

國立清華大學 112 學年第 1 學期新開課程課程大綱

科號 Course Number		學分 Credit	2	人數限制 Class Size	
中文名稱 Course Title	新興生命科學研究方法				
英文名稱 Course English Title	Method to watch: Nature Methods				
任課教師 Instructor	王慧菁/林珮君/謝琬甄/李以如/林郁婷/周雅菁/ 陳韋靜/廖品超				
上課時間 Time	R6R7	上課教室 Room			

課程簡述(必填)(最多 500 個中文字) 本欄位資料會上傳教育部課程網
Brief Course Description (required) (50-200 words if possible, up to 1000 letters)

本課程主要講授發表在 Nature Methods 期刊中的新興醫學及生命科學研究方法，並探討這些技術的未來應用。

This lecture will be given in English.

The lectures will focus on introducing select key methodologies published in the prestigious journal *Nature Methods*, as well as discussing their potential future implications. The teachers will introduce 17 different method topics and the lecture will be given in a hybrid mode (physical + online).

請輸入課程內容「中文暨英文關鍵字」至少 5 個，每個關鍵字至多 20 個中文，以半形逗點分隔(必填)

Please fill in at least 5 course keywords (up to 40 letters for each keyword) and use commas to separate them.(required)

Nature Methods, Biotechnology, Molecular Biology, Cell Biology, Immunology, Genetics, Neuroscience

一、課程說明	<p>Nature Methods is a monthly journal publishing novel methods and significant improvements to basic life sciences research techniques. The journal is aimed at a broad, interdisciplinary audience of academic and industry researchers actively involved in laboratory practice. It provides researchers with new tools to conduct their research and places a strong emphasis on immediate practical relevance and potential to advance new biological applications.</p> <p>We noted that each paper published in Nature Methods must be accompanied by strong validation, an application to an important biological question and results illustrating its performance in</p>
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	comparison to available approaches. Thus, papers are selected for publication based on broad interest, thorough assessments of methodological performance and comprehensive technical descriptions that facilitate immediate application. Accordingly, we believe our students may benefit a lot by learning these new methods.		
二、指定用書	<p>Nature methods</p> <p>The electronic international standard serial number (EISSN) is 1548-7105.</p> <p>https://www.nature.com/nmeth/</p> <p>https://www.nature.com/nmeth/articles?type=method-to-watch</p>		
三、參考書籍			
四、教學方式	Each lecture will consist of two parts. The first part will feature lectures given by individual teachers, while the second part will involve student presentations and discussions guided by the teachers		
五、教學進度	Please see the following table.		
Week	Date	Teacher	Topic
1	09/14	Lily Wang	General lecture introduction
			Topic-1: Method to watch 2022: Imaging without the labels https://www.nature.com/articles/s41592-021-01376-0
			Topic-2: Organic dyes for live imaging https://www.nature.com/articles/s41592-020-01032-z
2	09/21	Wei-Ching Chen	Topic-3: Method to watch 2020: Tools for metabolomics http://www.nature.com/articles/s41592-019-0710-6
			Topic-4: Method to watch 2023: Annotating unknown metabolites http://www.nature.com/articles/s41592-022-01735-5
3	09/28	Teacher's day	
4	10/05	Pei-Chun Lin	Topic-5: ClampFISH Nat Methods 19, 1403–1410 (2022). https://doi.org/10.1038/s41592-022-01653-6
			Student presentation
5	10/12	Ya-Ching Chou	Topic-6: Joint profiling of DNA methylation and chromatin architecture in single cells https://www.nature.com/articles/s41592-019-0502-z
			Student presentation
6	10/19	I-Ju Lee	Topic-7: Next-Generation Expansion Microscopy https://www.nature.com/articles/s41592-023-01793-3 and related articles
			Student presentation
7	10/26	Yu-Ting Lin	Topic-8: Controlling cellular activities with light Nat Methods 20, 357–358 (2023) https://www.nature.com/articles/s41592-022-01745-3

			Student presentation
8	11/02	Pei-Chun Lin	Topic-9: Cryo-electron tomography Nat Methods (2023). https://doi.org/10.1038/s41592-023-01783-5 Student presentation
9	11/09	I-Ju Lee	Topic-10: Methods to watch 2023: A light switch for targeted genomics https://www.nature.com/articles/s41592-022-01733-7 Student presentation
10	11/16	Ya-Ching Chou	Topic-11: SpaGCN: Integrating gene expression, spatial location and histology to identify spatial domains and spatially variable genes by graph convolutional network https://www.nature.com/articles/s41592-021-01255-8 Student presentation
11	11/23	Lily Wang	Topic-12: Neuroscience goes viral https://www.nature.com/articles/s41592-021-01373-3 Student presentation
12	11/30	Wan-Chen Hsieh	Topic-13:T cell development in a dish Nature Methods volume 18, page35 (2021) https://www.nature.com/articles/s41592-020-01047-6 Student presentation
13	12/07	Yu-Ting Lin	Topic-14: Patch-seq technique Nat Methods 19, 1340–1344 (2022) https://www.nature.com/articles/s41592-022-01662-5 Student presentation
14	12/14	Wan-Chen Hsieh	Topic-15:Macrophages enter CAR immunotherapy Nature Methods volume 17, page 561 (2020) https://www.nature.com/articles/s41592-020-0862-4 Student presentation
15	12/21	Pin-Chao Liao	Topic-16:Automated segmentation and tracking of mitochondria in live-cell time-lapse images <i>Nature Methods</i> volume 18, pages 1091–1102 (2021) https://www.nature.com/articles/s41592-021-01234-z Student presentation
16	12/28	Pin-Chao Liao	Topic-17: Actin chromobody imaging reveals sub-organellar actin dynamics <i>Nature Methods</i> volume 17, pages 917–921 (2020) https://www.nature.com/articles/s41592-020-0926-5 Student presentation
六、成績考核	Course participation: 20% Presentation: 80% (40% classmates, 40% teacher)		
七、可連結之網頁位址(相關網頁)	https://www.nature.com/nmeth/ https://www.nature.com/nmeth/articles?type=method-to-watch		