

Course title	Imaging Science		
Term	後期 2nd Half		
Credit(s)	1		
The main day		The main period	
School/Program	School of Life Science		
Department/Program	Common Subjects of Life Science		
Category	Common		
Lecturers	Murata, Nonaka, Fukunaga, Nemoto, Ohta, Kato		

Instructor	
Full name	
* MURATA KAZUYOSHI	
NONAKA SHIGENORI	

Outline	Imaging science consists of three measurement methods for generating image data, various image processing software for digitally processing image data, and an image analysis method for quantitative analysis of image data. This lecture will focus on cutting-edge 3D image measurement methods and quantitative image analysis methods. The former introduces cryo-electron microscopy, optical sheet microscopy, two-photon fluorescence microscopy, super-resolution microscopy, and magnetic resonance imaging, while the latter provides practices of basic quantitative analysis of image data using new mathematical tools.
Goal	Understand the most advanced 3D image measurement methods for life science, and learn the basics of image analysis methods for quantitative analysis of image data.
Grading system	
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Grading system	01:Four-grade evaluation (A, B, C, D)
Grading policy	Attendance and reports
Lecture Plan	Thursday, January 12, 2023 9: 00-10: 30 Optical microscopy for 3D and 4D observations: Focusing on optical sheet microscopy (Nonaka) 10: 30-12: 00 Structural analysis of biomolecules by cryo-electron microscopy (Murata) 13: 00-14: 30 Exercise: Quantitative Image Analysis Method I (Ota) 14: 30-16: 00 Exercise: Quantitative Image Analysis Method II (Ota) Friday, January 13, 2023 9: 00-10: 30 2 Photon fluorescence microscopy and super-resolution microscopy (Nemoto) 10: 30-12: 00 Basics of Magnetic Resonance Imaging (MRI) (Fukunaga) 13: 00-14: 30 Exercise: Quantitative Image Analysis Method III (Kato) 14: 30-16: 00 Exercise: Quantitative Image Analysis Method IV (Kato)
Location	Seminar room B at 9F, Building 3, Yamate campus
Language	English
Textbooks and references	"Watch all living things! How to choose and use imaging 100+" Experimental Medicine Special Edition Vol.36 No.20 (2018) (Japanese)
Keyword	quantitative image analysis, image measurement, optical sheet microscopy, cryo-electron microscopy, two-photon fluorescence microscopy, super-resolution microscopy, magnetic resonance imaging method