



TOHOKU
UNIVERSITY

6th SRIS Colloquium

TOHOKU FORUM for CREATIVITY

- Thematic Program 2026 Pre-event -



Pushing the limits of complex materials microstructure characterization

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Abstract

New generation Ultra-Small-Angle X-ray Scattering instrument (USAXS/SAXS/WAXS) benefits from upgraded APS-U beams and recent complete replacement of motion hardware to deliver next-generation performance. Demonstrated capabilities show the largest measured Q range of likely any microstructure characterization device in the world. We have demonstrated a minimum q (q resolution) of $3\text{e-}5$ [$1/\text{\AA}$] (~ 20 -micron size) with continuous data extending to above 6 [$1/\text{\AA}$], resulting in more than 5 decades of sizes characterized during one, less than 3 minutes long, measurement.

Hierarchical structures are ubiquitous in most applied/natural materials used today. Further materials performance optimization, necessary for further reduction of energy and other resources needs, is dependent on the development of a much better understanding of the manufacturing-structure-performance cycle.

The new generation USAXS/SAXS/WAXS can deliver a critical part of this understanding in many, if not most, areas. The talk will present an overview of the instrument design, its capabilities, and discuss examples of past and future applications where these new capabilities provided and will provide critical information necessary for the 21st-century materials challenges. Examples from fields from metallurgy to food production will be presented, and results briefly discussed.

August 4, 2025, 13:30 – 14:30

SRIS Building, Entrepreneur Hall

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Thematic Program 2026

*『Towards New Scientific Horizons
with Synchrotron Radiation』*



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