

# CHUN-HUI GAO (高春辉)

Ph. D, Microbiology, bioinformatician, data scientist and R user.

I am broadly interested in the data mining, particularly integration and visualization, of biological, industrial and social datasets, which comes from high-throughput screening, Next-Generation Sequencing (NGS), public databases and so on.



## WORK EXPERIENCE

2019   2016	<b>Post-doc Lecturer</b> College of Resources and Environment 📍 Huazhong Agricultural University
2015   2013	<b>Post-doctoral Fellow</b> School of Life Science 📍 University of Science and Technology of China
2012	<b>Lecturer</b> School of Food and Biological Engineering 📍 Hubei University of Technology

## EDUCATION

2012   2007	<b>PhD., Microbiology</b> Huazhong Agricultural University 📍 Wuhan, CN <ul style="list-style-type: none"><li>• Thesis: The characterization of a novel ArsR-type regulator in <i>Mycobacterium tuberculosis</i> and the characterization of molecular basis of isoniazid drug resistance in Mycobacteria</li></ul>
2008   2004	<b>B. S., Biotechnology</b> Huazhong Agricultural University 📍 Wuhan, CN <ul style="list-style-type: none"><li>• bachelor-master continuous program</li></ul>
2016	<b>The SCELSE Summer Course</b> Singapore Centre for Environmental Life Sciences Engineering 📍 Singapore, SG
2018/11/17   2018/11/15	<b>土壤微生物新理论新技术研讨会暨培训班</b> 中科院南京土壤所 📍 Nanjing, CN
2018	<b>“不忘初心，牢记使命”教工党员培训班</b> 韶山干部培训学院 📍 Shaoshan, CN

## CONTACT

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## SKILLS

- Molecular microbiology
- High-throughput sequencing
- Microbial ecology
- Bioinformatics
- Programming
- Data visualization

Made with the R package  
[pagedown](#).

The source code is available at  
[github.com/gaospecial/cv](https://github.com/gaospecial/cv).

Last updated on 2019-11-04.



## RESEARCH SUMMARY

2007  
|  
2009

### Whole genome protein-protein and TF-promoter interactome in *M. tuberculosis*

College of Life Science and Technology

📍 Huazhong Agricultural University

We used a bacterial two-hybrid method to construct the whole genome protein-protein interaction (PPI) network, and a bacterial one-hybrid method to construct the whole genome transcriptional regulator (TF) - promoter interaction network in *M. tuberculosis*.

2009  
|  
2012

### Novel transcriptional regulator in mycobacteria

College of Life Science and Technology

📍 Huazhong Agricultural University

- An ArsR-like transcriptional factor recognizes a conserved sequence motif and positively regulates the expression of *phoP* in mycobacteria
- A TetR-like regulator broadly affects the expressions of diverse genes in *Mycobacterium smegmatis*
- Characterization of a Novel ArsR-Like Regulator Encoded by Rv2034 in *Mycobacterium tuberculosis*

2009  
|  
2014

### The intra-action between three RelBE modules and inter-action between RelBE3/SirR

College of Life Science and Technology

📍 Huazhong Agricultural University

- Characterization of the Interaction and Cross-Regulation of Three *Mycobacterium tuberculosis* RelBE Modules.
- Characterization of the interaction between a SirR family transcriptional factor of *Mycobacterium tuberculosis*, encoded by Rv2788, and a pair of toxin-antitoxin proteins RelJ/K, encoded by Rv3357 and Rv3358.

2013  
|  
2014

### The regulation of secondary metabolite ( $\epsilon$ -poly lysine) biosynthesis in *Streptomyces albus* ZPM

School of Life Science

📍 University of Science and Technology of China

- Identification of genetic variations associated with epsilon-poly-lysine biosynthesis in *Streptomyces albulus* ZPM by genome sequencing.

2014  
|  
2015

### The distribution of type III-A CRISPR-Cas system in *Staphylococcus aureus* clinical isolates

School of Life Science

📍 University of Science and Technology of China

- Identification and functional study of type III-A CRISPR-Cas systems in clinical isolates of *Staphylococcus aureus*.

### Professional Competence

#### Microbiology

- Transcriptional regulator
- Drug resistance
- Pathogenesis
- Persistence

#### Microbial ecology

- Social interaction
- Co-culture
- Multispecies biofilm

#### NGS

- (meta-)Genomics
- (meta-)RNA-seq
- Microbiome
- ChIP-seq

#### Bioinformatics

- Linux
- Perl
- R

#### Visualization

- ggplot2
- ggVennDiagram
- Reproducible research

#### Skills

- Write R package
- Statistics
- Illustration
- Bibliometric
- Data mining

2012  
|  
2019

### The regulatory mechanism of drug susceptibility in mycobacteria

State Key Laboratory of Agricultural Microbiology  
📍 Huazhong Agricultural University

- InbR, a TetR family regulator, binds with isoniazid and influences multidrug resistance in *Mycobacterium bovis* BCG
- OxiR specifically responds to isoniazid and regulates isoniazid susceptibility in mycobacteria
- Cross-talk between the three furA orthologs in *Mycobacterium smegmatis* and the contribution to isoniazid resistance

2016  
|  
2019

### Unearthing the mechanism of soil biofilms

College of Resources and Environment  
📍 Huazhong Agricultural University

- *Bacillus subtilis* biofilm development in the presence of soil clay minerals and iron oxides
- Co-culture of soil biofilm isolates enables the discovery of novel antibiotics
- Divergent Influence to a Pathogen Invader by Resident Bacteria with Different Social Interactions
- Soil biofilms: microbial interactions, challenges, and advanced techniques for *ex-situ* characterization
- Impact of metal oxide nanoparticles on in vitro DNA amplification



## TEACHING EXPERIENCE

2018/7/18	RNA-seq从入门到精通 华中农业大学暑期生物信息学培训班	📍 武汉
2018/6/8	土壤生物化学课题组导师宣讲会 undergraduate students	📍 Wuhan, CN
2018/5/24	土壤微生物组 undergraduate students	📍 Wuhan, CN
2016/12/1	土壤中的多物种生物膜 graduated students	📍 Wuhan, CN



## CONFERENCES



## ORAL PRESENTATIONS

2018	细菌的江湖——土壤微生物互作研究 华中农业大学资源与环境学院博士后交流会	📍 武汉
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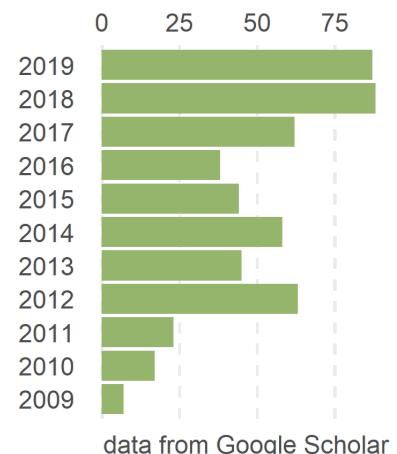
2017	微生物之间的协作有利于细菌的存活和代谢 全国土壤生物生化与土壤健康学术研讨会	📍 上海
2016	土壤生物膜的形成和群落演替 中国土壤学会第十三次全国会员代表大会	📍 西安

## CONFERENCE ABSTRACT

2017	Divergent influence to pathogen invader by environmental isolates with different social interactions The 2nd Global Soil Biodiversity Conference	📍 Nanjing, CN
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## PUBLICATIONS

2019	<b>Soil Biofilms: Microbial Interactions, Challenges, and Advanced Techniques for Ex-Situ Characterization</b> <i>Soil Ecology Letters</i> , 2019, 1(3-4):85-93 · Cai, Peng; Sun, Xiaojie; Wu, Yichao; Gao, Chun-Hui; Mortimer, Monika; Holden, Patricia A.; Redmile-Gordon, Marc; Huang, Qiaoyun	· Citation = 539 · H-index = 12 · I10-index = 13
	<b>Cross-Talk between the Three furA Orthologs in <i>Mycobacterium Smegmatis</i> and the Contribution to Isoniazid Resistance</b> <i>The Journal of Biochemistry</i> , 2019, 166(3):237-243 · Gao, Chun-Hui; Wei, Wen-Ping; Tao, Hui-Ling; Cai, Li-Kai; Jia, Wan-Zhong; Hu, Lihua; Yang, Min	
	<b>Divergent Influence to a Pathogen Invader by Resident Bacteria with Different Social Interactions</b> <i>Microbial Ecology</i> , 2019, 77(1):76-86 · Gao, Chun-Hui; Zhang, Ming; Wu, Yichao; Huang, Qiaoyun; Cai, Peng	
	<b>Impact of Metal Oxide Nanoparticles on in Vitro DNA Amplification</b> <i>PeerJ</i> , 2019, 7:e7228 · Gao, Chun-Hui; Mortimer, Monika; Zhang, Ming; Holden, Patricia A.; Cai, Peng; Wu, Shan; Xin, Yuexing; Wu, Yichao; Huang, Qiaoyun	



**Soil Biofilm Formation Enhances Microbial Community Diversity and Metabolic Activity**

**Environment International**, 2019, 132:105116

- Wu, Yichao; Cai, Peng; Jing, Xinxin; Niu, Xueke; Ji, Dandan; Ashry, Noha Mohamed; Gao, Chun-Hui; Huang, Qiaoyun

**OxiR Specifically Responds to Isoniazid and Regulates Isoniazid Susceptibility in Mycobacteria**

**FEMS Microbiology Letters**, 2019

- Yang, Min; Zhang, Li; Tao, Hui-Ling; Sun, Yuan-Chao; Lou, Zhong-Zi; Jia, Wan-Zhong; Hu, Li-Hua; Gao, Chun-Hui

2018

**Impact of Soil Clay Minerals on Growth, Biofilm Formation, and Virulence Gene Expression of Escherichia Coli O157:H7**

**Environmental Pollution**, 2018, 243:953-960

- Cai, Peng; Liu, Xing; Ji, Dandan; Yang, Shanshan; Walker, Sharon L.; Wu, Yichao; Gao, Chun-Hui; Huang, Qiaoyun

**Co-Culture of Soil Biofilm Isolates Enables the Discovery of Novel Antibiotics**

**bioRxiv**, 2018, 353755

- Gao, Chun-Hui; Cai, Peng; Li, Zhunjie; Wu, Yichao; Huang, Qiaoyun

**Towards a Better Understanding of the Aggregation Mechanisms of Iron (Hydr)Oxide Nanoparticles Interacting with Extracellular Polymeric Substances: Role of pH and Electrolyte Solution**

**Science of The Total Environment**, 2018, 645:372-379

- Lin, Di; Cai, Peng; Peacock, Caroline L.; Wu, Yichao; Gao, Chun-Hui; Peng, Wanxi; Huang, Qiaoyun; Liang, Wei

**Metabolism, Survival, and Gene Expression of Pseudomonas Putida to Hematite Nanoparticles Mediated by Surface-Bound Humic Acid**

**Environmental Science: Nano**, 2018

- Ouyang, Kai; L. Walker, Sharon; Yu, Xiao-Ying; Gao, Chun-Hui; Huang, Qiaoyun; Cai, Peng

**Recent Advances in Microbial Electrochemical System for Soil Bioremediation**

**Chemosphere**, 2018, 211:156-163

- Wu, Yichao; Jing, Xinxin; Gao, Chun-Hui; Huang, Qiaoyun; Cai, Peng

2017

**Survival of Escherichia Coli O157:H7 in Various Soil Particles: Importance of the Attached Bacterial Phenotype**

**Biology and Fertility of Soils**, 2017, 53(2):209-219

- Liu, Xing; Gao, Chun-Hui; Ji, Dandan; Walker, Sharon L.; Huang, Qiaoyun; Cai, Peng

**Bacillus Subtilis Biofilm Development in the Presence of Soil Clay Minerals and Iron Oxides**

**npj Biofilms and Microbiomes**, 2017, 3(1):4

- Ma, Wenting; Peng, Donghai; Walker, Sharon L.; Cao, Bin; **Gao, Chun-Hui**; Huang, Qiaoyun; Cai, Peng

**Effects of Humic Acid on the Interactions between Zinc Oxide Nanoparticles and Bacterial Biofilms**

**Environmental Pollution**, 2017

- Ouyang, Kai; Yu, Xiao-Ying; Zhu, Yunlin; **Gao, Chun-Hui**; Huang, Qiaoyun; Cai, Peng

**Metal-Free Inactivation of E. Coli O157:H7 by Fullerene/C<sub>3</sub>N<sub>4</sub> Hybrid under Visible Light Irradiation**

**Ecotoxicology and Environmental Safety**, 2017, 136:40-45

- Ouyang, Kai; Dai, Ke; Chen, Hao; Huang, Qiaoyun; **Gao, Chun-Hui**; Cai, Peng

自然环境中的多物种生物膜:研究方法及社群相互作用

**农业资源与环境学报**, 2017, (01):6-14

- 孙晓洁; 高春辉; 黄巧云; 蔡鹏

大肠杆菌表面感应机制研究进展

**浙江大学学报(农业与生命科学版)**, 2017, (06):685-690

- 王立亮; 高春辉; 吴一超; 黄巧云; 蔡鹏

2016

**Identification and Functional Study of Type III-A CRISPR-Cas Systems in Clinical Isolates of Staphylococcus Aureus**

**International Journal of Medical Microbiology**, 2016, 306(8):686-696

- Cao, Linyan; **Gao, Chun-Hui**; Zhu, Jiade; Zhao, Liping; Wu, Qingfa; Li, Min; Sun, Baolin

2015

**Identification of Genetic Variations Associated with Epsilon-Poly-Lysine Biosynthesis in Streptomyces Albulus ZPM by Genome Sequencing**

**Scientific Reports**, 2015, 5:9201

- Wang, Lin; **Gao, Chun-Hui**; Tang, Nan; Hu, Songnian; Wu, Qingfa

**InbR, a TetR Family Regulator, Binds with Isoniazid and Influences Multidrug Resistance in Mycobacterium Bovis BCG**

**Scientific Reports**, 2015, 5:13969

- Yang, Min; **Gao, Chun-Hui**; Hu, Jialing; Zhao, Lei; Huang, Qiaoyun; He, Zheng-Guo

2014

**Characterization of the Interaction between a SirR Family Transcriptional Factor of *Mycobacterium*-Tuberculosis, Encoded by Rv2788, and a Pair of Toxin-Antitoxin Proteins RelJ/K, Encoded by Rv3357 and Rv3358**

**The FEBS journal**, 2014, 281(12):2726-2737

· Yang, Min; Gao, Chun-Hui; Hu, Jialing; Dong, Chao; He, Zheng-Guo

**A Novel marRAB Operon Contributes to the Rifampicin Resistance in *Mycobacterium Smegmatis***

**PLoS ONE**, 2014, 9(8):e106016

· Zhang, Haiwei; Gao, Long; Zhang, Jiaoling; Li, Weihui; Yang, Min; Zhang, Hua; Gao, Chun-Hui; He, Zheng-Guo

2012

**Characterization of a Novel ArsR-Like Regulator Encoded by Rv2034 in *Mycobacterium Tuberculosis***

**PloS One**, 2012, 7(4):e36255

· Gao, Chun-Hui; Yang, Min; He, Zheng-Guo

**A TetR-like Regulator Broadly Affects the Expressions of Diverse Genes in *Mycobacterium Smegmatis***

**Nucleic Acids Research**, 2012, 40(3):1009-1020

· Yang, Min; Gao, Chun-Hui; Cui, Tao; An, Jingning; He, Zheng-Guo

2011

**An ArsR-like Transcriptional Factor Recognizes a Conserved Sequence Motif and Positively Regulates the Expression of phoP in Mycobacteria**

**Biochemical and Biophysical Research Communications**, 2011, 411(4):726-731

· Gao, Chun-Hui; Yang, Min; He, Zheng-Guo

2010

**Global Protein-Protein Interaction Network in the Human Pathogen *Mycobacterium Tuberculosis* H37Rv**

**Journal of Proteome Research**, 2010, 9(12):6665-6677

· Wang, Yi; Cui, Tao; Zhang, Cong; Yang, Min; Huang, Yuanxia; Li, Weihui; Zhang, Lei; Gao, Chun-Hui; He, Yang; Li, Yuqing; Huang, Feng; Zeng, Jumei; Huang, Cheng; Yang, Qiong; Tian, Yuxi; Zhao, Chunchao; Chen, Huanchun; Zhang, Hua; He, Zheng-Guo

**Characterization of the Interaction and Cross-Regulation of Three *Mycobacterium Tuberculosis* RelBE Modules**

**PLoS ONE**, 2010, 5(5):e10672

· Yang, Min; Gao, Chun-Hui; Wang, Yi; Zhang, Hua; He, Zheng-Guo

2009

**Dissecting Transcription Regulatory Pathways through a New Bacterial One-Hybrid Reporter System**

**Genome Research**, 2009, 19(7):1301-1308

· Guo, Manman; Feng, Hui; Zhang, Jun; Wang, Wenqin; Wang, Yi; Li, Yuqing; Gao, Chun-Hui; Chen, Huanchun; Feng, Ying; He, Zheng-Guo

**Archaeal Eukaryote-like Orc1/Cdc6 Initiators Physically Interact with DNA Polymerase B1 and Regulate Its Functions**

Proceedings of the National Academy of Sciences, 2009, 106(19):7792-7797

· Zhang, Lu; Zhang, Lei; Liu, Yi; Yang, Shifan; Gao, Chun-Hui; Gong, Hongchao; Feng, Ying; He, Zheng-Guo