TOHOKU UNIVERSITY

5th SRIS Colloquium

TOHOKU FORUM for CREATIVITY

- Thematic Program 2026 Pre-event -

SRIS

My journey with synchrotron:
Being on the both sides of an end user and a component technology developer

Dr. Hisato Yamaguchi
Los Alamos National Laboratory

Abstract

My journey with synchrotron has been unique and fulfilling, having an opportunity to be on the both sides of an end user and a component technology developer. I study corrosion of graphene protected metal surfaces as an end user, and develop a new technology for an electron source for accelerators. We won R&D 100 Award in 2019 on the technology we developed for graphene protected photocathodes. I started late as a synchrotron facility user. I am a materials scientist who used laboratory-based surface science techniques for PhD study but had not performed any synchrotron experiment until 2019, when I joined my collaborator's beam time. It was an interesting experience, as my postdoc work involved developing a component technology for accelerators, which I still continue to this date. Becoming a synchrotron facility user late was challenging, I encountered multiple occasions which I had no idea how to overcome the problems. I consider myself lucky to have supportive collaborators who have guided my way for past 6 years. My research as an end user involves use of supersonic molecular beam combined with X-ray photoelectron spectroscopy at BL23SU of SPring-8. We evaluate the efficacy of graphene protection coating against metal corrosion. My collaborators found a catalytic permeation of energized oxygen molecules through graphene protection coating and published the results in 2020, which was featured as a journal cover. This finding led to my current study of performing accelerated testing utilizing such phenomena. My effort on accelerator component technology development is being funded under Japan-US Science and Technology cooperation program supported by KEK and US DOE High Energy Physics. We demonstrated the robustness of susceptible alkali antimonide photocathodes can be improved by 3 orders of magnitude via graphene protection. I will present our progress so far on above two topics.

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SRIS Building, Entrepreneur Hall

Contact

International Center for Synchrotron Radiation Innovation Smart (SRIS)

Tohoku University, sris@grp.tohoku.ac.jp

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『*Towards New Scientific Horizons with Synchrotron Radiation*』

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