



Report on the 11th Japanese-French Frontiers of Science (JFFoS) Symposium

Planning Group Member (PGM) Co-Chair
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General Overview

The 11th Japanese-French Frontiers of Science (JFFoS) Symposium was held in Strasbourg, France, for four days from May 24 to 27, 2024. A total of 56 researchers gathered for the event, 30 from Japan and 26 from France. Featuring cross-disciplinary discussion and interaction, the symposium was held in a retreat-style setting in which the participants ate meals and lodged together. The topics for each session at the symposium were chosen by the Program Group Members (PGMs) via discussions and voting among them during the previous year. Then, an in-person preliminary meeting of the Japanese participants was held in February in which they had the opportunity to familiarize themselves with the themes of each field and interact with each other.

The topics provided and introduced by each session's PGMs and speakers energized and enriched the discussions held over the course of the 11th JFFoS Symposium. On top of that, the sharing of exquisite French cuisine and wine served each evening deepened interaction among the Japanese and French researchers. We would like to express our hearty thanks to JSPS and CNRS for providing us researchers such an inspiring opportunity, and we look forward to the continued thriving of academic exchange between Japan and France.

Day 1

The first day started with a Session Coordination Meeting for the PGMs, Introductory Speakers, and Speakers held to discuss the sessions of the following days. It was followed by a Welcome Dinner. In the Session Coordination Meeting (Math/Informatics/Engineering), each Speaker was asked to include a brief introductory slide about themselves (this had also been requested of Japanese participants during the preliminary meeting). The intend was to promote the creation of international research networks by having the participants get to know each other not only as researchers but also as persons, thus foster deeper relationships among them. Doing so would also serve as an icebreaker in each session, where some participants not familiar with speakers'

specialized topics could still enjoy the discussions via an interest in the speakers themselves.

During our walk to the restaurant where the Welcome Dinner was held, we enjoyed being immersed in the lovely cityscape of Strasbourg.

Day 2

The morning of the second day featured the Opening Ceremony and the “Nature’s Chemistry: Exploring Synthetic Biology and Biogenic Materials” session for Chemistry/Materials Science, while the afternoon saw the “New Standards of Visualizations in Social Sciences” session for Social Sciences/Humanities, introductions to CNRS and JSPS, and a poster session (including flash talks).

The Opening Ceremony began with welcome remarks from Prof. Michel DENEKEN (Chairperson of University of Strasbourg), followed by opening speeches from Dr. MIZUMOTO Tetsuya (Executive Director, JSPS) representing JSPS, and Mr. Edouard BESSERVE (Deputy Director for European Research and International Affairs Department, CNRS) representing CNRS. Then, the Planning Group Co-Chairs Dr. Nadia YOUSFI-STEINER and I, HIDAKA Shohei, provided an overview of the symposium and an explanation of its purpose. Each speech oozed with joy that the symposium was at long last beginning.

Nature’s Chemistry: Exploring Synthetic Biology and Biogenic Materials

(Chemistry/Materials Science)

PGMs: Damien VOIRY and FUJITA Daishi,

Introductory Speaker: YUZAWA Satoshi,

Speakers: Nicolas MARTIN and ABE Satoshi

The first session, “Nature’s Chemistry: Exploring Synthetic Biology and Biogenic Materials,” involved researchers from fields of chemistry and materials science. The PGMs posed questions about recent fusions between and advances in these fields, such as whether biochemistry is part of biology or an application of biology within chemistry. Dr. YUZAWA Satoshi provided an overview of synthetic biology, including methods for generating organic materials like gasoline. Dr. Nicolas MARTIN discussed the latest techniques for artificially creating cells, the smallest units where chemical reactions occur. Dr. ABE Satoshi presented on Protein crystal engineering, crucial for creating

artificial cells. The topics were presented in an easy-to-understand manner with concrete examples, making it interesting even for those without a background in chemistry.

During the Q&A session, diverse questions were raised, ranging from the development of key future technologies to the control of created cells, showing the broad interest in this evolving field.

New Standards of Visualizations in Social Sciences (Social Sciences/Humanities)

PGMs: Aleksandra KOBILJSKI and Ryuma SHINEHA

Introductory Speaker: Vivien PHILIZOT

Speakers: OTSUKA Jun and Pedro RAMACIOTTI MORALES

The second session, “New Standards of Visualizations in Social Sciences,” involved researchers from social sciences and humanities. Introductory speaker Dr. Vivien PHILIZOT gave an overview of the history and development of data visualization in science. Dr. OTSUKA Jun discussed concerns and challenges related to AI as a black box in scientific data analysis, given its pervasive presence in various fields. Dr. Pedro RAMACIOTTI MORALES provided insights into visualizing the structure and distribution of political opinions in society using data from social media services (SNS).

The Q&A session included discussions on the role of AI in understanding data without low-dimensional visualization, the spread of misinformation, the relationship between visual and textual explanations, and the definition of “new visualization” in social sciences. While the responses and discussions were not always aligned, it highlighted the different perspectives within the field, making it a thought-provoking session.

Day 3

Reliability of Modern Technologies in Society (Mathematics/Informatics/Engineering)

PGMs: Nadia YOUSFI-STEINER and HIDAKA Shohei

Introductory Speaker: OSEKI Yohei

Speakers: Baptiste CARAMIAUX and MORI Hiroki

The third session, for which I was responsible, “Reliability of Modern Technologies in Society,” brought together researchers from fields of mathematics, informatics, and engineering. The session’s aim was to question the reliability that society should demand of new technologies, such as AI, which being archetypical of deep learning, is rapidly developing and becoming increasingly pervasive. Introductory speaker Dr. OSEKI Yohei

gave an overview of recent developments in AI, focusing on natural language processing technologies like ChatGPT, and discussed criteria needed for AI technologies within human-centered societies, such as interpretability, generality, and efficiency. Dr. Baptiste CARAMIAUX highlighted issues surrounding recent AI technologies that learn from human data, pointing out the unpredictability of the final learning outcomes when people are in the learning loop and the difficulty in determining the appropriate use of the results as tools. Dr. MORI Hiroki introduced his research in cognitive robotics, explaining the need for embodiment of physicality in the physical world for robot technologies to be developed in the real world.

During the Q&A session, many questions were asked based on both expectations and concerns regarding the future development of AI given the rapid progress being made in artificial intelligence technologies across many fields. It was stated that AI technologies have already gained a certain degree of trust and are becoming widespread as seen in ChatGPT, a cutting-edge technology rapidly spreading throughout society. With this in mind, I was impressed that virtually all of the researchers said that AI would be essential to making future advances in their work. On the other hand, the discussion veered to how ChatGPT can weave “lies” into its outputs that are difficult to spot at a glance, making it difficult to take its information at face value and incurring a risk of misinformation.

Time Domain Astronomy—from long time to short time (Physics/Astrophysics)

PGMs: Francesca CALORE and SAKAI Nami

Introductory Speaker: Pierre MAGGI

Speakers: MOTOGI Kazuhito and Cherry NG GUIHENEUF

The fourth session, “Time Domain Astronomy—from long time to short time,” saw researchers interacting in fields of physics and astrophysics. While PGM Dr. Francesca CALORE was unable to attend, Dr. SAKAI Nami skillfully facilitated an engaging session. Introductory speaker Dr. Pierre MAGGI provided an overview of the technical requirements for capturing astronomical phenomena across different time scales, from years to seconds, explaining the requirement for huge amounts of data processing and ultra-precise observations to capture various astronomical phenomena. Dr. MOTOGI Kazuhito explained how the birth of stars reveals a wealth of information that can be used in exploring the origin of matter, and how high-precision observation techniques are needed for capturing such phenomena. Dr. Cherry NG GUIHENEUF introduced her research on developing advanced computational processing techniques for enhancing

telescope observation precision and on developing fundamental technologies that underlie them.

The Q&A session included questions about the relationship between hypotheses and observations in astronomy, the distinction between noise and signal, the use of AI technology. Also, a question on which is more importance, computational resources or algorithms. The responses showed a shift from the classical image of simply looking through a telescope to a new image of astronomy in which the modern “telescope” refers to systematic observation that combines theory and information technology. I was also impressed to learn that what astronomy is working to clarify through its observations is the origins of the stars and matter, and beyond that, the origin of life—a question asked by everyone at least once.

Day 4

Uncovering Paleo Disasters and Human Impacts on Modern Earth Science (Earth Science/Geosciences/Environment)

PGMs: Matthieu DELLINGER and NANKO Kazuki

Introductory Speaker: ISHIMURA Daisuke

Speakers: Anaëlle SIMONNEAU and NAKANISHI Ryo

The fifth session, “Uncovering Paleo Disasters and Human Impacts on Modern Earth Science,” involved discussions by researchers from fields of earth science, geosciences, and environmental studies. In the opening, PGM introduced the session by explaining its focus on exploring clues from ancient disasters to understand the increasing frequency of natural disasters. Introductory speaker Dr. ISHIMURA Daisuke provided a definition of disasters as events that negatively impact human society and explained the importance of rare records of ancient disasters for understanding long-cycle natural disasters. Dr. Anaëlle SIMONNEAU discussed her research on past flood patterns, including frequency and scale, through sediment deposits, while Dr. NAKANISHI Ryo explained how information that sheds light on ancient tsunamis can be obtained by analyzing sediments collected through field research and research voyages.

The Q&A session revealed regional differences in disaster concerns, with floods being a major issue in France and earthquakes in Japan. Also, the prediction of disasters and elucidation of causal mechanisms attracted considerable attention.

Unlocking the Secrets: Exploring Neurotechnology (Biology/Life Science)

PGMs: James BONAIUTO and SHIMA Ai

Introductory Speaker: Léa PILLETTE

Speakers: SAKAGUCHI Hideya and Antoine VALERA

The final session on “Unlocking the Secrets: Exploring Neurotechnology” brought together researchers from fields of biology and life sciences in a discussion on observation and synthesis technologies being applied to the nervous system. Such technologies have seen rapid advancement over recent years in fields of neuroscience and engineering. The session opened with remarks from PGM Dr. James BONAIUTO, who told how people have long been interested in the brain as an organ and how that history of scientific endeavor has spawned such fields as phrenology. Introductory speaker Dr. Léa PILLETTE gave an overview of brain-machine interface technologies used to read brain signals. Dr. Antoine VALERA initiated a discussion on techniques for observing neural cell activity in live animals, while Dr. SAKAGUCHI Hideya introduced technologies for artificially organizing neural circuit-like biological tissues called brain organoids.

All of the topics presented in this session spawned fascinating discussions on the latest techniques for studying our most mysterious organ—the brain.

Overall, the 11th JFFoS Symposium provided a platform for enriching cross-disciplinary discussions, facilitated by engaging speakers and well-coordinated sessions. The event fostered new research collaborations and deepened academic exchange between Japan and France.

Poster Sessions (Days 2 & 3)

There were two poster sessions, each beginning with approximately one-minute flash talks, followed by poster presentations on the floor. As seen in the attached photos, in-depth discussions were had at each poster, while the sessions also served as opportunities for engaging in casual conversations over coffee.

I personally enjoyed the chance to engage in such exchanges during the poster sessions and coffee breaks. At typical conferences, I do not have opportunities to discuss studies on such subjects as planetary observation or the ecology of certain shells with researchers from entirely different fields of specialization. As an example, during the second day's poster session, I was able to ask the presenters such naive questions as "Why observe stars?" and "What can be learned from understanding the state of stars?"

Whereas they seemed simple, answering these questions appeared to be perplexing for the presenter. I presumed that she would probably not be asked such simple questions at academic conferences in her field. Through questioning, it became clear to me that astronomers are also interested in the origins of life—whether conditions for life, such as abundant water, are present on other planets. Although such insights might not immediately benefit my research, they could by broadening my perspectives later relate to my work in unforeseen ways. I felt that having this kind of interdisciplinary connections with researchers in entirely different fields to be something very unique to FoS symposiums.

City Walk (Day 3)

Each evening during the symposium, we walked from Strasbourg University to restaurants near the Cathédrale Notre-Dame de Strasbourg in the city center for dinner. This gave us an opportunity to experience the beautiful evening scenery of the city. Walking and chatting with each other in such an environment amid the afterglow of the day's symposium was most pleasant. On the third day, we also participated in a cultural tour, taking a boat ride to view the sights and scenes of Strasbourg running along one of the canals encircling the central cathedral. An audio-guide helped us to explore the city we were seeing deeper. We viewed buildings, such as the EU Parliament and the world's first midwifery school, representing the unique cultural background of Strasbourg, which lies on the border between Germany and France and has historically belonged to both countries.

The symposium participants assembled together (at Strasbourg University on the second day)



Session Coordination Meeting (on the first day)



Opening Ceremony



Chemistry/Materials Science session



Social Sciences/Humanities session



Mathematics/Informatics/Engineering session



Physics/Astrophysics session



Earth Science/Geosciences/Environment session



Biology/Life Science session



Meal time



Scene from the first-day Welcome Dinner with the Japanese and French speakers and participants of each session seated next to each other at the tables.



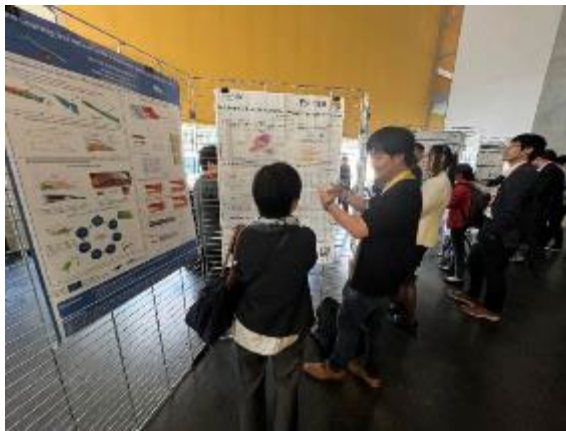
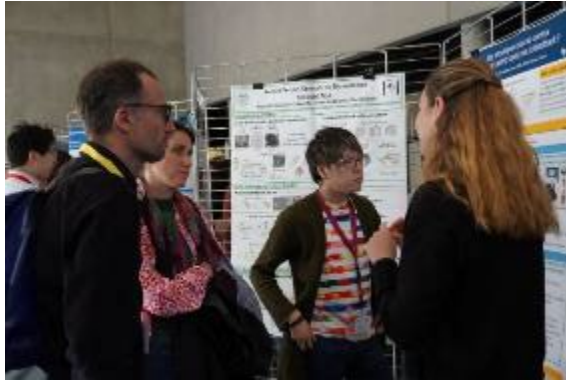
Cathédrale Notre-Dame de Strasbourg in the center of the city. Enjoying dinner at a restaurant in the vicinity of the cathedral.



Flash talks



Poster sessions and coffee breaks



Closing Ceremony



Group photo of information session participants taken after everything had concluded
(at Farewell Lunch venue)

