

# Digital Agriculture and Agricultural Internet-of-things (DAAI) Innovation Team



**Prof. He Yong**

Digital Agriculture and Agricultural Internet-of-Things (DAAI) Innovation Team at Zhejiang University (ZJU) focuses on developing and delivering state of the art technologies in agricultural engineering including: sensors and sensing technology of plant-soil-environment, internet of things in agriculture, intelligent agricultural equipment and management, smart agriculture and rural informatization, quality control and monitoring of energy microalgae, optical properties measurement and phenotyping of plants. DAAI team aims to maximize the synergy by taking the advantages of broad-based platform of multidisciplinary in agriculture, biology, information and engineering technology, and to meet the goal of national development strategy, support local agriculture development, and seek solutions to challenges and problems of agriculture faced by China and the rest of the world.

The principal investigator Dr. He Yong is Qiushi Distinguish Professor, Director of Agricultural Information Institute, Associate Director of Digital Agriculture and Agricultural Informatization Institute, and Associate Director of the Key Laboratory

of Equipment and Informatization in Environment Controlled Agriculture, Ministry of Agriculture China. Dr. He has received many recognitions at National, Ministry or Provincial level, such as Chief Experts of National 863 Program in the field of Modern Agricultural Technology, National Distinguished Teacher, National Hundred, Thousand and Ten Thousand Talents, Outstanding Young Teachers of MOE. He was a visiting scholar and visiting professor at University of Tokyo, Tokyo University of Agriculture and Technology, and UIUC. He serves as Editor-in-Chief of Computers and Electronics in Agriculture and editorial board members of more than ten scientific journals. He was selected as top 1% of "Most Cited Scientists" in Agriculture with the ranking of No. 55, and ranked at No. 18 based on the number of top papers with the H-index of 36. Dr. He was also selected as "Highly Cited Researchers 2016" and became the only candidate in Agriculture in Mainland China.

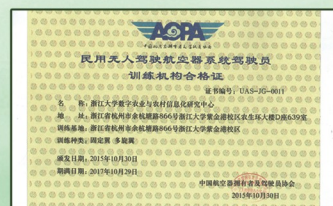
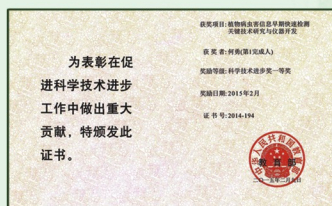
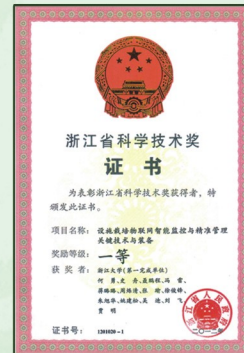
In the last decade, DAAI innovation team undertook more than 50 research projects granted by the National Ministries (the National Science Foundation, the Ministry of Science and Technology (MOST)), provincial agencies or industrial companies. The proven track record of DAAI team includes: (1) Second Place of National Award of Science and Technology, four First Place Awards and nine second Place Awards of Science and Technology from Zhejiang Province, one First Place Award and one Second Place Award of National Education Achievement from Ministry of Education. In addition, one faculty member is recognized as National Young Thousand Talents; (2) Ph.D. students won the National Excellent Doctoral Dissertation Award Nomination; one was awarded as the Second Place of National Youth Science Star Award; one received Committee of 100 Leadership Scholarship; three students won Chu Kochen Award of Zhejiang University. Our faculty and students have published more than 400 articles in scientific journals, Authorized more than 80 Invention Patents, 80 Utility Model Patents, and 30 Computer Software Copyrights.



## Main Research Area of DAAI Innovation Team:

- Sensors and sensing technology of plant-soil-environment
- Internet of things in agriculture
- Intelligent agricultural equipment and management
- Smart agriculture and rural informatization
- Quality control and monitoring of energy microalgae
- Optical properties measurement and phenotyping of plants

## DAAI Innovation Team and Achievements



ZJU's Digital Agriculture and Agricultural Internet-of-things (DAAI) Innovation Team

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# Rapid sensing of plant-environment and real-time monitoring IoT technology and equipment

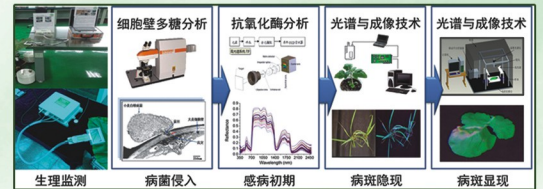
In traditional agriculture, crop irrigation, fertilization and spraying, rely on farmers, which will not only result in low efficiency, a serious waste of fertilizer, but also affect the quality and safety of agricultural products. The intelligent management of the real-time data and precision management of fertilizer and water have the potential of improving the crop quality and productivity and promoting the agricultural development.

The Zhejiang University innovation team led by Prof. He Yong has focused on three main bottlenecks, including the rapid sensing of agriculture, stable transmission and precise control, and made the great progress in fundamental study, technology, equipment and commercialization, advancing the development of precision agriculture and internet of things (IoT).

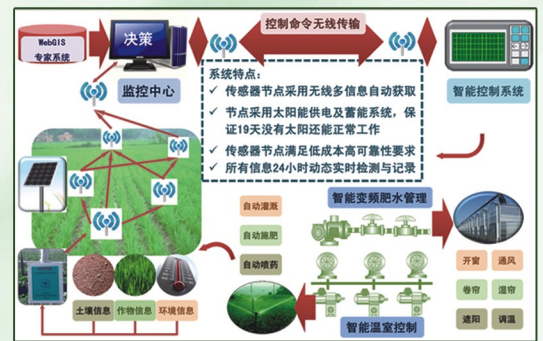
The team has obtained a breakthrough in rapid sensing of plant nutrient / physiological / disease information, multi-scale rapid measurement of soil water / salt / nutrient, stable wireless transmission of information in complex farmland environment, IoT environment control based on plant growth, and precision management of fertilization and irrigation. They have developed a series of products and systems some of which have been commercialized. It provides new methods for agricultural standardization production and intelligent regulation and control. The systems have been widely used in different crops such as grain and oil, fruits and vegetables and flowers in more than 20 provinces including Zhejiang, Beijing and Heilongjiang with the total areas of more than 470000 thousand hm. The team also has helped on training more than 10,000 agricultural technicians. They have made significant social, economic and ecological benefits, and advanced the agricultural scientific and technological progress. The work has been selected as the First Place Award of Science and Technology from Zhejiang Province in 2012 and Second Place of National Award of Science and Technology in 2015. It was also selected as outstanding achievements in the national "12<sup>th</sup> Five-Year" scientific and technological innovation achievements exhibition, and 100 outstanding cases of "Internet + " Modern Agriculture by Ministry of Agriculture.



Awards and academic seminar



Rapid detection of plant diseases

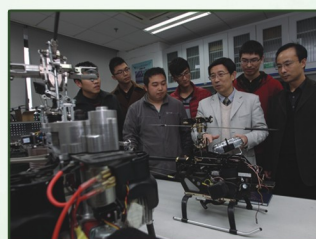
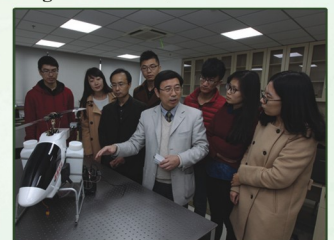
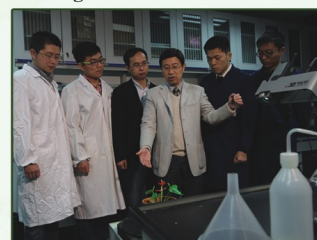
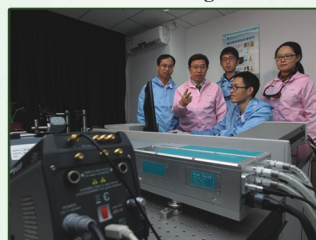
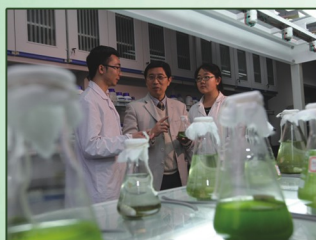


System framework of IoT technology in agriculture



Field application of IoT technology and equipment

## Fruitful Research and Exchange Activities (Microalgae, LIBS, Plant 3D-modelling and UAVs)



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