

# 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<br> <br>2019-11-3     | ● <b>数据科学家</b><br>北京热心肠生物技术研究院有限公司                                 | 📍 北京, 中国  |
| 2019-10-1<br> <br>2016-3-2 | ● <b>Post-doc Lecturer</b><br>College of Resources and Environment | 📍 Huazhong Agricultural University              |
| 2015<br> <br>2013          | ● <b>Post-doctoral Fellow</b><br>School of Life Science            | 📍 University of Science and Technology of China |
| 2012                       | ● <b>Lecturer</b><br>School of Food and Biological Engineering     | 📍 Hubei University of Technology                |

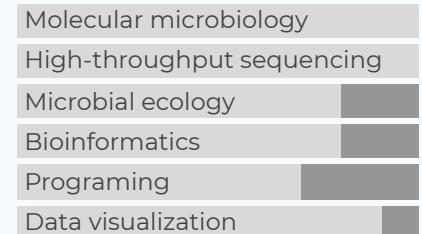
## EDUCATION

- |                               |   |                 |
|-------------------------------|---|-----------------|
| 2012<br> <br>2007             | ● <b>PhD., Microbiology</b><br>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<br> <br>2004             | ● <b>B. S., Biotechnology</b><br>Huazhong Agricultural University   | 📍 Wuhan, CN     |
|                               | • bachelor-master continuous program  |                 |
| 2016                          | ● <b>The SCELSE Summer Course</b><br>Singapore Centre for Environmental Life Sciences Engineering   | 📍 Singapore, SG |
| 2018-11-17<br> <br>2018-11-15 | ● <b>土壤微生物新理论新技术研讨会暨培训班</b><br>中科院南京土壤所   | 📍 Nanjing, CN   |

## CONTACT

- ✉ [gaospecial@gmail.com](mailto:gaospecial@gmail.com)
- /github [github.com/gaospecial](https://github.com/gaospecial)
- ✉ [gaospecial](#)
- ✉ [gaospecial](#)
- 🔗 [bio-spring.info](https://bio-spring.info)
- 📞 (86) 13147133164

## SKILLS



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

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

Last updated on 2020-10-20.

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*.

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

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 albus* 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*.

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



## 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

## BOOKS 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

## CROWN SCHOOL HONORS

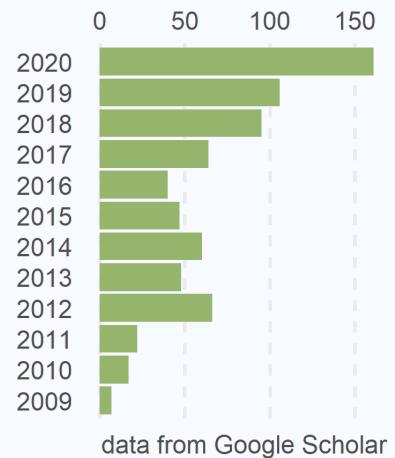
- 2012  
|  
2011  
● **农业微生物学国家重点实验室优秀研究生**  
10 each year  
📍 Wuhan, CN
- 2012  
● **优秀毕业研究生**  
n.a.  
📍 Wuhan, CN
- 2011  
|  
2010  
● **三好研究生**  
n.a.  
📍 Wuhan, CN

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

## ≡ PUBLICATIONS

- 2020 ● **The Initial Inoculation Ratio Regulates Bacterial Coculture Interactions and Metabolic Capacity**  
*The ISME Journal*, 2020, 1–12  
· Gao, Chun-Hui; Cao, Hui; Cai, Peng; S, SJ.
- **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
- **活出健康: 免疫力就是好医生 = Get healthy**  
*人民卫生出版社*, 2020  
· 王立祥; 张文宏; 王贵强
- **Cd(II)-Binding Transcriptional Regulator Interacts with Isoniazid and Regulates Drug Susceptibility in Mycobacteria**  
*J Biochem*, 2020  
· Yang, Min; Jia, Shi-Hua; Tao, Hui-Ling; Zhu, Chen; Jia, Wan-Zhong; Hu, Li-Hua; Gao, Chun-Hui
- 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

• Citation = 742  
• H-index = 14  
• I10-index = 18



- **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**  
*Microp 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
- **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

2017

- **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
- **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/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**  
*FEBS J.*, 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***  
*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