

Ming Liu

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Education

University of Oxford

Oxford, United Kingdom

DPhil in Zoology, Thesis Title: EVOLUTION OF PHENOTYPIC DIVERSITY (MINOR CORRECTION; EXAMINED BY PROF ALAN

Oct 2019 - Jan 2024

GRAFEN FRS AND PROF RYOSUKE IRITANI)

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

National Taiwan University

Taipei, Taiwan

MSC in Entomology, Thesis Title: MULTITASKING AND THE EVOLUTION OF OPTIMAL CLUTCH SIZE IN FLUCTUATING

Feb 2016 - Feb 2018

ENVIRONMENT (Thesis Score: A+; Examined by Prof ZAC HSIEH, Prof TAKESHI MIKI, AND Prof HUI-YU WANG)

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

National Taiwan University

Taipei, Taiwan

BSc in Entomology (GPA: 3.82/4.3, Rank: 2/23)

Sep 2011 - Jan 2016

- Undergrad member of Insect Neurobiology Lab (Prof En-Cheng Yang; 2013-2015) and Insect Population Lab (Prof Toshinori Okuyama; 2015-16)
- Best in class for: Insect Taxonomy & Lab (ENT 210), Microbiology (PPM1007), Genetics (ENT2002), and Mathematics for Life Scientists (LS5073)

Publication

1. **Liu, M.***, Wild, G., West, S. A. (2023). Equilibria and oscillations in cheat-cooperator dynamics. *Evolution Letters* 7 (5), 339-350..
 2. Shen, S.-F.*, Reeve, H. K., Emlen, S. T., **Liu, M.**, Rubenstein, D. R. (2023). Group size and the resolution of insider-outsider conflict in animal societies. *Animal Behaviour* 205, 107-116..
 3. Tsai, C.-Y.*, Huang, H.-T., **Liu, M.**, ..., Wu, C.-J., Liu, W.-T.* (2023). Associations of fine particulate matter exposure with sleep disorder indices in adults and mediating effect of body fat. *Atmospheric Pollution Research* 14 (10), 101886.
 4. Lin, Y.-H.[†], Chen, Y.-Y.[†], Rubenstein, D. R., **Liu, M.**, Liu, M., Shen, S.-F.* (2023). Environmental quality mediates the ecological dominance of cooperatively breeding birds. *Ecology Letters* (14226).
 5. **Liu, M.***, West, S. A., Wild, G. (2022). The evolution of manipulative cheating. *eLife* 11 (80611).
 6. Cooper, G. A.*, **Liu, M.**, Peña, J., West, S. A. (2022). The evolution of mechanisms to divide labour in microorganisms. *Nature Communications* 13 (195).
 7. Cooper, G. A.*, Frost, H., **Liu, M.**, West, S. A. (2021). The evolution of division of labour in structured and unstructured groups. *eLife* 10 (71968).
 8. **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.
 9. **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.
 10. Tibbetts, E. A.*, **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.
 11. **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.
 12. **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.
- **Liu, M.***, Bell-Roberts, L., Botero, C., Cornwallis, C. K., West, S. A. (2025). Environmental predictability in phylogenetic comparative analysis: how to measure and does it matter?. Under review in *Global Ecology and Biogeography*.
 - **Liu, M.**[†], Hung, T.-M.[†], Wu, S.[†], ..., Chen, I.-C.*, Shen, S.-F.* (2025). Benign environment promote thermal trait diversity. Under review in *Science*.
 - **Liu, M.***, Piskovsky, V., Brown, D., Tomanek, I., Foster, K. R. (2025). How does diversity affect ecological stability?. In preparation for *Nature*.

*: Correspondence, [†]: Co-first authorship

Experience

University of Oxford

Oxford, United Kingdom

POSTDOCTORAL RESEARCH ASSOCIATE (PI: KEVIN R. FOSTER)

Oct 2023 -

- Resolving the decades-long debate about the diversity-stability relationship in community ecology

DEMONSTRATOR AND TUTOR

Oct 2019 -

- Tutor on bet-hedging, oscillating dynamics, parental care, and the debate on kin selection (1-3 students per session)
- Lead the scientific writing course (12-15 master students; 2022-24)
- Host math problem-solving sessions, and undergrad journal clubs (20-40 students)
- Demonstrate in mini-projects and various practicals (50-60 students)

Kenting National Park

Pingtung, Taiwan

SUBSTITUTION MILITARY OFFICER (COMPULSORY)

Apr 2018 - Apr 2019

- Guide international tourists and collect tickets

Awards & Achievements

OFFERED DATA ANALYST POSITION BY NATIONAL ENVIRONMENTAL AGENCY, SINGAPORE

Apr 2024

SHORTLISTED IN SCHMIDT SCIENCE FELLOWS (1/8 CANDIDATES NOMINATED BY OXFORD)

Jul 2023

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

OXFORD-TAIWAN AND OXFORD-NATURALMOTION GRADUATE SCHOLARSHIPS

2019 - 23

UNDERGRADUATE RESEARCH SCHOLARSHIP FROM MINISTRY OF SCIENCE AND TECHNOLOGY OF TAIWAN

2014 - 15

PRESIDENTIAL AWARDS FROM NATIONAL TAIWAN UNIVERSITY

2012 - 13

Skills

PROGRAMMING AND THEORIES

- Construct individual-based simulations with genetic algorithm and Gillespie algorithm (C and Python)
- Derive analytical and numerical solutions for game theories and differential equations (Mathematica and Python)

BIOSTATISTICS

- Time series and machine learning analysis (R and Python)
- Phylogenetic comparative analysis with frequentist and Bayesian stats (R)

SCIENTIFIC PRESENTATION

- Project visualisation and management (Quarto and Jupyter Notebook)
- Digital illustration and image processing (Adobe softwares)

Selected presentations

CONTRIBUTED TALKS

- Human microbiome: diversity, selection and adaptation (2025); Banff, Canada
- Leeds 2024 eco-evolutionary dynamics workshop (L24EEDs); Leeds, United Kingdom
- European meeting for PhD students in evolutionary biology (EMPSEB 28, 2023); Millport, United Kingdom
- International society of behavioral ecology (ISBE, 2016 & 2022); Exeter, United Kingdom; Stockholm, Sweden

INVITED TALKS

- Complexity science seminar at Nanyang Technological University (2024); Singapore
- Evolutionary biology section seminar at Oxford University (2023); Oxford, United Kingdom
- 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

Services

- **Student Supervision:** PhD student rotation (Apr - Jul 2024), Undergrad project (Nov 2017 - Feb 2018), Private tutor (science, biology, and chemistry with Taiwanese or AP materials; 2012 - 18)
- **Peer Review:** Philosophical Transactions of the Royal Society B (2022 -), Journal of Theoretical Biology (2024 -), Ecological Research (2018 -)
- **Society Membership:** International Society of Microbial Ecology (2024 -), European Society of Evolutionary Biology (2023 -), Microbiology Society (2020 -), British Ecological Society (2019 -), International Society of Behavioral Ecology (2016 -)
- **Other Activity:** Oxford University Taiwanese Student Society (President; 2020 - 21), Oxford University Photography Society (Treasurer; 2020 - 22), Photo One Taipei (Selected artist for portfolio review; 2019), National Taiwan University Photographic Society (Various chairs in digital, analog, and fineart workshops; 2013 - 18)