

## Advanced Chemical Biology (Fall 2020)

### Professors:

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**Classroom:** Chemistry 121

**Hours:** Mon. 13:30 – 15:10, Thu. 13:30 – 15:10

**Language:** English (lectures, exams, and student presentations shall all be given in English)  
Students must also answer exam questions in English

**Grading:** **1<sup>st</sup> half: Midterm exam 40%, quizzes 10%, discussion participation 10%**

**2<sup>nd</sup> half: Final exam 40%, Final presentation 20%**

**Presentation:** Present any topic in the frontiers of chemical biology research (5 min. presentation graded by other classmates). The contents should be based on research published within the past 3 years.

### Prerequisite:

Everyone enrolled in this class should have taken undergraduate level biochemistry. Some background information from basic biochemistry will be provided in the lectures. Undergraduate students can enroll only if they have already taken (and passed) biochemistry.

### Online material:

PowerPoint slides and assigned reading materials will be uploaded to CEIBA ([ceiba.ntu.edu.tw](http://ceiba.ntu.edu.tw)) course website one day before each lecture.

Course Syllabus (check CEIBA website for updates)

#	Date	Day	Topic	Note
<b>1<sup>st</sup> half: John Chu (朱忠瀚)</b>				
1	9/14	Mon.	The philosophy of science and what is chemical biology	
2	9/17	Thu.	<b>Guest Lecture: CRISPR and CAR-T technologies</b>	<b>Kurt Mou</b>
3	9/21	Thu.	Experiments relevant to understanding the origin of life	
4	9/24	Mon.	Nucleobase, nucleoside, and nucleic acid	
5	9/28	Mon.	Nucleic acid mimetics	Discuss assigned paper
6	10/1	Thu.	<b>No class (mid-autumn festival)</b>	
7	10/5	Mon.	DNA sequencing technologies	
8	10/8	Thu.	<b>Guest Lecture: CAR-T technology</b>	<b>Kurt Mou</b>
9	10/12	Thu.	RNA, aptamers, ribozymes, and directed evolution	
10	10/15	Mon.	Classic directed evolution experiments and recent advances	Discuss assigned paper
11	10/19	Thu.	Amino acids, peptides, and proteins	
12	10/22	Mon.	Ribosome and protein translation	
13	10/26	Thu.	Incorporate noncanonical amino acids into proteins	Discuss assigned paper

14	10/29	Mon.	Carbohydrates and lipids	
15	11/2	Mon.	Secondary metabolites	
16	11/5	Thu.	Chemical biology of secondary gene products	Discuss assigned paper
17	11/9	Mon.	No class (mid-term week)	
<b>18</b>	<b>11/12</b>	<b>Thu.</b>	<b>Mid-term exam</b>	
<b>2<sup>nd</sup> half: Bruce Tai (戴桓青)</b>				
19	11/16	Mon.	Protein degradation and misfolding	
20	11/19	Thu.	Antibody and biotin technology	
21	11/23	Mon.	Bioorthogonal Chemistry	
22	11/26	Thu.	Biomolecule separation	
23	11/30	Mon.	Fluorescent dyes and proteins	
24	12/3	Thu.	Super-resolution fluorescence imaging	
25	12/7	Mon.	Electron microscopy	
26	12/10	Thu.	Mass spec instrumentation	
27	12/14	Mon.	Protein sequencing by mass spec	
28	12/17	Thu.	Protein quantification	
29	12/21	Mon.	(no class) KT Wang Lectures	
30	12/24	Thu.	Bioanalytical chemistry of natural materials	
31	12/28	Mon.	Bioanalytical chemistry of natural materials	
32	12/31	Thu.	Student presentations	
33	1/4	Mon.	Student presentations	
34	1/7	Thu.	Student presentations	
<b>35</b>	<b>1/11</b>	<b>Mon.</b>	<b>Final exam</b>	