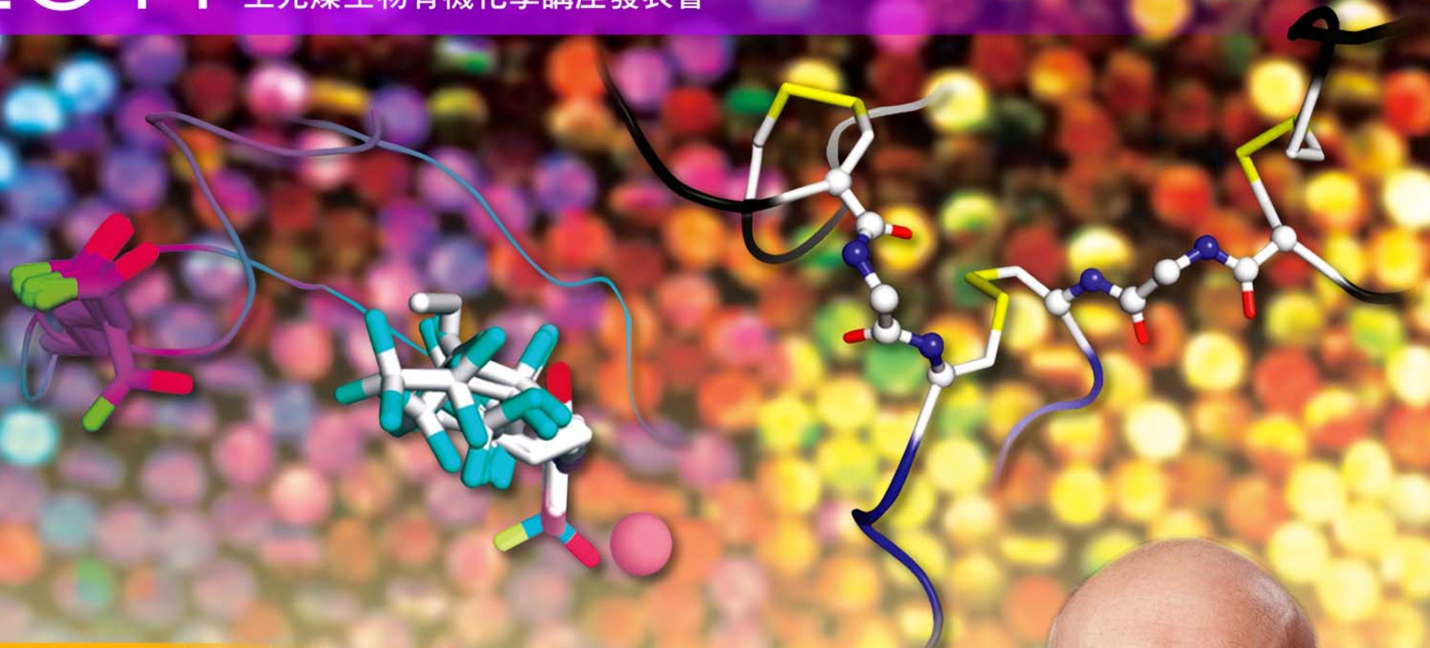
2011 K.T. Wang Bio-organic Chemistry Lectureship
王光燦生物有機化學講座發表會



Oct 17 (Mon) 14:30 國立臺灣大學醫學院第一會議室

Simple Solution: Developing Bioanalytical Systems for Diagnostics
Prof. George M. Whitesides

Oct 18 (Tue) 14:40 國立交通大學科學二館210演講廳

Nanoscience and Nanotechnology
Prof. George M. Whitesides

Oct 19 (Wed) 14:00 . 15:30 頒獎典禮暨演講 | 中央研究院人文國際會議廳

Translating Science into Real-World Value
Prof. George M. Whitesides

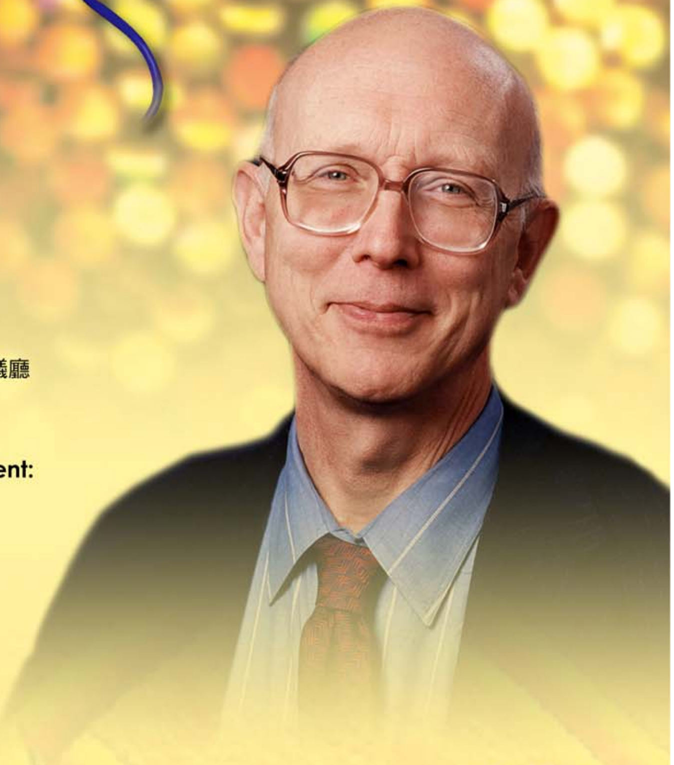
Role of Academic Research in Innovative Drug Discovery and Development: Opportunities for Taiwan-based Research Institutions
Dr. Whaijen Soo

Oct 20 (Thu) 14:30 國立臺灣大學化學系新大樓演講廳

Reinventing Chemistry
Prof. George M. Whitesides

Oct 21 (Fri) 14:00 中央研究院生化所103演講廳

Proteins, Ligands, and Water
Prof. George M. Whitesides



學術講座

Prof. George M. Whitesides

美國哈佛大學教授
Woodford L. and Ann A. Flowers University Professor
美國國家科學院院士

產業講座

Dr. Whaijen Soo 蘇懷仁博士

生技研發產業新機籌劃及策略經營顧問

主辦單位
財團法人台北市王光燦生物有機化學教育基金會

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中央研究院基因體中心
台灣大學化學系
國科會化學推動中心
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王光燦院士及王光燦生物有機化學教育基金會介紹

王光燦院士，1929 年出生於台灣台北市。1952 年台灣大學化學系畢業，1962 年獲日本東北大學博士學位。

1966 年是一個物資缺乏的年代，他用老師家中一件舊的尼龍襯衫，發明了聚醯胺（polyamide）薄膜色層分析（TLC），此技術被廣泛應用於天然物的分離與鑑定，尤其應用於蛋白質胺基酸定序，該論文被引用超過千次，被稱譽為「窮人的薄膜層析法」。1969 年他加入美國加州大學李卓皓教授的研究室，從事蛋白質化學合成研究工作。1972 年加入中央研究院生化所擔任研究員，1978 年完成全世界首次固相全合成台灣眼鏡蛇心臟毒蛋白。在 1980 年至 1986 年期間，他擔任中央研究院生化所所長，積極推動國內生物化學的學術研究。他更應用酵素進行有機化合物不對稱合成反應，發明以微波爐加速胜肽水解及合成反應的方法。於近半世紀之教學研究生涯中，王院士治學態度嚴謹，研究專注執著，作育英才無數；至今王院士於國內外著名學術期刊發表論文超過兩百篇，並且獲得行政院傑出研究科技榮譽獎、國科會研究傑出獎、侯金堆文教基金會傑出榮譽獎、台美基金會科技工程獎等多項榮譽及獎章，更於 1994 年當選中央研究院院士。

為了促進台灣生物有機化學的蓬勃發展，並能繼續推展台灣有機化學的研究，中央研究院李遠哲院士、翁啟惠院士等人共同發起，於 2000 年 10 月 18 日成立「財團法人台北市王光燦生物有機化學教育基金會」（The K-T Wang Bioorganic Chemistry Foundation），每年頒獎給一位對生物有機化學有重大貢獻的國際知名學者，並邀請他到國內演講、與產學座談提供研究心得及建議，以促進國內生物有機化學的發展。

王光燦院士於 99 年 12 月 19 日辭世，師母慨捐三百萬元給基金會嘉惠臺灣學子，中興大學獸醫系王孟亮教授曾為王院士研究生，特撰紀念文章發表於 The European Peptide Society Newsletter

From polyamide thin layer chromatography in the sixties, solid phase synthesis of snake venom proteins in the seventies, to application of microwave on chemical reaction in the eighties, Dr. Kung-Tsung Wang's substantial achievements greatly influence the whole Bioorganic Chemistry community.

On October 19, 1999, Dr. Wang, who was 70 years old, gave a moving speech in his honorable retirement ceremony planned by all the attendees, good friends and students of his, who were at the scene to pay him respect. In order to honor Dr. Wang and carry over the mission to nourish the Bioorganic Chemistry Research in Taiwan, a group of the Taiwanese scientists including Dr. Y.T. Lee and Dr. C.H. Wong organized and helped the founding of "K-T Wang Bioorganic Chemistry Educational Foundation" in October 2000.

The K-T Wang foundation enables more students and young scholars to have the opportunity to meet with world-renowned scientists face-to-face. Once a year the foundation awards a world-famous scholar to give talks on his/her research experiences. The purpose is to inspire the youth in this field and thus speed up the progress of Bioorganic Chemistry research in Taiwan.

Dr. Wang passed away on December 19, 2010.

In Memoriam

Kung-Tsung Wang (1929–2010)

When Taiwan was part of Imperial Japan, Kung-Tsung Wang was born in Taipei City in 1929. In April 1942, Wang entered the Third Junior High School (now the Affiliated Senior High School of National Taiwan Normal University) in Taipei. Because of the Pacific War, all students could not study regularly in the schools. After the Pacific War, types of education in Taiwan were drastically changed from the Japanese types to the American-like. The rulers in Taiwan changed from Japanese to Chinese. Wang and students of his generation in Taiwan had to learn Chinese; it was a new language to them. Wang passed in the high school entrance examination in September of 1945 and continued his studies in the Taipei Senior High School (the same location became the National Taiwan Normal University later). In 1948, he was admitted into the Department of Chemistry of National Taiwan University.

Wang started his research career as a teaching assistant in the Department of Chemistry in National Taiwan University in 1954, and he worked on isolation and structural determination of natural products in Professor Yao-Tang Lin's laboratory.

His first research topic was to analyze the components and to determine the structures of compounds in Taiwan cypress volatile oil. The research conditions in Taiwan were very bad at that time; universities did not have sufficient money to buy the equipment and instruments needed. Consequently, for the first six years, Wang's research had no significant progress. In 1958 Professor Lin studied in Munich, Germany and he wrote to Wang, telling him that German scientists used a kind of adsorbent of polyamide (the primary constituent of nylon) in column chromatography for purification of flavonoids. At that time, polyamide was expensive and not affordable to Taiwanese scientists, so Wang used Professor Lin's nylon shirt as research material. He dissolved the nylon shirt using the formic acid, and then used ethanol to increase the nylon purity. Then he made nylon powder by air dry, and used in column chromatography flavonoid purification. However, Wang thought that column chromatography for separation and identification of flavonoid was too complicated. After a couple of days of pondering, he tried to use the filter paper chromatography method. Wang further found paper chromatography method could unexpectedly separate the ortho-, meta- and para-cresols. This achievement was remarkable, because these cresol structures differ very little and were difficult to be separated. Later, Wang published five papers in *Nature* (1965–1967) on the separation of amino acid derivatives and of many natural products by using polyamide layer chromatography. Wang is co-author of 20 papers in the *Journal of Chromatography* as well as many more papers on peptide analysis and synthesis in other journals.

In August 1969, Wang came to Dr. Choh-Hao Li's hormone research laboratory in the University of California at San Francisco where he learned solid phase peptide synthesis technique. Returning to Taiwan, Wang started to work on peptide synthesis by either the liquid phase synthesis or the solid phase synthesis method. In collaboration with his laboratory members (Chi-Huey Wong, Shui-Tein Chen and Chewn-Lang Ho), they synthesized Taiwan cobra cardiotoxin by solid phase synthesis (Synthesis of a fully active snake venom cardiotoxin by fragment condensation on solid polymer. *Biochimica et Biophysica Acta – Protein Structure*. 1978; 536: 376–389).

During his career, Wang has profoundly influenced the field of bioorganic chemistry in Taiwan.

Contributed by Min-Liang Wong

2011 年王光燦生物有機化學學術講座得獎人

Professor George M. Whitesides

George M. Whitesides has worked in an unusually broad range of areas, including nuclear magnetic resonance (NMR) spectroscopy, organometallic chemistry, applied enzymology, self-assembly, soft lithography, microfluidics, organic surface science, and nanotechnology. His current research interests include physical and organic chemistry, materials science, biophysics, complexity and simplicity, tools for biology, technology for developing economies, and the origin of life. His laboratory a Harvard University is noted for its diversity, creativity, and productivity, and for the quality of the students it produces.

He received an A.B. degree from Harvard University and a Ph.D. from the California Institute of Technology under John D. Roberts. He was a member of the faculty of the Massachusetts Institute of Technology from 1963 to 1982. He joined the Department of Chemistry at Harvard in 1982 and served as department chairman from 1986 to 1989. From 1982 to 2004, Whitesides was the Mallinckrodt Professor of Chemistry at Harvard and is currently the Woodford L. and Ann A. Flowers University Professor.

Whitesides is active in numerous public service roles. He has served on advisory committees for the National Science Foundation, NASA, the U.S. Department of Defense. He has also served on the National Research Council in various capacities since 1984, including roles with the Committee on Science and Technology for Counterterrorism, Science Technology and Economic Policy, the "Gathering Storm" Committee, and the Committee on Science, Engineering, and Public Policy. Whitesides is the author of over 1,100 scientific articles and is listed as an inventor on more than 100 patents.

He is a member of the American Academy of Arts and Sciences, the National Academy of Sciences, and the National Academy of Engineering. He is a foreign associate of the Royal Society of Chemistry (UK), the Royal Netherlands Academy of Arts and Sciences, the Indian Academy of Science, and the French Academy of Science. He is also a fellow of the American Association for the Advancement of Science, the Institute of Physics, and the American Chemical Society. Among honors, he has received the U.S. National Medal of Science in 1998, the Kyoto Prize in Materials Science and Engineering in 2003, the Welch Award in Chemistry in 2005, the Dan David Prize in Future Science in 2005, the American Chemical Society Priestley Medal in 2007, the Prince of Asturias Award in Science and Technology in 2008, the Dreyfus Prize in Chemistry in 2009, the Othmer Gold Medal (Chemical Heritage Foundation) in 2010, and the King Feisal Prize in 2011.

2011 年王光燦生物有機化學產業講座受邀學者
Dr. Whaijen Soo

Dr. Soo is a global pharmaceutical and bio-pharmaceutical research and development executive with over 25 years of management experience with strategic and portfolio planning, as well as execution of new drug research, development, and product registrations in US, Europe, and rest of world. He has a broad knowledge in a variety of drug classes including small molecules, interferons, antibodies, other protein therapeutics such as enzyme replacement, and evolving new technologies. He has participated in many mergers and acquisitions, licensing-in agreement, various research collaborations, business partnerships, and alliance management for drug co-development.

Dr. Soo most recently was Senior Vice President and Head of Research and Development a Shire Human Genetic Therapies, with an annual budget over $ 450 million USD. While at Shire, he led the consolidation of functions, establishment of a solid portfolio, the filing of two new IND's, as well as approval for VPRIV, a treatment for Gaucher disease. He also served as Chief Scientific Officer of Jerini, a German company Shire acquired for the development and marketing of Firazyr, a treatment for Hereditary Angioedema. Prior to joining Shire, Dr. Soo was Senior Vice President, Medical Research, at biogenidec where he was responsible for the worldwide clinical development of all drugs in the biogenidec portfolio, with multiple IND filings as well as the approval of Tysabri, a breakthrough new drug for the treatment of multiple sclerosis. Before joining biogen idec, Dr. Soo spent eighteen years with Hoffmann La-Roche Inc., as Vice President and head of clinical sciences in charge of worldwide clinical development of new anticancer drugs, antiviral and immunotherapies against AIDS and other viral diseases, as well as drugs used for organ transplantation, with successful registrations and launches of 11 new drugs in U.S., Europe, and rest of world.

Dr. Soo received a Ph.D. in Biochemistry from the University of California, Berkeley. He also has an M.D. from the University of California, San Francisco and received postgraduate training at Brigham and Women's Hospital, Harvard Medical School, in Boston. Dr. Soo was a member of numerous public and trade committees, including Round Table on Research and Development of Drugs, Biologics, and Devices, Institute of Medicine, National Academy of Science, Board of Participants, Intercompany Collaborations on AIDS drug development, and Scientific Panel, American Foundation on AIDS Research.

Since 2004 Dr. Soo has been an advisor to the Premier and the Executive Yuan in Taiwan on biotechnology and new drug research and development, first as a member of, the Strategic Review Board, and later the BioTaiwan Committee. He has also been an advisor to other Asian countries and local governments to help establish biotech strategies, increasing competitiveness and capabilities for biopharmaceutical research and development value chain, designing and managing biotech parks, as well as building global networks

Dr. Soo is currently a management consultant to biotech start-up companies. He is also involved in venture planning for the development and commercialization of new drugs, biopharmaceuticals, and biosimilars in Asia,

Abstract

Lecture 1. Simple Solutions: Developing Bioanalytical Systems for Diagnostics

Prof. George M. Whitesides

"Simple solutions" is the phrase we use to describe technology developed to contribute to health care in developing economies, where simplicity, low cost, ruggedness, and independence of infrastructure pose remarkably challenging technical and organizational problems. We believe that successful solutions will also be useful in the developed world: low cost and simplicity are advantages almost everywhere. This talk will summarize the current state of work on diagnostic systems that use microfluidic systems based on patterned paper, and will describe the development and use of a new family of microanalytical devices based on paper. To fabricate these devices (micro-paper-based analytical systems, or μ-PADs), paper is first patterned with lines of a hydrophobic polymer or wax; the hydrophobically bounded regions of paper then act as fluidic microchannels, through which water moves by capillarity. Stacking patterned paper with interleaved hydrophobic sheets (double-sided adhesive tape, with holes patterned in it) generates three-dimensional devices. The immediate use of these microsystems is as diagnostics for use in the developing world, where low cost and mechanical ruggedness are important. They have, however, a surprisingly wide range of capabilities and uses, which this talk will summarize.

Lecture 2 .Nanoscience and Nanotechnology. Why is this area now attracting so much attention, and what is it all about?

Prof. George M. Whitesides

Nanoscience and nanotechnology are words that are attracting great attention. Why? One answer is that they may provide ways of extending the range and lifetime of existing microtechnologies. A second is that nanoscience will lead to the discovery of new phenomena and new levels of understanding of nature, and that new science will lead to new technologies. This talk will give a view of the current state of nanoscience and nanotechnology, and suggest ways in which nanotechnology—which can make and characterize very small things—and other areas: energy, conservation, biology—in which nanoscale structures are central to the function, will interact with one another.

Lecture 3. Translating Science into Real-World Value

Prof. George M. Whitesides

A discussion of strategies and opportunities for creation of commercial technology from science, with illustrations from real-life companies. This talk can be phrased either as "technology transfer" or as "how to be an entrepreneur".

Lecture 4 .Role of Academic Research in Innovative Drug Discovery and Development: Opportunities for Taiwan-based Research Institutions

Dr. Whaijen Soo

Pharmaceutical drug discovery and development, by experience and trial and error, has evolved into a highly disciplined process. This disciplined R and D model was highly successful in the 90's, allowing drug and biotech companies to launch one after another blockbusters such as Prozac, Lipitor, and Plavix. In a short span of fifteen years, over twenty new HIV drugs were discovered, developed, and approved. While the value chain and work flow for this process have not significantly changed during the past two decades, global pharmaceutical industry collectively have been unable to produce high-value, innovative medicines to meet business and medical need in recent years. Two of the key reasons for the loss of productivity were the increase in the complexity of the disease targets, and difficulties in applying new tool boxes to facilitate drug discovery and development.

The industry has responded to these challenges with a number of initiatives and new business models. We have seen efficiency-based large merger and acquisitions, as well as scale-based joint venture formation of disease-specific marketing companies. More importantly, large and mid-sized companies have increasingly depended on collaboration and acquisition to achieve sourcing of new technologies, either directly from academia or indirectly through small start-up biotech companies who usually spin off from academic technology transfers. Academic research has become the initial engines for innovative drug discovery and development.

Academic research, by design, should be relatively free and spontaneous for creativity and forward thinking. Scientists in research institutions, however, need to be better focused and learn to connect more efficiently to the disciplined drug development process. We are establishing a "Supra Incubation Center" (SIC) to facilitate focused drug discovery research in academic centers with R and D capability, connect relevant research platforms, enable core facilities, and network sequential value chain players to increase work-flow efficiency and probability of success for future Taiwan biotech industry. Feasibility of this approach will be therapeutic-area dependent, and oncology offers a good example. In Taiwan, one can access a consortium of medical centers with multiple EGFR-TKI wide-type and resistance cell-lines, relevant orthotopic xenograft and transgenic mouse models, lung cancer patients, as well as facilities for cutting-edge early-phase clinical trials including the use of real-time molecular imaging. Similar value-chain capabilities can be mapped and established for other types of cancer as well as diseases in other therapeutic areas.

Lecture5. Reinventing Chemistry

Prof. George M. Whitesides

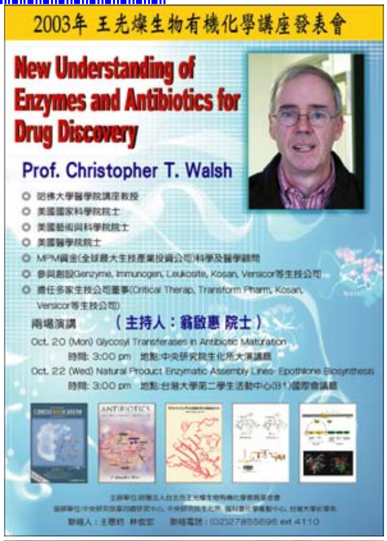
Chemistry, and the world of science and technology of which it is a part, are changing dramatically. Biology, materials, nanotechnology, and other less familiar/popular areas offer opportunities; the decline in invention in the chemical industry, and of productivity in the pharmaceutical industry, limit opportunities. One future for chemistry is the emergence of new fields; another is absorption by other disciplines. Every area of science faces periods of maturation and reinvention. What are the indicators for chemistry at this time? Does the history of other fields offer useful lessons? (A general audience talk directed primarily at chemists.)

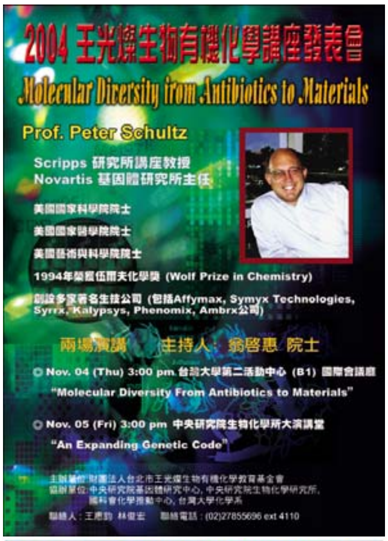
Lecture 6. Proteins, Ligands, and Water

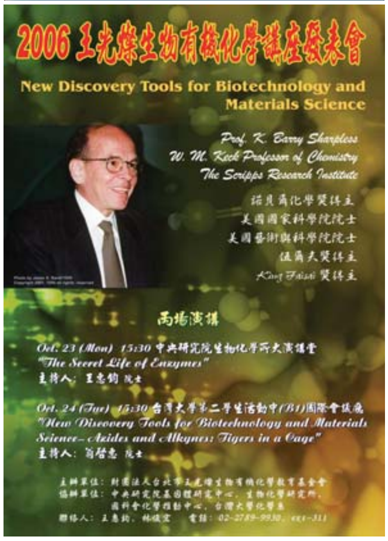
Prof. George M. Whitesides

This talk is a mixture of experimental work and more general discussion focusing on why it is so difficult to design ligands to fit protein receptors, how we should go about analyzing molecular recognition in aqueous solution, and the specific (and counterintuitive) role of water in protein-ligand association.

王光燦生物有機化學講座發表會紀錄







感謝

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