

Feature Article

The CUSBEA Program: Twenty Years After

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The CUSBEA (China–United States Biochemistry Examination and Application) program was implemented during the 8 years between 1982 and 1989, with a total of 422 Ph.D. students selected and placed in over more than 90 top universities in the United States (1–3). The original aim of this program was to train bright young Ph.D. scientists in the field of Biochemistry and molecular biology, with an expectation that they will eventually return to China to promote research and education in this and related areas. As a CUSBEA fellow of 1985 (Class IV), I put forth this article to express my great appreciation to those people involved, especially in remembrance of late Prof. Ray Wu, the initiator of the CUSBEA program who suddenly passed away on February 10, 2008.

THE PEOPLE WHO INITIATED THE CUSBEA PROGRAM

On a personal opinion basis, Professors Ray Wu and Xiaocheng Gu were the two who played the most important roles in implementing the CUSBEA program. Dr. Ray Wu, the Liberty Hyde Bailey Professor of Molecular Biology and Genetics at Cornell University in New York, was a prominent scientist who pioneered techniques to determine DNA sequences, publishing the first paper in this field as early as 1968 and later designed a novel location-specific primer-extension strategy for DNA sequencing in 1970 (4–6). This scientific finding was recognized by Nobel laureate Dr. Fred Sanger as the first breakthrough in determining the nucleotide sequence of a DNA molecule, several years before the dideoxynucleotide method of DNA sequencing was invented (7, 8), which brought Sanger a second Nobel Prize in 1985. Dr. Ray Wu also made a remarkable contribution in developing methods of recombinant DNA technology and served as editor or co-editor for nine volumes of *Recombinant DNA* series in *Methods of Enzymology* from 1979 to 1993 (Volumes 68, 100, 101, 153, 154, 155, 216, 217, 218). Dr. Wu also served as department chair (1976–1978) of the Section of Biochemistry, Molecular and Cell Biology at Cornell University. His great scientific achieve-

ments were the credential that earned him utmost respect in the scientific community and such an excellent prestige paved way for him to convince both the China and the US side to implement the CUSBEA program.

With great effort, Professor Wu convinced the Chinese Government to officially start the operation of the CUSBEA program in 1981. The Chinese Ministry of Education then asked Peking University to manage this program. The president of Peking University at that time, Prof. Longxiang Zhang, a biochemist himself, then asked Prof. Xiaocheng Gu (who was the vice chair, and later served as chair, of the Department of Biology) to serve as the coordinator of this program. One reason at least was that Prof. Gu spoke fluent English. Prof. Gu managed the CUSBEA program for a period of eight years between 1982 and 1989, a time when such advanced technologies as internet or mobile phone were not yet heard of and the two countries depended mostly on telegraphs or hand-written letters to communicate with each other. Her dedication to this program was undoubtedly greatly appreciated by all the CUSBEA fellows.



Professors Xiaocheng Gu (left) and Ray Wu (right)

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THE CUSBEA FELLOWS WERE SELECTED VIA A WRITTEN EXAM AND AN INDIVIDUAL INTERVIEW CONDUCTED BY PROFESSORS FROM THE UNITED STATES

The CUSBEA Program was established at a time when China just reopened to the outside world and suddenly realized that it was lagging behind, especially in the field of science and technology. The establishment of formal diplomatic relationship between China and United States in 1979 and the restoration of the Chinese higher education in 1977 might be considered as the two main conditions that instigated the implementation of such training programs as CUSPEA (China–United States Physics Examination and Application), CUSBEA, and CGP (Chemistry Graduate Program), through which talented Chinese students were selected and sent to the United States for Ph.D. training in physics, biology, and chemistry, respectively. The CUSPEA program, masterminded by Prof. Tsung-Dao Lee, a Chinese-born Nobel Laureate in physics working at Columbia University, was the first implemented among the three. A total of ~1,500 students were sent to top US universities for Ph.D. studies in these three fields.

The students through this CUSBEA program did not take in TOEFL and GRE exam (Neither were available for the Chinese Students in those days), instead they were selected through a designed procedure, which in short goes as below. From an outlined graduate programs in selected Chinese institutions a few top students would be selected among the entering classes of graduate students (e.g., I was selected by Shanghai Institute of Biochemistry, Chinese Academy of Sciences) in that particular year to take part in a two-section written exams: The first section was Biochemistry and Molecular Biology (in English and



Prof. Keith Moffat (Cornell)

composed by a group of professors at American universities). The second section was English, which comprises of reading, writing and listening. About half of the participants would pass the written exams and be interviewed by professors representing



Prof. Manfred Karnovsky (Harvard)



Prof. Gerald Feigenson (Cornell)

the participating universities in the US side. Such interviews were conducted in Beijing (For students of North China) and Shanghai (for those from South China) respectively, usually by two professors together with their wives. The interview part was challenging for the Chinese students, most of whom had never had a chance to meet any foreigners. Those who were fortunate enough to pass both stages of selection were sent for an intensive English program at Guangzhou English Language Center (GELC) located in Sun Yat-Sen University, Canton, China, where the students were taught by teachers from the United States (I remember that our English teachers were themselves graduate students of UCLA). During this period, the students applied for Ph.D. programs of 5-6 assigned institutions from the participating universities (including prestigious ones as Harvard, Yale, UC-Berkeley, UCLA, etc.). This was of course a two-way selection process. The total number of students eventually selected during each of these eight years were as follows (according to the record, ref. 1): 55 in 1982 (Class I); 62 in 1983 (Class II); 59 in 1984 (Class III); 61 in 1985 (Class IV); 58 in 1986 (Class V); 28 in 1987 (Class VI); 50 in 1988 (Class VII); 49 in 1989 (Class VIII).

A total of six professors came to China to conduct the interviews over the eight years of the CUSBEA program. Prof. Manfred Karnovsky from Harvard Medical school and Prof. Keith Moffat from Cornell University conducted the interviews for Classes I, II, and VI; Prof. Gerald Feigenson from Cornell conducted it for Class III; Prof. David W. Allmann from Indiana University School of Medicine conducted it for Classes III, IV, V, and VII; Prof. Richard Gumport from University of Illinois conducted it for Classes IV, V, VII, and VIII; and Prof. Woodland Hastings from Harvard did it for Class VIII. It is fair



Prof. David W. Allmann (Indiana)

to say that the fate of many Chinese students was determined by these interviews. It is also sad to say that Profs. Manfred Karnovsky and David Allmann had left us forever. They will be remembered by all the CUSBEA fellows for their efforts to open the new door for all of us.



Prof. Richard Gumport (Illinois)



Prof. Woodland Hastings (Harvard)



CUSBEA Class I (82)



CUSBEA Class II (83)



CUSBEA Class III (84)



CUSBEA Class IV (85)



CUSBEA Class V (86)



CUSBEA Class VI (87)



CUSBEA Class VII (88)



	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
前排	庄耀	杨伟海	宗比	高阳	张泽民	刘斌	明远明	陈力	岳晓丹	陈萃	李仕勇	卫富明	夏良	周士斌	吴敏	梁影	黄建东
中排	薛维祖	陆为民	潘多鑫	王小叶	冷毅华	胡亮	韩利民	曹典	成伟	李珍	金安芳	陈雁	徐春	魏伟	刘革	丘云	丛培杰
后排	王思群	孙恩东	陈雁	李克生	郭益民	陈海杰	马吉钰	叶宁	周征	陈海梅	陈新建	杨建	梁宁	张廷	程翠	高洪安	XXX

CUSBEA Class VIII (89)

Table 1
Incomplete survey of CUSBEA fellows taking faculty positions

Name of institutions	Full Prof.	Assoc. Prof.	Assist. Prof.	Remarks
Cheung Kong Graduate School of Business	Huining Cao (85)			Chair (Dept. of Finance)
East China Normal Univ.	Yinghe Hu (85)			Director
Hong Kong Univ. of Sci. & Technol.	Yong Xie (83)			
Nankai Univ.	Luyuan Li (82)			
Peking Univ.	Zengyi Chang (85)			Vice Dean
Tsinghua. Univ.	Peng Li (88), Bing Zhou (88), Zhen Li (89)			P. Li, vice chair.
Univ. of Hong Kong Uni. Sci & Technol. China	Longping Wen (82), Ling Chen (85)	Jian-Dong Huang (89)		Chen, Adjunct professor & Dept. Chair
Xiamen Univ.	Shengcai Lin (85)			Dean
Zhejiang Univ.	Ming Qi (86)			Licensed physician
Zhongnan University	Shi Huang (84)			
Beijing Institute of Genomics, CAS	Jun Yu (84)			Deputy director
Guangzhou Institute of Biomedicine and Health, CAS	Duanqing Pei (85), Donghai Wu (85)			Pei, Director General
Shanghai Institute for Biol. Sci., CAS, China	Guoping Zhao (83), Kan Liao (85)			Zhao, director, Member of CAS
Albert Einstein Coll. Med.		Maomi Li (84)		Li, licensed physician
Baylor College of Medicine	Hui Zheng (85)	Zheng Zhou (89)		
Boston Univ.	Zhi-Xiong Xiao (86)			
Case Western Reserve Univ.			Guangbin Luo (86)	
Cornell Univ.		Jun Kelly Liu (89), Pengbo Zhou (88)		
Duke Univ.	Xiaofan Wang (82)	Yuan Zhuang (84)		
Harvard Medical School	Junying Yuan (82), Yang Shi (83)	Qiufu Ma (88)	Xin Xu (88)	Yuan, Fellow of the American Academy of Arts and Sciences
Indiana Univ.	Cong Yan (82), Xin-Yuan Fu (82), Yan Xu (82), Jian-Ting Zhang (84)			
Johns Hopkins Univ.	Min Li (85), Duojia Pan (89)			Pan, HHMI investigator
MIT	Jianzhu Chen (83)			
New York University	Zhen-Qiang Pan (83)			
Penn. State Univ.	Zhichun Lai (83)		Jiyue Zhu (85)	
Rutgers Univ.	Renping Zhou (83)			
Stanford Univ.	Liqun Luo (87)		Guowei Fang (88)	Luo, HHMI investigator

Table 1 (Continued)

Name of institutions	Full Prof.	Assoc. Prof.	Assist. Prof.	Remarks
State Univ. of New York		Qing-Yu Zhang (82)		
Tufts University			Jay-Jiguang Zhu (85)	Zhu, licenced physician
UC-Berkeley	Qiang Zhou (86)			
Univ. of Alabama	Ming Luo (82)		Jianhua Zhang (85)	
UC-Irvine.	Haoping Liu(84)			
UC-Los Angeles	Hong Wu (84), Genhong Cheng (85), Wenyuan Shi (85), Ke Shuai (85), Jiaoti Huang (87)	Shen Pang (82) Xin Liu (83)		Huang, licensed physician (pathologist)
UC-Riverside		Xuemei Chen (89)		
UC-San Diego	Xiang-Dong Fu (83), Kunliang Guan (83), Donger Zhang (83), Yishi Jin (85)	Yimin Zou (89), Yang Xu (89)		Jin, HHMI investigator
Univ. of Cincinnati	Jun Ma (83)			
Univ. of Colorado at Boulder	Min Han (83)			HHMI investigator
Univ. of Connecticut		Ping Zhang (83)		
Univ. of Georgia		Haini Cai (82)		
Univ. of Illinoisat Chicago		Bin He (88)		
Univ. of Maryland	Zhongchi Liu (83)	Yun Qiu (89)		
University of Massachusetts	Zuoshang Xu (83)	Zheng-Zheng Bao (87)		
Univ. of Medicine and Dentistry in New Jersey	Mengqing Xiang (86), Xiaofeng Zheng (86)			
Univ. of Missouri		Lixing Wang (85)		
Univ. of Michigan	Junlin Guan (82)			
Univ. of North Carolina Chapel Hill	Yue Xiong (83), Xiao Xiao (86)	Lishan Su (82)		
Univ. of Oklahoma		Xinli Lin (82), Yuechueng Liu (83), Guangpu Li (85)		
Univ. Pittsburgh	Zhou Wang (84)			
Univ. of Rhode Island		Gongqin Sun (84)		
Univ. of Rochester	Lin Gan (86)	Ming Qi (86), Xin Bi (89)		
Univ. of South California	Mei Chen (84), Wei Li (84)			
Univ. of South Florida/ Moffitt Cancer Center & Research Institute	Jie Wu (83), Wenlong Bai (85), Jiandong Chen (86)			
UT-Southwestern Med. Center at Dallas	Xiaodong Wang (85), Jin Jiang (87)			Wang, HHMI investigator, Member of US Acad. Sci.
Univ. Wisconsin			Chaoyang Zeng	

Table 1 (Continued)

Name of institutions	Full Prof.	Assoc. Prof.	Assist. Prof.	Remarks
UT-Health Science Center at San Antonio	Rong Li (86)			
UT-M.D. Anderson Cancer Center	Jinsong Liu (84), Bing Su (85), Wei Zhang (86)			Liu, licensed physician
Vanderbilt Univ.		Peng Liang (83)		
Washington Univ. at St. Louis	Guojun Bu (86)			
Wayne State Univ.		Li Li (86)		
Yale Univ.	Haifan Lin (83)	Bing Su (85)		
Feinstein Inst. For Med. Res.		Yuenian Shi (84)		
NIH	Weidong Wang (Sr. Investigator)			
Nevada Cancer Institute (Las Vegas)	Hui Zhang (83), Hong Sun (83)			
Oklahoma Med. Res. Found.	Xiaohong Sun (82)			
Wodsworth center, New York State Department of Health	Xinxin Ding (82)			
Dalhousie Univ. Univ. British Columbia	Xiangqin Liu (82)	Youwen Zhou (84)		Zhou, licenced physician
Univ. of Toronto Inst. Mol. Cell Biol. Singapore	Jianxiang Hu (82) Wang Yue (82), Wanjin Hong (83)	Xinmin Cao (82), Xiaohang Yang (83), Mingjie Cai (85)		Hong, Deputy Director
National Univ. of Singapore	Xinyuan Fu (82)			Chair

THE CURRENT STATUS OF THE CUSBEA FELLOWS

Twenty years after the end of the program, all of these 422 CUSBEA fellows have finished their studies and are at various stages of their career. Many of these fellows become very successful scientists and professors in prestigious universities or similar positions in research institutes. At least more than 79 of the CUSBEA fellows have been promoted to full professorship positions (see Table 1).

Among these, at least five (Min Han of Class II, Xiaodong Wang and Yishi Jin of Class IV, Liqun Luo of Class VI, Duoqia Pan of Class VIII) have been selected as investigators of the prestigious Howard Hughes Medical Institute, one (Xiaodong Wang of Class IV) was elected as a member of the National Academy of Sciences in the United States, and one (Junying Yuan of Class I) was elected as fellow of the American Academy of Arts and Sciences. Some of the CUSBEA fellows have decided to work in the industries or clinical medicine and have earned their promi-

nent positions as well (see Table 2). Through this partial survey, it is clear that many of the CUSBEA fellows have achieved good success in their career in China, the United States, or elsewhere.

In the past decade or so, the impressive development in China has attracted an increasing number of these CUSBEA fellows to return to their motherland for a career. They are taking professorship positions in a few prestigious institutions (see Table 1). In a sense, many of these CUSBEA fellows, in particular those returned to China, are making their contributions in promoting the development of biological science in China. Their contribution will become more obvious when we see it in years to come.

I have to emphasize that the information in Tables 1 and 2 have to be considered partial at best for the following reasons. First, information of the current status of about half of the CUSBEA fellows are unavailable to me. Second, I would not consider myself as qualified to write a historical article as this, which would for sure required professional treatment of the in-

Table 2
Incomplete list of CUSBEA fellows currently working in industry or clinical medicine

Names of company	CUSBEA Fellow (name, class, and positions)
Beijing Ganli Pharmaceutical Co. Ltd (Beijing)	Zhongyu Gan (84), President and CEO
Ambrosia Pharmaceutical Co (Shanghai)	Qiang Yu (82), President and CEO
Bioveda China	Zhi Yang (82), Founder, Chairman and Managing Partner; Yi Li (85), Partner
China Novartis Inst. Biomed. Res. (Shanghai)	Kevin K. Chen, Chief Operating Officer (85); Baohua Gu, Sr. Res. Investigator (85), Zhi Chen (86), Sr. Res. Investigator
GlaxoSmithKline R&D China,	Ling Chen (85), Vice president, Founding Director-General, Guangzhou Institute of Biomedicine and Health, CAS (2004-2008)
ImmPort therapeutics, Inc.	Xiaowu Liang (82), President and CEO
Accelagen, Inc. (California),	Chun Luo (86), President and CEO
Johnson & Johnson	Yixin Wang (88), Executive Director
Merck	Jinshan Hu (84), Director; Xiaoming Guan (83), Senior Investigator
Epitomics Inc. (California)	Guo-Liang Yu (84), President and CEO; Xiuwen Liu (87), Director of Research
Emerging Technology Partners, LLC (Maryland),	Wei-Wu He (86), General Partner and Co-founder
DuPont	Siqun Wang (89), Director
Genentech	Wei-Qiang Gao (83), Sr. Scientist, Zemin Zhang (89), Acting Director
Genzyme	Yuanxin Xu (85), Director
Amgen	Yao Zhuang (89), Principal Scientist
Promega	Fan Fan (88), r. Research Manager
Monsanto	Jingdong Liu (84), Platform lead
Physician	Qingping Wang (84)
Oncologist	Jeffrey Zhengsheng Ye (83)
Physician	Yihao Yu (83)
Oncologist	Xingsheng Liao (87)
Radiologist	Feiyu Xue (84)

formation. I thus have to apologize to many of the CUSBEA fellows whose information is not listed in the two tables.

CONCLUSION

It was somehow controversial a couple of years ago on whether the CUSBEA Program achieved its original goal of training high level researchers for China. With an increasing number of these fellows returning to China, and many more making their contribution while working in another country, people might view the effect of this program quite differently in the future. To all the CUSBEA fellows, I would like to say, whatever you choose to do and wherever you choose to stay, let's work hard to achieve the most and the best.

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