

**CFAES**

**NOW ONLINE**

# **Plant Empowerment Workshop**

**July 9-10, 2020  
10 a.m. to 2:30 p.m. (EDT)**

**We are using The Ohio State University's **Zoom** platform. Visit [go.osu.edu/plantworkshop](http://go.osu.edu/plantworkshop) for more information.**

*Advanced learning and discussion towards  
“an integrated approach based on physics and plant physiology, leading to  
a balanced growing method for high yields, quality, saving energy, and  
profitability in greenhouse controlled environments”*



**Instructor: Dr. Peter van Weel**  
Author of *Plant Empowerment*  
Expert in greenhouse climate control  
Former PI at Wageningen UR  
The Netherlands



**Host: Dr. Chieri Kubota**  
The Ohio State University  
Ohio CEA Center  
Contact: [kubota.10@osu.edu](mailto:kubota.10@osu.edu)

 **THE OHIO STATE UNIVERSITY**  
COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES



**Register at [go.osu.edu/plantregister](http://go.osu.edu/plantregister) or  
email [white.1309@osu.edu](mailto:white.1309@osu.edu).**



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# NOW ONLINE Plant Empowerment Workshop

*July 9-10, 2020*

*10 to 2:30 p.m. (EDT)*

*Ohio State University's Zoom platform*

## *Program*

*Thursday, July 9: Part One*

10 a.m to 2:30 p.m.

**“Introduction to Plant  
Empowerment, The Theories”**

*Friday, July 10: Part Two*

10 a.m. to 2:30 p.m.

**“The Practical Applications of  
Plant Empowerment”**



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## Plant Empowerment Workshop Online

### **Thursday, July 9th (10AM-2PM EDT) – Introduction to Plant Empowerment, The Theories**

- 10AM-10:10AM Welcome & announcements (Chieri Kubota, Ohio State)
- 10:10AM – 11:15AM Basic knowledge about physics and physiology that play an important role in a greenhouse and for plants (Peter van Weel, The Netherlands)
- The interaction between the main resources: CO<sub>2</sub>, light, water, RH and temperature
  - The energy balance and stomata opening
  - The role of air movement and ventilation
  - The role of heat emission in the dark
- 11:15AM – 11:30AM Q&A
- 11:30AM – 11:45AM Break
- 11:45AM – 1:00PM Plant empowerment, from experience-based control to sensor-based control (Peter van Weel, The Netherlands)
- Controlling 6 balances instead of climate. Why are they important?
  - Why and how reduction of transpiration under intense light can increase photosynthesis
  - Why is transpiration control in the dark better than RH or VD control?
  - Prevention of fungal diseases with a better screen management
- 1:00PM – 1:40PM Q&A, Discussion (Panel: Peter van Weel; Peter Ling; Chieri Kubota)
- 1:40PM – 2:00PM Sponsor mini presentations

### **Friday, July 10th (10AM-2PM EDT) – The Practical Applications of Plant Empowerment**

- 10:00AM – 11:00AM Introduction to the sensors, the software tools and the value of data analysis (P Peter van Weel, The Netherlands)
- Measure energy balance to control transpiration, stomata opening and water balance
  - The RTR (ratio temperature to radiation) tool to control plant balance
  - Demonstration of the radiation monitor tool: the effect of energy screens on the greenhouse climate, transpiration, energy consumption and plant conditions
- 11:00AM – 11:15AM Q&A
- 11:15AM – 11:30AM Break
- 11:30AM – 12:30PM Cont.
- Demonstration of the GPE (growing by plant empowerment) simulation tool: how can I use the hardware components such as screens, light, air tubes, air circulation or ventilation fans and windows in an integrated way?
- 12:30PM – 1:10PM Q&A, Discussion (Panel: Peter van Weel; Peter Ling; Chieri Kubota)
- 1:10PM – 1:30PM Sponsor mini presentations
- 1:30PM Closing (Chieri Kubota, Ohio State)