

# **Data-driven tailoring design of biological systems: from data collection to algorithms development**

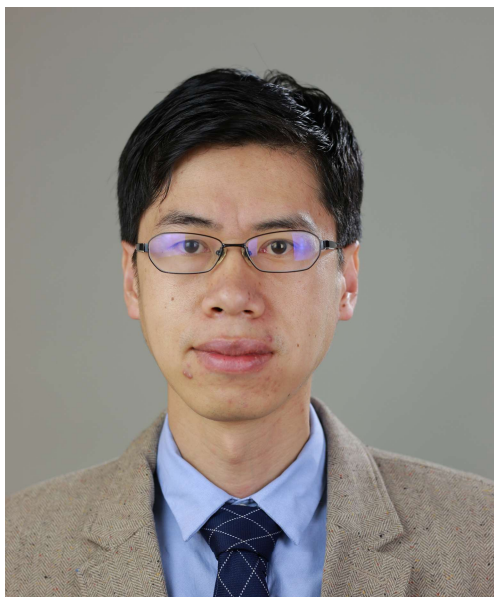
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## **Abstract**

Synthetic biology depicts a promising future for rational design of biological systems: building up with well-defined and standardized biological parts, a synthetic biological system can be predictably and quantitatively assembled and constructed. However, due to the complexity of biological systems, this ambition still faces a lot of challenges. In past decades, rapid development of gene synthesis and assembly techniques has improved the ability to construct biological samples with various genetic background; while with the help of the next generation sequencing (NGS) and high-throughput phenotype analysis technologies, one can easily convert the above samples into high quality genotypic-phenotypic association data at very low cost. These new technologies make it possible to precisely design of complex biological systems with reliable and standardized data-driven learning strategies. In this talk, we will introduce our recent efforts on tailoring design of biological systems with data driven strategies, including the collection of genotypic-phenotypic association data, the development of learning algorithms, and finally the design of complex biological systems with the help of data. In this talk, we will also discuss the opportunities and challenges of machine learning strategies in the design of biological systems based.

## **Speaker's biography**

Dr. ZHANG Chong received his B.Sc. and Ph.D. in chemical engineering at Department of Chemical Engineering, Tsinghua University in 2002 and 2008, respectively. In 2011, he was promoted as an Associate Professor at the Dept. of Chemical Engineering, Tsinghua University. His research interests include: synthetic microbial cell factories, evolution engineering of microbes and biomolecules, genotype phenotype association based on next generation sequencing and high-throughput phenotyping technologies. He has published more than 100 peer reviewed papers in scientific journals including Nature Communications, Nucleic Acid Research, Metabolic Engineering, ACS Synthetic Biology. He is the inventor of 20 Chinese patents, 8 of them has been licensed.



## **Brief CV**

### **Chong Zhang, Ph.D.**

Associate Professor

Department of Chemical Engineering, Tsinghua University

#### **Education:**

BS Chemical Engineering, Tsinghua University, China, 1998

Ph.D. Biochemical Engineering, Tsinghua University, China, 2008

#### **Professional Career:**

2008-2010: Tsinghua University, Postdoc.

2019-2011: Department of Chemical Engineering, Tsinghua University, Assistant Professor

2011- date: Department of Chemical Engineering, Tsinghua University, Associate Professor

#### **Research Interests:**

1. Metabolic engineering
2. Systems and Synthetic Biology
3. High-throughput microbial phenotyping technology

## **Selected publications**

1. Zhang C\*. *Nature Communications*, (2018), 1–25. <http://doi.org/10.1038/s41467-018-04899-x>

2. Zhang C\*. *Nucleic Acids Research*, (2018), 1–18. <http://doi.org/10.1093/nar/gky572>
3. Dai JB\* and Zhang C\*. *Metabolic Engineering*, (2018) 47, 294–302.
4. Zhang C\*. *Metabolic Engineering*, (2017) 39, 159–168.
5. Zhang C\*. *Metabolic Engineering*, (2016) 33, 41–51.
6. Zhang C\*. *ACS Synthetic Biology*, (2017) <http://doi.org/10.1021/acssynbio.7b00247>