

教师介绍 Faculty



Luo LIU (刘璐)

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 Tan, 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***, (2017), Metabolic engineering for recombinant major ampullate spidroin 2 (MaSp2) synthesis in *Escherichia coli*, *Scientific Reports*. DOI:10.1038/s41598-017-11845-2.
 - 8 Shafaq Parveen, Biqiang Chen, **Luo Liu***, Tianwei Tan. (2017), Enzymatic phosphorylation of mannose by glucomannokinase from *Mycobacterium phlei* using inorganic polyphosphate. *Enzyme and Microbial Technology*, 104, 16-21
 - 9 Meng Wang, Kaili Nie, Hao Cao, Haijun Xu, Yunming Fang, Tianwei Tan, Jan Baeyens, **Luo Liu***, (2017), Biosynthesis of medium chain length alkanes for bio-aviation fuel by metabolic engineered *Escherichia coli*, *Bioresource Technology*, 239, 542-545.
 - 10 Hao Cao, Kaili Nie, Chengcheng Li, Haijun Xu, Fang Wang, Tianwei Tan, **Luo Liu***. (2017), Rational design of substrate binding pockets in polyphosphate kinase for use in cost-effective ATP-dependent cascade reactions. *Applied Microbiology and Biotechnology*, 101(13), 5325–5332
 - 11 Hao Cao, Kaili Nie, Haijun Xu, Xin Xiong, Rumen Krastev, Fang Wang, Tianwei Tan, **Luo Liu***. (2016) Insight into the mechanism behind the activation phenomenon of lipase from *Thermus thermophilus* HB8 in polar organic solvents. *Journal of Molecular Catalysis B: Enzymatic*, 133 S400–S409
 - 12 Yanhui Liu, Biqiang Chen, Zheng Wang, **Luo Liu**, Tianwei Tan (2016) Functional characterization of a thermostable methionine adenosyltransferase from *Thermus thermophilus* HB27. *Frontiers of*

- 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 Ming Yang Lv; Hai Yan Teng; Zhao Yang Chen; Yong Mei Zhao; Xin Zhang; Luo Liu; Zhenglong Wu; Li Min Liu; Hai Jun Xu, (2015), Low-cost Au nanoparticle-decorated cicada wing as sensitive and recyclable substrates for surface enhanced Raman scattering, *Sensors and Actuators B: Chemical*, 209, pp 820-827
 - 19 Hui Fang; Chang Xing Zhang; Luo Liu; Yong Mei Zhao; Hai Jun Xu, (2015), Recyclable three-dimensional Ag nanoparticle-decorated TiO₂ nanorod arrays for surface-enhanced Raman scattering, *Biosensors and Bioelectronics*, 64, pp 434-441
 - 20 Liu, Yanhui; Song, Jianing; Tan, Tianwei; Liu, Luo, (2015), Production of Fumaric Acid from L-Malic Acid by Solvent Engineering Using a Recombinant Thermostable Fumarase from *Thermus thermophilus* HB8, *Applied Biochemistry and Biotechnology*, 175(6), pp 2823-2831
 - 21 Chun-Li Liu; Li-Hai Fan; Luo Liu; Tian-Wei Tan, (2014), Combinational biosynthesis of isoprene by engineering the MEP pathway in *Escherichia coli*, *Process Biochemistry*, 49(12), pp 2078-2085
 - 22 Li, Ying; Liu, Luo; Tian, Pingfang, (2014), NAD(+)-independent aldehyde oxidase catalyzes cofactor balanced 3-hydroxypropionic acid production in *Klebsiella pneumoniae*, *Biotechnology Letters*, 36(11), pp 2215-2221
 - 23 Junfeng Liu; Li Deng; Meng Wang; Kaili Nie; Luo Liu; Tianwei Tan; Fang Wang, (2014), Lipase Catalyzed Synthesis of

Medium-chain Biodiesel from *Cinnamomum camphora* Seed Oil, *Chinese Journal of Chemical Engineering*, 22(11–12), pp 1215-1219

- 24 Zhang, Chang Xing; **Liu, Luo**; Yin, Hong Jun; Fang, Hui; Zhao, Yong Mei; Bi, Chu Jian; Xu, Hai Jun, (2014), Recyclable surface-enhanced Raman scattering template based on nanoporous gold film/Si nanowire arrays, *Applied Physics Letters*, 105(1)
- 25 Tao, Yifeng; Cui, Caixia; Shen, Huaqing; **Liu, Luo**; Chen, Biqiang; Tan, Tianwei, 2014, Enhancing trimethylolpropane esters synthesis through lipase immobilized on surface hydrophobic modified support and appropriate substrate feeding methods, *Enzyme and Microbial Technology*, 58-59, pp 60-67
- 26 Jia, Ru; Hu, Yi; **Liu, Luo**; Jiang, Ling; Huang, He, (2013), Chemical modification for improving activity and stability of lipase B from *Candida antarctica* with imidazolium-functional ionic liquids, *Organic and Biomolecular Chemistry*, 11(41), pp 7192-7198
- 27 Jia, Ru; Hu, Yi; **Liu, Luo**; Jiang, Ling; Zou, Bin; Huang, He, (2013), Enhancing Catalytic Performance of Porcine Pancreatic Lipase by Covalent Modification Using Functional Ionic Liquids, *ACS Catalysis*, 3(9), pp 1976-1983
- 28 Liu, Chun-Qiao; Deng, Li; Zhang, Peng; Zhang, Shu-Rong; **Liu, Luo**; Xu, Tao; Wang, Fang; Tan, Tian-Wei, (2013), Screening of high alpha-arbutin producing strains and production of alpha-arbutin by fermentation, *WORLD JOURNAL OF MICROBIOLOGY & BIOTECHNOLOGY*, 29(8), pp 1391-1398
- 29 Fan, Liping; Liu, Junfeng; Nie, Kaili; **Liu, Luo**; Wang, Fang; Tan, Tianwei; Deng, Li, (2013), Synthesis of medium chain length fatty acid ethyl esters in engineered *Escherichia coli* using endogenously produced medium chain fatty acids, *ENZYME AND MICROBIAL TECHNOLOGY*, 53(2), pp 128-133
- 30 Liu, Chunqiao; Zhang, Peng; **Liu, Luo**; Xu, Tao; Tan, Tianwei; Wang, Fang; Deng, Li, (2013), Isolation of alpha-arbutin from *Xanthomonas* CGMCC 1243 fermentation broth by macroporous resin adsorption chromatography, *JOURNAL OF CHROMATOGRAPHY B-ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES*, 925, pp 104-109
- 31 **Luo Liu**, Hao Cao, Yifeng Tao, and Biqiang Chen (2013). Recent Advances in Industrial Applications of Lipases and Strategies for Improving Lipase Properties. *Journal of Bioprocess Engineering and Biorefinery* Vol. 2, 1–8, 2013
- 32 Shuang Wen, **Luo Liu**, Kai Li Nie, Li Deng, Tian Wei Tan, Fang Wang (2013). Enhanced Fumaric Acid Production by Fermentation of Xylose Using a Modified Strain of *Rhizopus arrhizus*. *BioResources*, 2013, 8(2)
- 33 Chunbo Gu, Yuqing Zhou, **Luo Liu**, Tianwei Tan, Li Deng (2013).

- Production of fumaric acid by immobilized *Rhizopus arrhizus* on net. Bioresource Technology, March 2013, 131: 303–307
- 34 Xin Zhang, Kaili Nie, Meng Wang, **Luo Liu**, Kefei Li, Fang Wang, Tianwei Tan, Li Deng (2013). Site-specific xylitol dicaprate ester synthesized by lipase from *Candida* sp. 99-125 with solvent-free system J Mol Catal B, May 2013, 89:61-66
 - 35 **Luo Liu**, Michael Braun, Gabi Gebhardt, Dirk Weuster-Botz, Ralf Gross, and Rolf D. Schmid (2013) One-step synthesis of 12-ketoursodeoxycholic acid from dehydrocholic acid using a multienzymatic system. Appl Microbiol Biotechnol, January 2013, 97(2): 633-639
 - 36 **Luo Liu***, Arno Aigner and Rolf D. Schmid (2011) Identification, cloning, heterologous expression, and characterization of a NADPH-dependent 7 β -hydroxysteroid dehydrogenase from *Collinsella aerofaciens*. Appl Microbiol Biotechnol, April 2011, 90(1): 127-135 (*Corresponding author)
 - 37 **Luo Liu**, Rolf D. Schmid and Vlada B. Urlacher* (2010) Engineering cytochrome P450 monooxygenase CYP 116B3 for high dealkylation activity. Biotechnology Letters, June 2010, 32(6): 841-845
 - 38 **Luo Liu**, Rolf D. Schmid and Vlada B. Urlacher* (2006) Cloning, expression, and characterization of a self-sufficient cytochrome P450 monooxygenase from *Rhodococcus ruber* DSM 44319. Appl Microbiol Biotechnol, October 2006, 72(5): 876-882.
 - 39 Di Feng, **Luo Liu**, Liyuan Zhao, Qingfeng Zhou, Tianwei Tan*, (2011) Determination of Volatile Nitrosamines in Latex Products by HS-SPME–GC–MS. Chromatographia, December 2011, 74(11-12): 817-825
 - 40 Yifeng Tao, Biqiang Chen, **Luo Liu**, Tianwei Tan*, (2011) Synthesis of Trimethylolpropane Esters with Immobilized Lipase from *Canadia* sp. 99-125. Journal of Molecular Catalysis B: Enzymatic, Feb 2011, 74(3-4): 151-155
 - 41 Michael Braun, Hannes Link, **Luo Liu**, Rolf D. Schmid, Aigner A, Dirk Weuster Botz*, (2010) Kinetische Modellierung eines Zwei Enzym Systems zur Oxidation von Cholsäure. Chemie Ingenieur Technik 82, 1498 DOI: 10.1002/cite.201050267.
 - 42 Michael Braun, Hannes Link, **Luo Liu**, Rolf D. Schmid, Dirk Weuster Botz*, (2010) Biocatalytic process optimization based on mechanistic modeling of cholic acid oxidation with cofactor regeneration. Biotechnology and Bioengineering, 2011 Jun;108(6):1307-17
 - 43 Di Feng, **Luo Liu**, Liyuan Zhao, Qingfeng Zhou, Tianwei Tan*, (2011) Evaluation of simulant migration of volatile nitrosamines from latex gloves and balloons by HS-SPME-GC-MS. Journal of Chromatographic Science, (2012) 50(8): 733-738
 - 44 Yanhui Liu, Xu Jia, **Luo Liu***, Tianwei Tan(2013). The construction of high-yield s-adenosyl-l-methionine synthetase genetic engineered strain. Journal of Beijing University of Chemical Technology (Natural Science)

- 2013:2 In Chinese
- 45 Zhibing Huang, Jianing Song, Luo Liu, Tianwei Tan (2013). The expression and activity characterization of Acyl-Coenzyme A Synthase in *Escherichia coli*. Journal of Beijing University of Chemical Technology (Natural Science) 2013:2 In Chinese
 - 46 Qian Li, Meng Wang, Luo Liu, Tianwei Tan (2011). Expression of L-lactate Dehydrogenase in *Escherichia coli* BL21(DE3). Chinese Journal of Bioprocess Engineering, 2011:6 in Chinese
 - 47 Jianing Song, Zhibing Huang, Luo Liu, Li Deng, Fang Wang, Tianwei Tan (2012). Cloning and characterization of D-lactate Dehydrogenase gene from *Klebsiella pneumoniae* and construction of genetically engineered *Escherichia coli*. Journal of Beijing University of Chemical Technology (Natural Science) 2012:2 In Chinese

课程介绍 About Course

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.

Outlines:

- Chapter1: cells Introduction. (4hours)
- Chapter2: cell material flow (a) cell chemistry. (4hours)
- Chapter3: cell material flow - (b) cell structure. (4hours)
- Chapter4: cell information flow(4hours)
- Chapter 5: energy flow of cell. (4hours)
- Chapter 6: cell's life. (4hours)
- Chapter 7: cell aging and death. (4hours)
- Chapter 8: ribosome. (4hours)
- Chapter 9: Synthetic biology. (4hours)
- Chapter 10: Cell culture engineering. (8hours)

课程大纲 Syllabus

Instructor: Luo Liu, Dr./Asso. Prof.

Course Code:

Hours: 48

Credits: 3.0

Prerequisites: Biochemistry

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: Molecular 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**