OTC Mission

• To facilitate the transfer of University of Minnesota research to licensees for development of new products and services that benefit the public good, foster economic growth and generate revenue to support the University’s research and education goals
# OTC Metrics

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invention Disclosures</td>
<td>217</td>
<td>244</td>
<td>255</td>
<td>250</td>
<td>324</td>
<td>331</td>
<td>343</td>
</tr>
<tr>
<td>New U.S. Patent Filings</td>
<td>52</td>
<td>65</td>
<td>66</td>
<td>78</td>
<td>115</td>
<td>146</td>
<td>138</td>
</tr>
<tr>
<td>New Licenses</td>
<td>63</td>
<td>44</td>
<td>67</td>
<td>76</td>
<td>71</td>
<td>91</td>
<td>154</td>
</tr>
<tr>
<td>University Start-Ups</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>9</td>
<td>12</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Current Revenue-Generating Agreements</td>
<td>281</td>
<td>306</td>
<td>399</td>
<td>457</td>
<td>426</td>
<td>331</td>
<td>429</td>
</tr>
<tr>
<td>Gross Revenues</td>
<td>$86.9</td>
<td>$95.2</td>
<td>$83.8</td>
<td>$10.1</td>
<td>$45.7</td>
<td>$39.5</td>
<td>$27.4</td>
</tr>
</tbody>
</table>

### Recent OTC Awards/Recognition

- 2013 MHTA Tekne: Innovative Collaboration Award
- 2014 MSP Business Journal: Eureka Award
- 2014 MN Finance & Commerce: MN Progress Award
- 2014 Tech Connect: National Innovation Award
- 2014 Nature Biotechnology article ranked UMOTC in top 5 TTOs for life sciences output
OTC Process overview

Idea → Reduction to practice and/or data → Disclosure to OTC

IP Protection → Evaluation

Marketing & Licensing → Commercialization
How is my technology evaluated?

**Strength of Invention:**
- What problem is solved?
- Is there a technical advantage?
- Easy to work around?
- Additional work required?
- Enough funding to complete?
- Discovery or invention?
- Is the inventor a leader in the field?

**Commercial Potential:**
- Who are the customers?
- Addresses an unmet need?
- How big is the market?
- Competing technologies?
- Expected time to market?
- Dominating IP?
- Supportive VOC?
- Third-party strings?
- Who will pay for development?
- Interested licensee?

**Patentability:**
- Surprising and unexpected results?
- Novel/Non-obvious?
- Public disclosures?
- Patent landscape?
- Publication landscape?

*In consultation with a patent attorney.
Requirements for patentability

An invention must meet these criteria:

• **Utility**
  – It must benefit mankind and have a “use”

• **Novel**
  – It must not have been previously known

• **Non-obvious**
  – It must not be obvious to one skilled in the art – “surprising and unexpected”

• **Sufficiently described and enabled**
  – The invention has to work and do what you claim it does
Examples of “Public Disclosures”

- Poster presentations
- Research Abstracts
- Research talks at meetings
- Graduate theses
- Open Seminars
- Information on non-secure websites
- Info from grants when they are awarded
- Technical updates for granting agencies
- Talking to company without a CDA
Tech Commercialization Simplified

Develop
Faculty, students and staff develop new IP

Protect
File patent application or copyright asset

License
License IP to existing company or start new company

Product
Company develops and sells product

Income
Company pays U royalty
However, Commercial Success Is Not Easy

145 U.S. Universities – Gross Tech Transfer Revenues

Only 16 Universities (11%) in 2009 had rev. >$25M
Only 15 Universities had >$500M in research $s
Only 5 Universities achieved both of above

Source: AUTM 2009 Survey Data
Inventions Often Take Years to Get Licensed

**Columbia University’s Licenses**

# of Years From Invention to Licensing Activity

("All Deals")

<table>
<thead>
<tr>
<th>Elapsed Years from Invention to License</th>
<th>% of Total Licenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>19%</td>
</tr>
<tr>
<td>1</td>
<td>39%</td>
</tr>
<tr>
<td>2</td>
<td>47%</td>
</tr>
<tr>
<td>3</td>
<td>64%</td>
</tr>
<tr>
<td>4</td>
<td>71%</td>
</tr>
<tr>
<td>5</td>
<td>75%</td>
</tr>
<tr>
<td>6</td>
<td>82%</td>
</tr>
<tr>
<td>7</td>
<td>90%</td>
</tr>
<tr>
<td>8</td>
<td>96%</td>
</tr>
<tr>
<td>9</td>
<td>98%</td>
</tr>
</tbody>
</table>

CU FY07-09 n=108
(NCI 95-09 n=251)
“Blockbusters” Drive Most of the Revenue, But are Rare

It takes 100 licenses to produce one that generates >$1M

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

Source: AUTM Licensing Survey (FY04)
## Top US Universities ranked by Licenses/Income

<table>
<thead>
<tr>
<th>University</th>
<th>Licenses and/or options executed</th>
<th>Gross licensing revenue received</th>
<th>Startups</th>
<th>NIH awards</th>
<th>NIH funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California system</td>
<td>236</td>
<td>$97,218,208</td>
<td>55</td>
<td>4,239</td>
<td>$1,741,730,393</td>
</tr>
<tr>
<td>University of Washington/Washington Research Foundation</td>
<td>134</td>
<td>$47,428,701</td>
<td>9</td>
<td>932</td>
<td>$454,274,167</td>
</tr>
<tr>
<td>Columbia University</td>
<td>55</td>
<td>$137,000,000</td>
<td>6</td>
<td>860</td>
<td>$348,146,222</td>
</tr>
<tr>
<td><strong>University of Minnesota</strong></td>
<td>48</td>
<td><strong>$34,400,000</strong></td>
<td>9</td>
<td>608</td>
<td><strong>$264,302,067</strong></td>
</tr>
<tr>
<td>New York University</td>
<td>29</td>
<td>$213,137,273</td>
<td>5</td>
<td>612</td>
<td>$220,178,414</td>
</tr>
<tr>
<td>Wake Forest University</td>
<td>23</td>
<td>$2,206,625</td>
<td>4</td>
<td>242</td>
<td>$101,760,292</td>
</tr>
<tr>
<td>Northwestern University</td>
<td>22</td>
<td>$256,163,456</td>
<td>3</td>
<td>593</td>
<td>$233,095,315</td>
</tr>
<tr>
<td>University of Rochester</td>
<td>8</td>
<td>$27,139,128</td>
<td>0</td>
<td>382</td>
<td>$146,849,347</td>
</tr>
<tr>
<td>University of Massachusetts</td>
<td>7</td>
<td>$32,624,826</td>
<td>1</td>
<td>392</td>
<td>$158,659,306</td>
</tr>
<tr>
<td>Princeton University</td>
<td>4</td>
<td>$130,000,000</td>
<td>1</td>
<td>117</td>
<td>$39,609,228</td>
</tr>
</tbody>
</table>

**Nature Biotechnology 32, 1085 (2014) doi:10.1038/nbt.3066 Published online 07 November 2014**
## Start ups and Licenses

<table>
<thead>
<tr>
<th>Company</th>
<th>Stage</th>
<th>Development</th>
<th>License Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oncology company</td>
<td>In Phase. Ia/Ib</td>
<td>clinical trials for multiple cancers</td>
<td>Anti-HIV therapy licensed to Glaxo resulted in a multimillion dollar royalty stream to the University</td>
</tr>
<tr>
<td>Discovery stage company</td>
<td>Developing small molecules</td>
<td>to treat APOBEC driven cancers</td>
<td>Multimillion dollar deal with Intrexon-Ziopharm for the use of SB system for cancer Immunotherapy</td>
</tr>
<tr>
<td>Clinical stage company</td>
<td>Developing IV</td>
<td>Topiramate for Adult Epilepsy</td>
<td>Porcine Reproductive and Respiratory Syndrome (PRRS) Vaccine licensed to Boehringer Ingelheim</td>
</tr>
</tbody>
</table>

**Sleeping Beauty (SB) Transposon System**

**ApoGen** TM

**CURx Pharmaceuticals**
Licensing Strategies
Reflection of risk, capital requirements, and market disruption

Standard Patent License
Exclusive License
Non-Exclusive License
Option to License

Minnesota Innovation Partnership
MN-IP Create
MN-IP Try & Buy

New Company Startups
Disruptive technologies
Technologies serving an unmet need

Office for Technology Commercialization
Case Study I

Sleeping Beauty (ca. 1996):

- **Patents**
  - Broad composition and method claims **ISSUED**

- **Technology**
  - Fully enabled and widely used by the research community

- **Commercialization**
  - Bench to Bedside translation
  - Field interest (High)
Case Study- II

Novel Stem Cell Marker for Oncology:

• **Patents**
  – Narrow claims *(Not Issued)*

• **Technology**
  – Some enablement and limited validation by the research community

• **Commercialization**
  – Early pre-clinical data; clinical translation
  – Field interest *(Niche to high)*
DISCUSSION
Recent University of Minnesota Start-ups

Celladon

THE ACTIVES FACTORY

Medication Management Systems, Inc.

Miromatrix Medical Inc.

BIOCEE

United Science

earlyLEARNINGlabs

EVIDENTIA health

Omicon Health

Rushford HYPERSONIC

A CUTTING EDGE NANOTECHNOLOGY COMPANY

Nouvant

NEWWATER

EmboMedics

ERC Epitopeletic Research Corporation

cellectis plant sciences

VitalSims
Office for Technology Commercialization

University of Minnesota
Driven to Discover™