Ho, Wei-Chin

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Education

2011 – 2017 **Ph.D. in Ecology and Evolutionary Biology**
University of Michigan, Ann Arbor, USA.
Dissertation: The genotype-phenotype map: origins, properties, and evolutionary consequences (Advisor: Dr. Jianzhi Zhang)

2008 – 2010 **M.S. in Zoology**
National Taiwan University, Taiwan.
Thesis: Inferring speciation history of *Drosophila* by massive parallel sequencing (Advisor: Dr. Chau-Ti Ting)

2004 – 2008 **B.S. in Life Science (Minor in Chemistry)**
National Taiwan University, Taiwan.

Professional Experiences

2017 – now **Postdoctoral Research Associate, Biodesign Center for Mechanisms of Evolution, Arizona State University, USA.** (Advisor: Dr. Michael Lynch)

2010 – 2011 **Research Assistant, Department of Life Science, National Taiwan University, Taiwan.** (Advisor: Dr. Chau-Ti Ting)

Research Interests

Aims: Understanding the facilitating and limiting factors on the rates and outcomes of evolution, seeking the improvement of evolutionary forecasting, and pursuing evolutionary applications to public health.

Current directions: (1) studying how evolution is affected by mutation-related features and how these features evolve, including mutation rates, mutational effects, epistasis, pleiotropy, robustness, and plasticity; (2) evaluating the contributions of deterministic and stochastic forces to evolution; and (3) searching for biochemical, biophysical, and systems approaches for better evolution modeling.

Publications (*co-first authors; @corresponding authors; ^mentored undergrads)

In-prep

- Wei-Chin Ho@, Jadon Gonzales^, & Michael Lynch@ (2021) **Antibiotic treatment affects the distribution of fitness effects of spontaneous mutations.**

Submitted

- Wen Wei*@, Wei-Chin Ho*, Megan G. Behringer, Samuel F. Miller, George Bcharah & Michael Lynch@ (2021) **Rapid evolution of the mutation rate and spectrum in response to environmental and population-genetic challenges.**

- Megan G. Behringer*[@], Wei-Chin Ho*[@], Samuel F. Miller, John Meraz, Gwyneth Boyer & Michael Lynch (2021) **Evolutionary response to resource deprivation: parallelism and nonmonotonicity.** (*BioRxiv*: 865584)

Published

9. Wei-Chin Ho[@], Megan G. Behringer, Samuel F. Miller, Jadon Gonzales[^], Amber Nguyen[^], Meriem Allahwerdy[^], Gwyneth Boyer & Michael Lynch[@] (2021) **Evolutionary dynamics of asexual hypermutators adapting to a novel environment.** *Genome Biol. Evol. In press*

8. Wei-Chin Ho*, Diyan Li*, Qing Zhu & Jianzhi Zhang[@] (2020) **Phenotypic plasticity as a long-term memory easing readaptation to ancestral environments.** *Sci. Adv*. 6(21): eaba3388.

7. Michael Lynch[@] & Wei-Chin Ho (2020) **The limits to estimating population-genetic parameters with temporal data.** *Genome Biol. Evol.* 12(4): 443-455.

6. Wei-Chin Ho & Jianzhi Zhang[@] (2019) **Genetic gene expression changes during environmental adaptations tend to reverse plastic changes even after the correction for statistical nonindependence.** *Mol. Biol. Evol.* 36(3):604-612.

5. Wei-Chin Ho & Jianzhi Zhang[@] (2018) **Evolutionary adaptations to new environments generally reverse plastic phenotypic changes**. *Nat. Comm.* 9: 350.

4. Wei-Chin Ho, Yoshikazu Ohya & Jianzhi Zhang[@] (2017) **Testing the neutral hypothesis of phenotypic evolution.** *Proc. Natl. Acad. Sci. U.S.A.* 114(46): 12219-12224.

3. Calum J. Maclean*, Brian P.H. Metzger*, Jian-Rong Yang*, Wei-Chin Ho, Bryan Moyers & Jianzhi Zhang[@] (2017) **Deciphering the genic basis of yeast fitness variation by simultaneous forward and reverse genetics**. *Mol. Biol. Evol*. 34(10): 2486-2502.

2. Wei-Chin Ho & Jianzhi Zhang[@] (2016) **Adaptive genetic robustness of *Escherichia coli* metabolic fluxes.** *Mol. Biol. Evol.* 33(5): 1164-1176.

1. Wei-Chin Ho & Jianzhi Zhang[@] (2014) **The genotype-phenotype map of yeast complex traits: basic parameters and the role of natural selection.** *Mol. Biol. Evol.* 31(6): 1568-1580.

Public Talks and Conference Oral Presentation

- **"Antibiotic treatment increases fitness effects of spontaneous mutations"**
  Arizona Postdoctoral Research Conference, Phoenix, Sep 2021
- "**Phenotypic changes in organismal adaptation to new environments: plasticity distorts while evolution restores**"
  Annual Meeting of SMBE, Gold Coast, Australia, July 2016
- "**Adaptive origin of the genetic robustness of metabolic fluxes**"
  Annual Meeting of SMBE, Vienna, Austria, July 2015
- "**Prevalent adaptive evolution of morphological traits in the budding yeast *Saccharomyces cerevisiae***"
  Annual Meeting of SMBE, San Juan, Puerto Rico, June 2014

- "**Natural selection for robustness shapes the genetic architecture of yeast complex traits**"
  University of Michigan, Ann Arbor, Jan 2013
- "**Expression divergence between two behavioral races of *Drosophila melanogaster* revealed by whole transcriptome analyses**"
  Annual Meeting of SMBE, Lyon, France, July 2010

Conference Poster Presentation

- **"Antibiotic treatment increases fitness effects of spontaneous mutations"**
  Annual Meeting of SMBE Online, 2021
- "**Evolution of high mutation rates is generally constrained but permitted during intermediate-level cycles of starvation**"
  PEQG at The Allied Genetics Conference Online, April 2020
- "**Evolutionary and ecological dynamics of *Escherichia coli* mutators adapting to a complex environment**"
  Gordon Research Conference on Molecular Mechanisms in Evolution, Easton, MA, USA, May 2019
- "**Experimental evolution of *Escherichia coli* mutators in a complex environment**"
  Annual Meeting of SMBE, Yokohama, Japan, July 2018
- "**Does genetic correlation constrain or facilitate long-term phenotypic evolution?**"
  Annual Meeting of SMBE, Austin, TX, USA, July 2017
- "**Testing the neutral hypothesis of phenotypic evolution using 220 morphological traits in yeast**"
  Annual Meeting of SMBE, Chicago, IL, USA, July 2013
- "**Genome-wide genetic architecture of morphological traits in yeast**"
  Annual Meeting of SMBE, Dublin, Ireland, June 2012
- "**Differential gene expression between two behavioral races of *Drosophila melanogaster***"
  Asian-Pacific *Drosophila* Research Conference, Taipei, Taiwan, May 2011
- "**Searching candidate loci responsible for behavior differentiation between two *Drosophila melanogaster* races by genomic approaches**"
  Symposium on College of Life Science, National Taiwan University, Taipei, Taiwan, June 2010
- "**Incomplete lineage sorting in *Drosophila simulans* clade**"
  Symposium on College of Life Science, National Taiwan University, Taipei, Taiwan, June 2009

Mentoring Experiences

- Mentoring undergraduate researchers: Meriem Allahwerdy (2019), Tristan Chen (2019), Jadon Gonzales (2018-), Logan Graham (2020-), Lily King (2019-), Amber Nguyen (2018-2019), Dannish Tung (2020-2021).
- Mentoring graduate student instructors in the class Supervised Teaching (EEB/MCDB 801), University of Michigan, W2017

Teaching Experiences

- Graduate Student Instructor, Genetics (BIOLOGY 305), University of Michigan, W2017, W2015, W2013, W2012
- Graduate Student Instructor, Evolution, University of Michigan (EEB 390), F2013
- Graduate Student Instructor, Introductory Biology: Ecology and Evolution (BIOLOGY 171), University of Michigan, F2011
- Teaching Assistant, Population Genetics (EEB 5045), National Taiwan University, F2010, F2009, F2008
- Teaching Assistant, Genetics (LS 3007), National Taiwan University, Sp2010
- Teaching Assistant, General Biology (LS 1006), National Taiwan University, F2009
- Teaching Assistant, General Biology Laboratory (LS 1017), National Taiwan University, F2008

Awards and Fellowships

- Young Investigator Travel Award, Annual Meeting of the Society for Molecular Biology and Evolution, 2018-2015
- Rackham One-Term Dissertation Fellowship, Rackham Graduate School, University of Michigan, 2016
- Graduate Travel Award, Annual Meeting of the Society for Molecular Biology and Evolution, 2014, 2010
- Chia-Lun Lo Fellowship ($10,000), Rackham Graduate School, University of Michigan, 2013
- Scholarship of Government Sponsorship for Overseas Study in Systematic Biology (Taiwan), 2011 (declined)
- Dean's Award, College of Life Science, National Taiwan University, 2010
- Outstanding Students Conference Travel Grant, Foundation for the Advancement of Outstanding Scholarship (Taiwan), 2010
- Reward of Excellence, Symposium on College of Life Science, National Taiwan University, 2010

Professional Associations

Genetics Society of America (2020-)
Society for Molecular Biology and Evolution (2010-)
Society for the Study of Evolution (2020-)

Academic Services

- *Ad-hoc* Reviewer for journals:
  - *BMC Genomics*
  - *Ecol. Evol.*
  - *eLife*
  - *Evol. Dev.*
  - *Genome Biol. Evol.*
  - *Mol. Biol. Evol.*
  - *Nat. Eco. Evol.*
  - *Proc. Natl. Acad. Sci. U.S.A.*

  - *PLoS Genetics*
  - *PLoS One*
- Co-organizer, SMBE satellite meeting on Mechanisms of Cellular Evolution, Arizona State University (postponed to 2022)
- Organizer, Diversity, Equity, and Inclusion (DEI) Reading Group, Center for Mechanisms of Evolution, Arizona State University (2020-2021)
- Volunteer, ASU Open Door at the Biodesign Institute (Feb-24-2018, Feb-23-2019, Feb-22-2020)
- Committee Representative, the 13th Annual University of Michigan Early Career Scientists Symposium: Ecology and Evolutionary Biology of Phenotypic Plasticity, University of Michigan, Ann Arbor (Mar-11 2017)
- Co-organizer, special lunch seminar: (EEB's Faculty "Leslie" Panel: A "behind the scenes" look at life from multiple positions in academia), University of Michigan, Ann Arbor (Nov-29 2016)
- Voluntary helpers, Software Carpentry Workshops, University of Michigan, Ann Arbor (Oct-17 2016, Dec-14 2016).
- Seminar Committee Representative, Graduate Researchers in Ecology and Evolutionary Biology, University of Michigan, Ann Arbor (F2016-W2017, F2013-W2014)
- Camp Director, Life Science Camp at National Taiwan University (five-day symposium for 80 selective high school students; July2007)
- Director of Academic and Culture Section, Student Association of the Department of Life Science at National Taiwan University (F2006-Sp2007)
- Deputy Editor, *The Cell*, published (in Chinese) by Student Association of the Department of Life Science at National Taiwan University (Sp2006)

Professional Development

- Rackham-CRLT Seminar on Preparing Future Faculty at University of Michigan, Ann Arbor (May-Jun 2016)
- LS&A ELI/CRLT Graduate Student Instructor Training Course at University of Michigan, Ann Arbor (Jul-Aug 2011)

Programming Skills

C/C++, MATLAB, Perl, Python, R.