MUSC Foundation for Research Development
Technology Transfer Strategic Plan

Vision:
FRD is the premier resource for MUSC to bring intellectual property to the marketplace.

Mission:
FRD serves MUSC through efficient and effective commercialization of research and educational discoveries and industry partnering.

- Promote the public good by transferring MUSC intellectual property to industry for commercialization into products and services that improve the lives and health of our fellow citizens.

- Aid in the creation of a climate of innovation at MUSC that attracts and retains world class faculty by providing efficient and effective technology transfer services for MUSC.

- Engaging private sector strategic research and development partners for MUSC thereby producing ground breaking discoveries than would not be achieved alone.

- Contribute to economic development by providing streamlined access to MUSC intellectual property for South Carolina startup and technology based companies.

FRD Values

- Commitment to Excellence
- Effective and Rapid Communications
- Accountability
- Collaboration
- Fiscal Responsibility
- Teamwork
- Solution Focused
- Adaptability
**Strengths and Opportunities**

**Strengths**
- Innovative faculty with a prior record of success in obtaining research awards and clinical excellence.
- Untapped intellectual property on campus waiting to be mined.
- FRD Board of Directors provides high end industry experience and expertise.

**Opportunities**
- MUSC Strategic Plan’s focus on entrepreneurialism, innovation, and technology.
- MUSC’s planned Center for Innovation and Entrepreneurialism.
- New funding paradigms internally at MUSC and externally at SCRA.
- Growing collaborations with Clemson, USC, and others.

**Benchmarking**

Comparing MUSC’s core tech transfer benchmarks to national averages shows a marked need for increases in the:
- number of invention disclosures,
- number of patent filings, and
- commercial viability of discoveries.

Additionally while FY11 deal flow was at a near record level for MUSC, streamlining the transactional process is needed with less focus on maximizing financial return and more focus on increased numbers of deals ("more shots on goal") and maximizing other benefits to MUSC such as research support.

The metrics table below shows comparisons to the Top 20 in License Income, Top 20 in NIH funding, and all universities with a medical school; the latter category being more pertinent for comparison purposes for MUSC. The detailed benchmarking data found in the supporting documentation also includes statistics from similarly situated peer institutions. We also benchmarked against best practices and methods at top performing institutions such as Utah, Penn, Mayo, UNC, Columbia and others.

While benchmarking is a useful tool, consideration must also be given to the resources of the organization. With that in mind, our benchmarking will allow FRD to focus on how we should improve to be the best we can in our situation.
MUSC AUTM Metrics per $10M research expenditures

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Top 20 License $</th>
<th>Top 20 NIH $</th>
<th>All Univ w/ Med Schools</th>
<th>2011</th>
<th>2010</th>
<th>2009</th>
<th>2008</th>
<th>2007</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Exp ($10M)</td>
<td>$61</td>
<td>$71</td>
<td>$35</td>
<td>$16</td>
<td>$16</td>
<td>$16</td>
<td>$16</td>
<td>$16</td>
<td>$15</td>
</tr>
<tr>
<td>IP Disclosures</td>
<td>4.32</td>
<td>3.95</td>
<td>3.88</td>
<td>2.75</td>
<td>2.13</td>
<td>2.81</td>
<td>3.67</td>
<td>3.18</td>
<td>2.87</td>
</tr>
<tr>
<td>New US Patent Apps</td>
<td>1.96</td>
<td>2.32</td>
<td>2.43</td>
<td>0.63</td>
<td>0.69</td>
<td>0.88</td>
<td>1.00</td>
<td>1.31</td>
<td>1.33</td>
</tr>
<tr>
<td>US Patents Issued</td>
<td>0.77</td>
<td>0.62</td>
<td>0.62</td>
<td>0.38</td>
<td>0.00</td>
<td>0.13</td>
<td>0.00</td>
<td>0.13</td>
<td>0.20</td>
</tr>
<tr>
<td>License &amp; Options</td>
<td>1.41</td>
<td>1.00</td>
<td>0.95</td>
<td>0.69</td>
<td>0.31</td>
<td>0.56</td>
<td>0.19</td>
<td>0.31</td>
<td>0.47</td>
</tr>
<tr>
<td>Startups formed</td>
<td>0.12</td>
<td>0.08</td>
<td>0.11</td>
<td>0.25</td>
<td>0.19</td>
<td>0.25</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
</tr>
</tbody>
</table>

**Strategic Initiatives**

To achieve our Vision and perform our Mission in support of MUSC the following strategic initiatives (goals) with specific implementation objectives were developed for FRD:

1. **Empower the MUSC Faculty to increase the number and quality of inventions.**
   - FRD commitment and accountability to rapid responsiveness through established benchmarks
   - Provide an Inventors Web Portal for ease of disclosure and status checks
   - Engage inventors in a review process that provides instructional feedback
   - Establish Industry Advisory Groups

2. **Establish efficient and effective technology transfer process, procedures, and metrics coupled with a streamlined licensing process.**
   - Create clear and concise written operations plan with published procedures and metrics which include tracking timeliness of performance
   - Offer “Express Licenses” and create a road map to guide industry through the licensing process

3. **Implement an effective communications plan to educate inventors and convey the performance, value, and benefit of FRD.**
   - Update the FRD website including technology marketing tools
   - Implement regular communications to faculty including department seminars and quarterly reporting of metrics
• Establish a Faculty Advisory Committee

4. **Develop a sustainable funding model for MUSC technology transfer.**
   - Secure funding a five (5) year funding commitment to support ramped up operations that can exceed performance goals
   - Operate at a net benefit to MUSC

An implementation timeline with metrics is shown in the attached table.

**Funding Needs**

Critical factors impacted by funding levels at FRD include staff size and the number of patent applications filed. While more detailed revenue and expense forecasting models can be found in the supporting documentation, the base line funding needs for tech transfer are shown in the table below. (Note this does not include technology project development funds and tech scouting type functions that are planned to be located in the new MUSC Center for Innovation and Entrepreneurialism.)

<table>
<thead>
<tr>
<th>Category</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td></td>
</tr>
<tr>
<td>Current MUSC Contract</td>
<td>$900,000</td>
</tr>
<tr>
<td>Patent Reimbursement</td>
<td>$280,000</td>
</tr>
<tr>
<td>License Income (FRD portion and Out of Pocket Recovery)</td>
<td>$125,000</td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td><strong>$1,305,000</strong></td>
</tr>
<tr>
<td>Expenses</td>
<td></td>
</tr>
<tr>
<td>Administrative Expenses &amp; Salaries</td>
<td>$550,000</td>
</tr>
<tr>
<td>Tech Transfer Salaries</td>
<td>$650,000</td>
</tr>
<tr>
<td>Technology Evaluation &amp; Patent Prosecution</td>
<td>$800,000</td>
</tr>
<tr>
<td>Other</td>
<td>$100,000</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td><strong>$2,100,000</strong></td>
</tr>
<tr>
<td><strong>Net Result of Operations (Unfunded mandate)</strong></td>
<td><strong>($795,000)</strong></td>
</tr>
</tbody>
</table>

An immediate objective of the Strategic Plan is increasing the sources and amounts of available funding for FRD operations. Currently FRD tech transfer operations are funded by the MUSC Provost Office at $900,000 per year. Additional revenue sources to be considered include:

• Philanthropy including a relationship with the MUSC Foundation and OIP surplus.
• Co-investing by the South Carolina Research Authority (SCRA) where SCRA funds would be used in a 1:1 match with FRD funds for patenting.
• Co-investing by an early stage venture fund or angel group.
• Providing fee for service support to other operations (OIP), universities, or research labs.
• Allowing MUSC departments to make investments in commercial development of MUSC inventions. (This could also include project funds which are not included in the above budget.)
• Sharing of operational infrastructure with peer institutions such as Clemson or USC to offset costs.
• Sharing of returns with service providers willing to provide services at an upfront cash discount in exchange for downstream success fees.

**Operational Overview - Models & Metrics**

**A. Tech Transfer Models Considered**

Various tech transfer models\(^1\) were considered including: Intensive Internal Development, Startup Intensive, and Market Driven approaches. A technology based approach which makes use of available funding sources (which are primarily external\(^2\)) was chosen for MUSC.

A technology based approach uses two primary factors for selection of the appropriate vehicle for commercialization: (a) stage of development of the technology and (b) location of funding sources for future commercial development. Chart 1 shows the technology based approach to selection of the preferred commercialization path.

The operational process and procedures that will be used in the evaluation of new inventions is shown in Chart 2. An interactive process was chosen that allows the inventor to be part of the evaluation which furthers the inventor's understanding of the critical factors needed for commercial success. This process and the adherence to defined timelines for responsiveness will build inventor confidence in the decision made and FRD.

**B. Metrics**

FRD will publish periodic performance metrics. It will also utilize a faculty advisory group that meets quarterly to judge FRD performance and provide feedback and guidance for improved service to faculty. Potential metrics include:

• No. of Invention Disclosures  
• Office Responsiveness  
• Commercialization Success Rate  
• No. of Startups

• Patent Expense Reimbursement  
• No. Patent Apps filed  
• License Income  
• Startup Success Rate
Chart 1: Operational Model: A Technology Based Approach to Commercialization
Selection of the Preferred Vehicle for Commercialization of a Discovery

The stage of development of a discovery and the market dynamics will determine the preferred route for commercialization.

Discoveries that do not require additional development to attract a licensing partner will be offered to industry partners for commercialization. For discoveries with merit that require additional development such as proof of hypothesis, prototyping, etc. a process will be followed that determines the preferred development path. Funding opportunities will be a critical factor in the decision making process. Startups and focused technology development companies (technology accelerators) will be utilized.

Using this methodology, discoveries will be placed in the hands of private sector partners that offer the best opportunity for successful commercialization.
Chart 2: Operational Process: Evaluation & Decision-making which Engages Faculty

- Timelines are from receipt of an invention disclosure.
- Triage team performs an initial assessment to determine if a more detailed review is warranted.
- ScoreCards are typically prepared with the assistance of outside consultants and address patentability and market potential. ScoreCards provide a numerical score (1-10) to aid in the allocation of resources/funding.
- Review Committee is a committee of the FRD Board with extensive industry experience.
  - Additional input can be obtained from MUSC clinical faculty and industry partners.
  - Report will include technology development steps needed.
- Inventors are engaged at each step of the process and encouraged to provide input and participate in the preparation of review materials.
- The Department Chair (or designee) is involved in the decision making process. This aligns funding and the strategic research goals of the department with IP commercialization.
1 Tech Transfer Models

A. Intensive Internal Development: This model deploys teams of "enablers" into research programs and provides these interdisciplinary teams with substantial proof of concept and prototyping funding. An example of a program following this model is Mayo Clinic which saw its success rate for technology commercialization climb to 49% upon implementation of this model. This model requires substantial internal funding for technology development in addition to a robust tech transfer budget. It does provide increased commercialization success rates.

B. Startup Intensive: This model has a greater than average focus on startups, with the tech transfer office often creating and incubating startups prior to the identification of funding or management. Utah is a good example of an institution which has implemented this model. In the right climate it may attract capital to a region and spur local economic development. However, it can result in startups that are often merely shells.

C. Market Driven: By allowing the market to decide the fate of technologies this model is built upon filing a large number of provisional applications, an intensive marketing effort, and terminating efforts for all but a very small number of technologies that are not licensed out prior to the one year provisional application date. This model provides an effective approach to portfolio and budget management with defined and timely end points for inventors. However, it may not be suitable for many life science technologies that require substantial development time often exceeding the one year provisional time period.

2 Funding sources for MUSC technology development are primarily external. Specifically SCLaunch funds, which are available at various levels from $25,000 to $200,000 are payable to for profit entities. However, S.C. has a shortage of experienced life science entrepreneurs to serve as management. Thus a balanced approach that attempts to develop technologies internally for licensing to established companies to the extent practical coupled with focused startup and technology development companies with experience management for external development was chosen. This takes advantage of available resources and helps address the human capital gap.