45th IIR-ASMat Seminar
（IIR-ASMat & CLS 合同セミナー）

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DNA as a Programmable Scaffold for Protein Organization, Delivery and Imaging

Although DNA primarily stores genetic information, its molecular programmability also makes it a versatile scaffold for organizing, transporting and visualizing proteins at the nanoscale. I will first present hybrid DNA-protein nanogels formed by crosslinking multibiotinylated DNA with streptavidin or enzyme conjugates. These nanogels can carry high protein loads and enable intracellular delivery while preserving enzymatic activity. I will then describe thermodynamically controlled DNA origami, where massive strand displacement drives isothermal shape transformations repositioning attached proteins and modulating a coupled enzymatic cascade. Finally, I will show how programmable-length DNA tags can serve as physically readable labels for atomic force microscopy. Site-selective DNA conjugation to α-synuclein enables individual DNA arms to be visualized and counted, providing a direct measurement of oligomer aggregation number. Together, these examples illustrate how DNA programmability can be used to deliver proteins, control their nanoscale organization and quantitatively characterize their assemblies.

日時：2026年11月11日（水）16:00~17:00

場所：東京科学大学 横浜キャンパス S8棟 1階 レクチャールーム

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