

2 PhD Positions and 3-4 summer interns in Damselfly Speciation & Aposematic Insects, NTNU, Taipei, Taiwan, 2018

The Systematics & Evolutionary Biology Lab in the National Taiwan Normal University (NTNU) is seeking 2 self-motivated and enthusiastic PhD students and 3-4 summer interns to study the speciation in damselflies and aposematism in insects begin in the Summer of 2018.

1. Damselfly Speciation

We focus on a damselfly species, *Psolodesmus mandarinus*, with two subspecies differ in their wing pigmentations and distribution in Taiwan, providing a great opportunity to evaluate the relative importance of natural and sexual selection in damselfly divergence. We are incorporating a wide range of techniques, including a whole-island field survey, behavioural observation, morphological manipulation experiments, population genetics and genomic analysis to investigate the divergence in damselflies.

A description of research projects:

<https://sites.google.com/site/yuhsunhsu/research?pli=1>

2. Insect Aposematism

Pachyrhynchus weevils are a group of brilliant, metallic-coloured weevils distributed in the Old World tropics. Recent studies showed that the conspicuous colouration of these weevils function as effective warning signals to prevent predacious pursuit by lizards. We are interested in studying the spatio-temporal dynamics of interactions between vertebrate predators and aposematic prey.

Related articles:

Tseng, H-Y., W-S. Huang, M-L. Jeng, R.J.T. Villanueva, O.M. Nuñez and C-P. Lin (2017) Complex inter-island colonization and peripatric founder speciation promote diversification of flightless *Pachyrhynchus* weevils in the Taiwan-Luzon volcanic belt. *Journal of Biogeography* (early view) (DOI: 10.1111/jbi.13110)

Chen, Y-T., H-Y. Tseng, M-L. Jeng, Y-C. Su, W-S. Huang and C-P. Lin (2017) Integrated species delimitation and conservation implications of an endangered weevil *Pachyrhynchus sonani* (Coleoptera: Curculionidae) in Green and Orchid Islands of Taiwan. *Systematic Entomology* 42: 796–813 (DOI: 10.1111/syen.12242)

Tseng, H-Y., C-P. Lin, J-Y Hsu, D.A. Pike and W-S. Huang (2014) The functional significance of aposematic signals: geographic variation in the responses of widespread lizard predators to colourful invertebrate prey. *PLoS ONE* 9(3):e91777

PhD positions: 2

Research project - The PhD students will be encouraged to, but not limited to, evaluate the speciation mechanisms of between the two subspecies of *Psolodesmus* damselflies and *Pachyrhynchus*'s aposematism. The students will be expected to develop their own research dissertation projects within the scope of these research projects.

Funding – The PhD fellowship includes a competitive monthly stipend of NT\$34,000 (~1,133 USD) for up to 3 years through the TIGP (Taiwan International Graduate Program – Biodiversity), a jointed graduate program between NTNU and Academia Sinica. Students are also eligible for on-campus housing during the years of their studies.

Eligibility - The position is open to all applicants that meet TIGP admission criteria, but preference will be given to students with a master degree or prior experiences in animal behaviour, population genetics, and insect ecology and evolution.

Criteria/material used to evaluate the applicant's qualifications for the admission: (<http://biodiv.sinica.edu.tw/TIGP-BP/index.php?page=admission>)

How to apply – perspective students should prepare (1) a CV, (2) a list of prior experience, (3) three references (contact info & emails), (4) a one-page statement of research interests, and (5) a two-page research proposal based on damselfly speciation or weevil's aposematism in one PDF file, and email the file to Chung-Ping Lin (treehopper@ntnu.edu.tw) with the subject line "TIGP application".

Additionally, perspective students should submit a formal online application for admission in TIGP Biodiversity (<http://db1x.sinica.edu.tw/tigp/index.php>). Deadline for applications through the online portal is March 31st.

Summer Internship: 3-4

Research training – Morphological measurements and behavioural observation will be conducted in a damselfly population within a research station in northern Taiwan (Fusan Botanical Garden). This is a good opportunity for undergraduate students to be involved in a research project of the Asian tropics. The field survey will be conducted from 1st July to 31st August continuously, with the possibility to extend for another two to four weeks. The training will include individual marking, morphological measurements and behavioural observation. Basic statistical analysis can also be taught if perspective interns are highly interested in.

Funding – Each intern will receive a total of NT\$30,000/month (~\$1,000 USD) for two months together from TIGP and Chung-Ping Lin's laboratory (the hosting PI). In addition, half of the cheapest round-way airfare at economy class of the batch will be provided upon completion of the training program.

Accommodation and meals – Accommodation will be arranged in a research center next to the field site. Accommodation fee varies for each year but generally ranges between 0 and 150 NTD/night. Meals and lodging will be covered by the research projects.

Eligibility - The position is open to all applicants that meet TIGP Internship admission criteria, but preference will be given to undergraduate students with prior experiences in field survey, animal behaviour, and/or insect biology. Interns with scooter/car driving license will be preferred. Criteria/material used to evaluate the applicant's qualifications for the admission:

<https://db1x.sinica.edu.tw/tigpSummer/pageEligibility.php>

How to apply – perspective students should prepare (1) a CV, (2) a list of prior experience, and (3) a one-page statement of research interests in one PDF file and email it to Yu-Hsun Hsu (yuhsunhsu@gmail.com) with the subject line "TIGP Internship application – Speciation in damselflies". Additionally, perspective interns should submit a formal online application for admission in TIGP International Internship (<https://db1x.sinica.edu.tw/tigpSummer/index.php>). The online application will be open between 1st January and 31st March 2018.

Web pages:

The Systematics & Evolutionary Biology Lab

(<http://web.ntnu.edu.tw/~treehopper/index.php?page=home&lang=en>)

The Department of Life Sciences

(<http://www.biol.ntnu.edu.tw>)

National Taiwan Normal University

(<http://en.ntnu.edu.tw>)

TIGP Biodiversity Program Website

(<http://biodiv.sinica.edu.tw/TIGP-BP/>)

TIGP International Internship

(<https://db1x.sinica.edu.tw/tigpSummer/index.php>)

Biodiversity Research Center, Academia Sinica

(<http://biodiv.sinica.edu.tw/en/>)

Fusan Botanical Garden

(<http://fushan.tfri.gov.tw/en/index.php>)