

Project Title	Integrated management and exploitation of multi-dispersed agricultural residues – application to energy production		
Acronym	SYNAGRON	Project Coordinator	Prof. Vagelis G. Papadakis
Organization	Beijing University of Chemical Technology (BUCT), Biomass Energy and Environmental Engineering Research Center, Associate Professor Wen Wang		



Beijing University of Chemical Technology (BUCT) is a high-level university that aims to develop chemical talent at the cutting-edge of science and technology. The university was established in 1958 and was known formerly as the Beijing Institute of Chemical Technology. BUCT is a **national key university** directly affiliated to the Ministry of Education of the People's

Republic of China. It is **one of the Project 211 universities and 985 Project Innovation Platforms**, with responsibilities for basic and applied scientific research; original, high-tech development; and the training of high-level, innovative talent. BUCT has a total of 14 colleges (51 undergraduate and 96 master's degree programs) with over 15.000 full-time undergraduate students more than 6.000 postgraduate students (approximately 1.000 at PhD level), a large body of international students (≈ 500) and >1.000 academic staff members. **Its staff has won numerous prestigious national awards** and includes 11 academicians of the Chinese Academy of Science and the Chinese Academy of Engineering; one National Outstanding Professional and Technical Talent; seven experts from the National Thousand Talents Program; eight Chief Scientists in the 973 National Program; and 24 winners of "the National Science Fund for Distinguished Young Scholars". Scientific research at BUCT has developed rapidly with **its per capita research funding at the top 1% among Chinese universities**. Since 2001, twenty-six scientific research projects of BUCT have won the National Technology Award. BUCT has 3 innovative research groups of the National Natural Science Foundation, and 6 innovation teams of the Cheung Kong Scholar Program from the Ministry of Education. **BUCT thus ranks at the forefront of Chinese colleges and universities. In 2016, BUCT received nearly 727 million yuan RMB (≈ 93 million €) in funding for research in science and technology, won 7 science and technology awards at the provincial and ministerial levels, and obtained 335 patents.**

Assoc. Prof. Wen Wang received her Ph.D. degree from the Department of Environmental Engineering, Tongji University. She has since been working in the School of Chemical Engineering, Beijing University of Chemical Technology. Her research is focusing on biomass to biofuels (biogas, biohydrogen, bio-acid, bio-alcohol) production, optimization of the anaerobic processes and development of sustainable solutions for organic waste and wastewater treatment. **Assoc. Prof. W. Wang has published over 40 academic papers, 1 book and got 14 China Patents. She has been Principal Investigator (PI) at more than 10 program grants** from the National Science Foundation of China, Science and Technology Commission of Beijing Municipality, Fundamental Research Funds for the Central Universities.

It should be noted that in the case that the project proposed herein will be successful, **Assoc. Prof. W. Wang has secured additional funding for BUCT** to that applied for to the Chinese funding/managing authority (Chinese Ministry of Science and Technology, Department of International Cooperation). **In particular, on top of the approximately 200.000€ that BUCT is applying for to the Chinese Authorities, two companies will partner / fund the Chinese side of the project (Beijing United Pioneer Environmental Engineering Co., Ltd and Nanjing Benran Environmental Technology Co., Ltd) to the tune of 130.000€ each.** This demonstrates in an unequivocal manner the tremendous interest of Chinese companies for the results of the proposed project and the ready market for the project's outcomes.

Moreover, **Assoc. Prof. W. Wang, Prof. V.G. Papadakis** (Project Coordinator of the Greek proposal) and **Prof. M.A. Goula** (Greek Project Partner) **have initiated proceedings for the signing of Memorandums of Understanding between BUCT and UP and TEIWM.** The strong commitment of the 2 Consortia for the SYNAGRON project is demonstrated by the fact that **delegation from BUCT** (that includes BUCT's President, Prof. Tianwei Tan) **will visit both UP and TEIWM in early May to further expand on collaboration activities between their respective Universities.**

SELECTED PROJECTS:

2018-2020 The new technology for anaerobic conversion of syngas selectively to acetate and then to methane together with organic wastes and the identification of functional microorganisms by metagenomic analysis, Beijing Municipal Natural Science Foundation, Project Leader, **25.845,82€.**

2016-2018 Bioaugmentation as a tool to tackle ammonia inhibition of anaerobic digestion and to enhance the methane production, National Science Foundation of China, Project Leader, **29.722,70€.**

2016-2018 Technology and equipment development and demonstration of biomethanation of carbon monoxide and hydrogen from biomass pyrolysis, Science and Technology Commission of Beijing Municipality, Project Leader, **51.683,62€.**

2016-2018 Key technology and mechanism of bioconversion from biomass to biogas, Foundation for Excellent talents of Beijing Municipality, Project Leader, **5.169,20€.**

2015-2017 Technology development and mechanism discovery of bioconversion of coke-oven gas into nature gas, Foundation for Excellent talents of BUCT, Project Leader, **38,768,98€**.

2015-2016 Effective conversion of bioenergy resource via poly-generation technology, Cross-disciplinary platform project of BUCT, Project Leader, **336,009.83€**

SELECTED PUBLICATIONS:

1. Hangyu Sun, Ziyi Yang, Qing Zhao, Malikakhon Kurbonova, Ruihong Zhang, Guangqing Liu* and **Wen Wang***, Modification and extension of Anaerobic Digestion Model No.1 (ADM1) for syngas biomethanation simulation: From lab-scale to pilot-scale, *Chemical Engineering Journal*, 2020, 126177
2. Ziyi Yang, Hangyu Sun, Qing Zhao, Malikakhon Kurbonova, Ruihong Zhang, Guangqing Liu and **Wen Wang***. Long-term evaluation of bioaugmentation to alleviate ammonia inhibition during anaerobic digestion: process monitoring, microbial community response, and methanogenic pathway modeling, *Chemical Engineering Journal*, 2020, 125765
3. Chao Liu, Yaowei Shi, Haopeng Liu, Mingrui Ma, Guangqing Liu*, Ruihong Zhang and **Wen Wang***. Insight of co-fermentation of carbon monoxide with carbohydrate-rich wastewater for enhanced hydrogen production: homoacetogenic inhibition and the role of pH. *Journal of Cleaner Production*, 2020, 122027
4. Chao Liu, **Wen Wang***, Sompong O-Thong, Ziyi Yang, Shicheng Zhang, Guangqing Liu, Gang Luo*. Microbial insights of enhanced anaerobic conversion of syngas into volatile fatty acid by co-fermentation with carbohydrate-rich wastewater. *Biotechnology for Biofuels*, 2020,13 (53):
5. Chao Liu, Gang Luo*, Haopeng Liu, Ziyi Yang, Irini Angelidaki, Sompong O-Thong, Guangqing Liu, Shicheng Zhang, **Wen Wang***. CO as electron donor for efficient medium chain carboxylate production by chain elongation: Microbial and thermodynamic insights, *Chemical Engineering Journal*, 2020, 390, 124577
6. Ziyi Yang, Yang Liu, Jie Zhang, Kaiwei Mao, Malikakhon Kurbonova, Guangqing Liu, Ruihong Zhang and **Wen Wang***, Improvement of biofuel recovery from food waste by integration of anaerobic digestion, digestate pyrolysis and syngas biomethanation under mesophilic and thermophilic conditions, *Journal of Cleaner Production*, 2020, 256, 120594
7. Ziyi Yang, Hangyu Sun, Yang Liu, Chao Liu, Guangqing Liu* and **Wen Wang***, Comparison of anaerobic methane fermentation performance and ammonia resistance with different inoculum configuration, *Energy & Fuels*, 2019, 33 (9): 8711-8720
8. Ziyi Yang, **Wen Wang***, Chao Liu, Ruihong Zhang and Guangqing Liu, Mitigation of ammonia inhibition through bioaugmentation with different microorganisms during anaerobic digestion: Selection of strains and reactor performance evaluation, *Water Research*, 2019, 155: 214-224
9. Xiaonan Li, Ziyi Yang, Guangqing Liu*, Zonghu Ma and **Wen Wang***, Modified anaerobic digestion model No.1 (ADM1) for modeling anaerobic digestion process at different ammonium concentrations, *Water Environment Research*, 2019, 91: 700-714
10. Chao Liu, Gang Luo, **Wen Wang***, Yanfeng He, Ruihong Zhang and Guangqing Liu*, The effects of pH and temperature on the acetate production and microbial community compositions by syngas fermentation, *Fuel*, 2018, 224 :537-544
11. Ziyi Yang, **Wen Wang***, Yanfeng He, Ruihong Zhang and Guangqing Liu*, Effect of ammonia on methane production, methanogenesis pathway, microbial community and reactor performance under mesophilic and thermophilic conditions, *Renewable Energy*, 2018, 125:915-925
12. Naveed Anwar, Chao Liu, **Wen Wang***, Jie Zhang, Guangqing Liu* and Ruihong Zhang, Effect of hydraulic retention time distribution on anaerobic digestion of kitchen waste for optimum energy recovery, *Journal of Biobased Materials and Bioenergy*, 2018, 12, 1-9
13. Chao Liu, **Wen Wang***, Naveed Anwar, Zonghu Ma, Guangqing Liu* and Ruihong Zhang, Effect of organic loading rate on anaerobic digestion of food waste under mesophilic and thermophilic conditions, *Energy & Fuels*, 2017, 31 (3), 2976-2984
14. Ziyi Yang, **Wen Wang***, Shuyu Zhang, Chao Liu, Guangqing Liu and Ruihong Zhang, Comparison of the methane production potential and biodegradability of kitchen waste from different sources under mesophilic and thermophilic conditions, *Water Science & Technology*, 2017, 75 (7), 1607-1616
15. Lina Xue, **Wen Wang***, Yunlong Guo, Guangqing Liu, Pengbo Wan*, Flexible polyaniline/carbon nanotube nanocomposite film-based electronic gas sensors, *Sensors and Actuators B: Chemical*, 2017, 244, 47-53
16. Hong Chen, **Wen Wang***, Lina Xue, Chang Chen, Guangqing Liu, and Ruihong Zhang, Effects of Ammonia on Anaerobic Digestion of Food Waste: Process Performance and Microbial Community, *Energy & Fuels*, 2016, 30 (7), 5749-5757
17. Xinxin Ma, Qingshan Lin, Jinmiao Liu, Guangqing Liu, **Wen Wang*** and Yanfeng He*, Low-cost upgrading of biomass pyrolysis vapors by recycling char in a downstream reactor, *Journal of Biobased Materials and Bioenergy*, 2016, 10 (2), 145-150
18. Naveed Anwar, **Wen Wang***, Jie Zhang, Yeqing Li, Chang Chen, Guangqing Liu and Ruihong Zhang, Effect of Sodium Salt on Anaerobic Digestion of Kitchen Waste, *Water Science & Technology*, 2016,73 (8),1865-1871