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Institute of Synthetic Biology
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Education & Degrees

June 2018	Ph.D. in Biochemical engineering	East China University of Science and Technology
June 2012	B.E. in Bioengineering	Huazhong Agricultural University

Positions

Dec 2023 – Present	Professor	SIAT, CAS
Feb 2023 – Dec 2023	Associate professor	SIAT, CAS
Feb 2018 – Dec 2022	Postdoctoral researcher	Chalmers University of Technology

Key Publications

1. **Chen Y** & Nielsen J (2022) Yeast has evolved to minimize protein resource cost for synthesizing amino acids. **Proceedings of the National Academy of Sciences**
2. **Chen Y** & Nielsen J (2021) In vitro turnover numbers do not reflect in vivo activities of yeast enzymes. **Proceedings of the National Academy of Sciences** [recommended in Faculty Opinions]
3. **Chen Y**#, van Pelt-KleinJan E# et al (2021) Proteome constraints reveal targets for improving microbial fitness in nutrient-rich environments. **Molecular Systems Biology** (# co-first author)
4. **Chen Y** et al (2021) Yeast optimizes metal utilization based on metabolic network and enzyme kinetics. **Proceedings of the National Academy of Sciences** [picked up by Mirage News]
5. **Chen Y** & Nielsen J (2019) Energy metabolism controls phenotypes by protein efficiency and allocation. **Proceedings of the National Academy of Sciences** [recommended in Faculty Opinions, and picked up by ScienceDaily etc.]

Grants

2024 – 2026	Shenzhen Science and Technology Program	0.75 M CNY
2024 – 2026	Shenzhen Medical Research Fund	0.8 M CNY
2024 – 2026	Chinese Academy of Sciences Talent Program	X M CNY
2024 – 2026	National Talent Program	X M CNY
2023 – 2028	National Key Research and Development Program of China	1.2 M CNY

Supervision

Zhihao Liu	PhD student (Guest)	2023 – Present
Yongzhu Li	Master student	2023 – Present
Siyu Han	Master student (Guest)	2023 – Present
Jingyu Yang	Research assistant	2023 – Present

Teaching Experience

- Mathematical modeling of energy metabolism. Lecture at Chalmers University of Technology. Sweden. Oct 10, 2022
- Constraint-based modeling of metabolism. Lecture at Shandong University. Virtual. Nov 10, 2021

Presentations

- Understanding metabolism by constraint-based models. The 207th Academic Seminar of the Institute of Synthetic Biology by Shenzhen Institute of Synthetic Biology. Virtual. Jan 11, 2022 (Oral)
- Understanding metabolism by constraint-based models. International Forum for Young Scholars by Institute of Biological and Molecular Smart Manufacturing of ZJU-Hangzhou Global Scientific and Technological Innovation Center. Virtual. May 29, 2021 (Oral)
- Understanding metabolism by constraint-based models. International Forum for Young Scholars by School of Life Sciences of Nanjing University. Virtual. May 26, 2021 (Oral)
- Yeast optimizes metal utilization based on metabolic network and enzyme kinetics. International Forum for Young Scholars by School of Biotechnology of East China University of Science and Technology. Virtual. May 15, 2021 (Oral)
- Modeling energy metabolism with proteome constraints in *E. coli* and yeast. Annual Meeting of Novo Nordisk Foundation Center for Biosustainability. Lyngby, Denmark. Sept 4, 2019 (Poster)

Peer Review Experience

Serving as peer reviewer for scientific journals including PNAS, Nature Communications, Current Opinion in Systems Biology, Bioinformatics, Analytical Chemistry, Biotechnology and Bioengineering, Biotechnology Journal, ChemBioChem and FEMS Microbiology Letters.
https://www.webofscience.com/wos/author/record/2235260

Full List of Publications

Google scholar website: https://scholar.google.com/citations?hl=en&user=tArfdEcAAAAJ

# equal contribution, * corresponding author

- Peer-reviewed research articles

1. Li F#*, **Chen Y**#, Anton M#, Nielsen J* (2022) GotEnzymes: an extensive database of enzyme parameter predictions. ***Nucleic Acids Research*** **(IF: 14.9)**
2. **Chen Y**, Nielsen J* (2022) Yeast has evolved to minimize protein resource cost for synthesizing amino acids. ***Proceedings of the National Academy of Sciences*** **(IF: 11.1)**
3. **Chen Y**, Nielsen J* (2021) In vitro turnover numbers do not reflect in vivo activities of yeast enzymes. ***Proceedings of the National Academy of Sciences*** **(IF: 11.1)**
4. **Chen Y**#, van Pelt-KleinJan E#, van Olst B, Douwenga S, Boeren S, Bachmann H, Molenaar D, Nielsen J*, Teusink B* (2021) Proteome constraints reveal targets for improving microbial fitness in nutrient-rich environments. ***Molecular Systems Biology*** **(IF: 9.9)**
5. **Chen Y**, Li F, Mao J, Chen Y, Nielsen J* (2021) Yeast optimizes metal utilization based on metabolic network and enzyme kinetics. ***Proceedings of the National Academy of Sciences*** **(IF: 11.1)**
6. **Chen Y**, Sun Y, Liu Z, Dong F, Li Y, Wang Y* (2020) Genome-scale modeling for *Bacillus coagulans* to understand the metabolic characteristics. ***Biotechnology and Bioengineering*** **(IF: 3.8)**
7. **Chen Y**, Nielsen J* (2019) Energy metabolism controls phenotypes by protein efficiency and allocation. ***Proceedings of the National Academy of Sciences*** **(IF: 11.1)**
8. **Chen Y**, Wang Y*, Nielsen J* (2017) Systematic inference of functional phosphorylation events in yeast metabolism. ***Bioinformatics*** **(IF: 5.8)**
9. **Chen Y**, Dong F, Wang Y* (2016) Systematic development and optimization of chemically defined medium supporting high cell density growth of *Bacillus coagulans*. ***Applied Microbiology and Biotechnology*** **(IF: 5.0)**
10. Zhang Y, Su M, **Chen Y**, Wang Z, Nielsen J, Liu Z* (2023) Engineering yeast mitochondrial metabolism for 3-hydroxypropionate production. ***Biotechnology for Biofuels and Bioproducts*** **(IF: -)**
11. Qin N, Li L, Ji X, Pereira R, **Chen Y**, Yin S, Li C, Wan X, Qiu D, Jiang J, Luo H, Zhang Y, Dong G, Zhang Y, Shi S, Jessen HJ, Xia J, Chen Y, Larsson C, Tan T, Liu Z*, Nielsen J* (2023) Flux regulation through glycolysis and respiration is balanced by inositol pyrophosphates in yeast. ***Cell*** **(IF: 64.5)**
12. Cao X, Yu W, **Chen Y**, Yang S, Zhao ZK, Nielsen J, Luan H, Zhou YJ* (2023) Engineering yeast for high-level production of diterpenoid sclareol. ***Metabolic Engineering*** **(IF: 8.4)**
13. Li F#, Yuan L#, Lu H, Li G, **Chen Y**, Engqvist MKM, Kerkhoven EJ*, Nielsen J (2022) Deep learning-based k_{cat} prediction enables improved enzyme-constrained model reconstruction. ***Nature Catalysis*** **(IF: 37.8)**
14. Li F, **Chen Y**#, Qi Q#, Wang Y#, Yuan L, Huang M, Elsemman IE, Feizi A*, Kerkhoven EJ, Nielsen J* (2022) Improving recombinant protein production by yeast through genome-scale modeling using proteome constraints. ***Nature Communications*** **(IF: 16.6)**
15. Xia J, Sánchez B, **Chen Y**, Campbell K, Kasvandik S, Nielsen J* (2022) Proteome allocations change linearly with the specific growth rate of *Saccharomyces cerevisiae* under glucose limitation. ***Nature Communications*** **(IF: 16.6)**

16. Chen R, Gao J, Yu W, Chen X, Zhai X, **Chen Y**, Zhang L*, Zhou YJ* (2022) Engineering cofactor supply and recycling to drive phenolic acid biosynthesis in yeast. ***Nature Chemical Biology*** **(IF: 14.8)**
17. Lu H#, Li F#, Yuan L#, Domenzain I, Yu R, Wang H, Li G, **Chen Y**, Ji B, Kerkhoven EJ, Nielsen J* (2021) Yeast metabolic innovations emerged via expanded metabolic network and gene positive selection. ***Molecular Systems Biology*** **(IF: 9.9)**
18. Qin J, Krivoruchko A, Ji B, **Chen Y**, Kristensen M, Özdemir E, Keasling JD, Jensen MK, Nielsen J* (2021) Engineering yeast metabolism for the discovery and production of polyamines and polyamine analogues. ***Nature Catalysis*** **(IF: 37.8)**
19. Zhang J#, Petersen SD#, Radivojevic T, Ramirez A, Pérez-Manríquez A, Abeliuk E, Sánchez BJ, Costello Z, **Chen Y**, Fero MJ, Martin HG, Nielsen J, Keasling JD, Jensen MK* (2020) Combining mechanistic and machine learning models for predictive engineering and optimization of tryptophan metabolism. ***Nature Communications*** **(IF: 16.6)**
20. Liu Q, Yu T, Li X, **Chen Y**, Campbell K, Nielsen J, Chen Y* (2019) Rewiring carbon metabolism in yeast for high level production of aromatic chemicals. ***Nature Communications*** **(IF: 16.6)**
21. Lv X, Yu B, Tian X, **Chen Y**, Wang Z, Zhuang Y, Wang Y* (2016) Effect of pH, glucoamylase, pullulanase and invertase addition on the degradation of residual sugar in L-lactic acid fermentation by *Bacillus coagulans* HL-5 with corn flour hydrolysate. ***Journal of the Taiwan Institute of Chemical Engineers*** **(IF: 5.7)**

- Peer-reviewed reviews
  1. **Chen Y**, Li F, Nielsen J* (2022) Genome-scale modeling of yeast metabolism: retrospectives and perspectives. ***FEMS Yeast Research*** **(IF: 3.2)**
  2. **Chen Y**, Nielsen J* (2021) Mathematical modelling of proteome constraints within metabolism. ***Current Opinion in Systems Biology*** **(IF: 3.7)**
  3. **Chen Y**, Nielsen J* (2016) Flux control through protein phosphorylation in yeast. ***FEMS Yeast Research*** **(IF: 3.2)**
  4. Li F*, **Chen Y**, Gustafsson J, Wang H, Wang Y, Zhang C, Xing X (2023) Genome-scale metabolic models applied for human health and biopharmaceutical engineering. ***Quantitative Biology*** **(IF: 3.1)**
- Book chapters
  1. **Chen Y**, Nielsen J, Kerkhoven EJ (2021) Proteome Constraints in Genome-Scale Models. *Metabolic Engineering: Concepts and Applications*
  2. **Chen Y**, Li G, Nielsen J (2019) Genome-scale metabolic modeling from yeast to human cell models of complex diseases: latest advances and challenges. *Methods in Molecular Biology*
  3. Lu H, **Chen Y**, Nielsen J, Kerkhoven EJ (2021) Kinetic Models of Metabolism. *Metabolic Engineering: Concepts and Applications*

Updated Jan 2024