

課程資訊 (Course Information)

科號 Course Number	BMES546600	學分 Credit	3	人數限制 Size of Limit	20
中文名稱 Course Title	生物影像技術				
英文名稱 Course English Title	Bioimaging technology				
任課教師 Instructor	朱麗安				
上課時間 Time	R2R3R4	上課教室 Room	醫環館 R419		

課程簡述 (Brief course description)

人與人在交換資訊時，除了語言，照片是一個非常有效的訊息傳遞方式。而科學家在進行意見交流時，影像也往往是最直接有效的溝通方式，每一個重要的生物影像技術發明，大多都獲得諾貝爾獎的肯定。而現今的生物影像技術，正是百花齊放的年代，從功能性造影到超解析顯微鏡，都讓過去難以觀察的生物現象得已被展示及記錄。本課程除介紹各式生物影像技術之原理及應用，亦將安排帶領同學實地參觀部分儀器設施，並探討目前技術的瓶頸及解決方式，透過課程及討論，希望帶給學生未來在研究上第一手的最新知識。

When people exchange information, in addition to language, photos are a very effective way to convey information. When scientists exchange opinions, images are often the most direct and effective way of communication. Most important bio-imaging technology inventions have won the Nobel Prize. Now is the golden age of bio-imaging. From functional imaging to super-resolution microscopy, biological phenomena that were difficult to observe in the past now can be easily displayed and recorded. In addition to introducing the principles and applications of various types of bioimaging technology, this course will also arrange to lead students to visit some instruments and facilities on the spot, and discuss the current technology bottlenecks and solutions. Through the courses and discussions, we hope to bring students the first hand information about bio-imaging system now and the trend in the near future.

課程大綱 (Syllabus)

一、課程說明(Course Description)

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技術的瓶頸及解決方式，透過課程及討論，希望帶給學生未來在研究上第一手的最新知識。

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二、教學方式(Teaching Method)

3hours/week

2 hours introduction, 1 hour group discussion

三、教學進度(Syllabus)

- Foundations of microscopy 1 - geometrical optics
- Foundations of microscopy 2 - lenses and optical systems
- Lecture: Foundations of microscopy 3 - wave optics Demonstration: Abbe diffraction apparatus
- Evaluating optical performance using PSFs
- Deconvolution
- Confocal & multiphoton microscopy
- Light sheet microscopy
- Tissue clearing
- Super-resolution 1 - STED
- Super-resolution 2 - (F)PALM/(d) STORM/GSD
- Ethics in Imaging

四、成績考核(Evaluation)

Midterm (30%)

Final (30%)

Group report (30%)

Attendance (10%)