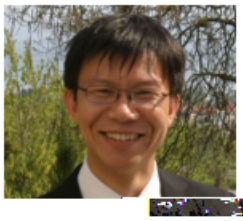
细胞生物学与培养工程 Cell Biology and Culture Engineering

教师介绍 Faculty



Asso. Professor
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Research Field: Bioengineering, synthetic biology

**Education**

**February, 2003 – August, 2007:**
Institute of Technical Biochemistry, University of Stuttgart, Germany
PhD in Technical Biology

**March, 2000 – February, 2003:**
Institute of Technical Biochemistry, University of Stuttgart, Germany
MS in Technical Biology

**September, 1990 – June, 1994:**
Wuhan University, Wuhan, China
BS in Virology & Molecular Biology

**Work Experience**

**October, 2012 - present:** Asso. Professor
College of Life Science and Technology, Beijing University of Chemical Technology

**October, 2010 – September, 2012:** Post-Doc
College of Life Science and Technology, Beijing University of Chemical Technology

**May, 2007 – August, 2010:** Post-Doc
Institute of Technical Biochemistry, university of Stuttgart and PharmaZell GmbH, Germany

**August, 1994 – August, 1998:** Associate Engineer
Beijing Pharmaceutical Factory, China

**Representative Publications**

1 Shuaiqi Meng, Jia Guo, Kaili Nie, Tianwei Tan, Haijun Xu, **Luo Liu***. (2019) Chemoenzymatic Synthesis of Musk Flavors from Stearic Acid.

ChemBioChem, doi:10.1002/cbic.201900210

2 **Luo Liu**, Shuaiqi Meng, Ren Wei, Min Jiang, Fang Wang, Kaili Nie, Tianwei Tan. (2019) Improved Stability of Baeyer–Villiger Mono-Oxygenase from Pseudomonas fluorescens by Substitution of Cysteine Residues J. Biobased Mater. Bioenergy 13, 490–497

3 Junyu Xu, Ziheng Cui, Kaili Nie, Hao Cao, Min Jiang, Haijun Xu, Tianwei Tan, **Luo Liu*** (2019) A Quantum Mechanism Study of the C-C Bond Cleavage to Predict the Bio-Catalytic Polyethylene Degradation. Frontiers in Microbiology, doi: 10.3389/fmicb.2019.00489

4 Wenlong Zhu, Miaomiao Gao, Biqiang Chen, Tianwei Tan, Hui Cao, **Luo Liu*** (2019) The Synthesis of Mannose-6-Phosphate Using Polyphosphate-Dependent Mannose Kinase. Catalysts, 9, 250

5 Shuaiqi Meng, Jia Guo, Kaili Nie, Ulrich Schwaneberg, Tianwei Tan1 Haijun Xu, **Luo Liu***, (2019) High Throughput Screening Method for Engineering P450 Towards Terminal Hydroxylation of Fatty Acids. Journal of Biobased Materials and Bioenergy, 13, 1–7

6 Hao Cao, Chengcheng Li, Jing Zhao, Fang Wang, Tianwei Tan, **Luo Liu***, (2018), Enzymatic production of glutathione coupling with an ATP regeneration system based on polyphosphate kinase, *Applied Biochemistry and Biotechnology*, 185(2), 385-395

7 Hao Cao, Shafaq Parveen, Ding Ding, Haijun Xu, Tianwei Tan, Luo Liu*

Chemical Science and Engineering, 10(2): 238-244.

13 Hong Yan, Zheng Wang, Fang Wang, Tianwei Tan and **Luo Liu**, (2015), Biosynthesis of chain-specific alkanes by metabolic engineering in *Escherichia coli*. Engineering in Life Sciences. DOI: 10.1002/elsc.201500057

14 Yifeng Tao, Guohua Chen, Ioannis V. Pavlidis, Yang Jiang, Longfei Qie, Caixia Cui,a **Luo Liu,** Biqiang Chen and Tianwei Tan. (2015), A water-dependent kinetics guide for complex lipase-mediated synthesis of biolubricants in a water activity control reactor. Catal. Sci. Technol., 2015, DOI: 10.1039/C5CY00995B

15 Kaili Nie; Fang Wang; Tianwei Tan; **Luo Liu,** (2015), Strategy to Overcome Effect of Raw Materials on Enzymatic Process of Biodiesel from Non-edible Oils Using *Candida* sp. 99-125 Lipase. Appl Biochem Biotechnol. 2015 Aug 18

16 Hui Fang; Hong Jun Yin; Ming Yang Lv; Hai Jun Xu; Yong Mei Zhao; Xin Zhang; Zheng Long Wu; **Luo Liu**; Tian Wei Tan, (2015), Approach for determination of ATP:ADP molar ratio in mixed solution by surface-enhanced Raman scattering, *Biosensors and Bioelectronics*, 69, pp 71-76

17 Kaili Nie; Meng Wang; Xin Zhang; Wenjing Hu; **Luo Liu**; Fang Wang; Li Deng; Tianwei Tan, 2015, Additives improve the enzymatic synthesis of biodiesel from waste oil in a solvent free system, *Fuel*, 146, pp 13-19

18 [illegible]

sional Ag nanoparticle-decorated iO2 nced Raman scattering, *Biosensors and*

Tan, Tianwei; **Liu, Luo**, (2015), m l-Malic Acid by Solvent Engineering mostable Fumarase from Thermus *hemistry and Biotechnology*, 175(6), pp

**iu**; Tian-Wei Tan, (2014), Combinational neering the MEP pathway in *Escherichia* 2), pp 2078-2085

g, (2014), NAD(+)-independent aldehyde nced 3-hydroxypropionic acid production *hnology Letters*, 36(11), pp 2215-2221

Meng Wang; Kaili Nie; **Luo Liu**; (2014), Lipase Catalyzed Synthesis of

(2015), Recyclable three-dimen nanored arrays for surface-enha *Bioelectronics*, 81, pp 134-141

20 Liu, Yanhui; Song, Jianing; Production of Fumaric Acid fro Using a Recombinant Ther thermophilus HB8, *Applied Bioc* 2823-2831

21 Chun-Li Liu; Li-Hai Fan; **Luo Li** biosynthesis of isoprene by engi *coli*, *Process Biochemistry*, 49(12

22 Li, Ying; **Liu, Luo**; Tian, Pingfang oxidase catalyzes cofactor balan in *Klebsiella pneumoniae*, *Biotec*

23 Junfeng Liu; Li Deng; M Tianwei Tan; Fang Wang,

**Description:** Cellular and molecular biology is the core of today's biology and where the most active front. This course along the basic framework of the material flow, information flow and energy flow within the cell, as far as possible and introduce cutting-edge molecular events related to dynamic content. Through this course, students can hope to master the basic outline of the current cellular and molecular biology content and related biology of the latest developments, such as synthetic biology and culture engineering.

**Textbook:** Molecuar Biology of the Cell, 5th Edition, Bruce Alberts, Garland Science, 2007

**References:**

[1] Cell and Molecular Biology, 4th Edition, Nalini Chandar, John Wiley & Sons, Inc. 2010；

[2] Molecular Cell Biology, 4th Edition, Harvey Lodish, W H Freeman & Co 2012；

[3] Lewin's Genes X, Jocelyn E. Krebs, Jones & Bartlett Pub, 2009；

[4] Synthetic Biology, Part A, Volume 497: Methods for Part/Device Characterization and Chassis Engineering, Christopher Voigt, Academic Press (2011

**General Syllabus:**

Chapter1: cells Introduction. (4hours)

understand the concept of Molecular cell biology. understanding of the content of Molecular cell biology. understand the development of Molecular cell biology, important people and events; the difference of cytology and cell biology and molecular cell biology, development direction of Molecular and cellular biology.

Chapter2: cell material flow (a) cell chemistry. (4hours)

constitute a cell of four small molecules and four macromolecules; cell protein (protein self-splicing; protein transport orientation; protein life and death).

Chapter3: cell material flow - (b) cell structure. (4hours)

Knowledge point:.

Cell membrane; cytoskeleton; microtubules and fibrils; cells in the intima and organelles; ribosomes and endoplasmic reticulum; nucleus.

Chapter4: cell information flow(4hours)

the information molecule; chromosome; human genome project completion and post-genomic era; cellular signal command and control; the molecular basis of vision.

Chapter 5: energy flow of cell. (4hours)

Knowledge point:.

Chloroplast, mitochondria, ATP molecules and high-energy transport; glycogen chemical energy decomposition and photosynthesis.

Chapter 6: cell's life. (4hours)

Knowledge point: cell proliferation, growth and division; molecular events of the cell cycle; cell cycle gene and protein and gene expression.

Chapter 7: cell aging and death. (4hours)

Cell differentiation; stem cells; nucleus totipotent; nuclear transfer and biological cloning; programmed cell death; cell senescence and death.
Chapter 8: ribosome. (4hours)
the structure and function of the ribosome. protein biosynthesis and polyribosomes. ribosome assembly

Chapter 9: Synthetic biology. (4hours)
The concept and research method of synthetic biology

Chapter 10: Cell culture engineering. (8hours)
method of cell culture, cell culture of microbial, animal and plant cells.

Exam (4hours)

**Grade Points:** Final Exam-60%, Homework-40 %.

- **教案　　Teaching Plan**
- **视频　　Video**