Contemporary History of Four Large-Scale Japanese Research Facilities

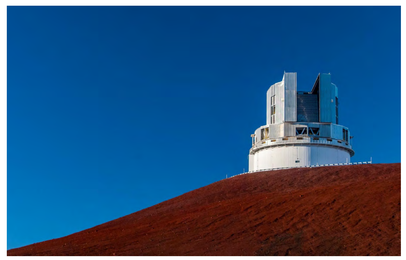
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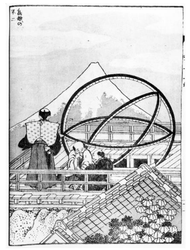
Internationality [*kokusaika* 国際化] and **Intersectionality since the 1980s at 4 large-scale Japanese research facilities in astronomy and high energy physics**

+ Separately and together we have been engaged for two decades in an ongoing set of studies about changing careers at large-scale research facilities in astronomy and high energy physics in Europe, Japan, North America.
+ We hypothesize that innovative international research at such telescopes and accelerators is simultaneously accompanied by innovations in the organization, work practices, and collaboration design, along with innovations in relations with government, industry, and universities nationally and internationally, as well as by innovations in mentoring and the shape of careers.

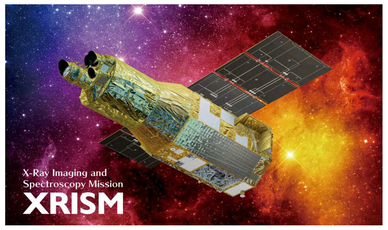
In this poster we

+ discuss 4 distinctive Japanese exemplars of innovative, international collaboration design.
+ specify our research questions about how those different international collaboration ecologies contribute to different mentoring and career practices.









Some Images:

+ NAOJ Subaru + Hokusai ukiyoe of *Fuji at Torigoe* + JAXA XRISM + Kyodai/Instituto Geofixico del Peru: Cosmos Coronagraphic Observatory + Solar Flare Monitoring Telescope + Todai/ICRR/KEK: Kamiokande (not pictured)

REFERENCES

+ Clancey, G, Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868–1930. University of California, 2006
+ Hasse, C., & S. Trentemøller, Break the Pattern! A critical enquiry into three scientific workplace cultures: Hercules, Caretakers and Worker Bees. UPGEM, 2008
+ Holbrook, J.C. "ASTROMOVES: Astrophysics, diversity, mobility." *Proceedings of the International Astronomical Union* 15, no. S367 (2019): 286-292
+ Kato-Nitta, N., "Searching for a ``black sky'' in the Andes Mountains: A migratory process and identity formation of a Japanese astronomer in Peru." *Role of Astronomy in Society and Culture, Proceedings of the International Astronomical Union, IAU Symposium*, Volume 260, p. 533-538
+ Kikuchi, Y. Anglo-American Connections in Japanese Chemistry: The Lab as Contact Zone. Palgrave Macmillan, 2013
+ Nakayama, S. A History of Japanese Astronomy: Chinese Background and Western Impact. Harvard, 1969
+ Shimizu, K. "The internationalization of higher education in Japan: Shifting interpretations and notions of *kokusaika*." (Dissertation, Univ Arizona, 2019)
+ Sorensen, K. & S. Traweek, Questing Excellence in Academia: A Tale of Two Universities. Routledge, 2022. FREE ACCESS
+ Srigyan, P. & S. Traweek, Pedagogy as a Portal, *ContraSTS*, Oct 2025 (MIT)
+ Traweek, S., Beamtimes and Lifetimes: The World of High Energy Physicists. Harvard, 1988 (remaining 'in print' for 37 years; published in Chinese 2003)
+ Traweek, S. "Generating High Energy Physics in Japan: Moral imperatives of a Future Pluperfect" in D. Kaiser, ed. Pedagogy and the Practice of Science: Historical and Contemporary Perspectives. MIT, 2005 (pp. 357-392)

4 distinctive Japanese ecologies for innovative, international collaboration design

+ JAXA XRISM (2008-) The 2016 Hitomi satellite spun out of control due to human errors. Seeking new ways to achieve results expected from Hitomi and offering young scientists experience in new projects led to the XRISM proposal. The Hitomi problems were addressed by organizational change: XRISM would have a project manager (PM) and primary investigator (PI). The division of labor between PIs and PMs has been controversial in multiple expensive, complex 'big science' projects around the world, such as ESS and ITER.

+ NAOJ Subaru, Hawaii (1984-) Siting a major Japanese research facility outside Japan has been controversial from the early planning stage. In contrast to other observatories in Hawaii Subaru leadership carefully built relationships with indigenous leaders. Subaru included more Japanese women scientists and built a far more international staff than other research facilities in Japan, giving young scientists an opportunity to work in a more diverse ecology.

+ Univ Tokyo ICRR+KEK: Kamioka Observatory -> Kamiokande, Mozumi Mine, Hida City, Gifu Prefecture [1982-] Kamioka projects have blended sponsorship from Todai, ICRR, and KEK, included foreign collaborators in the design of the facility, and strengthened neutrino astrophysics, a new field at the intersection of astronomy, cosmic ray physics, and high energy physics. That conceptual, disciplinary, and organizational collaboration at Kamioka has never been easy; it has created new strategies for 'big science' projects, new interdisciplinary science projects.

+ Kyoto Univ + Instituto Geofísico del Perú: Cosmos Coronagraphic Observatory, Huancayo, Perú (1951-1987-88; 1995-) and Solar Flare Monitoring Telescope at Hida Observatory (1992-) moved to Ica, Perú (2010-)
The quest for solar data from an excellent location led Kyodai astronomers to build deep, long-term, inclusive ties with Peruvian universities and astronomers, They were an early example of sending Japan-based instruments to other countries with a focus on education and building generations-long collaborations, as in the SESAME project in Jordan, launched by a set of colleagues from KEK, DESY, and SLAC.

4 significant variables contribute to those different collaboration strategies at each site:

+ Distinctive **Japanese and global meshworks** (complex, cross-generational, lateral and vertical ties of facilities, institutes, and universities) *within* which various collaboration are actively pursued at each site.
+ Distinctive **traditions and styles in astronomical research**, including divisions of labor, decision making, mentorship, and intellectual genealogies;
+ distinctive **research questions, instruments, and resources, plus data collection and analysis practices**;
+ There is limited, stylized interaction *between* these 4 ecologies and there is little migration of people or resources *between* the 4 ecologies; however, migration *within* each of the 4 ecologies is active. That is**, the differences across the 4 ecologies remain robust**. The 4 ecologies then serve Japanese astronomers as a repertoire of strategic options for international collaboration.

+ Traweek, S., Beamtimes and Lifetimes: The World of High Energy Physicists. Harvard, 1988 (remaining 'in print' for 37 years; published in Chinese 2003)
+ Traweek, S. "Generating High Energy Physics in Japan: Moral imperatives of a Future Pluperfect" in D. Kaiser, ed. Pedagogy and the Practice of Science: Historical and Contemporary Perspectives. MIT, 2005 (pp. 357-392)
+ Traweek, S. "*Bachigai* (out of place) in Ibaraki: Tsukuba Science City, Japan," in G. Marcus, ed., Technoscientific Imaginaries (Late Editions, vol. II). Chicago, 1995
+ Traweek, S. "*Kokusaika, Gaiatsu,* and *Bachigai:* Japanese Physicists' Strategies for Moving into the International Political Economy of Science," Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge, edited by L. Nader. Routledge, 1996 (pp.174-97)
+ Traweek, S. "Faultlines: How Modern Became Retro: an historical political economy of knowledge," for Doing Science + Culture: How Cultural and Interdisciplinary Studies Are Changing the Way We Look at Science and Medicine, edited by S. Traweek & R. Reid. Routledge, 2003 (pp.21-48
+ Traweek, S. "I Prefer the Map," ***E**ngaging Science, Technology, and Society*, Vol 7, No 2 (2021), pp 56-64

Having identified those 4 distinctive Japanese ecologies for innovative international collaboration design, now we are investigating how those 4 ecologies also have distinctive mentoring and career practices.
We hypothesize that individual researchers align themselves *within* these distinctive ecologies their entire careers. We ask:

+ Who collaborates internationally, at what career stage, on what topics, and why?
+ How do people learn these distinctive approaches to international collaboration?
+ What circulates best/worst? people/instruments/ideas/strategic thinking/organizational structures?
+ What are successful mentoring practices within each of those 4 ecologies

For your information: we employ 4 research methods for our data collection

+ lengthy, open-ended life history interviews generating rich, complex, unstructured data
+ decades-long ethnographic participant-observation fieldwork
+ archival searches of collaboration records
+ literature review of related research by other scholars

We employ 4 Analytic strategies for inquiring what kind of a difference makes a difference?

+ **ethnographic analysis of customary practices for performing expertise, success, leadership, etc**. in **different disciplines and sub-fields**
+ **individual and cohort demographic analysis, such as:** life/career stages, academic genealogies, nationalities, classes, indigeneities/races/ethnicities, genders/sexualities, dis/abilities, etc
+ **cross-cultural analysis of interviewees' key concepts:** luck, commitment, perseverance, motivation, initiative, responsibility, tradition, contribution, aesthetics, ethics, teamwork, goals, internationalization *Kokusaika* 国際化
+ **cross-cultural analysis examining different models for interviewees' narrative strategies, such as**: 4 master tropes, kishōtenketsu 起承転結, *qǐchéngzhuǎnhé* 起承轉合, 5-act plot structure, bāgǔwén 八股文, etc.

[Note that this poster has 4 items in each category, making use of both tropes and kishotenketsu.]

Note this important earlier Japanese example of international collaboration: the Asakusa Astronomical Observatory at Torigoe (built 1782) for celestial calendrical and cartographic research. Shogun-sponsored shift from using Chinese observations and interpretations to Japanese investigations, using texts from the Netherlands [蘭學 *ran-gaku*, literally 'Holland-learning']. The observatory became an important site for learning first about European sciences and mathematics, and then about Europe. The observatory was influential in multi-generational work in research instrument making, revising calendrical systems, and mapmaking in Japan, based on learning from and building upon ideas from foreign texts.

Queries for EAMA11 participants: Why and how do you think the answers to our research questions might vary:

+ at different facilities in different countries at different times?
+ when a 'critical mass' of team members is from one country or one region?
+ within and between subfields? by host institution? by funder?

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