Session 4 :
Case Studies of TTOs

Case studies of TTOs-USA
Discussion 1: Practical lessons from the US experience

Ashley Stevens, John Fraser, Richard Cahoon

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Who's Speaking

Ashley Stevens

PhD, CLP, RTTP

Dr. Stevens is a biotech entrepreneur and technology commercialization expert. He co-founded Genmap, Inc. and Kytogenics, Inc., bringing academic innovations to market. He later led technology transfer at Dana-Farber Cancer Center and Boston University, where he helped launch 55 startups. He currently teaches commercialization at Osaka University.

Affiliation

- Past President Association of University Technology Managers, USA(AUTM)
- Head of Tech Transfer for Boston University
- President Focus IP Group, LLC

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Who's Speaking

John Fraser

CLP, RTTP

John is a global expert in technology transfer and knowledge exchange, with extensive experience in maximizing innovation impact. Having led four technology transfer offices across two countries, he understands the complexities of translating research into market-ready products. As a former AUTM President, he has advised global technology transfer professionals on country-specific challenges. Through Burnside Development, he consults for WIPO, Chilean institutions, Serbia's Innovation Foundation, and India's Department of Biotechnology.

Affiliation

- Past President Association of University Technology Managers, USA(AUTM)
- President, Burnside Development & Associates LLC
- Head of Tech Transfer for Florida State University & Simon Fraser University

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Who's Speaking

Richard Cahoon
PhD

Richard Cahoon, Adjunct Professor at Cornell University, specializes in technology transfer, IP management, and commercialization. With over 30 years of experience, he has advised governments, universities, and global organizations on innovation ecosystems, IP strategy, venture creation, and technology-driven economic development in over 25 countries.

Affiliation

- Past Association of University Technology Managers, USA (AUTM) Board of Directors
- President, BioProperty Strategy Group, Inc.
- Head of Tech Transfer, Cornell University

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Case studies of TTOs- USA

Ashley Stevens

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Boston University

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Boston University at a Glance

- Founded 1839
- 37,000 Students
  - 140 countries
- 4,500 research and instructional faculty
- Charles River, Medical and Fenway Campuses
  - 17 Schools and Colleges
  - 130 Centers, Institutes and Special Programs
- $560 million in Grants and Contracts +$170 million at BMC
- First University in America to:
  - Award an M.D. to a woman (1864)
  - Award a Ph.D. to a woman (1877)
  - Award a JD to a woman (1881)

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History of Technology Transfer at Boston University

- Pre-history
- Three phases:
  - Origins
  - Multiple programs
  - Consolidation
    - Modern era
- Willingness to experiment and innovate
  - And adapt and restructure

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Trivia

- Who is the most famous Professor who's ever been a member of BU's faculty?

Clues:

- Not known for his scientific discoveries or learned writings
- Applied a 50 year old scientific discovery to meet unmet consumer needs
- Couldn't interest the leading company in his industry to take up his ideas
- Founded his own company, with his father-in-law, to commercialize
  - Just a typical prof doing what it takes to get his stuff commercialized

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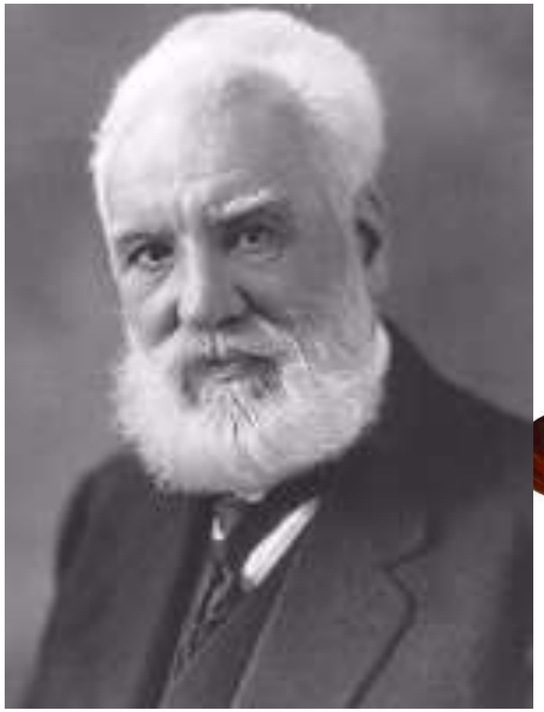

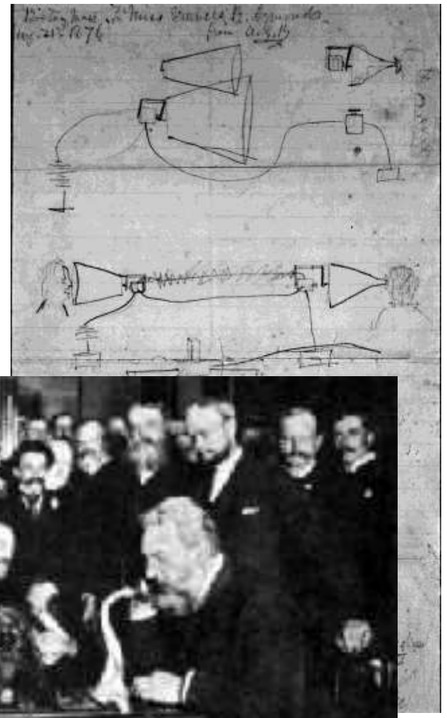

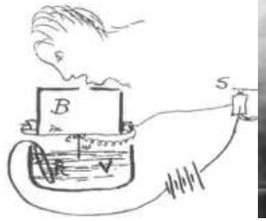

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Alexander Graham Bell

1873	Appointed Professor of Vocal Physiology and Elocution at Boston University
1874	Started experimenting with electricity; worked on a harmonic multiple telegraph system
1875	Dean Lewis Monroe advanced him one year's salary
1876	Patent prepared January 15 - February 13; filed morning of February 14; Elisha Grey filed caveat in afternoon

Interference declared February 19; dissolved February 25

US Patent 174,465 issued March 7;

"Mr. Watson -- come here -- I want you" March 10, 1876

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No. 174,465

The United States of America.

To all to whom these presents shall come:

Whereas Alexander Graham Bell, of Salem, Massachusetts has presented to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful Improvement in Telegraphy a description of which invention is contained in the Specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of Law in such cases made and provided, and

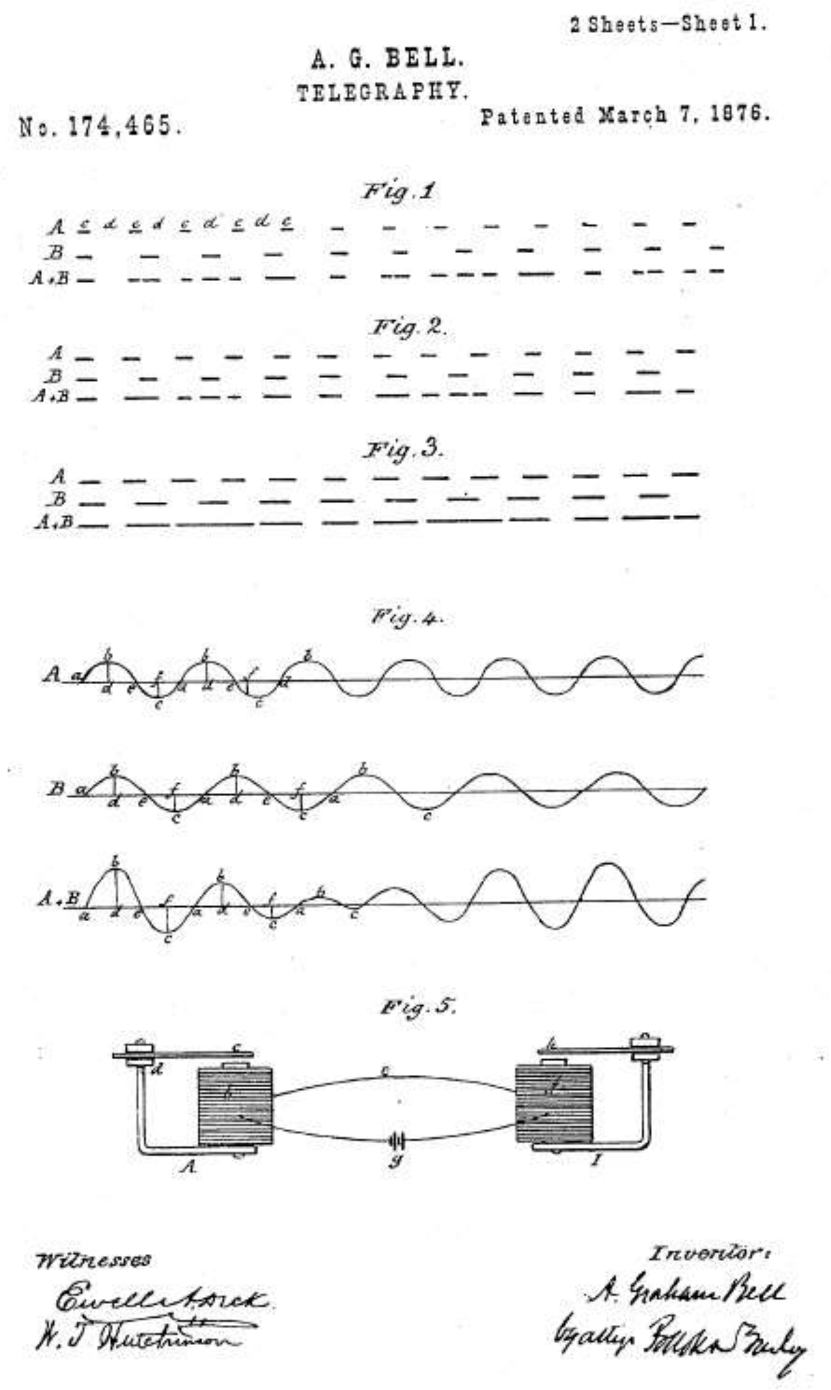
Whereas upon due examination made the said Claimant is adjudged to be justly entitled to a Patent under the Law.

Now therefore these Letters Patent are to grant unto the said Alexander Graham Bell, his heirs or assigns for the term of seventeen years from the seventh day of March one thousand eight hundred and seventy-six the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this seventh day of March in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States of America the One hundredth.

Secretary of the Interior

Commissioner of Patents



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The Aftermath

- Sold his Bell System stock fairly early
- Was involved in the early days of the airplane
  - Aligned with Curtiss in the Curtiss-Wright Brothers patent battle

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Oh, and what did BU get out of it?

- Nada
  - Didn’t have any patent policy in place at the time
- US Universities taught rather than researched back then

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Pre-History – Itek

- One of Massachusetts' first high tech companies
  - Founded in 1957
    - Kodak patent for first data retrieval system
      - Combined punch cards with microfiche
    - Funded by the Rockefeller family
  - Developed the Corona camera system for US' first spy satellites
    - After Sputnik
  - Boston University contributed its Applied Physics Lab
    - Had lost Federal funding after WWII
      - 150 people
    - Received stock in Itek
- Went public in 1959
  - Validated the "VC funded, early liquidity" start-up model
- Some of the Itek people came back to found tech transfer at BU

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Origins of Tech Transfer at BU

- BU sold the stock it got in Itek in the IPO
  - Missed the big run up in value after the IPO
- New President in 1971, John Silber, vowed never to repeat this
  - BU needed to understand business better
- Founded Community Technology Fund in 1975
  - VC fund
    - Headed by Walter Levison
      - Ex-Itek
- Tech transfer added in 1978
  - Headed by Larry Gilbert
    - Patent attorney, formerly at MIT
  - Translational research fund from earliest days

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Community Technology Fund

- Evergreen
- Wholly funded by BU
- Peak value $45 million
  - June 2000
- Best returns in early years
  - Not many VC funds around at that time
- Made money
  - Managers were BU employees
    - No “carry”
    - Couldn’t attract world class VC’s
- Invested in some BU spinouts
  - Mainly non-BU companies

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Community Technology Fund

- A university doesn’t need a VC fund in an ecosystem like Boston today
  - May need one in other ecosystems
- Fund closed in 2005
  - Profits returned to endowment
  - Draw ~$500k
    - Ignition awards (pre-seed)
    - Launch awards (seed fund)

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Technology Transfer

- Has grown steadily
  - 2.5 FTE's in 1995
- Only modest financial success
  - Retained income doesn't cover operating expenses
- Challenges:
  - Managing patent budget
  - Evaluating new disclosures properly
    - Student Analyst program
  - Effectively marketing technologies
  - Workload of Licensing Managers
    - Maintaining acceptable turnaround times in negotiations
    - Now have 3 lawyers in OTD
      - 1 paralegal

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Technology Transfer

- 2023 Activity:
  - $732 million research funding
  - 95 invention disclosures
  - 87 new patent applications
  - 181 total patent applications
  - 36 issued US patents
  - $3.4 million income
  - $2.1 million patent expenditures
    - $1.0 million patent reimbursements
  - 31 licenses and options
  - 3 start-ups
  - 8 licensing staff
  - 5 support staff

Source : AUTM Licensing Survey

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Translational Research at BU

- Have had a translational research fund since 1975
  - Initially ~$25k
  - Increased to ~$75k
- Currently called Ignition Fund
  - ~$300k / year
  - Made as a grant
    - No repayment
- In 2005, BU was one of 10 universities that received substantial translational research funding from Wallace H. Coulter Foundation
  - Medical Devices
  - Initially $500k / year for 5 years
    - Increased to $1 million/year
    - $10 million endowment to successful universities

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Diversification

- A number of additional programs added starting in1985
  - Health Policy Institute
    - Dr. Richard Egdahl
      - VP, Medical Affairs
      - Vascular surgeon
    - Changing health care system in US
      - Created several companies
        - Health Payment Review
  - Photonics Center
    - Applied Research Center
      - Commercial application of light
    - Don Fraser
      - Created a number of companies
      - Incubator

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Diversification

- BioSquare
  - Research park
  - Medical campus
- Fraunhofer Center
  - German non-profit group
  - Applied research focus
    - Rapid prototyping and manufacturing

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Consolidation

- Office of Technology Development
  - 2005
  - Given responsibility for Photonics Center incubator
  - VC fund shut down
    - Seed funding capability replaced it
  - Current focus:
    - Translational research
    - Mentorship
    - Student analysts
- Health Policy Institute, Photonics Center, BioSquare have shifted focus to more academic models
  - Fraunhofer continuing original mission

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The TTO as an Independent Entity vs a University Department

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Benefits of an Independent Entity

- Streamlined decision making
  - Signatory authority
- Freedom from university bureaucracy
  - Pay scales
    - Ability for incentive comp
- External Board Members
  - “Free” expertise / advice

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Issues with an Independent Entity

- Financing
  - Initial capitalization
    - Source
  - Sustainability
    - “Eat what you kill”
      - What happens if you don’t kill enough?
- Culture
  - “Us” vs “Them”
  - Straying too far from the core mission
    - Imperial Innovations
      - Publicly traded on the AIM

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Independent Entities

- Has been a popular model in Australia / New Zealand
  - In U.S., many public universities set up a Research Foundation to hold the IP
    - 501(c)3
      - Wholly-owned by the university
  - Wisconsin Alumni Research Foundation
    - Oldest TTO in U.S.
      - Keep the Vitamin D income away from the State of Wisconsin!

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Thank you for listening.

Questions?

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Case studies of TTOs- USA

John Fraser

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Florida State University

- A public, state R-1 University. It is a nationally ranked, mid-sized, small town university. Atlanta is 4 hours away by car. Orlando – 2.5 hours.
- In the Fall of 2023, Florida State University (FSU) had a total enrollment of 43,234 students. Of these, 32,217 were undergraduate students, and 11,017 were graduate students.
- 60 + unique Research Centers: https://www.research.fsu.edu/research-fsu/research-centers-and-institutes/:
- Advanced Power Systems, Center for (CAPS); Autism Institute; World War II and the Human Experience, Institute on; Prevention and Early Intervention Policy, Center for; National High Magnetic Field Laboratory
- In Fiscal Year 2024, Florida State University (FSU) recorded research expenditures of approximately $455 million.

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Little formal interest in TT until Taxol Deal in 1996

- Traditional Main sources of Disclosures: FSU had no Medical school until 2010. The Engineering school was a joint venture with the local HBCU which had little interest yet in research, but focused on graduating black bachelor students ready to be employed by industry.
- Taxol – a License was signed with Bristol Myers Squibb used to manufacture their anti-cancer drug Taxol, later a billion $$US drug (more later).
- The Magnet Lab – the size of a shopping mall with parking for 200 cars. FSU Prof Jack Crowe led application for 3 University, facility-based center in new office building in FSU Research Park. Now NSF support of $30 million USD /year for Tallahassee, Gainesville and New Mexico sites.
- CPEIP (center studying how to help unwed Mom's prepare for and give birth without a male partner- now $5 million/year in evidence-based research).
- All these are due to one passionate faculty member.

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History

- 1994. Faculty task force was asked to make recommendations wrt future FSU technology transfer activities, largely driven by the fact that the cross-state rival university (U Florida) had a fully functioning TTO.
- IP Policy was updated to include Copyrights and other forms of IP.
- 1995 – a national search for a TTO Director was held – John Fraser was selected.
- One secretary hired. A lot of Outreach was done.
- 1996. Strategic Plan prepared to access Taxol monies. Office expanded to 1 Director, 2 Licensing officers, 1 junior Licensing Officer and 1 Secretary (5 people). TTO funded entirely from Taxol $$ in initial 8 years, then budget moved to indirect costs of R&D for long term stability
- 2014. John Fraser leave FSU.

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Structure of Office

- Office too small to specialize and organize by Activities.
- Office organized by interest/background of employees
  - Outreach – Director + Licensing staff
  - Disclosure input/evaluation – Licensing staff
  - Marketing/Negotiation – Licensing staff
  - License Administration – Licensing staff + Secretary
  - SpinOuts: Director + Licensing staff
- MISC: Helping other Offices with U/Industry negotiations; Communications (constantly Communicating the Benefits of participation to Stakeholders; Metrics gathering; Story Writing; Outreach); Commercialization Grant writing;

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LESSONS: Challenges / Opportunities – 1

- You need to communicate CONSTANTLY the Value /Impact of what you do and gather and communicate the evidence in the form of Metrics, Stories and Case studies. Nobody else will;
- Be active in strong networks in the State + National TT community;
- Be an entrepreneurial administrator;
- Manage EXPECTATIONS: Always try to under-promise and over-deliver. The key issue to communicate is: TTOs are not cash cows, even with a big hit.
- In a 2020 EU Report: Harmonization of Knowledge Transfer (KT) Metrics, the authors state: "A word of warning. Output indicators cannot be assessed in isolation. Context matters. Often overlooked **is the fact that KT indicators are a measure of the performance of the Public Research Organization (PRO) and not of its KT Office.** KT and impact are not the sole responsibility of the KTO. The KTO provides a professional service function within the overall PRO context and the PRO mission, environment, **priorities** and support determine its activities and performance.

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LESSONS: Challenges / Opportunities – 2

- The Mission statement of the TTO should be that its Mission is to assist the Institution to achieve its Mission.

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LESSONS: Challenges / Opportunities – 3

- The researcher is the key to everything;
- TT is a very tough business with few successes;
- All want to deal with MNCs, but in US, 20% of yearly deals are to start-ups; 33% to MNCs; 47% to SMEs.
- Tell Stories all the time and be an evangelist.
- TTOs staff need to take initiative and be willing to work in a rapidly changing environment where new disclosures come in unexpectedly.
- This is not a Business, but is a Service.

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THANK YOU for LISTENING !

John Fraser, President
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Case studies of TTOs- USA
Discussion 1: Practical lessons from the US experience

Richard Cahoon

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Cornell University

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Case Studies of TTO: practical lessons from US experience

Cornell University:

- The Large Office perspective
- Typically in top-10 of US research universities for annual research $$ ($1.2 billion in 2022)
- Invention Disclosures/year:
  1990 = 95
  2000 = 200
  2022 = 420
- The revenue share debate:
  15% not enough
  33.33% allows break-even

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Case Studies of TTO: practical lessons from US experience

Cornell University:

- The Large Office perspective
- Staff growth:
  1990 = Director, 2 Tech Mgrs, 4 admim
  2009 = Director & Assoc. Dir., 9 Tech Mgrs, 12 admin
  + student interns
- Licenses:
  1990 = 20/year
  2009 = 125/yr
- Break-even after 10 years of 1/3 revenue share
- Windfall returns with liquidation of start-up equity

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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%)

50% of all Cornell's patent expense reimbursed by licensees

Compare: 95% of US patents produce NO revenue!

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Case Studies of TTO: practical lessons from US experience

Cornell University: start-ups & spin-outs

- prior to 1989 = no licenses to start-ups
- 1989 IP Policy change allows equity for license fee
- 1990-2000 = avg of 5 start-ups/year
- 2008 = Cornell #1 US university in start-up licenses (12)
- 2008-2025 = avg of 10 start-ups/year

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Case Studies of TTO: practical lessons from US experience

Cornell University: generators of Invention Disclosures

- College of Medicine
- College of Agriculture & Life Sciences
- College of Engineering

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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

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