

# Ming Liu

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## Education

### University of Oxford

DPHIL IN ZOOLOGY, THESIS TITLE: EVOLUTION OF PHENOTYPIC DIVERSITY

• Supervisors: Prof. Stuart A. West and Dr. Guy A. Cooper

Oxford, United Kingdom

Sep. 2019 - Sep. 2023

### National Taiwan University

MSC IN ENTOMOLOGY, THESIS PUBLISHED IN 2018

• Supervisors: Prof. Sheng-Feng Shen and Prof. Chun-Che Chang

Taipei, Taiwan

Feb. 2016 - Feb. 2018

### National Taiwan University

BSC (WITH HONS) IN ENTOMOLOGY

• Undergrad member of Insect Neurobiology Lab (PI: En-Cheng Yang; 2013-2015) and Insect Population Lab (PI: Toshinori Okuyama; 2015-16)  
• Best in class for: Insect Taxonomy & Lab(ENT 2010), Microbiology(PPM1007), Genetics(ENT2002), and Mathematics for Life Scientists(LS5073)

Taipei, Taiwan

Sep. 2011 - Jan. 2016

## Publication

1. **Liu, M.\***, Wild G., West, S. A. (2023). Equilibria and oscillations in cheat-cooperator dynamics. In press in *Evolution Letters*.
  2. Shen, S.-F.\*<sup>†</sup>, Reeve, H. K., Emlen, S. T., **Liu, M.**, Rubenstein, D. R. (2023). Group size and the resolution of insider-outsider conflict in animal societies. In press in *Animal Behaviour*.
  3. Lin, Y.-H.<sup>†</sup>, Chen, Y.-Y.<sup>†</sup>, Rubenstein, D. R., **Liu, M.**, Liu, M., Shen, S.-F.\* (2023). Environmental quality mediates the ecological dominance of cooperatively breeding birds. *Ecology Letters* (14226). [Link](#)
  4. **Liu, M.\***, West, S. A., Wild, G. (2022). The evolution of manipulative cheating. *eLife* 11 (80611). [Link](#)
  5. Cooper, G. A.\*<sup>†</sup>, **Liu, M.**, Peña, J., West, S. A. (2022). The evolution of mechanisms to divide labour in microorganisms. *Nature Communications* 13 (195). [Link](#)
  6. Cooper, G. A.\*<sup>†</sup>, Frost, H., **Liu, M.**, West, S. A. (2021). The evolution of division of labour in structured and unstructured groups. *eLife* 10 (71968). [Link](#)
  7. **Liu, M.\***, West, S. A., Cooper, G. A. (2021). Relatedness and the evolution of mechanisms to divide labour in microorganisms. *Ecology and Evolution* 11(21): 14475-14489. [Link](#)
  8. **Liu, M.**, Rubenstein, D. R., Cheong, S.-A., Shen, S.-F.\* (2021). Antagonistic effects of long- and short-term environmental variation on species coexistence. *Proceedings of the Royal Society B: Biological Sciences* 288 (1958), 20211491. [Link](#)
  9. Tibbetts, E. A.\*<sup>†</sup>, **Liu, M.**, Laub, E. C., Shen, S.-F. (2020). Complex signals alter recognition accuracy and conspecific acceptance thresholds. *Philosophical Transactions of the Royal Society B: Biological Sciences* 375(1802), 20200482. [Link](#)
  10. **Liu, M.**, Rubenstein, D. R., Liu, W.-C., Shen, S.-F.\* (2019). A continuum of biological adaptations to environmental fluctuation. *Proceedings of the Royal Society B: Biological Sciences* 286(1912), 20191623. [Link](#)
  11. **Liu, M.**, Rubenstein, D. R., Cheong, S.-A., Shen, S.-F.\* (2018). Multitasking and the evolution of optimal clutch size in fluctuating environments. *Ecology and Evolution* 8(17), 8803-8817. [Link](#)
- Cooper, G. A., **Liu, M.\***, Zhang, Z., Fisher, R. A., West, S. A. (2023). The evolution of predominantly sterile social groups. Under review in *Evolution Letters*.
  - Thomas, J. L.\*<sup>†</sup>, Wilson, D. J., **Liu, M.**, Bray, J. E., Griffin, A. S., Ghoul, M. (2023). The evolution & ecology of bacteriocin-mediated competition in natural populations of *Staphylococcus aureus*. In preparation for ISME.
  - **Liu, M.**<sup>†</sup>, Wu, S.<sup>†</sup>, Hung, T.-M.<sup>†</sup>, ..., Chen, I.-C., Shen, S.-F.\* (2023). Benign environment promote thermal trait diversity. In preparation for *Nat Ecol Evol*.

\*: Correspondence, <sup>†</sup>: Co-first authorship

## Experience

### University of Oxford

DEMONSTRATOR OR FACILITATOR

• Demonstrate in scientific writing course, mini-projects, math catch-up, biology labs, journal clubs, and problem-solving sessions  
• Monitor or provide technical support for master projects and undergrad projects

Oxford, United Kingdom

2019 - 23

### Academia Sinica

RESEARCH ASSISTANT

• Finalise my research projects from master program

Taipei, Taiwan

Apr. 2019 - Aug. 2019

### Kenting National Park

SUBSTITUTION MILITARY OFFICER

• Compulsory service for the country

Kenting, Taiwan

Apr. 2018 - Apr. 2019

## Part-time jobs

PRIVATE TUTOR

- Teach science, biology, and chemistry with Taiwanese or AP materials

Taipei, Taiwan

2012 - 18

## Awards & Achievements

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### AWARDS

BEST SLIDE AWARD FROM EUROPEAN MEETING OF PhD STUDENT IN EVOLUTIONARY BIOLOGY (EMPSEB 28)

Jun. 2023

TRAVEL AWARD FROM INTERNAL SOCIETY OF BEHAVIOURAL ECOLOGY (ISBE 2022)

Aug. 2022

PRESIDENTIAL AWARDS FROM NATIONAL TAIWAN UNIVERSITY

2011 & 2012

### SCHOLARSHIPS

OXFORD-TAIWAN AND OXFORD-NATURALMOTION GRADUATE SCHOLARSHIPS

2019 - 23

UNDERGRADUATE RESEARCH SCHOLARSHIP FROM MINISTRY OF SCIENCE AND TECHNOLOGY OF TAIWAN

2014 - 15

### SERVICE

REVIEWER FOR PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B: BIOLOGICAL SCIENCES

2022

PRESIDENT OF OXFORD UNIVERSITY TAIWANESE STUDENT SOCIETY

2020 - 21

TREASURER OF OXFORD UNIVERSITY PHOTOGRAPHY SOCIETY

2020 - 22

## Skills

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### PROGRAMMING AND THEORETICAL BIOLOGY

- Construct individual-based simulations for eco-evolutionary theories with genetic algorithm or Gillespie algorithm (C and Python)
- Derive analytical and numerical solutions for game theoretical models or differential equation systems (Mathematica and Python)
- Manage Linux-based server and write user instructions (shell and R Markdown)

### BIOLOGICAL STATISTICS

- Time series analysis with autocorrelation or frequency (R and Python)
- Perform comparative analysis with frequentist or Bayesian statistics (phytools, phyloglm, and MCMCglmm in R)

### PRESENTATION

- Project visualisation and management (R Markdown and Jupyter Notebook)
- Digital illustration and image processing (Adobe Illustrator, Photoshop, and Lightroom)

## Presentations

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### CONTRIBUTED TALKS

- European meeting for PhD students in evolutionary biology (EMPSEB 28, 2023); Millport, United Kingdom
- International Society of Behavioral Ecology (ISBE, 2016 and 2022); Exeter, United Kingdom and Stockholm, Sweden

### CONTRIBUTED POSTERS

- Understanding and predicting microbial evolutionary dynamics (2022); Manchester, United Kingdom
- Annual meeting of Microbiology Society (2021); Online
- Festival of ecology by British ecological society (2020); Online

### INVITED TALKS

- Monthly Webinar of Taiwanese Entomologists in the World (2021); Online
- Symposium of adapting to new challenges: evolution in humans, animals, and plants (2019); Taipei, Taiwan