An Integrative Approach to Technology Entrepreneurship

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TI:GER Founder & Executive Director

Entrepreneurship Education: Developing a Community of Practice
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Duke University
What is TI:GER?

- 2-year Team-based Experiential Certificate Program
- PhD students in Science & Engineering team with Georgia Tech MBA & Emory School of Law JD students
- Focus on issues in potential commercial application of PhD student thesis research
Technology commercialization requires integration of
- Science & engineering expertise
- Knowledge of Business & Law

Graduate students—particularly PhDs-- underserved in entrepreneurship education

Challenge: Not to divert PhD students from research
Program Goals

• Produce graduates with multidisciplinary skills & entrepreneurial perspective for career success in innovation
  - S&E PhDs aware of business & legal issues
  - MBAs & JDs experienced in technical research setting
  - Communication & team skills

• Produce S&E research of technical merit and market relevance
2 Year Graduate Certificate Program

Science & Engineering Classes/Labs

3 Core Classes Industry/Legal Mentors Consult/Int’l Projects

Multidisciplinary Research Centers Teams: Issues in Potential Commercialization of PhD Research

Management Classes

Internships

Law Classes Clinics/Internships

PhDs

TI:GER

3 Core Classes Industry/Legal Mentors Consult/Int’l Projects

Teams: Issues in Potential Commercialization of PhD Research

Market Informed S&E Research Graduates aware of technical, legal, market, interpersonal, & communication issues

Mgt/Law/Econ Research on the Innovation Process

MBAs

JDs

Georgia Tech
## Team Experience

<table>
<thead>
<tr>
<th>INTEGRATED RESEARCH</th>
<th>S&amp;E/ MGMT/ LEGAL ISSUES</th>
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</thead>
<tbody>
<tr>
<td>Hypothesis formation</td>
<td>Scientific merit; feasibility</td>
</tr>
<tr>
<td><strong>Market opportunities</strong></td>
<td><strong>Economic and social impact</strong></td>
</tr>
<tr>
<td>Legal landscape</td>
<td>Prior art</td>
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<tr>
<td>Proof of concept</td>
<td>Testing and validation</td>
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<tr>
<td><strong>Competitive analysis</strong></td>
<td>Risk, product &amp; platform definition</td>
</tr>
<tr>
<td>Intellectual Property</td>
<td>Startup &amp;/or license; financing</td>
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<tr>
<td><strong>Intellectual Property</strong></td>
<td>Freedom to operate</td>
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<tr>
<td><strong>Prototype</strong></td>
<td><strong>Refinement and scale-up</strong></td>
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<tr>
<td>Commercialization strategy</td>
<td>Full market analysis (pricing, cost)</td>
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<tr>
<td>Business Associations</td>
<td>Contractual issues</td>
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</table>
Teams Span Disciplines & Universities

5 member teams; 35 – 40 students per cohort

Georgia Tech PhD & MBA; Emory JD students

<table>
<thead>
<tr>
<th>Program</th>
<th>Number</th>
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<tbody>
<tr>
<td>PhDs</td>
<td>108</td>
</tr>
<tr>
<td>JD</td>
<td>211</td>
</tr>
<tr>
<td>MBA</td>
<td>161</td>
</tr>
<tr>
<td>Post Docs</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>483</td>
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Metrics: Student & Project Outcomes

• NSF Assessment Results
  – Pre and Post Capabilities of TI:GER PhDs vs control PhDs
  – On all criteria, TI:GER PhDs scored significantly higher than Controls
  – Within sample comparisons, entry vs. exit, differential gains but few significant

• Survey of PhD Research Commercialization Outcomes
  – For the TI:GER PhD research projects, have any of the following events occurred? (79 responses; 32% reported a commercialization event with 76 outcomes reported)
    - SBIR/GRA: 16 (20%)
    - Company formed: 17 (22%)
    - Funds raised 09-14: 14 (18% of $13 M)
    - Patent filed: 19 (24%)
    - Job Opportunity: 13 (16%)

• 3 waves of surveys re career paths, differentiate those in startups/medium & large companies
Challenges

- Curriculum materials accessible to all


- Funding—PhD & MBA students partially supported; $ 2 M endowment; Provost Office;

- Demands for growth in high human capital intensive curriculum

- Maintaining successful integration long term
  - Across administrators, universities
  - Free rider problem
Integrative Education in Technology
Entrepreneurship & Innovation