果蠅神經解剖學（*Drosophila* Neuroanatomy）課程大綱

任課老師：江安世教授
上課時間：週一 AM 10:10-12:00
上課地點：生科一館 112 教室

一、課程說明 (Course Description)

教授果蠅神經解剖學之相關研究技術，包括各種果蠅神經標幟技術、神經組織製備，共軛焦顯微鏡技術與 3D 神經影像處理等，各項技術並有實作練習。希望藉此課程能使修課同學對果蠅神經影像技術有一整體了解與實作經驗。

二、指定用書 (Text Books)

1. Chiang AS, Lin CY, Chuang CC, Chang HM, Hsieh CH et al. (2009) Three-dimensional reconstruction of brainwide wiring networks in *Drosophila* at single cell resolution (submitted).
2. FlyCircuit (http://140.110.17.72/flycircuit_work/)

三、參考書籍 (References)

1. Nicholas J. Strausfeld (1976) Atlas Of An Insect Brain. Springer-Verlag, New York.
2. Alan R. Hibbs (2004) Confocal Microscopy for Biologists. Amazon.
3. Zeiss LSM710 operation manu.
4. Flybrain (http://flybrain.neurobio.arizona.edu/)

四、教學方式 (Teaching Method)

Interactive lecture, discussion, practical training

五、課程大綱 (Outline)

9/19 Fundamental neuroanatomy of Drosophila (江安世)

9/26 Light and fluorescence microscopy: principle & operation (林奇文)

10/3 Confocal microscopy: principle & operation (林暉皓)

10/17 Immunohistochemistry and *Brainbow* technology (林萱文)

10/24 Single neuron and clonal labeling: MARCM, Flp-out & fru-FLP (施孟甫)

10/31 Polarity analysis: syt::Dscam::GFP;mko,mko;syt::HA/TM3 (朱麗安)

11/7 Discuss.

Super-resolution microscopy (林彥穎)

11/14 Connectivity analysis: GRASP and PaGFP (林志勇)

11/21 3D image processing: segmentation, warping and visualization (擎曄)

11/28 Discuss.

Monitoring protein synthesis with ricin^{ts} & Kaede (陳俊朝)

12/5 Functional imaging of neural activity with GCaMP (黎思宇)

12/12 FlyCircuit database I: Searching & visualization (王定遠)

12/19 FlyCircuit database II: Connectivity prediction (莊朝鈞);

Neural tract analysis. (葉昌偉)

12/26 Practice: 3D image processing (張修明)

1/02 Final (oral report)

六、成績考核 (Evaluation)

Discussion 20%

Practice 40%

Term paper 40%

七、可連結之網頁位址

http://brc.life.nthu.edu.tw/html/course_meeting.html

Drosophila neuroanatomy

Virtual Insect Brain is a brief course of neuroanatomy of *Drosophila melanogaste.* It also provides nomenclature for brain anatomy.

Flybase is a database of genetic and molecular data for *Drosophila*. FlyBase includes data on all species from the family *Drosophilidae*; the primary species represented is *Drosophila melanogaster*.

Berkeley Drosophila Genome Project (BDGP). The goals of the *Drosophila* Genome Center are to finish the sequence of the euchromatic genome *of Drosophila melanogaster* to high quality, and to generate and maintain biological annotations of this sequence.

The Bloomington Fly Stock Center collects, maintains and distributes *Drosophila melanogaster* strains for research.

The Basic Atlas of the Drosophila Brain provides the user with a hypertext tour guide to the basic structural elements of the *Drosophila* nervous system.

BLAST® (Basic Local Alignment Search Tool) is a set of similarity search programs designed to explore all of the available sequence databases regardless of whether the query is protein or DNA.

The Baylor College of Medicine (BCM) Search Launcher is an ongoing project to organize molecular biology-related search and analysis services available on the web by function, by providing a single point-of-entry for related searches.

Pfam is a large collection of multiple sequence alignments and hidden Markov models covering many common protein families.

Prodom is a comprehensive set of protein domain families automatically generated from the SWISS-PROT and TrEMBL sequence databases.

The ExPASy (Expert Protein Analysis System) proteomics server of the Swiss Institute of Bioinformatics is dedicated to the analysis of protein sequences and structures.