

Spreading the Knowledge among Society about Space Science An Interview with Prof. Álvaro Giménez and Prof. Maurizio Falanga at the Science Seminar “Life in the Universe” by Iana Grytsenko (Belt-and-Road Space Education)

The GoTaikonauts! Team took the opportunity to speak with Prof. Maurizio Falanga, Executive Director of ISSI-Beijing and Álvaro Giménez, Professor for Astrophysics at the Spanish National Council for Scientific Research (CSIC), to discover more about the current challenges and progress in the field of space science. The interview took place during the informative event “Understanding Science Seminar” at the International Space Science Institute - Beijing on 5 December 2019.

懂 Understanding Science
Scientific seminars for the general public

LIFE IN THE UNIVERSE

THURSDAY, DECEMBER 5, 2019
7:00 PM
TusStar Coffee, 8108 Building C (Floor -1), Tsinghua Science Park,
No. 1 Zhongguancun East Rd, Haidian District, Beijing
启迪之星创业咖啡, 北京市海淀区中关村东路1号清华科技园大厦C座
8108(地下1层)

Food & drinks are included
Limited seats: first come, first served

Free Entrance

Prof. Alvaro Giménez
Director General of the Foundation of the Spanish National Research Council (CSIC), Spain

We only know for sure about the existence of living organisms on our own planet, but this is an extremely small part of our galaxy, let alone of the Universe. In parallel, our Solar System is being explored to find out the limits of habitability that could be applied to other, more distant worlds. The discovery of more than 4000 extrasolar planets shows their diversity and actual necessity of the rules of nature? Are we alone? The discovery - 25 years ago - of an extrasolar planet around a solar-type star opened a new field of research in astronomy and the search of Earth-like planets around other stars that may even harbor some kind of life.

“Are we alone?”

Prof. Alvaro Giménez is a senior astrophysicist and the current Director General of the Foundation of the Spanish National Research Council (CSIC), Spain. He has collaborated with the Universidad Complutense de Madrid, the National Institute of Aerospace Technology (Spain), and the European Space Agency (ESA), among others. From 2011 to 2018, he took up duty as the Director of Science in ESA. With several books and more than 200 scientific articles published, his areas of interest include the history and philosophy of astronomy, astrophysics, and space instruments. His research has also focused on the internal structure of stars through the analysis of eclipsing binaries.

Álvaro Giménez is Professor of Astrophysics at the Spanish National Council for Scientific Research (CSIC). He works since 17 years for the European Space Agency (ESA) where he served as the former Director of Science at the establishment in Noordwijk ESTEC. Currently he is the Science Policy Coordinator in the ESA Director General's Cabinet in Paris.



Prof. Giménez. Credit: Iana Grytsenko

Professor Giménez, what is your motivation to give a talk in Beijing?

Giving a talk in Beijing is part of my commitment to connect space science with our society in general, and the opportunity offered by ISSI-Beijing during one of my regular visits to China, could not be missed.

How was your talk perceived by the audience?

I think the audience got the main point of the current status of research in the field of astrobiology, and was excited by the new challenges in the search for life beyond the Earth. The questions received after the talk clearly showed the connection with the big questions of science today.

What is your impression of ISSI-Beijing?

ISSI-Beijing is a great initiative for the promotion of international cooperation in space sciences for China. ISSI-Beijing keeps a high level of international standards, allowing upcoming scientists feel like at home, share data and projects.

You have been ESA's Director of Science and you are now Science Policy Coordinator in the Director General's Cabinet. How do you evaluate the chances for closer European space science cooperation? We are aware of the cooperation for Double Star,¹ for the Earth Observation Dragon Programme,² for the Chang'e lunar missions³ and currently for SMILE.⁴ However, considering the size and scope of science in Europe and now also in China: Could there be more possible?

I have been personally involved in the developing of cooperation between Europe and China in space sciences, particularly in the SMILE mission which is currently under development. Nevertheless, future cooperation opportunities are possible and looked for. For instance, the European involvement in the Chinese-led Einstein Probe mission⁵ has been approved.

On 5 December 2019, ISSI-Beijing (ISSI-BJ) - the only partner of the world-renowned space science “platform” of the ISSI-Bern, organised and facilitated a public event for experts from space and science fields and non-experts to reflect on space science-related questions. This meeting was at TusStar Coffee in Haidian District, Beijing, where with a great atmosphere Prof. Álvaro Giménez gave the scientific lecture on “Life in the Universe”. After the presentation, the audience took the opportunity to ask questions.

It should be noted that many people believe that this casual meeting helped to spread the knowledge and achieve a closer integration of science and society.



Credit: Iana Grytsenko



Prof. Falanga. Credit: ISSI

The social event started with the warm welcome message given by Prof. Maurizio Falanga, Executive Director of ISSI-Beijing (ISSI-BJ).

Prof. Falanga took up duty as ISSI-BJ Executive Director in 2012, right after the establishment of the institute. Since then, he has served a 4-year term from 2012 to 2016 and then from 2017 to 2019 (ad interim). Since he has left office at the end of 2019, we have seized the opportunity to ask him about his experience working at ISSI-BJ.

Which milestone achievements could ISSI-Beijing record during the last years?

I personally identify ISSI-BJ's achievements in two categories. First of all, I am happy to say that ISSI-BJ is currently able to connect with high-level agencies and prominent scientists to promote innovative scientific activities in Beijing. Secondly, in addition to the ISSI-BJ tools which are shared with ISSI in Bern, ISSI-BJ has inaugurated two novel assets, i.e. the TAIKONG Magazine - ISSI-BJ forum-related output - as well as its biennial Space Science School. To be more specific, I deem we have achieved a sustainable development of our organisation which turned it into a reliable and stable institution in the international scientific landscape. As the field of space science research is moving fast, we need to keep up with the pace and make continuous progress to support and promote space scientists efficiently and thus preserve a good reputation.

Considering the big recent successes of Chinese space experts in quantum communication,⁶ lunar exploration⁷ and dark matter research,⁸ what can be expected next? Is China marching ahead of other nations?

I think that the recent successes of China's space research and missions can hardly be compared with the extensive experience gathered by other countries in the space science field, and the reasons why are very simple. China's accelerated programme began in 2003 with the triumphant flight of the Shenzhou 5 and on 29 September 2011, with the launch of Tiangong 1, making China the third country in the world, after Russia and the USA, to possess the capability of sending human into space independently; nonetheless, ESA and NASA's first space missions trace back to the 1960's. Therefore, both parties have made the most out of the legacy bequeathed by a long line of explorers throughout history, but in the space science field, this has happened at different times.

The cornerstone European Rosetta Mission launched its satellite ten years ago to reach and perform a series of manoeuvres around the Comet 67P/Churyumov-Gerasimenko, to go into orbit around and eventually land on it. Furthermore, the Science Programme Committee (SPC) in Europe has been looking for and measuring gravitational waves traveling through space since a long time, opening a completely new window for general relativity testing. For these reasons, I think that the recent progress made by Chinese space programmes cannot be equated with other countries' achievements, e.g. Europe's missions and studies or NASA's six decades of experience. It cannot be denied, though, that China's recent attainments have opened the way to becoming a key player in the space science field, as the country is putting a lot of efforts in space studies' activities and investing a relatively considerable budget in space science programmes, projects, research, and innovation. Moreover, it has proven to be open to international cooperation with Europe in order to achieve common goals, as cost-sharing and joint efforts are important steps to advance in scientific as well as technological research. Thus, China is on the right path to march ahead of other nations in space science programmes.

Would you dare a forecast for the future? With respect to space science, which direction into the future is China going? Which role will international cooperation play?

I think that to become a key player and be able to compete with the main space agencies around the world, significant investments in innovation should be made. They need to find what is the space science to be the first.

In my opinion, the Chinese lunar programme has a clear direction and strong ambitions, thus showing China's super power, but at the same time, such ambitions are also very costly and a bigger role ought to be played by the cooperation with international actors. Even though results in space science are clearly something to be proud of, an equilibrium between national interests and the international framework should be found to not stir up tensions and competition, as space research requires combined efforts and resources to advance and to avoid the too familiar "space race" scenario. Furthermore, joint accomplishments do also considerably increase a country's power and prestige, therefore making an international space station a more valuable asset than a single-country space station.

Finally, one decade of space science research and missions is just the positive beginning of a fruitful journey towards a successful positioning in space. By looking at other country's experiences, it seems to me that coherence, stability, and striving toward a sustainable development constitute the



Prof. Giménez is giving his talk at the "Understanding Science Seminar" at the International Space Science Institute - Beijing on 5 December 2019. Credit: I. Grytsenko

1) The agreement for cooperation on Double Star on 9 July 2001 was signed at the European Space Agency's Headquarters in Paris.
2) The European Space Agency ESA, together with the National Remote Sensing Centre of China (NRSCC) have cooperated in the field of Earth observation application development. Three-year Earth Observation exploitation programme called Dragon (2004 to 2007) focuses on science and applications development in P.R. China using mainly data from the ERS and Envisat missions.

3) A series of successful lunar missions began on 24 October 2007. CNSA has sent a host of spacecraft to the Moon as part of the Chang'e programme, named after the Chinese goddess of the Moon.
4) The Solar Wind Magnetosphere Ionosphere Link Explorer, or SMILE, is a joint mission between ESA and the Chinese Academy of Sciences CAS. SMILE aims to build a more complete understanding of the Sun-Earth connection by measuring the solar wind and its dynamic interaction with the magnetosphere.

5) The Einstein Probe (EP) is a mission of the Chinese Academy of Sciences (CAS) dedicated to time-domain high-energy astrophysics. Its primary goals are to discover high-energy transients and monitor variable objects.
6) China launched the world's first quantum communications satellite on 16 August 2016, officially known as the Quantum Science Satellite (QUESS) <https://spectrum.ieee.org/tech-talk/aerospace/satellites/china-launches-worlds-first-quantum-communications-satellite>.
7) Chinese Lunar Exploration Programme:

China launched the Chang'e 1 robotic lunar orbiter on 24 October 2007 - for exploring the Moon and is investigating the prospect of lunar mining, specifically looking for the isotope Helium-3 for use as an energy source on Earth.
8) Dark matter is composed of particles that do not absorb, reflect, or emit light, so they cannot be detected by observing electromagnetic radiation. The China Dark Matter Experiment was the first experiment to be hosted at China Jinping Underground Laboratory, beginning construction of its shield in June 2010.



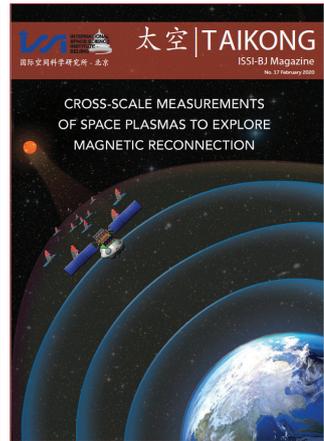
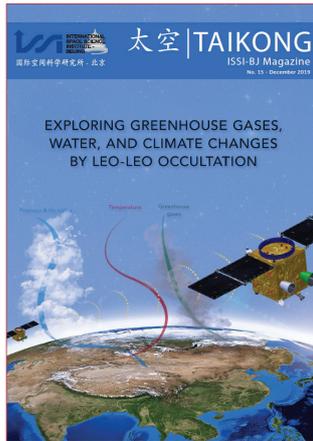
key factors to maintaining high-quality programmes, together with transparency and info-sharing to promote international cooperation and an eventual restructuring of the space science research organisational framework.

Prof. Falanga, we have spoken to you four years ago. How is progress in the meanwhile - how is the work at ISSI-Beijing going?

Very well, I am very satisfied with ISSI-BJ development and progress in the last years, as it was agile and efficient. Up to now, we have hosted a total of five workshops and published their corresponding books - the last one related to the workshop on "Oscillatory processes in solar and stellar coronae" will be

released later this year - 20 Forums and the forum-related TAIKONG magazine issues (TAIKONG means "outer space" in Chinese), 38 International Teams have been approved since 2013, and two Space Science Schools have been organised between 2016 and 2018. Our third one will take place this year.

Last but not least, the participation of the scientific community to our activities has increased steadily over the years, prompting us to strive towards continuous improvement and increasing the visibility of our institute, which we also try to achieve by hosting the Understanding Science seminars for the general public - the thirteenth one took place in December 2019.



The most recent issues of Taikong magazine. Credit: ISSI-BJ