UIDPCONNECT
2021

Iowa State Biosciences Innovation Program

September 13, 2021 | 5:30 - 6:30 PM ET

Moderator:
Magan Lewis
Corteva Agriscience

Peter Dorhout
Iowa State University

UIDP
Strengthening University-Industry Partnerships

IOWA STATE UNIVERSITY

Office of the Vice President for Research

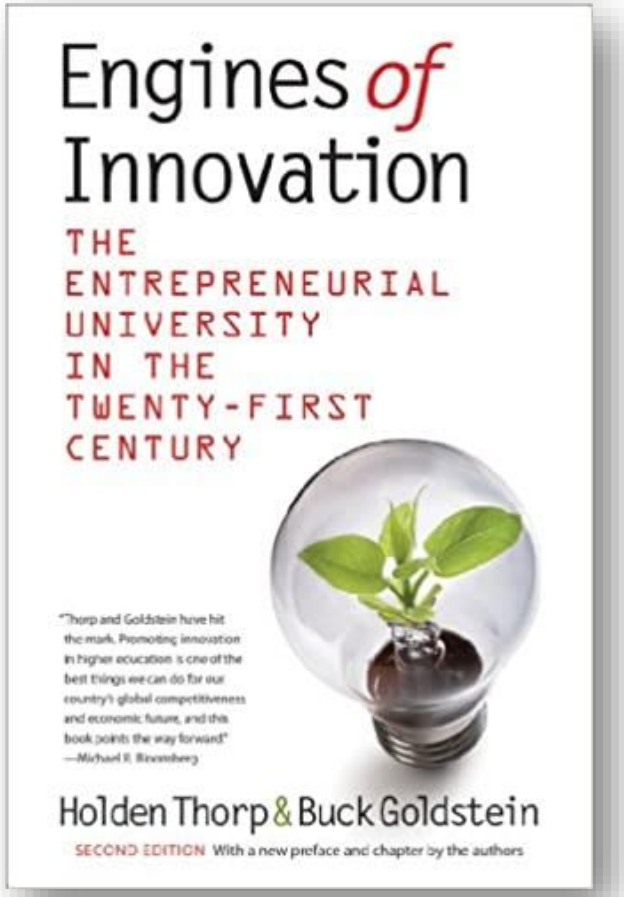
Iowa Bioscience Innovation Platforms

Peter Dorhout

Vice President for Research, ISU

UIDP - September 2021

Renewed call to action

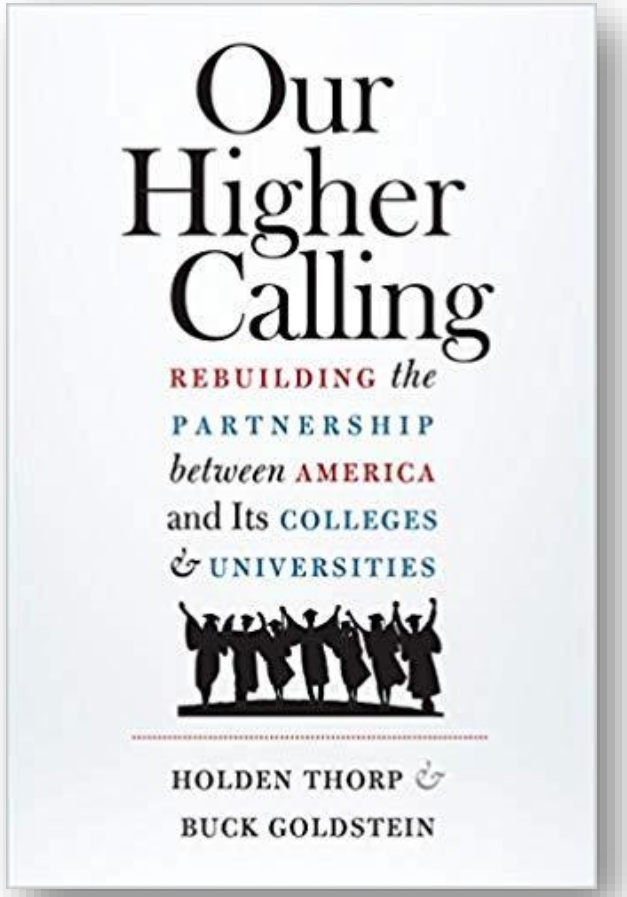


2010

"Big problems require new approaches to problem solving: … disciplined mind, … synthesizing mind, … creating mind, … respectful mind, and the … ethical mind."

"Team building and engagement are critical to success. Multiple disciplines & communities must be engaged."

"Partnership with the community is essential."



2018

What are we hoping to achieve for Iowa?

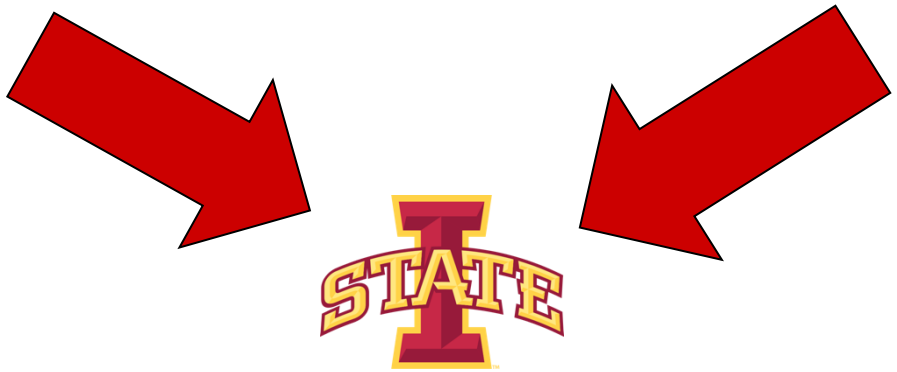
- Iowa State needs to operate in a new way as a critical state and industry partner to grow and diversify Iowa's economy
- Enhanced commercialization of new technologies
- Accelerated translation of scientific breakthroughs
- Improved collaboration between industry and universities
- Further development of a skilled biosciences workforce

Innovation & Entrepreneurship

Brings jobs and capital to Iowa

Faculty
Students
Staff
Collaborators
Community
Extension

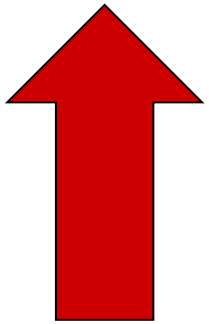
Talent



Place

Ames
Facilities
Programs
Student Innovation Center
Research Park
Ames Lab

To have impact through innovation…

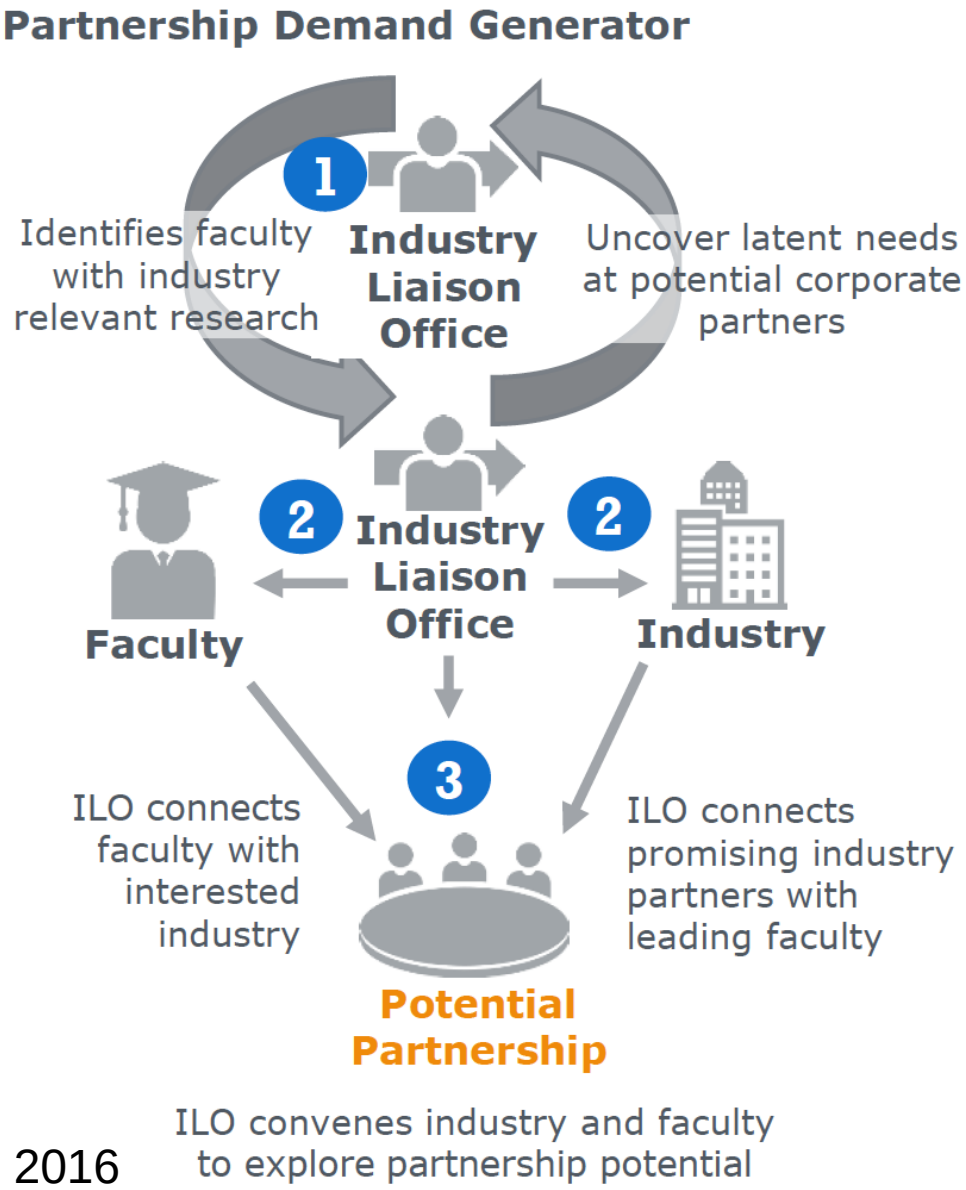


…create a University and community of systematic change-making.

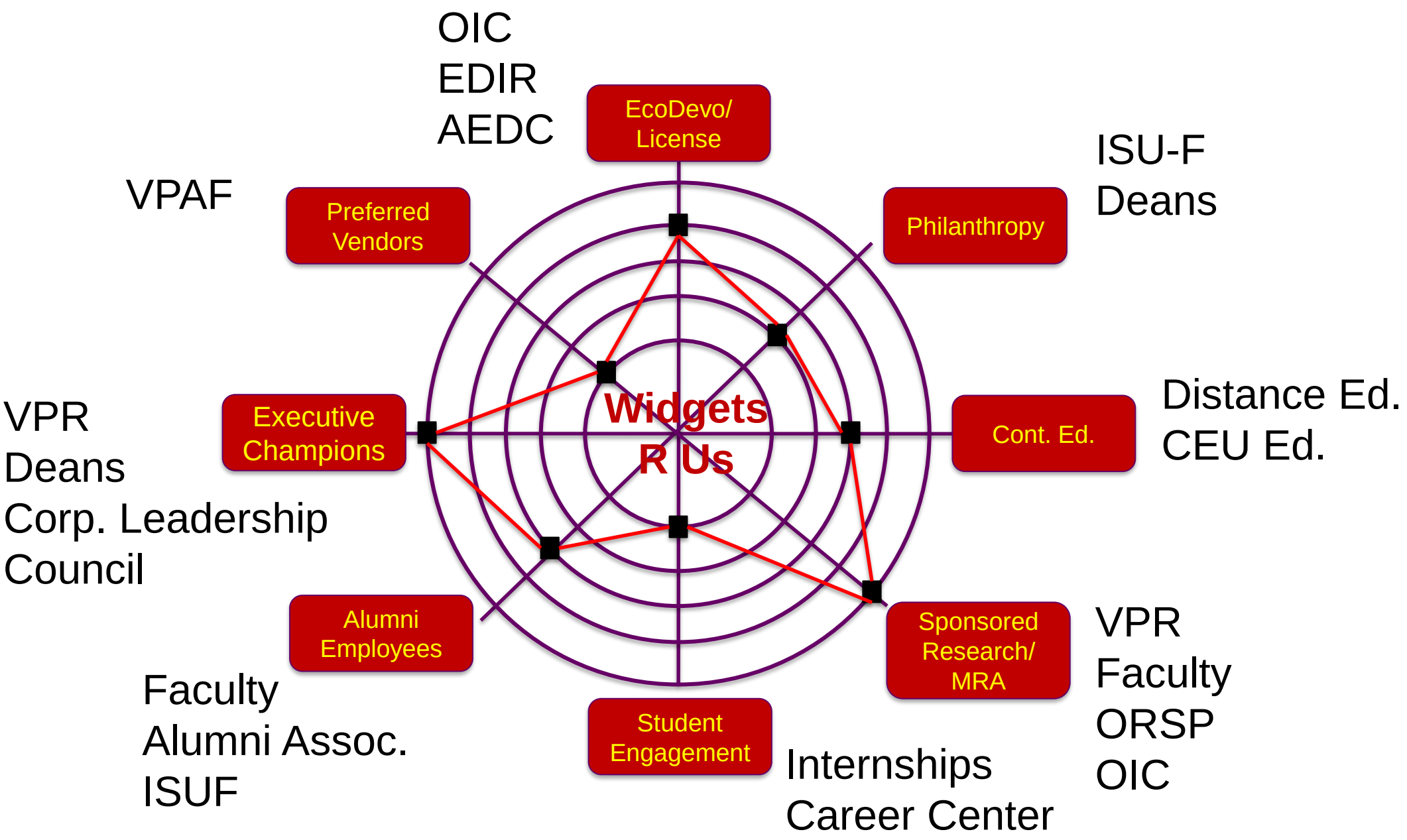
Research

Our Model

- Innovation ”Platforms” designed around a regional need, strength
- Hired a “Chief Technology Officer” (our Liaison, see 1) for each
- Coordinate with Foundation, Tech Transfer Office
- Focus on the partnerships with talent
- Hired a Corporate Intelligence Analyst



EAB Research, 2016

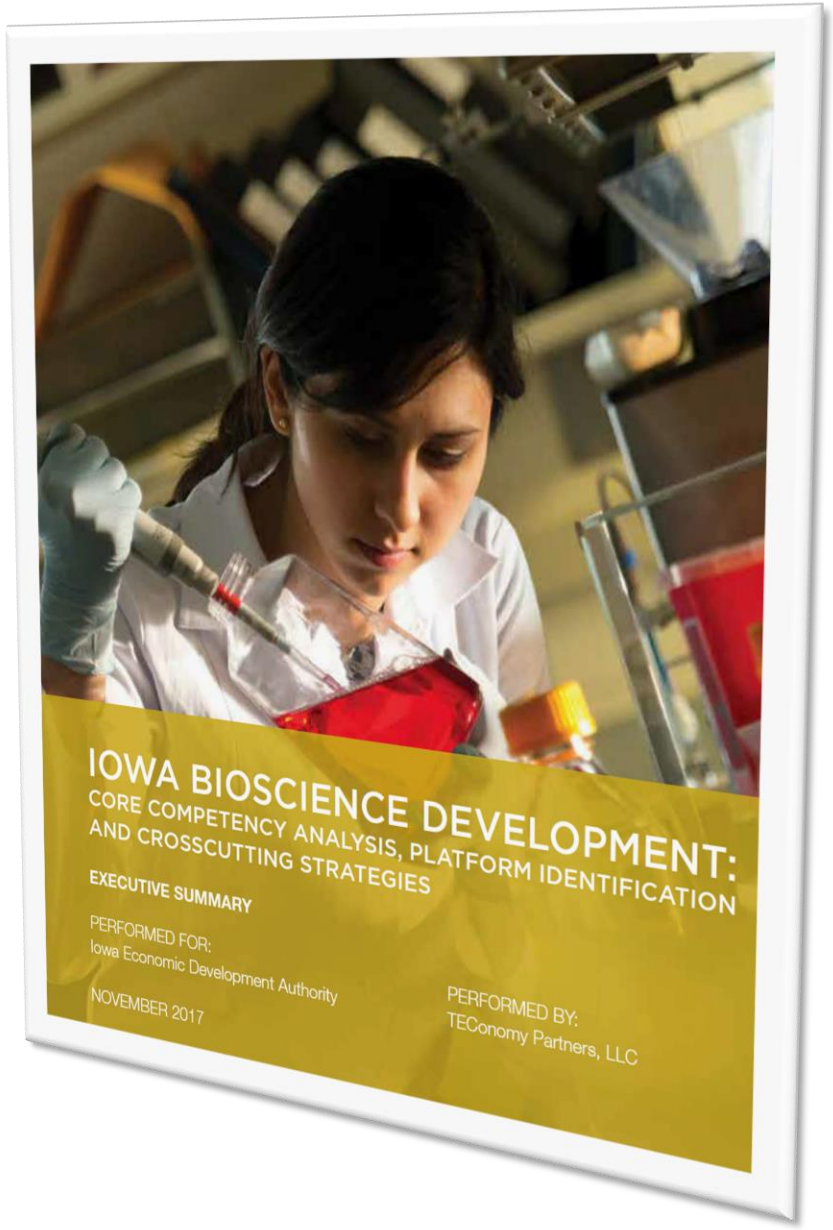

OIC
EDIR
AEDC
EcoDevo/ License
ISU-F
Deans
VPAF
Preferred Vendors
Philanthropy
VPR
Deans
Corp. Leadership Council
Executive Champions
Widgets R Us
Cont. Ed.
Distance Ed.
CEU Ed.
Alumni Employees
Sponsored Research/ MRA
VPR
Faculty
ORSP
OIC
Faculty
Alumni Assoc.
ISUF
Student Engagement
Internships
Career Center

Why Bioscience Platforms?

Biobased products

Digital and precision agriculture

Vaccines and immunotherapeutics



To accelerate translation of discoveries to commercial products by building the partnerships and leveraging strengths

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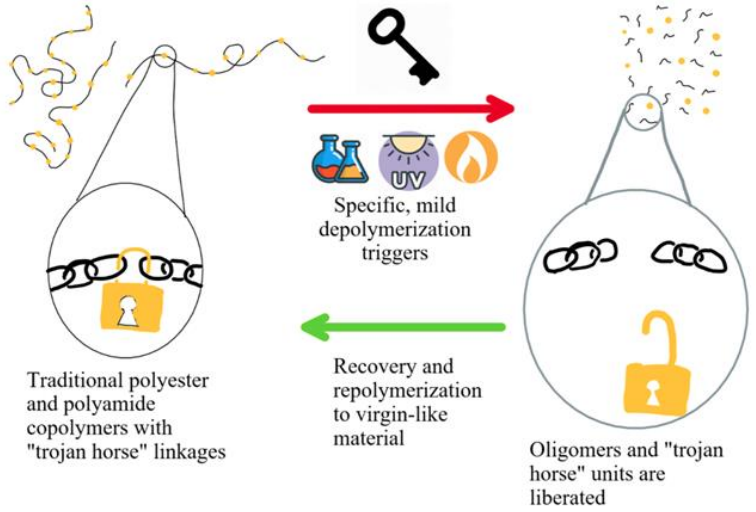
Biobased Products

Biobased Products Ecosystem

- Opportunity
  - Value-added use of agricultural products that creates wealth across the state
  - U.S. chemical market is >$250B/year
- Leverage state funding
  - The Department of Defense has provided $87.5M of funding over six years to BioMADE (Univ. Minnesota, lead)
- Seed grants for industry collaborations
- New startups such as SoyLei Technologies LLC to commercialize soybean-based asphalt modifier

Leveraging Seed Projects for Industry Partnerships

- Biobased molecules to generate improved plastics recyclability
  - **$2.1M** award from the Department of Energy
  - Process non-food starches as building blocks for plastics
  - Dramatically increase both the quality and quantity of recoverable waste plastics
- Leading to industry partnerships on the DOE Bottle project



https://www.bottle.org/about.html

bottle

ADM

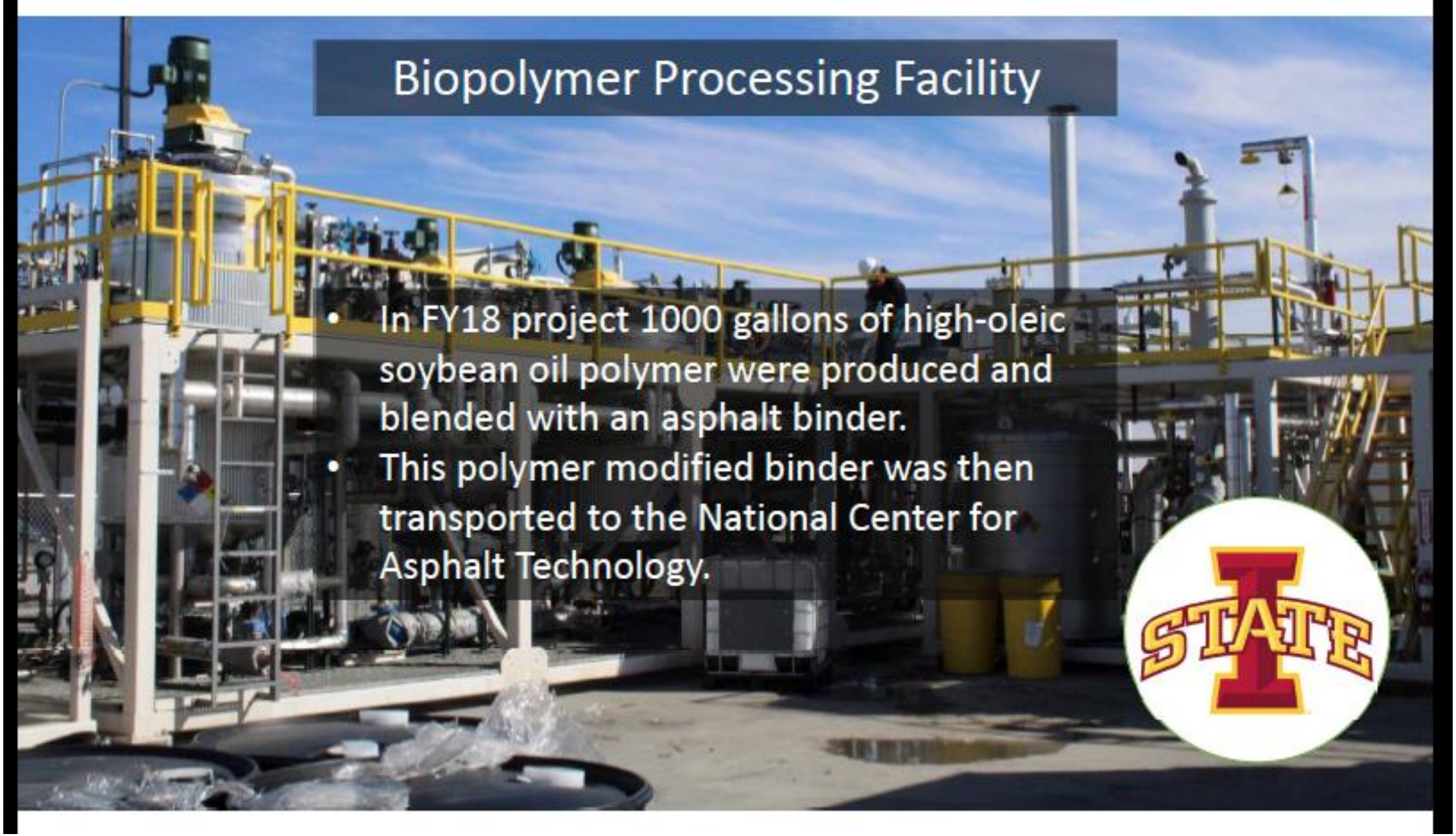
DIAGEO NORTH AMERICA

3M

Commercialization of ISU Research - Developing a new biobased asphalt modifier

- New polymers developed at ISU from High Oleic Soybean Oil
- Polymer additive that can transform the asphalt industry through use of biorenewable feedstocks, and provide better functionality
  - 300,000,000 tons of asphalt placed in 2017
  - 60,000,000 tons of polymer-modified pavements
  - 350,000,000 pounds of polymer used for this purpose

ISU Faculty Leads: Eric Cochran; Chris Williams -winners of the 2021 ACS PMSE Cooperative Research award


Biopolymer Processing Facility
• In FY18 project 1000 gallons of high-oleic soybean oil polymer were produced and blended with an asphalt binder.
• This polymer modified binder was then transported to the National Center for Asphalt Technology.


National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY
A 2-mile track that undergoes continuous loading by heavily burdened semi-trailers to generate 24 years of simulated aging over 3 years.

Stakeholders for developing a new biobased asphalt modifier

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Digital and Precision Agriculture

Digital and Precision Agriculture Ecosystem

- Opportunity
  - Digital and precision agriculture enables farmers to optimize inputs and maximize yields
  - The global precision farming/agriculture market totals over $3.3 billion
- Digital and Precision Agriculture Convergence Accelerator Workshop funded by NSF
- New $16M NSF-PAWR grant focused on rural broadband
  - ARA: Wireless Living Lab for Smart and Connected Rural Communities
- New $20M USDA grant to establish AIIRA: AI Institute for Resilient Agriculture (https://aiira.iastate.edu)

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Vaccines and Immunotherapeutics

Vaccines and Immunotherapeutics Ecosystem

- Opportunity
  - Next generation vaccines for animals and humans
  - Global vaccine market revenue is $33B with 6% growth through 2021 (expected to be even higher in the future). Animal vaccine segment is $6B with 5% growth through 2021
- Leverage state funding
  - A team led by ISU faculty – including multiple industrial and academic partners– received a $5.6M award from NIH to leverage ISU
- Nearly 20 faculty-initiated companies have licensed ISU technologies
  - 3D Health Solutions

Leveraging Ecosystem Partnerships: COVID-19 Nanovaccine Development & Manufacture

- A $2M CARES Act award to team from ISU, UI and Iowa-based startups and other companies
- Advanced SARS-CoV-2 nanovaccine based on patented ISU-UI technologies to overcome limitations of existing vaccines
  - Single dose, needle-free, room temperature stable (no cold chain), long-term immunity
- Scale-up of SARS-CoV-2 nanovaccine

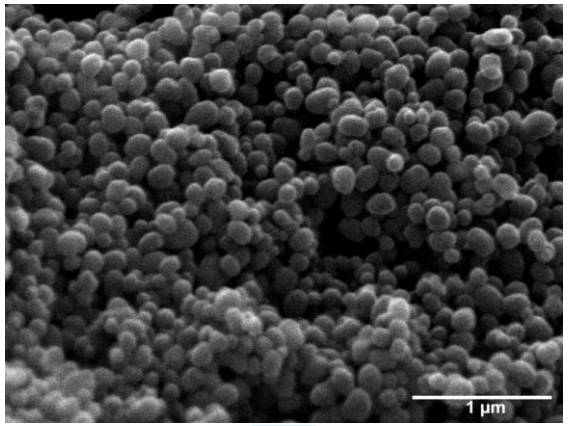
SwRI Southwest Research Institute

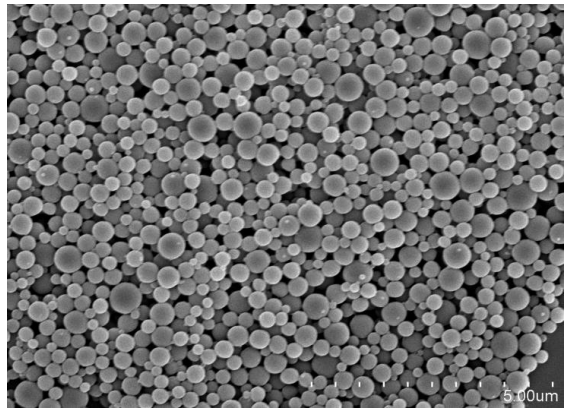
Skroot Laboratory, Inc.

Zeteo Biomedical

Iowa State University Nanovaccine Institute
Revolutionizing how we prevent and treat disease

Next Gen Vaccines for Animal Agriculture





- Diseases impacted
  - Swine
    - PRRSV
    - Influenza virus
  - Cattle
    - BRD
    - Johne's disease
  - Poultry
    - Avian influenza virus
    - Infectious bronchitis virus

Example Startup Activity

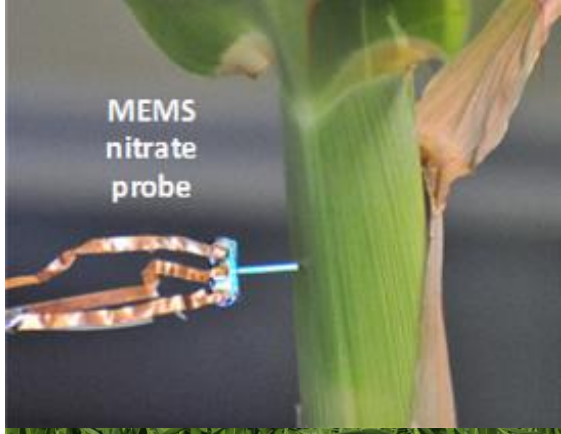
Start-Up Companies Based on ISU Technologies: Biobased Nylon

Sumatra Biorenewables, LLC

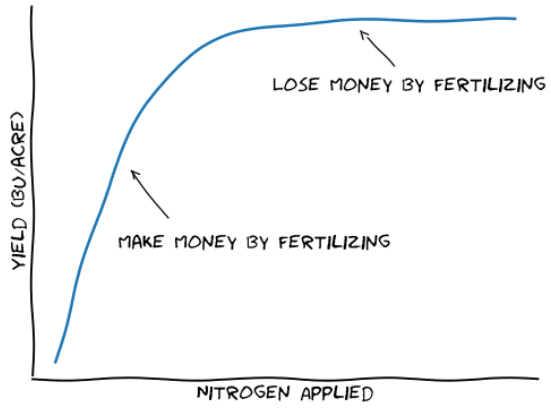
- Novel nylon polymers derived from corn starch for use in textiles, packaging, automotive and other applications
  - Market opportunity: $40 billion
- Funded partnership with major multinational nylon producer

SUMATRA BIORENEWABLES

Startup Companies Based on ISU Technologies: Plant Nitrate Sensors



- **EnGeniousAg LLC,** an ISU spin-out licensed a nitrate sensor technology from ISURF and has secured two competitive SBIR grants from NSF and USDA
- It will offer low-cost, instant readout, high-performance, field-deployable nutrient sensors for crops, soils and water, to improving agronomic management practices
- Technology will increase <u>both</u> farmer profitability and sustainability



UIDP Sessions

September 14

- Bioeconomy Workshop — 1330 (EDT)
- Alliance Managers — 1500

September 15

- Corporate Engagement Officers — 1215 on Sept 15
- Convergence Accelerator — 1445
- PTIE — 1445