

# YIXIN ZHAO, PH.D.

## PERSONAL INFORMATION

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**Current Institute:** Simons Center for Quantitative Biology, Cold Spring Harbor Laboratory

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## SUMMARY

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### Key points:

- Over 10 years experience of utilizing leading-edge molecular biology experiments and computational tools.
- Familiar with genome editing techniques in *Drosophila*, including TALEN and CRISPR/Cas9.
- Proficient in analyzing Next Generation Sequencing data, including mRNA and small RNA seq.
- In-depth knowledge in functional evolution and biostatistics.
- Participant for several projects funded by National Natural Science Foundation of China (NSFC, grant number: 91231117, 31130069 and 31170308).
- Working with principle investigator as co-reviewer for eLife.
- Good at presentation and communication, 6 years of teaching experience (for high school students) and working as teaching assistant in Sun Yat-Sen University (Top 10 university of China).
- Self-motivated, fast-learner, good at team work and passionate for new knowledge.

## ACADEMIC POSITIONS

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<b>Computational Postdoctoral Fellow</b> <i>Adviser: Prof. Adam Siepel, Cold Spring Harbor Laboratory, New York, USA</i>	<i>03/2018 - Present</i>
<b>Research Assistant</b> <i>Adviser: Prof. Chung-I Wu, Sun Yat-sen University, Guangzhou, PRC</i>	<i>07/2016 - 03/2018</i>

## EDUCATION

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<b>Ph.D. Biochemistry and Molecular Biology</b> <i>Adviser: Prof. Chung-I Wu, Sun Yat-sen University, Guangzhou, PRC</i>	<i>09/2011 - 06/2016</i>
<b>B.Sc. Biotechnology</b> <i>Advisers: Profs. Chung-I Wu and Tian Tang, Sun Yat-sen University, Guangzhou, PRC</i>	<i>09/2007 - 06/2011</i>

## THESIS

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<b>Functional Evolution of Adaptive MicroRNAs in <i>Drosophila</i> Spermatogenesis</b> <i>Ph.D. Thesis</i>	<i>06/2016</i>
<ul style="list-style-type: none"><li>• Knocked out both young and old miRNAs using TALEN in <i>Drosophila melanogaster</i> and <i>D. simulans</i>.</li><li>• Studied miRNA divergence and functionality in spermatogenesis.</li><li>• Investigated divergent miRNA regulation network.</li></ul>	
<b>The Application of Anti-microRNA Oligoribonucleotides for the Study of Conserved MiRNAs' Effects on Their Targets</b> <i>B.Sc. Thesis</i>	<i>06/2011</i>
<ul style="list-style-type: none"><li>• Used AMOs to silence two conserved miRNAs in <i>D. melanogaster</i>, <i>D. simulans</i> and <i>D. pseudoobscura</i>.</li><li>• Measured miRNA and target gene expression levels. Unraveled weak repressions of miRNAs on their targets.</li></ul>	

**Experimental Skills:**

- Molecular Biology: DNA and RNA isolation, PCR, qPCR, gene cloning, vector construction, culture of bacteria, immunostaining, etc.
- Microscopes: light, fluorescence, confocal, electron, etc.
- Genetics in *Drosophila*: gene disruption (TALEN), transgene, genetic screens, cross scheme design, etc.
- Others: *Drosophila* handling, tissue dissection, microinjection, etc.

**Computational Skills:**

- Programming: Python, R, bash, MATLAB.
- RNA-seq analysis tools: Bowtie, Tophat, HISAT2, StringTie, Seqmonk, etc.
- miRNA analysis tools: miRdeep2, PITA, TargetScan, miRanda, etc.
- Differential expression analysis: Ballgown, DESeq2, EdgeR, etc.
- Database: familiar with NCBI Gene Expression Omnibus, FlyBase, miRBase, modENCODE, ENCODE, UCSC Genome DB, etc.
- Others: L<sup>A</sup>T<sub>E</sub>X, Microsoft Office, Graphpad Prism, etc.

PUBLICATIONS

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**Published:**

- **Zhao Y**, Shen X, Tang T, Wu CI. 2019. Weak regulation of many targets is cumulatively powerful - a reply to Seitz on microRNA functionality. **Mol Biol Evol**. <http://dx.doi.org/10.1093/molbev/msz055>.
- Lu G, **Zhao Y**, Yang H, Lan A, Shi S, Liufu Z, Huang Y, Tang T, Xu J, Shen Xu, Wu CI. 2018. Death of new microRNA genes in *Drosophila* via gradual loss of fitness advantages. **Genome Res** 28, 9, 1309-1318.
- Lu G, **Zhao Y**, Liufu Z, Wu CI. 2018. On the possibility of death of new genes - evidence from the deletion of de novo microRNAs. **BMC Genomics** 19(1), 388
- **Zhao Y**, Lin P, Liufu Z, Yang H, Lyu Y, Shen X, Wu CI, Tang T. 2018. Regulation of large number of weak targets - New insights from twin-microRNAs. **Genome Biol Evol** 10(5): 1255-1264.
- **Zhao Y**, Shen X, Tang T, Wu CI. 2017. Weak regulation of many targets is cumulatively powerful - An evolutionary perspective on microRNA functionality. **Mol Biol Evol** 34(12): 3041-3046.
- Liufu Z, **Zhao Y**, Guo L, Miao G, Xiao J, Lyu Y, Shi S, Tang T, Wu CI. 2017. Redundant and incoherent regulations of multiple phenotypes suggest microRNAs' role in stability control. **Genome Res** 27:1665-1673.
- Lyu Y, Shen Y, Li H, Chen Y, Guo L, **Zhao Y**, Hungate E, Shi S, Wu CI, Tang T. 2014. New microRNAs in *Drosophila*—birth, death and cycles of adaptive evolution. **PLoS Genet** 10(1): e1004096.

**In Preparation:**

- **Zhao Y**, Yang H, Lin P, Liufu Z, Lu G, Xu J, Tang T, Wen H, Wu CI. 2018. Testing the Red Queen hypothesis on *de novo* new genes - Run or die in the evolution of new microRNAs. BioRxiv. doi: <https://doi.org/10.1101/345769>.
- Lu G, **Zhao Y**, *et al.* miRNAs collectively serve as canalization agent.
- Liufu Z, Miao G, **Zhao Y**, Shen X, Tang T. MicroRNAs repress target genes at different strength across *Drosophila* species

Google Scholar: <https://scholar.google.com/citations?user=ZkWi8isAAAAJ&hl=en>

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CONFERENCE AND PRESENTATION

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- Studying RNA half life using PRO-seq and RNA-seq**  
*Oral Presentation, QB, CompBio and Bioinformatics Seminar at CSHL, NY, USA* 03/2019
- Testing the Red Queen hypothesis on *de novo* new genes - Run or die in the evolution of new microRNAs**  
*Poster, "Germ Cells" meeting at CSHL, NY, USA* 10/2018
- Weak effects cumulatively produce large defects - microRNA robustness function in *Drosophila* stress resistance**  
*Poster, "Regulatory and Non-coding RNA" meeting at CSHL, NY, USA* 05/2018
- How many target genes does a regulator regulate? — New insight from twin-microRNAs and their many weak targets**  
*Poster, "The Annual Meeting of Society for Molecular Biology and Evolution" at Austin, Texas, USA* 07/2017
- How miRNAs affect phenotype — Evidence from the *Drosophila* miR-310 cluster**  
*Oral Presentation, "Evolutionary Genetics and Genomics" at CSHL (Asia), Suzhou, PRC* 10/2014

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SELECTED AWARDS AND HONORS

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- QiaoYin Scholarships for Excellent Student (Two consecutive years)**  
Sun Yat-sen University 2013 - 2015
- Outstanding Graduate and Outstanding Graduation Thesis**  
Sun Yat-sen University 2011
- First Prize Merit Scholarships for Excellent Student (Three consecutive years)**  
Sun Yat-sen University 2007 - 2010
- Third Prize, 11th "Challenge Cup" National Undergraduate Curricular Academic Science and Technology Work Competition** 2009
- Outstanding Innovation Award**  
World International Property Organization 2007

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TEACHING EXPERIENCE

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- Part-time Teacher, Chemistry** 10/2012 - 06/2014  
*Alpschool, Guangzhou, PRC*
- Part-time Teacher, Chemistry** 12/2011 - 09/2012  
*TAL (Tomorrow Advancing Life) Education Group, Guangzhou, PRC*
- Teaching Assistant, Evolutionary Biology** 04/2012 - 07/2012  
*Sun Yat-sen University, Guangzhou, PRC*

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LANGUAGES

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**English:** Fluent | **Mandarin:** Native Speaker | **Cantonese:** Native Speaker