

Dr Yunpeng Wang

**Yunpeng Wang**

**School of Chemistry, BSRC, University of St Andrews, Fife, KY169ST**

E-mail: yw72@st-andrews.ac.uk

I am a highly motivated synthetic biology researcher with keen interest in promoter engineering, pathway modification and compounds production using synthetic biology methods and protein expression and purification. As a researcher in molecular biology, metabolic engineering, and synthetic biology I have valuable experience in production of small molecules and natural products through introduction and engineering of pathways. I have experience in elevating production titres using pathway and promoter engineering. I also have skills in protein production and purification. I have expertise in both LC and LCMSMS analysis which I apply to both metabolomics and natural product identification.

**Employment record**

**Research Fellow, School of Chemistry, University of St. Andrews, Professor R. J. M. Goss, May 2017-present.**

**Major work:**

The possible biosynthesis gene clusters in 5 actinomycetes were predicted using antiSMASH. Then the libraries of the strains were constructed. After the screening 21 clusters from the cosmid and BAC library of strains were obtained. All the clusters were transferred into series of *Streptomyces* for heterologous expression. After the analysis of LCMSMS and GNPS (Global Natural Products Social Molecular Networking) Several novel nature products could be discovered. 10 promoters were also used to increase to nature compound production. After RT-qPCR screening I found one of the 10 promoters could enhance the gene clusters expression effectively.

A wild type flavin-dependent viral halogenase (VirX1) from a cyanophage was discovered. VirX1 with strong iodination and bromination activity could catalyze a wide range of substrate. By this way, the substrate activity could be improved significantly. VirX1 was expressed, purified and the structure of VirX1 was studied through X-ray crystallographic analysis. In order to identify key catalytic residues, I have done site directed mutagenesis. And then the mutant proteins were expressed and purified. Then the activity was studied.

**Education**

**PhD School of Chemistry engineering, Tianjin university Professor Weiwen Zhang, 2012—2016.**

**Major work:**

The biosynthetic pathway of 3-HP was constructed in cyanobacterium *Synechocystis* sp. PCC 6803. and then optimized the system through modification of pathway and promoter engineering methods. Finally, the efforts led to a production of 837.18 mg L<sup>-1</sup>.

The metabolic responses of cyanobacteria to 3-HP internally produced were first determined using proteomic and metabolomic methods and provides an important basis for further engineering the cyanobacteria of high 3-HP production.

**Master School of Chemistry engineering, Tianjin university Professor Xiaohong Kou, 2009—2012.**

**Major work:**

Dr Yunpeng Wang

Snake venom kallikrein which could be used for treatment of hypertension was expressed in *E. coli*, *pichia pastoris* and wheat germ cell free systems. After the optimization, separation and purification snake venom kallikrein activity was detected in wheat germ cell free system for the first time. This result indicated the production of snake venom kallikrein in protein synthesis systems was feasible.

### **Bachelor School of Pharmaceutical, Zhejiang university of technology, 2005-2009**

#### **Major work:**

The effect of steroidal dehydrogenation in different ionic liquids using immobilized microbial cells was studied. After the filter of different ionic liquids, the effect of steroidal dehydrogenation catalyzed by immobilized microbial cells was improved.

#### **Skills and Knowledge**

Extensive experience in target metabolites production, metabolic pathway modification, promoter screening, proteomic and metabolomic analysis, protein expression and purification, site specific mutations.

Extensive experience in molecular biology, synthetic biology and metabolic engineering.

Extensive experience in  $\lambda$  RED recombination, Gibson assembly, Golden Gate, CRISPR and other genome editing technologies.

Extensive experience in using related IT skills such as ChemOffice, Snapgene, antiSMASH, GNPS, SEVIE.

#### **Administrative Experience**

Trained and supervised undergraduate students in research and experiment plan design and conduct (PHD and postdoctoral period)

Participated in the writing of papers and successful grant proposals (PhD period).

#### **Publications**

1. **Yunpeng Wang**, Emily Abraham, Rebecca J. M. Goss. Genome Informed Natural Product Discovery Pipeline. In preparation.

2. Danai S. Gkotsi, Hannes Ludewig, Sunil V. Sharma, Jack A. Connolly, Jagwinder Dhaliwal, **Yunpeng Wang**, William P. Unsworth, Richard J. K. Taylor, Matthew M.W. McLachlan, Stephen Shanahan, James H. Naismith, and Rebecca J. M. Goss\*. A Marine Viral Halogenase that Iodinated Diverse Substrates. *Nature Chemistry*. 2019

3. **Yunpeng Wang**, Tao Sun, Xingyan Gao, Mengliang Shi, Lina Wu, Lei Chen, Weiwen Zhang. Biosynthesis of platform chemical 3-hydroxypropionic acid (3-HP) directly from CO<sub>2</sub> in cyanobacterium *Synechocystis* *Metabolic Engineering* 2016.

4. **Yunpeng Wang**, Lei Chen, Weiwen Zhang. Proteomic and metabolomic analyses reveal metabolic responses to 3-hydroxypropionic acid synthesized internally in cyanobacterium *Synechocystis* sp. PCC 6803. *Biotechnology for Biofuels* 2016.

Dr Yunpeng Wang

5. **Yunpeng Wang**, Wentao Xu, Xiaohong Kou, Yunbo Luo, Yanan Zhang, Biao Ma, Mengsha Wang, Kunlun Huang Establishment and optimization of a wheat germ cell-free protein synthesis system and its application in venom kallikrein. *Protein expression and purification* 2012.

6. Xiaohong Kou, **Yunpeng Wang**, Wentao Xu, Zuoqi, Zhaohui Xue. Microbial Detection Technology Research Progress. *2010 International Conference On Computer and Communication Technologies in Agriculture Engineering (CCTAE 2010)* 2010,6.

7. Yanan Zhang, Wentao Xu, Biao Ma, Kunlun Huang, Menwei Song, Ning Zhang, Ying Zhang, Zhifang Zhai, **Yunpeng Wang**, Yunqing Dai, Yunbo Luo. Isolation and characterization of a kallikrein-like enzyme from Agkistrodon halys pallas snake venom. *Journal of the Science of Food and Agriculture*,2011.