



## PROGRAMM

### Summer School

### *Cover Materials for Greenhouses*

24 – 30 September 2018

*University of Thessaly  
Department of Agriculture Crop Production and Rural Environment  
Fytokou str., 384 46 Volos, Greece*

In the Framework of the ZuGABe Cooperation between  
**University of Thessaly & Geisenheim University**

*Greek-German Research and Teaching Network in terms of Productivity, Future and  
Environmental Compatibility of Protected Cultivation*

## **24 Sep. 18**

- 09:00 – 10:30 *General overview: global situation of protected cultivation*  
N. Katsoulas, J. Max
- 10:30 – 11:00 Coffee break
- 11:00 – 12:30 *Greenhouse structures*  
J. Max, F. Langner
- 12:30 – 13:15 Lunch break
- 13:15 – 14:45 *Materials I: Glass & rigid plastics*  
J. Max, F. Langner
- 14:45 – 15:00 Coffee break
- 15:00 – 16:30 *Greenhouse covering systems between energy efficiency and optimal conditions for plant growth - squaring the circle?*  
S. Lück

## **25 Sep. 18**

- 09:00 – 10:30 *Solar radiation & physical principles of light*  
E. Schettini
- 10:30 – 11:00 Coffee break
- 11:00 – 12:30 *Photoselective cover materials & transmission*  
E. Schettini
- 12:30 – 13:15 Lunch break
- 13:15 – 14:45 *Materials II: Modern plastic films and their innovative contribution*  
E. Kykris
- 14:45 – 15:00 Coffee break
- 15:00 – 16:30 *The effect of agricultural screen covers and screenhouses on crop microclimate, water consumption and insect penetration*  
J. Tanny

## **26 Sep. 18**

- 08:30 – 13:15 Visit in local greenhouse, start at 8<sup>30</sup> at the Parking of Volos Port
- 13:15 – 14:45 *Microclimatic responses to greenhouse covers*  
T. Barzanas
- 14:45 – 15:00 Coffee break
- 15:00 – 16:30 *Greenhouse Climate control*  
C. Kittas

**27 Sep. 18**

- 09:00 – 10:30    *Plant responses on light conditions*  
E. Levizou
- 10:30 – 11:00    Coffee break
- 11:00 – 12:30    *Plant responses on microclimate*  
N. Katsoulas
- 12:30 – 13:15    Lunch break
- 13:15 – 14:45    *Pest Control under different light conditions*  
C. Becker
- 14:45 – 15:00    Coffee break
- 15:00 – 16:30    *Virtual plants*  
K. Kahlen

**28 Sep. 18**

- 09:00 – 10:30    *Scientific writing*  
M. Elsner
- 10:30 – 11:00    Coffee break
- 11:00 – 12:30    *Scientific writing*  
M. Elsner
- 12:30 – 13:15    Lunch break
- 13:15 – 14:45    *Funding opportunities in Europe and Germany*  
C. Jost
- 14:45 – 15:00    Coffee break
- 15:00 – 16:30    *Consultation*  
C. Jost, M. Elsner

**29 Sep. 18,**

*Free day*

**30 Sep. 18**

Day tour to Meteora, start at 9<sup>00</sup> at the parking of Volos port

## Lecturers

**Nikolaos Katsoulas**, Dr., Associate Professor (BSc in Agronomy- 1997, Ph.D. in Agricultural Engineering-2002), Director of the Lab of Agricultural Constructions and Environmental Control of the University of Thessaly, is specialized in microclimate control in agricultural buildings. He is currently involved in research on greenhouse design, crop transpiration, use of models for irrigation, fertigation and climate management in greenhouses, increase of circularity in protected cultivations and development of decision support systems. He has participated in more than 35 EU and National funded research projects and has published more 150 publications (50 in peer-reviewed journals h-index=16).

**Johannes Max** is a scientist in the fields of plant nutrition and soil science. Since 2014 he is working at Hochschule Geisenheim University (Germany) and focussing on vegetable crops, especially under protected cultivation and in tropical and subtropical regions. His first academic degree was a Diploma (equivalent to today's Master of Science) in physical geography (Geo-ecology). In 2004 he received a doctorate in Agricultural Science from the University of Kiel, institute of plant nutrition and started working at the Asian Institute of Technology (AIT) in Thailand. There he led an international project dealing with the development of sustainable protected cultivation strategies for tropical lowlands. Back in Germany he was working in the institute of plant sciences (IBG-2) at research centre Jülich before finally accepting the current position in Geisenheim.

**Frederik Langner** is a scientist in the fields of plant nutrition and soil science. Since 2016 he is working Hochschule Geisenheim University (Germany) and focussing on vegetable crops, especially under protected cultivation and Greenhouse technology. He started as a Plant biotechnologist in Hannover in the field of Genetics and switched to Greenhouse technology in his PhD. During his PhD developed a Software to simulate the energy demand of greenhouses. After moving to Geisenheim he worked with international partners to develop a vacuum insulation for greenhouses and is right now working on optimisation of open fertigation systems via cascades.

**Stephan Lück** is a gardener and was the owner of the nursery founded by his father from 1993 to 2018. For 10 years, he has been working on new, energy-efficient construction methods in which vacuum is used as thermal insulation. Patents have been granted and an R&D project under the leadership of Johannes Max (Geisenheim) on this topic is now running for two years.

**Evelia Schettini** obtained her degree in Civil Engineering at the Polytechnic of Bari (Italy); did her PhD in "Structural Engineering" and is an Associate Professor at the Department of Agricultural and Environmental Science of the University of Bari (Italy) from 2015. Her scientific research topics deal with: the greenhouse covering materials, the study of the use in agriculture of innovative biodegradable materials, the greenhouse equipment, the indoor environment and the structures of the buildings for protected cultivation, the microclimatic and meteorological data and their numerical and statistical analysis, agricultural plastic waste management. Recently her research deals with green technology such as green walls as passive control system of the microclimate inside the buildings. She was the Scientific Secretary of GreenSys2007 "High Technology for Greenhouse system Management", Naples. She was a member of the organising committee of the XI International Conference AIIA2017 "Biosystems Engineering addressing the human challenges of the 21st Century", Bari. She was invited to participate to the Scientific committee of: LightSym2012, Greensys2015, ISAE 2015, ISAE 2017 and GreenSys2019. She was invited to chair sections at several conferences: CIGR and AgEng2006 Congress, AgEng 2008, GreenSys2011, LightSym2012, Greensys2015, ISAE 2015. Schettini is the author of about 115 papers, published in international and national refereed scientific journals and proceedings. She was a co-editor of the Acta Horticulturae n 801 (2008), with the title "High Technology for Greenhouse System Management". She carried out referee duties for several International Journals.

**Emmanuel Kykrilis** has studied Agricultural Engineering at the Agricultural University of Athens. He has very long experience in horticultural science and applications. He has worked for 18 years in the field of Greenhouse Crops Protection and 28 years in the field of agricultural plastics as a Senior Marketing Manager of the renowned plastics manufacturer Plastika Kritis SA. Currently he is Marketing and R+D Director of Plastika Kritis SA as well as Member of the Board of Directors.

**Josef Tanny** obtained his degree and PhD in Mechanical Engineering at the Tel Aviv University (Israel); he is a Senior Lecturer at Holon Institute of Technology and a Senior Researcher at Agricultural Research Organization. Some of his research topics: turbulent transport techniques for quantitative canopy evapotranspiration estimates; effect of screen texture on water consumption, microclimate, growth and yield; screen constructions for fruit trees; modelling evaporation from water reservoirs; evapotranspiration estimation of orchards and vegetable crops under screens; real-time measurements of water consumption via surface renewal technique;

effect of vegetation on urban micro-climate; Surface Renewal technique for evapotranspiration estimates; modelling crop water requirements; estimating crop water consumption using remote sensing imagery.

**Thomas Bartzanas** is Director of Research in the Center for Research and Technology (CERTH) / Institute of Bio-Economy and Agrotechnology (iBO) Research Institute. He is an agricultural engineering with a PhD on environmental control of agricultural structure. His research area is focused on controlled environment agriculture (greenhouses, livestock buildings), the application of precision agricultural technologies (sensors, automation and ICT tools) for sustainable agriculture, systems analysis and modelling in agriculture and environmental assessment of agricultural operations. He has participated as a Researcher or/and project manager, or/and coordinator in 45 research projects. He has 350 publications in peer reviewed Journals, book chapters, conference proceedings. He has co-edited a Book for Springer, his h-index is 19 and he has 1800 citations.

**Constantinos Kittas**, Dr., Emeritus Professor of the University of Thessaly, Agricultural, Civil and Mechanical Engineer. He has more than 35 years of teaching and extensive research involvement in the field of agricultural engineering. He is currently involved in research on agricultural structures management and control and use of models for irrigation and fertigation management in greenhouse participated in more than 45 EU or National funded research projects and has published more 300 publications (100 in peer-reviewed journals).

**Efi Levizou** is Assistant Professor and leader of the Plant Physiology Group of the Department of Agriculture Crop Production and Rural Environment of UTH (BSc in Biology and PhD in Plant Physiology). Her research interests focus on i) abiotic stress effects on plant physiology and performance, with special emphasis in environmental factors causing phytotoxicity, i.e. heavy metals in soil and toxins in the irrigation water and ii) plant stress detection and performance in aquaponics. She has published 27 articles in peer-reviewed journals (h-index 12, >450 citations) and 55 presentations in International and Greek conferences.

**Christine Becker** obtained her degree in Biology at Würzburg University (Germany) and her PhD in Food Chemistry at Berlin Technical University (Germany). After a PostDoc at University Nice Sophia Antipolis and INRA Sophia Antipolis (France), she now works in the Department of Crop Protection at Hochschule Geisenheim University. Her research interest always included different fields of biology, for instance plant physiology, plant insect-interactions, chemical ecology, meandering between basic and applied research in order to investigate how plants interact with their biotic and abiotic environment. For her PhD thesis, she studied how growing conditions in low-energy greenhouses affect crop quality and yield. During her post-doctoral years, she studied how herbivores and their natural enemies are indirectly affected by changing growing conditions, like manipulated nutrient solution and elevated carbon dioxide.

**Katrin Kahlen** holds a degree in mathematics with minor subject physical chemistry after studies at the universities of Oldenburg and Hannover. She obtained a PhD from the University of Hannover in 2000, followed by postdoctoral work in a Collaborative Research Centre (SFB 326). After that, she worked at the Institute of Vegetable Crops and Systems' Modelling at the University of Hannover (2002-2011) with a habilitation in 2011 in the field of agronomy. Since August 2011, she is working as research associate at the Department of Vegetable Crops at Hochschule Geisenheim University (HGU), where she is also acting as deputy head. She is a member of scientific and organization committees of several conferences with topics on modelling and simulating (e.g. HortiModel, FSPM), a member of the editorial board of 'Frontiers in Plant Science' and '*in silico* Plants' and reviewer for national and international journals and research foundations (e.g. DFG). She represents the HGU as member in the European Plant Science Organisation (EPSO) and, since October 2017, Katrin Kahlen is the deputy vice president for research at HGU. Her research focus is in the area of virtual plants (> 15 years). Such models describe plant architecture *in silico*. Virtual plant models consider both the three dimensional plant architecture and concepts of plant physiology. She uses virtual plants as research tool for the analysis of complex feedback processes between plant architecture and environmental conditions.

**Markus Elsner** did his graduate work at EMBL in Heidelberg, Germany and the University of Gothenburg, Sweden, where he worked on characterizing protein dynamics in living cells. In his postdoctoral studies at the National Institutes of Health he investigated the mechanisms of lipid and protein sorting during membrane transport events. He joined Nature Biotechnology in 2008.

**Christiane Jost** is a biochemist by training and did her PhD and Postdoc work in molecular biology. She has since switched to science management and tries to support scientists in finding and successfully applying for grants to do their research.