Patent Public Advisory Committee
Quarterly Meeting

Patenting and Licensing
from the University Perspective

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Overview

• A Primer on the University Patenting and Licensing Practice

• A View of Universities in the Innovation Ecosystem

• Conclusions
• What are the goals and tools of a university patenting and licensing practice?

• What are the features of a university patenting and licensing practice?

• How do these goals and features translate to university expectations from the patent system?
The Goals

- transfer university research
  - outside the university
  - for the benefit of society on a local, national, and global basis

- support university research, education, and teaching
The Tools

• protect university inventions with patents  
  – university owns the inventions of its faculty

• license university patent rights  
  – to start-ups and commercial enterprises  
  – for development into practical applications  
  – at market-rate terms  
  – to generate revenue
The Key Features

• Early-stage research
  – filing at the start of the inventive process
  – filing before a product or market exists

• Diversified
  – filing across a broad range of technologies

• Unpredictable research success
  – maintaining a large patent portfolio for years
The University Expectations

• Quality Examination
  – Early filing and unpredictable research success requires us to seek broad claims.
  – Quality examination ensures that these claims will withstand validity challenges downstream.

• Compact Prosecution
  – Diversification and unpredictable research success requires us to file extensively.
  – Compact prosecution helps us to focus our resources on the most patentable inventions.
The Innovation Ecosystem

• What roles do universities play in the innovation ecosystem?

• What challenges do universities face in being successful in these roles?

• What is Columbia’s experience?
Universities are Initiators of Innovation. 

- ~$809B in research funding
- ~320,000 invention disclosures
- ~175,000 patent applications
- ~70,000 patents awarded
- $2.5M disclosure
- 55%
- 40%
- 37,349 active license & options, 9,261 start-ups, 130+ new drugs & devices, 300,000+ new jobs

Source: AUTM Licensing Surveys (FY91-FY14)
Universities are Suppliers of Innovation.

Only 1 in 6 inventions ever gets licensed.

Roughly 1 in 100 pharma compounds gets approved.

Roughly 1 in 10 venture investments is a significant hit.

Success! a product on the market
Universities are champions of Startups.

AUTM Data for All US Universities (1.0 = FY2005)

- 36% increase in Startups relative to licenses

Source: AUTM STATT database
Universities Face Many Challenges in these Roles.

155 U.S. Universities – Gross Tech Transfer Revenue

Source: AUTM 2014 Survey Data
Why is this so hard?

Unpredictable Research Success

Part 1: The Valley of Death
Part 2: Predicting the Commercial Future is Hard.
The Valley of Death

- Government & Foundation Grants
- Early Feasibility Studies
- Technical Validation & Prototyping
- Early Market Testing
- Industry & VC Funding
- Product Development, Marketing, and Sales

The Valley
Predicting the Commercial Future is Hard.
For Columbia, only ~55% of Deals Done by Year 3, only 85% by Year 6

Columbia’s experience mirrors that of other universities.

Source: Review of elapsed time from invention submission to executed license, for ~400 executed licenses covering ~700 inventions, 1982 until 2014 (32 years)
Blockbusters Drive Most of the Revenue. But are Rare.

Only 1 in 6 inventions is ever licensed.

100%            75%            50%            25%            0%

Active Licenses        Revenue-Generating Licenses        Licenses >$1M Annually

Less than 1% of licenses generate > $1M / year

Source: AUTM Licensing Survey (FY04)

Only 1 in 6 inventions is ever licensed.
And Blockbusters Take Many Years To Develop.
And They Aren’t Always Obvious at the Time.

Columbia’s Four Biggest Revenue Producers
(Revenue per Year)
Columbia’s Experience
On an Annual Basis.

~400 new inventions from Columbia research each year

100+ licenses & options
15+ start-up companies
Millions in licensing revenue

Columbia Technology Ventures
Products Using Columbia Technology
>50% of Our Exclusive Licenses Are Now Granted to Startups On An Annual Basis.

An Explosion of Startups!
150+ Startups Spun out of Columbia in 20 Years
100+ still active, 45+ VC-backed, 10 gone public, 23 acquired

Health Analytics
- Intelligent Bio-Systems (A QIAGEN company)
- genia
- Health Fidelity

Pharma & Devices
- Schrödinger
- mesoblast
- Aton Pharma
- Kallyope
- Alkeus Pharmaceuticals INC.
- Pharmacopeia
- Viatar
- CTC Solutions
- Spience Therapeutics
- Armgo Pharma, Inc.

Media & Fashion
- Thunderlily
- MPEG LA

Communications & Devices
- CounterPath
- Emergent Communications
- Cellrox

Cybersecurity & Corporate Computing
- System Management ARTS (SMARTS)
- Infinio
- allure security technology inc.

Cleantech
- Radiator Labs
- BluCarbon
Universities are initiators in the innovation ecosystem.

As initiators, universities follow a virtuous cycle that leverages early-stage innovations and patents to support research, education, and teaching for society’s benefit.
Conclusions (Part 2)

• Participation in the innovation ecosystem requires investment and patience.

• USPTO quality examination and compact prosecution help universities focus their investment.
  – *The USPTO thereby provides critical support for the virtuous cycle underlying the start of the innovation ecosystem.*
Questions and Comments

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Thank you
Where Does the Money Go?
University Policy On Distribution of Commercialization Revenue

Gross Revenue
First $125K

- 40% Inventor
- 20% Inventor's Lab
- 20% Tech Ventures
- 20% University
- 20% School
- 20% Department

Gross Revenue
Over $125K

- 20% Inventor
- 20% Inventor's Lab
- 20% Tech Ventures
- 20% University
- 20% School
- 20% Department

Note: Certain caps and deductions may apply. See Appendix D of The Faculty Handbook for details.
Somewhere between invention and commercialization, there’s a desolate place where new technologies go to die alone. It’s called the Valley of Death, and it’s littered with the decaying corpses of technologies that never get to realize their potential. Too many technologies will be left to rot on the lonely, dusty road.
Example of a Recent University Startup: Radiator Labs
Converting Steam Radiators into Smart Energy-Efficient Appliances

The Cozy, by Radiator Labs, increases comfort, reduces costs and saves energy.

Our patent pending technology installs over your existing radiator turning it into a high tech, energy efficient heating source.

For Building Managers

For Home or Apartment
Example of a Recent University Startup: Radiator Labs

“170 years later, you can now close your window in winter.”

[Image: Radiator Labs team accepting an award]

[Image: Radiator Labs booth at a conference]