

## Professor Shu-Ting Chang on His 85th Birthday



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On September 30, 2015, Professor Shu-Ting Chang (“S-T” to many of his friends and acquaintances), editor of the *International Journal of Medicinal Mushrooms*, celebrated his 85th birthday. Dr. Chang was born in Yuanping, Shanxi, China, but he has been Australian by nationality since 1973. He is married to Judy Li-Ju Chang (née Lee). Their children are David Ming-Tsan, Barbara Ming-Wai, Judy Ming-Sze, Ernest Ming-Cheng, and Jennifer Ming-Jing. They have 13 grandchildren.

Professor Chang’s name occupies a prominent place in the world of mycology because of his outstanding contributions to the fields of mushroom biology, mushroom cultivation, and medicinal mushrooms. Chang’s wide circle of interests, the clarity of his scientific vision, and his enormous energy, enthusiasm, and honesty are just a few of his many great personal attributes.

Professor Chang graduated from the National Taiwan University and received a bachelor of science degree in 1953. He received his master of science

degree from the University of Wisconsin in 1958 and stayed on to pursue his PhD. He received it in 1960, after which he started his professional career at the Chinese University of Hong Kong (CUHK). He began as an assistant lecturer in biology and worked his way up to a professor emeritus. Throughout his scientific career—over a span of 45 years—he has been connected to CUHK in one way or another. He also influenced administrative changes in the Department of Biology at CUHK. For 11 years (1983–1994) he served as the chairman of the Department of Biology. From 1974 to 1977 he was the dean of the Faculty of Science; from 1979 to 1981 he served as the director of the Office of Student Affairs, and from 1975 to 1985 he was the director of the Research Laboratory for Food Protein Production. Dr. Chang acted as the director of the Marine Science Laboratory from 1984 to 1994. In 1985 he became the director of the Institute of Science and Technology, a position he held until 1992. In 1980 he was the head of the Division of

Biology in the graduate school. From 1983 through 1994 he was the chairman of the Board of Studies in Biology. Professor Chang became the chairman of the Science Center Management Committee, which he served on for 3 years. In 1991 he worked as the director of the Chinese Medicinal Material Research Center for 1 year, and from 1993 until 1995 he was the chairman of the Science Engineering Complex Management Committee.

Since 1960, Professor Chang's main fields of research has been mushroom biology, technology for mushroom cultivation, and mushroom biotechnology for tonic and medicinal products. The main philosophy and drive behind this line of research for the past 55 years is summarized in what follows.

Modern technology in human civilization is expanding every day; however, human beings face, and will continue to face, 3 basic problems that are capable of causing crises: food shortages, environmental pollution, and the diminishing quality of human health resulting from a continuously increasing world population. Mushrooms (macrofungi) not only can convert the huge amount of lignocellulosic biomass waste into food rich in protein; they can also produce notable nutraceutical/pharmaceutical products that have many health benefits. The most significant aspect of mushroom cultivation is to create pollution-free or zero-emission environments. In addition, mushroom-based farming and industry could provide employment to youth and women, particularly in rural areas in less-developed countries. Mushrooms are relatively fast-growing organisms, as well. Some tropical mushrooms can be harvested and consumed within 10 days after spawning. Using different varieties, mushrooms can be cultivated year-round.

Professor Chang has had 6 main research areas:

1. Mushroom life cycles using genetic and cytological techniques
2. Improvement of mushroom strains by genetic manipulation, including molecular markers and protoplast fusion techniques
3. Nutritive values and medicinal effects of mushrooms
4. Development and improvement of cultivation technology

5. Development of new concepts of mushroom biology, mushroom science (concerned with mushroom production), and mushroom biotechnology (concerned with mushroom products)
6. Introduction and development of the terms mushroom biology and mushroom nutraceuticals, and the concepts of "what is a mushroom?" and the "nongreen revolution". This research has improved the supply of nutritious food for human consumption, the quality of life for humanity, and the condition of polluted environments.

As the result of Professor Chang's 55 years of research on the basic and applied aspects of mushrooms—with over 220 scientific papers and 23 books published—the following major contributions have already had and will continue to have an impact at national, regional, and global levels.

1. In 1969, cotton wastes from cotton textile industry were used for the first time to grow straw mushrooms (*Volvariella volvacea*) in Hong Kong.
2. Protoplast techniques were used to breed high-temperature strains of *Lentinus edodes*.
3. The new disciplines of mushroom biology and mushroom biotechnology were established, leading to the First International Conference on Mushroom Biology and Mushroom Products, held at the CUHK, August 23–26, 1993, and to the formation of the World Society of Mushroom Biology and Mushroom Products.
4. The term and concept of "mushroom nutraceuticals" was introduced with Professor J. A. Buswell in 1996.
5. Mushroom cultivation and mushroom products were called the "nongreen revolution" for the first time in 1998 as a result of the positive effects of cultivation and development of edible and medicinal mushrooms on equitable economic growth and human welfare. Benefits include the use of mushrooms as food, health tonics, medicines, animal feed, fertilizers; for protecting and regenerating the environ-

ment; for promoting sustainable development; and for contributing positively to economic and social conditions.

Professor Chang is an author or coauthor of 23 books. Special attention must be given to his latest book, *Mushrooms: Cultivation, Nutritional Value, Medicinal Effect, and Environmental Impact*, written with Philip G. Miles and published in 2004. This book provides an encyclopedia-like review and emphasizes worldwide trends and developments in mushroom biology from an international perspective; it is highly recommended for medicinal mycologists, mushroom growers, botanists, plant pathologists, and professionals and scientists in related fields. Chang's book illustrates that mushroom cultivation has and will continue to have a positive global impact on long-term food nutrition, health care, environmental conservation, regeneration, and economic and social change. The value of this book cannot be overestimated. Its potentially extensive use can be recognized in universities, classrooms, and laboratories, and it is useful for beginning students, those engaging in PhD studies, and beyond. Chang's book is a real encyclopedia of mushroom biology, including their cultivation methods, nutritional values, medicinal values, and environmental impacts. To my knowledge, no past or current book comes close to covering all the subjects considered in mushrooms.

Professor Chang is now the vice-president of the World Society for Mushroom Biology and Mushroom Products. He is honorary president of the International Society of Medicinal Mushrooms. He served as a member of the Executive Committee of the International Society for Mushroom Science from 1996 to 2004. Professor Chang was also the president of the International Mushroom Society for the Tropics (1981–1995), the national point-of-contact representative of Hong Kong for the UNESCO Regional Network of Microbiology in Southeast Asia (1981–1993), and the executive secretary of the headquarters of the UNESCO Regional Network of Microbiology in Southeast Asia (1984–1987). He was elected to be a member of the executive board of the International Union of Microbiological Societies (1990–1994) and was a member of the Standing Committee on

Membership, Structure and Status of International Council of Scientific Unions (1993–1996).

Professor Chang was one of the initiators of our special International Journal of Medicinal Mushrooms. He is and has been an editor of the journal since its inception in 1999. He has also been a critical and proficient reviewer of several articles, as well as an author himself. Since 1999 he has published very important keynote papers in this journal:

- “Global Impact of Edible and Medicinal Mushrooms on Human Welfare in the 21st Century: Nongreen Revolution” (Int J Med Mushrooms, 1999;1:1–8)
- “World Production of Cultivated Edible and Medicinal Mushrooms in 1997 with Emphasis on *Lentinus edodes* (Berk.) Sing, in China” (Int J Med Mushrooms, 1999;1:291–300)
- “*Ganoderma lucidum* (Curt.: Fr.) P. Karst. (Aphyllophoromycetidae)—A Mushrooming Medicinal Mushroom” (Int J Med Mushrooms, 2000;2:139–46)
- A 40-Year Journey Through Bioconversion of Lignocellulosic Wastes to Mushrooms and Dietary Supplements (Int J Med Mushrooms, 2001;3:299–310)
- “The World Mushroom Industry: Trends and Technological Development” (Int J Med Mushrooms, 2006;8:297–314)
- “The Need for Scientific Validation of Culinary-Medicinal Mushroom Products” (Int J Med Mushrooms, 2006;8:187–95)
- “Development of the Culinary–Medicinal Mushrooms Industry in China: Past, Present, and Future” (Int J Med Mushrooms, 2006;8:1–17)
- “Development of the World Mushroom Industry: Applied Mushroom Biology and International Mushroom Organizations” (Int J Med Mushrooms, 2008;10:195–208)
- “The Role of Culinary-Medicinal Mushrooms on Human Welfare with a Pyramid Model for Human Health” (Int J Med Mushrooms, 2012;14(2):95–134)

Since 1977, Professor Chang, as an eloquent and prominent speaker, has been associated with

agencies of the United Nations (e.g., UNESCO, UN Development Programme/UN Office for Project Services, UN University, UN Industrial Development Organization, and the Food and Agriculture Organization) as a consultant on mushroom cultivation and mushroom products. Since 2000, Professor Chang has been invited twice by the Commonwealth Secretariat in London to serve as a consultant on mushroom farming in Namibia. He has also been invited to conduct many training workshops/courses on mushroom biology and mushroom biotechnology across the 5 continents, most recently in African and Latin American countries, sponsored by the UN Development Programme/Office for Project Services. In addition, he has been invited to serve as scientific advisor and honorary professor for over 30 research institutes and universities in China. He has also been honored in receiving the following awards:

- Fellow of the World Academy of Arts and Science, Sweden (1989)
- Fellow of the International Institute of Biotechnology, England (1990)
- Fellow of the World Academy of Productivity Science, Sweden (1992)
- International Cooperation Award for Light Industry, China (1990)
- Honorary Life Member of the British Mycological Society (1990)
- Honorary Life Member of the International Society for Mushroom Science, England (1993)
- Officer of the Most Excellent Order of the British Empire in the Queen's Birthday Honours List (1994)
- Recipient of the Magnolia Silver Award from the Shanghai Municipal People's Government (2004)
- Outstanding Researcher Award from the World Society for Mushroom Biology and Mushroom Products (2005)

- Fellow of the World Technology Network, New York (2005)
- West Lake Friendship Award from Zhejiang Provincial People's Government, China (2008)
- Friendship Award from the Chinese Government (the country's highest award to foreign experts for their contributions to its economic and social development) (2009)
- Honorary Fellowship from CUHK (2012)

The diversity of Chang's research programs; scientific, organizational, and pedagogical activities; and significant achievements in various fields of mycology identify him as a scientist with a wide scope of interests, a brilliant science organizer, and a world scientific leader of the school of mushroom biology whose achievements and accomplishments became incorporated into the world of science.

Professor Chang was the honorary president and main organizer of the 5th International Medicinal Mushrooms Conference (September 2009, Nantong, China) and the 7th International Medicinal Mushrooms Conference (August 2013, Beijing, China).

With his ability to learn languages and his ease in adapting to various cultures, Professor Chang currently lives in Canberra, Australia, with his family. He is an extraordinary, vibrant man in the broadest sense of the word. People are attracted to him like a magnet because of his charm, wit, and erudition. His avocations are traveling, reading, golf, cycling, and walking. From the first encounter with him one can sense the warmth of his personality and his outgoing, unconventional nature. Chang is not only a creative and gifted scientist but also an intellectual with a broad education. He celebrates his 85th birthday at the peak of his creative activity. We—friends, colleagues, collaborators, and students—wish him good health, happiness in all his activities, new creative achievements, good fortune, and wisdom.