An Integrated Educational Approach to Biomedical Innovation and Entrepreneurship
Ofer Amit, Richard Schoephoerster, Alan Carsrud, Vish Prasad

Biomedical Engineering Partnership Program
Florida International University, Miami, Florida

Presented at the
Roundtable on Entrepreneurship Education for Scientists & Engineers
Stanford University
October 2004

Ofer Amit
Director, Institute for Technology Innovation
Director, Partnership & Industry Programs
• The Setting:
  – Florida International University
  – The College of Engineering
  – The Department of Biomedical Engineering
  – The Institute for Technology Innovation
  – The South Florida Biomedical Industry
  – The South Florida Clinical Community
• A Closed Loop of Biomedical Innovation
  – Networking
  – Regional economic and community development
  – **FIU BME:**
    Practical experiences for faculty and students, project support, technology entrepreneurship/commercialization
  – **Industry Partners:**
    Cost effective projects, quality graduates/cost effective recruiting, technology transfer
  – **Clinical Partners:**
    Cost effective research, improved clinical outcome, technology commercialization, medical school
The Biomedical Engineering Partnership Program:

- A catalyst for excellence in education
- Innovation, invention, discovery & entrepreneurship
- Teamwork & leadership
- Infrastructure and environment
• Funding:
  – National Science Foundation
    *Partnerships for Innovation Award*
  – Wallace H. Coulter Foundation
    *Collaborative Technology Innovation Program*
    *Young Inventor Program*
  – Howard J. Leonhardt New Venture Challenge
    *Best medical technology business plan*
  – Member annual sponsorship grants
    *See Sponsorship Program*
• **Partner Input:**
  
  – **MS program**
    - Undergraduate minor, BS/MS combined program with ME, EE
  
  – **BS program**
    - Molecular, cellular, tissue engineering focus
  
  – **PhD program**
    - Research focus areas (cardiovascular, neuroengineering)
  
  – **Faculty hiring**
    - Search and screen committee participation
  
  – **Formation of a Department**
    - Strategic planning - goals
• **Infrastructure:**
  – **Resources:** space, people, budget
  – **By laws**
  – **Semi-annual Meetings**
  – **Biomedical Engineering Advisory Board**
  – **Biomedical Engineering Executive Committee**
  – **Sponsorship Program**
### Sponsorship Program:

<table>
<thead>
<tr>
<th>No</th>
<th>Contributions</th>
<th>Unit of Measure (UOM)</th>
<th>Point Per UOM (Not-for Profit)</th>
<th>Point Per UOM (Small Company)</th>
<th>Point Per UOM (Large Company)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minimum Cash Contribution</td>
<td>$</td>
<td>N/A</td>
<td>$250</td>
<td>$1,000</td>
</tr>
<tr>
<td>2</td>
<td>Additional Cash Contribution</td>
<td>$</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>In-Kind Gifts (Non-cash Donations)</td>
<td>$</td>
<td>2</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>Internship</td>
<td>Student per semester</td>
<td>500</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Lectures at the university</td>
<td>Hour</td>
<td>200</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>Projects Involving Students</td>
<td>$</td>
<td>0.1</td>
<td>0.1</td>
<td>0.01</td>
</tr>
<tr>
<td>7</td>
<td>Publish Articles for Students</td>
<td>Each</td>
<td>200</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>Serving on Committees</td>
<td>Hour</td>
<td>100</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>Sponsoring a Board Meeting</td>
<td>Session</td>
<td>500</td>
<td>500</td>
<td>150</td>
</tr>
<tr>
<td>10</td>
<td>Student Mentoring</td>
<td>Hour</td>
<td>100</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>11</td>
<td>Participate in University Activities/Initiatives</td>
<td>Hour</td>
<td>100</td>
<td>100</td>
<td>25</td>
</tr>
</tbody>
</table>
• Environment/Programmatic Innovations:
  – Young Inventor Award (under construction)
  – Howard J. Leonhardt New Venture Challenge
  – Graduate Program:
    • Clinical research experience
  – Collaborative Technology Innovation program
  – Undergraduate Program:
    • Clinical rotations
    • Senior design experience (mentoring & internship)
• Collaborative Technology Innovation program (CTIP):
  – Technology seed funding
  – On an annual basis
  – A two-phase program jointly funded by FIU and members of the Partnership Program:
    • Phase I: two $50K projects (WHCF, revised)
    • Phase II: one $100K project (NSF)
• Clinical Rotation:
  – Introduction to the end-user of medical device development
  – Observation of medical procedures
  – Interaction and discussion with clinicians
  – Key elements:
    • 3 hours/week + 2 procedures
    • Each session: lecture, tour/demonstration, discussion
    • Student evaluation: attendance, weekly reports, other written assignments
• Senior Design Experience:
  – Two-semester sequence, 1+3 hr/wk, 4 options
  – Entrepreneurship Option
    • *Endpoint*: Howard J. Leonhardt New Venture Challenge
  – Clinical Option
  – Research Option
  – Corporate Option*
    • *Endpoints for above three options*: Annual FIU Technology Expo and Competition

* - Endpoint may depend on technology/IP position
• Where Do We Go from Here?
  – Biomedical Engineering:
    • Three-phase CTIP
    • Expansion: regional initiatives
    • Bioscience technology/business incubation
  – College-level scale up
Thank You

An Integrated Educational Approach to Biomedical Innovation and Entrepreneurship

Biomedical Engineering Partnership Program
Florida International University

Roundtable on Entrepreneurship Education for Scientists & Engineers
Stanford University
October 2004