

# April (Xinzhu) Wei, Ph.D.

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## Education

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- University of California, Los Angeles** 10/2020 -current  
**Postdoctoral scholar** at Computer Science, Human Genetics, and Computational Medicine  
Advisor: Sriram Sankararaman
- University of California, Berkeley** 07/2018-09/2020  
**Postdoctoral scholar** at Statistics and Integrative Biology  
Advisors: Rasmus Nielsen, Montgomery Slatkin
- University of Michigan, Ann Arbor** 09/2013-07/2018  
**Ph.D.** in Ecology and Evolutionary Biology (04/2018)  
Advisor: Jianzhi “George” Zhang  
Graduate Certificate in Computational Discovery and Engineering  
Professional Development Certificate in Diversity, Equity and Inclusion
- Fudan University, Shanghai, China** 09/2009-06/2013  
**B.S.** in Biology with quantitative emphasis  
Advisors: Li (Felix) Jin, David Waxman

## Publications

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1. Nelson, C.\*, Ardern, Z.\*, Goldberg, T., Meng, C., Kuo, C-H., Ludwig, C., Kolokotronis, S-O., **Wei, X.** *Dynamically evolving novel overlapping gene as a factor in the COVID-19 pandemic.* (2020) eLife (preprinted)
2. Nelson, C., Ardern, Z., **Wei, X.** *OLGenie: estimating natural selection to predict functional overlapping genes.* (2020) Molecular Biology and Evolution (preprinted)
3. Maier, R., Akbari, A., **Wei, X.**, Patterson, N., Nielsen, R., Reich, D. *No statistical evidence for an effect of CCR5-Δ32 on lifespan in the UK Biobank cohort* (2019) Nature Medicine (preprinted)
4. **Wei, X.**, and Zhang, J. *Patterns and mechanisms of diminishing returns from beneficial mutation.* (2019) Molecular Biology and Evolution (preprinted)
5. **Wei, X.**, and Zhang, J. *rK-relationship and pleiotropy by environment interactions resulting from rate-maintenance and rate-efficiency tradeoffs.* (2019) PLOS Biology
6. **Wei, X.**, and Zhang, J. *The optimal mating distance resulting from heterosis and genetic incompatibility.* (2018) Science Advances
7. **Wei, X.**, and Zhang, J. *On the origin and composition of ribosomes.* (2018) Genome Biology and Evolution
8. **Wei, X.**, and Zhang, J. *Why phenotype robustness promotes phenotype evolvability.* (2017) Genome Biology and Evolution
9. **Wei, X.**, and Zhang, J. *The genomic architecture of genotype by environment interactions in natural*

*polymorphism*. (2017) *Genetics*

10. **Wei, X.**, Zhao, L., Lascoux, M., and Waxman, D. *Population structure and the rate of evolution*. (2015) *Journal of Theoretical Biology*
11. **Wei, X.**, and Zhang, J. *A simple method for estimating the strength of natural selection on overlapping genes*. (2015) *Genome Biology and Evolution*

### **Manuscripts in preparation**

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12. A new theory on the cause of genetic dominance
13. Ongoing purifying selection in the human genome
14. Inference of spatiotemporal asymmetric migration rates and population sizes from whole-genome ancestral recombination graphs

### **Academic services**

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**SMBE 2018 symposium organizer** on ‘50 years since Ohno's genome duplication: integration across disciplines and timescales’ (with Kentaro Shimizu and Takashi Makino)

**Reviewer (ad-hoc):** *PLOS Genetics, Genome Biology and Evolution, Genetics, Nature*

**Center of Theoretical Evolutionary Genetics seminar organizer** (09/2019-05/2020)

**UM-EEB departmental seminar organizing committee** (09/2016-04/2018)

### **Conference presentations**

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**Talk**, The Biology of Genomes, CSHL (online due to SARS-CoV-2 pandemic), 2020, on *Inference of Asymmetric Migration Rate and Effective Population Size from Whole-genome Sequences*.

**Talk**, Probabilistic Modeling in Genomics Conference (ProbGen), Aussois, France, 2019, on *Ongoing Purifying Selection in the Human Genome*.

**Invited talk**, Genomics and Modeling Symposium, Kihara Institute for Biological Research, Yokohama City University, Yokohama, Japan. 2018, on *RK-relationship and Pleiotropy by Environment Interactions Resulting from Rate-maintenance and Rate-efficiency Tradeoffs*.

**Talk, Walter M. Fitch symposium (plenary)**, Society for molecular biology and evolution (SMBE), Yokohama, Japan, 2018, on *The Optimal Mating Distance Resulting from Heterosis and Genetic Incompatibility*.

**Talk**, Population, Evolutionary, and Quantitative Genetics Conference (PEQG), Madison, WI, 2018, on *The Optimal Mating Distance Resulting from Heterosis and Genetic Incompatibility*.

**Talk, Walter M. Fitch symposium (plenary)**, SMBE, Austin, TX, USA, 2017, on *A New Theory on the Cause of Genetic Dominance*.

**Talk**, Gordon Research Conference (GRC) on Molecular Mechanisms in Evolution, Easton, MA, USA, 2017, on *A New Theory on the Cause of Genetic Dominance*.

**Talk**, PEQG meeting in The Allied Genetics Conference (TAGC), Genetics Society of America, Orlando, FL, USA, 2016, on *The Genetic Architecture of Gene by Environment Interactions in Yeast*.

**Talk**, SMBE, Gold Coast, Australia, 2016, on *Patterns and Mechanisms of Diminishing Returns from Beneficial Mutations*.

**Talk**, Universitas21 (the leading global network of research universities for the 21<sup>st</sup> century) Undergraduate Research Conference, Tokyo, Japan, 2012, on *Delaying Childbirth Speeds the Rate of Evolution in Human*.

### **Seminars and local meetings**

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**Talk** at Bay Area Population Genetics Meeting, Stanford University (2019)

**Seminar** at Center for Theoretical Evolutionary Genomics, UC Berkeley (2019 × 2)

**Talk** (research) at Ph.D. student recruitment, University of Michigan (2018)

**Seminar** at Stanford University (Invited by Dmitri Petrov, 2016)

**Seminar** at INRA-University of Paris-Sud, France (Invited by Olivier Martin, 2015)

**Seminar** at EEB department, University of Michigan (2015)

### **Selected awards/grants/fellowships**

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**Young Investigator Travel Award**, SMBE 2019

**Walter M. Fitch Award Finalist**, SMBE 2018

**Walter M. Fitch Award Finalist**, SMBE 2017

*(Eight finalists are chosen each year to present their graduate work at the Fitch symposium.)*

**Rackham Dissertation Fellowship** 2018

**Rackham Research Grant** 2017

**Outstanding Undergraduate Dissertation** (1/140), Fudan University 2013

**Honor Graduate**, Bio-elite Program, <http://bio-elite.fudan.edu.cn/>, China 2013

### **Mentorship**

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**Kailey Ferger** (2020), Computational Biology Ph.D. student at the Moorjani lab

**Ziqing Pan** (2018), visiting undergraduate student at the Nielsen lab (Ph.D. student at Columbia University to-be, offer deferred due to the SARS-CoV-2 pandemic)

**Yifan Dai** (2017), visiting undergraduate student at the Zhang lab (SMBE undergraduate travel award awardee, on to bioinformatics master program at Copenhagen University, Denmark)

### **Teaching**

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**Graduate Student Instructor** for Bio305 (Genetics), winter 2014 and winter 2015

**Graduate Student Instructor** for Bio173 (Intro Bio Lab), fall 2014

## **Languages and skills**

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**Programming/scripting:** C++, MATLAB, Mathematica, Perl, Python, R

**Scripting simulators:** msPrime, SLiM,  $\partial a \partial i$

**Languages:** English, Chinese, German

## **References**

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### **Jianzhi “George” Zhang**

Ph.D. advisor

Marshall W. Nirenberg Collegiate Professor and Associate Chair for Graduate Studies

Department of Ecology and Evolutionary Biology, University of Michigan

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### **Rasmus Nielsen**

Postdoc advisor

Professor, Departments of Integrative Biology and Statistics, UC Berkeley

<https://www.nielsenlab.org>

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### **Montgomery Slatkin**

Postdoc co-advisor

Professor Emeritus, Department of Integrative Biology, UC Berkeley

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