



22nd ANNUAL
**Greenhouse Crop Production &
Engineering Design Short Course**

Wednesday, March 15th

Fundamentals of Hydroponics and Controlled Environment Agriculture (CEA)

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| 8:00–8:45 AM | Check-in for on-site participants
<i>1951 E Roger Road, Tucson, AZ 85719</i> |
| 8:45–9:00 AM | Welcome and Introductions
<i>Dr. Murat Kacira, CEAC Director, University of Arizona</i> |
| 9:00–9:45 AM | CEA Overview
<i>Dr. Merle Jensen, Professor Emeritus, University of Arizona</i> |
| 9:45–10:00 AM | Discussion and Q&A |
| 10:00–10:45 AM | Managing Plant Nutrition for Crop Production
<i>Dr. Triston Hooks, University of Arizona</i> |
| 10:45–11:00 AM | Discussion and Q&A |
| 11:00–11:30 AM | Break & Exhibitor Networking |
| 11:30–11:45 AM | Sponsor Presentations |
| 11:45–12:30 PM | Integrated Pest Management
<i>Speaker TBD</i> |
| 12:30–12:45 PM | Discussion and Q&A |
| 12:45–1:45 PM | Lunch |
| 1:45–2:00 PM | Sponsor Presentations |
| 2:00–2:45 PM | Greenhouse Structure and Design
<i>Dr. Gene Giacomelli, University of Arizona</i> |
| 2:45–3:00 PM | Discussion and Q&A |
| 3:00–4:30 PM | CEAC Facilities Tour & Networking |



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Thursday, March 16th


Environmental Controls & Automation in CEA

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|----------------|--|
| 9:00–9:45 AM | Sensors and Environmental Monitoring in Controlled Environments
<i>Dr. Murat Kacira, University of Arizona</i> |
| 9:45–10:00 AM | Discussion and Q&A |
| 10:00–10:45 AM | Autonomous Greenhouses: Data- and Plant-Centric Environmental Controls
<i>Dr. Kenneth Tran, CTO, Koidra</i> |
| 10:45–11:00 AM | Discussion and Q&A |
| 11:00–11:30 AM | Break & Exhibitor Networking |
| 11:30–11:45 AM | Sponsor Presentations |
| 11:45–12:30 PM | Water Quality and Treatment Alternatives
<i>Dr. Paul Fisher, University of Florida</i> |
| 12:30–12:45 PM | Discussion and Q&A |
| 12:45–1:45 PM | Lunch |
| 1:45–2:00 PM | CEAC Mission Award |
| 2:00–2:15 PM | Sponsor Presentations |
| 2:15–3:00 PM | Fundamentals of Supplemental and Sole Source Lighting
<i>Dr. Ricardo Hernandez, North Carolina State University</i> |
| 3:00–3:15 PM | Discussion and Q&A |
| 3:15–4:45 PM | CEAC Facilities Tour & Networking |



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Friday, March 17th

Alternative Crops and Growing Methods in CEA

9:00–9:45 AM	Beneficial Microbes <i>Dr. Rosa Raudales, University of Connecticut</i>
9:45–10:00 AM	Discussion and Q&A
10:00–10:45 AM	Mushroom Cultivation <i>Dr. Barry Pryor, University of Arizona</i>
10:45–11:00 AM	Discussion and Q&A
11:00–11:30 AM	Break & Exhibitor Networking
11:30–11:45 AM	Sponsor Presentations
11:45–12:30 PM	Culinary Herbs in CEA <i>Dr. Kellie Walters, University of Tennessee Knoxville</i>
12:30–12:45 PM	Discussion and Q&A
12:45–1:45 PM	Lunch
1:45–2:00 PM	Sponsor Presentations
2:00–2:45 PM	Hemp Production <i>Speaker TBD</i>
2:45–3:00 PM	Discussion and Q&A
3:00–4:30 PM	CEAC Facilities Tour & Networking



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