The Florida Senate

COMMITTEE MEETING EXPANDED AGENDA

AGRICULTURE
Senator Rouson, Chair
Senator Bradley, Vice Chair

MEETING DATE: Wednesday, October 13, 2021
TIME: 9:00—11:30 a.m.
PLACE: *Toni Jennings Committee Room,* 110 Senate Building

MEMBERS: Senator Rouson, Chair; Senator Bradley, Vice Chair; Senators Ausley, Boyd, Burgess, Perry, Polsky, Rodriguez, and Thurston

TAB	BILL NO. and INTRODUCER	BILL DESCRIPTION and SENATE COMMITTEE ACTIONS	COMMITTEE ACTION
1		Presentation on Artificial Intelligence and Precision Agriculture by the University of Florida/IFAS	Presented
2		Presentation on Extension Services Supporting Workforce Development in Agriculture, Natural Resources, and Food Systems by the University of Florida/IFAS	Presented
3		Florida A&M University Agricultural Innovation & Impact Presentation	Presented
		Other Related Meeting Documents	

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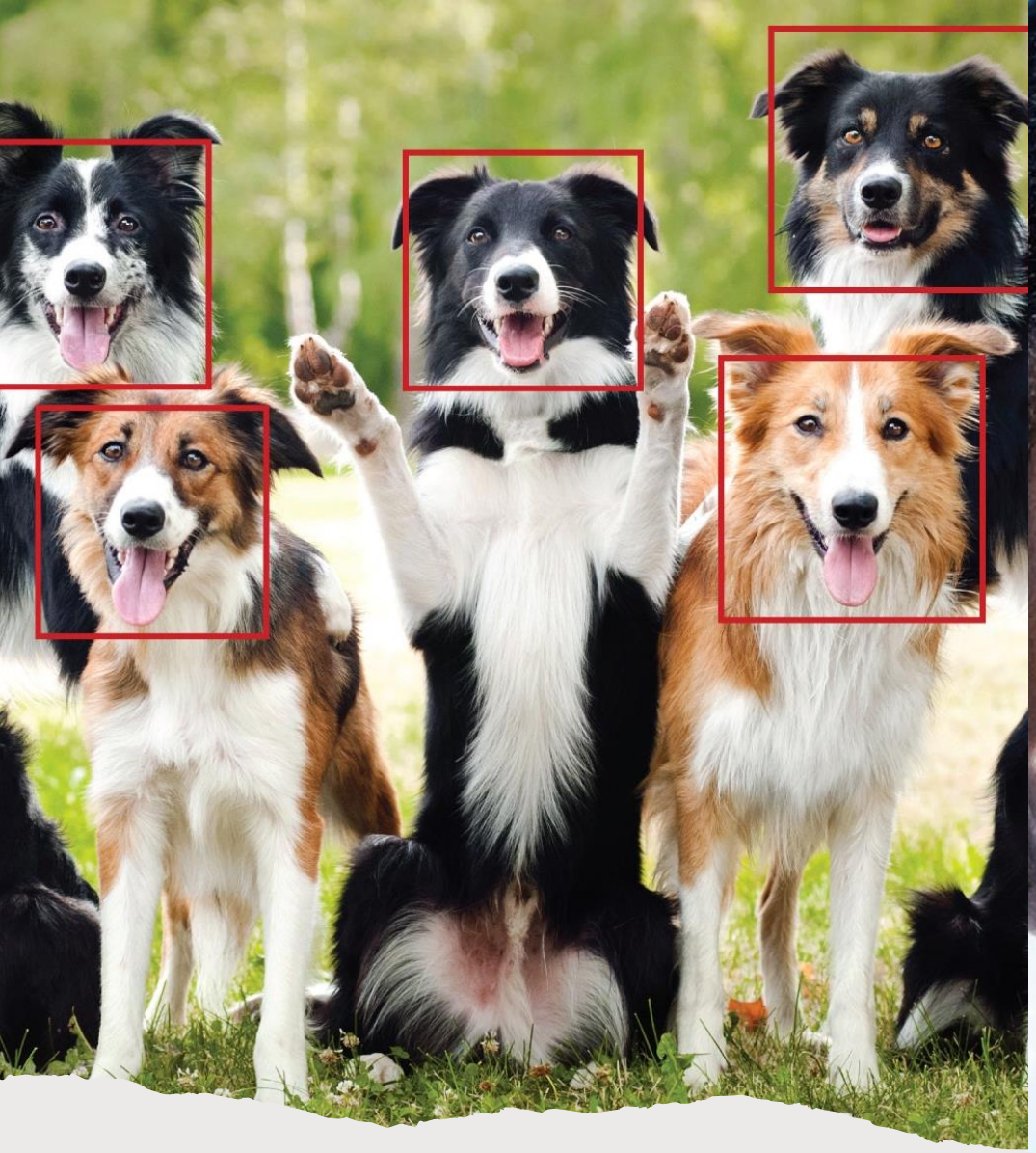
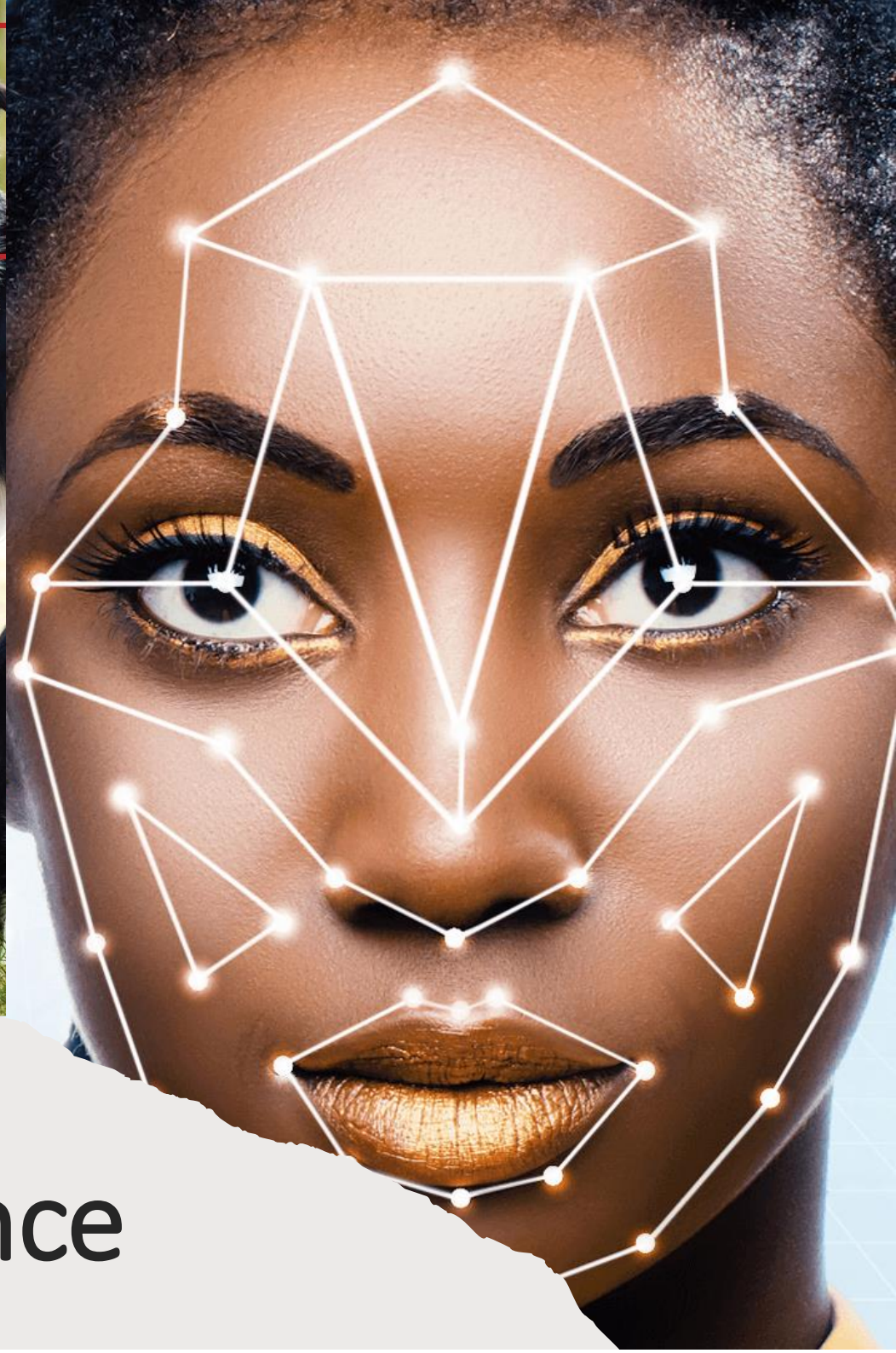
Leading the Way in Artificial Intelligence and Precision Agriculture

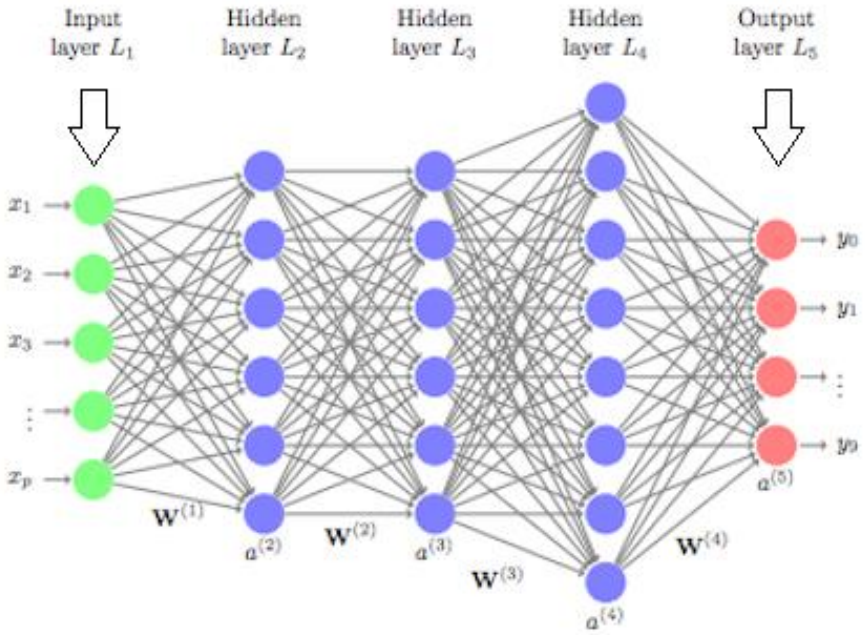
Nathan S. Boyd





Artificial Intelligence

Deep Learning / Computer Hardware



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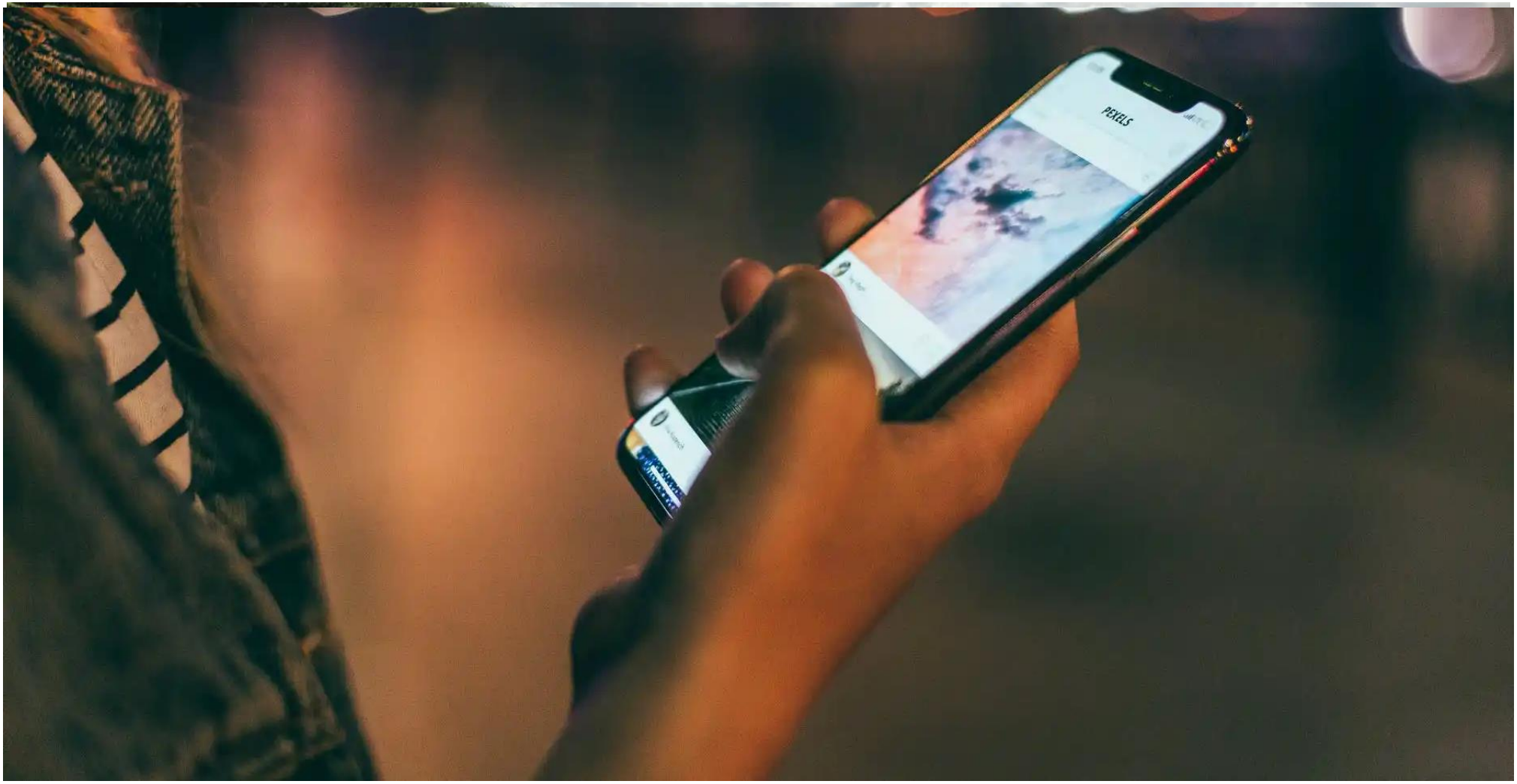

The Technological Revolution

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Objectives

- Give a few brief examples of University of Florida research that is transforming Agriculture
- Summarize potential impacts

Weed Management

- Weeds occur in non-uniform patches
- Technology to detect and identify
- Technology to treat only where weeds occur

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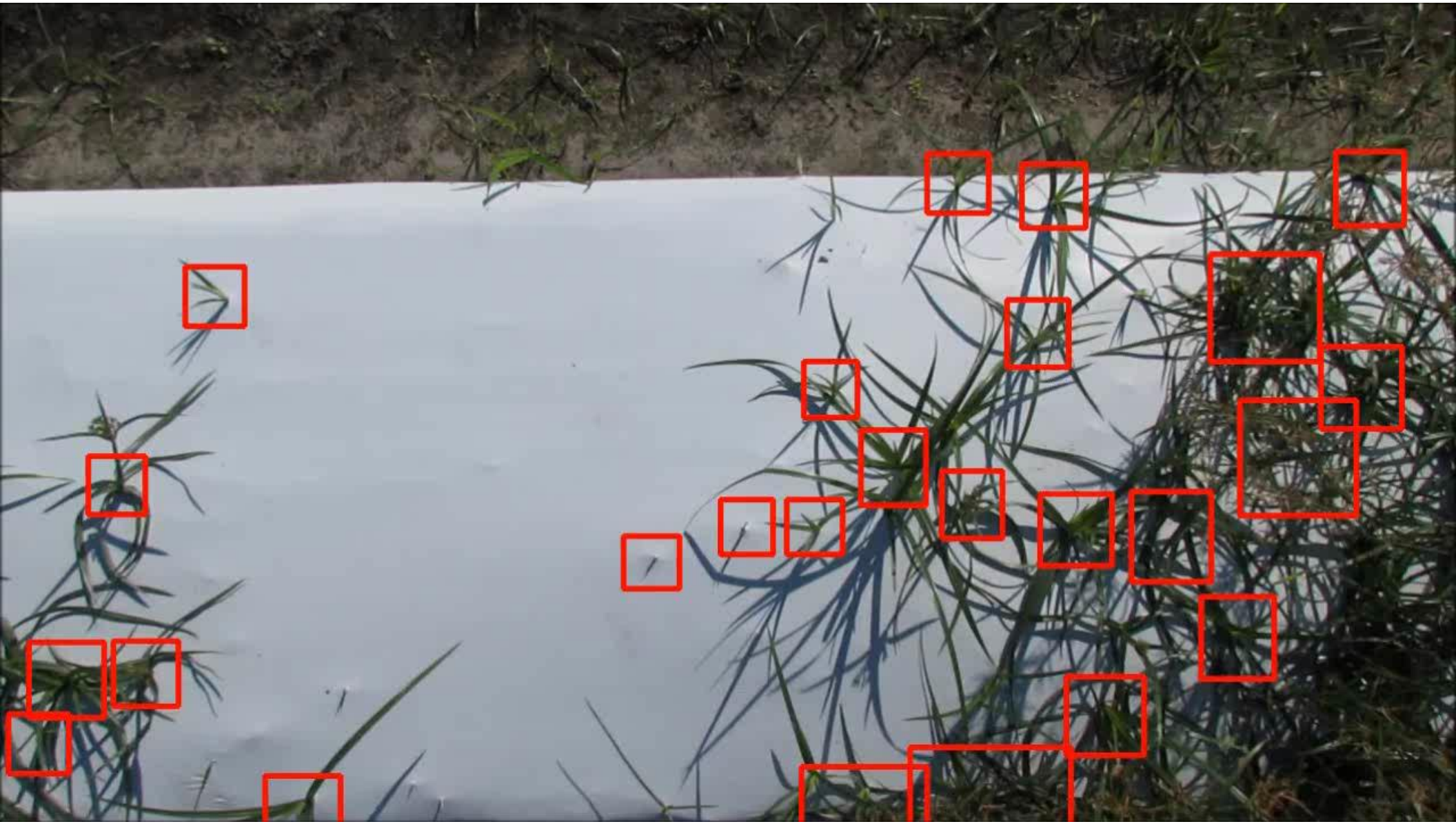
Nutsedge Detection



Dr. Arnold Schumann

Detection and precision spraying POST herbicide on nutsedge in tomato

Areas where control valves opened to spray target nutsedge

Potential herbicide reduction: 44%

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Dr. Shaun Sharpe

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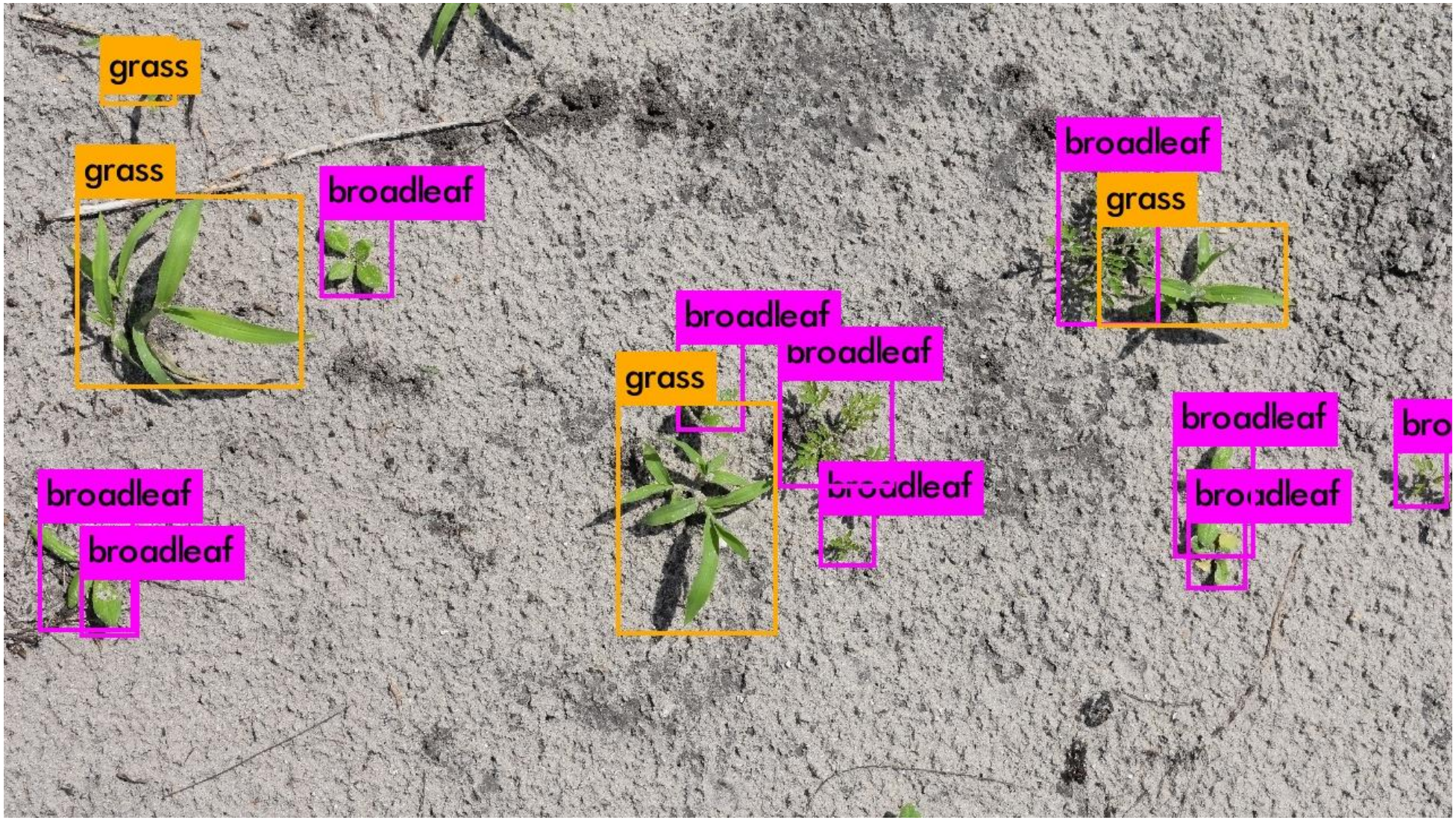
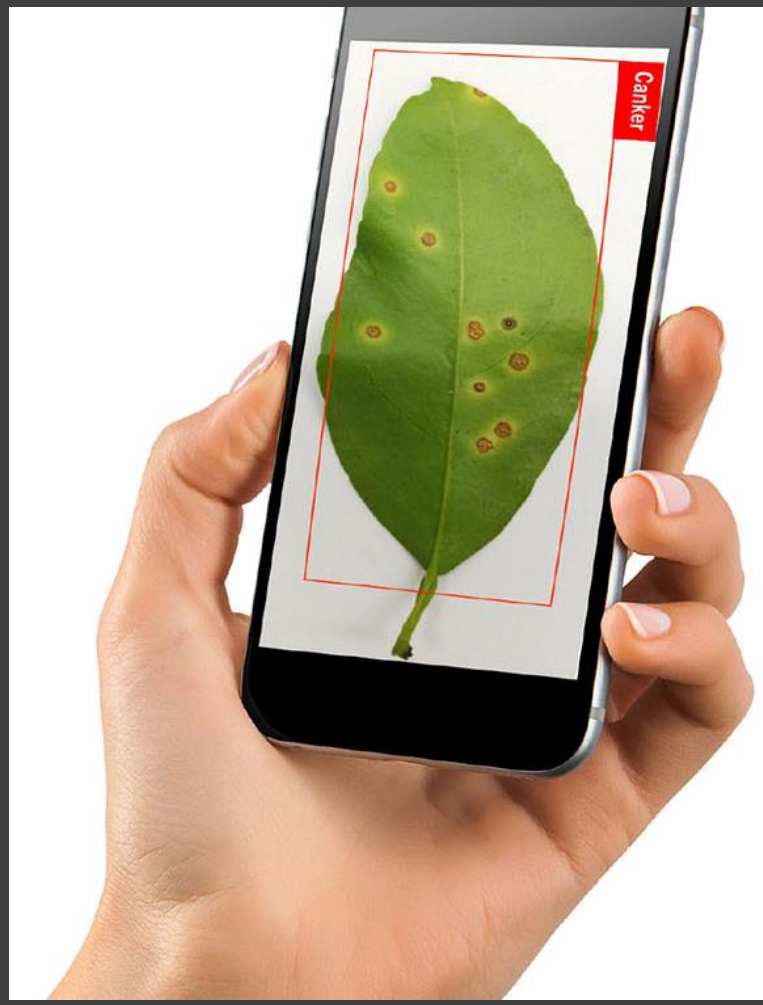



STOUT
AGTECH
PATENT PENDING
FarmWise
BLUE RIVER
TECHNOLOGY
Optimize Every Plant
Blue River Technology is building the next generation of smart agriculture equipment.
We're introducing See & Spray technology, enabling a world in which every plant counts.

Disease, Insect, and Fertility Management



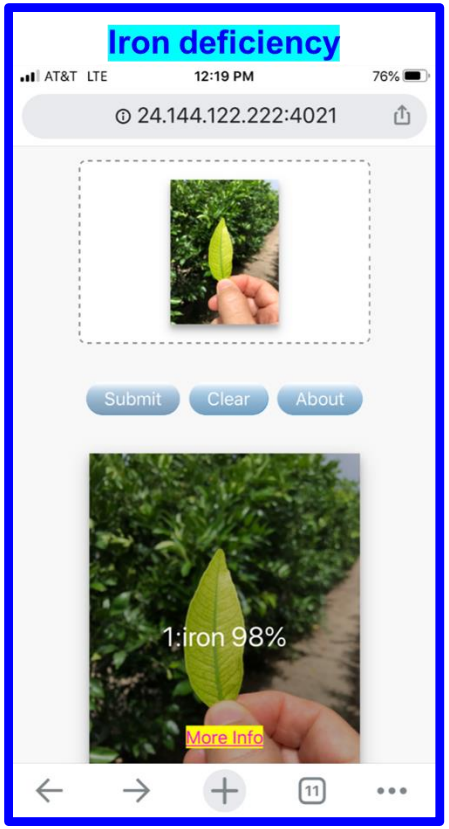
Hand-held Apps

- Economically feasible
- Rapid development

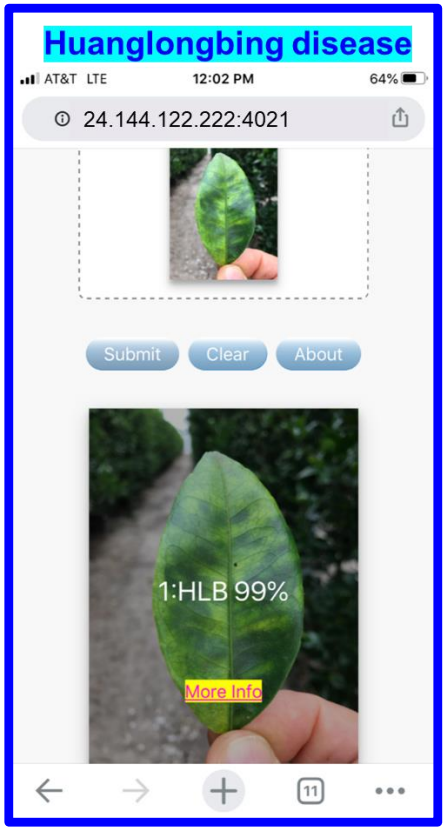
Dr. Arnold Schumann

AI-Based Smartphone Apps for Leaf Symptom Diagnosis

Arnold Schumann
CREC, UF/IFAS



Mg Mn Zn Fe



May 12, 2021 Florida Citrus Show

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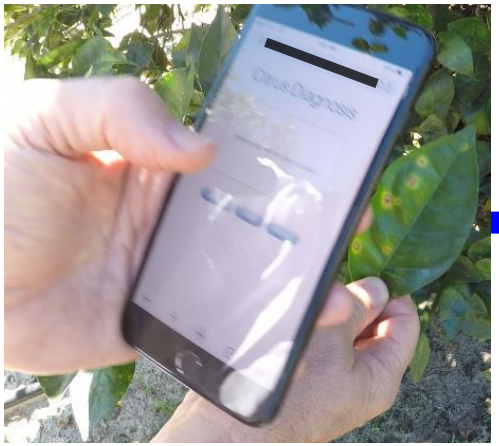
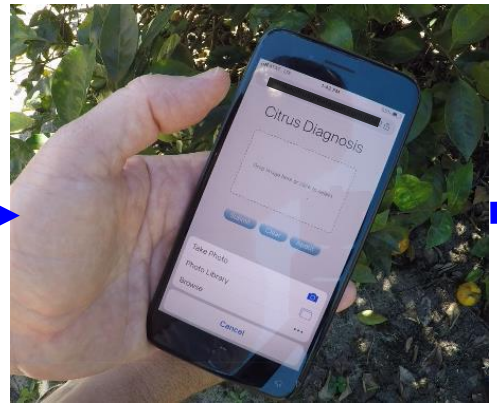
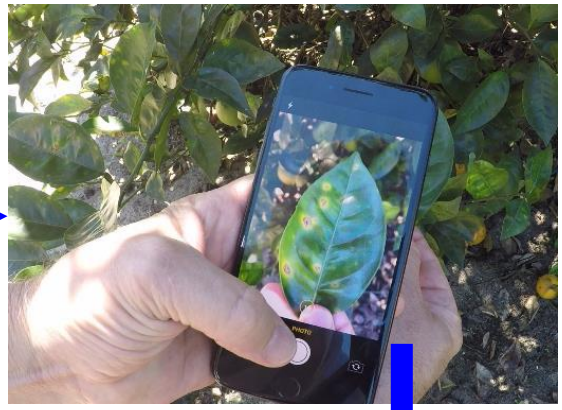
Leaf diagnosing with a smartphone web app:

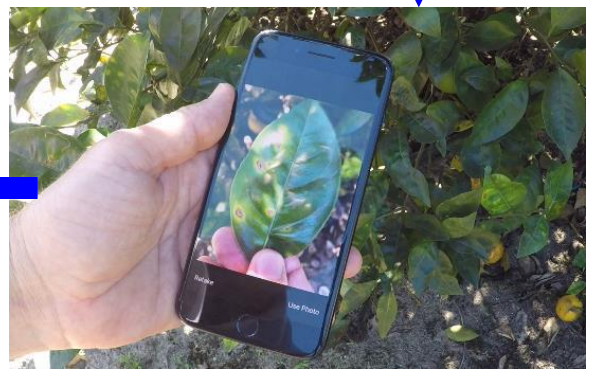


1. Pick a leaf

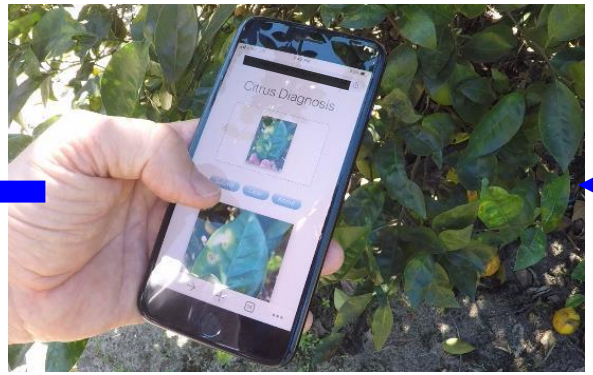




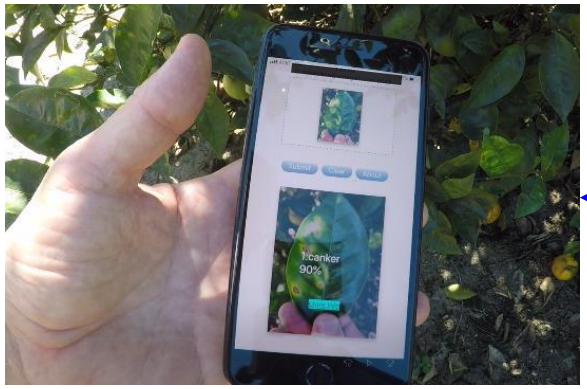
2-3. Take a photo



4. Use photo



5. Submit photo



6. Show result

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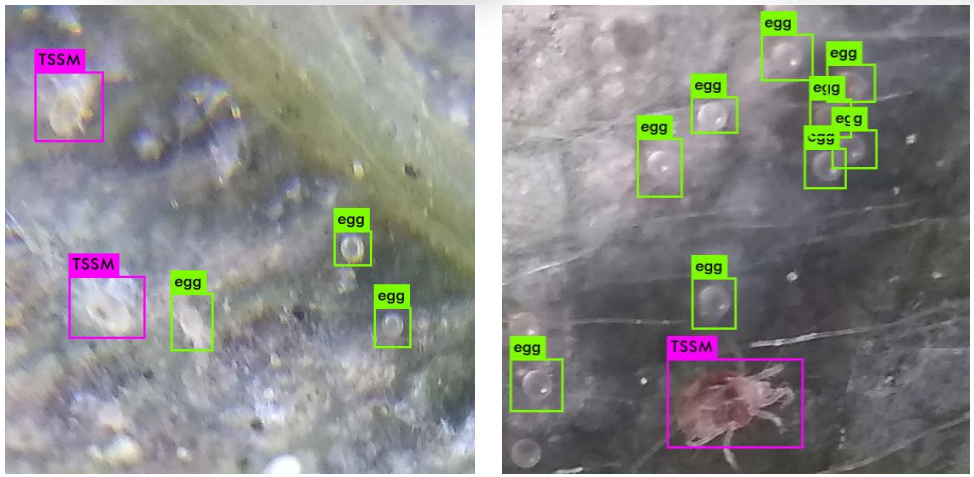
Two-Spotted Spider Mite Detection Using AI and a Smartphone

Dr. Wonsuk "Daniel" Lee



TSSM & egg detection results

Detection accuracy using a smartphone

	Precision	Recall	Average Precision
TSSM	0.59	0.67	0.62
Egg	0.60	0.76	0.67

Detection accuracy using a computer

	Precision	Recall	Average Precision
TSSM	0.81	0.85	0.86
Egg	0.86	0.92	0.93

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Benefits of AI-based Technology

- **Precision technology can:**
- Reduce agrochemical inputs
- Reduce production costs
- Reduce risk of crop damage
- Reduce reliance manual labor
- Improve farm income

Benefits of AI-Based Technology

- **Precision technology can:**
- Reduce pesticide residues on food
- Reduce impacts on pollinators
- Enhance water and nutrient management
- Improve crop yields
- Decrease negative environmental effects

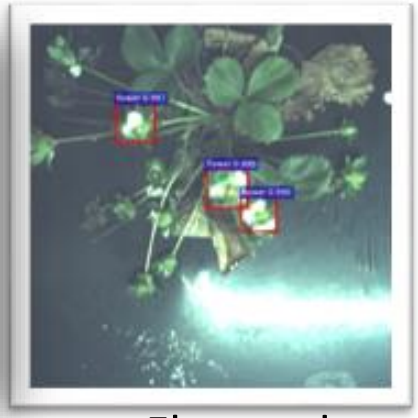
Crop Canopy Mapping / Trait Specific Breeding

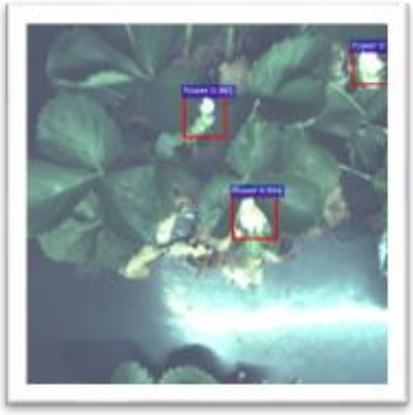
Dr. Amr Abd-Elrahman / Dr. Vance Whitaker

Strawberry flower detection for early yield mapping

Dr. Wonsuk “Daniel” Lee

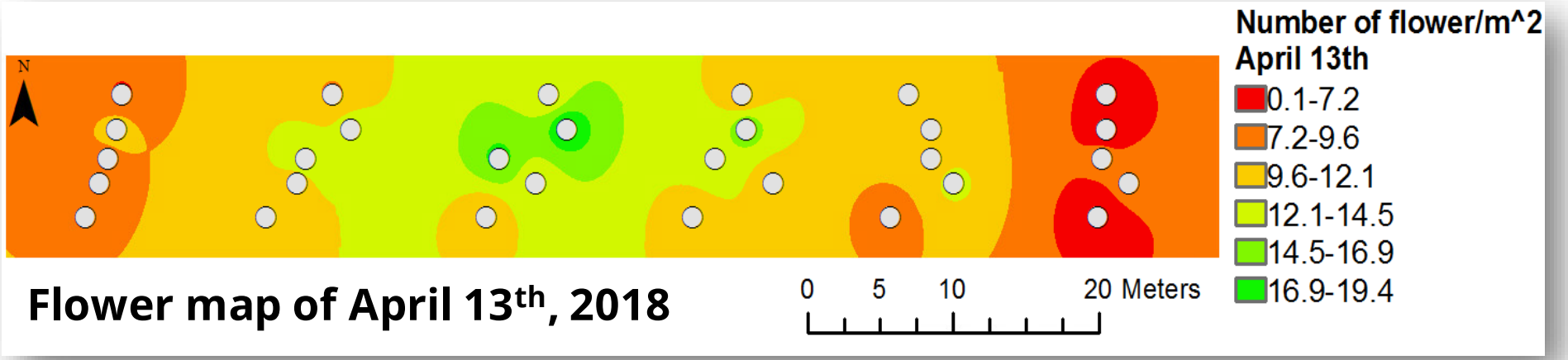
Field image acquisition





Flower detection using AI

Autonomous robot



Flower map of April 13th, 2018

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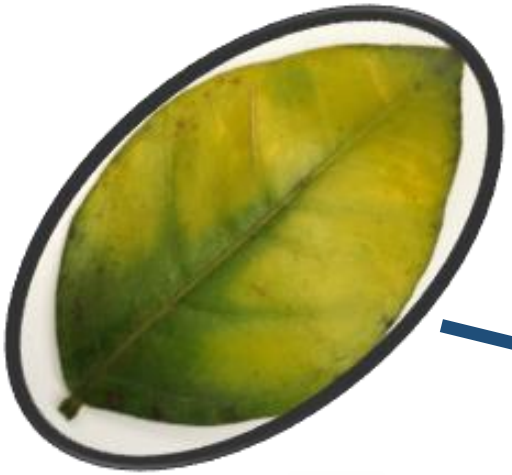
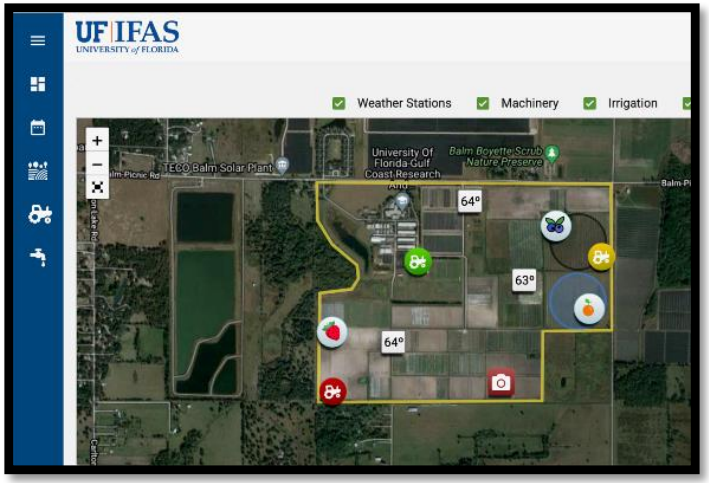
Automation

Data Integration for Actionable Outputs





Digital Platform

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UF/IFAS AI Initiatives

$70 M NVIDIA-UF PARTNERSHIP WITH UF HIRING 100+ FACULTY POSITIONS FOCUSED ON AI.

HIRE 13 AI POSITIONS FOCUSED ON 10 PRIORITY AREAS

CENTER FOR APPLIED ARTIFICIAL INTELLIGENCE IN AGRICULTURE

THANK YOU

For your interest

For your support

For helping Florida be the leader in the next agricultural revolution

UF/IFAS Extension
Statewide Support of Workforce Development in ANR and Food Systems

Saqib Mukhtar
Associate Dean
State Program Leader for ANR
UF/IFAS Extension

Audiences

- -Pesticide Applicators
- -Growers
- -Fishing Guides
- -Food Handlers, Caterers, Food Service Managers
- -Natural Areas Managers
- -Aquatic/Natural Resources Managers
- -Seafood Inspectors & Processors
- -Inmates

Training Methods

- -Workshops
- -Seminars
- -Virtual Classes
- -Hands on Training
- -Podcasts
- -Recorded Modules
- -Field Trainings

Educational Products

- -Print Materials
- -Videos
- -Manuals
- -Field trips
- -Projects

Credentialing

- -Certificate of Completion
- -CEU's
- -CC and CEU

Agriculture & Horticulture

Program (Year)	Yearly Participation	Yearly Certificates/CEU's issued
Pesticide Education (1970's)	> 2,700 Online enrollments ~6,000 exams administered	150,000 CEU's total License Issued by FDACS (4yrs)
Precision Ag and AI (2017)	~1,000	10-20 CEU's/person CC (Drone Pilot prerequisite)
Greenhouse management Online Training (2015)	• 2020: 787 enrolled • Lifetime 3,895	536 graduated (68%) CC and CEUs
Farmworker Protection Education (2001, County Program)	>1,800 (6 yr. average)	Average of 1,290 Certificates issued over 6 years

Agriculture & Aquaculture

Program (Year)	Yearly Participation	Yearly Certificates/CEU's issued
Aquatic Weed Control Short Course (1976)	~500	Up to 20 CEU's/person
Seafood Hazard Analysis and Critical Control Points (HACCP) Training (1997)	>250	CC issued by Association of Food and Drug Officials
Florida Friendly Fishing Guide Certification (2019)	~68	CC

Natural Resources

Program (Year)	Yearly Participation	Yearly Certificates/CEU's issued
Natural Areas Training Academy (2000: Nature Conservancy) (2008: Moved to Extension)	~160	CC
Florida Master Naturalist Program (2001)	1,000-1,500 graduates per year	CC and CEUs and credits toward Florida Educator Renewal Certification
Florida Friendly Landscaping-Green Industries BMPs (2002)	~5,600	Since 2006 Total Certified 60,073

Food Systems

Program (Year)	Yearly Participation	Certificates/CEU's issued
Food Safety and Quality (2001)	~800	ServSafe® CC (5yrs) Florida Food Handler Credentials (3yrs)

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Impacts of Extension ANR Workforce Development Education

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PDEC Program Development & Evaluation Center

IMPROVING FLORIDA'S
Workforce, Economy, and Natural Resources

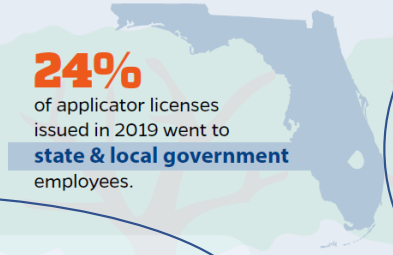
UF/IFAS Extension partners with state agencies, professional organizations, and pest management and landscaping businesses to provide training that helps thousands of Florida's workers improve their skills, knowledge and job opportunities.

UF/IFAS pesticide programs support:

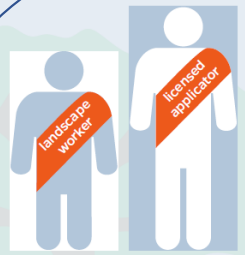
56,000
pest control workers and pesticide applicators with a wage base of
$1.91 billion

3,074
new and renewal pesticide applicator licenses in 2019

$62 million
in economic benefit to the state.[1]



24%
of applicator licenses issued in 2019 went to **state & local government** employees.



$27,610 ANNUAL WAGE

$34,060 ANNUAL WAGE

Average annual wage is
23% or $6,448
higher for licensed applicators.

Between 2007 and 2019:
- **38,600** pesticide applicator licensees trained,
- **53,900** certified in Green Industry Best Management Practices, and
- **3,600** attended the UF/IFAS Pest Management University.

*Direct benefit of $20m due to salary differential ($6,448 x 3,074) and additional $42m in indirect benefits due to additional income being spent in the economy.

Economic Benefits
- A well-trained workforce
- Higher profits and lower costs for Green Industry businesses
- Reduced liability
- Less damage due to termites and bed bugs

Environmental/Health Benefits
- Reduced chemical exposure
- Safe and effective pesticide use
- A safer water supply, safer environment

Updated April 2020

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Florida-Friendly Landscaping™ PROGRAM

REDUCing Nitrogen Pollution in Florida Waters

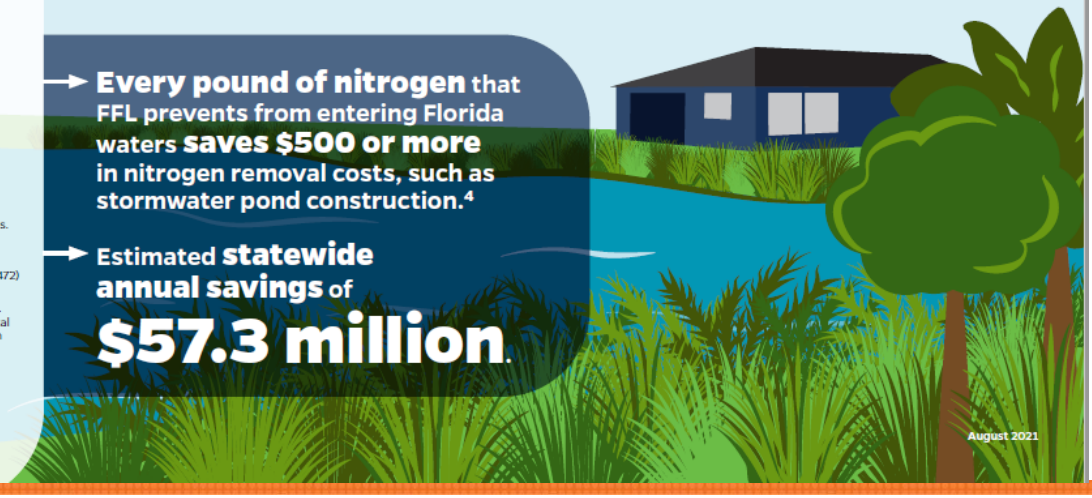
Since 1993 the Florida-Friendly Landscaping™ (FFL) program has partnered with the Florida Department of Environmental Protection (FDEP) to reduce pollution in Florida waters. Polluted runoff from rainfall or overwatering is a major source of excess nitrogen and a major contributor to poor water quality.[1] FFL is an integral component of many Basin Management Action Plans (BMAPs) and helps to reduce nitrogen loading into Florida waters.

PDEC Program Development & Evaluation Center

WATER QUALITY BENEFITS OF FLORIDA-FRIENDLY LANDSCAPING™

- **FFL** efforts **prevented** an estimated **114,650 pounds of nitrogen from entering Florida waters** in 2020.
- **3,000** landscape professionals **adopted** one or more green industry **best management practices** (GI-BMP).[2]
- **15,000** adult participants in FFL Extension programs **adopted** one or more **best management practices** for residential landscapes.
- **Participants shared** what they learned through FFL **with 10 other people**, on average.[3]
- **96%** of landscape professionals reported using UF/IFAS green industry **best management practices for fertilizer use**, compared to just **60% before** attending the FFL training.
- **93%** of residential participants said they **adopted** one or more **FFL water conservation practices**.[3]

- **Every pound of nitrogen** that FFL prevents from entering Florida waters **saves $500 or more** in nitrogen removal costs, such as stormwater pond construction.[4]
- Estimated **statewide annual savings** of **$57.3 million**.



August 2021

[1]Reisinger et al. March 2020. Sources and Transformations of Nitrogen in Urban Landscapes. https://edis.ifas.ufl.edu/publication/ss681.

[2]2020 IFAS Workload data.

[3]2020 surveys conducted of FFL participants (N=472) and landscape professionals (N=235)

[4]Florida Department of Environmental Protection. June 2021. 2020 Statewide Annual Report on Total Maximum Daily Loads, Basin Management Action Plans, Minimum Flows or Minimum Water Levels, and Recovery or Prevention Strategies. https://floridadep.gov/dear/water-quality-restoration/content/statewide-annual-report.

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PDEC Program Development & Evaluation Center

Reducing Recidivism Through PROFESSIONAL DEVELOPMENT *and* CERTIFICATION

UF/IFAS Extension provides training opportunities for inmates at the Federal Correctional Complex, Coleman (FCC Coleman), a U.S. federal prison. Through horticulture and culinary programs, inmates can receive certificates such as

- **the National Restaurant Association's ServSafe® and ManageFirst Professional®,**
- **UF/IFAS Green Industries-Best Management Practices (GI-BMP), and**
- **the Florida Nursery, Growers and Landscape Association's Certified Horticulture Professional (FCHP).**

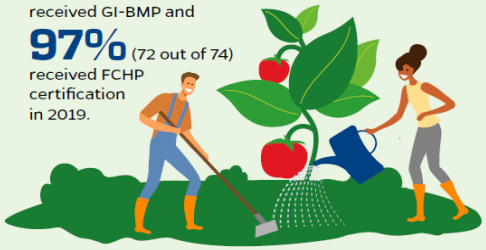
UF/IFAS Extension programs at FCC Coleman are designed not only to provide credentials that are useful or required for employment, but also skills and assistance that improve an inmate's likelihood of being hired after release, thus reducing their chances of being reincarcerated.

HIGH SUCCESS RATES

Horticulture

98% of FCC Coleman students (57 out of 58) received GI-BMP and

97% (72 out of 74) received FCHP certification in 2019.



Culinary

78% (62 out of 80) of medium security inmates and

61% (44 out of 72) of high security inmates received ServSafe® and/or ManageFirst certificates in 2019.

LOWER RECIDIVISM

5.4% rate of recidivism among **500** FCC Coleman students who completed the horticulture program over the past 9 years

VS.

the national average rate of recidivism within 8 years of release from federal prison, which is **49.3%**.[1]

BIG SAVINGS FOR TAXPAYERS

$8.2 MILLION in estimated taxpayer savings due to dramatically lower recidivism rate.[2]

[1]United States Sentencing Commission (2016)
[2]The average annual cost of incarceration for each federal inmate in 2018 was $37,499 (Bureau of Prisons, Federal Register, November 2019). The estimated cost of incarceration is $9.2M at higher recidivism rate (500 x 49.3% x $37,499) vs. $1M at the lower rate (500 x 5.4% x $37,499).

Created June 2020

UF IFAS Extension
UNIVERSITY of FLORIDA

Thank you and Questions

FAMU
COLLEGE OF AGRICULTURE + FOOD SCIENCES
FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY

Senate Agriculture Committee
College of Agriculture and Food Sciences Innovation & Impact Presentation

October 13, 2021

FAMU COLLEGE OF AGRICULTURE + FOOD SCIENCES
FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY

CAFS Academic Programs

Bachelor's Degree

- Agribusiness
- Agricultural Sciences with majors in:
  - Agronomy
  - Animal Science
  - Entomology
  - Veterinary Technology
- Biological Systems Engineering
- Food Science

Doctoral Degree

- Doctoral Degree *(Joint program with University of Florida)*
  - Entomology

Master's Degree

- Agricultural Sciences majors:
  - Agribusiness
  - Entomology
  - Plant Science, Soil and Water Sciences

International Agriculture

- International Agriculture Research, Outreach and Development
- International Education (Study Abroad) and Exchange Program

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CAFS Research Programs

Center for Viticulture and Small Fruit (1978)

Goal: Conduct basic and applied research and provide service to promote development of viticulture industry in Florida.

Center for Biological Control (1999)

Goal: Development of ecologically based integrated pest management and management and mitigation of invasive alien species.

Center for Water Resources (1998)

Goal: Protect, improve, restore and maintain Florida's water resources through research, education, extension and technology transfer.

Brooksville Agricultural and Environmental Research Station (2015)

Goal: Conduct innovative agricultural and natural resource research, learning, outreach and extension services that will enhance the mission of Land-Grant system.

USDA Florida Forest Watershed Research Program

Goal: Enhance natural resource science research, education, and outreach at FAMU to better understand sustainable watersheds in the coastal plain region.

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New and Innovative CAFS Agricultural Research and Outreach Projects

- **Use of Microalgae and Cyanobacteria to Reduce Nutrient Loads to Surface and Groundwater Pollution and Algae Bloom** – Center for Water Resources ***(FAMU, DEP, Algeteral Technologies)***
- **Climate Change, Adaptation, and Welfare Implications: A Study of US Agriculture – National Center for Atmospheric Research Project** – FAMU CAFS Agribusiness Program ***(FAMU, NSF)***
- **Development of Microbial Control Agents for Varroa Mites of Honey Bees** – Center for Biological Control ***(FAMU, USDA/APHIS)***
- **Complete Sequence of Muscadine Grape Whole – Genome** – Center for Viticulture and Small Fruit ***(FAMU, FSU)***
- **Support Landowners and Research through Conservation to Increase USDA Opportunities and Programs** – Brooksville Agricultural and Environmental Research Station ***(FAMU, USDA/NRCS)***
- **USDA AMS Grant Applicant Technical Assistance with Underserved Community Focus** – Cooperative Extension Service ***(FAMU, UMES)***
- **USAID Horticulture Innovation Lab Aims to Empower Smallholder Farmers** – International Programs ***(FAMU, UC Davis, Texas A&M, Michigan State, World Vegetable Center)***
- **Collaborative Microplastics Community Science Project – UF Sea Grant Program** – Center for Water Resources / Cooperative Extension ***(FAMU, UF)***

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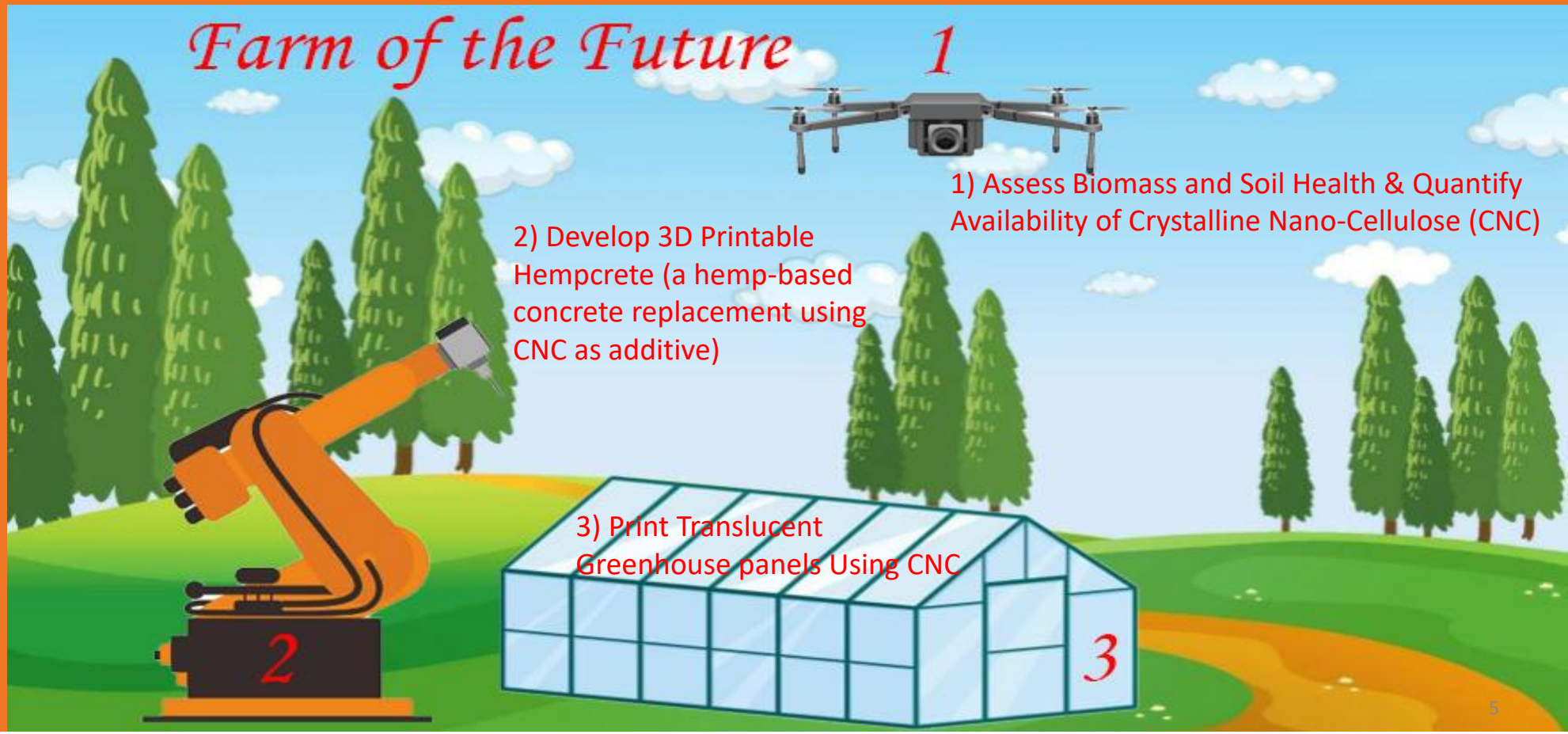
FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY



1) Assess Biomass and Soil Health & Quantify Availability of Crystalline Nano-Cellulose (CNC)

2) Develop 3D Printable Hempcrete (a hemp-based concrete replacement using CNC as additive)

3) Print Translucent Greenhouse panels Using CNC

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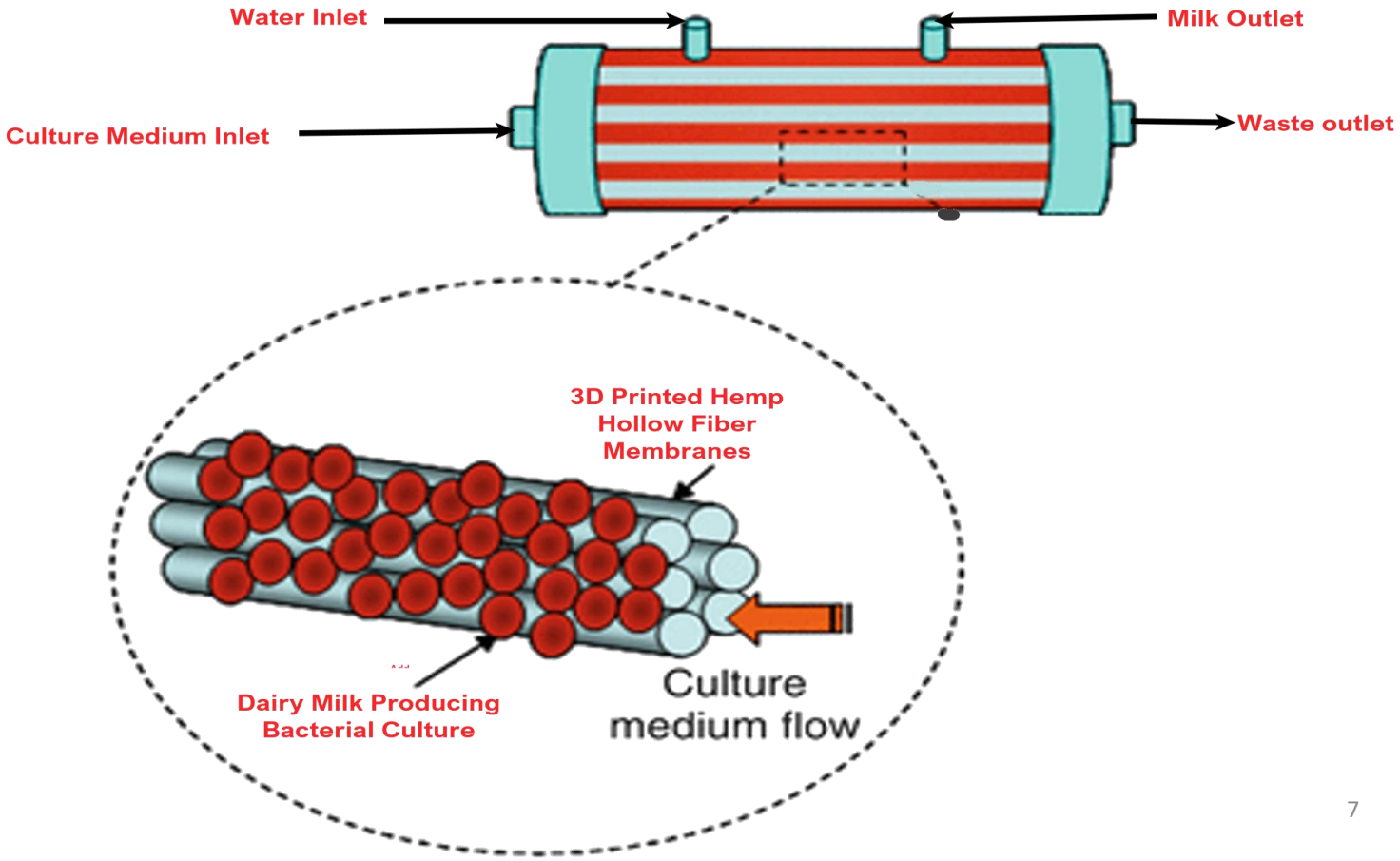
Hemp Hollow Fiber Bioreactors for Dairy Milk Production



FAMU FLORIDA A&M UNIVERSITY COOPERATIVE EXTENSION
COLLEGE OF AGRICULTURE AND FOOD SCIENCES

- Provides research-based educational programs and direct technical assistance to Florida citizens with particular emphasis on underserved and limited resource audiences and communities.
- Broad-based reach to youth, adults, families, communities and small farmers





FAMU FLORIDA A&M UNIVERSITY COOPERATIVE EXTENSION
COLLEGE OF AGRICULTURE AND FOOD SCIENCES

4-H/Youth Development	Agriculture and Natural Resources		Community Resource Development	Family & Consumer Science
• Agri-STEM	• Beginning Farmers	• Small Ruminants	• Business Development	• Aging and Senior Living
• Citizenship/ Leadership	• Protected Agriculture (Hydroponic/ Aquaponic, High Tunnel)	• Small-Scale Livestock Production Systems	• Community Asset Building (incl. gardening, landscape, arboriculture)	• Emergency & Disaster Preparedness
• Financial Literacy Entrepreneurship	• Sustainable Food Systems		• Heir Property	• Farm to School
• Gardening	• Vegetable Production		• Re-Entry& Certification Programs	• Financial Literacy
• Nutrition				• Nutrition
• Youth & The Law				

FAMU FLORIDA A&M UNIVERSITY COOPERATIVE EXTENSION COLLEGE OF AGRICULTURE AND FOOD SCIENCES

Agriculture Innovation in Reaching. Teaching. Serving.

Master Goat & Sheep Certification Program

Farm-to-School

Produce Safety, Horticulture, GI-BMPs, Arboriculture Certification Programs

(Farmers, Industry & Re-Entry)


FLORIDA A&M UNIVERSITY
Founded in 1887 as the State Normal College for Colored Students.
Florida Agricultural and Mechanical University (FAMU) is the only
historically state supported educational facility for African
Americans in Florida. It has always been co-educational. In 1890,
the second Morrill Act was passed. This enabled the school to
become the Black Land Grant College for the State of Florida.
In 1891, the college was moved from its original location west of
town to its present location which was once the site of
"Highwood," Territorial Governor W.P. Duval's slave plantation.
The site is one of the highest hills in Tallahassee. The school
was known as Florida A&M College from 1909 until 1953 when
it attained university

The Florida Senate

APPEARANCE RECORD

Deliver both copies of this form to
Senate professional staff conducting the meeting

Oct 13/21
Meeting Date

Senate Agricultural Committee
Committee

UF/IFAS AI
Bill Number or Topic

Amendment Barcode (if applicable)

Name Nathan Boyd

Phone 813-419-6613

Address 14625 County Road 672
Street

Email nsboyd@ufl.edu

Wimauma FL 33598
City State Zip

Speaking: ☐ For ☐ Against ☑ Information **OR** Waive Speaking: ☐ In Support ☐ Against

PLEASE CHECK ONE OF THE FOLLOWING:

☒ I am appearing without compensation or sponsorship.

☐ I am a registered lobbyist, representing:

☐ I am not a lobbyist, but received something of value for my appearance (travel, meals, lodging, etc.), sponsored by:

While it is a tradition to encourage public testimony, time may not permit all persons wishing to speak to be heard at this hearing. Those who do speak may be asked to limit their remarks so that as many persons as possible can be heard. If you have questions about registering to lobby please see Fla. Stat. §11.045 and Joint Rule 1. 2020-2022JointRules.pdf (flsenate.gov)

This form is part of the public record for this meeting.

S-001 (08/10/2021)

The Florida Senate

APPEARANCE RECORD

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10-13-21
Meeting Date

Senate Ag Committee
Committee

UF/IFAS
Bill Number or Topic

Amendment Barcode (if applicable)

Name SAQIB MUKHTAR

Phone 979-777-3352

Address 1020 McCarty D
Street

Email SMukhtar@ufl.edu

Gainesville FL 32611
City State Zip

Speaking: ☐ For ☐ Against ☑ Information **OR** Waive Speaking: ☐ In Support ☐ Against

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S-001 (08/10/2021)

The Florida Senate

APPEARANCE RECORD

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10.13.2021
Meeting Date

Agriculture Committee
Committee

Bill Number or Topic

Amendment Barcode (if applicable)

Name Robert Taylor, Ph.D.

Phone (850) 561-2644

Address Florida A&M University College of Agriculture
Street

Email robert.taylor@famu.edu

Tallahassee FL 32307
City *State* *Zip*

Speaking: ☐ For ☐ Against ☑ Information **OR** Waive Speaking: ☐ In Support ☐ Against

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S-001 (08/10/2021)

The Florida Senate

APPEARANCE RECORD

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10.13.2021
Meeting Date

Agriculture Committee
Committee

Bill Number or Topic

Amendment Barcode (if applicable)

Name Satyanarayan Dev, Ph.D.

Phone (850) 561-2977

Address Florida A&M University College of Agriculture
Street

Email satyanarayan.dev@famu.edu

Tallahassee FL 32307
City *State* *Zip*

Speaking: ☐ For ☐ Against ☑ Information **OR** Waive Speaking: ☐ In Support ☐ Against

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S-001 (08/10/2021)

The Florida Senate

APPEARANCE RECORD

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10.13.2021
Meeting Date

Agriculture Committee
Committee

Bill Number or Topic

Amendment Barcode (if applicable)

Name Vonda Richardson

Phone (850) 599-3546

Address Florida A&M University College of Agriculture
Street

Email vonda.richardson@famu.edu

Tallahassee FL 32307
City *State* *Zip*

Speaking: ☐ For ☐ Against ☑ Information **OR** **Waive Speaking:** ☐ In Support ☐ Against

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S-001 (08/10/2021)

CourtSmart Tag Report

Room: SB 110 **Case No.:** **Type:**
Caption: Senate Committee on Agriculture **Judge:**

Started: 10/13/2021 9:01:16 AM
Ends: 10/13/2021 10:14:42 AM Length: 01:13:27

9:01:20 AM Opening Remarks
9:01:22 AM Roll Call
9:02:12 AM Chair Rouson
9:02:36 AM Tab 1 - Presentation on Artificial Intelligence and Precision Agriculture by Nathan Boyd, UF
9:14:58 AM Chair Rouson
9:15:04 AM Senator Ausley with questioin
9:15:58 AM Nathan Boyd to respond
9:16:29 AM Follow up by Senator Ausley
9:16:53 AM Nathan Boyd to respond
9:18:13 AM Senator Ausley with follow-up
9:18:28 AM Nathan Boyd to respond
9:18:37 AM Senator Boyd with comments
9:19:03 AM Nathan Boyd to respond
9:19:51 AM Senator Rouson with comments
9:20:20 AM Nathan Boyd to respond
9:22:11 AM Senator Ausley with question
9:22:42 AM Nathan Boyd to respond
9:23:31 AM Senator Ausley with comments
9:23:47 AM Senator Bradley with question
9:24:12 AM Nathan Boyd to respond
9:24:45 AM Senator Thurston with question
9:24:58 AM Nathan Boyd to respond
9:26:47 AM Senator Thurston with follow-up
9:26:57 AM Nathan Boyd to respond
9:26:58 AM Chair Rouson
9:27:17 AM Tab 2 - Presentation on Extension Services Supporting Workforce by Dr. Saqib Mukhtar, Associate Dean, UF
9:38:15 AM Chair Rouson
9:38:24 AM Senator Thurston with question
9:38:35 AM Dr. Mukhtar to respond
9:39:24 AM Senator Thurston with follow-up
9:39:40 AM Dr. Mukhtar to respond
9:40:30 AM Senator Thurston
9:40:37 AM Dr. Mukhtar to respond
9:41:12 AM Senator Ausley with question
9:41:24 AM Dr. Mukhtar to respond
9:42:40 AM Senator Ausley with follow-up
9:43:03 AM Dr. Mukhtar to respond
9:43:09 AM Chair Rouson
9:43:25 AM Tab 3: Presentation by Dr. Robert Taylor, Dr. Satyanarayan Dev, & Vonda Richardson, FL A & M, Agricultural Innovation & Impact

9:50:19 AM Chair Rouson with question
9:50:33 AM Dr. Taylor to respond
9:52:09 AM Senator Thurston with question
9:52:16 AM Dr. Taylor to respond
9:54:12 AM Chair Rouson with question re: grapes
9:54:26 AM Dr. Taylor to respond
9:57:10 AM Senator Rouson with comment
9:57:19 AM Dr. Dev to continue presentation
10:01:40 AM Senator Thurston with question
10:01:50 AM Dr. Dev to respond
10:02:34 AM Senator Thurston with follow-up
10:02:46 AM Dr. Dev to respond
10:03:43 AM Senator Thurston with follow-up
10:03:47 AM Dr. Dev to respond
10:04:08 AM Dr. Richardson to continue presentation
10:10:02 AM Chair Rouson
10:10:05 AM Senator Thurston with question
10:10:25 AM Dr. Richardson to respond
10:12:57 AM Senator Thurston with comments
10:13:21 AM Chair Rouson with comments
10:14:12 AM Chair Rouson with closing remarks
10:14:25 AM Meeting ajourned