Chi-Yun Kuo

Department of Biomedical Science and Environmental Biology

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EDUCATION

PhD, Organismic and Evolutionary Biology, 2015
University of Massachusetts Amherst, USA
Advisor: Duncan J. Irschick

MS, Ecology and Evolutionary Biology, 2006
National Taiwan University, Taiwan

BA, Zoology, 2003
National Taiwan University, Taiwan

ACADEMIC POSITIONS

Assistant Professor, 2021-present

Department of Biomedical Science and Environmental Biology, Kaohsiung Medical University

Associate Editor, 2020-present

Functional Ecology

Postdoctoral Research Associate, 2020-2021

Institute of Fisheries Science, National Taiwan University
(PI: Chia-Ying Ko)

- The effect of warming on species abundance in large marine fish communities

Postdoctoral Research Associate, 2017-2020

Department of Biology, LMU München and the Smithsonian Tropical Research Institute
(PI: Richard M. Merrill and Owen McMillan)

- Ecology and genetics of mate preference in *Heliconius* butterflies

Postdoctoral Research Associate, 2015-2017

Department of Biology, Duke University (PI: Sheila N. Patek)

- Biomechanics of power-amplified mandible strikes in trap-jaw ants

Graduate Research Assistant, 2013-2015

Department of Biology, University of Massachusetts Amherst

- Functional morphology of adhesive toepads in geckos

Research Assistant, 2008-2009

Academia Sinica, Taipei, Taiwan

- Evolution of desaturase genes in the *Drosophila simulans* species complex

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GRANTS

Predator learning and the paradox of warning signal diversity. Kaohsiung Medical University Research Foundation, 2022. NT$500,000 (KMU-Q111001)

Genetic and environmental contributions to the (co)variation in animal personality and predator defense: boldness and tail autotomy in lizards. Taiwan Ministry of Science and Technology, 2021. NT$900,000 (110-2621-B-037-003-)

PUBLICATIONS (* corresponding author)

In review/revision

Kuo C-Y, Chin H-E, Wu Y-C. *In review.* Learning reduces covariation between boldness and foraging behavior in a generalist predator.

Published/accepted

Hausmann AE, Freire M, Alfthan SA, **Kuo C-Y**, Linares M, McMillan O, Pardo-Diaz C, Salazar C, Merrill RM. *In press.* Does sexual conflict contribute to the evolution of novel warning patterns? Journal of Evolutionary Biology

Sutton GP, St Pierre R, **Kuo C-Y**, Summers A, Bergbreiter S, Cox S, Patek SN. 2022. Dual spring force couples yield ultrafast, precision rotation in tiny mechanical systems. Journal of Experimental Biology 225: jeb244077

Kuo C-Y*, Ko C-Y, Lai Y-Z. 2022. Assessing warming impacts on marine fishes by integrating physiology-guided distribution projections, life-history changes, and food web dynamics. Methods in Ecology and Evolution 13: 1343-1357

Yu C-N, **Kuo C-Y**, Lin H-C, Su Y-C. *Accepted*. Foraging payoffs change with group size in kin and non-kin groups of an Argyrodinae kleptoparasitic spider, *Argyrodes miniaceus.* Frontiers in Ecology and Evolution 10: 813777

Tu Z-W, Lai Y-Z, Chen X-Q, **Kuo C-Y**, Lee P-F, Ko C-Y. 2022. Trends in geographic sensitivity of marine fishes over decades in the North Sea. Frontiers in Marine Science 8: 748278

Hausmann AE, **Kuo C-Y**, Freire M, Rueda-M N, Linares M, Pardo-Diaz C, Salazar C, Merrill RM. 2021. Light environment influences mating behaviours during the early stages of divergence in tropical butterflies. Proceedings of the Royal Society B 288: 20210157

Kuo C-Y*, Muñoz MM, Irschick DJ. 2019. Lizard foraging: a perspective integrating sensory ecology and life histories. In Behavior of Lizards: Evolutionary and Mechanistic Perspectives (Eds: Vincent Bels and Anthony Russell). Taylor and Francis.

Farley G, Wise M, Harrison J, Sutton G, **Kuo C-Y**, Patek SN. 2019. Adhesive latching and legless leaping in small, worm-like insect larvae. Journal of Experimental Biology 222: jeb201129.

Imburgia MJ, **Kuo C-Y**, Briggs DR, Irschick DJ, Crosby AJ. 2019. Effects of digit orientation on gecko adhesive force capacity: synthetic and behavioral studies. Integrative and Comparative Biology 59: 182-192.

Ilton M, Bhamla S, Ma X, Cox S, Fitchett, LL, Kim Y, Koh J-S, Krishnamurthy D, **Kuo C-Y**, Temel FZ, Crosby A, Prakash M, Sutton G, Wood R, Azizi E, Bergbreiter S, Patek S. 2018. The principles of cascading power limits in small, fast biological and engineered systems. Science 360: eaao 1082.

Irschick DJ, Fu AL, Lauder GV, Wilga CD, **Kuo C-Y**, Hammerschlag N. 2017. A comparative morphological analysis of body and fin shape for eight shark species. Biological Journal of the Linnean Society 122: 589-604.

Labonte D, Clemente CJ, Dittrich A, **Kuo C-Y**, Crosby AJ, Irschick DJ and Federle W. 2016. Extreme positive allometry of animal adhesive pads and the size limits of adhesion-based climbing. Proceedings of the National Academy of Sciences USA 113: 1297-1302.

Fu AL, Hammerschlag N, Lauder GV, Wilga CD, **Kuo C-Y** and Irschick DJ. 2016. Ontogeny of head and caudal fin shape of an apex marine predator: the tiger shark (*Galeocerdo cuvier*). Journal of Morphology 277: 556-564.

Kuo C-Y* and Irschick DJ. 2016. Ecology drives natural variation in an extreme antipredator trait: a cost-benefit analysis integrating modelling and field data. Functional Ecology 30: 953-963.

Kuo C-Y*, Irschick DJ and Lailvaux SP. 2015. Trait compensation between boldness and the propensity for tail autotomy under different food availabilities in similarly aged brown anole lizards. Functional Ecology 29: 385-392.

Gillis GB, **Kuo C-Y**, Irschick DJ. 2013. The impact of tail loss on stability during jumping in green anole lizards (*Anolis carolinensis*). Physiological and Biochemical Zoology 86: 680 – 689.

Kuo C-Y*, Gillis GB, Irschick DJ. 2012. Take this broken tail and learn to jump: the ability to recover from reduced in-air stability in tailless green anole lizards (*Anolis carolinensis* [Squamata:Dactyloidea]). Biological Journal of the Linnean Society 107: 583 – 592.

Kuo C-Y*, Gillis GB, Irschick DJ. 2011. Loading effect on jump performance in green anole lizards *Anolis carolinensis*. Journal of Experimental Biology 214: 2073 – 2079.

Kuo C-Y*, Y-T Lin, Y-S Lin. 2009. Sexual size and shape dimorphism in an agamid lizard, *Japalura swinhonis* (Squamata: Iguania: Agamidae). Zoological Studies 48: 351 – 361.

Kuo C-Y, Y-T Lin, YK Lin. 2007. Resource use and morphology of two sympatric *Japalura* lizards (Iguania: Agamidae). Journal of Herpetology 41: 713 – 723.

AWARDS

OEB Student Research Grant ($1,000), 2013

UMass Amherst Dissertation Research Grant ($1,000), 2012

UMass Amherst Graduate Student Fellowship (campus-wide competition, $16,000), 2012

UMass Natural History Collections Grant ($1,000), 2012

Sigma-Xi Grant-in-Aid of Research ($500), 2011

OEB Student Research Grant ($500), 2011

Jane Hallenbeck Bemis Endowment for Natural History Research ($3,000), 2010

Taiwan Ministry of Education Scholarship (nation-wide competition, $50,000), 2008

Fulbright Science and Technology Award (declined for the fellowship above), 2008

National Taiwan University Presidential Award ($100), 2003

TEACHING EXPERIENCE

Instructor

Kaohsiung Medical University, 2021-present

Ecological Modeling

Evolutionary Biology (taught in English)

Co-instructor

Kaohsiung Medical University, 2021-present

Introductory Biology
Ecology

University of Massachusetts Amherst, 2013-2014

SOURCE (Study of Using R Codes and Executables, a weekly workshop on R-related topics)

- Design syllabus, compile teaching materials and lead weekly meetings

Guest Lecturer

Duke University, 2015

How Organisms Move (topic: biomechanics, ecology and evolution of trap-jaw ants)

UMass Amherst, 2014-2015

Comparative Physiology (topic: animal locomotion)

Animal Behavior (topic: antipredator behavior)

Graduate Teaching Assistant

UMass Amherst, 2010-2011

Comparative Vertebrate Anatomy labs

Quantitative Systems Biology labs

Introductory Biology labs

National Taiwan University, 2003-2006

Comparative Vertebrate Anatomy labs

MENTORING EXPERIENCE

Kaohsiung Medical University

Hui-Chi Liu (MOST undergraduate researcher, 111-2813-C-037-054-B)

- Project: Variation in toxicity and signal similarity within two butterfly mimicry rings

Hao-En Chin, Ching-Ning Yeh, Hsiang-An Chao, Yu-Che Wu, Miao-Chu Tseng, I-Ting Hung (work-study students)

- Project: Genetic and environmental contributions to the (co)variation in boldness and avoidance learning in lizards

LMU/Smithsonian Tropical Research Institute (STRI)

Dinah Parker (MS student at LMU)

- Project: Sensory bias in male visual preference and its consequence in mate choice in *Heliconius* butterflies

Diana Abondano Almeida and Morgan Oberweiser (STRI Interns)

- Project: The genetic basis of visual attraction in Heliconius butterflies

Duke University

Anna Ruta and Casey Thompson (Army Education Outreach Program Internship)

- Project: Kinematics of latch release in trap-jaw ants

Justin Jorge and Achintya Kumar (Army Education Outreach Program Internship)

- Project: Kinematics of jaw-powered escape jumps in the trap-jaw ant *Odontomachus brunneus*

UMass Amherst

Dylan Briggs (undergraduate research assistant; currently a graduate student at the University of Illinois at Urbana-Champaign)

- Project: Evolution of scaling and shape variation of toepads in Gekkotan lizards

Hasan Merza (undergraduate independent study)

- Project: Digit placement during adhesion in geckos

Eileen Curran (undergraduate independent study)

- Project: Daily activity pattern of green anole lizards in captivity

SELECTED PRESENTATIONS

Kuo C-Y. 2022. Oral presentation. What determines the degree of predator avoidance towards unprofitable prey? A meta-analysis. Annual Meeting of Taiwan Entomological Society. Kaohsiung, Taiwan.

Kuo C-Y. 2022. Invited seminar. Resolving the paradox of warning signal diversity with predator learning: a combination of modeling and meta-analysis. Department of Life Sciences, National Taiwan Normal University. Taipei, Taiwan.

Kuo C-Y. 2022. Oral presentation. Resolving the paradox of warning signal diversity with predator learning. Animal Behavior Society Meeting. San José, Costa Rica.

Kuo C-Y. 2022. Invited seminar. Assessing warming impacts on marine fishes. Center for Big Data Research, Kaohsiung Medical University. Kaohsiung, Taiwan.

Kuo C-Y. 2021. Invited seminar. Resolving the paradox of warning signal diversity with predator learning: a combination of modeling and meta-analysis. Department of Entomology, National Taiwan University. Taipei, Taiwan.

OUTREACH EXPERIENCE

Kaohsiung Medical University

Aboriginal Biodiversity and Culture Workshop for International Students in Taiwan.

- Workshop organizer

Forest classes for elementary school students, an activity organized by the KMU University Social Responsibility Program

- Guest instructor

LMU/Smithsonian Tropical Research Institute

Science Day: an outreach event aiming at introducing biological sciences to young children, co-organized with Smithsonian Tropical Research Institute and Gamboa Discovery School

- Guest instructor

UMass Amherst

OEB Science Cafe (http://oebsciencecafe.org): an outreach program for communicating science to the local public

- Co-founder and event organizer

ACADEMIC SERVICES

Thesis/dissertation committee: Cheng-Yu Wu (KMU), Chia-Ning Yu (KMU), Kieran Murphy (University of Tasmania)

Peer reviewer - Proceedings of the Royal Society B; Journal of Experimental Biology; Biological Journal of the Linnean Society; Journal of Anatomy; Journal of Morphology; PLoS ONE; Current Biology; Evolutionary Biology; Ecology, Ethology and Evolution; Ecology and Evolution