Proceedings

Teaching Entrepreneurship to Engineering Students

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Developing an Entrepreneurial Culture for Faculty, Researchers, and Students

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Developing an Entrepreneurial Culture

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Jacobs School of Engineering at UCSD

- 160 Faculty – Planned to grow to 250 in 2010
  - Research Expenditures/Faculty Member $890,000
- 4,000 Undergraduate students
- 925 Graduate Students

- 450,000 square feet of new construction
The von Liebig Center – A Pre-Incubation Incubator?

- Offering Pre-Incubation Advisory Services
- Project Funding
- Space for Commercialization Activities associated with Jacobs School of Engineering technologies
- Teaching Entrepreneurism to Engineering students
- Creating a more entrepreneurial environment
Von Liebig Center Mission

- Serve Jacobs School faculty by stimulating innovation and technology applications
- Serve as advisor and conduit to funding sources for the commercialization of Jacobs School technology
- Prepare engineering students for the entrepreneurial workplace
Permanent Staff

- Experience in Start-ups, Technology Transfer, Research Management, Venture Capital, Fundraising
- Not Academics but understand Academia
- Small number of permanent/full-time staff
- Highly qualified administrative staff
Technology Advisors

- Consultants with experience in assessing the commercial viability of a product or service
- Have start-up experience
- Have connections with local companies and investment sources
- Focused areas of expertise
- Understanding of University environment and culture (or ability to adapt to it!)
- 2-6 days/month
Technology Advisors

- Work one-on-one with Faculty and Researchers
- Analyze Commercial Potential
  - Proactively identify current research projects
  - Assess potential commercial interest
  - Identify early commercial interest
- Create Business Model
  - Determine best model: license or start-up
  - Work with inventors’ interests and preferences
- Ensure Intellectual Property is Disclosed and Protected
Technology Advisors

■ Licensing
  ■ Identify Potential Licensees
  ■ Market to Companies

■ Spin-Off
  ■ Develop Business Plan
  ■ Market to Investors
Technology Advisors

- **Pros**
  - High Levels of Expertise & Corporate/Capital Connectivity
  - Leverage into business and investment networks
  - Flexibility in number of hours worked
  - Faculty appreciate quality, dedicated support

- **Cons**
  - More conflict of interest issues
  - More coordination & collaboration time required by permanent staff
  - More education in academic culture and technology transfer issues
Technology Reviewers

- Unpaid volunteers
  - Technology Brainstorming Sessions
  - Funding Application Reviewers

- Benefits
  - Great Outreach – increase community participation & knowledge
  - High levels of technical expertise available
  - “Try before you buy”
Project Funding

- Gap funding to build prototypes, demonstrate, test feasibility, protect intellectual property
- Up to $50,000 first round, can apply for a further $50,000
- Basic application
- External reviewers
- Approx 10 projects per year
Funding Review Process

- Internal Review
  - External reviewers
    - Technology Due Diligence
      - Awards
Comparative Programs

- CalTech ($400,000/yr - $50,000 per project)

- Wisconsin Alumni Research Foundation (WARF) ($400,000/yr - $2,000 - $40,000 per project)

- Stanford University – Birdseed Fund ($210,000 in four years)

- Scotland – Proof of Concept Fund (£30 million fund - typical award £250,000)
Importance of Gap Funding

- Can fund projects that are not fundable from other sources
- Gets Faculty attention
- Gets Faculty to start thinking more about their inventions
- New mindset from awards as they are milestone driven with regular meetings with Center staff
Follow-on Resources

- **Other UC Resources**
  - CONNECT – start-up and Venture Capital assistance
  - Discovery Grants – UC funding for joint projects with California companies
  - CCAT – funding for homeland security projects

- **Community Resources**
  - Local VC’s
  - Local Incubators
  - Industry Associations

- Advisors help to identify and introduce
Collaboration with Technology Transfer

- Co-location of a senior licensing officer from TTIPS in our facility
- Close coordination of disclosures, patent filings and marketing
- More focused marketing efforts
- Increase service level to faculty on general commercialization issues
- At other institutes many of the von Liebig advisory functions are performed by Tech Transfer office
The Facilities

- Transition Space – not research – not commercial
- Needs to feel different from regular University office and lab space
- Can’t be too intimidating for faculty – can’t be like visiting the bank manager
- In the heart of Engineering Quad
IdeaEdge

Local Venture Incubator
Advisory staff and companies
Semi-public offices & cubes
Private Venture Garages
Forward Ventures

Focus on biotech industry
• Investments between $500,000 and $5 million
• Incubator space along side the partners in the firm’s offices
• Offices for executives – plus cubes
• Usually 2-3 firms incubating at any time
The von Liebig Center Facilities

Shared Resources

Conference and Presentation Spaces

- Auditorium
- Conference Rooms
- Visualization Lab & Linux Cluster

- Small Library – also on-line resources
- A/V Equipment & Teleconferencing Capabilities
- Wireless Access throughout the building
- Administrative Staffing & Office Equipment
The von Liebig Center Facilities

- Project Rooms/War Rooms/Proposal Rooms
  - Equipped as small offices/small conference rooms with flexible furnishing
- Priority given to funding recipients – other commercialization projects on a space available basis
- Research work remains in faculty and dept labs
Facilities
Not a Regular University Incubator

- Not open to companies – either spin-offs or outside entities
- Available only as long as we are working with them
- Priority given to those that we are funding
- Not regular labs
Education in Entrepreneurism

- “Entrepreneurism Fundamentals of the Enterprise”
  - The way of life in innovative, entrepreneurial companies
- Designed for engineers, by engineers
Current Courses

- Venture Mechanics (ENG 201)
  - Developing innovative ideas and new product projects
  - Cultural, behavioral, historical perspectives
  - Project Manager level

- Enterprise Dynamics (ENG 202)
  - Managing and growing innovative companies
  - Innovation sources, idea screening and feasibility, markets, money
  - VP/CTO level

- Applied Innovation (ENG 203)
  - Planning and building new business ventures
  - Forecasting processes, strategic analysis, market/sales plans, competitive positioning, manufacturing-distribution-service
  - CEO/Governance level
New Courses

- Technical Tools of the Innovation Process (MAE 207)
  - Design, manufacturing, sourcing, testing, regulatory approval, channel development for marketing and sales, maintenance, final product launch, …

- Entrepreneurism in a Global Context
  - Perspectives on the global marketplace

- Discussions under way with new Graduate School of Management on collaborative educational programs
Questions you have to answer

- Is this appropriate for a research university?
- Is this appropriate for our students?
- Should we be doing this research on campus?
- Should we be employing grad students on these projects?
- Doesn’t this duplicate other offices on campus?
Conclusions

- One-by-one impact and change
- Need to have experts that faculty will respect
- Gap funds really help
- Students want to be able to understand more about business – so they can be better engineers and participate – and make better choices