Commercializing RPO Research and Innovation: A U.S. University Perspective

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Dairy from Dun Laoghaire

Agenda

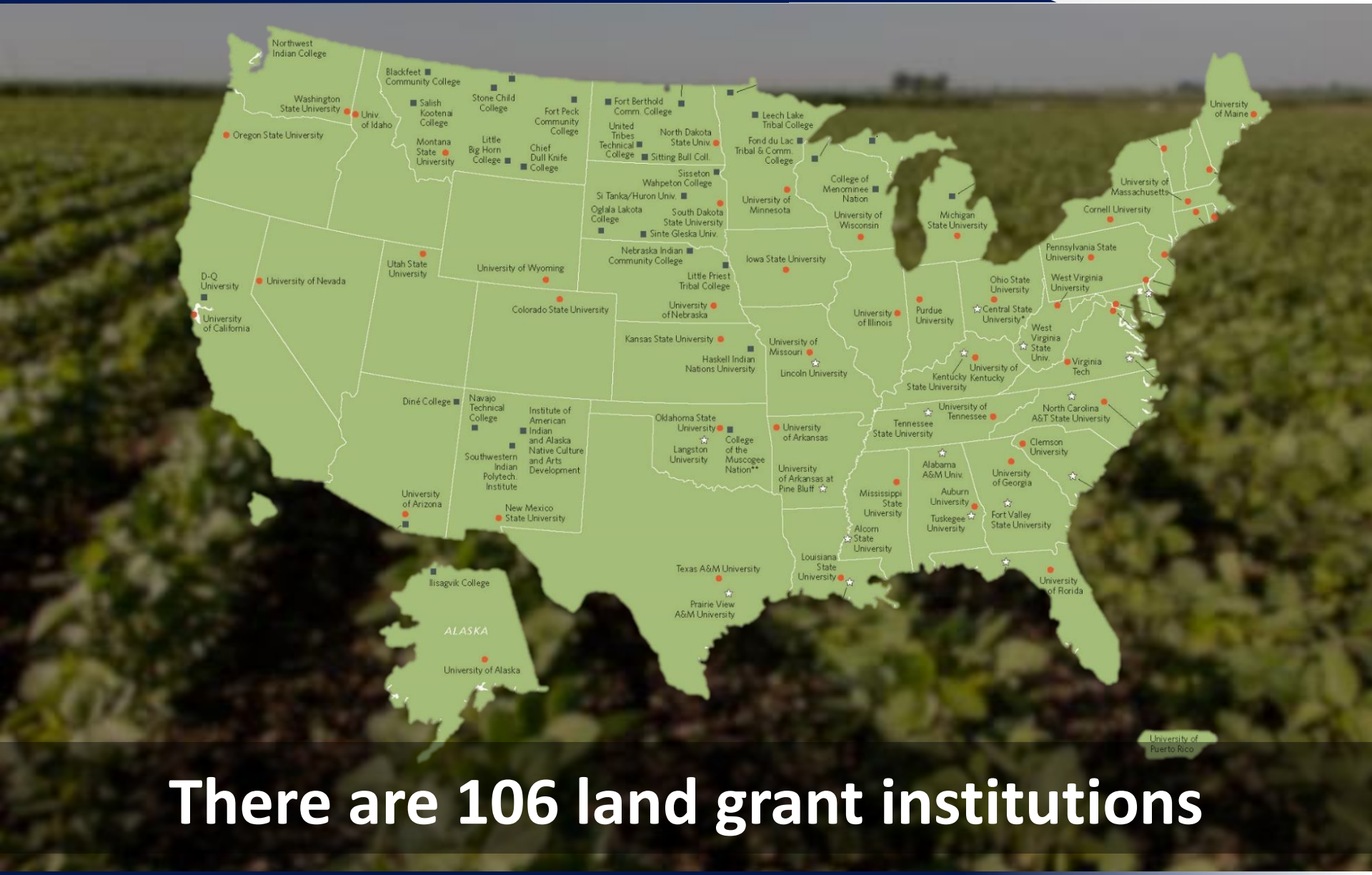
- Introduction
- The University of Illinois & the U.S. Land Grant System
- What is Technology Transfer?
- Institutional & Government Support for Technology Transfer
- Corporate Partnerships Enabling Technology Transfer
- Venture Capital Funding
- Summary

The Office of Technology Management

Land Grant Universities

- A **land-grant university** receives the benefits of the Morrill Acts of 1862 and 1890.
- Original focus on the teaching of **practical agriculture**, science, military science, and engineering
- Hatch Act of 1887 established a series of agricultural **experiment stations**
- Smith-Lever Act of 1914 introduced **cooperative extension** — sending agents into rural areas to help bring the results of agricultural research to the end users.
- Receive federal appropriations that have to be matched by the State.

NIFA Land-Grant Colleges & Universities



There are 106 land grant institutions

NIFA Land-Grant Colleges & Universities

U Illinois was founded in 1867

Illinois By The Numbers

$622M total research expenditures FY2014

2,992 faculty

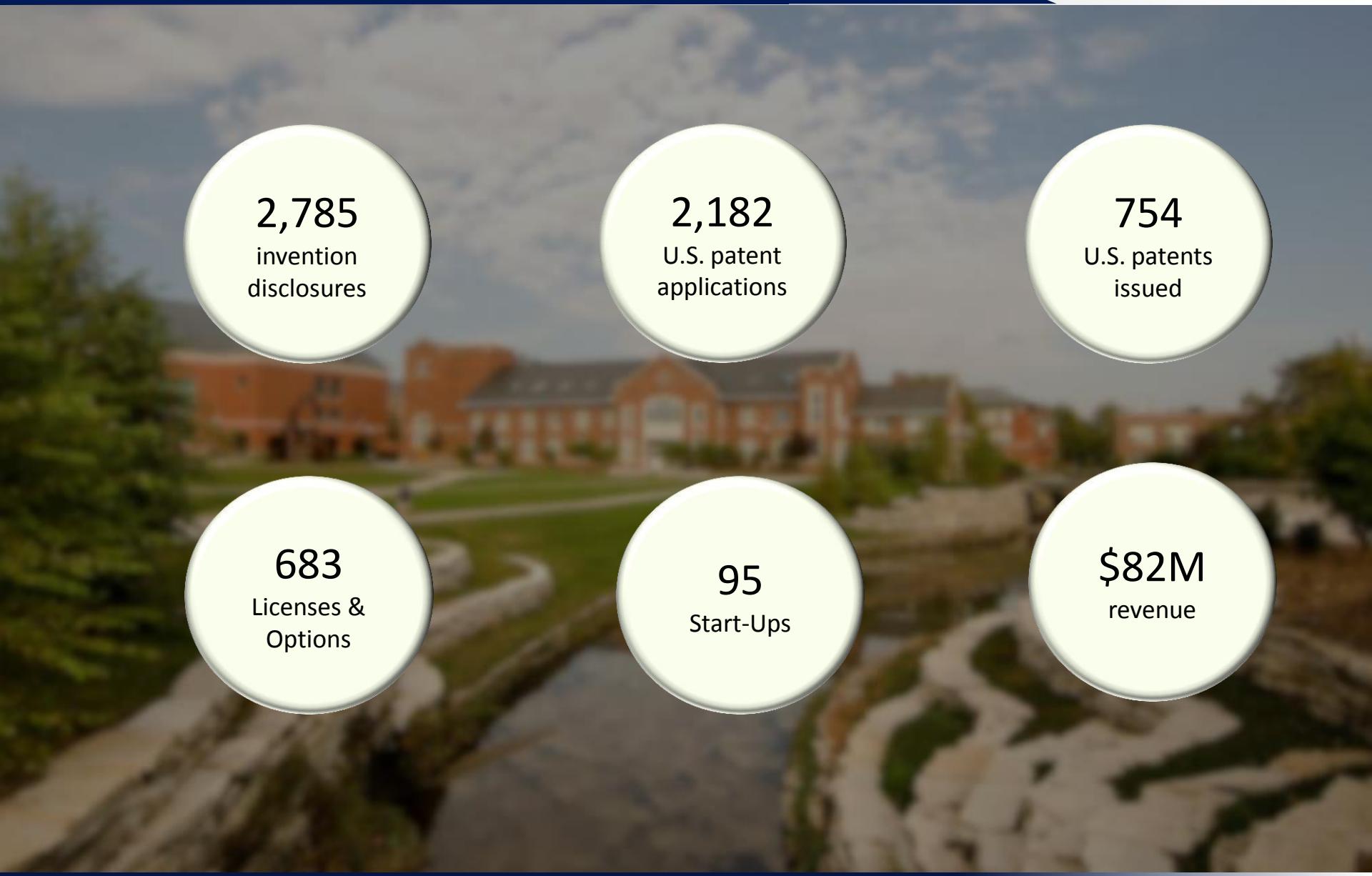
32,579 undergraduates

11,024 graduate students

3.1 million square footage for research

150+ centers, laboratories & research institutes

Fifteen Years of Tech Transfer



Challenges

Strained production
Ground water depletion
Rising populations
Loss of biodiversity
Pest resistance
Diminishing resources
Drought
Spoilage
Pollution
Disease
Post harvest loss
Flood
Hunger
Higher costs
Nutrition
Food security
Land degradation
Weather changes
Increased competition

What Is Technology Transfer?

The Bayh-Dole Act (1980)

- The 1970s
  - **$75 billion** per year in government sponsored R&D
  - Federal government held ≈ **28,000 patents**
  - **Fewer than 5%** of those were **licensed** to industry for development/commercial products
  - **Companies** did not have exclusive rights and therefore were **reluctant to invest** → taxpayers were not benefiting from their contributions

- Bayh-Dole
  - Permitted universities and small businesses to **elect ownership of inventions created under federal funding** and to become directly involved in the commercialization process

Impact of The Bayh-Dole Act

University Tech Transfer Metrics – 2014

$62.8B

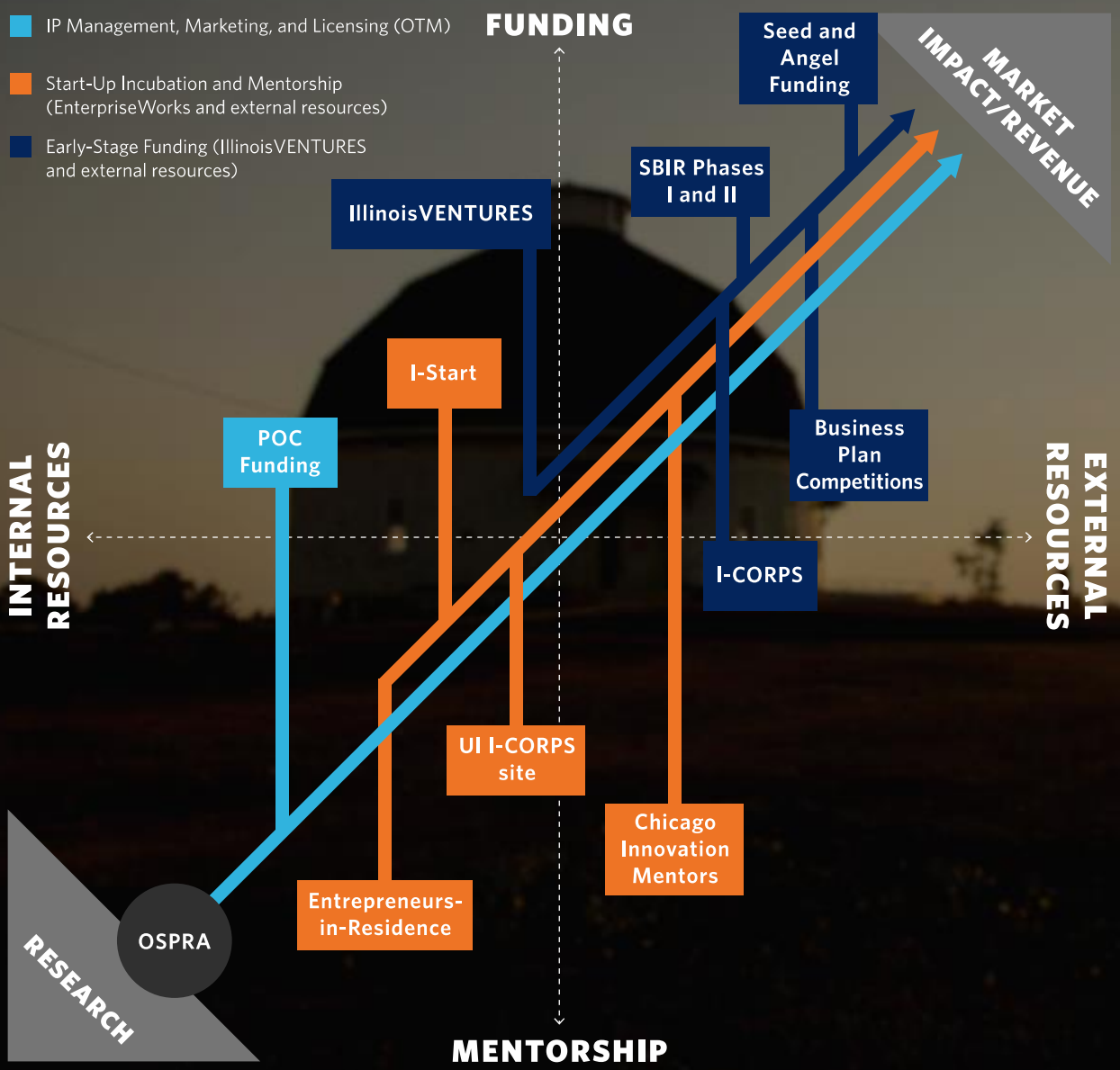
total research expenditures

* U.S. Universities reporting to the 2014 AUTM survey http://autmvisitors.net/sites/default/files/documents/FY2014%20Highlights.pdf

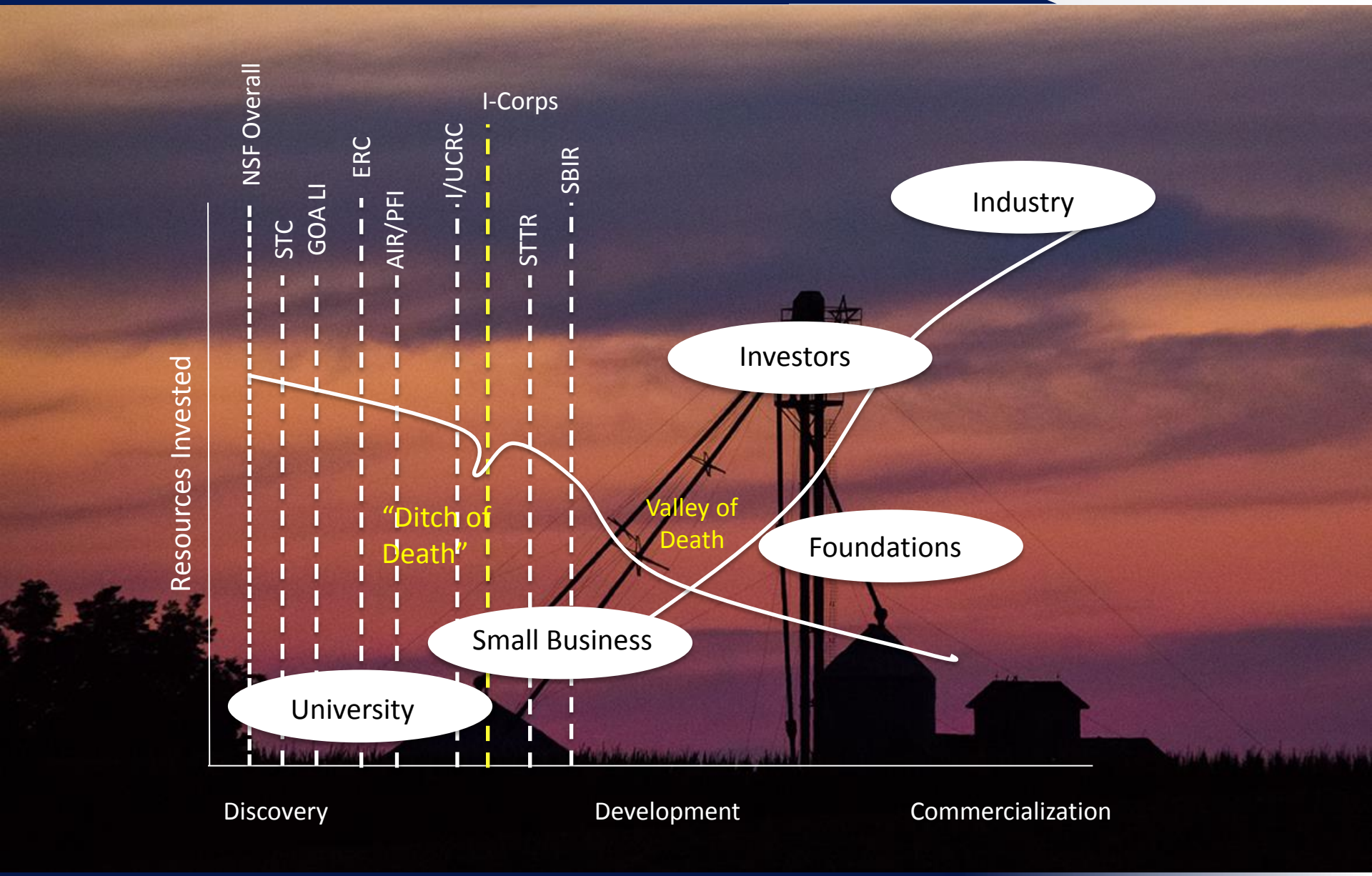
AUTM
Association of University Technology Managers®
Advancing Discoveries for a Better World®

Innovation Ecosystem at Illinois

Resources for Entrepreneurs



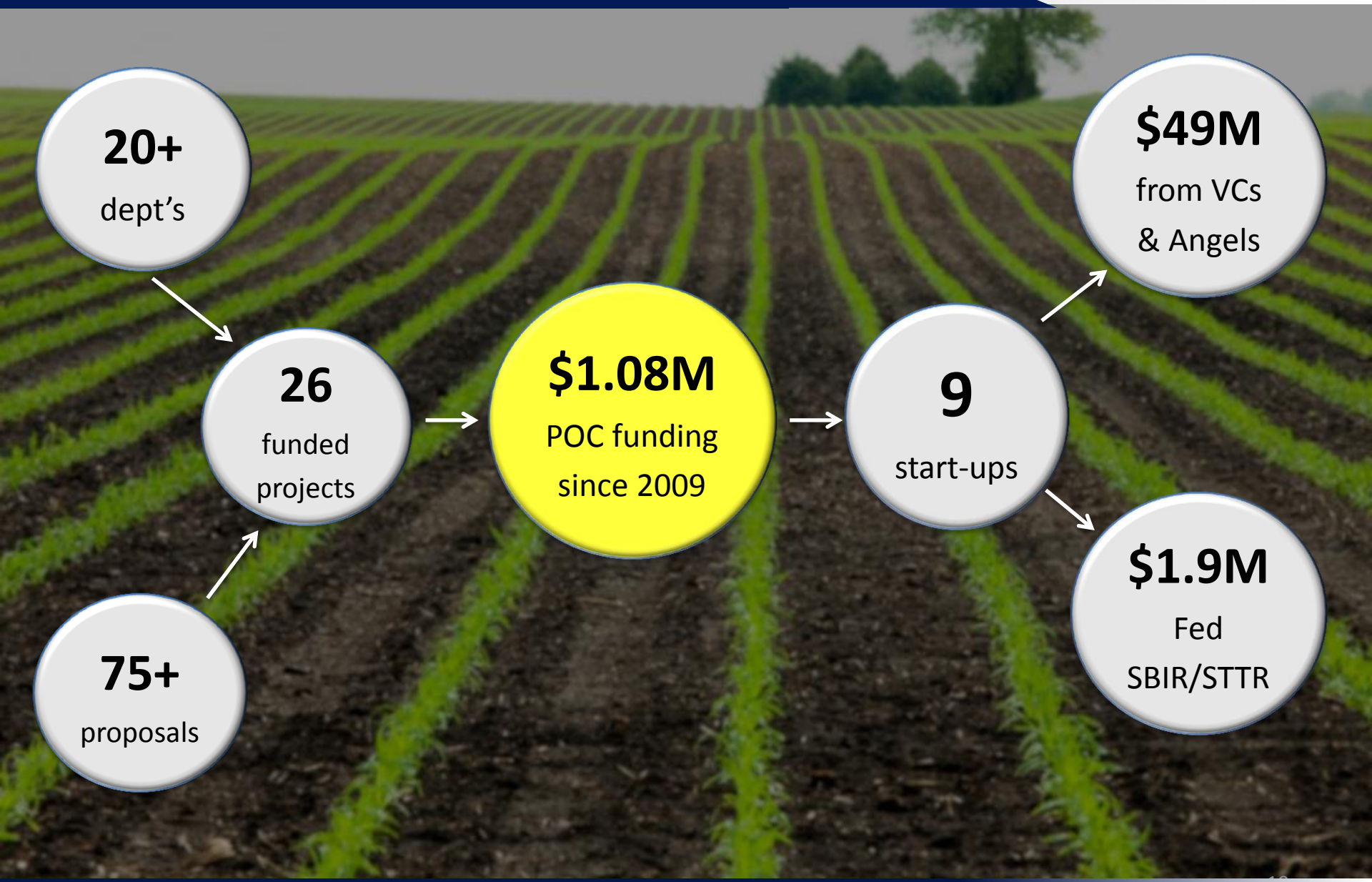
“Mind the Gap”


NSF Overall
STC
GOA LI
ERC
AIR/PFI
I/UCRC
I-Corps
STTR
SBIR
Resources Invested
“Ditch of Death”
Valley of Death
Industry
Investors
Foundations
Small Business
University
Discovery
Development
Commercialization

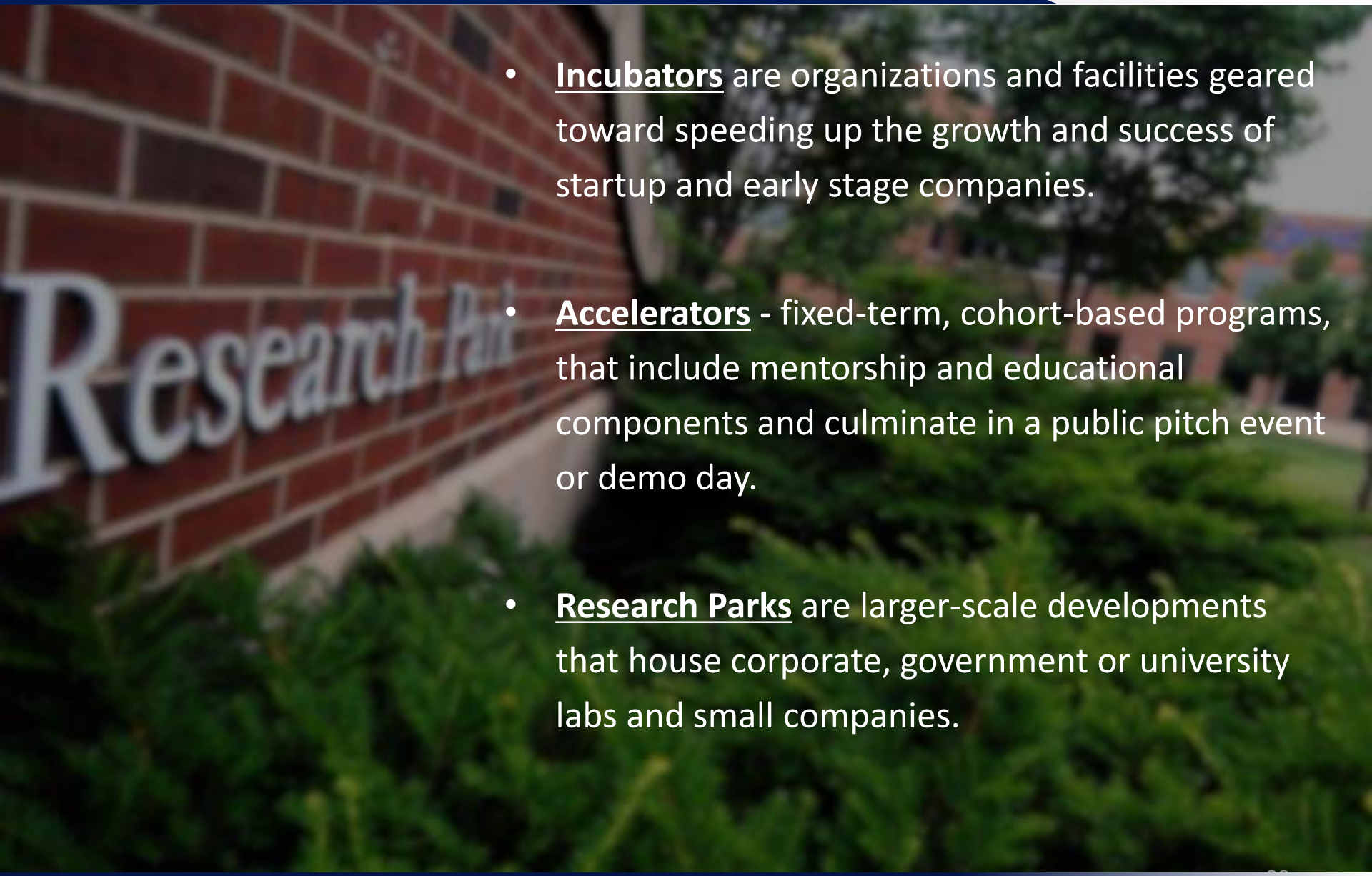
Illinois Proof-of-Concept Fund

https://youtu.be/G9FAbXA5ftI

Illinois Proof-of-Concept Fund



Incubators, Accelerators & Research Parks

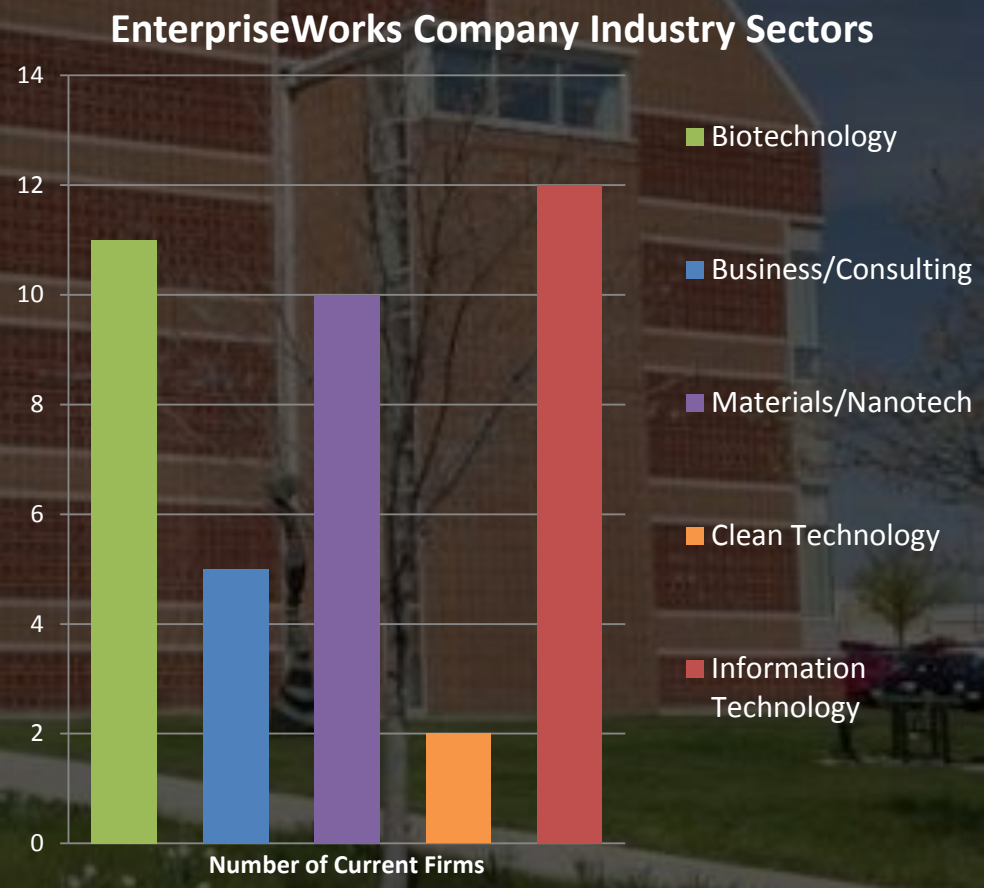


- **Incubators** are organizations and facilities geared toward speeding up the growth and success of startup and early stage companies.
- **Accelerators** - fixed-term, cohort-based programs, that include mentorship and educational components and culminate in a public pitch event or demo day.
- **Research Parks** are larger-scale developments that house corporate, government or university labs and small companies.

EnterpriseWorks Incubator

$879,000,000 attracted in VC & Angel funding since 2003

- One of Inc Magazine's "Top 3 College Town Incubators"
- One of Forbes' "12 Business Incubators Changing the World"
- 2011 Outstanding Research Park by the Association of University Research Parks



Select Companies in the Research Park

- Abbvie
- Abbott Laboratories
- ADM
- Ameren
- Anheuser-Busch InBev
- Caterpillar
- Capital One
- Dow Chemical
- Grainger
- John Deere
- Littelfuse
- Neustar
- Raytheon
- Riverbed
- Sony Biotechnology
- State Farm
- Wolfram
- Yahoo

iVenture Accelerator

- Inaugural class of iVenture Accelerator Startups are creating medical devices, mobile apps, nonprofits, wearables, healthcare software, and more.

- Supporting services include financial support, mentoring, work space, workshops, and access to Chicago networks.

https://business.illinois.edu/iventureaccelerator/

Sector Relevant Illinois Start-Ups

Precision Ag

AgLVT

Agrible

Agricultural Informatics

Soil Diagnostics

SpectroClick

Biotech

AgriGenomics

Aptimmune

Exalt Diagnostics

Energy & Environment

Andalyze

Mammoth Trading

SC4

Serionix

UEM

Software

Embedor

IntelinAir

OceanComm

Tyto

Veriflow

Corporate Engagement with Start-Ups

10 Startups

pitch their vision

chance to form a relationship with Caterpillar

Caterpillar gains visibility to emerging technologies

helps companies like Caterpillar stay competitive, innovative and in touch

Corporate Partnerships

RIPE
Realizing Increased Photosynthetic Efficiency
for sustainable increases in crop yield

Aims to facilitate **yield increases** of staple food crops in developing countries, including rice, legumes, and cassava by up to 60 percent. This will be done by harnessing major **advances in photosynthesis research, crop bioengineering, and computational tools.**

Commercialization Partner

Syngenta

Partner Institutions

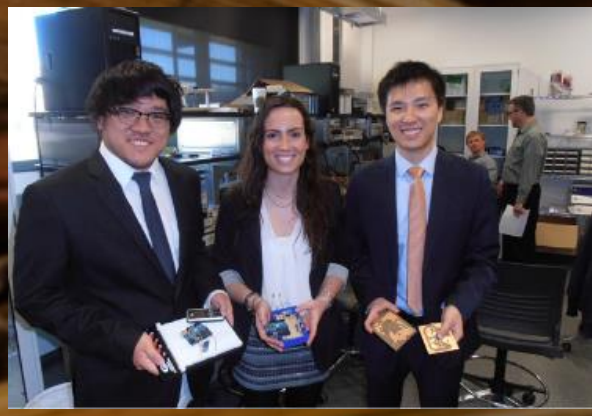
Australian National University
Bill & Melinda Gates Foundation
Chinese Academy of Sciences-Max Planck Institute
Lancaster University
Louisiana State University
University of California, Berkley
University of Essex
University of Illinois
USDA

Corporate Partnerships

ADM Institute for the Prevention of Postharvest Loss

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The ADM Institute for the Prevention of Postharvest Loss is an international information and technology hub for evaluating, creating and disseminating economically viable technologies, practices and systems that reduce postharvest loss in staple crops such as corn, wheat, and oilseeds.



Wireless Sensors for Smallholder Farmers to Monitor Grain Storage; These sensor units are equipped to measure the temperature and relative humidity conditions inside the bags at specified intervals.

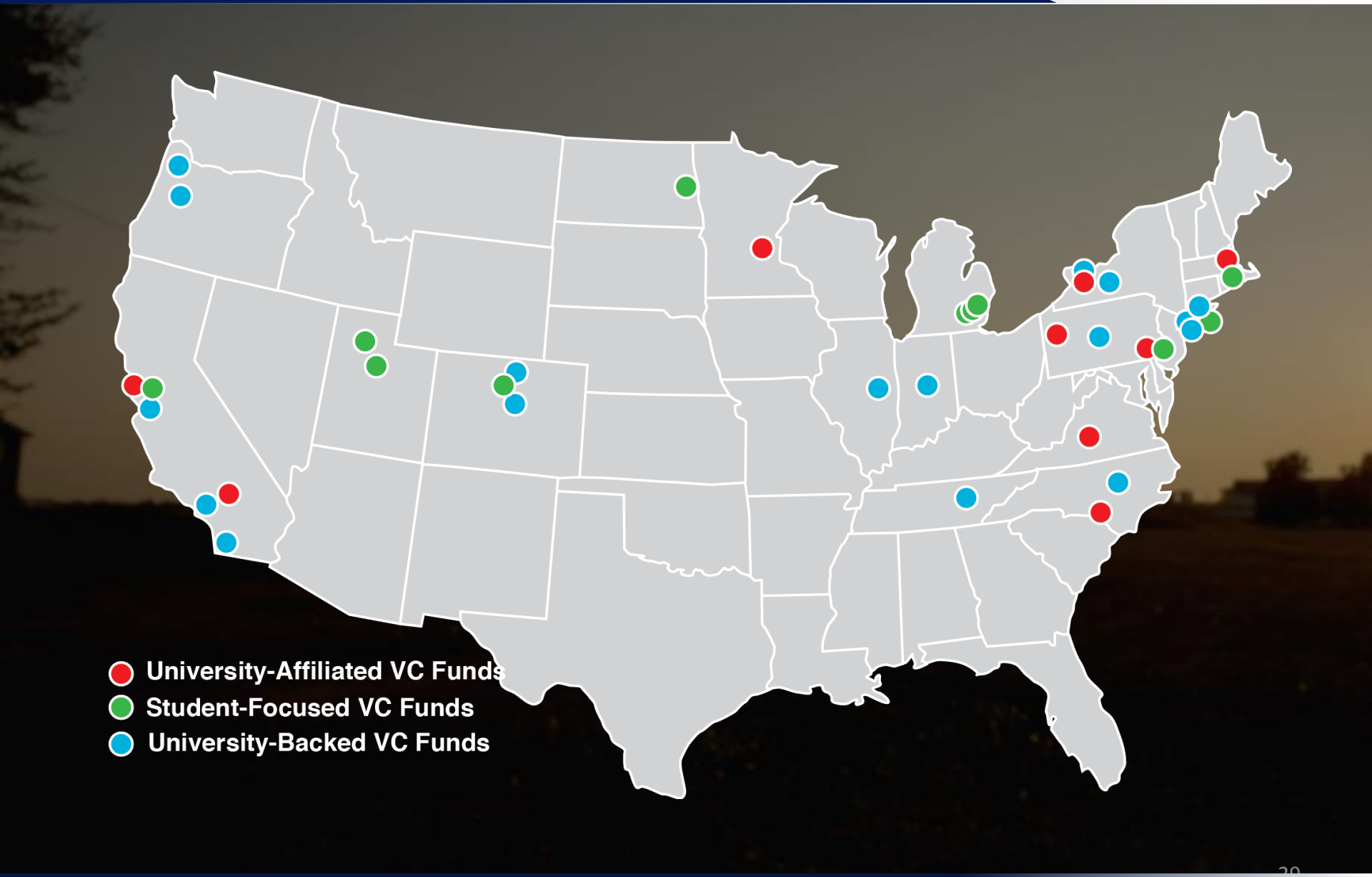
Venture Capital Funding

A Brookings Institute study found that Champaign-Urbana has annual venture first fundings on a per capita basis in excess of 3.2 times the U.S. average

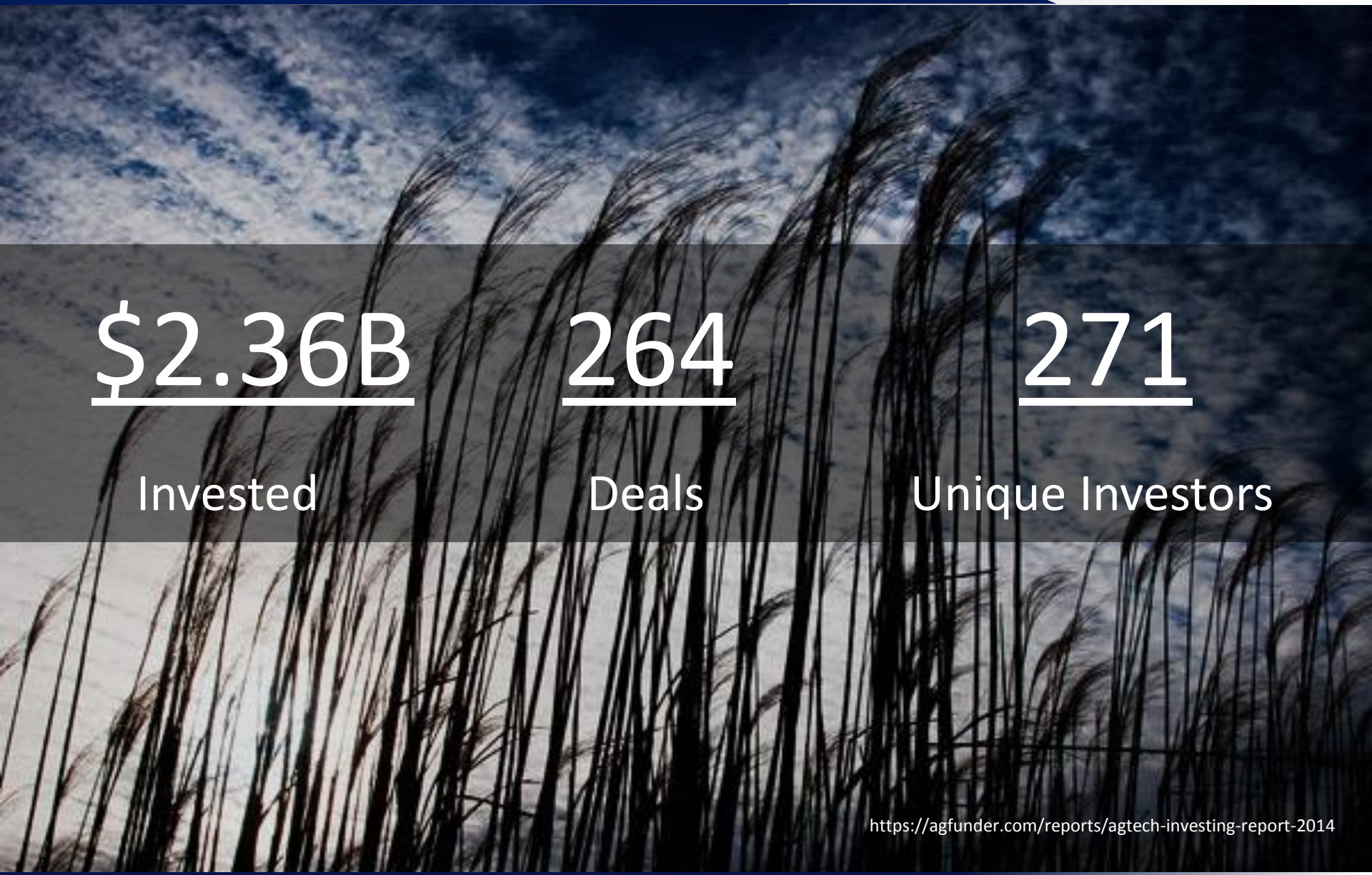
IllinoisVENTURES: Early and Seed Funding

- Created in 2002 by the UI Board of Trustees
- Offices in Chicago & Champaign
  $65 Million under management
- Investments in 75 companies
- $600 million in follow on funding (13:1 leverage)
- Ranked #1 in gap funding for third-party capital attraction by Innovosource in 2013

Venture Capital Funding



Ag Tech Investing 2014 Overview



$2.36B
Invested

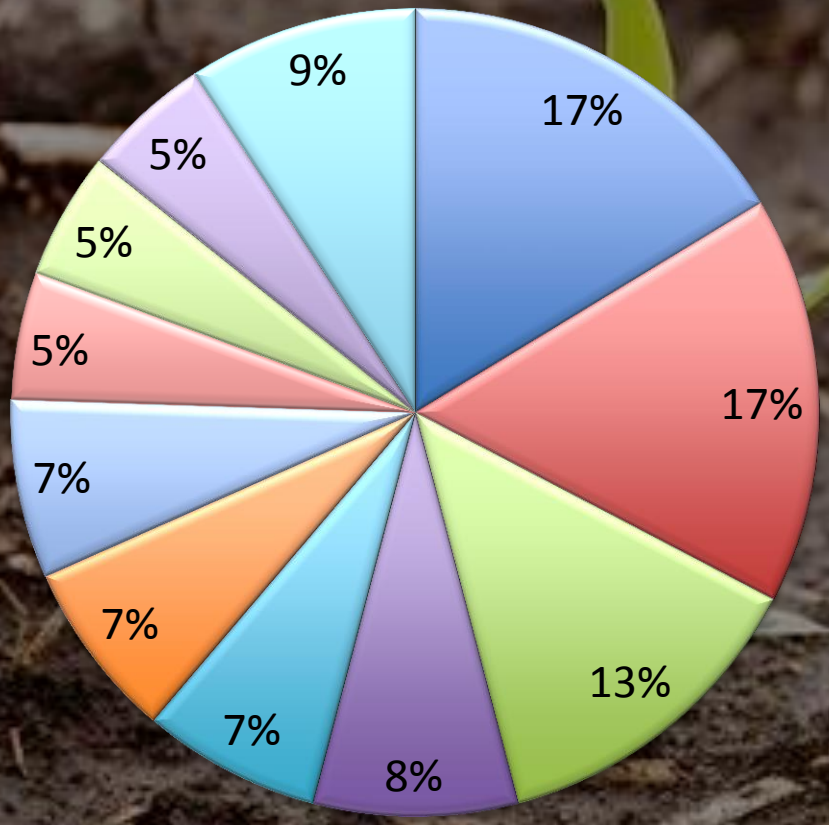
264
Deals

271
Unique Investors

https://agfunder.com/reports/agtech-investing-report-2014

Ag Biotech Investing

Investment Breakdown by Sector



- Bioenergy
- Food Ecommerce
- Soil & Crop Tech
- Sustainable Protein
- Biomaterials & Biochemicals
- Indoor Agriculture
- Waste Mitigation
- Decision Support Tech
- Smart Equip. & Hardware
- Drones & Robotics
- Other

https://agfunder.com/reports/agtech-investing-report-2014

Themes

- The Emergence of Precision Ag - hardware and software technologies that help farmers improve decision-making with data-driven analytics.
- Food Tech – 3 companies saw $679M in financing over 59 deals
- Indoor Agriculture - receiving seven percent of invested dollars
- Getting High - twelve weedtech (and hemp) companies captured nearly $23M in total funding for 2014
  - Eaze gave new meaning to the term ‘getting high’ after it raised $1.5M for its marijuana drone delivery service

https://agfunder.com/reports/agtech-investing-report-2014

Ag/Food Technology Transfer in Action

Peanut Rx

- University of Georgia, University of Florida, Auburn University, and Mississippi State University
- Disease risk index that allows peanut growers in the SE to predict relative disease risk for the upcoming season
- Four major diseases of peanuts: tomato spotted wilt (TSWV) , leaf spot, white mold, and Rhizoctonia limb rot

Illinois MarketMaker

- National network
- Connects farmers & fishermen with retailers, restaurants, grocery stores & consumers
- Currently used by 20 states

Illinois Wheat Lines

- Being produced on farms across the eastern United States
- Currently on of our largest revenue earners annually

Strawberries from UC DAVIS

- World-renowned international strawberry breeding program
- Currently largest source of licensing revenue at UC Davis
- Annual royalties and fees of over $8.2 million
- Roughly 70 percent of the strawberries produced commercially in California and 90 to 95 percent of strawberries produced commercially in certain foreign markets.

Illinois -- AgriGenomics

- Over 15 genetic tests
- Spider lamb in sheep,
- Angus Arthrogryposis Multiplex
- Tibial hemimelia in short horn cattle

This Is Agriculture

Images from a Google News search November 18, 2015