**Ruanbao Zhou, Ph.D.**

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(a) Professional Preparation

Anhui Normal University, China Biology B. S. 1985

Anhui Normal University, ChinaPlant Physiology, Biochemistry M.S. 1988

Peking University, Beijing, China Plant Molecular Biology Ph.D. 1997

**(b) Appointments**

South Dakota State University, USA Professor 07/2016-

South Dakota State University, USA Associate Professor 2008-06/2016

Michigan State University Assistant Professor (Research) 2004-2008

Michigan State University Postdoctoral Scientist 2001-2004

Michigan State University Postdoctoral Scientist 1998-2001

Anhui Normal University, China Guest Professor (since 2000)

Anhui Normal University, China Associate Professor 1995-1998

Anhui Normal University, China Assistant Professor 1988-1994

**(c) Honors and Awards**

2016 Gamma Sigma Delta Outstanding Research Award, SDSU.

2011 Pat and Jo Cannon Intellectual Property Commercialization Award on engineering cyanobacteria, South Dakota State University (SDSU) Faculty Recognition.

2010 Oversea outstanding scholar awarded by State Administration of Foreign experts Affairs, China Academy of Science.

2003 Wang Kuancheng Research Fellowship, Chinese Academy of Science

1998 Outstanding Ph.D. dissertation award, Peking University.

**(d) Selected publications (total >50 publications)**

1. Johnson TJ, J Gibbons, L Gu, **R Zhou**\* (corresponding), and W R Gibbons (2016). MOLECULAR GENETIC IMPROVEMENTS OF CYANOBACTERIA TO ENHANCE THE INDUSTRIAL POTENTIAL OF THE MICROBE: A REVIEW (Accepted).
2. Johnson TJ, L Gu, M Hildreth **R Zhou** and W R Gibbons (2016). EVALUATING VIABLE CELL INDICATORS FOR FILAMENTOUS CYANOBACTERIA AND THEIR APPLICATION (Accepted for publishing in JMBFS journal)
3. Johnson TJ, A Jahandideh, IC. Isaac, E L Baldwin, K Muthukumarappan, **R Zhou,** W Gibbons (2016). Determining the optimal nitrogen source for large-scale cultivation of filamentous cyanobacteria. *J Appl Phycol,* First Online, 20 August 2016
4. Johnson TJ, C. Halfmann, JD. Zahler, **R Zhou**, W Gibbons (2016). Increasing the tolerance of filamentous cyanobacteria to next-generation biofuels via directed evolution. *Algal Research*, 18: 250–256
5. Chen K, Zhu H, Gu L, Tian S and **R Zhou** (2016) Target gene inactivation in Anabaena sp. PCC 7120. *Bio-protocol*, 6:15, Aug 5, 2016 (published online).
6. Johnson TJ, Zahler JD, Baldwin EL, **Zhou R**, Gibbons WR. (2016). Optimizing cyanobacteria growth conditions in a sealed environment to enable chemical inhibition tests with volatile chemicals. *J Microbiol Methods*. 126:54-9.
7. Xu X, L Gu, P He, and **R Zhou** (2015). Characterization of five putative aspartate aminotransferase genes in the N2-fixing heterocystous cyanobacterium Anabaena sp. strain PCC 7120. *Microbiology,* 161(6):1219-30.
8. Hao J, B Lian, **R Zhou**, H Liu, L Shi, C Liu (2015) Microbial flocculant combined ferric trichloride facilitates floating aggregation of Microcystis aeruginosa for efficient removal. *Desalination and Water Treatment*. (2015) 1–11
9. **Zhou R,** L. Gu, W. Gibbons and C. Halfmann (2015). On the Cyanofactory Floor: Next-generation biofuel. *International Innovation, A renewable future* V178:118-119.
10. Chen K, X. Xu, L. Gu, and **R. Zhou** (2015). Simultaneous Gene Inactivation and Promoter Reporting in Cyanobacteria. *Appl Microbiol Biotechnol*. 99(4):1779-
11. Johnson TJ, Hildreth MB, Gu L, **Zhou R**, Gibbons WR (2015). Testing a dual-fluorescence assay to monitor the viability of filamentous cyanobacteria. *J Microbiol Methods*. 113:57-64.
12. **Zhou R**, OA Koksharova (2014) HepK, a protein-histidine kinase from the cyanobacterium Anabaena sp. strain PCC 7120, binds sequence-specifically to DNA. *Trends in Bacteriology*, 1:3.
13. Halfmann C, L Gu, W Gibbons, and **R. Zhou** (2014) Genetic Engineering Cyanobacteria to Convert CO2, Water and Light into the Long-Chain Hydrocarbon Farnesene. *Appl Microbiol Biotechnol.* 98:9869–9877.
14. Halfmann C L. Gu, and **R. Zhou**  2014. Engineering Cyanobacteria for Production of a Cyclic Hydrocarbon fuel from CO2 and H2O. *Green Chem*. 16 (6), 3175 - 3185
15. Chen K, X. Xu, L. Gu, and **R. Zhou**. 2014. Simultaneous Gene Inactivation and Promoter Reporting in Cyanobacteria. (under review in Applied Microbiology and Biotechnology).
16. Zhang Y., P. Luethy, **R. Zhou\***, and Lee Kroos (\*corresponding author). 2013. Residues in Conserved Loops of Intramembrane Metalloprotease SpoIVFB Interact with Residues near the Cleavage Site in Pro-σK. J Bacteriol. 195(21):4936-4946.
17. **Zhou\* R**., K. Chen, X. Xiang, L. Gu and L. Kroos. 2013. Features of Pro-σK important for cleavage by SpoIVFB, an intramembrane metalloprotease. J. Bacteriol. 195(12):2793-806).
18. Gu L, X Xiang, D Raynie, W Gibbons and **R Zhou**. 2012. Biosolar Conversion of CO2 and H2O into Long-chain Alcohol. Proceedings from Sun Grant National Conference: Science for Biomass Feedstock Production and Utilization, 2:3.17.
19. **Zhou, R\*** and W. Gibbons. 2015. Patent on Genetically Engineered Cyanobacteria

(<http://www.freshpatents.com/RUANBAO-ZHOU-BROOKINGS-invdirz.php>)

1. Chen K, Gu L, Xiang X, Lynch M and **Zhou R\***. (2012) Identification and Characterization of Five Intramembrane Metalloproteases in *Anabaena variabilis* *J. Bacteriol.* 194(22):6105-15
2. **Zhou R**., C. Cusumano, D. Sui, R. M. Garavito and L. Kroos (2009) Intramembrane proteolytic cleavage of a membrane-tethered transcription factor by a metalloprotease depends on ATP. *Proc. Natl. Acad. Sci. USA.* 106(38):16174-9.
3. Harry K, **Zhou R**, L. Kroos, Melville S. 2009. Sporulation and enterotoxin (CPE) synthesis are controlled by the sporulation-specific sigma factors SigE and SigK in Clostridium perfringens. *J. Bacteriol*. 191: 2728-2742
4. Imamura D, **R Zhou**, M. Feig and L. Kroos (2008) Evidence that the Bacillus subtilis SpoIIGA protein is a novel type of signal-transducing aspartic protease. *J Biol Chem*. 283(22):15287-99.
5. Wolk CP, Q Fan, **R Zhou**, G. Huang, S. Lechno-Yossef, T Kuritz and E Wojciuch (2007) Paired cloning vectors for complementation of mutations in the cyanobacterium sp. strain PCC 7120. *Arch. Microbiol*. 188:551–563
6. **Zhou R**, L Kroos (2005) Serine proteases from two cell types target different components of a complex that governs regulated intramembrane proteolysis of pro-σK during Bacillus subtilis development. *Mol. Microbiol.* 58: 835-846
7. Prince H, **R Zhou**, L Kroos (2005) Substrate requirements for regulated intramembrane proteolysis of Bacillus subtilis Pro-σK. *J. Bacteriol*. 187: 961-971
8. Ramirez ME, P Hebbar, R Zhou, CP Wolk, SE Curtis (2004) Anabaena sp. strain PCC 7120 gene devH is required for synthesis of a heterocyst glycolipid layer. *J. Bacteriol.* 187: 2326-2331
9. **Zhou R**, L Kroos (2004) BofA protein inhibits intramembrane proteolysis of Pro-sK in an intercompartmental signaling pathway during Bacillus subtilis sporulation. *Proc. Natl. Acad. Sci. USA*. 101:6385-6390
10. **Zhou R**, CP Wolk (2003) A two-component system mediates developmental regulation of biosynthesis a heterocyst polysaccharide. *J. Biol. Chem.* 278: 19939-19946
11. **Zhou R**, CP Wolk (2002) Identification of an akinete marker gene in Anabaena variabilis. *J. Bacteriol.* 184:2529-2532
12. Tao Li, Huang X., R. Zhou, Liu Y., Li B., Nomura C., and Zhao J (2002) Differential expression and localization of Mn and Fe superoxide dismutases in the heterocystous cyanobacterium Anabaena sp. Strain PCC 7120. *J. Bacteriol*. 184:5096-5013
13. Liu Y, **R Zhou**, J Zhao (2000) Molecular cloning and sequencing of sodB gene from heterocystous cyanobacterium Anabaena sp. PCC 7120. *Biochem. Biophys. Acta*.1491: 248-252
14. **Zhou R**, X Wei, N Jiang, Y Dong, J Zhao (1999) Biochemical characterization of HetR protein of Anabaena sp. PCC7120. In Phototrophic Prokaryotes, (Peschek G. A., W. Loffelhardt, G. Schmetterer eds.), Kluwer Academic/Plenum Publishers, New York, pp. 523-528
15. **Zhou R**, X Wei, N Jiang, H Li, Y Dong, J Zhao (1998) Evidence that HetR is an unusal serine-type protease. *Proc. Natl. Acad. Sci. USA* 95:4959-4963
16. **Zhou R**, Z Cao, J Zhao (1998) Characterization of HetR turnover in Anabaena sp. PCC 7120. *Arch. Microbiol*. 169: 417-42
17. **There are another 20 publications not listed here.**

**(e) Grants** (last 5 years, received over $2 million competitive Research Funding as **PI only**)

1. USDA-NIFA, N2-Fixing Cyanobacteria Harnessed For Biosolar Production Of Nitrofertilizer,

**PI:** R. Zhou; $150,000, 05/2015-04/2017

1. NSF (US-National Science Foundation), Regulated intramembrane proteolytic activation of membrane-tethered transcription factors. **PI**, $179,160; 2008-2012
2. NSF(US-National Science Foundation), Photosynthetic conversion of CO2 and low grade heat from biorefineries into linalool, **PI**; $300,000; 11/2011-10/2014.
3. NSF-MRI(US-National Science Foundation): Acquisition of an Ultra High Performance Liquid-Chromatography Tandem Mass-Spectrometer for a Multi-user Core Mass-Spectrometry Facility," Key personnel, $789,467; 2009-2012.
4. DOT (US-Department of Transportation), Biosolar conversion of CO2 and H2O into myrcene by engineered cyanobacteria. **PI**, $310,616; 2011-2015.
5. NASA-USA, Cyanofactory platform to photosynthetically produce advanced fuels and chemicals, while providing bioregenerative life support services. **PI**, $750,000; 11/2011-10/2014
6. USDA-NIFA （US-Department of Agriculture）, CO2–Emerging Feedstock for 3rd Generation Biofuel Production. **PI**, $34,000; 2010-2012.
7. USDA-NIFA （US-Department of Agriculture）equipment grant, **PI**, $25,000; 2009-2010
8. SDSU-AES grant, Developing a novel cyanobacterium to convert CO2 to fuel ethanol. **PI**, $20,000; 2008-2010.
9. SDSU-TTO grant: Biosolar synthesis of ethanol from CO2 and H2O. **PI**, $60,000 12/2010-12/2011.
10. USDA-SBIR (US-Department of Agriculture), Engineering Photosynthetic Cyanobacteria to Produce the Energy-Dense Fuel Farnesene from Carbon Dioxide. **Awarded PI**: Xianling Xiang (my postdoc), **Co-PI (**Zhou**)**; $100,000; 06/2011-02/2014.
11. SD-CBRD (South Dakota Governor Center for Bioprocessing Research and Development): Engineering cyanobacteria to produce biofuels and high value chemicals from carbon dioxide and water, PI, ca. $220,000, 2009-2013

**(f) Research interest keywords**

Cyanobacteria, genetic engineering and synthetic biology, nitrogen fixation,

biochemistry and molecular biology, molecular genetics of bacteria, intramembrane metalloproteases,

biofuels and microbial products, and *Bacillus subtilis*.