

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

EDUCATION

2012 2007	PhD., Microbiology Huazhong Agricultural University 📍 Wuhan, CN · 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
2008 2004	B. S., Biotechnology Huazhong Agricultural University 📍 Wuhan, CN · bachelor-master continuous program
2016	The SCELSE Summer Course Singapore Centre for Environmental Life Sciences Engineering 📍 Singapore, SG
2018/11/17 2018/11/15	土壤微生物新理论新技术研讨会暨培训班 中科院南京土壤所 📍 Nanjing, CN
2018	“不忘初心，牢记使命”教工党员培训班 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.

Last updated on 2019-11-04.



RESEARCH SUMMARY

2007
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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
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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 (ϵ -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

2018/9/11

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

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

2017/10/19
Divergent influence to pathogen invader by environmental isolates with
different social interactions
The 2nd Global Soil Biodiversity Conference
📍 Nanjing, CN
2017/10/15

🗓 CONFERENCE PARTICIPATION

2019/7/28
第一届生物信息学人才发展论坛
present
📍 Zhuhai, CN
2019/7/27

2019/7/16
2019年“双一流”农科联盟暨学科建设研讨会
present
📍 Wuhan, CN

2019/6/14
深圳市合成生物产业发展研讨会
present
📍 Shenzhen, CN

2019/5/6
中国肠道大会
present
📍 Beijing, CN
2019/5/4

2018/9/24
Sino-German Symposium on Microbiomics and Plant Health
present
📍 Wuhan, CN

2018/8/8
未来组学术研讨会
present
📍 Wuhan, CN

👑 SCHOOL HONORS

2012
农业微生物学国家重点实验室优秀研究生
10 each year
📍 Wuhan, CN
2011

2012
优秀毕业研究生
n.a.
📍 Wuhan, CN

2011
三好研究生
n.a.
📍 Wuhan, CN
2010

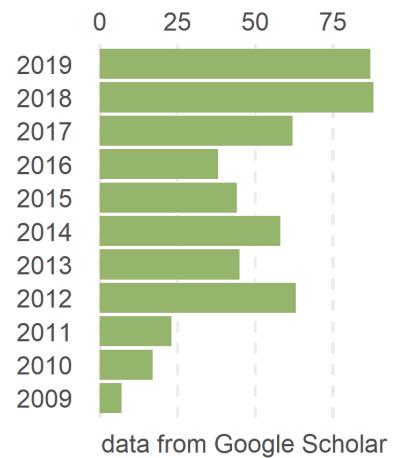
2009
三好研究生
n.a.
📍 Wuhan, CN
2008

2008	优秀毕业生 5 out of 45	📍 Wuhan, CN
2007	三好学生 10 out of 45	📍 Wuhan, CN
2006	优秀团员 5 out of 45	📍 Wuhan, CN
2005	三好学生 10 out of 45	📍 Wuhan, CN
2004		

Publications

- 2019 **Soil Biofilms: Microbial Interactions, Challenges, and Advanced Techniques for Ex-Situ Characterization**
Soil Ecology Letters, 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
- Cross-Talk between the Three furA Orthologs in *Mycobacterium Smegmatis* and the Contribution to Isoniazid Resistance**
The Journal of Biochemistry, 2019, 166(3):237-243
 · Gao, Chun-Hui; Wei, Wen-Ping; Tao, Hui-Ling; Cai, Li-Kai; Jia, Wan-Zhong; Hu, Lihua; Yang, Min
- Divergent Influence to a Pathogen Invader by Resident Bacteria with Different Social Interactions**
Microbial Ecology, 2019, 77(1):76-86
 · Gao, Chun-Hui; Zhang, Ming; Wu, Yichao; Huang, Qiaoyun; Cai, Peng
- Impact of Metal Oxide Nanoparticles on in Vitro DNA Amplification**
PeerJ, 2019, 7:e7228
 · Gao, Chun-Hui; Mortimer, Monika; Zhang, Ming; Holden, Patricia A.; Cai, Peng; Wu, Shan; Xin, Yuexing; Wu, Yichao; Huang, Qiaoyun
- Extraction of Extracellular Polymeric Substances (EPS) from Red Soils (Ultisols)**
Soil Biology and Biochemistry, 2019, 135:283-285
 · Wang, Shuang; Redmile-Gordon, Marc; Mortimer, Monika; Cai, Peng; Wu, Yichao; Peacock, Caroline L.; **Gao, Chun-Hui**; Huang, Qiaoyun

- Citation = 539
- H-index = 12
- i10-index = 13



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/C₃N₄ 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