

Photo of the 22nd AONSA Executive Committee Meeting in Mianyang, China

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## President's Message

By Brendan Kennedy

Having just attended the meeting of Neutron Facility Directors Meeting in Mianyang China I was struck by both the vibrancy and vulnerability of our community. The newest source in our region, the Chinese Spallation Neutron Source, has begun user operations and is producing world class science even as they work towards installing a comprehensive suite of instruments. J-PARC will again increase its operating current when the new target is installed. At the same time work is underway to ensure that when the oldest source in our region, JRR3-M, recommences operations, the beam delivery and instruments will be as good as possible. In terms of operating instruments things are looking very promising.

However, we are vulnerable. Parts of society fear the nuclear industry and these fears prompt government agencies to impose rigorous safety requirements upon the facilities. Nobody questions the necessity of operating with a safety-first attitude. However, it should be possible to do this without negatively impacting on the regular operation of the neutron sources that is critical for the efficient operation of the user programs. This unfortunately is not always the case.

It is important for all of us to promote the unique capability of our neutron sources, and to build a

network of people who understand the value of the science conducted at them. It is by making friends with the non-specialist and casual users that we can reduce our vulnerability.

On a more positive note I have seen the timetable for the 3<sup>rd</sup> AOCNS meeting to be held in Taiwan in November this year. At this important meeting where we will award the 3<sup>rd</sup> AONSA prize and there will be no better opportunity to celebrate the best neutron scattering achievements in the world. I am looking forward to seeing a large number of friends and colleagues there.



## Reports on the 22<sup>nd</sup> AONSA Executive Committee Meeting

The 22<sup>nd</sup> AONSA Executive Committee Meeting was held on Saturday May 25<sup>th</sup>, 2019, in Mianyang, China. The venue of the meeting was the Fulejiuzhou International Hotel in Mianyang, which was located just a few kilometers from the China Academy of Engineering Physics. In total 21 participants joined the meeting, including eleven Executive Committee (EC) members, nine observers representing neutron facilities in the Asia-Oceania region, and three special observers. Yun Liu (Australian National U.) and Kazuhisa Kakurai (CROSS newly joined the meeting as EC members representing ANBUG and JSNS, respectively. Jianming Song of China Mianyang Research Reactor also attended as the special observer after spending a lot of hands-on effort organizing the meeting.

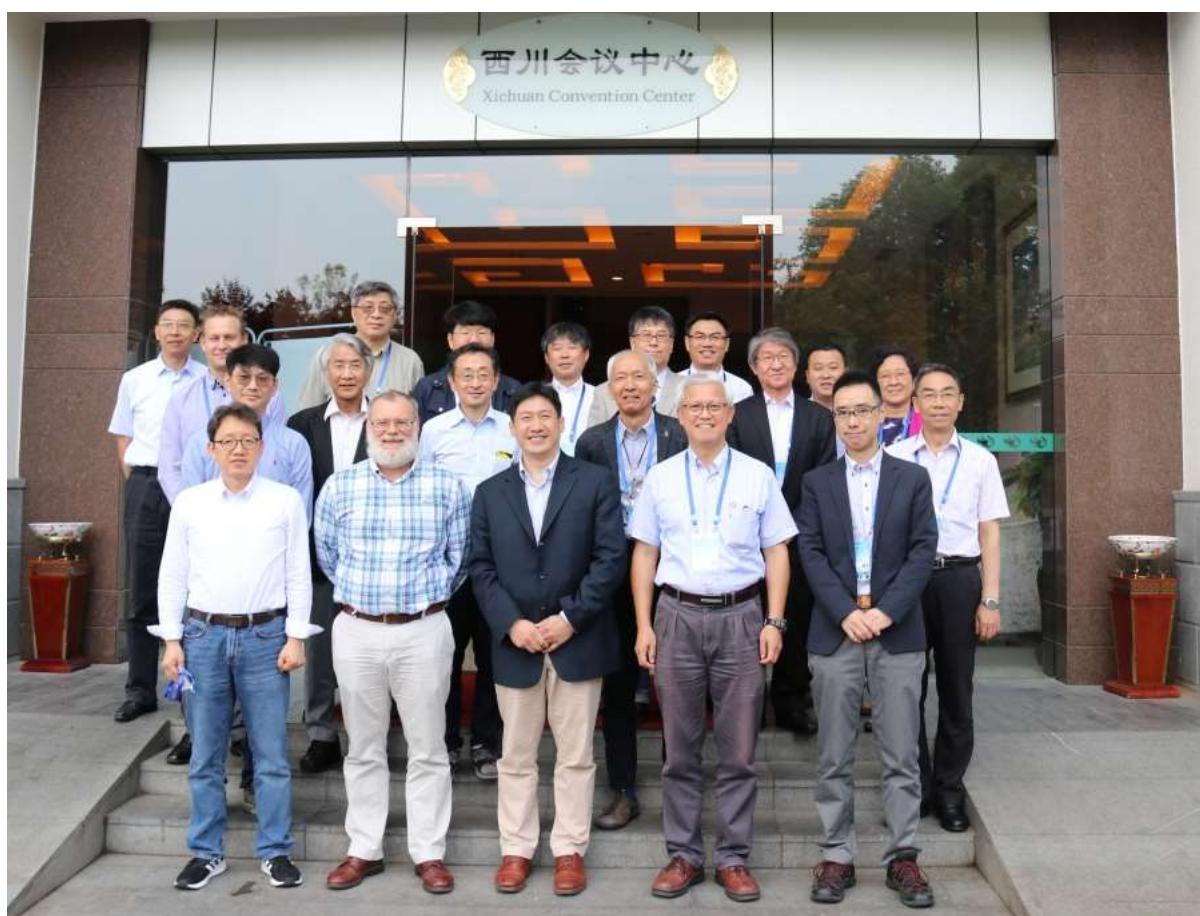
In general, the 22<sup>nd</sup> EC meeting was carried out in a relatively relaxed atmosphere with no items requiring serious discussions. The items discussed in the morning included financial matters, AONSA Prize, AONSA Young Research Fellows, and the preparation of the 3<sup>rd</sup> AOCNS in Kenting, Taiwan. Brendan Kennedy proposed to invite the second and third Presidents of AONSA to the 5<sup>th</sup> AONSA Prize award ceremony, where the 1<sup>st</sup> President, Mahn-Won Kim, will receive the prize. The proposition of the AONSA paying for their airfares to the 3<sup>rd</sup> AOCNS in Taiwan, which is the venue of the upcoming AONSA prize ceremony, was positively accepted by the participants. The possibility of their registration fee waiver will be

followed up by Hsiung Chou after internal discussions and decisions within local organizers of the 5<sup>th</sup> AOCNS.

The preparation status of the 11<sup>th</sup> AONSA Neutron School was presented by Sungil Park. The school will be held on August 19 – 23, 2019, near the HANARO reactor site in Daejeon, Korea. The school, which is jointly organized by the KAERI and KNBUA, will host 30 students including 20 from outside of Korea. Since the HANARO is unlikely to resume operations until September of this year, the experimental sessions will be dry run using existing data sets. The registration fee of USD350 will cover all the local expenses of lodging and meals. The AONSA will provide student travel support in the same extent as done to the previous schools.

After the lunch break, the member societies and observer communities reported on their recent activities. While the venues for the EC meeting in 2020 are not yet fully determined, INSS confirmed that they are willing to host the 24<sup>th</sup> EC meeting during the early half of next year. The 25<sup>th</sup> meeting may be hosted in Japan, which is subject to the decision by JSNS. Finally, Brendan thanked the host at CMRR and all the participants. The 23<sup>rd</sup> EC will be held in Taiwan during the 3<sup>rd</sup> AOCNS.

**Jae-Ho Chung**  
(Secretary of AONSA)



*Photo of the 22nd AONSA Executive Committee Meeting in Mianyang, China*



## The 17th Facility Directors Meeting held in Mianyang, China

### Introduction

The 17th Facility Directors Meeting (FDM) was held in Mianyang, China on Friday 24 May 2019. China Mianyang Research Reactor (CMRR) kindly offered the venue for the FDM and the AONSA Executive Committee meeting the following day in Fulejiuzhou International Hotel in Mianyang. The meeting started early in the morning at 9:00 because of the scheduled tour of the Sanxingdui museum in the afternoon, and lasted until the lunch break at 12:30. Sungil Park chaired the meeting. After an opening remark by the chair, the participants self-introduced themselves, the chair read the purpose & role of the FDM, and the participants approved the agenda of the meeting. Next the chair reviewed the last meeting notes.

### Facility Reports

Facility reports were given in the following order: Hesheng Chen on CSNS, Sungil Park on HANARO, Toshiji Kanaya on J-PARC MLF, Masayasu Takeda on JRR-3, Jamie Schulz on OPAL, Tianfu Li on CARR and Jian Gong on CMRR. Sungil Park went through the presentations from Dhruva and G. A. Siwabessy. Overall the facilities in the region showed a healthy growth in recent years. J-PARC MLF now have a stably operating target at 500 kW. HANARO operated a little less than 60 days in 2018 - a great progress from no operation until 2017. Chinese facilities, CARR, CSNS and CMRR, showed healthy growth in number of instruments and availability. OPAL once again displayed an exemplary performance. Dhruva and G. A. Siwabessy operated stably with many domestic and international activities carried out or planned. Details can be found in this Newsletter in the contributions from the facilities.

### Discussion on challenges, opportunities, and cooperation between facilities

Cooperation between facilities on software and other technical issues was discussed. Currently OPAL and CMRR have an acting cooperation on software issues. Sharing the status of such

cooperation between facilities at FDM is encouraged. To further such cooperation, it was suggested to hold the meetings of the engineering and technical staff along with the meetings of instrument scientists on the first day of the AOCNS. The facility directors will inform the organizers of AOCNS 2019 how many such meetings will take place within a couple of months.

Facility directors shared their concern on the current staffing level of the instruments. Generally it is widely accepted in the international community that six staff members are needed per instrument to provide service to users of a major neutron facility that operates more than 150 days a year. To convey their concern to their respective governments, the facility directors began considering establishment of “League of Neutron Facilities” in the region, à la “the League of Advanced European Neutron Sources”. Also, the facility directors agreed to write a region-wide status report of the facilities. The report will be shared with the user associations, which are expected to set their own priorities and forward their opinions to the respective governments. Lastly the facility directors discussed modification of the membership rule. Toshiji Kanaya proposed elimination of the exception clause for J-PARC which allowed two members for the facility. The directors agreed to remove the clause in the spirit of unified representation of the facility despite its size and complexity of the managerial issues.

### Other businesses

The facilities in the region play a critical role in the AONSA Young Research Fellow program and the AONSA Neutron School. Facility directors discussed how many YRF they can host in the coming years, and who will be hosting the next AONSA Neutron School. The number of YRF for the 2020 round was changed slightly: OPAL (1~2), J-PARC (1~2), CSNS (1), HANARO (0), CMRR (0), BATAN (0), CARR (1). Because of the difficulties assigning a Fellow

to a facility, it was suggested to advertise the available instruments along with the numbers. The facility directors will come up with the information on the available instrument in the next meeting. It was already decided in the previous meeting that either CSNS or CARR would be hosting the AONSA Neutron School in 2020. The respective directors would discuss who would host and report later. The directors outside China are asked to consider possibility of hosting the school in 2021.

Lastly the next chair of FDM was selected. Sungil Park nominated Fangwei Wang of CSNS

as the next chair, who accepted the position with the fellow directors approving the selection.

The next FDM will be held in Kenting, Taiwan during the AOCNS on Sunday 17 Nov 2019. Because the facility directors will give keynote presentations about their facilities in a separate session on Tuesday, the next FDM will not include the facility reports.

**Sungil Park (KAERI)**



*Photo: Group photo of the 17th FDM. Standing on the front from left, Jianming Song, Jae-Ho Chung, Fangwei Wang, Mitsuhiro Shibayama, Sungil Park, Jamie Schulz, Toshiji Kanaya, Kenji Nakajima. Behind from the left, Lin Zou, Sungkyun Park, Hesheng Chen, Guang-Ai Sun, Brendan Kennedy, Jian Gong, Hideki Seto, Kazuhisa Kakurai, Dongfeng Chen, Tianfu Li, Masayasu Takeda, Taku Sato, Hsing Chou, Yun Liu, Zhi-chao Zhu, Liang-Fei Bai, and Dong Liu.*



## Call for Applications for the AONSA Young Research Fellowship 2020

The AONSA Young Research Fellowship Program has been established in 2014 to support highly talented young scientists in the Asia-Oceania region and help them to develop their expertise and career in neutron science and technology. The Program will provide financial support for Fellows to visit major neutron facilities in the region for collaborative research using neutrons.

Any young scientist in the Asia-Oceania region within 8 years of the completion of his/her PhD and who wishes to perform neutron research at major neutron facilities in the region (but not in his/her home country) can apply by following the Rules as described below. The hosting Neutron Facilities in 2020 are J-PARC (Japan), OPAL at ANSTO (Australia), CARR (China) and CSNS (China). A total of three Fellowship positions are available in this application round (one for each hosting Facility) and the possible duration of each Fellowship visit is 3 to 12 months. Please send your applications electronically to the AONSA Office ([fujii.misono@jaea.go.jp](mailto:fujii.misono@jaea.go.jp)) with c.c. to [limei-sun2000@163.com](mailto:limei-sun2000@163.com) by **August 31, 2019**. The results will be communicated to applicants in November 2019 and the Fellowship visits will start in 2020. An application should include:

- A standard application form (provided by AONSA) with all required information completed including a scientific plan for collaborative neutron research. (The application form can be downloaded from <http://www.aonsa.org>)
- A curriculum vitae including a full list of publications.
- One recommendation letter from a supervisor at home institute.
- One letter of support from President of the home neutron society or a representative of home neutron community.

For the more information about neutron scattering instruments available and possible opportunities at the Facilities, please contact the following persons.  
J-PARC: Prof. Toshiji Kanaya

Email: [tkanaya@post.kek.jp](mailto:tkanaya@post.kek.jp)

OPAL at ANSTO: Dr. Jamie Schulz

Email: [jys@ansto.gov.au](mailto:jys@ansto.gov.au)

CARR and CSNS: Dr. Lin Li

Email: [lilin2009@ihep.ac.cn](mailto:lilin2009@ihep.ac.cn)

Selection Committee for the AONSA Young Research Fellowship 2020

Dongfeng Chen (Chair, CNSS), Anna Paradowska (ANBUG), Evvy Kartini (INSS), Hideki Seto (JSNS),

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In-Hwan Oh (KNBUA), P. U. Sastry (NSSI), Ya-Sen Sun (TWNSS)

### AONSA Young Research Fellow (Established February 21, 2014)

The purpose of the Asia-Oceania Neutron Scattering Association (AONSA) Young Research Fellowship Program is to support highly talented young scientists with leadership potential in the Asia-Oceania region, helping them to develop their career and expertise in neutron science and technology. The Program will provide financial support for Fellows to visit major neutron facilities in the region for collaborative research using neutrons.

#### 1. Rules

- The Fellowships shall be awarded every year to highly talented young scientists in the region who have demonstrated strong scientific or technical needs for an extended visit to a major neutron facility in the region (but not in his/her home country). Recipients can receive the Fellowship only once.
- The duration of the Fellowship visit shall be 3 to 12 months depending on his/her needs and resources available. The maximum number of recipients each year shall be determined by the AONSA Executive Committee (EC) after consultation with hosting facilities.
- The Fellowship consists of a certificate of Fellowship award, one round-trip airfare between his/her home institute and the hosting facility, and local living expense at the hosting facility. The amount of support for local living expenses shall be determined based on the nominal cost of living and funding resources available. At least one staff member shall be assigned by the hosting facility to the Fellow as a collaborator and mentor.
- The financial responsibility for each Fellow shall be shared by AONSA, the hosting facility, the home institute, and another funding agency (if available). When other funding resources are not available, AONSA shall provide one round-trip airfare, the hosting facility shall cover local living expenses, and the home institute shall provide salary, insurance and other financial needs. When funding from another agency is available, the guidelines of that agency shall be followed.
- Within 3 months of completing the Fellowship visit, each Fellow shall submit a report to the AONSA Office and the hosting facility with a brief description



of research performed during his/her visit and other outcomes.

*f.* In any publication resulting from the Fellowship visit, the AONSA Young Research Fellowship Program and hosting Facility shall be acknowledged.

*g.* A special session with successful Fellows as speakers shall be considered at the following AOCNS meeting.

## **2. Applications and Eligibility**

*a.* The AONSA Young Research Fellowship Program shall be open to young scientists in the Asia-Oceania region within 8 years of the completion of his/her PhD (as of the application deadline, excluding career interruptions) who wish to perform neutron research at major neutron facilities in the region (but not in his/her home country).

*b.* The Call for Applications shall be announced by Chair of the Fellowship Selection Committee (SC) through the AONSA network including member societies, observers and other personnel determined by the SC.

*c.* An application should include:

- A standard application form (provided by AONSA) with all required information completed including a scientific plan for collaborative neutron research.
- A curriculum vitae including a full list of publications. One recommendation letter from a supervisor at home institute.
- One letter of support from President of the home neutron society or a representative of home neutron community.

*d.* The application shall be electronically submitted to the AONSA Office by the deadline indicated in the Call for Applications.

*e.* An application shall be valid for one cycle only.

## **3. Selection Committee**

*a.* The SC shall consist of seven members chaired by the AONSA Vice President, other six members appointed by the EC. The term of SC members shall be two years. A member can be reappointed once (up to four years).

*b.* The SC members shall represent a broad range of member societies (not observers) and fields of neutron science and technology. The Chair of the SC may co-opt a person or persons from member societies or from observer country/region, when none of the six members has expertise in the research field(s) required for reviewing submitted applications. Co-opted member(s) shall be approved by the EC.

*c.* The SC members shall be posted on the homepage of AONSA when the SC issues the Call for

Applications. The co-opted member(s) shall also be posted.

*d.* The Chair of the SC shall consult with the Directors of hosting facilities concerning the suitability of prospective successful candidates at their facilities before finalizing and announcing the SC's decision.

*e.* The SC's review shall be completed within 2 months after the application deadline.

*f.* The SC shall submit a list of recipients with a review report for each recipient to the EC for approval by the end of November of each year. The approval by the EC may be done electronically, if necessary.

*g.* The list of recipients shall be communicated to the Directors of the hosting facilities and posted on the AONSA website. The result of each application shall be communicated to each applicant individually by the Chair of the SC.

*h.* The AONSA Office, hosting facilities and home institutes shall cooperate to arrange the Fellowship visits efficiently.

*i.* The commencement of the Fellowship is subject to meeting the security and visa requirements of the hosting facility.



## Asia-Oceania Conference on Neutron Scattering

The 3rd AOCNS 2019 ([www.aocns2019.org](http://www.aocns2019.org)) is going to be held in the Kenting National Park, Taiwan on November 16~21, 2019. AOCNS is a platform for more than 500 scientists from the Asia-Oceania, Europe and America regions to share outstanding works and updates of their state-of-the-art neutron facilities. This meeting traditionally spans the complete spectrum from their latest results and discoveries in neutron scattering, over fundamental physical and chemical concepts, to applied research zooming in on noble neutron instrument concepts to make use of the remarkable science across multiple fields. Additionally, honorable Asia-Oceania, Europe and American presidents will discuss the future collaborations, AONSA prize and AONSA Young Research Fellowship owner in this field will share their outstanding works.

The abstract submission opened on April 15 and the deadline, July 15, is fast approaching. Please visit conference website ([www.aocns2019.org](http://www.aocns2019.org)) and register an account for submission. The conference fee is USD650 before September 1 (for early bird) with lunch included.

Eight scientific programs and Poster parallel sessions offer abundant opportunities for all scientists and engineers to present their work. Neutron Science Facilities and AONSA Young Research Fellow will present their latest development and achievement. In the AONSA prize session, we will honor the winner with a medal & a prize to recognize the winner's outstanding research carrier with a significant impact or contribution in the use or development of neutron science or technology in the Asia-Oceania Region. JSNS annual meeting and Japan-Korea business meeting will be held during the conference period, and JSNS Award talks will be opened to all audience.

The Conference venue is located at Howard Beach Resort inside the Kenting National Park. Kenting National Park is located at the most southern part of Taiwan and is the first national park in Taiwan particularly to include both marine and terrestrial areas. In the marine area of the park, the Black Current runs across and maintains the annual warm climate with temperature at 22-29°C. It's diversified terrain and tropical climate have helped breed a rich and fertile vegetation ranging from upland to coast with a full variety of living species. Along the 70km coastline there are rich landforms, including the strange and delicate coral reef, the pure and fine sandy beach, and the ever-changing sandstone coast.

Howard Beach Resort Kenting is a luxurious 5-star hotel. Surrounded by beautiful mountains and seas, the resort boasts a Mediterranean-style facade, 405 exquisite rooms blessed with stunning natural scenery. Four other luxurious hotels (Caesar Part, Chateau Beach Resort, Full Resort and Amanda Hotel) nearby the conference site are recommended and exhibit different styles for your choice. A shuttle bus will run continuously during the meeting period. Among these hotels, the Amanda Hotel is Muslim friendly (MFR and MFT) hotel. During the busy conference schedule, it is great to enjoy the precious peaceful moment, or to enroll deep discussion for future collaboration while enjoy the nature and cultural activities.

### Scientific Programs

#### **S0. Instrument Scientist meeting,**

Around 7~9 parallel sessions

#### **S1. Condensed Matter Physics (CMP)**

Magnetism,  
Superconductivity and Multiferroics,  
Strongly-Correlated Electron Systems

#### **S2. Materials Science and Chemistry (MSC)**

Energy materials,  
Metallic glass,  
High-entropy Alloys,  
Earth Sciences,  
Reaction Kinetics and Mechanisms,  
Phase Transitions

#### **S3. Soft Matter Systems (SMS)**

Polymers,  
Colloids and Gels,  
Surfaces and Interfaces

#### **S4. Food and Biological Science (FBS)**

Proteins,  
Lipids,  
Membranes,  
Agricultural Materials

#### **S5. Engineering and Industrial Applications (EIA)**

Stress/Strain,  
Imaging,  
Texture,  
Energy and Other Applications

**S6. Fundamental Physics (FP)**

Fundamental properties of neutrons,  
Neutron interferometry and quantum physics

**S7. Sources, Methods and Techniques (SMT)**

Moderators,  
Neutron Beam Optics and Transport,  
Polarization Methods,  
Computational Methods and Modelling,

Sample Environment,  
Unique New Instruments

The Organizing Committee members will do their best to make AOCNS 2019 an enjoyable and memorable experience for all attendees in both terms; science and travel.

We look forward to seeing you in Kenting this November.



**3rd AOCNS 2019**  
3rd Asia-Oceania Conference on Neutron Scattering

**Date:** 2019 November 16-21  
**Registration:** April 15  
(Early Bird dead line: September 1)

**Venue:** Howard Beach Resort Kenting  
**Submission:** April 15-July 15  
**Approval Notification:** August 15

The Asia-Oceania Conference for Neutron Scattering(AOCNS) is a platform for more than 500 scientists in the Asia-Oceania, Europe and America regions to share outstanding works and updates of their state-of-the-art neutron facilities. This meeting traditionally spans the complete spectrum from their latest results and discoveries in neutron scattering, over fundamental physical and chemical concepts, to applied research zooming in on novel neutron instrument concepts to make use of the remarkable science across multiple fields. Additionally, prestigious Asia-Oceania, Europe and American Presidents meeting discussion the future collaboration, AONSA prize and AONSA Young Research Fellowship owner in this field will share their outstanding works.

**Scientific Program**

**S1 Condensed Matter Physics (CMP)**  
-Magnetism  
-Superconductivity and Multiferroic  
-Strongly-Correlated Electron Systems

**S2 Materials Science and Chemistry (MSC)**  
-Energy materials  
-Metallic glass  
-High-Entropy Alloys  
-Earth Sciences  
-Reaction Kinetics and Mechanisms  
-Phase Transitions

**S3 Soft Matter Systems (SMS)**  
-Polymers  
-Colloids and Gels  
-Surfaces and Interfaces

**S4 Food and Biological Science (FBS)**  
-Proteins  
-Lipids  
-Membranes  
-Agricultural Materials

**S5 Engineering and Industrial Applications (EIA)**  
-Stress/Strain  
-Imaging  
-Texture  
-Energy, Transportation, Pipes, & Power plants applications

**S6 Fundamental Physics (FP)**  
-Fundamental properties of neutrons  
-Neutron interferometry and quantum physics

**S7 Sources, Methods and Techniques (SMT)**  
-Moderators  
-Neutron Beam Optics and Transport  
-Polarization Methods  
-Computational Methods and Modelling  
-Sample Environment  
-Unique New Instruments

[www.aocns2019.org](http://www.aocns2019.org)  
[aocns2019@aocns2019.org](mailto:aocns2019@aocns2019.org)




## Reports from neutron associations

### Australian and New Zealand Neutron Beam Users' Group (ANBUG)

ANBUG is run for the benefit of members and all profits from our User conferences are used to offer student prizes and travel bursaries. We promote neutron scattering to the community, especially to students and early career researchers.

Activities in 2018 included the AONSA neutron scattering school held in Lucas Heights on Nov. 12-16<sup>th</sup>. We had 34 participants from 11 different countries/regions (1 China, 4 India, 1 Indonesia, 1 Malaysia, 1 Japan, 6 New Zealand, 7 South Korea, 1 Taiwan, 1 Thailand, 1 Hong Kong and 10 Australians). Five out of 16 lecturers were female and 3 out of 11 tutors were female.

53 abstracts were initially submitted and 35 of them were selected with one abstract withdrawn). Table 1 shows the gender distribution in abstract submissions.

Gender	%, in initial 53 abstracts	%, in selected 35 abstracts	% selected
Female	20	15	75.0
Male	31	20	64.5
Unknown	2		

Table 1: AONSA 2019 School statistics

The AINSE/ANBUG Neutron Scattering Symposium (AANSS 2018) was held the following week, from Nov. 19<sup>th</sup> to 21<sup>st</sup>. We congratulate the organizing committee, Chaired by Gail Iles, Katy Wood, Richard Mole, Kelly Cubin, Tilo Soehnel, Gary Byrant and Michelle Durant, for a very successful meeting.

The scientific programme was of excellent quality and we were delighted to welcome several speakers from other AONSA countries. The meeting opened with a traditional 'Welcome to Country' by a local aboriginal elder. Kicking off the scientific programme was a plenary by Professor Yun Liu from the Australian National University, who is the ANBUG incoming vice-president.

Overall, 50% invited talks were female, 42% female chairs and 50% female student prize winners. Table 2 shows the overall statistics of the meeting.

Delegate type	Female	Male	Grand Total
Career	13	41	54
ECR	3	7	10
Retiree		1	1
Student	7	23	30
Sponsor	1	3	4
Grand Total	24	73	99

Table 2: Statistics for the AANSS 2019 meeting

A big congratulations to Grace Causer, who won the inaugural ANBUG PhD thesis award! Her research focused on magnetic material using the Platypus and Taipan instruments at ANSTO.

ANBUG thanks Ian Gentle for his leadership in 2018 as ANBUG President. Tracy Rushmer is the incoming president and we welcome Yun Liu of ANU as incoming vice-president.

ANBUG currently has 390 members.

**Tracy Rushmer (ANBUG)**



Participants of the AONSA 2018 School held at Lucas Heights, November 12<sup>th</sup>-16<sup>th</sup>, 2018



Student prize winners with President ANBUG (Ian Gentle) and Chair (Gail Iles) AANSS meeting Nov. 19<sup>th</sup>-21<sup>st</sup>, 2018 at Lucas Heights.



## Activities of Indonesian Neutron Scattering Society (INSS)

### Lecture and Training

Lectures on "Neutron Scattering, Diffraction, Radiography and Tomography" for graduate students have jointly been organized and conducted by Center for Science and Technology of Advanced Materials (PSTBM), Indonesian Nuclear Energy Agency (BATAN), in cooperation with Department of Physics, Institut Teknologi Bandung (ITB), Bandung, during 4 days in April 2019. Prof. Ridwan, the director of PSTBM and his colleagues have given subjects in several topics related to the lecture's theme.



*Fig. 1. Joint lecture on neutron analyzing technique for graduate students of Department of Physics at ITB.*

Meanwhile, PSTBM has also conducted a public training on "Neutron Scattering Method and Instrumentation" on 25 February and 29 March 2019 at Puspipstek, Serpong.

### Workshop

A workshop on "Renewable Energy production and Storage from Waste Biomass" has been carried out at ITS, Surabaya, on 24-26 April 2019. This workshop invited researchers from the UK, Malaysia and Indonesia to conduct international collaborative researches on the production of renewable energy and energy storage from biomass waste, using neutron, synchrotron and muon based – techniques and facilities. Funded by the Global Challenge Research Fund (GCRF) through the Queen Mary University of London (QMUL), United Kingdom, joining in the workshop were University of Padjadjaran, ITB, University of Gajah Mada, University of Indonesia, University of Science Malaysia, and RIKEN Nishina Center, Japan.



*Fig. 2 Group photo of the workshop participants at ITS's Rectorate Building, Surabaya.*

As the continuation in promoting neutron scattering and diffraction techniques for young scientists and students, INSS will run again the workshop on "Neutron Scattering for Materials Research and Industrial Applications", on 19 June 2019, at Surabaya State University (UNESA), Surabaya. This activity inviting students, lecturers, and young scientists, will jointly be organized by the Indonesian Physical Society (PSI) - Surabaya, and Department of Physics, UNESA. Prof. Darminto and Dr. Iwan Sumirat have been appointed as lecturers in the workshop.

### Conference

Two staffs of Institut Teknologi Sepuluh Nopember (ITS) and two students of Malang State University (UM) have taken part in "International Nuclear Science and Technology Conference 2019" (INST2019), Bangkok, Thailand, 4-8 February 2019, as oral as well as poster presenters.

Further, INSS will co-organize together with Materials Research Society - Indonesia (MRS-Ina), "The International Conference on Advanced Materials Technology 2019" (ICAMT-2019), 8-9 October 2019, at Aston Hotel International, Sentul, West Java.

### Collaboration

Two professors of Doshisha University, Japan, Prof. Hiroyuki Miyamoto and Prof. Ken Hirota, have visited PSTBM. To optimize this visit, a scientific discussion was held in the form of focused Group Discussion (FGD), which was attended by all PSTBM's



management and researchers. This visit was also one of efforts to fulfill the PSTBM's responsibility to implement the center of excellence's agenda in establishing real cooperation with universities in general and with international research institutions in particular. In welcoming the opening of the head of PSTBM, Prof. Ridwan, expressed his hope that this FGD could open the potential of material R & D cooperation between the two countries, especially in the utilization of various nuclear techniques owned by BATAN for various material research conducted at Doshisha University.



*Fig. 3. The guest professors and students visiting Neutron Guide Hall at neutron facilities of PSTBM, BATAN, Serpong.*

**Evvy Kartini, Iwan Sumirat, and Darminto  
INSS**

## Report from JSNS

### Status of JSNS

As of May 1, 2019 the number of the JSNS members is 572 including 34 students. In addition there are 28 senior members. The number of the supporting members is 33.

From April 2019, Kazuhisa Kakurai (CROSS) serves as the president for a term of two years. At the same time half of the council members were exchanged and a new board of administration was organized. The lists of the new council and board members are as follows:

#### Council Members:

Masahiro Hino (Kyoto Univ.)  
 Hitoshi Endo (KEK)  
 Takashi Kamiyama (Hokkaido Univ.)  
 Masaaki Fujita (Tohoku Univ.)  
 Takashi Kamiyama (KEK)  
 Hazuki Furukawa (Ochanomizu Univ.)  
 Michinobu Kawakita (J-PARC)  
 Michiro Furusaka (AIST)  
 Mitsuhiro Shibayama (Univ. Tokyo)  
 Hiromichi Kishimoto (Sumitomo Rubber Ind.)  
 Junichi Suzuki (CROSS)  
 Kenji Ohyama (Ibaraki Univ.)  
 Naoya Torikai (Mie Univ.)  
 Hirohiko Shimizu (Nagoya Univ.)  
 Osamu Yamamuro (Univ. Tokyo)  
 Masayasu Takeda (JAEA)

#### Board of Administration

##### Secretary

Seiko Kawamura (J-PARC)  
 Taro Nakajima (Univ. Tokyo)

##### Treasurer

Satoru Iikubo (Kyushu Sangyo Univ.)  
 Kazutaka Ikeda (KEK)

##### Events Coordination

Taiki Tomonaga (CROSS)  
 Ryoji Kiyonagi (J-PARC)  
 Go Matsuba (Yamagata Univ.)

##### Communication

Asami Sano (JAEA)  
 Yusuke Nambu (Tohoku Univ.)

##### Public-Relations

Hiroshi Nakagawa (JAEA)

Nobuhiro Sato (Kyoto Univ.)

##### Publication

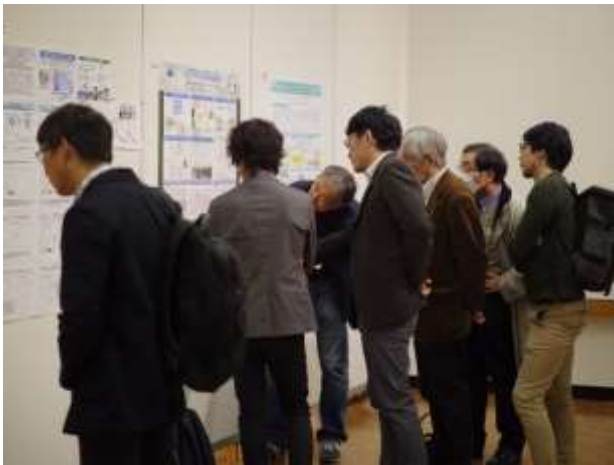
Taturo Oda (Kyoto Univ.)  
 Hiroki Iwase (CROSS)

### JSNS Activities

**The 18<sup>th</sup> Annual Meeting of the Japanese Society for Neutron Science** was held on Dec. 4th and 5th, 2018 in Mito chaired by Prof. Toru Ishigaki (Ibaraki Univ.). 262 participants attended the meeting with 46 oral and 116 poster presentations, including the keynote lecture on “Prospect of Neutron Science Viewed from Synchrotron Radiation Science” by Prof. Nobuhiro Kosugi (IMSS, KEK) and the awards lectures by the three JSNS Prize winners. (see AONSA News Letter Vol. 10 No.2 p.10).



*A vivid discussion on the 'Future of the Neutron Science' in the opening session of the 18<sup>th</sup> Annual Meeting in Mito*



*Lively information exchanges in the poster session of the 18<sup>th</sup> Annual Meeting in Mito*

In conjunction with the annual meeting a public lecture was organized on Dec. 8th (Sat) at the Ibaraki Quantum Beam Center, Tokai.

The lecture titles were

- “Opening the Future with Neutron Beam Utilization – From Everyday Life to Industrial Application and Medical Treatment” by Dr. Kunihiro Suzuki (QST),
- “What One Should Know about the Cancer Therapy using Particle Beam Radiation” by Prof. Tetsuya Yamamoto (Yokohama City University) and
- “History of the Universe Engraved in the Elementary Particle Muon – Searching for the Origin of the Universe and Matter with J-PARC” by Prof. Naoto Saito (J-PARC Center & KEK).

**The 17th Japan-Korea Meeting on Neutron Science (J-K Meeting)** co-organized by the Korean neutron Beam Association and Japanese Society for Neutron Science was held through Jan. 7th to 9th, 2019 in Daejeon, Korea, chaired by Prof. Jaeho Chung (Korea Univ.). A workshop on Neutron Reflectometry was held in Pusan from Jan. 6th to 7th, 2019, as a satellite event to the J-K Meeting.

### Upcoming events:

**The 4th Neutron and Muon School** will be held at J-PARC from Oct. 28 to Nov. 2, 2019. (Registration is open. Please visit <https://neutron.cross.or.jp/4th-nms/>)



**The 19<sup>th</sup> Annual Meeting of the Japanese Society for Neutron Science** will join the AOCNS2019, as has been announced in the last JSNS report (see AONSA News Letter Vol. 10 No.2 p.10).

JSNS Award Lecture session (open for AOCNS participants) and the General Assembly (closed session for JSNS members) are accommodated in the AOCNS program on Nov. 20, 2019. (<https://www.aocns2019.org/>)

**Kazuhiisa Kakurai (JSNS)**

## Report from Neutron Scattering Society of India (NSSI)

National Seminar on Crystallography (NSC) is one of the prestigious and most enthusiastically attended scientific annual events by the crystallography community in the country. The seminar is being organized annually by the Indian Crystallographic Association (ICA). So far 46 such seminars were held at various places in India. This year, the 47<sup>th</sup> NSC will be organized at Bhabha Atomic Research Center in association with Indian Crystallographic Association, National Committee of Indian National Science Academy (INSA) for International Union of Crystallography (IUCr), and Neutron Scattering Society of India (NSSI). The event will be held at the Department of Atomic Energy (DAE) Convention Center, Anushakti Nagar, Mumbai 400 094 during June 19-22, 2019. This is expected to bring together large number of researchers (~300) from various disciplines ranging from physics, chemistry, biology medicine and geology across India to discuss the science involving structural details of materials. An emphasis on the role of neutron scattering in crystallography will be given. Dr. R. Chidambaram is the chairman of the programme committee, and Dr. S. M. Yusuf is the chairman of the organizing committee of the event.

This seminar will provide a platform for the scientists working in the field of crystallography and crystal growth to share their observations, scientific experience and achievements. DAE has two major National Facilities: (1) National Facility for Neutron Beam Research (NFNBR) at Dhruva reactor, BARC, Mumbai, and (2) INDUS-1, INDUS-2 synchrotron facilities at RRCAT, Indore. These facilities have exclusive beam lines devoted to crystallographic research. NSC47 will also provide opportunities to young

researchers to interact with experienced scientists working in the above major national facilities for crystallographic studies in the country. The scientific deliberations will include plenary sessions, invited talks, seminars and contributory papers. Accepted contributory papers will be presented as posters, and few of them will also be presented in oral presentation sessions.

*S. M. Yusuf, President,  
Neutron Scattering Society of India*



## News from Taiwan Neutron Science Society (TWNSS)

### TWNSS committee Meeting (February 15, 2019)

The 1<sup>st</sup> 2019 TWNSS committee meeting (Fig. 1) was held at the Howard Beach Resort in Kenting, southern Taiwan on February 15<sup>th</sup>. The meeting was chaired by Prof. Ko-Wei Lin, President of TWNSS, and the purpose of the meeting was to on-site check the details (hotels, banquet, transportation, registration, etc.) for this coming 3<sup>rd</sup> AOCNS 2019 during November 16<sup>th</sup> - 21<sup>st</sup>. The meeting has been successfully arranged by TWNSS secretary, Prof. Hua-Shu Hsu of National Ping Tung University (local host). The committee members (Profs. Hsiung Chou, Ya-Sen Sun, Chun-Chuen Yang (VP), Jing-Ming Chen, Chia-Chin Chang, E-Wen Huang, Jyh-Shen Tsay, Shih-Chun Chung, Cheng-Si Tsao, Che-Yi Chu) contributed to planning a well-organized conference (flyer shown in Fig. 2). In addition, Prof. Hsiung Chou represented TWNSS at the AONSA EC meeting on May 25<sup>th</sup> held in Miangyang, China (Fig. 3).



Fig. 1. 2019 TWNSS committee meeting (group photo (top) and the beach site for banquet (bottom)) in Kenting, southern Taiwan.



**3 AOCNS 2019**  
3<sup>rd</sup> Asia-Oceania Conference on Neutron Scattering

**Date:** 2019 November 16- 21. **Registration:** April 15 (Early Bird dead line: September 1)

**Venue:** Howard Beach Resort Kenting **Submission:** April 15-July 15 **Approval Notification:** August 15

The Asia-Oceania Conference for Neutron Scattering (AOCNS) is a platform for more than 500 scientists in the Asia-Oceania, Europe and America regions, to share outstanding works and updates of their state-of-the-art neutron facilities. This meeting additionally spans the complete spectrum, from the latest results and discoveries in neutron scattering, over fundamental physical and chemical concepts, to applied research focusing in on novel neutron instruments concepts for wide use of the remarkable science across multiple fields. Additionally, prestigious Asia-Oceania, Europe and American Presidents meeting discussion the future collaboration, AONSA prizes and AONSA Young Research Fellowship owner in this field will share their outstanding works.

**Scientific Program**

- S1 Condensed Matter Physics (CMP)**
  - Magnetism
  - Superconductivity and Multiferroic
  - Strongly-Correlated Electron Systems
- S2 Materials Science and Chemistry (MSC)**
  - Energy materials
  - Metals/glass
  - High-Entropy Alloys
  - Earth Sciences
  - Molecular Kinetics and Mechanisms
  - Phase Transitions
- S3 Soft Matter Systems (SMS)**
  - Polymers
  - Colloids and Gels
  - Surfaces and Interfaces
- S4 Food and Biological Science (FBS)**
  - Proteins
  - Lipids
  - Membranes
  - Agricultural Materials
- S5 Engineering and Industrial Applications (EIA)**
  - Stress/Strain
  - Imaging
  - Texture
- S6 Fundamental Physics (FP)**
  - Fundamental properties of neutrons
  - Neutron interferometry and quantum physics
- S7 Sources, Methods and Techniques (SMT)**
  - Neutron Source
  - Neutron Beam Optics and Transport
  - Polarization Methods
  - Computational Methods and Modelling
  - Sample Environment
  - Unique New Instruments

www.aocns2019.org  
aocns2019@aocns2019.org

Fig. 2. AOCNS 2019 flyer.



Fig. 3. 2019 AONSA EC meeting group photo.

**Ko-Wei Lin, President, TWNSS**

## Reports from neutron facilities

### Report from J-PARC

The user program ended on December 16, 2018, with an availability of 94% to the scheduled beam time. The transportation of a used target vessel, which was used in 2008, to the storage facility from MLF was successfully carried out on January 16, and the neutron production operation started at 500 kW for the user program again on January 23, 2019 and will continue the operation until the end of June, including short maintenance break of March 26 to April 2.

The 3rd Neutron and Muon School was held in November 20-24, 2018. 35 young researchers and graduate students from China, India, Korea, Thailand, Russia, United Kingdom, as well as Japan participated in the school. They enjoyed the lectures and hands-on experiments using 9 instruments (Figure 1).

The 3rd ESS-J-PARC Workshop was held in November 13-15, 2018. 24 participants from ESS visited J-PARC. Swedish Ambassador, Mr. Magnus Robach joined the workshop on the first day (Figure 2). In the workshop we discussed many research subjects such as accelerator fields, safety relations, radiation monitoring, neutron targets, handling of radioactive substances, deuteration of experimental samples.

The joint meeting between Neutron Science Proposal Review Committee (NSPRC) and Proposal Evaluation Committee (PEC) was held on January 24, 2019 to review proposals for 2019A. The result was authorized by the joint meeting between MLF Advisory Board and Selection Committee on February 8. From 2019A period, POLANO (polarized neutron chopper spectrometer at BL23) was open to general users.

Neutron Advisory Committee Meeting for J-PARC MLF Facility was held during February 18- 19, 2019 to evaluate and advice for the operation and activities in J-PARC MLF (Figure 3). The members are Robert McGreevy (chair, ISIS), Bertrand Blau (PSI), Mark Wendel (SNS), Yoshiaki Kiyonagi (Nagoya U.), Sung-Min Choi (KAIST), Christiane Alba-Simionesco (LLB), Jamie Schulz (ANSTO), Yoshie Otake (RIKEN), Masaaki Sugiyama (Kyoto U.), Andreas Schreyer (ESS), Christian Rüegg (PSI). Unfortunately, A. Schreyer and C. Rüegg were absent in the meeting. The final report will appear soon.

Quantum Beam Science Festa which is a conference for mainly domestic users for MLF J-PARC and IMSS KEK was held in Tsukuba on March 12 to 13, 2019 with about 580 participants. In this Festa, MLF symposium was held on March 13 where MLF facility status, scientific results and developments were reported.

**Toshiji Kanaya  
(J-PARC)**





*Figure 1. Group photo at the 3rd Neutron and Muon School in November 20-24, 2018.*



*Figure 2. Visit of Swedish Ambassador, Mr. Magnus Robach to J-PARC during ESS-J-PARC Workshop in November 13-15, 2018.*

## Report from JRR-3

**JAEA (Department of Research Reactor and Tandem Accelerator):** Safety review of JRR-3 under the New Regulatory Requirements was completed on 7th November 2018 after the unexpected lengthy reviewing process. We, however, have to wait for additional two years because the roof of the reactor building had to be reinforced due to an increase of estimated maximum seismic motion following new findings of faults near JRR-3 in the reviewing process. In this occasion, we decided to make reinforcement of the peripheral structures like a stack, a cooling tower, the experimental hall and so on to assure the higher seismic performance. We started the reinforcing work in this April. Neutron beam will come back after almost two years from now through several additional reviews and inspections for the reactor safety.

As already mentioned in the previous report, we got budget to replace the cold neutron guides in the in-pile section very near the core with the high-performance supermirrors of 3Qc. The replacement is now working on. We expect a gain factor at the sample position reaches almost five in the most effective case although the gain factor strongly depends on the optics of each instrument.

**JAEA (Materials Sciences Research Center) & ISSP:** JAEA and ISSP set up two working groups for future plan of JRR-3 under the committee for promotion of neutron sciences using JRR-3, and requested Prof. Sato in Tohoku University and Prof. Sugiyama in Kyoto University to make reports on the future plans in different two research fields. One is condensed matter physics and another is soft matter, polymer and biological sciences. Two reports have been already handed in. Professor Sato's report proposes that it is better for us to concentrate on several characteristic instruments due to our shrinking budget and decrease of human resources. On the other hand, all instruments in the scope of the report should be maintained as long as possible in Professor Sugiyama's report. He, however, stresses the condition is that they take advantage over the instruments at MLF. We will discuss what instruments must be maintained when the proton beam power of MLF reaches 1 MW not only among us but also in cooperation with MLF, JSNS and so on.

**ISSP:** Neutron Science Laboratory (NSL) of ISSP has been running Overseas-Experiment Program since 2012. Travel expenses for two scientists per proposal were supported under the program. 64 persons were sent abroad in JFY2017, and 54 persons in JFY 2018 (as of Mar. 31, 2019), namely, OPAL, NIST, ILL, ORNL, etc. Table 1 shows the statistics of the program. 100 papers have been published in refereed journals since JFY 2011. See,

<http://www.issp.u-tokyo.ac.jp/labs/neutron/download/OverseasPubList.htm>

NSL continues call-for-proposals every year to keep neutron users in Japan. For JFY 2019, 83 general user proposals and 17 Instrument and Research Team (IRT) proposals were approved. Some proposals will be supported by the Overseas-Experiment Program.

Table 1. Numbers of scientists sent to overseas facilities since 2011 under Overseas-Experiment program of NSL-ISSP.

Facility			Number of users							
			FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
HFR	ILL	France	3	9	0	4	3	1	0	3
OPAL	ANSTO	Australia	7	7	4	18	22	35	25	22
HANARO	KAERI	Korea	2	7	7	0	0	0	0	0
FRM-II	MLZ (Munich)	Germany		4	1	0	8	1	7	2
ISIS	Rutherford Appleton Laboratory	UK		4	2	4	4	0	4	3
SINQ	PSI	Switzerland		1	4	5	6	1	3	4
NBSR	NIST	USA			3	13	5	2	11	6
BER II	HZB (Berlin)	Germany			2	0	7	3	2	2
HFIR	ORNL	USA	13		1	1	1	6	4	10
SNS	ORNL	USA			4	2	1	5	6	1
ORPHEE	ILL	France			1	1	1	1	2	1
Total			25	32	29	48	58	55	64	54

In order to re-activate User Program effectively, NSL has started to examine university-owned instruments for upgrading/abolishment.

**Mitsuhiro Shibayama (ISSP, U. Tokyo),  
Yoji Murayama (JAEA),  
and Masayasu Takeda (JAEA)**



## Report from ANSTO

Australia's Open Pool Australian Light-water (OPAL) reactor is a state-of-the-art 20 Megawatt reactor that uses low enriched uranium (LEU) fuel to achieve a range of nuclear medicine, research, scientific, industrial and production goals.

The Australian Centre for Neutron Scattering operates the suite of neutron beam instruments at the OPAL reactor and leads Australia in the use of neutron scattering and X-ray techniques to solve complex research and industrial problems in many important fields. There are currently 13 operating neutron beam instruments available for users and 1 neutron beam instrument under construction.

Open competitive access to the neutron beam instruments is available through the Australian Centre for Neutron Scattering Customer Portal (<http://neutron.ansto.gov.au>). Calls occur biannually and close in 15<sup>th</sup> September and 15<sup>th</sup> March.

In 2018 the Australian Centre for Neutron Scattering is celebrating two significant milestones of 10 years of neutron beam operations and 1000 Scientific Research Papers containing data obtained using the neutron scattering instruments at the OPAL reactor. These milestones also coincide with the 100<sup>th</sup> reactor cycle of the OPAL reactor.

Projects to replace the existing Cold Neutron Source and install an additional split neutron guide in the TG123 neutron beam assembly are progressing well with

planned installation of the TG123 neutron beam assembly in late 2019. The replacement cold source installation date has been delayed until 2024.

In the first half of 2018 we have made significant progress on the installation of a 2<sup>nd</sup> neutron reflectometer on the CG2B neutron guide. BioRef was transferred to ANSTO under a donation agreement with the Helmholtz-Zentrum Berlin in Germany. When installed at the OPAL reactor the instrument will be named SPATZ, the German word for sparrow, which follows the tradition of the naming convention of other instruments at the Australian Centre for Neutron Scattering, which are named after Australian and other fauna. Significant modifications to the BILBY sample enclosure area were also made to accommodate SPATZ. SPATZ is expected to commence hot commissioning in October 2018 and transition to normal operations in early 2019 and will be the 14<sup>th</sup> neutron beam instrument at OPAL.

A total of 292 proposals for cold- and thermal-neutron beam experiments along with proposals to the National Deuterium Facility were received for the 2018-2 proposal round with 192 proposals approved by the Australian Centre for Neutron Scattering & National Deuterium Facility Program Advisory Committee.

**Jamie Schulz (ANSTO)**

## Report from KAERI

Almost half a year after the shutdown due to the thinner than expected hot water layer of the reactor and also nearly four years after HANARO stopped scientific experiments, the 30 MW research reactor finally resumed operation on May 15, 2018. After rigorous testing of the reactor and the neutron beam instruments, finally, scientific experiments returned on June 10. Because any further shutdown would mean several months of scrutiny from the nuclear regulators without neutrons, the reactor operators and instrument scientists are extremely cautious to keep the facility operational and safe.

Even though the instrument scientists tried hard to keep the instrument in operational condition for the past four years, many instruments showed troubles with electronic devices including detectors. While some instruments such as HRPD and 40M-SANS quickly recovered, many took several weeks to recover fully. As of writing, most of the existing nine instruments are now operational albeit with some limitations.

Meanwhile, two instruments are expected to the list of operational instruments by the end of the year. They are the Disk-Chopper Time-of-Flight (DC-ToF) spectrometer and the Bio-Reflectometer (Bio-REF). They are the two of the five instruments to be commissioned in the coming years.

For the time being, HRPD and 40M-SANS will be only instruments included in the upcoming call for proposals due to the lack of resources. To use other instruments users are advised to contact the instrument scientists and collaborate.

To discuss collective actions to counter the difficulties mentioned above, KNBUA - the user organization and NSC - the facility operator held a joint brainstorming session in Daejeon from June 28 to 29. The participants agreed to concentrate resources to a few essential instruments to maximize output and impact, to invite Participating Research Teams to operate under-funded

and under-staffed instruments and to pursue funding similar to the one the Pohang Light Source receives from the government to help users and improve the facility. After losing a big chunk of funding and a few essential staff members, the neutron beam facility at HANARO is in a critical condition. Stakeholders have risen to face the challenges, and hopefully, the facility regains its premier status soon.

In 2019, HANARO will host the AONSA neutron school and the IAEA Training Workshop on Neutron Imaging. The dates are not fixed yet.

***Beam is on after almost 4 years since HANARO was shut down in July 2014.***



***Participants of the KNBUA+NSC Join Brainstorming pose for a group photo. (courtesy: June-Hyuk Lee)***



**Sungil PARK (KAERI)**

## Report from China Advanced Research Reactor

The China Advanced Research Reactor (CARR) is a high-flux and multipurpose reactor, located at the campus of China Institute of Atomic Energy in Beijing. The reactor has been able to run safely and reliably for about 75 days most of the time at 30MW since January 2018.

Two new cold neutron spectrometers, Multi Axis Crystal Spectrometer (博雅) and Cold Triple Axis Spectrometer (行知) got their final technical acceptance on Feb 25th 2019 and are now in operational mode. These two instruments belong to the collaboration project with Renming University. The neutron results show that the performance of the two instruments are very well. There are now 11 instruments under operation at CARR in total. Another seven instruments are under construction or testing.

Although the neutron beam time supplied by CARR was very limited, many experiments, including diffraction, spectrometers, SANS, imaging, neutron activation analysis, have been carried out by both internal researchers and collaborators from other universities and institutes. And more scientific research papers have been published. Part of the neutron beam time has also been used for optimizing the instruments.

**Kai Sun (CARR)**



Figure 1. The Cold Neutron Triple Axis Spectrometer at CARR



Figure 2. The Multi Axis Crystal Spectrometer at CARR

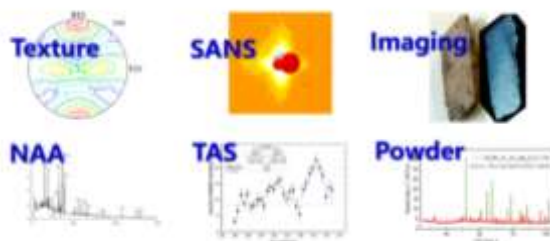


Figure 3. Some results of different kinds of neutron experiments carried out at CARR



## Report from China Spallation Neutron Source

After first round commissioning with beam power of 20 kW and partial opening to users, CSNS started to increase the beam power to 50 kW from December 2018. By the end of December, the beam single-pulse with the equivalent power of 50 kW reached. The beam supply was resumed on January 1, 2019 and the beam power increase steadily. The beam power was increased to 32 kW on January 4th, to 42kW on January 16, and finally to 50kW on January 29th. CSNS have been running at 50 kW with availability of ~92.5% since then.

In the first two rounds of open operations, a total of 89 proposals were approved from 138 applications.

Up to now, more than 80 user research projects have completed, 9 papers are published or accepted.

The third round of proposal call has been opening (the second half of 2019, the experiment time from September 26, 2019 to January 16, 2020).

GPPD neutron diffraction was employed to investigate the structural-dimensionality effect on the lattice oxygen redox (l-OR) in combination of other neutron and X-ray data. In contrast to the Li-rich TM oxides with 2D-ordered cation structure, the Li-rich TM oxides with 3D-disordered cation framework show a relatively stable oxygen lattice structure accompanying the l-OR. This finding is explained based on the different spatial distribution of unhybridized O 2p orbitals in the different structure dimensionality (Zhao Enyue, *et al. Angew. Chem. Int. Ed.* 2019, 58, 1–6). GPPD is also employed to determine whether a helical magnetic structure exists in MnNiGa biskyrmion system (Li Xiyang, *et al. Adv. Mater.* 2019, 1900264). Interface Induced Enhancement of Inverse Spin Hall Voltage in NiFe/Pt Bilayers Capped by MgO layer by the reflectometer RM (Zhu *et al* 2019 *J. Phys.: Condens. Matter*). The amorphous-to-crystalline phase transformation in Zr-, Fe- and Pd-based bulk metallic glasses was observed by SANS machine. The 1<sup>st</sup> review meeting of CSNS S&T committee was held on November 27, 2018 (Fig. 1). It is concluded that the overall plan to construct the

user's instruments and the preliminary plan of the second phase of the project were reasonable and feasible although it is quite challenged to build a state-of-art instrument in 2-3 years. CSNS is also demanded to reach the beam power of 100 kW as soon as possible with high stability and availability in order to serve users efficiently. A meeting to evaluate the 2019 operational plan was held on March 22, 2019.



Figure 1. The First CSNS Science and Technology Committee Review Meeting

In order to strengthen the relationship of the users, a series of workshops and symposiums have been organized. On December 8, 2018, a workshop on the application of neutron science and technology in combustible ice was held. More than 70 experts from 25 universities and institutes attended this meeting (Fig. 2). Another workshop on the application of neutron science and technology in the field of batteries was held on January 16, 2019. More than 60 experts from 28 universities and institutes attended the meeting. Discussion facilitate the fuse of multidisciplinary intersect and will further promote the application and development of neutron technology in the research of basic science and engineering of clean energy materials.



*Figure 2. Workshop on Neutron S&T in Combustible Ice*

Three international advisory committee (IAC) meeting of user instruments have been held in the past half year for the further optimization and engineering construction of three specific user instruments. The IAC meeting of Very Small Angle Neutron Scattering (VSANS) was held In January 24-25; the IAC meeting of the Engineering Materials Diffractometer (EMD) was held in April 24-25; and the IAC meeting of the Energy-Resolved Neutron Imaging Instrument (ERNI) was held from April 30 to May 1. Experts from domestic and foreign universities and research institutes were attended, they made comments and suggestions on the overall design and key parameters of the instruments.



*Figure 3. International Advisory Committee of Energy-Resolved Neutron Imaging instrument*

A McStas Training Course, given by Dr. P K Willendrup, E B Knudsen and M Bertelsen of Technical University of Denmark, was held in March 25-29 in CSNS campus. More than 30 young staffs and students from CSNS, CARR and CMRR attended the training.

May 19 was the CSNS public open day with the theme "Small Particles Make the Big World". Nearly 6,000 people took a whole visit tour to CSNS machine including of LINAC, RCS, target station and neutron instruments, and listened four popular science lectures: Neutron- The eye of microscopic world by Dr. Junrong Zhang, The secret of the accelerator by Dr. Weidong Chen, BNCT- A new weapon for exploring cancer treatment by Dr. Tianjiao Liang, and From the mysterious pyramid to the mysterious muon by Dr. Yu Bao. It produced a wide range of social impacts.

**Fangwei Wang (CSNS)**



*Figure 4. Public tour in CSNS scattering hall*

# National Facility for Neutron Beam Research (India) - Facility Report

## Neutron as a probe to study of magnetization compensation in $\text{Li}_{0.5}\text{FeCr}_{1.5}\text{O}_4$ spinel ferrite

Lithium ferrite is known to have applications in microwave devices, magnetic recording, transformer cores, magnetic liquids, and lithium batteries. Spinel lithium ferrite doped with chromium,  $\text{Li}_{0.5}\text{FeCr}_{1.5}\text{O}_4$  has shown the phenomenon of magnetization compensation below room temperature [Fig. 1]. We have employed neutron depolarization and neutron diffraction techniques to get mesoscopic and microscopic understanding of the phenomenon of magnetization compensation in  $\text{Li}_{0.5}\text{FeCr}_{1.5}\text{O}_4$  [1]. The compound shows two compensation temperatures ( $T_{\text{Comp}}$ ) under both field cooled cooling (FCC) and field-cooled warming (FCW) modes of dc magnetization

measurements for  $H < 500$  Oe, and the two  $T_{\text{Comp}}$  merge at 256 K for  $H \geq 500$  Oe. Transmitted neutron beam polarization measurement [under  $H = 50$  Oe] has revealed zero domain magnetization around the two  $T_{\text{Comp}}$ . Temperature dependent neutron diffraction patterns [Fig. 1] have been analysed to yield net moment variation across the  $T_{\text{Comp}}$ . The derived asymmetric variation of the sublattice moments as a function of temperature has revealed the microscopic origin of magnetization compensation in  $\text{Li}_{0.5}\text{FeCr}_{1.5}\text{O}_4$  [1]

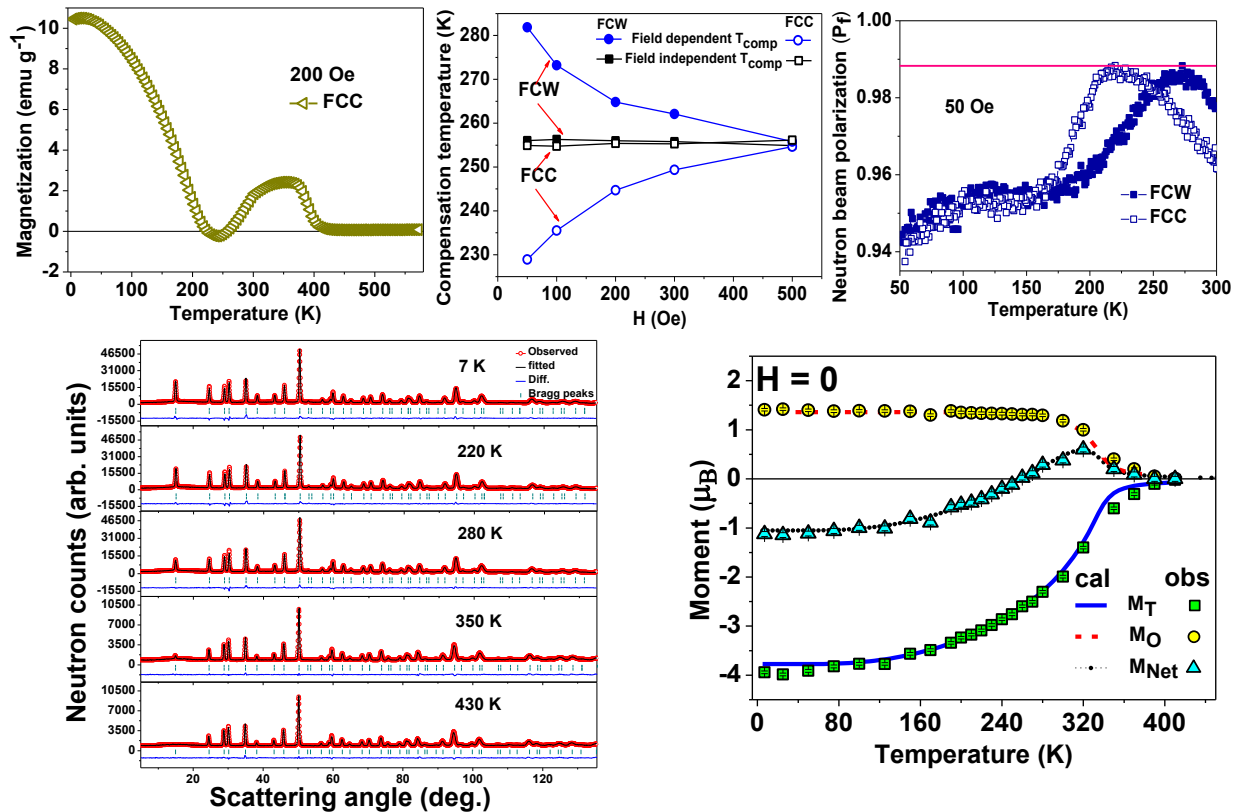


Fig 1. (Top panel) (Left) dc magnetization curve showing magnetization compensation in  $\text{Li}_{0.5}\text{FeCr}_{1.5}\text{O}_4$ . (Middle) Variation of two  $T_{\text{Comp}}$  as a function of magnetic field. (Right) Neutron depolarization data for FCC and FCW modes of measurements. (bottom panel) (Left) Neutron diffraction data at various temperatures showing evolution of magnetic ordering. (Right) Temperature variations of ordered magnetic moments of tetrahedral site ( $M_T$ ), octahedral site ( $M_O$ ), and net magnetic moment per formula unit ( $M_{\text{Net}}$ ) extracted from the Rietveld refined neutron diffraction patterns.

[1] M Ghanathe, A Kumar, SM Yusuf, Journal of Applied Physics 125 (9), 093903 (2019).



## Structure of $x\text{MoO}_3-(100-x)\text{TeO}_2$ glasses by neutron diffraction and Reverse Monte Carlo modeling

Heavy metal oxide tellurite glasses are excellent materials for third harmonic generation and optical fiber applications.  $x\text{MoO}_3-(100-x)\text{TeO}_2$  glasses have wide glass forming range and form clear and transparent glasses in the bulk form easily. There are contradictory findings in the literature on the Mo–O speciation in molybdenum tellurite glasses, and it is unresolved issue that whether molybdenum ions exist in octahedral or in tetrahedral co-ordination with oxygen in the glass network. Short-range structural properties of glasses of the system:  $x\text{MoO}_3-(100-$

$x)\text{TeO}_2$  ( $x = 20, 30, 40$  and  $50$  mol%) were studied by neutron diffraction [1]. The diffraction data were modeled by Reverse Monte Carlo (RMC) simulations and the partial pair correlation distributions: Te–O, Mo–O, O–O bond lengths/distances, Te and Mo speciation and the bond angle distributions were determined to resolve Mo–O coordination to be about 4.

S. M. Yusuf (NSSI)

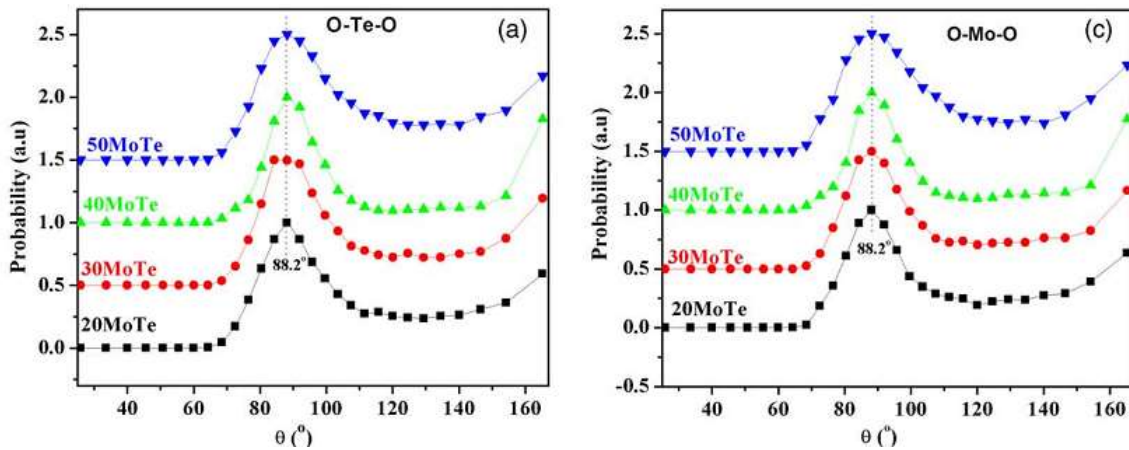


Fig.1. O-Te-O bond angle distributions from the RMC modeling of the neutron diffraction data

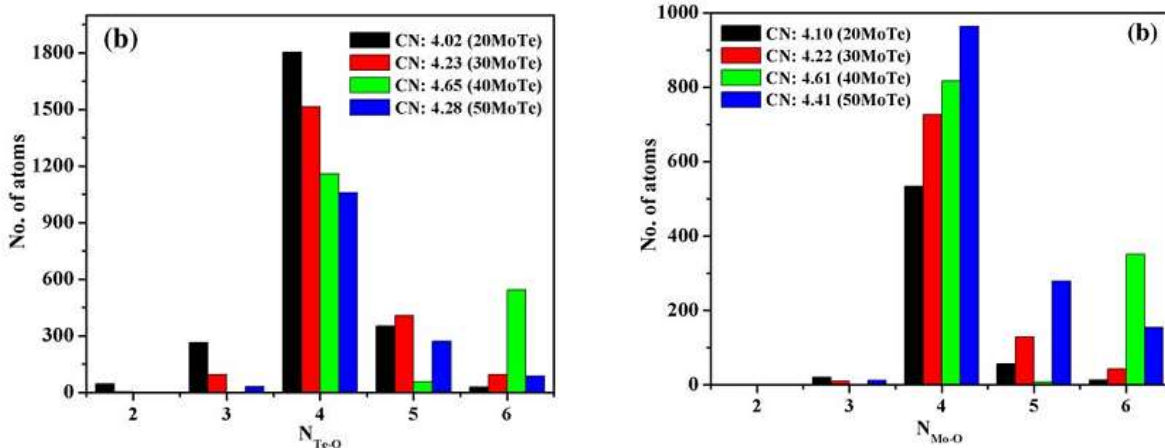


Fig.2. Te-O and Mo-O co-ordinate distributions from RMC modeling of neutron diffraction data

1. Atul Khanna, Amandeep Kaur, Margit Fábíán, P S R Krishna and A B Shinde, Mater. Res. Express 6, 075211, [2019]

## BATAN's Neutron Scattering Laboratory - Facility Report

BATAN Neutron Radiography facility is participating in the IAEA Round Robin Samples to determine the resolution of radiographs and tomograms. Figure 1 shows the round-robin sample that has been examined. At present the data from the measurements are under study and analyzed.



*Fig. 1. IAEA Round-Robin sample to determine resolution of Neutron Radiography.*

At March 6, 2019 located in BATAN Serpong, Center for Science and Technology of Advanced Materials - PSTBM, held a Focus Group Discussion - FGD on Neutron Scattering Application for Advanced Material Research, Industrial Materials, and Maritime Products. The objective of the FGD was to introduce neutron scattering techniques and facilities to various parties, i.e. Universities, Ministries, and Industries, and to encourage the development of synergic cooperation between Academic - Business - Government on fundamental understanding of materials based on neutron scattering characterization techniques. This FGD was carried out to support and implement the efforts of PSTBM in order to produce new innovations based on the results of fundamental research (From Basic Knowledge to Innovative Solutions). The FGD was opened by the Deputy of Head of BATAN, and attended by the Director of PSTBM, Director of Multipurpose Research Reactor, researchers, staffs from Research and Management officials, and stakeholders

coming from Universities, Ministries, and industries of manufacture and oil and gas. Figure 2 shows opening session of the FGD by the Deputy of Head of BATAN on Science and Application of Nuclear Technology.



Prof.Dr. Ir. Efrizon Umar, MT, selaku Deputi Bidang Seins dan Aplikasi Teknologi Nuklir membuka dan langsung memberikan arahan dalam FGD: Aplikasi Neutron Scattering untuk Litbang Material Maju, Bahan Industri, dan Produk Kemaritiman.

*Fig. 2. Focus Group Discussion - FGD on Neutron Scattering Application for Advanced Materials Research, Industrial Materials, and Maritime Products.*

Figure 3 shows an example of utilization of Neutron Diffractometer for residual Stress analysis by two of users coming from university. The activity is one example of the implementation of the aforementioned FGD.



*Fig. 3. Two PhD students from University of Indonesia performed residual stress measurements using Residual Stress Neutron Diffractometer*

Dr. Iwan Sumirat, Head of BATAN Neutron Scattering Facility attended the IAEA Technical Meeting on Neutron Scattering and Spectroscopy

with Low and Medium Flux Neutron Sources at its Headquarters in Vienna, Austria, from 13 to 16 May 2019. The purpose of the meeting was to bring together practitioners, users and other stakeholders interested in neutron beam scattering and neutron spectroscopy techniques from both research reactor and accelerator-based neutron sources in the low and medium neutron flux range, and to share information on existing experience, good practices, lessons learned and the challenges related to those techniques. The meeting was attended by 16 participants from 14 Member States that own and operate research reactor or

accelerator-based neutron sources with medium and low neutron flux, used for neutron scattering or neutron spectroscopy, or are planning or establishing a new neutron scattering or neutron spectroscopy facility. Figure 4 shows photo session of the meeting of all participants and the IAEA officials of the Physics Section of the Department of Nuclear Applications.

**Iwan Sumirat**  
BATAN



*Fig. 4. IAEA Technical Meeting on Neutron Scattering and Spectroscopy with Low and Medium Flux Neutron Sources, Vienna May 13 - 16, 2019.*



## Reports on 17th Japan-Korea Meeting on Neutron Science

The 17th Japan-Korea Meeting on Neutron Science was held in Daejeon, Korea from 2019. 01. 07 (Mon) to 09 (Wed) for three days. This meeting has been held annually in Korea and Japan, alternatively, since 2000. This has been continued for 20 years with the name of the Korea-Japan (KJ) meeting when held in Japan and the Japan-Korea (JK) when held in Korea, respectively. During the last meeting, there were 24 oral presentations (14

from Japan and 10 from Korea) and 14 poster presentations (5 from Japan and 9 from Korea) including the special session of the soft-matter field, which was organized by Prof. Soohyung Choi (Hongik Univ.), Prof. Jaseung Koo (Chungnam Nat'l Univ.), and Prof. Kenji OHYAMA (Ibaraki Univ.).



Last time, 24 people from Japan and 64 people from Korea attended. It was the most successful meeting in terms of the number of attendees so far. There was also a business meeting in the middle of the meeting. The Japan-Korea joint research activities were reported and the location and schedule of the next meeting were discussed. For Japan-Korea collaboration activity, (1) the 2nd Japan-Korea Joint Workshop on Polarized Neutron Reflectivity (PNU) was held from 2019/01/06 to 07 by Dr. Miyata, Hanashima (CROSS, J-PARC) and Prof. Jeon, and Park (PNU). (2) Tohoku University and KAERI made an agreement to collaborate on neutron science and instrumentation. (3) Funding proposals have been jointly submitted to both NRF of Korea and JSPS by Prof. Seto and Prof. Taehwan Kim. The next business meeting will be held during AOCNS 2019 in November 2019. The 18<sup>th</sup> Korea-

Japan meeting will be held in January 2021 in Japan. Korea and Japan have concluded that they will continue to make efforts on collaboration on neutron science between the two countries.

**Jaseung Koo (Chungnam National University)**