



82nd RAP Seminar

The 82nd Seminar on RIKEN Center for Advanced Photonics

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(理研 和光キャンパス 研究交流棟 3階会議室 W319)

Title: **Create! Laboratory Automation – Introduction to Robot and Super-Resolution Microscopy Collaboration Case Studies**

作る！ラボラトリーオートメーション～ロボットー超解像顕微鏡の連携事例の紹介～

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In recent years, remarkable advancements in super-resolution microscopy (SRM) have been made. SRM has enabled the observation of cellular dynamics at the molecular scale, and artificial intelligence (AI) technology has garnered attention for analyzing massive image data. The combination of SRM and AI is anticipated to yield new insights that were previously undiscoverable. However, observing cell samples with SRM involves various processes, such as cell culture, transformation, and staining, making the acquisition of large amounts of image data needed for AI analysis seem unrealistic.

To address this issue, we constructed an automated super-resolution imaging system by integrating the general-purpose bio-experiment automation system LabDroid Maholo with the super-resolution microscope Yokogawa CSU-W1 SoRa. Maholo can automatically perform the sample preparation process, from cell culturing to staining. The prepared samples are transported by a robotic arm and placed on the stage of the inverted microscope attached to SoRa, which then executes the predetermined imaging protocol. This system aims to automate super-resolution observations, combining a wide variety of cell types and various staining protocols. However, there are still challenges in super-resolution imaging, which will be discussed in this talk.