLAC, USA
Janos Kirz, LBNL, USA
Carolyn Larabell, LBNL, USA
Cheuk-Yiu Ng, UC Davis, USA
G. Brian Stephenson, ANL, USA
Jean Susini, ESRF, France
J. Friso van der Veen, SLS, PSI, Switzerland
Soichi Wakatsuki, SLAC, USA

2012-2014 TPS MAC

Alexander W. Chao (Chairperson), SLAC, USA
Michael Boege, PSI, Switzerland
Michael Borland, ANL, USA
Mark de Jong, CLS, Canada
Dieter Einfeld, ALBA, Spain
Takaaki Furuya, KEK, Japan
Robert Hettel, SLAC/SSRL, USA
Philippe Lebrun, CERN, Switzerland
Haruo Ohkuma, JASRI/SPring-8, Japan
Gregory J. Portmann, LBNL, USA
Sushil Sharma, BNL, USA
Rickard Walker, Diamond Light Source, UK

2012-2014 SAC.

2014 User Executive Committee.

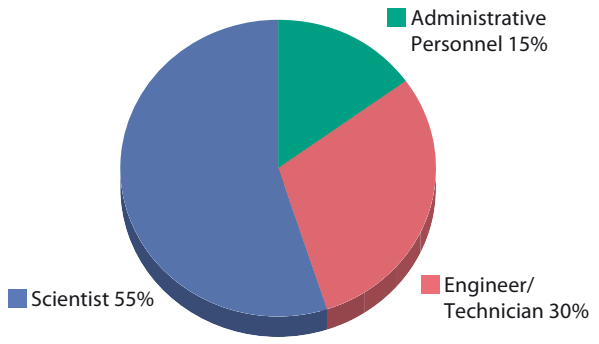
2014 User Executive Committee

Albert T. Wu (Chairperson), National Central University
Ying-Hao Chu (Vice Chairperson), National Chiao Tung University
Chia-Hao Chen, NSRRC
Chun-Jung Chen, NSRRC
Hsin-Lung Chen, National Tsing Hua University
Jhih-Wei Chen, National Cheng Kung University
Tsang-Lang Lin, National Tsing Hua University
Yen-Ting Liu, National Chiao Tung University
Ya-Sen Sun, National Central University
Hsien-Sheng Yin, National Tsing Hua University

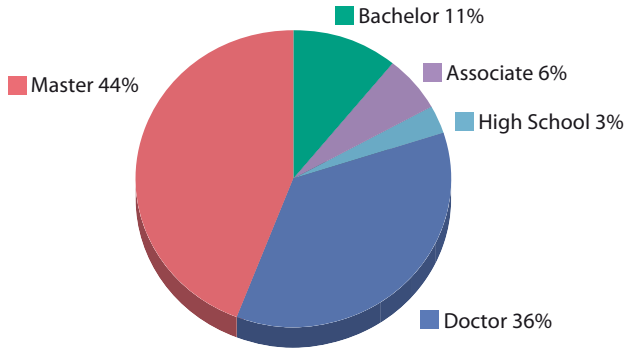
Manpower

As of January 2014, the NSRRC workforce comprises 403 staff members. The following two pie charts show the manpower distributions by profession and educational background, respectively.

Profession

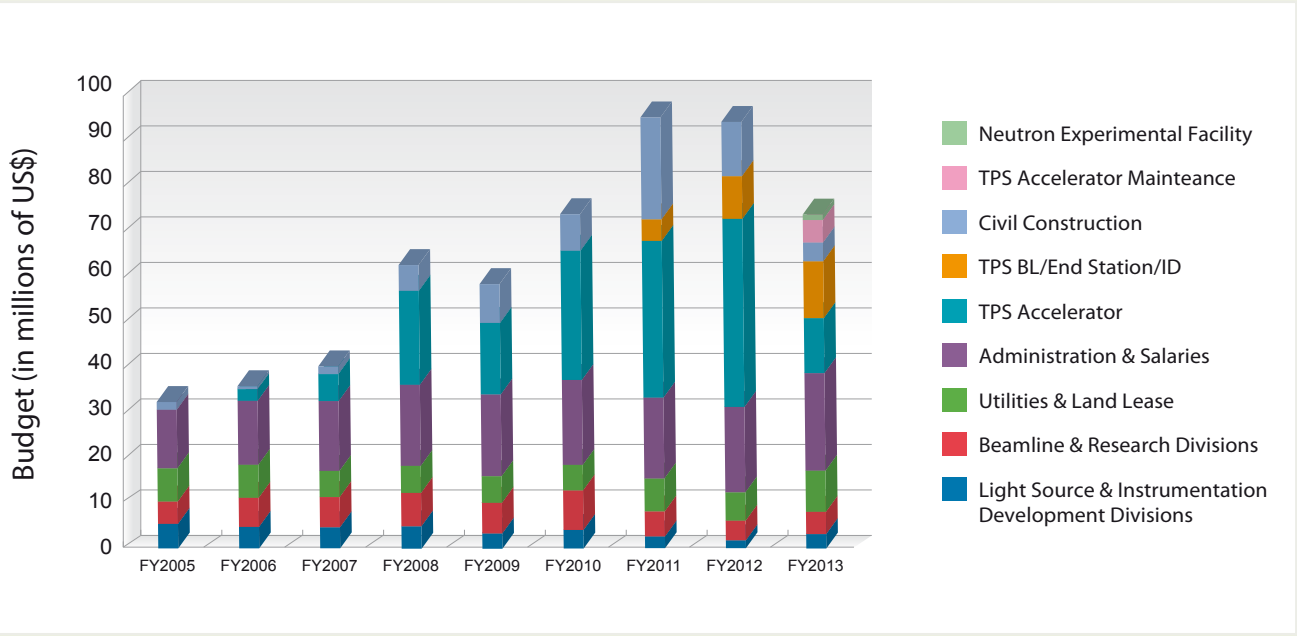


Education



Budget

The major categories of the NSRRC budget include Light Source & Instrumentation Development Divisions, Beamline & Research Divisions, Utilities & Land Lease, Administration & Salaries, Taiwan Photon Source (TPS) Accelerator, TPS BL/End Station/ID, Civil Construction, TPS Accelerator Maintenance, and Neutron Experimental Facility. The total budget for fiscal year 2013 is US$74.36 million (based on exchange rate: 1 USD=29.05 NTD) with growth rate 1.27 % in operational cost of light source & instrumentation development over that of the prior year.

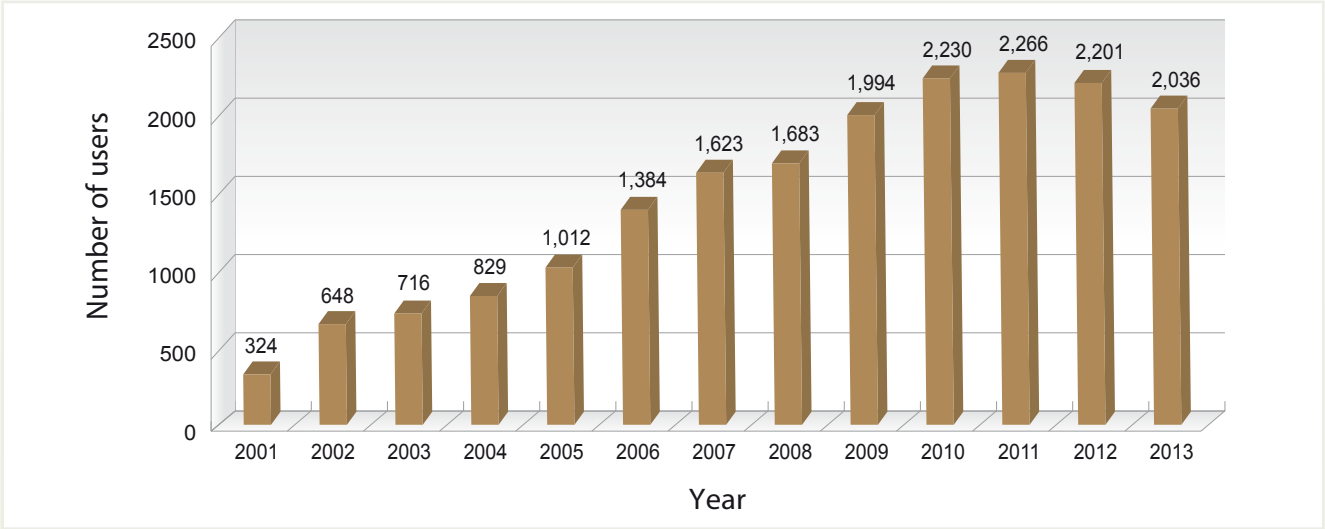


User Statistics

From 1994 to 2013, the total number of beamlines opened to general users has increased from 3 to 26. During the year of 2013, the User Administration & Promotion Office (UAO) handled 1,586 research proposals and 10,848 user runs. The total executed beam time, excluding beamline maintenance and study, for TLS and SPring-8 beamlines/experimental stations is 14,308.8 shifts and 921 shifts (including 78 shifts for SP44XU beamline) respectively, allocated to the above proposals conducted by 2,036 users (321 principal investigators) drawn from 128 affiliations (including 279 users from 71 foreign institutions).

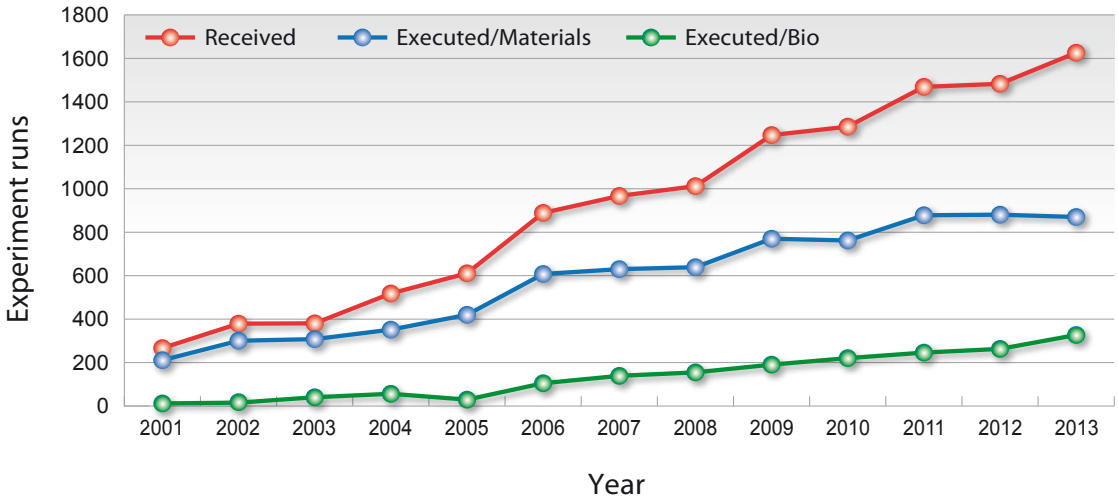
In the year of 2013, the UAO has dealt with 3,527 subventions for TLS experiments and 230 subventions (including 45 subventions for SP44XU experiments) for SPring-8 experiments. In addition, the UAO has handled 64 subventions, which are funded by the National Science Council, for Taiwan Neutron users to carry out experiments at Neutron facilities worldwide.

During the year, the UAO has issued 906 new user cards. There are 104 master theses and 37 doctoral dissertations utilizing NSRRC facilities. Operational data on beamlines/experimental stations and users are summarized in the following figures.

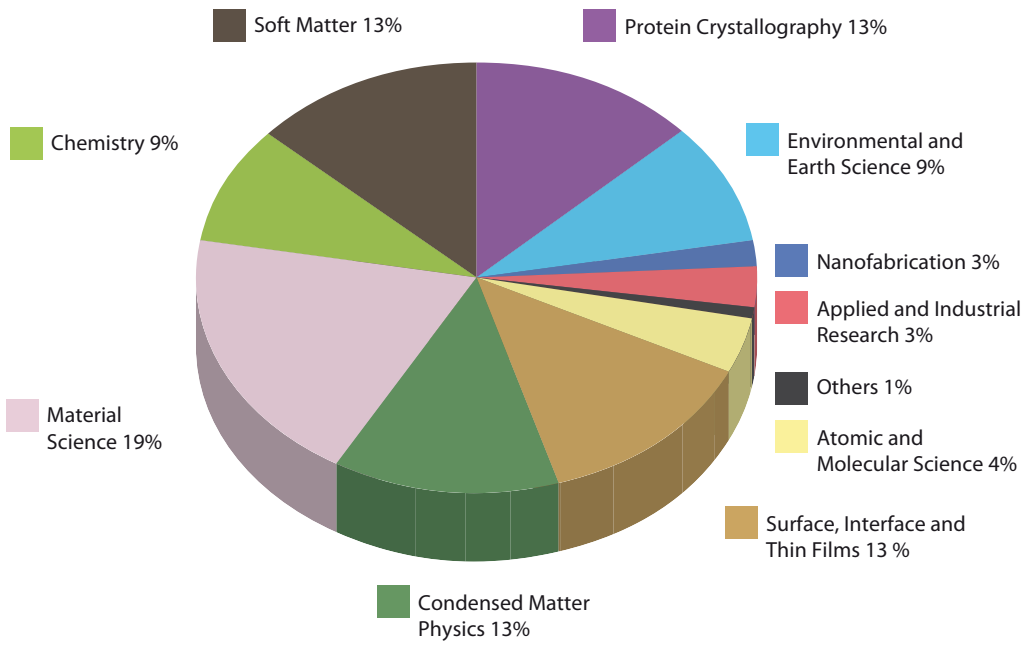


Growth of user numbers.

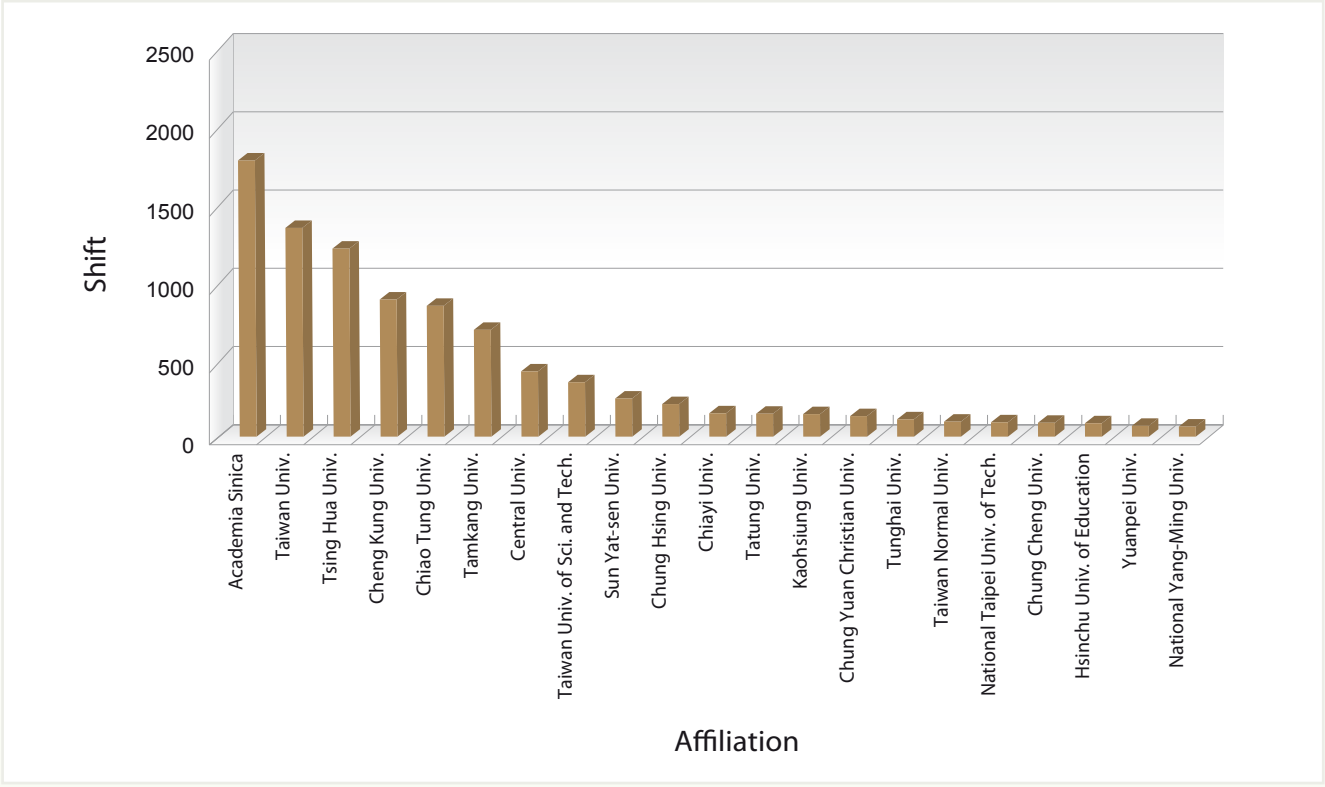
Numbers of IR/VUV experiment runs from year 2001 to 2013.



Numbers of soft and hard X-ray experiment runs from year 2001 to 2013.

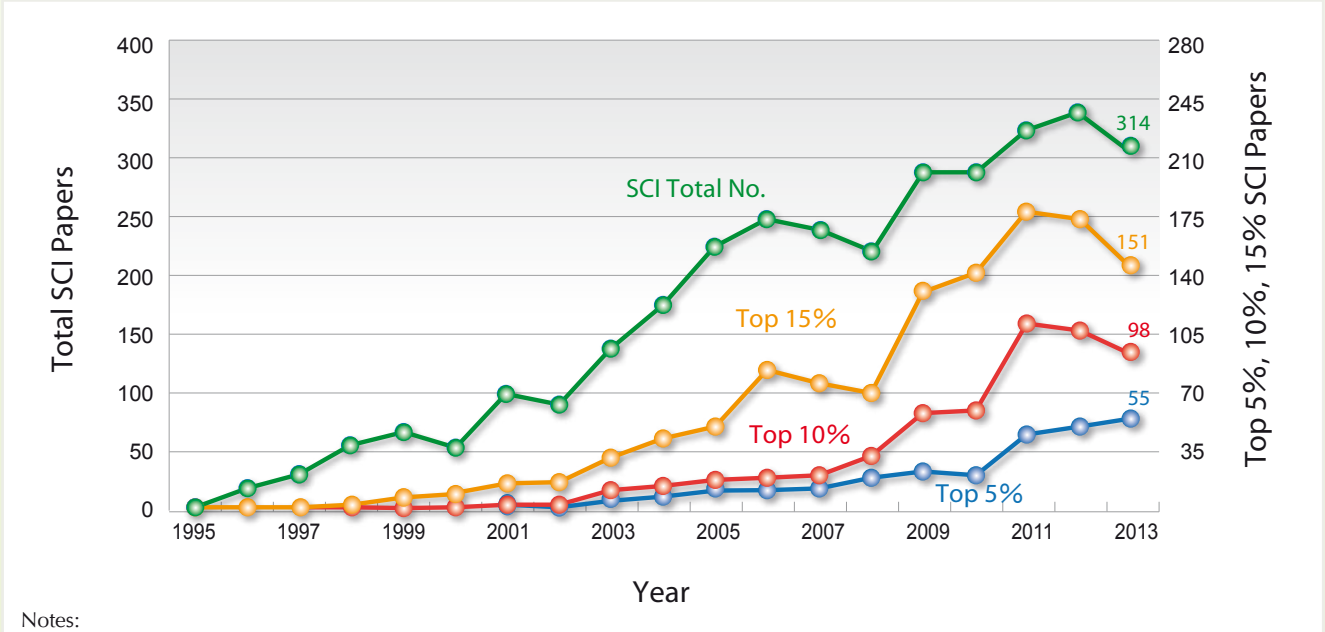


Distribution of users' proposals in 2013.



Distribution of beam time used by domestic affiliations in 2013. Each shift is 8 hours.

Publications



Notes:
1. Top 5%: I.F. ≥ 6.0 for physical science; I.F. ≥ 9.0 for life science.
2. Top 10%: I.F. ≥ 4.5 for physical science; I.F. ≥ 6.0 for life science.
3. Top 15%: I.F. ≥ 3.5 for physical science; I.F. ≥ 4.8 for life science.

(As of March 10, 2014)

Publications from TLS and Taiwan beamlines at SPring-8.

Beamline Status

Beamlines at Taiwan Light Source

No.	Beamline	Mono. Type	Energy Range (eV)	Res. Power (E/ΔE)	Status	Spokesperson E-mail	Beamline Tel ext.
01A	[01A1] SWLS - White X-ray (PRT 75%)	none	> 5 k		in operation	Hwu, Yeu-Kuang phhwu@sinica.edu.tw	1011
01B	[01B1] SWLS - X-ray Microscopy (PRT 75%)	DCM	8 k -11 k	1,000	in operation	Song, Yen-Fang song@nsrrc.org.tw	1012
01C	[01C1] SWLS - EXAFS	DCM	6 k - 33 k	7,000	in operation	Chan, Ting-Shan chan.ts@nsrrc.org.tw	1013
	[01C2] SWLS - X-ray Powder Diffraction				in operation	Sheu, Hwo-Shuenn hsheu@nsrrc.org.tw	1013
03A	[03A1] BM - (HF-CGM) - Photoabsorptian/Photoluminescence	CGM	4 - 40	50,000	in operation	Cheng, Bing-Ming bmcheng@nsrrc.org.tw	1031
04	[04B1] BM - (Seya) SRCD	SNM	4 - 40	5,000	in operation	Lin, Yi-Hung yihung@nsrrc.org.tw	1042
	[04C1] Dynamic SRCD	NIM	4 - 10	3,000	in operation	Lin, Yi-Hung yihung@nsrrc.org.tw	1042
05	[05A1] EPU - Inelastic Scattering	AGM	400 - 1.5 k	20,000	commissioning	Huang, Di-Jing djhuang@nsrrc.org.tw	1051
	[05B1] EPU - Soft X-ray Chemistry	SGM	60 - 1.5 k	20,000	in operation	Liu, Chen-Lin Liu.CL@nsrrc.org.tw	1050
	[05B2] EPU - PEEM				in operation	Wei, Der-Hsin dhw@nsrrc.org.tw	1052
	[05B3] EPU - Soft X-ray Scattering				in operation	Huang, Di-Jing djhuang@nsrrc.org.tw	1053
07A	[07A1] IASW - X-ray Scattering	DCM	5 k - 23 k	7,000	in operation	Soo, Yun-Liang soo@phys.nthu.edu.tw	1071
08A	[08A1] BM - (L-SGM) XPS, UPS	SGM	15 - 200	20,000	in operation	Pi, Tun-Wen pi@nsrrc.org.tw	1081
08B	[08B1] BM - AGM	AGM	300 - 1 k	10,000	in operation	Pi, Tun-Wen pi@nsrrc.org.tw	1082
09A	[09A1] U50 - SPEM	SGM	60 - 1.5 k	15,000	in operation	Chen, Chia-Hao chchen@nsrrc.org.tw	1101
	[09A2] U50 - Spectroscopy				in operation	Hsu, Yao-Jane yjhsu@nsrrc.org.tw	1101
11A	[11A1] BM - (Dragon) MCD, XAS (PRT 75%)	SGM	8 - 1.5 k	15,000	in operation	Lin, Hong-Ji hjlin@nsrrc.org.tw	1111
13A	[13A1] SW60 - X-ray Scattering	ACCM	12 k - 14 k	1,000	in operation	Lee, Ming-Tao mtlee@nsrrc.org.tw	1131
13B	[13B1] SW60 - Protein Crystallography	DCM	5 k - 20 k	7,000	in operation	Jean, Yuch-Cheng ycjean@nsrrc.org.tw	1132
13C	[13C1] SW60 - Protein Crystallography	ACCM	12 k - 14 k	1,000	in operation	Chao, Frodo frodo@nsrrc.org.tw	1133
14A	[14A1] BM - IR Microscopy	FTIR	1- 25 mm		in operation	Lee, Yao-Chang yclee@nsrrc.org.tw	1141

Beamlines at Taiwan Light Source (continued)

No.	Beamline	Mono. Type	Energy Range (eV)	Res. Power (E/ΔE)	Status	Spokesperson E-mail	Beamline Tel ext.
15A	[15A1] Biopharmaceuticals Protein Crystallography	DCM	5 k - 20 k	7,000	in operation	Jean, Yuch-Cheng ycjean@nsrrc.org.tw	1151
16A	[16A1] BM - Tender X-ray Absorption, Diffraction	DCM	1 k - 9 k	7,000	in operation	Jang, Ling-Yun lyjang@nsrrc.org.tw	1161
17A	[17A1] W200 - X-ray Powder Diffraction	ACCM	8 k - 12 k	1,000	in operation	Lee, Jey-Jau jjlee@nsrrc.org.tw	1171
17B	[17B1] W200 - X-ray Scattering	DCM	4 k - 15 k	7,000	in operation	Lee, Hsin-Yi hylee@nsrrc.org.tw	1172
17C	[17C1] W200 - EXAFS	DCM	4 k - 15 k	7,000	in operation	Lee, Jyh-Fu jflee@nsrrc.org.tw	1173
20A	[20A1] BM - (H-SGM) XAS	SGM	70 - 1.2 k	10,000	in operation	Chen, Jin-Ming jmchen@nsrrc.org.tw	1201
21	[21A1] U90 - (White Light) Chemical Dynamics (PRT 50%)	none	4 - 500	50	in operation	Lee, Shih-Huang shlee@nsrrc.org.tw	1211
	[21A2] U90 - (White Light) Photochemistry				in operation	Cheng, Bing-Ming bmcheng@nsrrc.org.tw	1210
	[21B1] U90 - (CGM) Angle-resolved UPS	CGM	4 - 100	100,000	in operation	Tsuei, Ku-Ding tsuei@nsrrc.org.tw	1212
	[21B2] U90 - Gas Phase				in operation	Lee, Yin-Yu yylee@nsrrc.org.tw	1212
23A	[23A1] IASW - Small/Wide Angle X-ray Scattering	DCM	5 k - 23 k	7,000	in operation	Jeng, U-Ser usjeng@nsrrc.org.tw	1231
24A	[24A1] BM - (WR-SGM) XPS, UPS	SGM	10 - 1.5 k	30,000	in operation	Yang, Yaw-Wen yang@nsrrc.org.tw	1241

Beamlines at SPring-8

No.	Beamline	Mono. Type	Energy Range (eV)	Res. Power (E/ΔE)	Status	E-mail
SP12B	[SP12B1] BM - Materials X-ray Study	DCM	5 k - 100 k	7,000	in operation	Ishii, Hirofumi h_ishii@spring8.or.jp
	[SP12B2] BM - Protein X-ray Crystallography					Chen, Chun-Jung cjchen@nsrrc.org.tw
SP12U	[SP12U1] U32 - Inelastic X-ray Scattering	DCM/ HRM	5 k - 30 k	1,000,000	in operation	Tsuei, Ku-Ding tsuei@nsrrc.org.tw
	[SP12U2] HE Photoemission	DM/ HRM	6 k - 14.4 k	300,000	in operation	Tsuei, Ku-Ding tsuei@nsrrc.org.tw

ACCM: Asymmetrically-cut Curved Crystal Monochromator
AGM: Active Grating Monochromator
BM: Bending Magnet
CGM: Cylindrical Grating Monochromator
DCM: Double Crystal Monochromator
DM: Diamond Crystal Monochromator
EPU: Elliptically Polarized Undulator
FTIR: Fourier Transform Infrared Spectroscopy
HRM: High Resolution Crystal Monochromator
PEEM: Photoemission Electron Microscope
SGM: Spherical Grating Monochromator
SNM: Seya-Namioka Monochromator
SPEM: Scanning Photoemission Electron Microscope
SW6: Superconducting Wiggler
SWLS: Superconducting Wavelength Shifter
XAS: X-ray Absorption Spectroscopy
XRD: X-ray Diffraction

Major Events

Annual Users' Meeting and Twentieth Anniversary of Operation

The "Annual Users' Meeting and 20th Anniversary of Operation" was held at NSRRC on September 4 and 5. The meeting, jointly organized by the UEC chair Prof. Rong-Ming Ho from National Tsing Hua University (NTHU) and Dr. Yao-Jane Hsu of NSRRC, consisted of plenary sessions and two featured workshops, namely Workshop I on Unconventional Photoelectron Spectroscopy: NAP-XPS and HAXPES chaired by Dr. Yaw-Wen Yang and Dr. Ku-Ding Tsuei, and Workshop II on Applications of Synchrotron Radiation to Structural Biology chaired by Dr. Chun-Jung Chen of NSRRC. In this year's meeting, 224 posters were displayed, among which 33 authors signed for the Student Poster Contest and six for the Young Scientist Oral Presentation. Overall, the event was attended by 20 distinguished speakers from Taiwan and abroad and 451 other participants.

Year 2013 marked the Twentieth Anniversary of Operation of the Taiwan Light Source (TLS); to celebrate this significant event, activities in a series were thus held in conjunction with the Annual Users' Meeting. First of all, a memorial issue 光芒萬丈 [Boundless Resplendence] was released in early September. This memorial issue includes congratulatory manuscripts and addresses from senior staff of NSRRC and of other institutes, who recite their personal experience with NSRRC or the progress of NSRRC over the past 20 years.

Group photographs of "Annual Users' Meeting and 20th Anniversary of Operation" taken at the TPS building (right) and in front of the Administration and Operation Center (bottom).

Besides the memorial issue, a twentieth-anniversary retrospective session was arranged on the afternoon of September 4. The session began with a group photograph taken in front of the Administration and Operation Center of Taiwan Photon Source (TPS). Following this event, two honorable guests, Deputy Minister Chung-Yuan Mou of National Science Council and Chairman Lih J. Chen of NSRRC's Board of Trustees, as well as former directors of NSRRC including Prof. Edward Yen, Prof. Yuen-Chung Liu, Dr. Chien-Te Chen, and Prof. Keng S. Liang, were invited to deliver speeches at the session. The lectures not only recalled NSRRC's development from the initial stage but also conveyed the serendipity connecting everyone to NSRRC. Subsequent to this twentieth-anniversary retrospective session was an evening reception at the Activity Center. The celebration ended with an impressive photo slide show of NSRRC from the past to the present, weaving those historical moments into the memorable afternoon and evening, together with delicacies and performances, joys and satisfaction.

Fifth SAC Meeting

The NSRRC Science Advisory Committee (SAC) convened its fifth meeting on February 25 and 26 at NSRRC to review and to evaluate the progress of construction and related improvement of techniques of the TPS Phase-I beamlines as well as NSRRC's scientific achievement and development scheme. The meeting, chaired by Prof. Keith Hodgson from SLAC in USA, was attended by ten committee members. In a sequence of presentations, the committee was informed of the current status of TLS operation and TPS construction, NSRRC's strategies to develop scientific research and techniques, the results of research using NSRRC facilities, the plan to transfer TLS beamlines into the TPS building, and the advanced experimental techniques on which NSRRC is currently working. The SAC members complimented not only NSRRC's dedication to research in science and techniques but also the progress of TPS peripheral facilities. In the meeting, the SAC provided NSRRC with profound advice on the continuing projects, which would offer NSRRC valuable guidance on major scientific directions and initiatives.

Fifth meeting of NSRRC SAC.

Opening of NSRRC Office at ANSTO

A celebration was held in the OPAL Auditorium of Australian Nuclear Science and Technology Organisation (ANSTO) on the opening of NSRRC's office at the OPAL Reactor on May 2. Delegates from the Taipei Economic and Cultural Office in Australia, including Representative Katharine Siao-Yue Chang and Executive Director of the Science and Technology Division, Mei-Ling Hshieh, as well as Director General Joseph Chin-Fa Chow and Director Bob M. J. Lu from the Taipei Economic and Cultural Office in Sydney, participated in this significant moment in history with the director of NSRRC, Shih-Lin Chang and deputy director, Di-Jing Huang.

This occasion marked the transfer, to NSRRC, of operational responsibility for the new SIKA cold-neutron three-axis spectrometer, which was constructed by National Central University, under the leadership of Prof. Wen-Hsien Li, with funding from National Science Council of Taiwan.

The Taiwan research community represents the largest single group of overseas users at the OPAL reactor; we expect this partnership to expand, as OPAL's new instruments come on line in the coming year.

Opening of NSRRC's office at the OPAL Reactor at ANSTO's Lucas Heights Campus on May 2.

NSRRC, NTHU and NAR Labs Signed a MOU for Strategic Collaboration Alliance

NSRRC, NTHU and National Applied Research Laboratories (NAR Labs) signed a "Memorandum of Understanding of Strategic Partnership on an Incubation Alliance (MOU)" on June 5 to generate the incubation of business and collaborative programs between industry and university. The purposes of the alliance are to facilitate the industrialization of research results and to assist Taiwan's high-quality startup entrepreneurs in advancing scientific development. The MOU was signed by Shih-Lin Chang, Director of NSRRC, Lih J. Chen, President of NTHU, and Liang-Gee Chen, President of NAR Labs. The three parties will establish an environment for incubation between industry and university and move the incubation alliance and industrialization of Taiwan's R & D achievements toward a new milestone.

From right to left: Director Shih-Lin Chang (NSRRC), President Lih J. Chen (NTHU), and President Liang-Gee Chen (NAR Labs) after signing the MOU.

The collaboration includes the combination of the synchrotron light source technology and resources in integration of optical and electrical systems, optical imaging, vacuum and micro/nano technology, biotechnology and medical material products of counseling and other core technical capabilities from NSRRC, the business consultation from the Innovative Incubator Center of NTHU, and the advantage of promoting the industrialization of research results from NAR Labs. The alliance will attract more new ventures and research teams to join the incubation programs, and thus enhance the future cooperation between industry and academy. NSRRC expects this MOU to boost cooperation among the three parties and to serve better the campus, new ventures and entrepreneurial teams.

Cooperation among Synchrotron Radiation Research Centers Across the Straits

NSRRC and synchrotron radiation research facilities across the straits have opened many opportunities for cooperation on accelerator technologies and scientific research. Since NSRRC held the Second Cross-strait Synchrotron Radiation Research Symposium in 2012, NSRRC has reinitiated the interactions with the synchrotron radiation research facilities in China. In March, NSRRC signed a memorandum of understanding with Beijing

Synchrotron Radiation Facility, National Synchrotron Radiation Laboratory and Shanghai Synchrotron Radiation Facility. Director Shih-Lin Chang and Deputy Director Gwo-Huei Luo of NSRRC also visited the three institutes to understand more about the current status of the facilities in China and to discuss further the detailed plans for potential cooperation pertinent to the accelerator and science. It is expected that the institutes might have increased interactions and experience exchanges through these prospective events.

Appointment of Distinguished Research Fellows

NSRRC has been enthusiastically dedicated to invite prominent scholars and experts from around the globe to engage in NSRRC's advanced research. NSRRC was honored to appoint Prof. Shih-Yuan Lee of Indiana University as a distinguished research fellow from 2013 onward as well as to appoint Prof. Alex Chao from Stanford University, Prof. Tomitake Tsukihara from University of Hyogo, and Prof. Fujimori Atsushi from University of Tokyo as distinguished research fellows continually from 2014.

All distinguished research fellows are recognized as eminent researchers in their fields. As an internationally renowned physicist, Prof. Lee has extraordinary contributions to accelerator physics and technology. Prof. Chao has been committed to improving the quality of TPS beams and to advance the research of accelerator physics. Prof. Tsukihara, with expertise on protein crystallography and structural biology, has boosted domestic research in the field. Prof. Fujimori has achievements in high-temperature superconductors of condensed-matter physics and photoemission spectra and will continue to be engaged in NSRRC's research with X-ray photoelectron spectra and high-energy soft X-rays. As with the completion and commissioning of the TPS, the participation of these eminent researchers will strengthen NSRRC's accelerator techniques and scientific research.

Prof. Shih-Yuan Lee has been appointed as a distinguished research fellow of NSRRC from 2013 onward.

Conferences & Colloquia

Thirteenth Japan-Korea-Taiwan Symposium on Strongly Correlated Electron Systems

The Japan-Korea-Taiwan Symposium on Strongly Correlated Electron Systems was held between January 15 and 17 at Osaka University, Japan. Deputy Director Di-Jing Huang was not only a member of this meeting's organizing committee but also gave a speech on "Magnetic Order of Transition-metal Oxides Studied by Using Resonant Soft X-ray Scattering". During the symposium, Academician Chien-Te Chen, a former director of NSRRC, was also awarded as Honorary Fellow. The topics of this symposium covered the materials and properties of strongly correlated electron systems. The participants had extensive and diverse discussions on the novel spectral techniques, multiferroic and superconducting materials, spin-orbit interaction and so on.

Workshop on IR-VUV Science

A Workshop on IR-VUV Science was held at NSRRC on August 29-30. Experts and scholars in this field gathered at NSRRC to discuss significant topics of scientific research adapting IR-VUV techniques. Before the workshop, NSRRC had called for research topics that might be explored with the IR-VUV experiments and proposals for the construction of IR-VUV facilities. Responses from the users were collected in advance and discussed at the workshops. Three prestigious scholars from around the world – Prof. Cheuk-yiu Ng from University

Participants in the Workshop on IR-VUV Science.

of California Davis, Academician Kopin Liu from Academia Sinica, and Prof. Xueming Yang from Chinese Academy of Sciences – gathered to discuss the palpable science at NSRRC. In the two-day workshop, diverse research topics were presented and constructive advice is offered to the attendees. NSRRC is expected to become a world-leading research facility for performing pioneering IR-VUV experiments in the near future.

Joint Conference of TWNSS Annual Meeting & NSRRC Neutron Users' Meeting & Workshop

The 2013 Joint Conference of TWNSS Annual Meeting & NSRRC Neutron Users' Meeting & Workshop was held at National Museum of Marine Biology & Aquarium in Pingtung during October 10-13. The conference was jointly organized by NSRRC and Taiwan Neutron Science Society. Prominent speakers, such as Prof. Peter K. Liaw from University of Tennessee, Prof. Mu-Ping Nieh from University of Connecticut, Dr. Jason Gardner and Dr. Chia-Hung Hsu from NSRRC, delivered speeches in the conference. Dr. Gardner, the group leader of NSRRC Neutron Group, also introduced the business of the group and the current status of SIKA at ANSTO to the participants.

During the NSRRC Neutron Users' Meeting, the list of the first Neutron User Executive Committee was released. The committee members include Dr. Chun-Jung Chen and Dr. Gardner from NSRRC, Prof. Hsiung Chou from National Sun Yat-sen University, Prof. Hsi-Mei Lai, Prof. Jauyn Grace Lin and Mr. Tsung-Yu OuYang (student member) from National Taiwan University, Prof. Tsang-Lang Lin from NTHU, Prof. E-Wen Huang and Prof. Wen-Hsien Li from National Central University. In the Neutron Users' Meeting, the members voted Prof. Lee and Prof. Lai to become the chairman and vice-chairman. In total, 180 participants attended the four-day conference.

Participants of 2013 Joint Conference of TWNSS Annual Meeting & NSRRC Neutron Users' Meeting & Workshop.

Scientific Colloquium by Academician Hsing-Jien Kung

Academician Hsing-Jien Kung, President of National Health Research Institutes (NHRI), was invited to NSRRC to present a lecture on "Self-killing or Self-eating: How to Trick Cancer Cells to Die?" on August 7. Academician Kung discussed the causes and treatment of cancers on understanding the mutation of cancer cells and treating them with tailor-made targeted therapy. Current treatments such as the targeted therapy or cocktail therapy, which is a mixture of several therapies, have been proved to be more effective in availing themselves to fight against the cancer than a traditional chemotherapy. Academician Kung then shared with NSRRC colleagues the prospective treatments on which scientists are recently working. The aim of this research is intriguing – cancer cells eat themselves by cutting a particular supply of food.

Following the lecture, Academician Kung had lunch with Director Shih-Lin Chang, Academician Chien-Te Chen, Deputy Director Gwo-Huei Luo and some NSRRC scientists. During the lunch, they conversed about the challenges that domestic research institutes have recently faced. They looked forward to further cooperation on future scientific research and experimental techniques between NHRI and NSRRC.

Group photo of Academician Kung (fourth from the left), Director Shih-Lin Chang (to his right), Deputy Director Gwo-Huei Luo (to his left), and some NSRRC scientists after Academician Kung's lecture.

Scientific Colloquium by Academician Samuel Chao Chung Ting

Academician Samuel Chao Chung Ting visited NSRRC on October 11 and gave a spectacular presentation on an Alpha Magnetic Spectrometer (AMS), the only experimental module for particle physics that is mounted on the International Space Station. The sophisticated AMS, developed by an international team of 600 scientists from 60 universities or research institutes in 16 nations, was designed to search for evidence of dark matter measuring antimatter in cosmic rays, that is, to detect the beings or phenomena in the universe that are unknown and unimaginable to men. Since AMS employed a scaled-down detector to meet the limitations of the space shuttle, the challenging design and construction of the detector was decisive for the success of the entire project. After AMS construction was complete, it was first carried by the Space Shuttle Endeavour onto the International Space Station on 2011 May 16. AMS then has begun its 20-year mission to collect data measured precisely. From then onward, it has recorded 400 billion cosmic-ray events since its installation, which surpasses the sum of all data recorded in the past century.

As NSRRC is also developing interstellar research, it was an honor to have Academician Ting share with the colleagues the pioneering research conducted in outer space. On the day of presentation, the speech hall was packed to capacity, and the attendees were amazed by the achievements of Academician Ting's research.

Scientific colloquium from Academician Samuel Chao Chung Ting at NSRRC.

Workshops & Training Courses

Workshop on X-ray Pump-Probe Science and Instrument & Training Course on Single-Crystal Laue-Diffraction Data Collection and Analysis

Participants at the Workshop on X-ray Pump-Probe Science and Instruments.

The Workshop on X-ray Pump-Probe Science and Instruments was held on April 2 and 3 at NSRRC. The workshop brought together five established experts and scholars to share their current knowledge of the ultrarapid time-resolved pump-probe technique, its application and development with the participants. They discussed the current studies on the technique, ranging from interactions between materials, chemical reactions, and so on. As using the experimental technique of Laue diffraction has become a trend in ultrarapid time-resolved experiments, the participants had enthusiastic discussions about it. The 1.5-day workshop began on April 2 and ended at noon on April 3. Subsequent to the workshop was the Training Course on Single-Crystal Laue-Diffraction Data Collection and Analysis in the afternoon. Dr. Zhong Ren from Argonne National Laboratory in USA presented a lecture and instructed the participants how to undertake the analysis. All participants acquired the skills of the ultrarapid time-resolved pump-probe technique that will be crucial after the TPS provides a light source with great energy and high temporal and spatial resolution.

Workshop on Neutron Beam Research

Participants of Workshop on Neutron Beam Research.

The 2013 Neutron Beam Research Workshop was held at NSRRC on October 19 and 20. Chaired by Dr. Jason Gardner, the group leader of the NSRRC Neutron Group, the workshop was attended by forty domestic principal investigators who have interests in neutron research. In the two-day workshop, Dr. Kirrily Rule, Dr. Anton Le Brun and Dr. Richard Mole, all of whom are experts on neutron research from ANSTO, as well as Prof. Mu-Ping Nieh from University of Connecticut in USA presented lectures on techniques in neutron research, such as powder diffraction, SANS, reflectometer, time of flight and triple axis, and their applications on magnetism and biomaterials. They concurrently advised the participants of some useful skills and suggestions in writing proposals applicable to neutron research. The attendees had many discussions about neutron science and proposals with the international speakers.

Summer Internship

NSRRC organized the first summer internship from July 1 to August 2. The summer internship was targeted at junior and senior university students with an interest in conducting research using a synchrotron light source. Because of limited space, NSRRC selected 25 out of 61 enrolled students to participate in this internship.

Summer interns and NSRRC scientists.

From the lectures given by NSRRC scientists in the first week, the students acquired a fundamental knowledge about accelerator science and diverse research applicable to the NSRRC beamlines. From the second to the fifth weeks, students selected a research group and joined the internship in the laboratory or at the end stations. They had frequent interactions with NSRRC scientists to discuss their experiments. Before the internship terminated, each student delivered an oral presentation on the research results that they had worked out during this period. The students indicated that they acquired not only the knowledge but also the empirical skills to process the data. All interns were able to perform experiments independently after the five-week internship.

Winter School on Free-Electron Lasers

The Winter School on Free-Electron Lasers 2013 was held at NSRRC from January 21 to 25. Well known domestic and international speakers made presentations on the essence of free-electron lasers in this five-day event. Fifty-eight students enrolled and participated in this winter school. Free-electron lasers (FEL), the fourth-generation light source, have been deemed to be the most significant light source of the future. FEL will play a crucial role in the development of innovative technological research and will create abundant breakthrough innovation. This winter school, accordingly, aimed to assist the students in first becoming familiar with the FEL techniques and their applications in industry, medicine, physics, chemistry and materials, and then becoming interested in the research of FEL accelerators and related scientific research. It is hoped that young scientists might acquire knowledge of the latest accelerator techniques and develop the advanced scientific research in Taiwan.

Winter School on Free-electron Lasers 2013.

Training Courses on X-ray Absorption Spectroscopy Data Analysis

Two Training Courses on X-ray Absorption Spectroscopy Data Analysis were held at NSRRC on August 19-20 and 22-23 respectively. The courses were designed for NSRRC users of X-ray absorption spectra beamlines to facilitate their use of the related software for data analysis. In the training courses, the lecturers instructed the users how to use software programs, including Athena, Atoms, Feff and Artemis, to analyze X-ray data. The principal investigators were strongly encouraged to participate personally in the training courses with their team mates. In sum, eighty-four users obtained practical operating experience under the instruction of NSRRC scientists. All participants became acquainted with procedures and some important concepts of detailed data analysis.

Training Courses on Protein Crystallography

Two training courses on protein crystallography were held at NSRRC from August 11 to 16 and from August 26 to 30 respectively. The training courses were organized by NSRRC with the Core Facilities for Protein Structural Analysis at Academia Sinica and the Crystallography Committee of ROC. Sixteen participants joined each course. While the first course was designed for domestic potential users who require this technique but lack experience in using it, the second course was restricted to newly admitted graduate/PhD students, post-doctoral and research assistants from the NSRRC user community.

Participants of the protein crystallography training courses.

The five-day training course consisted of lectures focusing on theory and the interactive sessions on directly practicing techniques of protein crystallography. In the experiment classes, the participants completed growing crystals, collecting diffraction data, and analyzing the single-crystal diffraction data using Gd-MAD and S-SAD methods. In each course, the participants not only acquired fundamental knowledge but also learned how to operate the instruments and to analyze the structure of protein crystals by themselves. They obtained the skills to operate the facilities independently and to make the best use of the laboratory facilities for their research.

Summer School on Applications of a Synchrotron Light Source

The Summer School on Applications of a Synchrotron Light Source was jointly held by NSRRC and NTHU from July 30 to August 12. Forty-six students from universities across Taiwan participated in the two-week course. The purpose of this three-credit course was to disseminate to undergraduate students a total knowledge of synchrotron light sources and related research. The students acquired fundamental knowledge about synchrotron light sources and learned to utilize these sources to facilitate their research through this course.

Students in the Summer School on Applications of a Synchrotron Light Source after the final-term exam.

Fourth Summer School on X-ray Science

The fourth Summer School on X-ray Science took place during July 8-10 at Tamkang University, Taipei. It was jointly organized by NSRRC and the Department of Physics of Tamkang University. The objective was to help the participants to acquire, within a short period, the knowledge and experimental skills to facilitate their research. Eighty-five students and researchers attended this event.

The summer school covered topics on X-ray science in a broad spectrum, ranging from X-ray absorption, X-ray emission and resonant inelastic X-ray scattering, X-ray excited optical luminescence to X-ray magnetic circular dichroism and X-ray linear dichroism. Lecturers were invited from domestic and international institutions – Prof. Akio Kotani from Tokyo University in Japan, Prof. Tsun-Kong Sham from University of Western Ontario in Canada, Dr. Jinghua Guo from Advanced Light Source in USA and Dr. Hong-Ji Lin from NSRRC. They gave presentations on theories and experiments in those fields.