Patents & Intellectual Property

Rob Hallford
Associate Director
Duke University
Office of Licensing & Ventures

olv.duke.edu
IP Enables a Virtuous Cycle

Innovation

Research Funds

Intellectual Property

Revenue

Commercial Opportunity
Agenda

- Intellectual property
- Commercialization
- Office of Licensing & Ventures
Basics of Intellectual Property

Protecting Innovation

Linking Ideas to Impact
Types of IP Protection

Patent

Copyright

Trademark
Patent: Teach the World

- Description of an invention reduced to practice
- Inventor provides: detailed instructions on “how to”
- Government provides: commercial protection
To be patentable, an invention must be:

- Novel – some aspect must be new
- Non-obvious
- Useful
- Of patentable subject matter
- Undisclosed

When in doubt, let us check it out
Patentable Subject Matter

- Patentable inventions:
  - Compositions of matter
  - Methods of use
  - Methods of making
  - Apparatus

- Patent relationships:
  - Dominance
  - Mutual exclusion
Disclosure and Inventorship

- An invention is disclosed when **enabling information** is:
  - Verbally presented or discussed
  - Put into print
  - Posted online

- An inventor is one who contributes, in an inventive manner, to at least one claim:
  - Would the claimed invention exist?
  - Ideas incorporated vs. not incorporated
More Patent Details

- Claims
- Enforcement and jurisdiction
- Patent rights—protection
US Process and Timeline

- Provisional Patent Filed
- Non-Provisional Filed w/in 1 year
- Office Action Rejected/Response
- Notice of Allowance
- Patent Issuance
- Maintenance Fees 3.5, 7.5, 11.5 years
- Patent Expires 20 years

Priority Date
Bar Date

"Have you been waiting here long?"
Why Do Research?

- Passion for a particular field
- Intellectual curiosity
- Desire to find and share knowledge
- Desire to improve human condition
## Improving the Human Condition

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Drug Development Costs:</td>
<td>$1.0 B</td>
</tr>
<tr>
<td>Typical Number of Duke Drug Licenses:</td>
<td>~10/yr</td>
</tr>
<tr>
<td>Entirety of Duke University Endowment:</td>
<td>$4.8 B</td>
</tr>
</tbody>
</table>

Commercial partners are critical in realizing benefits of research.
Licensee (partner): obtains right to practice under patent

Licensor (Duke):
- Compensation
- Patent ownership

Inventor (PI):
- Retained rights to practice
- Research funds
- Revenue share
# Duke University Start-Ups

<table>
<thead>
<tr>
<th>Diagnostic</th>
<th>Therapeutics / BioTech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Liquid Logic</td>
<td>Angiomics</td>
</tr>
<tr>
<td>Aldagen (formerly STEMCO Biomedical)</td>
<td>B3Bio</td>
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<tr>
<td>Bioptigen</td>
<td>Collective Therapeutics</td>
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<td>Centice</td>
<td>Chaperone Therapeutics</td>
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<td>Expression Analysis</td>
<td>FibroGen</td>
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<tr>
<td>Reproductive Health Technology</td>
<td>Humacyte</td>
</tr>
<tr>
<td></td>
<td>Nitrox</td>
</tr>
<tr>
<td></td>
<td>Precision Biosciences</td>
</tr>
<tr>
<td></td>
<td>Reproductive Health Technology</td>
</tr>
<tr>
<td></td>
<td>Trimeris</td>
</tr>
<tr>
<td></td>
<td>Trevena</td>
</tr>
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<table>
<thead>
<tr>
<th>Drug Delivery</th>
<th>Therapeutics / Pharmaceutical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affinergy</td>
<td>Aerie Pharmaceuticals</td>
</tr>
<tr>
<td>Merix Bioscience</td>
<td>Bradmer, MicroIslet</td>
</tr>
<tr>
<td>Phase Bioscience</td>
<td>Orexigen</td>
</tr>
<tr>
<td>Regado Biosciences</td>
<td></td>
</tr>
<tr>
<td>Synergy Vaccines</td>
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<table>
<thead>
<tr>
<th>Hardware / Software / IT</th>
<th>Venture Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Liquid Logic</td>
<td>Southeast TechInventures</td>
</tr>
<tr>
<td>Bright View Technologies</td>
<td>SyneCor</td>
</tr>
<tr>
<td>MBright, Sentillion</td>
<td></td>
</tr>
</tbody>
</table>
## Revenue Sharing Structure

<table>
<thead>
<tr>
<th></th>
<th>Net Revenue &lt;$500K*</th>
<th>Net Revenue $500K - $2000K*</th>
<th>Net Revenue &gt;$2000K*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventor</td>
<td>50%</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>Inventor Lab</td>
<td>10%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Inventor Dept</td>
<td>10%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>OLV</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>University Rsch</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Inventor School</td>
<td></td>
<td>7%</td>
<td>5%</td>
</tr>
<tr>
<td>Grad/Post Doc Rsch</td>
<td></td>
<td></td>
<td>10%</td>
</tr>
</tbody>
</table>

* After patent expenses are paid
Delays publication?
Restricts scientific discovery?
At odds with academic mission?
Viewed as materialistic?
Bayh-Dole Act: University IP

Patents Issued to U.S. Universities

Number of Patents

Fiscal Year

SOURCE: UNITED STATES PATENT & TRADEMARK OFFICE
All inventions must be disclosed
  • Not necessarily University-owned
  • Disclosure is confidential
  • Forms: olv.duke.edu/inventors/forms

University-owned inventions come from:
  • University research
  • Scope of inventor’s employment
  • University time, facilities, staff, etc.
Office Responsibilities

- **Inventors**
  - IP assessment
  - Market assessment
  - Patent filing & management
  - Government compliance
  - Financial management

- **Partners**
  - License & option negotiations
  - Industry relationships
  - Invention marketing
  - Start-up formation
  - Innovation mining
OLV is one part of Duke University’s Corporate and Venture Development, under Dr. Robert Taber, Vice Chancellor.
<table>
<thead>
<tr>
<th>Name</th>
<th>Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amy Collinsworth, PhD</td>
<td>Orthopedics, Stem Cells, Pharma tools (biochips and manufacturing support), sensors &amp; control systems</td>
</tr>
<tr>
<td>Bryan Baines, RPh</td>
<td>Oncology, Pulmonary/Asthma, genomics</td>
</tr>
<tr>
<td>Dennis Thomas, PhD</td>
<td>Ophthalmology, Infectious Disease, Organ diseases, Agriculture</td>
</tr>
<tr>
<td>Rob Hallford, MS, MBA</td>
<td>Metabolism/Nutrition/Diet, software, biomarkers</td>
</tr>
<tr>
<td>Henry Berger, PhD</td>
<td>Brain machine interface, non-disease specific drug delivery, internet/computers, electronic materials/semiconductors, imaging device/equipment, transportation/environment</td>
</tr>
<tr>
<td>Karthik Gopalakrishnan, PhD</td>
<td>Immunology, Neuroscience, Imaging Chemistry, Psychiatric Disease, Cardiovascular</td>
</tr>
</tbody>
</table>
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Office of Licensing & Ventures
919-681-7579
rob.hallford@duke.edu