

From Bern to Beijing: Cultivating Collaboration for the Excellence of Space Science

– At the Third Anniversary of the International Space Science Institute - Beijing

By XIN Ling (Staff Reporter)



Prof. Maurizio Falanga, science program manager of the International Space Science Institute (ISSI) and founding executive director of ISSI-Beijing.



Just a couple of kilometers east of Zhongguancun, the heart of China's Silicon Valley, another hot summer day is building momentum as the sun scorches the 12-story-tall, grayish home to the National Space Science Center (NSSC) of the Chinese Academy of Sciences (CAS). Walk to the southern end of the third floor, and there appears a meeting room not much different from any other meeting rooms you will run into at a research institute. Next to the windows is a long conference table surrounded by black swivel chairs. Along one wall, things are arranged in order: a book shelf, a tea table, a counter that bears a coffee machine and a mini fridge. The room is lit up by colorful, eye-catching posters sprawling over the walls: from the solar eruptions forum to the gamma-ray bursts workshop, they lure visitors to slow down, and chat over a cup of coffee or tea about the most baffling phenomena in our universe in a most relaxed way.

However, for those who have been to the International Space Science Institute (ISSI) in Bern, Switzerland, as soon as they walk in here, they will feel familiar and warm. As the only partner of the world-renowned space science "platform" ISSI, ISSI-Beijing not only has inherited the office layout of its headquarters 8,000 km away, but is striving to follow Bern's pursuit of scientific excellence and its motto: small is beautiful.

Based at NSSC with a daily working area of around 100 m², ISSI-Beijing has achieved much more than expected since its inauguration in July 2013. During the first three years of operation, it attracted over 500 international scientists to participate in its scientific activities. With only five staff members, it successfully implemented 11 active international teams, nine forums, four scientific seminars, three workshops, and six public seminars. As ex-director of ISSI and co-founder of ISSI-Beijing Roger-Maurice Bonnet puts it, "although very young, ISSI-Beijing can be considered an outstanding success."

Sowing a Swiss Seed in the Chinese Soil

Back in 1995, ISSI was set up by the European Space Agency (ESA) and the Swiss government as a platform for scientists from all over the world to meet and explore into the experimental data collected by previous space missions, so that the scientific community can make the best use of those outcomes in a continuous way.

From the very beginning, ISSI is extremely open and flexible. The science at ISSI is diverse, covering all related disciplines from the physics of the solar system and planetary sciences to astrophysics, cosmology, Earth

The Workshop on "Gamma-Ray Bursts: A Tool to Explore the Young Universe" was held at ISSI-Beijing from April 13 to 17, 2015.



sciences and astrobiology. To help people from different academic backgrounds and countries come together, ISSI has adopted various organizing “tools” to facilitate collaboration. For instance, a Workshop usually focuses on a specific scientific theme, lasts for a week with around 45 invited attendees, and ends up publishing a collection of papers generated from the workshop. A Forum, however, is less formal and features free debates on open questions of scientific or science policy nature, with 20–25 participants over two days’ time. There are also Working Groups, International Teams and Visiting Scientists programs for researchers who want to spend a period of time at ISSI, between a few weeks and several years.

After over 20 years of endeavor, ISSI has established itself as one of the world’s leading institutions for facilitating space science research. In total, more than 4,500 scientists from 50 countries have visited or worked at ISSI, with 60 and 13 technical books, reports and hundreds of articles published in international peer reviewed journals.

“Science-led only, multidisciplinary, international, and neutral – these are the key elements of ISSI’s success,” says Maurizio Falanga, who is ISSI’s science program manager and founding executive director of

ISSI-Beijing.

The idea of creating ISSI-Beijing came up in the fall of 2011, when Wu Ji, director general of NSSC, paid his first visit to ISSI in Bern. He was so surprised to see that “such a small organization, with less than 20 staff members, can attract nearly 1,000 top-level scientists every year to do cutting-edge research and discuss frontier topics together”.

At that time, NSSC was developing China’s first space science satellites under the 12th Five-Year Plan framework (2011–15), and just started thinking about what to do after that. “We already had several thoughts, and were eager to present them to the international community and hear what they say about these candidate programs,” Wu says.

At the end of his trip, Wu couldn’t help wondering how his friend Bonnet, who was then executive director of ISSI, would like the idea of having a twin institute of ISSI in the Chinese capital.

“ESA and ISSI have a long-lasting friendship with our Chinese colleagues, especially with Prof. Wu,” Bonnet tells BCAS. As he recalls, around that same time, ISSI was conducting an “internal reflection” on how to extend its activities without any increase in premises, staff and budget – to stay “small and beautiful”.

A new agreement of cooperation is signed between NSSC director general WU Ji and chair of the ISSI Board of Trustees Rosine Lallement on October 23, 2015 to continue ISSI-Beijing for another three years.





The discussion between the two directors turned out to be very constructive. Soon, the notion reached the ISSI board and was found to be an interesting concept worthy of further studies. Following the visit of an ISSI delegation to Beijing and the signature of a Memorandum of Understanding in February 2012, ISSI-Beijing was officially inaugurated on July 16, 2013.

“Space science is a rapidly developing and expanding enterprise in China,” says Falanga. “ISSI-Beijing was established in the right place at the right time.”

It was decided that both institutions should use the same management structure, share the same scientific committee and tools, but work with independent operational methods and funding sources. The financial support of ISSI-Beijing would mainly come from the Bureau of International Cooperation and the Strategic Priority Program on Space Science of CAS, as well as from NSSC.

Fostering the Future of Space Science in China

Since ISSI and ISSI-Beijing were set up to address respective problems of the European and Chinese space science programs, they have different goals by nature. In Europe, there are plenty of scientists and plenty of data coming from past space science satellites, so ISSI was created to re-analyze those data to address new problems. In China, however, there exist large numbers of scientists but not yet a large number of missions, and ISSI-Beijing is more focused on the development of future space science activities.

Soon after ISSI-Beijing was founded, it was asked by CAS to help with the international evaluation of eight candidate space science missions slated for launch before 2030. They include the X-ray Timing and Polarization (XTP) mission, the Space Very Long Baseline Interferometry (SVLBI) mission, the Magnetosphere, Ionosphere and Thermosphere (MIT) mission, the Solar Polar Orbit Telescope (SPORT), the Einstein Probe (EP), the Space Micro-arcsecond Astrometry to Search for the Terrestrial Exo-Planets (STEP) mission, the Advanced Space-based Solar Observatory (ASO-S), and the global Water Cycle Observation Mission (WCOM).

As a result, from 2013 to 2014, director Falanga and his team organized a forum at ISSI-Beijing for each of these missions, eight in total, which were assessed one by one with the highest level of experts in the field. The discussions were conducted in a “completely open way,

without any pressure from anybody”, and fully reflected ISSI’s “neutrality and science-only spirit”, says the director – “you know, not just the people working with the missions talking about what they want, but also what the limits are, what can be improved and so on.”

The forums played a key role in optimizing the scientific objectives of the missions, promoting their visibility, and even building international collaborations. “And putting its future space science missions on an international platform shows the determination of China, in becoming a world power, to open up to the world and contribute to the general interest of humanity”, Falanga remarks.

Meanwhile, ISSI-Beijing is also carrying out general research similar to that of ISSI. For instance, a workshop on astronomical distance determination was held in May 2016 bringing together 45 top researchers as well as promising young scientists from all over the world for a week-long discussion in Beijing.

Richard de Grijs, an astrophysicist at Peking University who is also a disciplinary scientist at ISSI-Beijing and convener of the workshop, says that he was happy to organize such a large-scale and high-level workshop, under ISSI-Beijing’s high reputation, to discuss the progress of the whole field. Now his work is to compile an eight-chapter book, as the main outcome of the workshop, which will be written by the workshop’s participants and published in 2017 “to hopefully set a new standard in the field”.

ISSI-Beijing has also extended to the local general public, jointly sponsoring an outreach program called “Understanding Science” with the Royal Society of Chemistry and the Institute of Physics. By far, ISSI-Beijing has organized nearly ten “Understanding Science” sessions, inviting world-renowned scientists to give seminars over a wide range of topics in Cafe places in Beijing, and giving a unique experience to its audiences from across the city.

“The recruitment of Prof. Falanga as the first executive director has been essential in the starting phase of ISSI-Beijing”, says Bonnet.

“I’m always impressed by Maurizio’s dedication to work,” echoes Wu. “I’ve seen him put into practice every commitment he made for ISSI-Beijing. Thanks to his efforts, ISSI-Beijing is able to take shape in the shortest time possible. He is irreplaceable for this institute.”

In 2015, a reviewer committee was convened to assess the performance of ISSI-Beijing for the first two years of operation. “It is remarkable that in this very short time, all



The International Team on “Coronae in the X-ray Flashlight” working together at ISSI-Beijing in May 2015.

the main tools that have worked so well for ISSI Bern are in place and operating in Beijing,” the reviewers wrote in their report. “The quality of activities is consistently very high, the output is competitive, and most importantly they have fulfilled the demand of the host nation. The future of ISSI-Beijing looks extremely bright.”

Towards a Better Future of ISSI-Beijing

It is almost the noontime of July 13, 2016, when Falanga is working in his ISSI-Beijing office for the last day of his directorship. With his favorite radio station on and a cup of tea steaming on the table, the director is busy writing emails to invite speakers and arranging courses for an upcoming ISSI-Beijing summer school in Thailand with the theme “how to design a space science mission”.

He has quite enjoyed his time in Beijing, Falanga says. Despite the pressure from frequent travelling and a young family to take care of, “being convinced that I’m doing the right thing” brings him to where he is three years after Bern entrusted him as the first helmsman of its Oriental venture.

“I will miss Beijing and come back to visit when there is a chance”, he says.

Raising ISSI-Beijing like his own daughter, who is also almost four years old, the director has not only laid a solid foundation for ISSI-Beijing but also blueprinted its future. For instance, the scientific activities of ISSI-Beijing will be scaled in proportion to its budget, including supporting 5–6 international teams per year, inviting scientists to spend a short period of time in Beijing for specific studies, organizing space science schools for students and early-career scientists, and increasing the scientific staff of ISSI-Beijing.

Still, the future can be challenging for such a young and special institute. First, it needs to attract more high-end Chinese scientists who are now deeply involved in their own missions at their home institutes. They are leading these important missions, and their work is driven more by the task or project rather than science itself. Engaging these researchers in ISSI-Beijing’s activities will help them produce more science.

As for funding, finding a stable and more independent financial source is essential for the future of ISSI-Beijing.



Swiss astronaut Claude Nicollier gives an *Understanding Science* talk on “Hubble: 25 Years of Utilization and On-Orbit Serving” in Beijing on July 6, 2015.

In the first three years, most of the institute’s revenue came from CAS and NSSC. Only in 2014, about 26% of the income was from outside sponsors through NSSC. New and potential sponsors include the Asia Pacific Space Cooperation Organization (APSCO), ESA (in-kind support), and the Japan Aerospace Exploration Agency (JAXA) who is supporting ISSI-Beijing through ISSI in Bern. But for maintaining long-term development and scientific neutrality of ISSI-Beijing, “this is obviously not enough,” says Wu.

What needs to remain independent is not only ISSI-Beijing’s funding but also its “identity”. While localization seems to be inevitable for many foreign institutions in China, ISSI-Beijing is expected to stay as an international organization – not a substructure of NSSC though administratively affiliated to it. “The more independent ISSI-Beijing is, the more it can benefit NSSC, CAS and China,” Wu insists. “The last thing we’d like to see is ISSI-Beijing localizes itself to a part of the Chinese institution and loses its identity as a neutral and science-only platform.”

ISSI-Beijing should stay unique, especially its casual, informal way of discussion. “Just not the traditional Chinese way,” Wu warns. For instance, the meeting room doesn’t have to be big; all participants, senior or junior,

should sit closely together and speak whenever they want to. “This is how it works at ISSI and how it should be working here too.”

To everyone’s delight, the reputation of ISSI-Beijing has accumulated quickly. In recruiting the next executive director, the ISSI-Beijing board had received altogether nine applications from around the world. After a strictly controlled selection procedure, Michel Blanc, who has been working as a disciplinary scientist at ISSI, was chosen to succeed Falanga and lead ISSI-Beijing starting from October 2016.

“Michel will bring his scientific expertise, especially in the field of planetary science and plasma physics,” Bonnet notes. “He knows very well ISSI, as well as ISSI-Beijing and his proceeding executive director. I think he has many elements which will continue and expand what Maurizio has already successfully achieved and implemented.”

In the foreseeable future, ISSI-Beijing will attract more space scientists to meet and work in Beijing. Right here at NSSC, people will see the highest level of space science in China, the most open attitude for collaboration, and the dedication of both Chinese scientists and the Chinese government to contributing to a better future of the space enterprise for all mankind.