

# Wei Zhou, PhD

Postdoctoral Associate in the Jackson Laboratory

## EDUCATION

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2011-2016	PhD candidate in biology, University of Pennsylvania Advisor: Dr. Dustin Brisson	GPA: 3.95/4.00
2009-2011	MS in Animal Science, University of Tennessee, Knoxville Advisor: Dr. Jun Lin	GPA: 4.00/4.00
2005-2009	BS in biology, Fudan University, China Advisor: Dr. Weida Huang	GPA: 3.37/4.00

## INTEREST AND EXPERTISE

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Host-microbe interaction  
Evolution of disease systems  
Microbiome  
Genomics and metagenomics

## SCIENTIFIC SKILLS

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**Computational biology:** Statistical analysis (R, SAS), Programming (C++), Sequence analysis (Sequencher, VectorNTI, BLAST, QIIME, Geneious), Functional metagenomics (MEGAN, PICRUSt, Tax4FUN), Metabolism and pathways (KEGG), Protein structure prediction (PyMol, Rosetta, MODELLER, LOOPY), Phylogenetics (BEAST, MrBayes, PHYLIP, Figtree)

**Molecular biology:** Cloning, Mutagenesis (site-directed/cassette-based), Protein expression and purification (in *E.coli*, yeast and CHO systems), Immunoassays (Western blot, ELISA).

**Cell biology:** Culturing of CHO cells, RNA interference using siRNA-expressing constructs, GFP and SEAP reporter system.

**Microbiology:** PCR identification, Handling BSL2 pathogens, Culturing from environmental samples, Random transposon mutagenesis, Susceptibility test.

**Metagenomics:** Library preparation (environmental/gut microbiome), Functional cloning, High-throughput screening, 16s rDNA Sequencing.

## PUBLICATIONS

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1. **Zhou, W.** and D. Brisson. Correlation between antigenicity and variability in the *vls* antigenic variation system of *Borrelia burgdorferi*. *BMC infectious diseases*. (submitted)
2. Bian, Y., S. Zhang, **W. Zhou**, R. Zhu, Siqintuya and C. Li. Analysis of genetic admixture in Uyghur using the 26 Y-STR loci system. *Scientific reports*. (in press)
3. Seifert, S.N., C.E. Khatchikian, **W. Zhou** and D. Brisson. **2015** Evolution and population genomics of the Lyme borreliosis pathogen, *Borrelia burgdorferi*. *Trends in Genetics* *31*, 201-207.
4. **Zhou, W.** and D. Brisson. **2014**. Potentially conflicting selective forces that shape the *vls* antigenic variation system in *Borrelia burgdorferi*. *Infection, genetics and evolution* *27*, 559-565.
5. Brisson, D., **W. Zhou**, B.L. Jutras, S. Casjens, B. Stevenson. **2013**. Distribution of cp32 prophages among Lyme disease-causing spirochetes and natural diversity of their lipoprotein-encoding *erp* loci. *Applied and Environmental Microbiology* *79*, 4115-4128.
6. **Zhou, W.**, Y. Wang, J. Lin. **2012**. Functional cloning and characterization of antibiotic resistance genes from the chicken gut microbiome. *Applied and Environmental Microbiology* *78*, 3028-3032.
7. Bian, Y., **W. Zhou**, Y. Zhao, X. Li, W. Geng, R. Hao, Q. Yang, W. Huang. **2011**. High-dose siRNAs upregulate mouse Eri-1 at both transcription and post-transcription levels. *PLoS ONE*

## PRESENTATIONS

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1. Variability and antigenicity of amino acid residues in the *Borrelia burgdorferi* surface antigen VlsE. **2015**. Biology Department Retreat, University of Pennsylvania, Philadelphia, PA.
2. Evolutionary constraints on the *vls* antigenic variation system in *Borrelia burgdorferi*. **2015**. Prokaryotic Seminar, Perelman School of Medicine, University of Pennsylvania, PA.
3. Variability and antigenicity of amino acid residues in the *Borrelia burgdorferi* surface antigen VlsE. **2014**. Ecolunch, University of Pennsylvania. Philadelphia, PA.
4. Conflicting selective forces that shaped the *vls* antigenic variation system in *Borrelia burgdorferi*. **2013**. Ecolunch, University of Pennsylvania. Philadelphia, PA.
5. Characterizing the antibiotic resistance gene reservoir in the chicken gut microflora. **2011**. Conference of Research Workers in Animal Diseases, Chicago, IL.

## AWARDS AND HONORS

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2014-2016	NIH T32 Emerging Infectious Diseases Pre-Doctoral Fellow
2011-Present	Gamma Sigma Delta Honor Society of agriculture
2011-Present	Golden Key International Honor Society
2011	The NC-1041 Enteric Diseases student awards
2010	ESPN-UT Athletics Department Graduate Student Award
2007-2009	People's Scholarship, Fudan University
2005	Freshman Scholarship, Fudan University

## RESEARCH EXPERIENCES

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- 2011-2016**                    **Department of Biology, University of Pennsylvania**
- Developed a novel ELISA method to map the polyclonal epitopes in VlsE, an important surface antigen in *B. burgdorferi*.
  - Constructed alanine scanning mutant library of the protein antigen VlsE using site-directed and cassette-based mutagenesis methods
  - Computationally modeled *vlsE* antigenic variation in *B. burgdorferi* for better understanding of the within-host dynamics of the parasite.
  - Developed a Bayesian-based method to phase NGS reads from ticks infected by multiple strains of *B. burgdorferi*.
  - Computationally analyzed genetic variation among *erp* alleles that facilitate immune suppression when infecting vertebrate hosts.
- 2012**                            **Roland Dunbrack Lab, Fox Chase Cancer Center**
- Computationally predicted the structures of the surface exposed loops in different mutants of the protein antigen VlsE.
  - Computationally predicted epitopes in the protein antigen VlsE by conducting random antibody-antigen docking analysis
- 2009-2011**                    **Department of Animal Science, the University of Tennessee, Knoxville**
- Constructed metagenomic libraries of chicken gut microflora.
  - Screened, cloned and characterized novel antibiotic resistance genes from the chicken gut microflora and tested the activities of the novel antibiotic resistance genes in foodborne pathogens.
- 2007-2009**                    **Department of Biology, Fudan University**
- Explored the potential of prokaryotic and eukaryotic expression systems to recombinantly express Dicer-like proteins
  - Identified transcriptional factors responsible for the upregulation of *meri-1* expression induced by high-dose siRNAs, which suppresses RNA interference as a negative feedback.

- Determined binding affinities of different viral NS5a mutants to human VAP-33 protein.

## **TEACHING EXPERIENCES**

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### **2012-2013 Department of Biology, University of Pennsylvania**

- Molecular biology of life. Supervisor: Dr. Phillip Rea, Dr. Mark Goulian, Dr. Michael Lampson, Dr. Dustin Brisson.
- Molecular biology lab. Supervisor: Dr. Karen Hogan.

### **2010 Department of Animal Science, the University of Tennessee, Knoxville**

- Introduction to animal sciences. Supervisor: Dr. Michael O. Smith

## **OUTREACH EXPERIENCES**

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### **2012-2015 Student representative, annual biology department retreat**

- Designed flyers for the event
- Organized student poster presentation sessions
- Prepared food and drink for the event

### **2012-2016 Lab coordinator, High School Science Day**

- Conducted scientific demonstrations for 6-10 high school students each year