

## Organisation & Directions

### Veranstaltungsort/Venue

Zentrales Hörsaalgebäude (ZHG)  
 Maximus-von-Imhof-Forum 6  
 85354 Freising-Weihenstephan  
 Deutschland

### Veranstalter/Host

World Agricultural Systems Center  
 Hans Eisenmann-Forum für Agrarwissenschaften  
 der Technischen Universität München  
 Liesel-Beckmann-Straße 2  
 85354 Freising-Weihenstephan  
 Germany  
 Tel: +49 8161 71 3464  
 Fax: +49 8161 71 2899

Please register via E-Mail at  
[hans-eisenmann-forum@tum.de](mailto:hans-eisenmann-forum@tum.de)

and indicate whether you would like to attend

- a) on-site or virtually
- b) day 1, day 2 or both days.

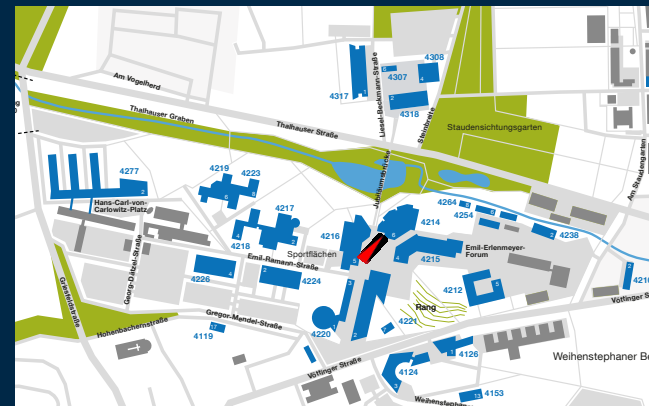
Day 1 in English  
 Tag 2 in German/Deutsch

Please note that the attendance on-site is limited.  
 Therefore, early registration is recommended.

The event is open to all interested parties  
 and is free of charge.

Redaktion  
 C.R. Luksch  
 Hans Eisenmann-Forum/TUM  
 Grafik: ediundsepp

### Veranstaltungsort/Venue:



ZHG | Maximus-von-Imhof-Forum 6 | 85354 Freising

### Arriving by public transport

From Munich airport: Take the bus 635 to Freising train station.  
 From Munich main station: Take the train or the S-Bahn (S1) to Freising train station.  
 From Freising train station busline 639 will take you to the campus.

### Arriving by car:

From the autobahn A9 exit "Allershausen" or from the autobahn A92 exit "Freising Mitte" and follow the signs to Freising. In Freising, follow directions to Weihenstephan/Universität.

Parking is available at Liesel-Beckmann-Straße.

### Technische Universität München

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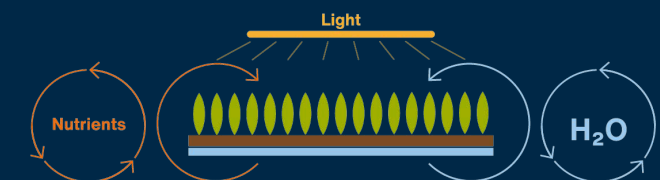
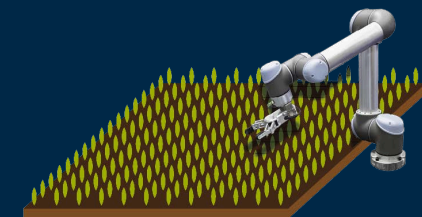
[hans-eisenmann-forum@tum.de](mailto:hans-eisenmann-forum@tum.de)  
[www.hef.tum.de](http://www.hef.tum.de)

Hans Eisenmann-Forum

## 12. HEF Symposium

September 23 & 24, 2021

# The Limits of Food Production - Vertical Farming



## The Limits of Food Production - Vertical Farming

### Program September 23/24

While food demand continues to increase with a growing global population, climate change and soil degradation have made it already difficult to ensure food security in some regions. Hence, producing more food in a more sustainable way constitutes a central agricultural challenge.

An alternative for growing crops in the field has emerged in recent years with vertical farming. With LEDs becoming affordable and more efficient, the economics of indoor and vertical farming are redefined.

In vertical farms, all growth factors including light, temperature, humidity, CO<sub>2</sub> level, ventilation, water and nutrients can be controlled and optimized. Simultaneously, weeds, pests and diseases can be excluded, and the use of water and fertilizer can be drastically reduced.

The aim of this conference is to discuss the current state of science in controlled-environment crop growth and yield, and to determine the limits of food production in vertical farms.

#### DAY 1 - September 23 ( in English)

09:00 - 09:10

**Prof. Dr. Senthold Asseng & Claudia Luksch**

*Hans Eisenmann-Forum, Technical University Munich*

**Welcome, Organizational remarks**

09:10 - 09:20

**Prof. Dr. Thomas Hofmann**

*President Technical University of Munich*

**Opening Words**

09:20 - 10:05

**Prof. Dr. Leo Marcelis** *Wageningen University*

**Vertical Farm: The sky is the limit?**

10:05 - 10:35

**Prof. Dr. Tracy Lawson** *University of Essex*

**The effect of light quality and intensity on photosynthetic processes**

#### DAY 1 - September 23 (cont., in English)

10:35- 11:05

**Prof. Dr. Erik Runkle** *Michigan State University*

**Light properties regulate yield and quality of plants grown in vertical farms.**

11:05- 11:35 Coffee break

11:35- 12:05

**Prof. Dr. Eva Rosenqvist** *University of Copenhagen*

**Temperature effects at different light levels and CO<sub>2</sub> concentrations**

12:05- 12:35

**Prof. Dr. Hans Lambers** *University of Western Australia*

**Will increasing plant productivity make nutrient uptake the next limiting step?**

12:35- 13:05

**Prof. Dr. Dean Kopsell** *University of Florida*

**Management of light quality to maximize specialty crop phytonutrient concentrations in vertical farms**

13:05- 14:05 Lunch break

14:05- 14:35

**Prof. Dr. Murat Kacira** *University of Arizona*

**Sensing and automation in vertical farms**

14:35- 15:05

**Dr. Morgan Pattison** *Solid State Lighting Services Inc.*

**LED Technology for Vertical Farming**

15:05- 15:35

**Prof. Dr. Francesco Orsini** *University of Bologna*

**Vertical Farms, are they sustainable? An insight into water, land, and energy use efficiency for reduced emissions in indoor farming systems**

15:35- 16:00 Coffee break

16:00 - 16:30

**Prof. Dr. Kathy Steppe** *University of Ghent*

**Visions for Vertical Farming: dessert, megacities, space travel**

16:30- 17:10

**Panel discussion with all speakers**

17:10 Closing words, Networking with Beer & Snacks

#### DAY 2 - September 24 (in german language)

9:00

**Begrüßung**

9:05 - 09:15

**Prof. Dr. Thomas Becker**

*Dekan der TUM School of Life Sciences*

*Technische Universität München*

**Eröffnung**

9:15 - 09:30

**Prof. Senthold Asseng & Claudia Luksch**

*Hans Eisenmann-Forum, TUM*

**Zusammenfassung vom Vortag**

09:30 - 10:15

**Prof. Dr. Christian Ulrichs** *Humboldt Universität Berlin*

**Vertical Farming in Deutschland - ein Überblick**

10:15- 10:45

**Dr. Simon Vogel** *Fraunhofer Institut IME*

**Vertical Farming 2.0 - neue Bausteine einer nachhaltigen Agrarproduktion**

10:45- 11:05

**Prof. Dr. Thomas Hamacher**

*Technische Universität München*

**Vertical Farming: Die Frage der Energie**

11:05- 11:35 Coffee break

11:35 - 11:50

**Christine Lössl-Zimmermann** *Association Vertical Farming*

**Vernetzung der Akteure im Vertical Farming**

11:50- 12:10

**Prof. Dr. Heike Mempel**

*Hochschule Weihenstephan Triesdorf*

**Container Indoor Farming - Potentiale und Grenzen**

12:10- 12:30

**Jochen Haubner** *Haubner Gemüse - SalaJoe*

**Erfahrungsbericht aus der Praxis**

12:30 - 13:00

**Dr. Daniel Schubert**

*Deutsches Zentrum für Luft- und Raumfahrt*

**EDEN ISS Greenhouse System -**

**Von der Antarktis in den Weltraum und zurück**

13:00 - 13:20 Diskussion

13:20 - 15:00 Vernetzung bei Bier & Snacks