Introduction to Patents and Their Applications

Boston College Office of Technology Transfer & Licensing
What is a Patent?

- A legal protection which gives an inventor the right to exclude others from performing certain activity in the country of issuance.

- Sanctioned monopoly for a set number of years in exchange for disclosure to the public.

- Does not give the inventor the right to make, use or sell the patented invention.
Why Patent an Invention?

• Source of recognition for the inventor(s)

• Incentive to develop a commercial product
  – License to an existing company
  – Start up a new company

• Protection against imitators
What Can Be Patented?

• **Must be:**
  – Novel: not previously known or used by others
  – Useful: have a known use or produce a concrete and tangible result
  – Non-obvious:
    • Is it obvious to PHOSITA (Person Having Ordinary Skill In The Art)?
    • Can not be found in a single or reasonable combination of patents that would yield a predictable result

• **Can not be:**
  – Idea
  – Law of Nature
  – Scientific Principle
Notable Events in US Patent History

- **1790**: 1st US Patent Act entitled “An act to promote the progress of useful arts”
- **1850**: Introduction of the concept that an invention must be non-obvious as well as new and useful
- **1978**: Patent Cooperation Treaty put into effect; allows single worldwide filing
- **1980**: Bayh-Dole Act – Universities retain title to results of Federally funded research
Publication Vs. Patent

**Scholarly Publication**
- Authorship somewhat negotiable
- Must have done the work
- Effort paramount
- Future ideas can interfere with subsequent patentability
- Only directly comparable results can lead to loss in priority

**Patent**
- Inventorship a matter of law
- “Constructive reduction to practice” encouraged
- Conception paramount
- Disclosure of ideas for as many future uses as possible strengthens the patent
- Results from analogous systems can result in prior art and obviousness rejections
What are the Parts of a Patent?

- Abstract
- Background of the Invention
- Summary of the Invention
- Figures with brief descriptions
- Detailed description or “specification”
  - Fully discloses what the invention is
  - How it is made?
  - How it can be used?
- Claim(s): sets the legal boundaries of protection
  - Independent
  - Dependent
3 Different Types of Patents

- **Utility Patent**
  - Most common type granted
  - Works to produce a useful result
    - Process (ex. making a new chemical or a new business method)
    - Machine (ex. camera)
    - Article of Manufacture (ex. carpet)
    - Composition of matter (ex. adhesive)

- **Plant Patent**
  - Distinct & new variety of asexually propagated plant
  - Not by tuber propagation, found in an uncultivated state, or by seeds
  - Can also be protected by a utility patent if it meets those requirements
  - Ex. hybrid rose plant with a novel color

- **Design Patent**
  - Ornamental appearance of an article of manufacture
  - Design and the applied object are inseparable
  - Can also be protected by a utility patent if it meets those requirements
  - Ex. surface ornamentation of flatware
How Does One Obtain a Patent?

- First assessment for whether or not the invention is patentable AND marketable
- File provisional application (~$10K)
- International (PCT Application) (~$20-30K) – non-binding examination and allows an applicant to postpone the applications for up to 30 months
- US Utility Application (~$20-30K) – binding examination
- Examination rounds and appeals require more time and money
- Total average cost of a US patent: $50K
- Total average time to obtain a US patent: 3-6 years
BC’s Approach to Obtaining a Patent & Commercialization

- **Disclosure**: Ideally when you can describe both what the invention is and what it accomplishes.
- **Evaluation**:
  - Can this invention be patented?
    - Is there any prior art? Is this invention new, useful, & non-obvious?
  - Is it worthwhile to patent this invention?
    - What product could come from this patent? Is there a market for said product?
- **Provisional application**: Preserves worldwide rights against initial disclosure; gives you 1 year to decide whether or not to pursue patent.
- **Initial publication**: If you publish prior to filing a provisional application you lose the rights to file internationally.
• **Patent Cooperation Treaty (PCT):** an international application which claims priority to a provisional US application & have option for protection for up to 111 countries.

• **Non-confidential disclosure (NCD)** is generated and summarizes the technology as well as the unmet need/opportunity.

• During this phase more **marketing & search for licensee** should be completed. If there is no market or the market is too narrow, then the application may not be pursued past this point.

• After the re-evaluation there may be **additional publications** with interesting animal data, prototyping, or further commercialization.
BC’s Approach to Obtaining a Patent & Commercialization

- Continuation of marketing/finding a licensee as well as additional publications
- National stage applications with expensive examination rounds
- Rarely get this far in the patent process without a licensee
Overview of Pathway to Commercialization

- **Disclosure**
- **Initial Publication**
- **Evaluation**
- **3 Months**
- **8 Months**
- **One Year**
- **Six Months**
- **12 Months**
- **FILE PROVISIONAL APPLICATION (~$10k)**
- **FILE PCT (~$25K)**
- **PCT PUBLICATION**
- **Enter National Phase & Prosecution (~$20k)**
- **RARELY GET THIS FAR W/O LICENSEE**
- **Generate NCD**
- **Marketing/Search for Licensee**
- **Patentability & Marketing Evaluation**
- **ADDITIONAL PUBLICATIONS W/ INTERESTING ANIMAL DATA, PROTOTYPING, FURTHER COMMERCIALIZATION**
What are the chances of obtaining a patent?

Figure US-8. New Patent Filings and Invention Disclosures Received, 1992–2006


Source: AUTM 2006 survey
What are the chances of licensing a patent?

Source: AUTM 2006 survey

**Table US-7.** Licenses Executed by U.S. Respondents in 2006: Exclusive vs. Nonexclusive

<table>
<thead>
<tr>
<th>FY 2006</th>
<th>Number of Respondents</th>
<th>Total Executed</th>
<th>Exclusive</th>
<th>Excl of Total</th>
<th>Nonexclusive</th>
<th>Nonexclusive % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Universities</td>
<td>161</td>
<td>4,192</td>
<td>1622</td>
<td>39%</td>
<td>2,570</td>
<td>61%</td>
</tr>
<tr>
<td>U.S. Hospitals &amp; Research Institutions</td>
<td>28</td>
<td>755</td>
<td>208</td>
<td>28%</td>
<td>547</td>
<td>72%</td>
</tr>
<tr>
<td>Technology Investment Firms</td>
<td>1</td>
<td>16</td>
<td>2</td>
<td>12.5%</td>
<td>14</td>
<td>87.5%</td>
</tr>
<tr>
<td>All U.S. Respondents</td>
<td>190</td>
<td>4,963</td>
<td>1,832</td>
<td>37%</td>
<td>3,131</td>
<td>63%</td>
</tr>
</tbody>
</table>

**Table US-8.** Exclusivity of Licenses and Options Executed by U.S. Respondents in 2006 by Type of Licensee Company

<table>
<thead>
<tr>
<th>FY 2006</th>
<th>Number of Respondents</th>
<th>Total</th>
<th>Exclusive</th>
<th>Non-exclusive</th>
<th>Exclusive</th>
<th>Non-exclusive</th>
<th>Exclusive</th>
<th>Non-exclusive</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Universities</td>
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<td>4,192</td>
<td>638</td>
<td>60</td>
<td>947</td>
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<td>466</td>
<td>859</td>
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<tr>
<td>U.S. Hospitals &amp; Research Institutions</td>
<td>28</td>
<td>755</td>
<td>57</td>
<td>9</td>
<td>108</td>
<td>181</td>
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<td>226</td>
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<tr>
<td>Technology Investment Firms</td>
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<td>16</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>All U.S. Respondents</td>
<td>190</td>
<td>4,963</td>
<td>695</td>
<td>69</td>
<td>1055</td>
<td>1,361</td>
<td>561</td>
<td>1,085</td>
</tr>
</tbody>
</table>

Source: AUTM 2006 survey
How much money can be generated by a patent license?

Royalty Income to US Academic Institutions

Source: A. Stevens, les Nouvelles, 38, 133-140, September 2003; AUTM Annual Survey
Examples of Successful University Patents

• Gatorade & U. of Florida: more than $94 million in royalties since 1973
• Google & Stanford: could earn more than $200 million depending on how the stock performs
• Remicade & NYU: $650 million deal with Royalty Pharma in May 2007
Boston College’s Commercialized Patents

- ChiroTech: exclusive patent license - catalysts for asymmetric olefin metathesis 1999; collaboration with MIT
- Solasta Inc: thin solar technology, company founded in 2006
- GMZ Energy: nanotechnology based materials, collaboration with MIT, patent granted in 2007
Resources

• For More Background Information:
  – www.autm.net
  – http://www.ladas.com/Patents/USPatentHistory.html
  – http://www.bitlaw.com/patent/requirements.html

• To Search for Patents:
  – www.uspto.gov
  – www.google.com/patents