President's Summit

Okinawa, Japan

November 2018

Impact of University IP/Technology Transfer

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The University as Social Invention

universitas magistrorum et scholarium,

The University's historical, unique social role

859 AD University of Karueein-Morocco (1st university)
(1,159 years ago)

1088 University of Bologna (1st European university)

1096 Oxford University (1st UK university)

1611 U. of Santo Tomas (1st Asian university)

1636 Harvard U. (1st U.S. university)

1850 U. of Sydney (1st in Australia)

1858 Keio University (1st in Japan)

Creators and Keepers of the Written Word

honor-bound to certain traditions

Educating the Next Generation

The Morrill Act (U.S.) 1862
applied science & technology taught,
and brought to farmers

Creators
and Disseminators of
Knowledge (Extension)

Technology creation & dissemination

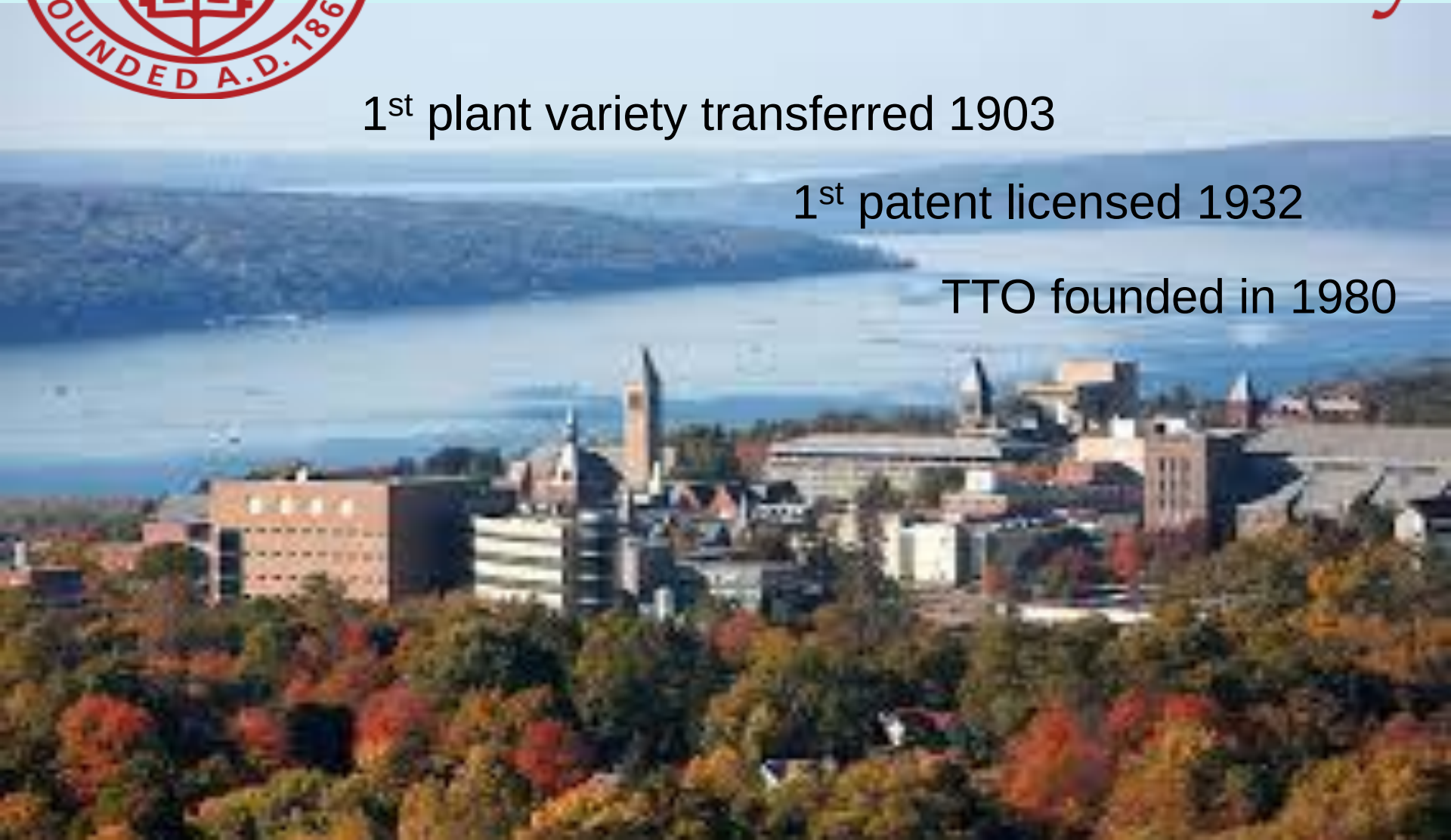
Creators of Knowledge (Research)

Cornell University

1st plant variety transferred 1903

1st patent licensed 1932

TTO founded in 1980



Essential Social Role

Creators and Keepers of the Written Word

A Community of Scholars and Teachers

Creators of Knowledge (Research)

Educators of the next generation

Researchers/Teachers (advancing knowledge)

Extension (bringing university technology to users)

Knowledge creation/dissemination for public good

Distinctive Social Role

Creators

and disseminators

of knowledge,

and technology

for the public good

IP/Tech Transfer just the latest embodiment of the university mission

The biggest impact of University IP/Tech transfer?

A dynamic new component added to the university's historical mission;

and its pact with society

The university's active engagement in the innovation ecosystem and in economic development

IP/Tech Transfer Latest in a Long History

of pursuing the basic mission

The experiment launched in U.S. in 1980

(US Bayh-Dole Act)

In nearly 4 decades:

- The Act is not just a success…..

  it has exceeded expectations!

- IP/TT now integral to university mission
- No negative effects on university philosophy, traditions, policies, and practices

Impact of University IP/Tech Transfer

Since 1980

- Every US research university actively participates in IP/tech transfer
- Growing rapidly around the world
- Tens of thousands of new products, services, companies, and jobs created
- Economic development based on intellectual assets and human capital

Driving the Innovation Economy
academic technology transfer in numbers

From 1996 to 2015...

$1.3 trillion
contributed to **U.S. gross industrial output**

$591 billion
contributed to **U.S. gross domestic product**

4.3 million
jobs supported

380,000+
inventions disclosed...

80,000+
U.S. patents issued...

to research institutions in the past 25 years

11,000+
startups formed since 1995

70%
of university **innovations licensed** to startups and small companies

200+
drugs and vaccines developed through public-private partnerships since **Bayh-Dole Act** enacted in 1980

AUTM
Association of University Technology Managers®
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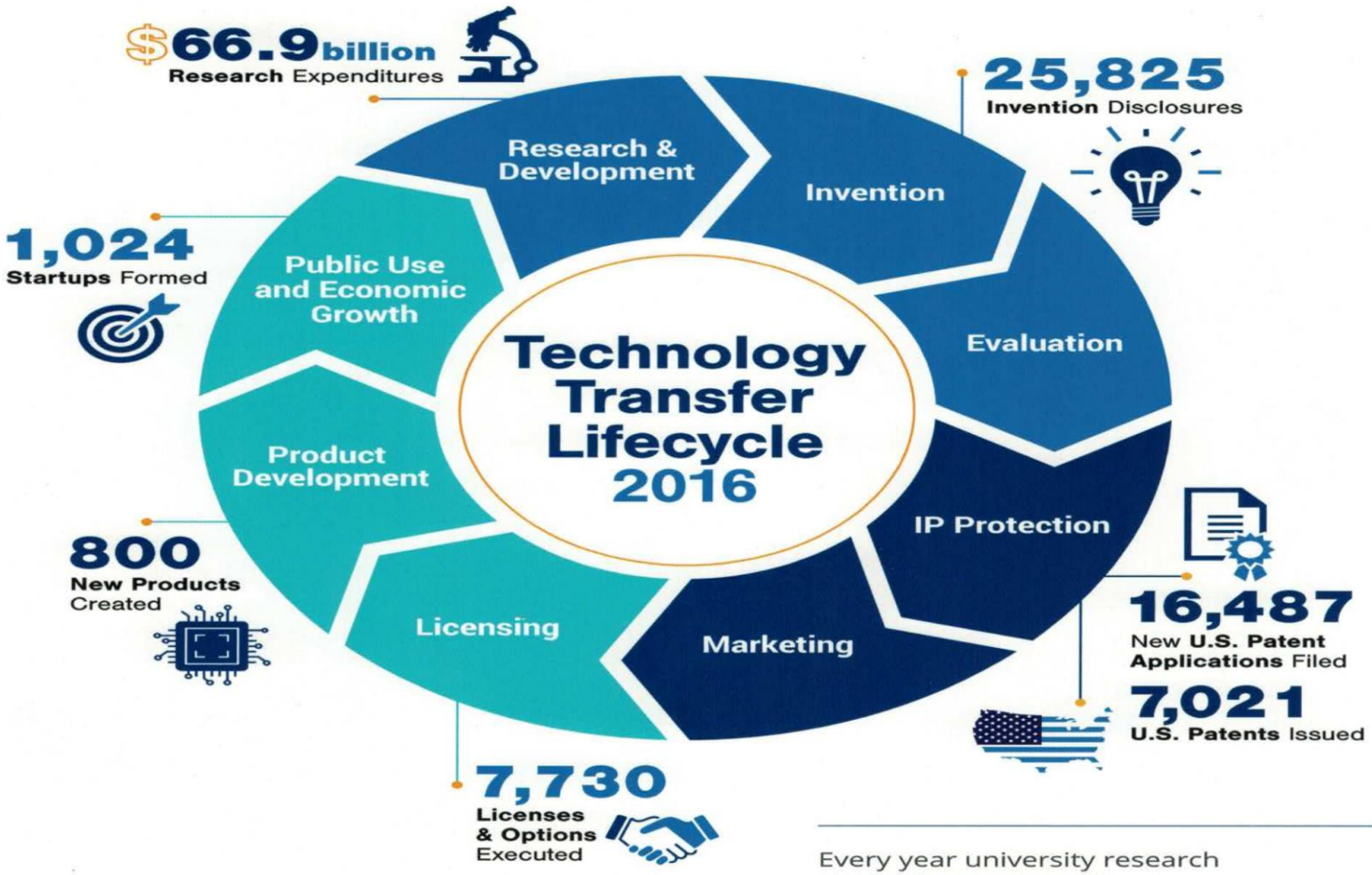
The Association of University Technology Managers (AUTM) is a nonprofit leader in educating, developing, promoting and inspiring technology transfer practitioners to make the world a better place through the commercialization of academic research. AUTM's global community of 3,200 members represent businesses and government organizations, and more than 350 universities, research institutions and teaching hospitals.

This information was compiled from Association of University Technology Managers (AUTM) and the Biotechnology Innovation Organization (BIO): The Economic Contribution of University/Nonprofit Inventions in the United States: 1996-2015; June 2017 as well as the AUTM U.S. Licensing Activity Survey Highlights 2016 and AUTM Statistics Access for Technology Transfer (STATT) Database, **www.autm.net/STATT**, and the Academic Patent Licensing Helps Drive the U.S. Economy, IPWatchdog.com, June 20, 2017.

Benefiting Society and the Economy
academic technology transfer for 2016



For more information visit **www.autm.net**

Every year university research yields discoveries with commercial potential.

Technology transfer professionals associated with universities and other academic institutions manage the complex process of shepherding ideas from the lab to the marketplace — from evaluating and protecting discoveries to commercializing the inventions through new and existing companies.

AUTM FY17 Infographic.indd - Google Chrome

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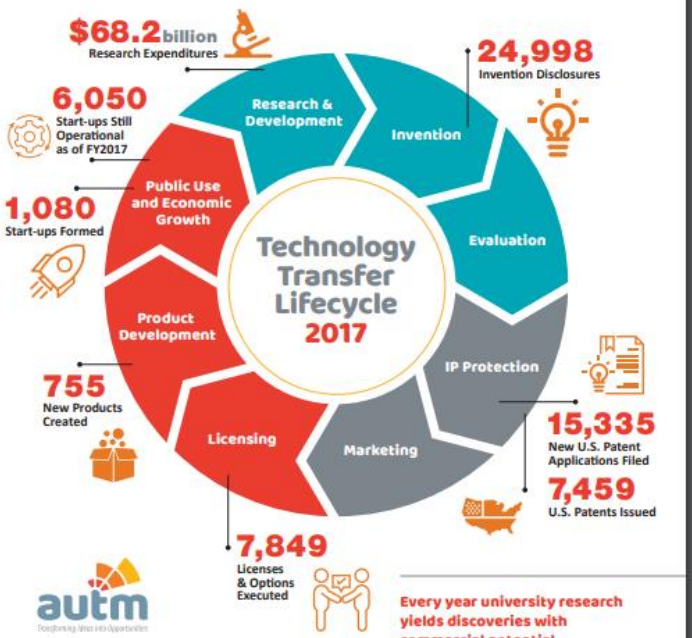
Benefiting Society and the Economy
academic technology transfer for 2017



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Impacts of IP-based University Technology Transfer

- An awareness of the role IP can play in serving the university's goals of the public good
- Collaborative engagement and transactions between university and private sector
- An active university role in entrepreneurship, new ventures, the economic development system
- Added vitality and variety to the university mission
- Increasingly inventive faculty and staff
- Renewed interest by alumni
- Enhanced student entrepreneurship

Impacts of IP-based University Technology Transfer

Individual IP/tech transfer acts are important

(licenses, products, ventures, jobs, profits)…..

…… But, it is the overall process that establishes the university's crucial role as a ***source*** and ***catalyst*** of the economic "innovation ecosystem"

Active university IP/tech transfer produces a vibrant, creative economy based on invention and innovation

It nourishes entrepreneurs and intrapreneurs who build the future

University IP/tech transfer: Lessons learned

More lessons learned:

A university should embrace and actively
engage in the IP process,
to widely disseminate its' technology
for the public good

NOT

as a source of revenue

University IP/tech transfer: Lessons learned

- With good management, it's reasonable to expect TTO to eventually break-even
- However, good TTO management, governance, leadership support and investment in TTO, and patience….

  will eventually produce significant revenue

As a by-product of a successful process

University IP/Technology Transfer is more about the process than its results

- While a well-managed IP/TT function is striving to break even, and ….
- Good TTO management practices will eventually produce significant revenue……
- The university is actively using its IP assets to catalyze an innovation ecosystem, spawning economic development, and a ripple-effect of societal benefits

Innovative and Enterprising Universities

WIPO's Enabling IP Environment (EIE) Project is based on this premise:

Universities can play an enhanced role in the economic development of a country,

through implementation of proven, sound policies and practices of IP management and technology transfer, and appropriate partnering with the private sector…..

….. and all this ultimately benefits the institution,

and society.

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Essential Elements in Sustaining Technology Transfer

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Elements of Sustaining IP/Technology Transfer

The essential element:

Sustainability

Elements of Sustainable IP/Technology Transfer

Capable research institutions

Creative faculty & staff

Sufficient research funding

Effective IP Policy and practices

(institutional ownership;

efficient licensing)

Elements of Sustainable IP/Technology Transfer

- Private investment necessary for invention development and commercialization
- Private investment requires a ROI

  (patents provide the mechanism)
- University ownership of patents maintains essential, close link between inventors and patent use, and provides control for:

  assure development & dissemination

  technology stewardship

  value capture (ROI for research)

Elements of Sustainable IP/Technology Transfer

Supportive senior leadership

Investment in IP/TTO infrastructure

Knowledgeable/motivated TTO professionals

Valuable technology/IP

Sustainable funding mechanism for IP/TTO operations

Protection of right-to-publish

Education, research, and academic goals always supercede IP/tech transfer

Elements of Sustainable IP/Technology Transfer

Effective conflict of interest policy

Incentives for inventors

(revenue sharing)

University IP/tech transfer: Lessons learned

University researchers are more motivated by the success of their invention than $$

- A small % want to get-rich through IP/TT
- A few don't want any $$ from their invention
- Most won't refuse their share of $$ if their invention is successful

but……

- **100% want their invention to be used to solve real-world problems!**

Elements of Sustainable IP/Technology Transfer

Enthusiasm to partner with private sector; responsive to private sector needs

Good private sector partners

(respectful, honest, capable)

Motivated by technology development and dissemination for the public good…… not making money

Elements of Sustainable IP/Technology Transfer

Supportive alumni

Entrepreneurs and entrepreneurial culture

Effective start-up policy

Start-up support system

Friendly investors

Supportive local business

Promotion of IP/TT on campus

Elements of Sustainable IP/Technology Transfer

The number of inventions/researcher/year does not remain constant

Outreach and promotion of tech transfer, and its successes will increase invention disclosure rate

The Cornell example:

1990: 90 disclosures/2700 researchers/year

= 0.03 inventions/researcher/year

2010: 350 disclosures/2700 researchers/year

= 0.13 inventions/researcher/year

4X increase in disclosures/researcher/yr over 20 years

Elements of Sustainable IP/Technology Transfer

What is the most essential element?

People!

motivated

knowledgable

creative, innovators

collaborative

skillful

optimistic

Thank You

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Accelerating University Technology to the Market:

The University Role

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Accelerating University Technology to Market

The university must have a commercialization partner; it can't do it alone

It's most essential role:

1. evaluate and validate its technologies,
2. protect them with IP,
3. strengthen the business case

In this way, the private sector can rely on the university for valuable technologies

Universities should be selective in the technologies they choose to pursue

The Cornell Example

Over a span of twenty years:

- 3000 inventions submitted to TTO
  - 1500 filed as patents (~ 50%)
    - 750 licensed (~25%)
      - 650 generate revenue (~20%)
      - <300 yield successful products (< 10%)

Cornell University

Over a span of 20 years (1990-2010)

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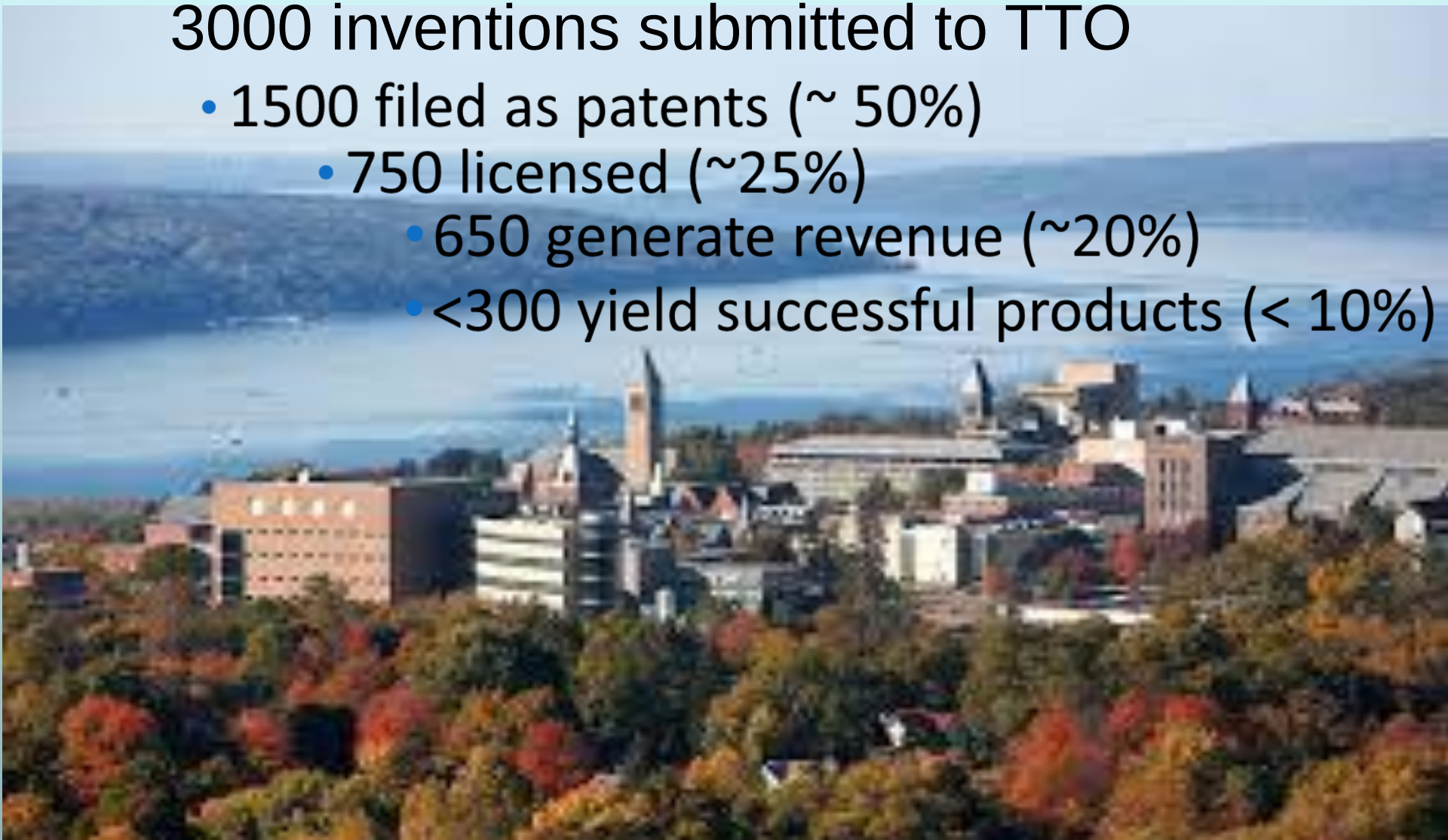

Accelerating University Technology to Market

- Many fewer "commercializable" university inventions than many realize

  (typically: 1 disclosure/$2million in research/yr)

- Most university inventions will never be commercialized because they:

  don't solve an economically important problem

  aren't better than what's currently available

  can't be scaled-up

  aren't cost-effective or feasible

  have some insurmountable flaw

  don't allow meaningful IP

Accelerating University Technology to Market

the University role

- Conduct technology validation and de-risking:
  - proof of product activities
  - pilot facilities
  - proof of concept funding
- Provide reasonable access to university facilities for commercialization partners
  - (renting, and fee-for service)

Allow (encourage?) faculty/staff to consult for commercialization partners

Accelerating University Technology to Market:

the University role

- Recruit pool of entrepreneurs
- Supportive of entrepreneurs and start-ups
- Entrepreneurship education
- Friendly policies for licensing start-ups

  equity in start-ups

  effective conflict-of-interest rules
- Participate in the local/regional economic development activities

  (e.g., Cornell/Ithaca “REV Incubator”)