

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

- | | | |
|----------------------------|--|---|
| 2020

2019-11-3 | ● 数据科学家
北京热心肠生物技术研究院有限公司 | 📍 北京, 中国 |
| 2019-10-1

2016-3-2 | ● 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

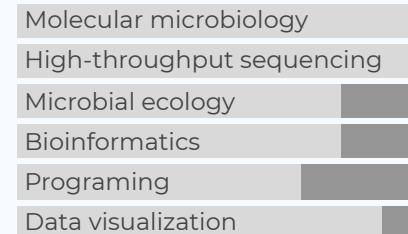
2004 | ● B. S., Biotechnology
Huazhong Agricultural University | 📍 Wuhan, CN |
| | • bachelor-master continuous program | |
| 2016 | ● The SCELSE Summer Course
Singapore Centre for Environmental Life Sciences Engineering | 📍 Singapore, SG |
| 2018-11-17

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 |

CONTACT

- ✉ gaospecial@gmail.com
- /github github.com/gaospecial
- `}
 [gaospecial](https://gaospecial.github.io)
- `}
 [@gaospecial](https://twitter.com/gaospecial)
- `}
 bio-spring.info
- `}
 (86) 13147133164

SKILLS



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

The source code is available at
github.com/gaospecial/cv.

Last updated on 2020-06-16.

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

2007

|

2009



RESEARCH SUMMARY

2009

|

2012

●

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

|

2014

●

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*

2013

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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.

2014

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2015

●

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.

●

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
- **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

2016
|
2019

▢ 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

- 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

▢ ORAL PRESENTATIONS

- 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
|
2017-10-15
● “Divergent influence to pathogen invader by environmental isolates with different social interactions”
The 2nd Global Soil Biodiversity Conference
📍 Nanjing, CN

▣ CONFERENCE PARTICIPATION

- 2019-7-28
|
2019-7-27
● 第一届生物信息学人才发展论坛
present
📍 Zhuhai, CN
- 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
|
2019-5-5
● 中国肠道大会
present
📍 Beijing, CN
- 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

มงกุฎ SCHOOL HONORS

- 2012
|
2011
● 农业微生物学国家重点实验室优秀研究生
10 each year
📍 Wuhan, CN
- 2012
● 优秀毕业研究生
n.a.
📍 Wuhan, CN
- 2011
|
2010
● 三好研究生
n.a.
📍 Wuhan, CN

2009 2008	● 三好研究生 n.a.	📍 Wuhan, CN
2008	● 优秀毕业生 5 out of 45	📍 Wuhan, CN
2007 2006	● 三好学生 10 out of 45	📍 Wuhan, CN
2006 2005	● 优秀团员 5 out of 45	📍 Wuhan, CN
2005 2004	● 三好学生 10 out of 45	📍 Wuhan, CN

≡ PUBLICATIONS

- 2020 ● **Seven Facts and Five Initiatives for Gut Microbiome Research**
Protein Cell, 2020, 11(6):391–400
 - Li, Danyi; Gao, Chun-Hui; Zhang, Faming; Yang, Ruifu; Lan, Canhui; Ma, Yonghui; Wang, Jun
- 2019 ● **Soil Biofilms: Microbial Interactions, Challenges, and Advanced Techniques for Ex-Situ Characterization**
Soil Ecol. Lett., 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**
J Biochem, 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**
Microb Ecol, 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

- Citation = 539
- H-index = 12
- I10-index = 13



- **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
- **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 Microbiol Lett, 2019, 366(10):
• 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**

Biol Fertil 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**
FEBS J., 2014, 281(12):2726–2737

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

- **A Novel marR 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***

Nucl. Acids Res., 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***

Biochem. Biophys. Res. Commun., 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**

J. Proteome Res., 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 Res., 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**

PNAS, 2009, 106(19):7792–7797

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