ICReDD International Seminar Series

Prof. Thomas Bocklitz (Friedrich Schiller University Jena, Germany)

Automated image quality assessment methods for optical microscopy: implementation and practical applications

Place: Hokkaido University, CRIS building

ICReDD Salon (room 02-106)

Time: Monday, 16 March 2026

16:00-17:00

Abstract: Optical microscopy is one of the leading techniques in biomedical research to investigate tissues, microorganisms, and biological processes down to the subcellular scale. These critical diagnostic tasks require managing image lifecycles with reliable data pipelines to translate measured samples into knowledge. In this context, reliability and FAIR data management can be ensured only by implementing robust quality control at each stage of the pipelines to assess measured data, processed images, and analysis outputs. From here, there is high demand for objective, automated, and reproducible image quality assessment methods. The talk introduces four open-source, machine learning-based image quality assessment methods we developed and shows their practical implementation to address real quality evaluation problems for optical microscopy studies. Each method satisfies different requirements of automation, interpretability, and prior knowledge of the evaluation problem. Possible applications of the developed methods include classification of experimental artifacts, quality ranking, parallel optimization of multiple channels in multimodal images, similarity estimation, and detection of spatially varying artifacts. Automated quality assessment not only ensures objective control over the results, but also reduces time and user effort, thus enhancing the extraction of valuable knowledge from optical microscopy images.

A seminar organized by the Komatsuzaki Group (WPI-ICReDD, Hokkaido University)

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