GREENHOUSE CROP PRODUCTION & ENGINEERING DESIGN SHORT COURSE

MARCH 12-16, 2018
THE UNIVERSITY OF ARIZONA CONTROLLED ENVIRONMENT AGRICULTURE CENTER

MARCH 11TH, EVENING
EXHIBIT AVAILABLE FOR SET-UP [For Sponsors & Exhibitors Only]
4:00 – 8:00pm Doors open to Sponsors & Exhibitors for set-up

MARCH 12, MORNING
ARRIVAL, CHECK-IN & SET-UP
Attendees:
8:00 am – 11:30am Check-in Table Open – Receive badges, workbooks, etc.

Sponsors/Exhibitors:
8:00 – 10:00am Exhibitor Gallery finalize set-up
10:00 am Exhibitor Gallery Opens

FUNDAMENTALS OF HYDROPONICS & CONTROLLED ENVIRONMENT AGRICULTURE (CEA)
8:30 – 9:30 am Greenhouse Design - Structures, Glazing & Cooling
   Dr. Gene Giacomelli – Professor, Ag & Biosystems Engineering, The University of Arizona

9:30 – 10:30 am Hydroponics, Medium Composition & Delivery Systems
   Myles Lewis – Owner, Arizona Vegetable Company & Instructor, CEAC Intensive Workshop

10:30 – 11:30 am Integrated Pest Management (IPM) - Common Insects & Mites
   Dr. Stacy Tollefson – Professor of Practice, Ag & Biosystems Engineering, The University of Arizona

11:30 – 11:55 pm Coffee & Refreshments Provided

MARCH 12, AFTERNOON
ESSENTIALS OF CROP PRODUCTION IN COMMERCIAL SETTINGS
11:55 – 12:00 pm Welcome and Introductions

12:00 – 12:15 pm 5 Minute Presentations from this year’s Sponsors

12:15 – 1:00 pm Critical Factors for Growing Under Cover
   Dr. Merle Jensen – Professor Emeritus, School of Plant Sciences, The University of Arizona

1:00 – 1:45 pm Managing Plant Nutrition for Crop Production Optimization
   Dr. Stacy Tollefson – Professor of Practice, Ag & Biosystems Engineering, The University of Arizona

1:45 – 2:30 pm IPM: What to Know When Preparing for Battle
   Karin Tifft – Greenhouse Vegetable Consultants

2:45 – 3:15 pm Discussion of Previous Lectures, Q&A

3:15 – 3:30 pm 3, 5 Minute Exhibitor Presentations

3:30 – 4:00 pm Coffee Break, Visit Exhibit

4:00 – 4:45 pm Substrate Considerations for Optimal CEA Production
   Remi Naaz – IR&D Supervisor, Premier Tech Horticulture

4:45 – 5:30 pm Developments in Seed Varieties
   Kees Rodenburg – Enza Zaden NA Inc.

5:30 – 5:50 pm Discussion of Previous Lectures

6:00 – 8:00pm Welcome Reception – Fueled by appetizers & cash bar
6:30 pm CEAC Mission Award
7:00 pm Key Note Speaker - TBD
MARCH 13, MORNING
7am Breakfast provided

ENGINEERING CONSIDERATIONS & OPTIMAL SYSTEMS DESIGN AND MANAGEMENT

7:55 – 8:00 am Welcome & Announcements

8:00 – 8:45 am Monitoring Your Greenhouse Environment: Simple Tools to Technology Trends
Dr. Murat Kacira – Professor, Ag & Biosystems Engineering, The University of Arizona

8:45 – 9:30 am Control Systems Design for Decision Support Management
Dr. David Story – Management Systems Consultant, Ridder HortiMax – North America

9:30 – 9:50 am Discussion of Previous Lectures – Q&A

9:50 – 10:05 am 3, 5-minute Exhibitor presentations

10:05 – 10:30 am Coffee Break, Visit Exhibit

10:30 – 11:15 am Engineering Your Greenhouse Structure for Energy Optimization
Dr. Gene Giacomelli – Professor, Ag & Biosystems Engineering, The University of Arizona

11:15 – 12:00 pm Water Quality & Considerations for Recycling Nutrient Solutions
Dr. Rosa Raudales, Assistant Professor & Extension Specialist, The University of Connecticut

12:00 – 12:20 pm Discussion of Previous Lectures – Q&A

12:20 – 1:20 pm Lunch Provided

MARCH 13, AFTERNOON

INNOVATIVE CEA SYSTEMS & VALUE-ADDED CROPS

1:20 – 2:05 pm Forthcoming Crops for CEA Production
Ian Justus – Sr. Manager Controlled Environment Production, Driscoll’s

2:05 – 2:50 pm Approaching Premium Crops for CEA Production: Hydroponic Hops
Myles Lewis – Owner, Arizona Vegetable Company & Instructor, CEAC Intensive Workshop

2:50 – 3:10 pm Discussion of Previous Lectures – Q&A

3:10 – 3:25 pm 3, 5-minute Exhibitor presentations

3:25 – 3:45 Coffee Break, Visit Exhibit

3:45 – 4:30 pm Co-Producing Mushrooms in CEA for Boosted CO₂
Dr. Barry Pryor – Professor, School of Plant Sciences, The University of Arizona

4:30 – 5:15 pm Locally Grown Market Opportunity
Chaz Shelton – Co-Founder, Merchant’s Garden

5:15 – 5:35 pm Discussion of Previous Lectures – Q&A
MARCH 14, MORNING

7am
Breakfast provided

ADVANCEMENTS IN CEA LIGHTING TECHNOLOGY

7:55 – 8:00 am
Welcome & Announcements

8:00 – 8:45 am
Sunlight and Supplemental Lighting Applications for CEA
Dr. Chieri Kubota – Professor, Horticulture & Crop Science, Ohio State University

8:45 – 9:30 am
Evaluating LED Technologies for Commercial Operations
Chris Higgins – CEO, Hort Americas

9:30 – 9:50 am
Discussion of Previous Lectures - Q&A

9:50 – 10:05 am
3, 5-minute Exhibitor presentations

10:05 – 10:30 am
Break, Visit your Exhibitors

URBAN CEA TECHNOLOGY

10:30 – 11:15 am
Airflow and Uniformity Considerations
Dr. Murat Kacira – Professor, Ag & Biosystems Engineering, The University of Arizona

11:15 – 12:00 am
Sole Source Electric Lighting for Controlled Environment Crop Production
Dr. Chieri Kubota - Professor, Horticulture and Crop Science, The Ohio State University

12:00 – 12:20 pm
Discussion of Previous Lectures, Q&A

12:15 – 1:15 pm
Lunch Provided

MARCH 14, AFTERNOON

THE EVOLVING CEA MARKET

1:15 – 2:00 pm
Food Safety Principles & Government Regulations
Stewart Jacobson – Food Safety Projects Coordinator, Arizona Department of Agriculture

2:00 – 2:45 pm
To Be Determined
TBD

2:45 – 3:05 pm
Discussion of Previous Lectures – Q&A

3:05 – 3:20 pm
3, 5 Minute Presentations Form Exhibitors

3:20 – 3:45 pm
Coffee Break, Visit Exhibit

3:45 – 4:15 pm
Economic Considerations to Keep Your Business Relevant
Dr. Robin Brumfield – Extensions Specialist, Ag, Food & Resource Economics, Rutgers University

4:15 – 5:30 pm
Elements for a Successful Urban Ag Start-up
Jenn Frymark – Chief Greenhouse Officer, Gotham Greens

5:30 – 5:50 pm
Discussion of Previous Lecture – Q&A

Dinner – On Your Own
### March 15, All Day!

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<tr>
<th>Time</th>
<th>Activity</th>
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<tr>
<td>7am</td>
<td>Breakfast provided</td>
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**Hands on workshops at CEAC:**

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<tr>
<th>Time</th>
<th>Activity</th>
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<tr>
<td>8:00</td>
<td>Depart hotel for CEAC [Bus provided]</td>
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<tr>
<td>8:30 – 10:15 am</td>
<td>ROUND 1</td>
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<tr>
<td>10:15 – 12:00 pm</td>
<td>ROUND 2</td>
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<td>12:00 – 1:00 pm</td>
<td>Lunch in the CEAC Classroom &amp; Yard</td>
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<td>1:00 – 2:45 pm</td>
<td>ROUND 3</td>
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<td>2:45 – 4:00 pm</td>
<td>Additional Round</td>
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<td>4:00 – 5:00 pm</td>
<td>Visit the Aquaponics Greenhouse [Bus provided]</td>
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<td>5:30</td>
<td>Return to Hotel</td>
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**Options for Hands-on Workshops:**

- Building Fertigation Systems
- High Wire Tomato Maintenance
- Lettuce Floating Systems
- Sensors and Controls
- Vertical Farm Tour and Exercises
- Intro to Mushroom Cultivation – Mobile Mushroom Unit
- Single Round Discussions with Panels crafted from experts attending from academia and industry

**Additional Round Workshop Options:**

- Business Planning Session
- Hydroponic Tomato Q&A
- Hydroponic Lettuce Q&A

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### March 16

**Commercial GH Tour**

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<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8am – 2pm</td>
<td>Touring Commercial Greenhouse of Southern AZ</td>
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<td>NatureSweet – Willcox, Arizona</td>
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