

A Glimpse Into the Near Future: Artificial Intelligence

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Associate Dean for Extension

State Program Leader 4-H, Families and Communities

TODAY

- **Background**
- **Application 1: Health Disparities, Social Determinants of Health**
- **Discussion**
- **Application 2: AI in the Workforce: Training our Next Generation**

WHAT ARE WE TALKING ABOUT?

- Machine Learning
 - Specialization in one thing – recognizing and seeing things in the data; Address one problem
- Machine Intelligence
 - learning, problem solving and prioritization
 - Can employ multiple ML approaches
- Machine Consciousness
 - Attempts to replicate consciousness using algorithms →



The logo consists of the letters 'UF' in a white, bold, sans-serif font, centered within a solid orange square. The background of the slide is a photograph of the University of Florida campus, featuring the prominent brick clock tower and the main building, set against a sky with a warm, golden glow. A blue geometric pattern of interconnected nodes and lines is overlaid on the image, particularly in the upper right and lower left corners.

UF

University of Florida AI University Initiative

UF's Vision for AI

The depth and breadth of our academics and research set us apart as one of the leading preeminent universities in the country. We are committed to thoughtful, equitable and inclusive development and deployment of AI solutions for research, education, and workforce development.

Art/Science fiction comes to life

In late 2014, Amazon introduced **Alexa**.

Alexa was inspired by the computer voice and conversational system on board the Starship Enterprise in science fiction TV series and movies.



CURRENT AI PROJECTS IN IFAS

- **Animal sciences**

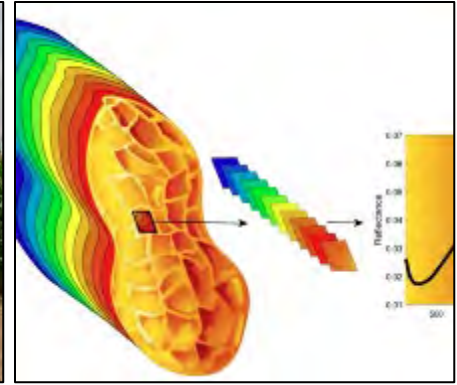
- Profiles of individual cattle to improve feeding efficiency.

- **Horticultural Sciences**

- SWREC uses UAVs to take images of 1,000s of individual plants.

- **Agronomy**

- Hyperspectral imaging and AI to determine peanut seed quality.
- GCREC uses sensing technology to identify weeds to reduced pesticide use.



CURRENT STATE OF AI IN AGRICULTURE

- **Agricultural Robots**
 - Autonomous robots to handle essential tasks such as harvesting crops at a higher volume and faster pace than human laborers.
- **Crop and Soil Monitoring**
 - Computer vision and deeplearning algorithms to process data captured by drones, optical sensors, and/or softwarebased technology to monitor crop and soil health.
- **Predictive Analytics**
 - Machine learning models to track and predict various environmental impacts on crop yield such as weather changes.

**But let's explore what else we
are able to do together...**

WHAT INFLUENCES OUR HEALTH?

- Health outcomes are influenced by individual behaviors as well as the context in which an individual lives, works, learns, and plays.
- Extension has historically focused on promoting behavior change by helping individuals gain knowledge, attitudes, skills, and aspirations requisite for the change to occur.
- We must also work to change the context in which people live by addressing what are commonly referred to as the social determinants of health.

Adapted from Rennekamp et al. 2021

UF | IFAS Extension
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UF | IFAS
UNIVERSITY of FLORIDA

UFHealth
UNIVERSITY OF FLORIDA HEALTH

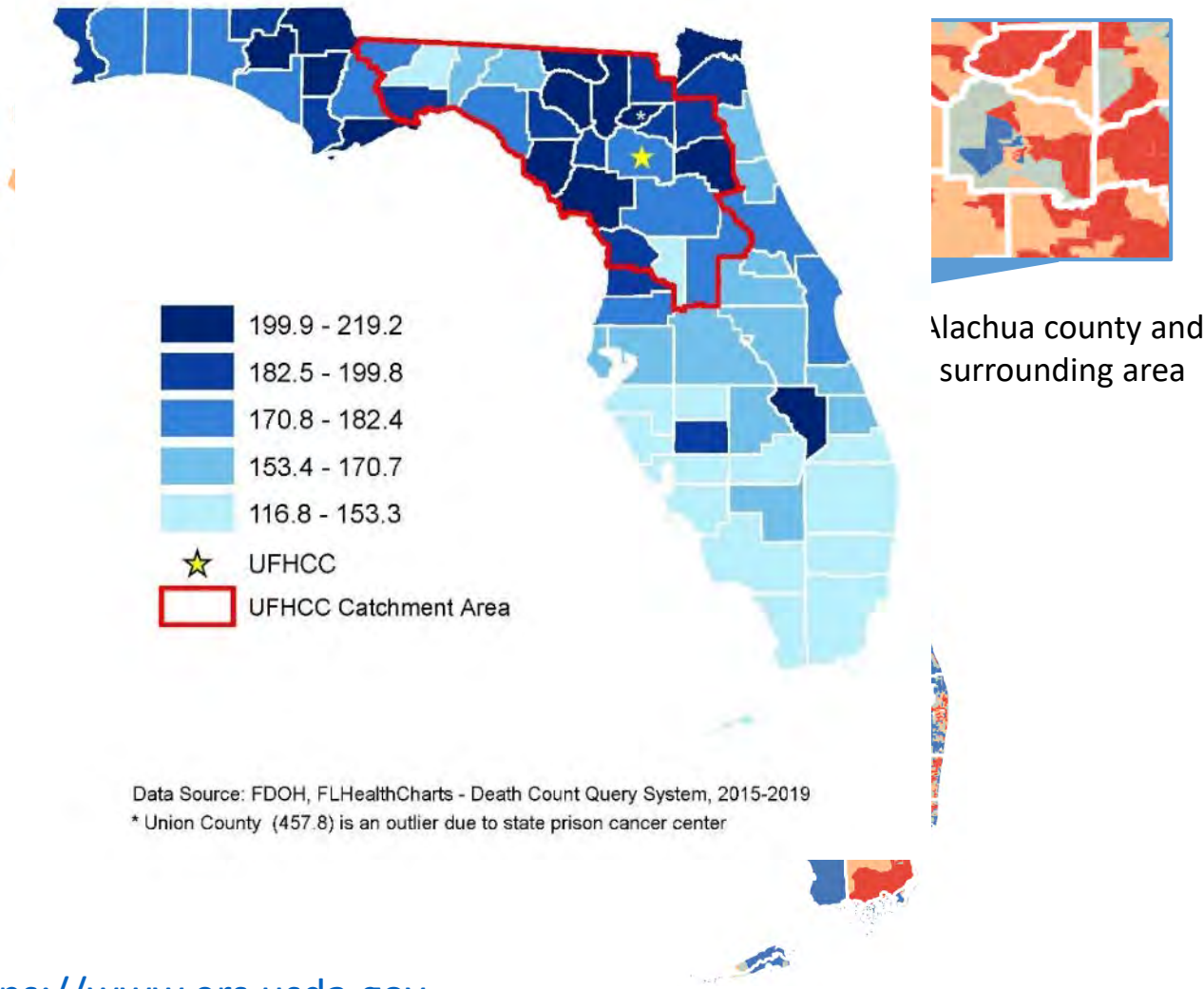
UFHealth
PEDIATRICS

WHAT ARE SOCIAL DETERMINANTS OF HEALTH?

- Factors or conditions beyond the individual that influence their overall health and well-being.
- Cooperative Extension is working to influence the social determinants of health through policy, systems, and environment (PSE) change, especially through SNAP-Ed and EFNEP.
- It is critical that approaches are tailored to unique needs of communities bearing the greatest health burdens. Approaches that drive resources to such communities are called precision approaches.
- Collective action models bring people and groups together to focus resources on a common goal.

Adapted from Rennekamp et al. 2021

Understanding Our Catchment Area: CANCER BURDEN, SOCIOECONOMIC VULNERABILITY AND RACE



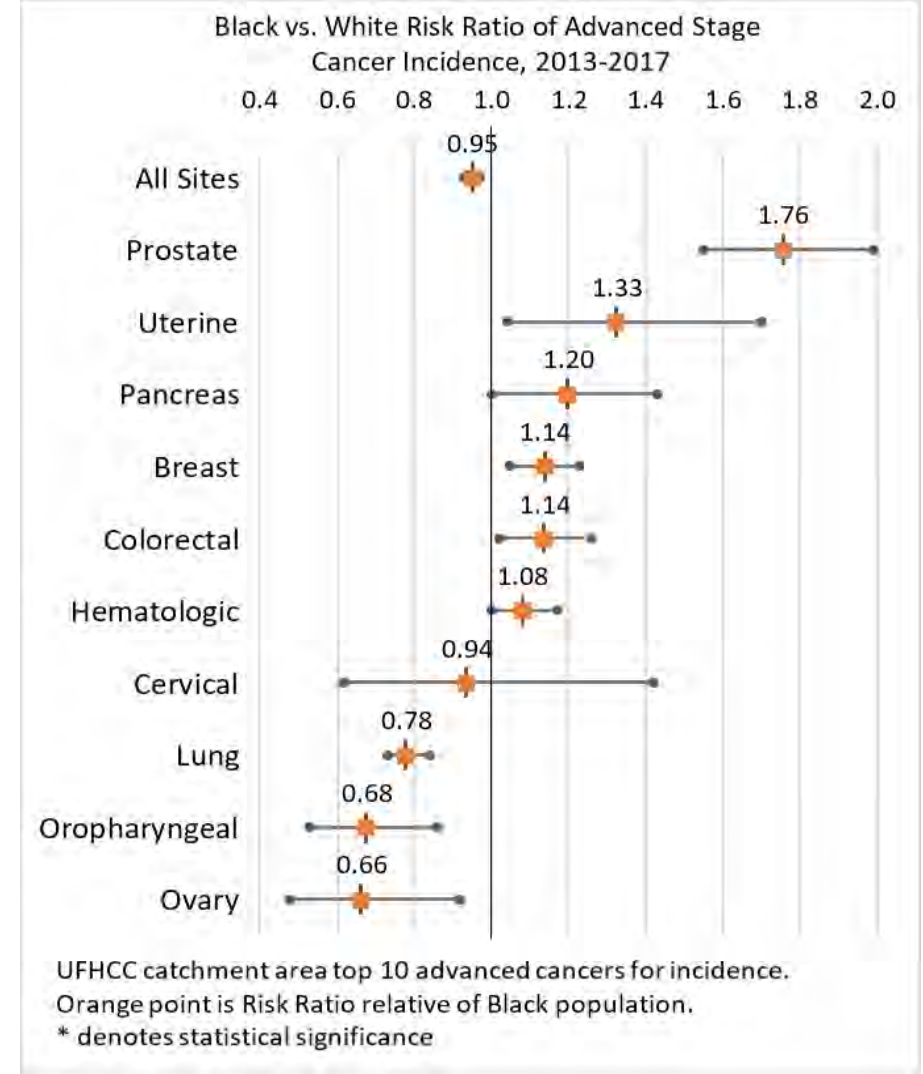
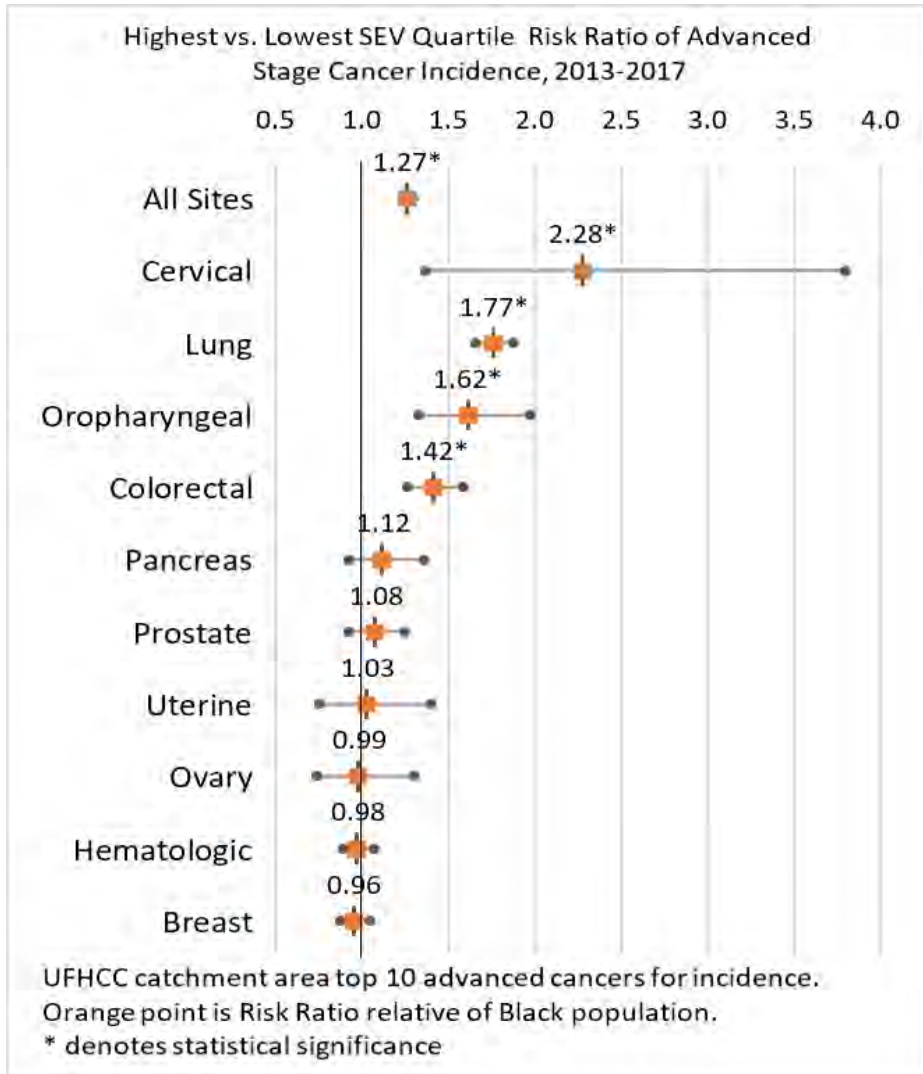
QUICK FACTS:

- 11 counties have persistent poverty
- Highest SEV: 57% less than \$53K for a family of 4, 18% no HS, 10% unemployed
- 682,000 people reside in highest quartile SEV neighborhoods
- ~39% of Blacks, 22% Hispanics and ~18% of Whites live in highest quartile SEV neighborhoods

Understanding Our Catchment Area:

CANCER BURDEN, SOCIOECONOMIC VULNERABILITY AND RACE

Disparities in Advanced State Diagnosis



Focus: Oncology in Rural Communities

Top 5 Cancers in Advanced Stage and Mortality



Regardless of gender, race or ethnicity for both A.S. and Mortality:

- Lung, breast, prostate and colorectal
 - Followed by blood (discuss aggregations), pancreas and oropharyngeal
 - Deeper Look at Patterns for lung, breast, prostate and colorectal
 - Need to consider rates but also absolute numbers
-
- Advanced Stage dx overall is 17% higher in high SEV
 - Highest incidence and adv. stage generally in the non-rural high SEV but varies by race
 - Mortality disparities most pronounced:
 - rural black females: breast and uterine
 - rural black males prostate, colorectal

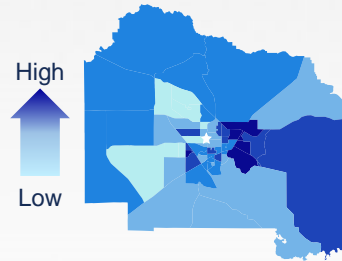
Impact of Project Continuity Developed with CAB:

SCREENING FOR SOCIAL DETERMINANTS OF HEALTH, CERVICAL CANCER



Identifying hotspots

- Primary care: Main Street, Eastside
- Focus SDOH
- Focus HPV screening



Engaging the community

- **40%** of patients could not read the questions
- Prayers by Faith Ministries
- Citizen Scientist recommended rural expansion



Making research linkages

- PCORI ME-2018C3-14754, SDOH Grant
- NCI R01 CA234030
- Text to Talk



Making an impact

- UF Health developed technology: *Voice to Text, Text to Voice*
- Automatic referrals to county extension (ex. Money Matters) & Telehealth in rural areas
- Completed # screenings for HPV and cervical cancer

Pilot Project: Staras and Renne



Stephanie Staras, PhD
(CCPS)



Rolf Renne, PhD
(MOO)

Project:

Bidirectional communication and engagement on HNC therapeutic vaccine trial with basic scientists and community members

Pilot Project: Salloum and Gutter



Ramzi Salloum, PhD
(CCPS)



Michael Gutter, PhD
(CCPS)

Project:

SDoH Screening in Oncology Clinics with automatic referral to *Money Matters Program*

**CAB recommendation to address SDoH barriers to cancer screening and care*

Achievements and Next Steps

Completed

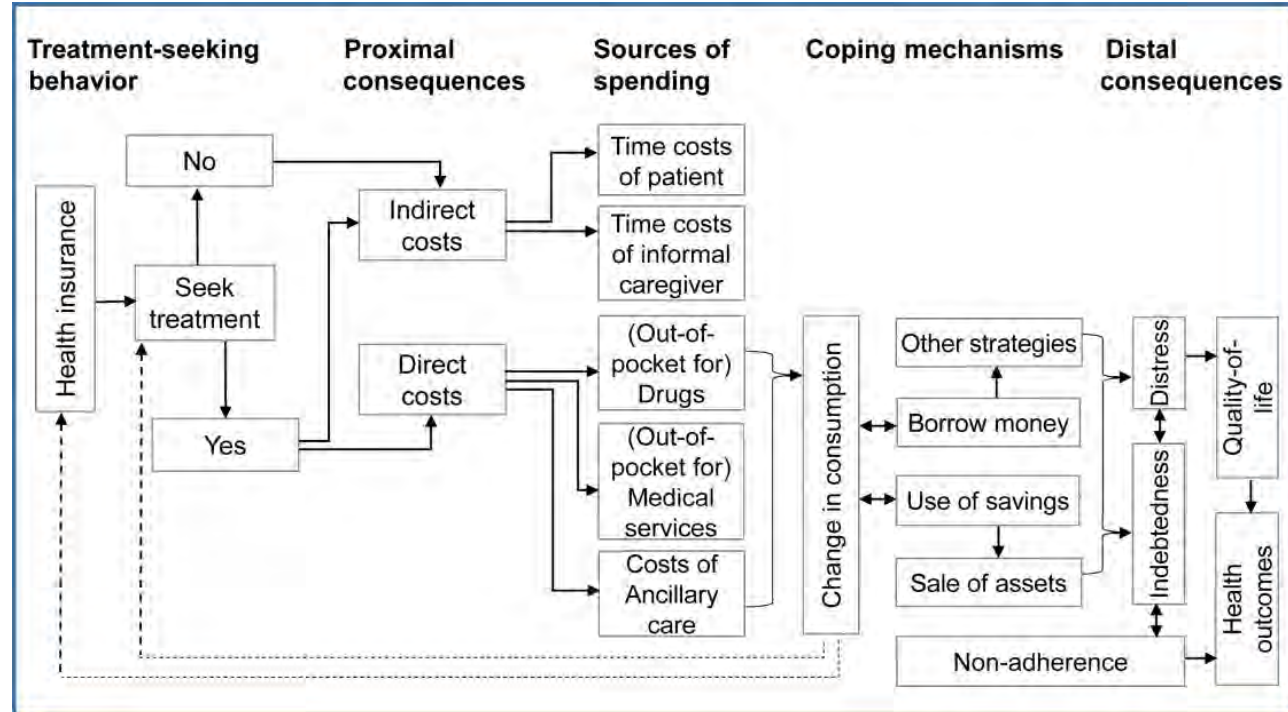
- Study team formed, clinical sites engaged and partnerships formalized (IFAS, FSU, Community Health IT)
- Protocol developed and IRB approval for High Risk Women and Integrated Dental sites
- Focus Groups at all High Risk Women sites- Meridian, UF- Internal Medicine, Apalachee Gadsden and Leon
- Activation of patient interviews at all High Risk Women sites
- Preliminary thematic analysis of High Risk Women focus groups
- Citizen Scientists added to study team

In Progress

- Continued enrollment for patient interviews at high risk women site (44% completed)
- Comprehensive thematic analysis of all patient interview and focus group transcripts for High Risk Women sites
- Focus Groups with Integrated Dental Sites
- Collaboration with Pastor Duncan and the Prayers By Faith Ministry
- Educational outreach through County Extension

FINANCIAL TOXICITY

Financial burden occurs with any shock to our household financial system. But toxicity....



Source: Carrera, Kantarjian, Blinder (2018)

Point-of-Care Intervention to Address Financial Toxicity in Patients with Cancer

BACKGROUND AND SIGNIFICANCE

- Average out-of-pocket expenses for a cancer patient range from \$2,000-\$25,000 per month (Dieguez, et al., 2017)
- Indirect costs of cancer can cause financial toxicity (Yabroff et al., 2012) Indirect costs of care include time spent receiving medical care, morbidity costs, and mortality costs (Yabroff et al., 2012)
- Financial counseling for cancer patients associated with lower economic impact of disease if occurred soon after diagnosis (Buzaglo et al., 2017)
 - Typically not addressed until a patient or caregiver brings it up due to impact on treatment compliance
- Rural survivors more likely to forego medical due to differences in prevention, screening, type of cancer treatment, and cancer survivorship (Centers for Disease Control, 2017).
 - UFHCC catchment area characterized by rurality (University of Florida Health Cancer Center, 2020)

STUDY CONTEXT

- **UF Health Cancer Center (UFHCC):**
 - 22 counties with high rates of cancer and cancer risk factors
 - Residents face disadvantage such as race/ethnicity, poverty, rurality, and poor health literacy
 - 18% live without insurance; all 22 counties are designated medically underserved
- **Financial counseling will incorporate AFCR® practitioners who are IFAS Coordination Extension Agents**
- **UF/IFAS County-based Extension faculty who are financial counselors may be able to assist patients with their full financial challenge of cancer treatment**
- **Expands effort into rural communities using place-based counselors who will work with cancer patients**

SPECIFIC AIMS OF OUR STUDY

Our Objective: To test the reach, preliminary efficacy, and overall implementation of a point-of-care intervention to connect cancer patients who experience financial toxicity with financial counseling services delivered via telehealth.

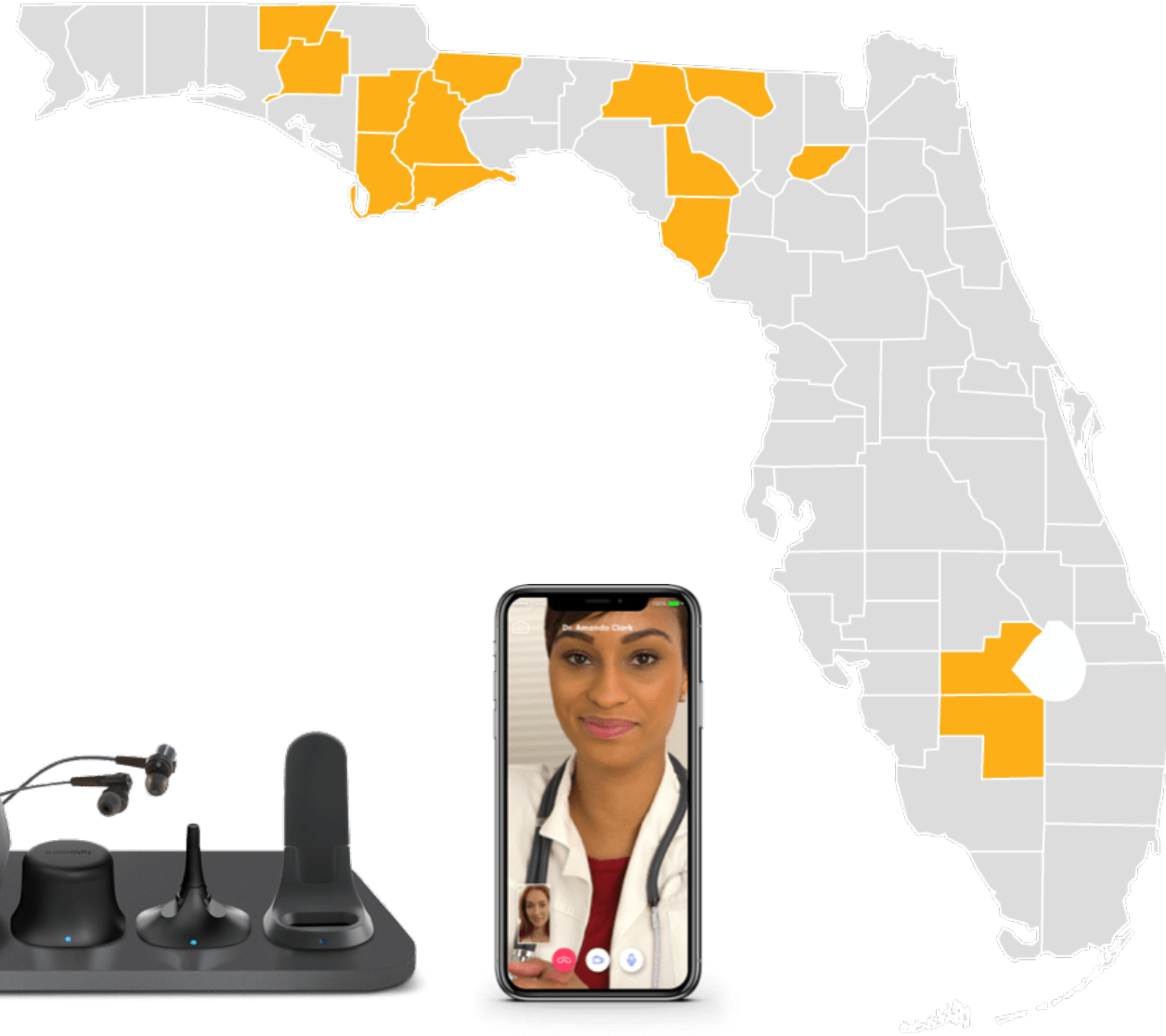
- *Aim 1: Examine the feasibility, acceptability, and usability of group and individual telehealth platform format to deliver financial counseling to cancer patients with financial toxicity*
- *Aim 2: Evaluate the preliminary efficacy of group or individual financial counseling in reducing financial toxicity in a randomized control trial*
- **Aim 3: Explore the feasibility of automatically identifying patients with financial toxicity using the electronic health record**

UF/IFAS UF Health Telemedicine Effort

Connecting the dots in our counties

- If you live in a rural area, seeing a health care provider, especially a specialist, is no easy feat. With many rural health care centers closing patients in rural areas must travel longer distances and at greater financial costs to receive the same care as those closer to urban centers. As a result, rural patients with chronic conditions may defer or skip treatment, increasing our overall health care burden.
- The Rural Telehealth Initiative aims to reduce this burden by making it easier for rural residents to see a health care professional who specializes in one of the following chronic conditions:
 - Diabetes, including childhood diabetes
 - High blood pressure
 - Cancer

- Tyto Device with Exam Camera and Basal Thermometer
- Tyto Otoscope, Stethoscope (with volume, bell, and diaphragm filters), tongue depressor adaptor, and ear buds
- TytoVisit platform (includes the TytoApp and Clinician Dashboard) for conducting live video telehealth exams, reviewing exams, and communicating with patients
- Customized workflow for clinicians
- HIPAA-secure, AWS cloud storage



Major Milestone Timeline

Phase 1	April 2021	Kick off, Planning, and First Steps
Phase 2	April/May 2021	Configuration: Beta (5 county pilot)
Phase 3	May/June 2021	Configuration: Build Out
Phase 4	June/July 2021	Testing and Training
Phase 5	August/Sept 2021	Go Live
Phase 6	Fall 2021	Post Go-Live



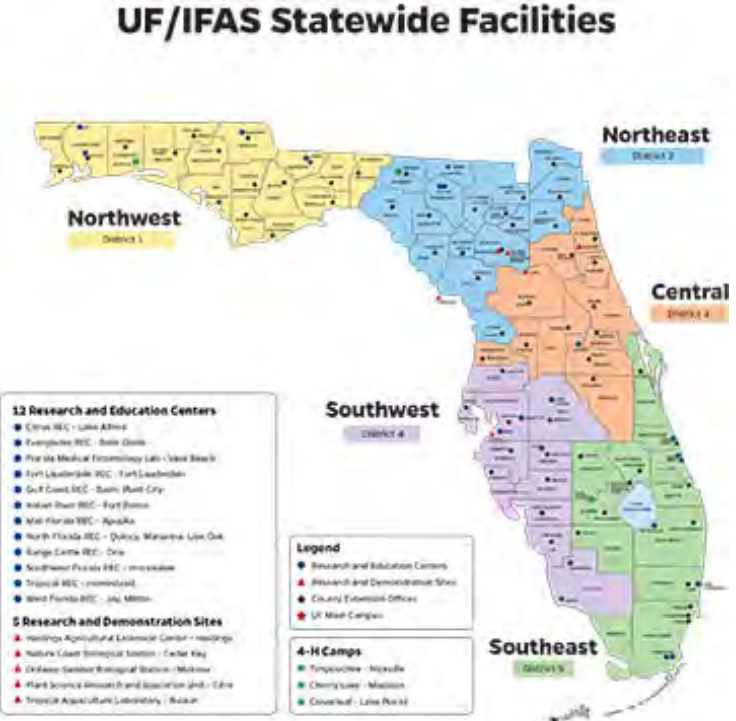
WHAT WE WILL DO

- UF/IFAS County Extension personnel will assist patients in accessing the telehealth kiosks
- Coordinating with technical support from UF Health, UF/IFAS, and the vendor when needed, and sanitizing the kiosks in between patient use.
- UF Health doctors, nurses, and scheduling staff will coordinate the patient telehealth visits.
- Partners can help advertise the availability of the telemedicine services and will meet regularly to discuss progress and resolve concerns.
- Work with referral system to have patients get connected to IFAS programs

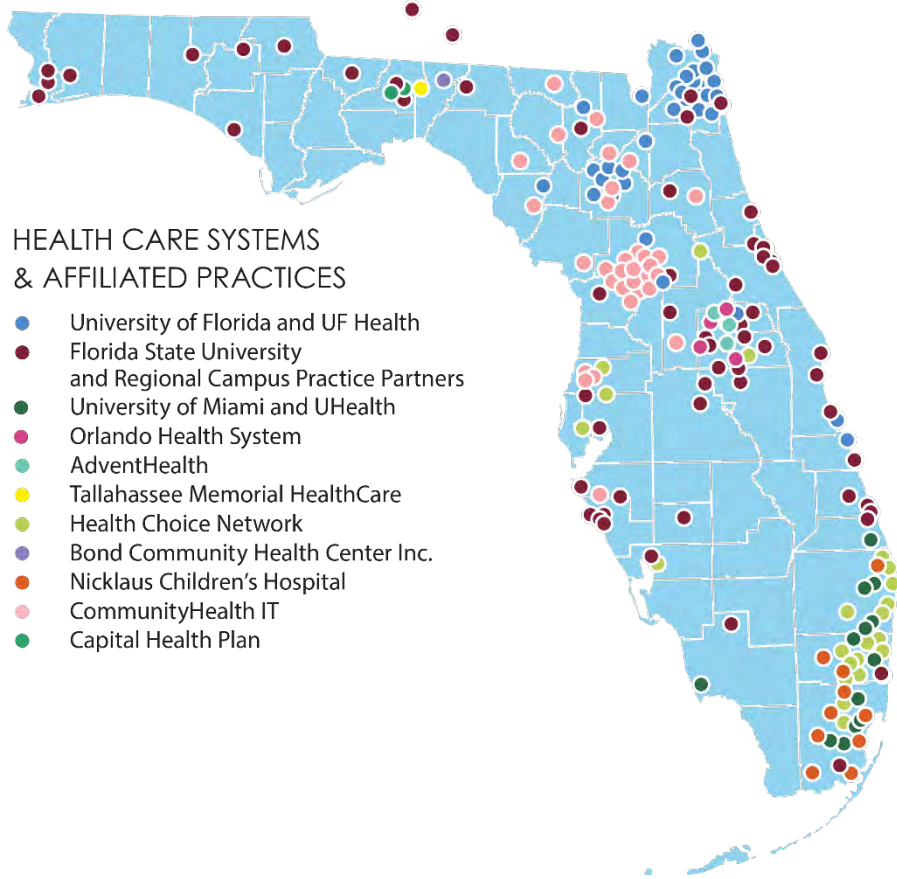
WRAP-AROUND PROGRAMS AND SERVICES

- Though our data driven IFAS programs will be come data driven referrals as part of their healthcare
- IFAS Programs
 - FNP, Food Security
 - Financial Counseling (virtual anywhere and limited in person)
 - Free Tax Assistance or tax education
 - Chronic Disease Education Programs in diabetes, hypertension, oncology
 - We have programs for each of these!
 - Pediatric patients can get connected to specialized 4H programs
 - Youth Development
 - Horticulture Therapy

BRINGING IT BACK



- Work with UF Health and many other providers across the state who are part of the OneFlorida clinical data trust.
- By using advanced techniques such as natural language processing and machine learning we can better assess the issues that affect our community's health
 - Referrals to local programs and services
 - Community engaged processes for programs and interventions that we can work on together.



J. Scott Angle, Vice President, UF/IFAS
 1008 McCarty Hall, P.O. Box 110190, Gainesville, FL 32611-0190

Produced by UF/IFAS Communications - August 2020



Brief Q & A

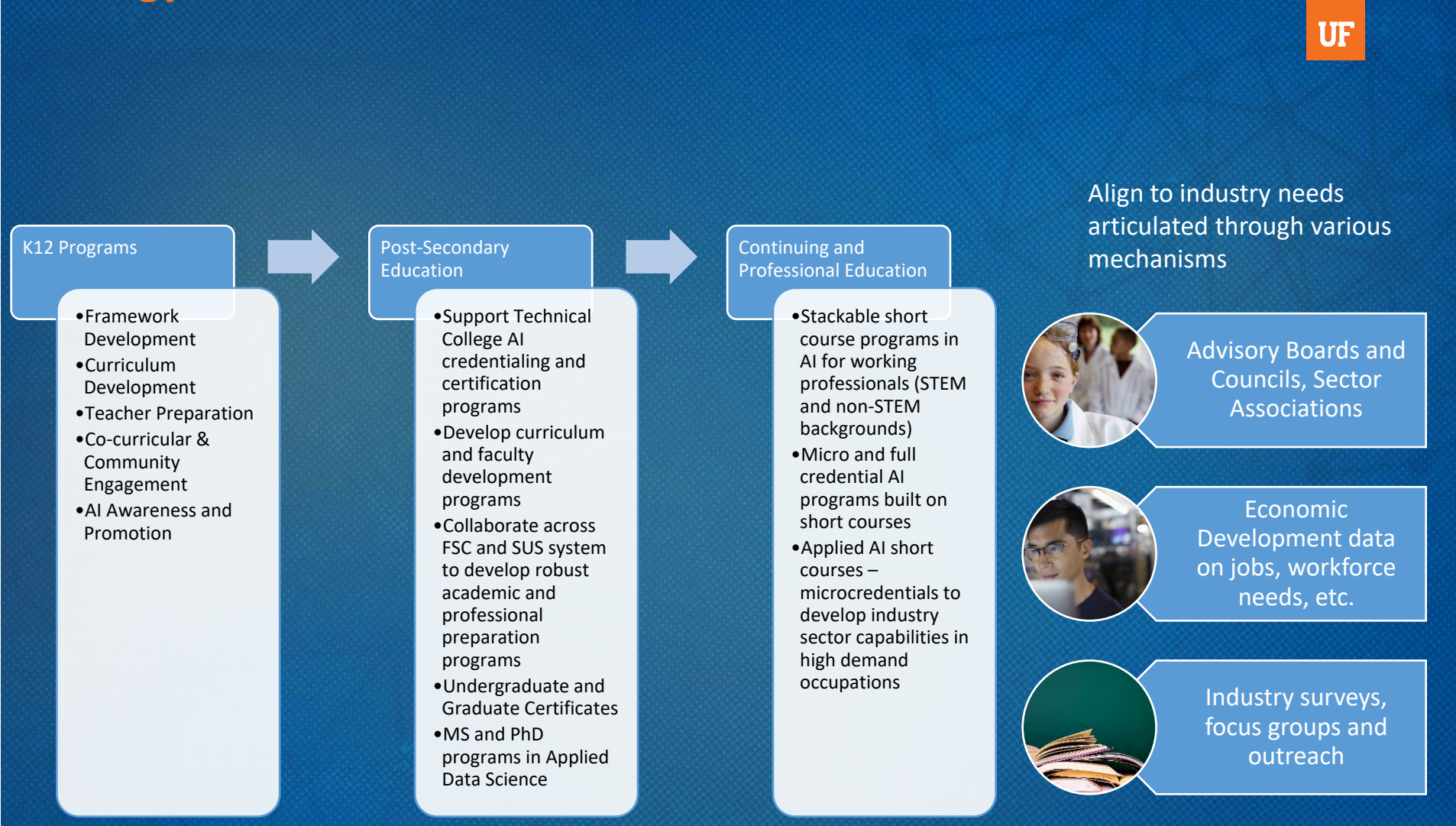
Or email msgutter@ufl.edu for any follow up questions you might have...

Looking to the Future: Preparing our Workforce for New Skills

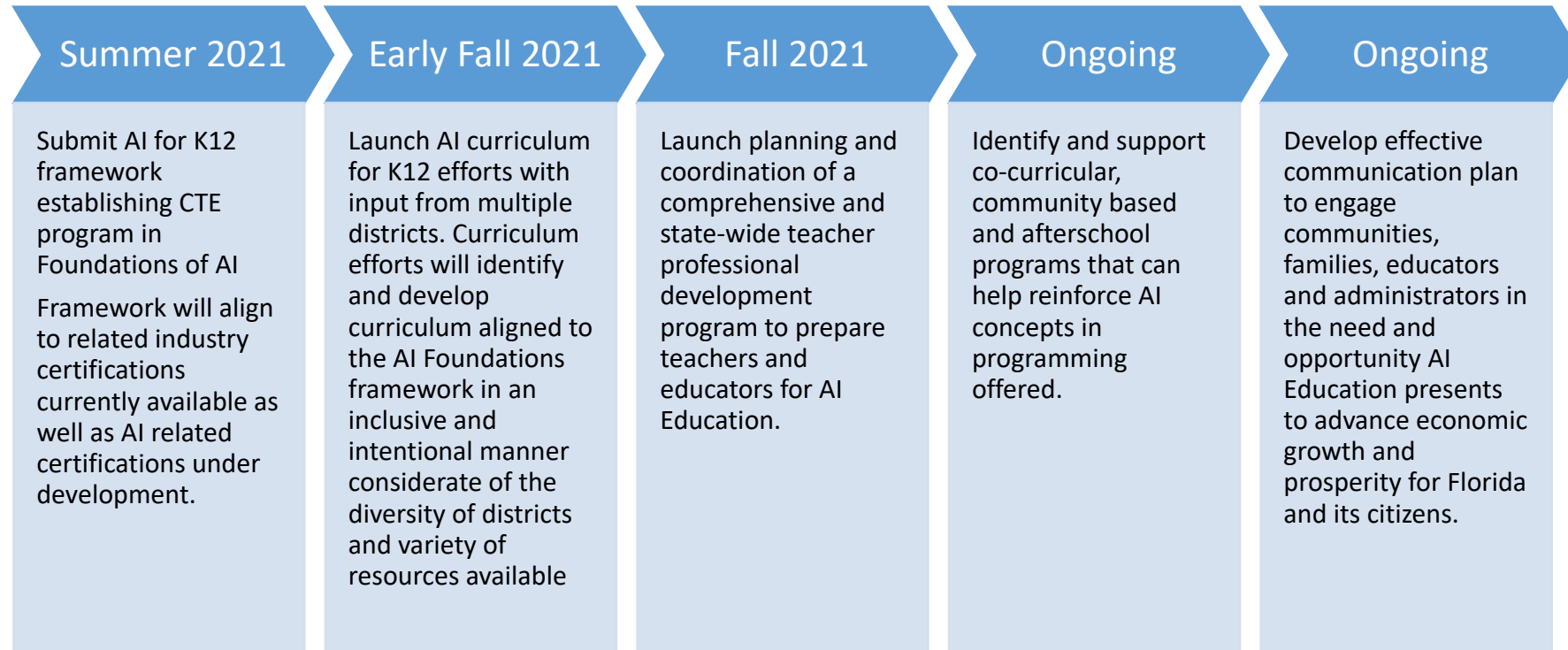
Brent Broaddus,
Regional Specialized Extension Agent
Southwest District

AI Outreach and Workforce Development Industry Aligned and Designed K to Gray Strategy

UF



AI for K12 Goals and Timeline



AI Across Curriculum

Undergrad Certificate in AI Fundamentals & Applications (9 credits) – Led by AI Academic Programs Committee and HWCOE Dept of Engineering Education.

Required courses:

Fundamentals of Artificial Intelligence

Ethics, Data, and Technology

College Specific courses (select 1), e.g.

Fundamentals of Machine Learning (EG-ECE major)

Interactive Modeling and Animation 1

AI in Agricultural and Life Sciences

Foundations of Business Analytics and AI

AI in the Built Environment

More TBA from colleges

Workforce Development (non-credit bearing) Targeted to Non-STEM Audiences

One-hour asynchronous on-line video on Introduction to AI (e.g. Definition of AI, AI impacts in our lives, AI terminology, future of AI) - Offered for free online starting Summer 2021

A series of three Short Courses with registration fees for Continuing Education Units (CEUs) starting Fall 2021:

Each Short Course earns 1.5 CEUs and comprises ~4 hours of asynchronous video plus ~9 hours of instruction, exercises, readings, etc.

High level content appropriate for Non-STEM backgrounds

Short Course initial offerings (Working Titles):

Fundamentals of AI for the Layperson (College of Engineering)

Ethics of AI (CLAS)

Choose one Applications of AI Short Course for Certificate (Under Development for Fall 2021 - Applied Data Science; AI Application in Business; AI Applications in Engineering; AI in Ag. and Life Sciences)

**Workforce Development (non-credit bearing)
Targeted to Engineering/CS/STEM Audiences**

**One-hour asynchronous on-line video on Introduction to AI
(deeper discussion than Intro to AI video for Non-STEM
audiences) - Offered for free online starting Summer 2021**

**A series of three Short Courses with registration fees for Continuing Education
Units (CEUs) starting Fall 2021:**

Each Short Course earns 1.5 CEUs and comprises ~4 hours of asynchronous video
plus ~9 hours of instruction, exercises, readings, etc.

Deeper technical content than Short Courses targeted to Non-engineers

Short Course initial offerings (Working Titles):

Fundamentals of AI for STEM Backgrounds (College of Engineering)

Ethics of AI (CLAS)

Choose one Applications of AI Short Course for Certificate (Under Development for
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Engineering; AI in Ag. and Life Sciences)

Ways to Engage in AI

Encourage school district participation in Foundations of AI CTE program

Encourage regional State College and Technical Colleges to adopt AI related coursework

Support teacher and faculty professional development in AI

Collaborate with CareerSource/ Workforce boards to understand specific AI skills and credentials needed

Support development of workforce programs.

AI in Agriculture

Artificial Intelligence > AI in Agriculture

IN PROGRESS

What if weeding your crops could be done by a robot?

One company that seeks to answer that question is Carbon Robotics. They've created an Autonomous Weeder. It uses robotics, artificial intelligence (AI), and laser technology to drive through crop fields, identify and target weeds, then destroy them.

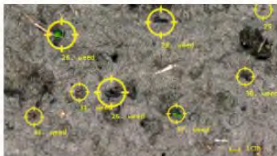
The robots utilize high-power lasers to burn the weeds without disturbing the soil.

And it does all of this on its own, without a driver.

Automated robots like this can allow farmers to use less herbicides and reduce labor to remove unwanted plants while improving the reliability and predictability of costs, crop yield and more.



How does it work?



Using artificial intelligence, the cameras find weeds and ignore crops.

Weeds are zapped with powerful lasers, burning them but leaving crops safe.

What's the difference?

Slide the line to see the difference between spraying chemicals or using lasers!



This information is presented with permission of Carbon Robotics. It is not meant as an endorsement, only to highlight current real-world uses of artificial intelligence in agriculture.

THE CLOVER ACADEMY

Artificial Intelligence Courses and eLearning System Features

camera system.

How did an A.I. that identified cakes learn to fight cancer?



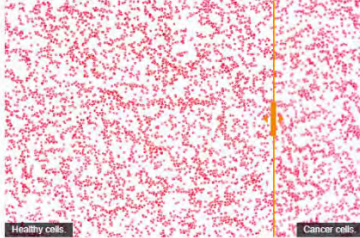
> Video Transcript

Now the same artificial intelligence program that was used in a bakery is helping doctors save lives!

How long would it take YOU to look at a million cells under a microscope and find one that was just a tiny bit different?

Slide the line to see how quickly the AI computer can spot the cell with cancer!

An AI computer can look at millions of cells at a time.



And it can show doctors any cancer cells it finds!

This information is presented with permission of BakeryScan. It is not meant as an endorsement, only to highlight current real-world uses of artificial intelligence.

Icon and Innovator, Hisashi Kambe



Hisashi Kambe is the man who created the pastry A.I. He grew up in Nishiwaki, a small town surrounded by mountains and rice fields. As a teenager, Kambe planned to take over his father's lumber business, which supplied wood for traditional home construction.

After high school he left for college in Tokyo and, after graduating in 1974, found a job at Panasonic. He took computer classes at night and fell in love with technology. He eventually returned to his home town and started a small software company. In 1985, he finally incorporated his company BRAIN Co., Ltd. and in 2007 would create BakeryScan.

You can read more about BakeryScan at their english language website here: <https://bakeryscan.com/bakeryscan-eng>

Interactive Lessons In the Benefits of A.I.



What's the difference?

Slide the line to see the difference between spraying chemicals or using lasers!



Spraying herbicides.

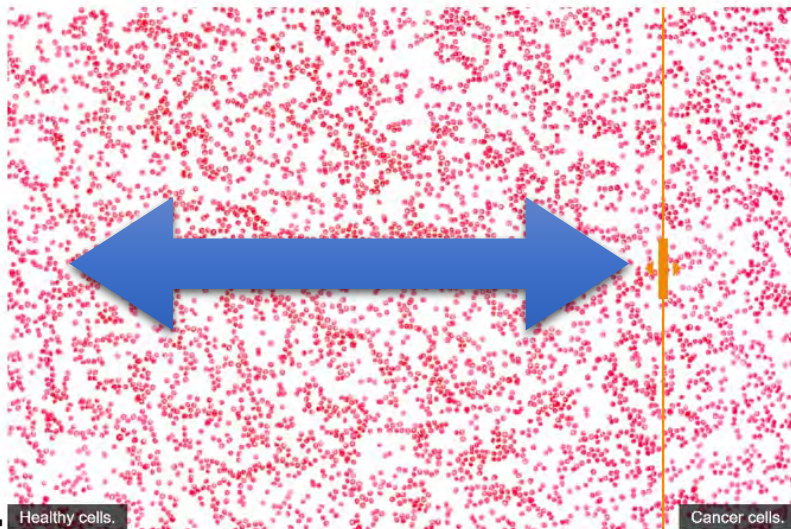
Using targeted lasers!

Interactive Lessons In A.I. Applications

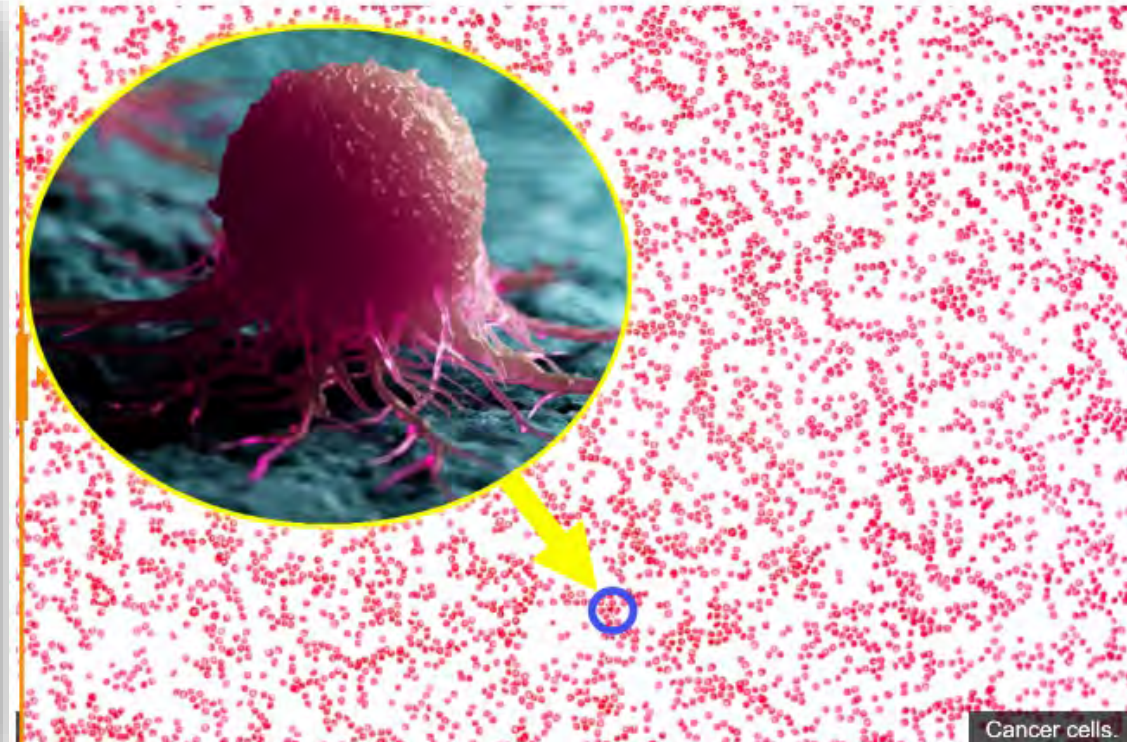
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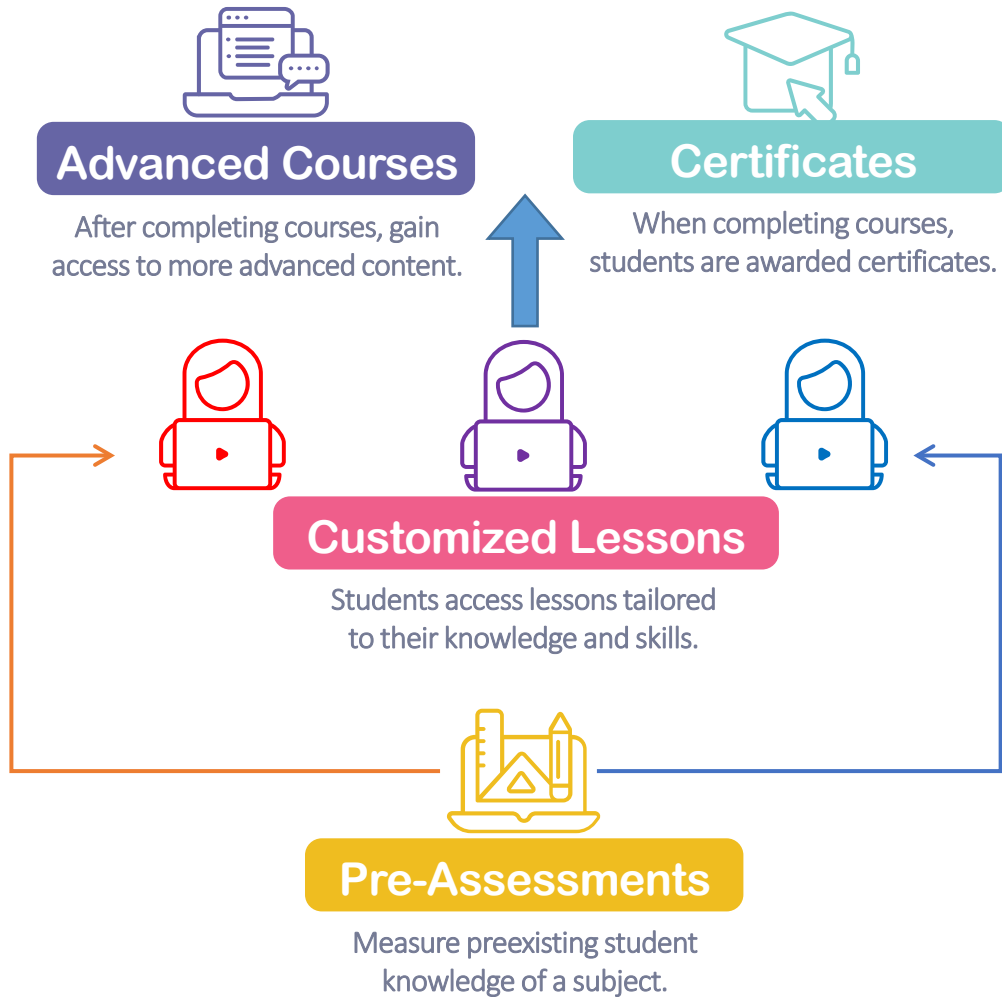
An AI computer can look at millions of cells at a time.



And it can show doctors any cancer cells it finds!



Adaptive Learning



Through Clover Academy, students will have access to customized courses tailored to their pre-existing knowledge and career goals.

Accessibility



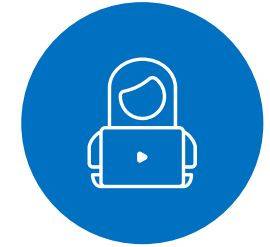
Content Variety

Variety of video, audio, images, text and interactive content engage learners



Responsive

LMS automatically scales and adapts for all screen sizes



Web Content Accessibility

All content is meets or exceeds WCAG Level A for usability by students with all abilities.



Diversity and Inclusion

Icon and Innovator, Kimberly Bryant



Kimberly Bryant was born and raised in Memphis, Tennessee by a single mother amidst the American Civil Rights Movement. She earned a scholarship to attend Vanderbilt University in 1985, where she planned to become a civil engineer. Enticed by technologies such as the microchip, the personal computer, and the portable cellphone, she switched her major and earned a degree in Electrical Engineering with minors in Computer Science and math. Early in her career, Bryant held jobs at electrical companies Westinghouse Electric and

Icon and Innovator, Hisashi Kambe



Hisashi Kambe is the man who created the pastry A.I. He grew up in Nishiwaki, a small town surrounded by mountains and rice fields. As a teenager, Kambe planned to take over his father's lumber business, which supplied wood for traditional home construction. After high school he left for college in Tokyo and, after graduating in 1974, found a job at Panasonic. He took computer classes at night and fell in love with technology. He eventually

Inspiration
for *all*
students.

Icon and Innovator, Lewis H. Latimer



Lewis H. Latimer was an African American inventor and engineer born to parents who had fled slavery. Literally wrote the book on electricity: *Incandescent Electric Lighting*. While his partner Thomas Edison received a great deal of credit for inventions they worked on together, Latimer went from helping Alexander Graham Bell invent the telephone in 1876 to helping Edison create the electric bulb, and then went on to invent and patent a process for making carbon filaments for light bulbs, and the electric lamp in 1881, then went back to work with Edison to improve his work. Read more about Lewis Latimer here:

<https://lewislatimerhouse.org/about/>

Icon and Innovator, Lynn Conway



Lynn Conway is an electrical engineer, computer scientist, and activist. She worked at IBM in the 1960s and is credited with the invention of generalized dynamic instruction handling, a key advance used in out-of-order execution, used by most modern computer processors to improve performance. She is also widely-known for the Mead-Conway VLSI chip design revolution in very large scale-integrated (VLSI) microchip design. That revolution spread rapidly through the research universities and computing industries during the 1980s, incubating an emerging

Career Connections

Career Connection: Biomedical Engineers



Bioengineers and biomedical engineers combine engineering principles with sciences to design and create equipment, devices, computer systems, and software. Biomedical engineers focus on advances in technology and medicine to develop new devices and equipment for improving human health. For example, they might design software to run medical equipment or computer simulations to test new drug therapies. In addition, they design and build artificial body parts, such as hip and knee joints, or develop materials to make replacement parts. They also design

Career Connections: Electronics Drafter



These professionals repair wiring diagrams, circuit board assembly diagrams, and layout drawings used for the manufacture, installation, or repair of electrical equipment. This is a growth industry, requires a high school diploma, and often apprenticeship, and the median annual wage for electricians was \$62,100 in 2020.

Read more about a future as an electronics drafter here:
<https://www.bls.gov/oas/current/oas173012.htm#st>

Career Connections: Electrical Engineer



Electrical engineers design, develop, test, and supervise the manufacture of electrical equipment, such as electric motors, radar and navigation systems, communications systems, or power generation equipment. Electrical engineers also design the electrical systems of automobiles and aircraft. Electrical engineering is a growing field which requires at least a four-

year college degree, and the median annual wage for electrical engineers was \$100,830 in 2020.

Career Connections: Electrician



Electricians install, maintain, and repair electrical power, communications, lighting, and control systems in homes, businesses, and factories. The world is expected to need a very large and growing number of electricians in the next decade, making it a great career choice! It requires a high school diploma, and some training and certification, and the median annual wage for electricians was \$56,800 in 2020.

Read more about a future as an electrician here:
<https://www.bls.gov/oon/construction-and-extraction/electricians.htm#tab-2>

Looking
to a
brighter
future for
our
students.

Questions?

msgutter@ufl.edu