Peng Xu, Ph.D.

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Chemical Engineering, 56-422, Massachusetts Institute of Technology, Cambridge, MA 02139

EDUCATION

2013   PhD in Chemical Engineering, Rensselaer Polytechnic Institute, Troy, USA

2006   MS in Biochemical Engineering, Jiangnan University, Wuxi, China

2003   BS in Biotechnology, Jiangnan University, Wuxi, China

RESEARCH PROJECTS

Postdoctoral research project (Advisor: Prof. Gregory N. Stephanopoulos)

➤ Engineering *Yarrowia lipolytica* biorefinery platform for production of commodity chemicals and fuels;

➤ Integrating regulatory control and metabolic circuit for metabolic pathway optimization;

➤ Inferring genetic intervention targets based on structural kinetic modeling of metabolic network;

PhD research project (Advisor: Prof. Mattheos A.G. Koffas)

➤ Modular optimization of multi-gene pathway for improving fatty acids production in *E. coli*;

➤ Engineering malonyl-CoA responsive toggle switch for dynamic tuning of metabolic flux in *E. coli*;

➤ Engineer versatile gene assembly platform ePathBricks for rapid design and construction of metabolic pathways in *E. coli*;

➤ Identification of genetic modifications to improve cellular malonyl-CoA availability using a constraint-based flux balance model in *E. coli*;

Master research project (Advisor: Prof. Ke-Chang Zhang)

➤ Kinetic modeling and optimization of terpenoids production using filamentous fungi *Ganoderma lucidum* in shake-flasks and bioreactors.

TEACHING AND MENTORSHIP

Postdoc Fellow in Chemical Engineering, Massachusetts Institute of Technology   06/2013-Present

➤ Supervise and coordinate safety and purchasing for a lab with 30 members.

➤ Conduct lab specific hygiene/safety training for lab members.

Research Assistant in Chemical & Biological Engineering, Rensselaer Polytechnic Institute   1/2011-05/2013

➤ Mentor multiple undergraduate and junior PhD students.

Teaching Assistant in Chemical & Biological Engineering, University at Buffalo   01/2009-08/2010

➤ Assist teaching undergraduate courses: biochemical engineering and metabolic engineering.

Lecturer in Department of Biological Engineering, Dalian Polytechnic University   07/2006-08/2008

➤ Teaching undergraduate courses: biochemical kinetics and bioreaction engineering, enzyme engineering, brewing chemistry and fermentation technology.

➤ Supervising multiple undergraduates and master students conducting research in metabolic engineering, bioprocess engineering and enzyme chemistry.

PUBLICATIONS

Please refer to **Google Scholar** for full list of publications and citations (**Total citation: 264; H-index: 10**)

1. **Xu P**, Li L, Zhang F, Linhardt RJ, Stephanopoulos GN and Koffas MA. (**2013**) Engineering malonyl-CoA responsive toggle switch for dynamic tuning of metabolic flux in *E. coli*. In preparation.

2. **Xu P**, Wang W, Li L, Zhang F, Bhan N and Koffas MA. (**2013**) Design and kinetic analysis of a hybrid promoter-regulator system for malonyl-CoA sensing in *E. coli*. ***ACS Chemical Biology***, Accepted.

3. Lim GC, Wong L, Dvora H, **Xu P**, Venkiteswaran S and Koffas MA. (**2013**) Engineering of recombinant *Escherichia coli* for high-yield anthocyanin biosynthesis. Submitted to ***Metabolic Engineering***.

4. Wang W, Englaender J, **Xu P**, Linhardt RJ, Koffas MA. (2013) Expression of low endotoxin 3-O-sulfotransferase in *B. subtilis* and *B. megaterium*. ***Applied Biochemistry and Biotechnology***, Accepted. [**link**]

5. Bhan N, **Xu P** and Koffas MA. Pathway and protein engineering approaches to produce novel and commodity small molecules. ***Current Opinion in Biotechnology***, **Accepted.** [**link**]

6. **Xu P**, Gu Q; Wang W, Wong L, Bower A, Collins CH and Koffas MA. (2013) Modular optimization of multi-gene pathway for fatty acids production in *E. coli*. ***Nature Communications***, **4**: 1409. [**link**]

7. **Xu P**, Vansiri A, Bhan N and Koffas MA. (**2012**) ePathBrick: A synthetic biology platform for engineering metabolic pathways in *E. coli*. ***ACS Synthetic Biology,*** **1** (7):256–266. [**link**]

8. **Xu P**, Bhan N and Koffas MA. (**2012**) Engineering plant metabolism into microbes: from systems biology to synthetic biology. ***Current Opinion in Biotechnology***. **24**(2): 291-299. [**link**]

9. Bhan N, **Xu P**, Khalidi O and Koffas MA. (**2012**) Redirecting carbon flux into Malonyl-CoA to improve Resveratrol titers: Proof of concept for genetic interventions predicted by OptForce computational framework. ***Chemical Engineering Science***, **88**, In press. [**link**]

10. **Xu P** and Koffas MA. (**2013**) Assembly of multi-gene pathways and combinatorial pathway libraries through ePathBrick vectors. ***Methods in Molecular Biology: Synthetic Biology***. [**link**]

11. **Xu P**, Ranganathan S, Fowler Z, Maranas CD and Koffas MA. (**2011**) Genome-scale metabolic network modeling results in minimal interventions that cooperatively force carbon flux towards malonyl-CoA. ***Metabolic Engineering***, **13**(5): 578-587. [**link**]

12. **Xu P**, Ranganathan S, Maranas CD and Koffas MA. (**2011**) An integrated computational and experimental study to increase the intra-cellular malonyl-CoA: Application to flavanone synthesis. ***Bioengineering Conference (NEBEC)***, 2011 IEEE 37th Annual Northeast, 1-2. [**link**]

13. Zhang L, Ding Z, **Xu P** et al. (2011) Methyl lucidenate F isolated from the ethanol-soluble-acidic components of *Ganoderma lucidum* is a novel tyrosinase inhibitor. ***Biotechnology and Bioprocess Engineering***, **16**(3): 457-461. [**link**]

14. **Xu P** and Koffas MA. (**2010**) Metabolic engineering of *Escherichia coli* for biofuel production, ***Biofuels***, **1**(3): 493-504. [**link**]

15. **Xu P**, Ding Z, Qian Z, Zhang K and Zhao C. (**2008**) Improved production of mycelial biomass and ganoderic acid by submerged culture of *Ganoderma lucidum* SB97 using complex media. ***Enzyme and Microbial Technology***, **42**(4): 325-331. [**link**]

SELECTED PRESENTATIONS

1. **Xu P** and Koffas MA. Engineering a synthetic malonyl-CoA controller for dynamic tuning metabolic flux in *E. coli*. 2013 AIChE annual meeting, San Francisco, CA (talk)
2. **Xu P**. Engineering tailor-made microbial cell factories for phytochemical and fuels production. Invited by School of Engineering, Case Western Reserve University, Cleveland, OH. September 10, 2013 (talk)
3. **Xu P** and Koffas MA. Expanding the synthetic biology toolbox for engineering metabolic pathways in *E. Coli*. 2012 AIChE annual meeting, Pittsburgh, PA (talk)
4. **Xu P** and Koffas MA. ePathBrick directed modular pathway engineering for improved fatty acids production in *E. Coli*. 2012 AIChE annual meeting, Pittsburgh, PA (talk)
5. **Xu P**, Ranganathan S, Maranas CD and Koffas MA. Genome-scale metabolic network modeling results in minimal interventions that cooperatively force carbon flux towards malonyl-CoA. 2011 AIChE annual meeting, Minneapolis, MN (talk)
6. **Xu P** and Koffas MA. Engineering synthetic malonyl-CoA sensor for dynamic tuning of metabolic flux in *E. coli*. The 1st Electrofuels Conference (2011), Society of Biological Engineering, Providence, RI (poster)
7. **Xu P**, Ranganathan S, Koffas MA and Maranas CD. An integrated computational and experimental study to increase the production rate of flavanones in *E. Coli*. 2010 AIChE annual meeting, Salt Lake City, UT (talk)

AWARDS AND HONORS

Chinese Government Scholarship for Outstanding Self-financed Students Studying Abroad* (*High distinction for top 0.3% Chinese PhD student studying in US)	2012
Travel grant for 1st Electrofuels Conference (Providence, RI), Society of Biological engineering	2011
Danisco-Dupont Scholarship for Excellent Students in Biotechnology	2006

ADDITIONAL

Professional memberships: American Institute of Chemical Engineers (AIChE); American Chemical Society (ACS), Society of Biological Engineering (SBE), International Metabolic Engineering Society (IMES)
Software: Origin 8.5, Matlab, Maple, Sigma plot, ChemDraw, Minitab, Vector NTI, BLAST, Pymol, Endnote X
Languages: Mandarin Chinese, English

REFERENCES

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