

Jean Coupon
JSPS Bridge fellowship 2017 post-visit report
Thursday June 28th, 2018.

Visit dates: July 3rd to August 15th, 2017

Host professor: Prof. Masahiro Takada, IPMU, the University of Tokyo

I arrived in Tokyo on July 3rd and went directly to Kyoto for a conference (“COSMOS 2017”) at Kyoto University, organised by Yoshihiro Ueda (Kyoto University) and Peter Capak (Caltech). The meeting was about the scientific analysis of a multi-wavelength survey (“COSMOS”) to study the evolution of the galaxies. The meeting lasted for 4 days where I gave a presentation to present my latest results. I could meet with a number of collaborators from Japan and elsewhere. In particular we made progresses about the scientific interpretation of my results, which show that the evolution of galaxies follows very closely that of the dark matter, which is the main component of the Universe and forms the skeleton that supports the formation and evolution of galaxies.

After the meeting, I went to Tokyo. I was hosted by Prof. Masahiro Takada at the Kavli Institute for the Physics and Mathematics of the Universe (IPMU) of the University of Tokyo, located on the Kashiwa campus (Chiba prefecture). Prof. Takada is an expert on gravitational lensing studies, one of the most powerful techniques to study the properties of dark matter using Einstein's general relativity theory. At Kavli IPMU, I had frequent interactions with a number of experts in cosmology, including Profs. Yasuda, More, and Silverman, and have given a number of informal talks. I also collaborated with Takahiro Nishimichi on the realisation of numerical simulations linked to my project in COSMOS. A paper is currently under preparation.

At IPMU, I worked on the science analysis of the Hyper-Suprime-Cam Subaru Strategic Program survey (HSC-SSP), which is a major project at the Japanese telescope Subaru. It started in 2012 and is lead by a consortium of 200 researchers from Japan, Taiwan and Princeton University. Additionally, a few researchers from other institutions in Europe and the USA are active members with full data access, owing to their significant contribution, including myself. The National Astronomical Observatory of Japan (NAOJ) allocated a total of 300 nights over five years to the HSC-SSP consortium, one of the most ambitious programs ever conducted at Subaru. The project is now half-way complete and the first set of science-quality data was released early 2016. My research plan related to this project is focused on the data analysis to study the origin of star-formation processes involved in galaxy evolution and linked to cosmology (in particular to dark matter through gravitational forces). I have a number of well-defined projects validated by the consortium that I'm currently leading. As of 2018, I have lead one published paper (Coupon et al. PASP, 70S, 7, “The bright-star masks for the HSC-SSP survey”) and have co-authored a number of others (see <http://hsc.mtk.nao.ac.jp/ssp/publications/>).

I also interacted with 3rd-year Ryoma Murata and 2nd-year Tomohiro Nozawa (Prof. Takada's graduate students).

On the Kashiwa campus, I have regularly visited Prof. Masami Ouchi at the University of Tokyo's Institute for Cosmic Ray Research (ICRR). Prof. Ouchi and I are involved in a number of on-going studies within HSC-SSP focused on the early time of galaxy formation. Prof. Ouchi has a number of students (in particular Yuichi Harikane) leading several scientific analysis in which I bring technical and scientific support. A few years ago, with colleagues from France, Canada and China, we got awarded some telescope time with the Canada-France-Hawaii telescope to bring a crucial (blue/UV) image data set ("CLAUDS") to be combined with HSC-SSP (which is a red image data set). I hold a leading role in the data reduction for this project and I have collaborated closely with Prof. Ouchi's group who has a very complementary expertise.

I visited Dr. Atsushi Nishizawa at Nagoya University for a few days on August 7-9 and gave a seminar. Dr. Nishizawa and I are involved in the computation of galaxy distances in the HSC-SSP survey. We have known each other since 2009, as we were colleagues at Tohoku University, during my JSPS postdoctoral stay.

Overall, the BRIDGE Fellowship had a significant positive impact on my research, in a number of projects. The proximity with my collaborators was very productive, supported by the possibility to travel. I could finish some projects, and started new ones.