

Title: Imaging Informatics and Computational Systems Bioinformatics for Pathway Analysis and Optimal Drug Therapy

Speaker:

Prof. Xiaobo Zhou
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Time: 4:00 pm

Venue: Room 603, Chow Yei Ching Building

Abstract:

The premise of today's drug development is that the mechanism of a disease is highly dependent upon underlying signaling and cellular pathways. Such pathways are often composed of complexes of physically interacting genes, proteins, or biochemical activities coordinated by metabolic intermediates, ions, and other small solutes and are investigated with molecular biology approaches in genomics, proteomics, and metabonomics. Nevertheless, the recent declines in the pharmaceutical industry's revenues indicate such approaches alone may not be adequate in creating successful new drugs. Our observation is that by combining methods of genomics, proteomics, and metabonomics with techniques of bioimaging will systematically provide powerful means to decode or better understand molecular interactions and pathways that lead to disease and potentially generate new insights and indications for drug targets. The former methods provide the profiles of genes, proteins, and metabolites, whereas the latter techniques generate objective, quantitative phenotypes correlating to the molecular profiles and interactions. In this talk, I will describe pathway reconstruction and target validation based on the proposed systems biologic approach and show microenvironment based in-silico modeling for pathway analysis and optimal drug selection.

Biography of the speaker:

Xiaobo Zhou received the B.S. degree in Mathematics from Lanzhou University, Lanzhou, China in 1988, the M.S. and the Ph.D degrees in Mathematics from Peking University, Beijing, China, in 1995 and 1998, respectively. From 1988 to 1992, he was a Lecturer at the Training Center in the 18th Building Company, Chongqing, China. From 1992 to 1998, he was a Research Assistant and Teaching Assistant with the Department of Mathematics at Peking University, Beijing, China. From 1998 to 1999, he was a Postdoctoral Fellow in the Department of Automation at Tsinghua University, Beijing, China. From 1999 to 2000, he was a Senior Technical Manager with the 3G Wireless Communication Department at Huawei Technologies Co., Ltd., Beijing. From Feb. 2000 to Dec. 2000, he was a Postdoctoral Fellow in the Department of Computer Science at University of Missouri-Columbia, Columbia, MO. From 2001 to 2003, he was a Postdoctoral Fellow in the Department of Electrical Engineering at Texas A&M University, College Station, TX. From 2003 to 2007, he was first a Research Fellow and then a faculty with the Harvard Center for Neurodegeneration and Repair in Harvard Medical School and Radiology Department in Brigham and Women's Hospital. Since June 2007, he has been an Associate Professor and the Chief of Bioinformatics and Biomedical imaging Analysis of The Methodist Hospital Research Institute affiliated with Cornell University. His current research interests include image and signal processing for medical imaging analysis, cellular imaging analysis, neuroinformatics, bioinformatics for genomics and proteomics, *In-silicon* cancer stem cell microenvironment modeling, and drug response modeling for integrated multiscale and multimodality systems biology research.

Dr. Zhou made original contributions to the cellular image analysis and got four NIH R01 grants with his colleagues. He recently got a NIH R01 grant on the genomics integration. He is also going to be awarded a NIH R01 grant on the medical image analysis. He and his colleagues newly got a NIH U54 center grant for cancer system biology where he made the original contribution to the computational biology component.

Organizer: Dr. C.Q. Chang