



**Key Laboratory of Algal Biology**  
**Institute of Hydrobiology, Chinese Academy of Sciences**

Wuhan, June 16, 2021

## PROPOSITION OF PRIZE NOMINATION

Dear ISAP Award Evaluation Committee Members,

It is with great pleasure to propose the nomination of Dr. Prof. **Yong-Ding LIU** for the 2021 **Distinguished Applied Phycologist Award** from the International Society of Applied Phycology (ISAP) in recognition of his outstanding achievements in the field of applied phycology, his tireless efforts in applying new knowledge and advanced microalgal biotechnology to solving environmental problems and in raising public awareness about algae as well as their relationship to the environment and human activities in the Chinese society and beyond. Please see the outlines of his major contributions below.



**Name:** Yong-Ding LIU

**Affiliation:** Professor, Institute of Hydrobiology, Chinese Academy of Sciences (CAS)

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## BIOGRAPHY

### Educational Background:

- 1988, Ph.D. in Plant Physiology, jointly granted by Institute of Hydrobiology, CAS and University of Konstanz, Germany
- 1982, M.S. in Hydrobiology, Institute of Hydrobiology, CAS
- 1968, B.S. in Agriculture, China Agriculture University

### Academic Posts:

- 2006 Visiting Professor, Sichuan University, China
- 2005-2009 Visiting Professor, Yunnan University, China
- 2003-2009 Affiliated Scientist, Central China Normal University, China
- 2000 Senior Visiting Scholar, Paul Sabatier University, France
- 1999-2000 Senior Visiting Scholar, Institute of Ecology, CNRS, France
- 1993-present Professor, Institute of Hydrobiology, CAS
- 1990-1991 Post-Doc, Juelich Research Center, Germany

- 1988-1993 Associate Professor, Institute of Hydrobiology, CAS
- 1985-1987 Visiting Scholar, University of Konstanz, Germany
- 1982-1988 Assistant Professor, Institute of Hydrobiology, CAS

**Leadership Roles:**

- 1999-2007 Chairman, Academic Degree Committee of Institute of Hydrobiology, CAS
- 1995-1999 Executive Deputy Director, Institute of Hydrobiology, CAS
- 1992-1999 Vice Chief, Academic Degree Committee of Institute of Hydrobiology, CAS
- 1992-1999 Vice Chief, Scientific Committee of Institute of Hydrobiology, CAS
- 1992-1995 Deputy Director, Institute of Hydrobiology, CAS
- 1988-1991 Deputy Director, Laboratory of Algae Research Division, Institute of Hydrobiology, CAS
- 1970-1979 Deputy Director, Microbial Testing Station of Anlu County, Hubei Province, China

**Awards and Honors:**

- Elected as an Academician of International Academy of Astronautics (IAA) in 2016;
- Awarded by the French Government with Academic Palms Award of Commander Degree in 2012;
- Awarded with national and provincial scientific and/or technological prizes for 12 times.
- Honorary titles from the state level and provincial levels received for his outstanding research contributions, such as the National Advanced Worker for Science and Technology and National Expert of Outstanding Contributions.

**Publications and Patents:**

With 46 Chinese patents, over 420 academic papers published in national and international peer-reviewed journals, and five monographs in the field of applied phycology and its applications.

**Graduate Education:**

He has mentored more than 50 M.S. and Ph.D. students

## **OUTSTANDING CONTRIBUTIONS**

We have worked with Prof. Yong-Ding LIU as former students or colleagues, and some of us for more than three decades. We witnessed him as a great and visionary scientist, and a pioneer in applying algae knowledge and biotechnology to the real world problems, like water eutrophication, cyanobacterial blooms, and desertification. In his academic career of more than 40 years, Professor Liu has made huge efforts in four areas of applied phycology and made outstanding contributions, as briefly summarized below:

### **1. Environmental Biology of Algae and Algal Biotechnology for Inland Waters**

As the principal investigator of a National Key Basic Research Program and the group leader of a National High Technology Research and Development Program, Professor Liu uncovered an eco-physiological mechanism of harmful algal blooms, and further proposed a stage-wise theory of the occurrence and development of shallow lake eutrophication. He has developed various strategies and

techniques, as described as ‘Three Nodes’ and ‘Ten Principles’, in preventing and controlling shallow water eutrophication and cyanobacterial blooms shallow lakes, in particularly urban areas. The theoretical models and multiple technological routes and specific sets of methods and techniques developed by his research team have greatly helped the central and local municipal governments and environmental firms to combat against heavy cyanobacterial blooms and improve the water quality and wellbeing of aquatic ecosystems. In recognition of his outstanding contributions and achievements, Professor Liu has received an honor of ‘Dianchi Lake Guardian Lifetime Contribution Award’ by the Kunming city government and Kunming natives living by the Lake, and awarded the first prize of Science and Technology Achievement by the Ministry of Environmental Protection of China.

## **2. Deployment of Cyanobacterial Restoration Biotechnology in Drylands**

In an effort to combat with soil desertification in Northwestern China, Professor Liu led a multidisciplinary research team to conduct a long-term eco-physiological survey on terrestrial microalgae in the basins of Yangtze River, Yellow River, and Amur River, as well as drylands in that region. The results uncovered the relationships between the composition and abundance of terrestrial algae and geographical, climatic, and edaphic conditions. It demonstrated the pioneering role of cyanobacteria in soil fertility and vegetation in the region. He has also carried out an in-depth study of biological soil crusts, and developed a microalgal mass culture technique for rapid large-scale introduction of artificial biocrusts in several desertification areas. Over the years, the methodology and techniques developed by Professor Liu and his team have been applied to many drylands and deserted areas in Inner Mongolia, Ningxia, Shannxi, Xinjiang and Qinghai Provinces with a total land area of ca. 200 km<sup>2</sup> and achieved meaningful sand stabilization, dust suppression, soil formation and fertilization in these treated areas.

## **3. Astrobiology of Algae**

Professor Liu is one of the first Chinese researchers exploring astrobiology of algae in space. Since 1987, he designed and executed numerous in-flight algae experiments in six retrievable satellites and two spacecrafts (Shenzhou II and VIII) and obtained new knowledge about algal photosynthesis, growth, and physiological characteristics under weightless and other space conditions. The closed algal culture systems and processes developed by Professor Liu have made significant contributions to designing and operation of advanced life supporting system in space. In recognition of his significant contributions, Professor Liu was elected as an academician of International Academy of Astronautics (IAA) in 2016.

## **4. Promotion and Consultation on Microalgal Biotechnology**

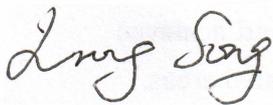
Professor Liu has tremendous knowledge and experience in mass culture and downstream processing of cyanobacteria, green algae, Euglena, diatoms, and other types of microalgae. Professor Liu was among the first introducing the cyanobacterium *Spirulina platensis* to China, which has led to the development of the world largest *Spirulina* industry; he was among the first applying microalgal cultivation technology to mass culture of nitrogen-fixation cyanobacteria as a biofertilizer for rice paddies in China, and he was among the first initiating commercial production of an edible cyanobacterium *Nostoc sphaeroides* as a food delicacy and as a functional ingredient for nutraceutical and cosmetics. Professor

Liu has strongly promoted microalgal biotechnology development and commercialization in China and consulted for more than 30 algae-related enterprises with regard to strain development, cultivation systems and processes, and possible applications in various commercial sectors. He also served twice as the chair of International Technical symposium of *Spirulina platensis*, and also chaired five times the National Symposia on applied phycology and algal biotechnology.

Because of his significant contributions in algal research and biotechnology development, Professor Liu has not only received 12 national and provincial science and technology awards/prizes, but also has earned great respect and gratitude of those for whom and with whom he helped, guided, and taught, as well as the peers in Chinese Academy of Sciences and in the phycological research community by large. As his peers whom Professor Liu has inspired and motivated to do algal research and applications, we would like to propose to nominate Professor Yong-Ding Liu with great enthusiasm for 2021 ISAP Distinguished Applied Phycologist Award.

Sincerely,

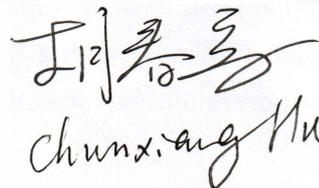
**Nominators:**



Dr. Prof. Lirong Song

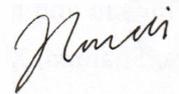


Dr. Prof. Chengcai Zhang



Chunxiang Hu

Dr. Prof. Chunxiang Hu



Dr. Hua Li