

THE UNIVERSITY OF MICHIGAN
REGENTS COMMUNICATION

SUBJECT: New joint graduate degree program between the College of Engineering and the Stephen M. Ross School of Business

ACTION REQUESTED: Approval to offer a new Master's Degree in Entrepreneurship, College of Engineering & Stephen M. Ross School of Business

The College of Engineering and the Stephen M. Ross School of Business propose a new joint graduate degree program, "Master's in Entrepreneurship." The proposed program has been under development by faculty and staff at the College of Engineering and the Stephen M. Ross School of Business for over two years. The proposed program will be the pinnacle entrepreneurship program offered by the University of Michigan, bringing together the strengths of engineering and business. While multidisciplinary entrepreneurship programs are on the rise at other institutions, none of our peer research institutions have been effective at creating a stand-alone, technology based, joint degree program in entrepreneurship. The faculty in the College of Engineering and the Stephen M. Ross School of Business see this as an opportunity to position the University of Michigan at the forefront of entrepreneurship education and execution.

The proposed program builds on the strengths of both the College of Engineering and the Stephen M. Ross School of Business. The program will be overseen by a Faculty Director and a Program Executive Committee. The Program Executive Committee will consist of two College of Engineering faculty and two Ross School of Business faculty. The Faculty Director will be a non-voting member of the Program Executive Committee, appointed jointly by the College of Engineering and Stephen M. Ross School of Business Deans.

The proposed program was approved by the faculty of the College of Engineering in October 2010 and the faculty of the Stephen M. Ross School of Business in April 2011. We request that the Regents approve the offering of the new graduate degree, Master's in Entrepreneurship. Pending approval, the first students will enter the program in September of 2012.

Recommended by:



David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering



Robert J. Dolan
Dean
Stephen M. Ross School of Business

Recommendation Endorsed by:



Philip J. Hanlon
Provost and Executive Vice President for Academic Affairs

PROPOSAL TO LAUNCH A MASTER'S DEGREE IN ENTREPRENEURSHIP

2011 JUNE 1

SUBMITTED BY:

COLLEGE OF ENGINEERING, UNIVERSITY OF MICHIGAN

STEPHEN M. ROSS SCHOOL OF BUSINESS, UNIVERSITY OF MICHIGAN

IN PARTNERSHIP WITH:

OFFICE OF TECHNOLOGY TRANSFER, UNIVERSITY OF MICHIGAN



Michigan**Engineering**



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SECTION I: INTRODUCTION

A. OVERVIEW OF THE PROPOSED MASTERS DEGREE IN ENTREPRENEURSHIP

The University of Michigan College of Engineering Center for Entrepreneurship (CFE) and the Stephen M. Ross School of Business (RSB) propose a joint Master's Degree in Entrepreneurship. The primary objective of this program is to arm students with the critical multidisciplinary knowledge necessary to create new technology-focused ventures, either as stand-alone entities or within established innovative organizations. Students will learn to create and capture value from novel technologies within the context of entrepreneurship.

In recent years, there has been national concern that the United States is falling behind in training students in innovation, engineering and science.¹ There is a growing belief that the future of education calls for a new way of teaching, as students will be faced with an entirely different professional landscape than that of their professors. Students will have to compete in a global economy where the rate of technology development outpaces their education and they are constantly pushed beyond the limitations of their education. Engineers will no longer be able to count on a one-job career in a traditional engineering discipline, such as mechanical, electrical, or chemical engineering. Career choices have transitioned to include multidisciplinary pursuits, where individuals are expected to take their primary skill sets and apply them to entirely new specialties (i.e. sustainability, biotechnology, health engineering). As a result of these changes, engineering schools are looking for new ways to educate engineers of the future.

At the same time, the overall landscape of business has been in a state of change. In the mid-20th century, the US economy was dominated by a finite number of big corporations. As we approached the 21st century, small, and high-growth potential new businesses became the main driving force of employment and economic growth. Today, small businesses are playing a larger role in the economy on state, national and global levels. The United States Small Business Association reports an average of 2,356 people per day go into business for themselves. Indeed, small businesses represent 99.7% of all employer firms and create more than half of non-farm private gross domestic product. During the late 1990s and early 2000s, small businesses provided 60 to 80 percent of the net new jobs in the US economy and most of these new jobs were a result of start-ups in the first two years of operation.² More than 500,000 "employer" firms (businesses with employees) are started in the United States every year³. These temporarily small, innovative firms have been responsible for the commercialization of radical new technologies that are transforming the way we act and interact. The impressive economic contribution of

¹ President Obama Launches "Educate to Innovate" Campaign for Excellence in Science, Technology, Engineering & Math (STEM) Education 2009

² *Overview and Discussion in Entrepreneurship in the 21st Century*. 2004: U.S. Small Business Administration Office of Advocacy and The Ewing Marion Kauffman Foundation.

³ Schramm, Carl J., "Building Entrepreneurial Economies," *Transition Studies Review* (2005); 12 (1); pp 163-171.#

start-up ventures, in conjunction with the changing role of engineers in the global economy has sparked a growing interest in entrepreneurship education across engineering college campuses.

Entrepreneurial tendencies are also at the heart of the future of large companies. These companies face the same environment of change, and entrepreneurs are needed within these companies (often called “intrapreneurs”) to identify opportunities, adjust products and exhibit a new sense of agility and flexibility. Companies do not just need good managers, they need entrepreneurs and leaders.

While entrepreneurship-education originated in business schools over fifty years ago, the demand of entrepreneurial training outside of traditional business schools has been increasing since the 1990s. Lateral interest can be seen across specialties, particularly among technologists, engineers, and scientists interested in commercializing their technologies. Traditional business school entrepreneurship education has been seated in graduate business schools helping students with venture creation, business plans, organizational skills and leadership principles. However, the technical innovations that are fueling today’s scalable new businesses are evolving from technologists, scientists and engineers.

Today, successful venture creation from these innovations requires much more than knowledge of a single discipline. It not only requires a sound intersection of knowledge across business, engineering and law, but individuals that embody the entrepreneurial mindset. The University of Michigan has the opportunity to create a premier professional master’s degree that integrates both technology development and entrepreneurial business fundamentals in real time.

B. EMPLOYMENT OPPORTUNITIES

The proposed Joint Master’s Degree in Entrepreneurship has been designed to give students the opportunity to pursue advanced training in technology development without a Ph.D., and to develop highly-valued business skills without an MBA. By learning how science creates value in the marketplace, students pursuing this degree will be prepared to become science and engineering change agents within their own ventures, established businesses, government or nonprofit organizations. Students will be subjected to a comprehensive program that includes rigorous study in science, engineering, and business. The program emphasizes team work and development of the skills necessary to transform cutting-edge technology into a viable business, through a hands-on, year-long practicum. The exposure to real-world uncertainty, under the mentorship of world-class University of Michigan faculty and entrepreneurs will offer students an unparalleled experience that will help them learn to create change in any organization.

Upon completion of the degree, students will be prepared to create their own venture, or to join a high-tech start-up or a large technology company, and will be prepared to translate technology for commercialization. Graduates with an interest in intellectual property and technology transfer will be able to work for the federal government or university technology transfer

operations. Students will also be well suited to pursue careers in venture capital firms or patent law firms.

C. MARKET ANALYSIS – COMPETITOR PROGRAMS

For over ten years, academic institutions have been working to address the changing professional needs of science and engineering graduates by leveraging:

1. Engineering/Science Concentrations/Certificates programs, and
2. Professional Science Master's (PSM) degrees.

Engineering/Science Entrepreneurship Concentrations/Certificates: Certificate-based programs typically provide one to five courses of instruction built around introductory knowledge that may be beneficial within entrepreneurship, technology assessment, and technology innovation. These programs, due to a limited timeframe, provide only a superficial introduction to entrepreneurship and do not create an environment of intensive application of this information to the market, or of business development and translation into a technology or service.

TABLE 1: INSTITUTIONS OFFERING CERTIFICATES IN ENTREPRENEURSHIP FOR ENGINEERING AND SCIENCE GRADUATES. (A MORE DETAILED DESCRIPTION OF SPECIFIC PROGRAMS CAN BE FOUND IN APPENDIX A.)

Graduate Science and Engineering Certificates in Entrepreneurship

- Georgia Tech
 - Purdue University
 - North Carolina State University
 - Stanford University
 - University of Southern California
 - MIT
 - University of Central Florida
 - Clemson University
 - Wayne State
-

Professional Science Master's Degrees: In 1997, the Sloan Foundation funded the first Professional Science Master's Degree with the intent of creating an alternative for the talent pool of scientists and engineers who do not want to pursue academics. The Sloan Foundation "perceived a gap between bachelor-level math and science education and the level of expertise required by employers in industry. In response to this need, the Foundation created the PSM degree to provide a pathway for science and math majors directly into jobs, configuring it in response to employer's desires."⁴ As of June, 2010, there were 198 Professional Science Master's Programs and 96 PSM-Affiliated Institutions (www.sciencemasters.com). In addition, in June, 2010, the National Science Foundation awarded 21 schools funding to create new

⁴ Gitig, Diana. "Professional Science Master's Degrees" AAAS Science, sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2010_06_18/science.opms.r1000091, June 18, 2010.

Science Master's Programs (\$14.7M) as part of the American Recovery and Reinvestment Act of 2009. To date, over 2,500 students are enrolled in Science Master's Programs and 2,500 have graduated.

TABLE 2: LIST OF 2010 NSF SCIENCE MASTERS RECIPIENTS

2010 NSF Science Master's Program Recipients	
• North Carolina State University	• Humboldt State University
• Purdue University	• Clemson University
• SUNY College at Buffalo	• Cornell University
• Rutgers University New Brunswick	• University of Florida
• Grand Valley State University	• Northwestern University
• University of Idaho	• University of Texas – El Paso
• University of Georgia	• Arizona State University
• San Diego State University	• University of New Mexico
• University of Maryland Eastern Shore	• Northern Arizona University
• Rochester Institute of Technology	• University of Alaska Fairbanks
	• San Francisco State University

Professional Science Master's programs are characterized as "science-plus" curricula that combine science and technology coursework with professional skills. A Professional Science Master's program prepares graduate students for careers in business, industry, nonprofit organizations, and government agencies by providing them with a strong foundation in science, technology, engineering and mathematics (STEM) disciplines, but also with research experiences, internship experiences, and the skills to succeed in those careers. Within the community of Professional Science Master's Programs, the focus areas with regard to science and technology and professional skills are diverse, ranging from geology to life sciences and entrepreneurship to capital markets. The PSM programs are two-year programs that present students with practice and knowledge in business, communications and regulatory affairs. These programs "have been developed in concert with employers and are designed to dovetail into present and future professional career opportunities".⁵

More recently, several institutions have launched individual Master in Entrepreneurship programs (Table 3). While the actual success of these individual programs has yet to be determined, the number of programs launching is increasing.

⁵ <http://www.sciencemasters.com/>, August 22, 2010

TABLE 3: MASTERS IN ENTREPRENEURSHIP DEGREES

Institution	Degree Title	Launch Date
Northeastern University	Master of Science in Technological Entrepreneurship (School of Technological Entrepreneurship)	2006
University of Rochester	Master of Science in Technical Entrepreneurship and Management (Graduate School of Engineering and Graduate School of Business)	1/2010
Brandeis University	Master of Arts in Computer Science and Information Technology Entrepreneurship (Graduate School of Arts and Science)	9/2009
University of Southern Florida	Master of Science Degree in Entrepreneurship in Applied Technology (Colleges of Business, Engineering, and Health)	2005
University of Texas - Dallas	Master of Science in Innovation and Entrepreneurship (UTD School of Management)	1/2010
Southern Methodist University	Master of Science in Entrepreneurship (SMU Cox Business School)	Fall 2008
University of Notre Dame	Engineering, Science and Technology Entrepreneurship Excellence Master's Program (ESTEEM) (College of Engineering, College of Science & College of Business)	9/2009
Case Western Reserve	Science and Technology Entrepreneurship Program (STEP) Master of Science	1999
Brown University	Program in Innovation Management and Entrepreneurship Engineering (PRIME)	2005
University of Florida	Thomas S. Johnson Master of Science in Entrepreneurship Program	2004
University of Rochester	Master of Science in Technical Entrepreneurship and Management	Fall 2007

SECTION II: PROGRAM DESCRIPTION

A. JOINT MASTER'S DEGREE: LEVERAGING A NEW MODEL

The proposed entrepreneurship program will leverage a new model for joint educational programs at the University of Michigan. Students enrolled in the program will complete requirements for a single master's degree that is conferred jointly, by the College of Engineering and the Ross School of Business. This contrasts with the existing 'dual degree' model in which students enroll in two colleges or schools, complete core requirements for each school and—double-counting a subset of credits—earn two degrees conferred by two schools in approximately seventy-five percent of the time required to complete two separate degrees (e.g. the Dual Master's Degree Program in Engineering and the School of Natural Resources and Environment, Engineering Sustainable Systems Program). This model also differs from the traditional interdepartmental degree model in which students enroll in one "home" college or school, complete graduation requirements for and earn one degree conferred by the home college or school (e.g., the Electrical Engineering and AOSS Joint Degree).

There are several reasons for pursuing this innovative joint model. Technology entrepreneurship is an interdisciplinary field that sits at the intersection of innovation, business, design and technology. Because of the field's interdisciplinary nature, the proposed program will itself be aggressively interdisciplinary—thus providing expanded opportunities for intellectual and practical innovation, as well as preparing students to occupy the type of boundary-spanning leadership positions that will be needed in the future. Graduates of the program will also be well positioned to pursue job opportunities for which credentials from either or both Schools will be viewed with high regard. Additionally, because competitor programs are offering or will offer cohesive entrepreneurship curricula, creating a single degree one-year curriculum is not only logical from a pedagogical but also from a marketing perspective. Finally, the proposed joint model will provide administrative efficiency and ensure the long-term commitment of both Schools to the program.

B. MASTER OF ENTREPRENEURSHIP: A NEW DEGREE

For students pursuing technology entrepreneurship, neither the existing Master of Science in Entrepreneurship nor Master of Business Administration degree provides sufficient depth in required areas. Therefore, students that complete the proposed professional master's program will earn a new type of degree—a Master of Entrepreneurship. Possession of this new degree will indicate attainment of in-depth, interdisciplinary training that could not be obtained through other channels.

C. CURRICULUM

By bringing together curricula and faculty from the College of Engineering (COE) and the Ross School of Business (RSB), the proposed program in entrepreneurship combines and leverages the strengths of two professional schools at the University of Michigan. The primary objective of the program is to arm students with the critical multidisciplinary knowledge necessary to create new technology-focused ventures, either as stand-alone entities or within established innovative organizations. Students will learn to create and capture value from novel University of Michigan technologies within the context of entrepreneurship.

Whereas a traditional master's degree in the CoE or RSB typically takes 1-2 years to complete, the proposed joint degree program has an intensive curriculum that enables students to finish in one calendar year. This approach promotes a cohesive cohort of students concentrating their efforts on the advancement of real world technology. Students will have the opportunity to focus on launching viable ventures during the summer following the conclusion of the academic year.

Masters in Engineering students may also be interested in pursuing the Master's Degree in Entrepreneurship. In this one-year option, students will be prepared to assume fundamental driving positions in a technology-based organization. This is in contrast to both a two-year Master in Business Administration degree, which traditionally trains executive level management, and a Master in Engineering that is research-based, focusing on developing

advanced technical competence. Students that participate in the Joint Master's Degree in Entrepreneurship will be more than managers; they will be future *technology change agents*.

ROLES AND COMPETENCIES

This new degree will:

1. Provide graduate level scientists and engineers with a comprehensive understanding of technology opportunity identification and implementation.
2. Educate students in the human-centric design approach to product development, emphasizing the importance of customer input throughout the design phase.
3. Provide students with fundamental entrepreneurial business skills for venture creation.
4. Provide students with the opportunity to integrate the key principles of entrepreneurship and technology development and to experience the added-value of this cross-disciplinary approach.

ENTRANCE REQUIREMENTS

Students will be required to have earned a bachelor's degree prior to matriculation in the master's degree program. Additional required application materials will include transcripts from all prior programs of study, GRE scores, TOEFL scores for students for whom English is not their first language, a personal statement and a statement of purpose. The statement of purpose should be used to exhibit the applicant's critical core skills that are relevant to becoming a technological change agent. These are:

- **Leadership:** Success in this program will depend on the ability of candidates to lead. Leadership skills can be demonstrated through a variety of activities such as student project experience or running a startup.
- **Intellectual Quality:** High-quality academic performance should be demonstrated based on GPA and also the results of the GRE. Previous educational experience should include strengths in analytical, technical and quantitative concepts at the level of undergraduate or graduate experiences in engineering, science or other technical fields. If applicable, TOEFL success or relevant work experience should also be demonstrated.
- **Teamwork and Communication:** Entrepreneurial success strongly depends on the ability of an individual to work in teams and to communicate effectively.

We expect students from a wide variety of undergraduate science and technology backgrounds to be interested in the program. We expect the admissions process to be highly selective, and we will not discriminate on the basis of age, race, disability or sexual orientation. The expected enrollment in the entrepreneurship program is 30 students within the first year and 50-75 students within three years.

MASTER OF ENTREPRENEURSHIP

The Joint Master's Degree Program will require completion of 36 credit hours of course work, including a practicum component, concentrated in the College of Engineering and the Ross School of Business. The overall structure of the program has been developed to provide students with the fundamental knowledge and skills necessary to shape, assess, and launch a scalable technology-based company (Appendix E). The degree can also be customized to address the unique aspects of individual technologies. One of the fundamental principles of the degree is experiential learning. Students will be guided through a series of project-oriented courses that are designed to lead the students through the business creation process from opportunity assessment to launch.

Student success will not be evaluated on the commercially-successful launch of a new venture, but rather the student's ability to master the material and develop the appropriate skill set required to successfully do so either during or following their participation in the program. The course work allows students to gain an entrepreneurial mindset and expand their knowledge on the process of creating commercial value from science, thereby allowing them to bridge the gap between science/engineering and business. The experiential program takes the learning to the next level, by providing students with the opportunity to develop their confidence and turn knowledge gained in the classroom into effective skills.

The master's program consists of a number of well-coordinated academic courses.

- A technology and business "boot camp," designed as a leveling platform to provide all incoming students, regardless of background, with necessary technology and business fundamentals. This will ensure that students have a basic understanding of the relevant technologies and processes to be addressed in the program and business vocabulary. This will ensure the basic knowledge of the diverse cohort of incoming students in the degree program.
- A two-semester practicum series in which commercialization paths for technologies are developed and new ventures are potentially launched.
- A series of business and technology courses focused on specific stages of the entrepreneurial process, and linked to the practicum experience.
- A launch opportunity experience, which may be an internship in an existing young, scalable company, or creation of a new student-led venture.

TABLE 4: SAMPLE MASTER'S DEGREE IN ENTREPRENEURSHIP SCHEDULE

Sample Masters Schedule	Unit of Instruction	CH	Term				Sp/Su
			Fall A	Fall B	Win A	Win B	
<i>"Boot Camp" preparation (0)</i>							
Business Boot Camp	Ross	0					
Tech Boot Camp	CoE	0					
<i>Subjects required of all specialties (21)</i>							
Accounting for the Entrepreneurial Firm	Ross	1.5	1.5				
Entrepreneurial Marketing	Ross	1.5	1.5				
Bus. Econ. For the Entrepreneur	Ross	1.5		1.5			
Entrepreneurial Operations	Ross	1.5		1.5			
How to Identify an Opp/Innov	CoE	1.5	1.5				
Design Process	CoE	1.5	1.5				
IP Strategy	CoE	1.5		1.5			
Technology Business Models	CoE	1.5		1.5			
Entrepreneurial Strategy	Ross	1.5			1.5		
Leading Startups	Ross	1.5			1.5		
Finance for the Entr. Firm	Ross	1.5				1.5	
Legal Aspects of Entrepreneurship	Ross	1.5				1.5	
Entrepreneurial Ownership	CoE	1.5			1.5		
Ethics in Design & Entrepreneurship	CoE	1.5				1.5	
<i>Technical elective (3)</i>							
Advanced engineering technical elective	CoE	3			3		
<i>Practicum (6)</i>							
	CoE/Ross	6	3		3		
<i>Business Launch (6)</i>							
	CoE/Ross	6					6
<i>Total</i>							
		36	7.5	7.5	7.5	7.5	6

Boot Camp

Students begin the year with a technology and business boot camp. These boot camps are intended to provide students with common terminology and basic understanding of topics to be addressed in the upcoming courses. These boot camps are critical when bringing together diverse technical backgrounds. The technology boot camp will also offer students insight into the current state-of-the-art of technologies to be discussed during the year. In the business boot camp, students will receive an overview of the business courses in the program; learn how the courses relate to the business planning process and review negotiation strategies and skills.

Courses

During the academic year, students will participate in science and engineering-focused courses in parallel with business-focused courses. The courses are designed to take students through the entire entrepreneurial process. While faculty from different schools will be responsible for the implementation of specific courses, they will work together to coordinate content for maximum value to students. Each course focuses on a specific discipline related to technology entrepreneurship. Lessons are targeted to give students key entrepreneurial tools and frameworks. Each course also introduces students to the vocabulary that dominates a given focus area and therefore provides students with the tools and confidence needed for interdisciplinary discussions that are required for any entrepreneurial outcome.

Each course is 1.5 credits, totaling 24 credits.

Fall A

How to Identify an Opportunity/Innovation (Tech): Students will learn about finding technology opportunities in specific business spaces through innovation. Students will explore creative problem-solving, how to identify the real problem to solve and the correct solution.

Design Process (Tech): Students will learn about the engineering design process, the importance of developing the correct design criteria, and how to relate the design criteria to customer requirements. This course will cover the strategies, methods and means to the design process and how to manage the design process.

Accounting for the Entrepreneurial Firm (Bus): Students will learn the basic concepts and methods used in financial and managerial accounting to (1) help the entrepreneur make decisions, (2) understand the results of the period, and (3) communicate those results to outsiders. Financial accounting topics include the basic accounting model, transactions analysis, the major statements (Balance Sheet, Income Statement and Cash Flow Statement).

Entrepreneurial Marketing (Bus): Students will learn the fundamentals of both marketing planning, strategy and market research. Fundamental topics include segmentation, targeting, positioning and SWOT. Students will also be instructed on how to develop value proposition through perceived benefits, perceived costs and understanding customer pain.

Fall B

IP Strategy (Tech): Inventors and entrepreneurs have four concerns related to patent law: protecting their inventions in the very early stages of product development, determining the patentability of their invention, avoiding infringement of a competitor's patent, and leveraging their patent as a business asset. This course will address each of these concerns through the application of law cases and business cases to an invention of the student's choice. The course will also cover other aspects of IP strategy, including trade secret protection, copyrights and trademarks.

Technology Business Models (Tech): Students learn about the technology-specific business models and the influence of the model selected on long-term technology implementation.

Business Economics for the Entrepreneur (Bus): This course provides students with the foundations of microeconomic analysis, with topics specifically chosen to give the potential entrepreneur a set of tools to analyze business opportunities. Students begin with the conceptual underpinnings of different components of costs and their relevance for new business ventures and the determinants and measurement of consumer demand. The course then progresses to focus on several pricing options that give the entrepreneur added flexibility to enhance profitability. Finally, we spend some time describing ways in which firms organize their transactions, and discuss when these might serve the entrepreneur well.

Entrepreneurial Operations (Bus): The course design is intended to meet the needs of an archetypical entrepreneur (AE), who has an idea for a product but few resources. What now? Assuming that enough market research has been done to demonstrate a proven market and identify desired features of the product and the early phase brainstorming and rough design work has been done so that the product idea can be visualized, how does that idea become a physical reality, subject to cost and performance constraints?

Winter A

Entrepreneurial Ownership (Tech): Students will formulate skills to become effective entrepreneurial managers, including how to appreciate and act on the difference between leadership and management, understand and develop ethical principles of entrepreneurial leadership, and recognize various entrepreneurial strategies and apply them as appropriate.

Technology Elective (Tech): Students enroll in an elective course that will add technology content knowledge to their venture development.

Entrepreneurial Strategy (Bus): This class will provide the entrepreneur with a general management orientation. Topics to be covered include: selecting a target market and buyer domain consistent with the product offering and value proposition; evaluating market structure and profit potential for alternate product market possibilities; designing organizational structure, control and incentive systems; competitive analysis; and competing against established incumbents.

Leading Startups (Bus): This class will help students understand the critical aspects to consider when leading an entrepreneurial endeavor. Students will review how to select and recruit a management team, how to design jobs and organization structure, motivate and incentivize, manage difficult people and building high performance teams.

Winter B

Ethics in Design and Entrepreneurship (Tech): Students will learn about the consequences of their technical choices, reconciling conflicting obligations, and the practical ethics of implementation.

Technology Elective (Tech): Continued from Winter A.

Finance for the Entrepreneurial Firm (Bus): This course teaches how to finance the entrepreneurial firm, whether that firm is a newly formed (startup) business or an entrepreneurial firm formed by the acquisition of an existing firm. Students will learn about valuation and structuring of the investment in the entrepreneurial firm; capital budgeting in an entrepreneurial setting; external capital acquisition; financing valuation, structure and term sheets; and financial aspects of organization characteristics of entrepreneurial firms.

Legal Aspects of Entrepreneurship (Bus): Law provides entrepreneurs with many opportunities for competitive advantage. This course offers an examination of the issues that every entrepreneur should understand, from start-up to IPO. These issues include: legal concerns that arise when you leave your current employer to start a business; creating an appropriate ownership structure; product innovation; fiduciary responsibilities of management; funding the venture; contracting with vendors and customers; understanding responsibilities for hiring and retaining the best staff; and going public.

Practicum

Like the admissions process, the practicum projects will also be overseen by the cross-School Executive Committee.

As entrepreneurial skills are developed from the application of knowledge, students will pursue a practicum component in parallel with all the business and technology courses focused on their technology-based new venture. The objective of the practicum is to provide students with the opportunity to apply the material they are learning in the classroom to the spectrum of activities that could lead to a real-world, high value, scalable technology-based new venture. Students will form teams around University technologies in Fall A and develop the commercialization strategy, product concept, business model, marketing plan, and translatable prototype throughout the year. Teams will interact with relevant industry mentors throughout the year. This practicum will enable students to see the value of iterative design based on feedback from both engineering/science and business principles.

The practicum component will have two features: 1) project specific exposure (including regulatory process, agencies etc.) and 2) project development. The project development component will require students to apply the information they gain in their individual modules to their specific technical project, including but not limited to the selection of an innovation to pursue, development of an IP strategy, business strategy and market analysis, business plan, and operations plan.

The practicum runs through both semesters for a total of 6 credits.

Launch

During the summer following the academic curricula, students will be provided with the opportunity and support to launch their venture or product. Students will be given three months and seed funding (should their ventures and teams seem viable) to pursue their venture or product launch. Students that find that their projects are not viable will be given an opportunity to work in a local start-up venture or company or develop their own ventures, applying the entrepreneurial knowledge they have accumulated in practice.

NEW COURSES

The creation of the Master's Program has broad impact and application across the University. The modular design will allow units from across campus to leverage the degree program and establish their own specializations (Appendix E). Such future specializations may include medical devices (Medical Innovations Center) and medical therapeutics or diagnostics (Medical School, Dental School, Life Sciences Institute). In addition, with the establishment of the core Master's Curriculum, UM doctoral students, faculty and staff will be able to access these courses and pursue a Certificate in Entrepreneurship.

The process for establishing new specializations in the entrepreneurship degree is defined as a four step process:

1. Assess student interest for the proposed specialization.
2. Assemble core faculty members in the proposed specialization departments.
3. Seek approval from the Department Chair or Program Chair.
4. Seek approval from each Academic Unit Dean (College of Engineering and Ross School of Business)

SECTION III: PROGRAM ADMINISTRATION AND DELIVERY

Although the proposed joint model for offering the degree will require administrative innovation, the College of Engineering and the Ross School of Business are committed to a coordinated effort for the administration and delivery of this program. The **Entrepreneurship Executive Committee**, comprised of two faculty members from both the RSB and the CoE and an Entrepreneurship Faculty Program Director will oversee the program. This governance structure will provide for accountability, balanced representation of faculty from the collaborating schools and mechanisms to establish and document academic policies and processes.

A. FACULTY

The strength of the entrepreneurship degree lies in the outstanding faculty from across the University of Michigan committed to entrepreneurship and technology translation. Numerous

faculty across the University have had firsthand experience with entrepreneurship through creating their own start-up ventures, consulting, and licensing of technology. Lists of faculty that have committed to or have been invited to be active participants in the proposed Joint Master's Degree in Entrepreneurship are listed in Appendices B and C. In addition, several prominent entrepreneurs and venture capitalists have also committed to serve as guest lecturers, practicum advisors, practicum mentors, and technical resources (Appendix D).

B. ADMINISTRATION

Entrepreneurship Faculty Program Director: Oversight of and leadership for the program will be the responsibility of the Entrepreneurship Faculty Program Director, who will be a non-voting member of the Executive Committee. The director will report to the Dean of the College of Engineering and the Dean of the Ross School of Business and receive support from a cross-School Executive Committee. Ideally, the program director will be a member of the faculty who is connected with entrepreneurship and venture creation. The director will have an external role as the public face of the program when marketing the program, as well as internal roles managing the program and advising and mentoring students.

Entrepreneurship Admissions and Curriculum Committee: The Entrepreneurship curriculum has been developed by faculty representatives from the College of Engineering and the Ross School of Business. This group designed the curriculum, and all or some portion of the group may remain actively involved through service on the Entrepreneurship Admission Committee and/or Curriculum Committee. Members of the Admission committee will review applications to the program and make admissions recommendations to the Executive Committee, which will make final admissions decisions. The Entrepreneurship Curriculum Committee will be responsible for the future of the entrepreneurship curriculum, including future modifications to the currently proposed curriculum and addition of new courses – subject to each School's curriculum change processes.

Entrepreneurship Administrative Committee: The Entrepreneurship Administrative Committee consists of leadership and finance staff from the College of Engineering and Ross School of Business. This committee is responsible for establishing an effective budget model for the sustainability of the Master's Program.

Entrepreneurship Academic Programs Assistant: A program assistant and student services staff will support all administrative and academic aspects of the program. This assistant will document and coordinate implementation of the program, including: policies and procedures, academic skills enrichment, speaker series, diversity coordination, career services and graduation.

C. KEY ADMINISTRATIVE FUNCTIONS

Marketing: The Program Director will work with management and admission and communications staff in the participating Schools to develop a marketing strategy and marketing

materials (e.g., print and online material, press releases, audio and video clips) for the program. Depending on the workload of the communications staff at both Schools, web development and some graphic design work may be developed using Michigan Marketing and Design or an external vendor.

Recruitment: We expect the entrepreneurship program will be attractive to students from a variety of technological backgrounds. The Program Director will work with management and admission staff in the participating Schools to develop a recruitment strategy and system of recruitment that attracts a diverse pool of applicants. For the short term, it is expected that the program assistant and admission staff from the College of Engineering will be able to handle recruitment efforts including print and e-correspondence, social media, planning for and presence at off-campus recruitment events and planning for and hosting on-campus recruitment events. As interest in the program increases, additional staff may be needed to support recruitment efforts.

Master's Admission: The Program Director will work with management and admission staff in the participating Schools and with CollegeNet (the University's application vendor) to develop an application for the master's degree program. The Entrepreneurship Admission Committee will be comprised of the Entrepreneurship Program Director and selected members of the faculty of the two Schools. As early as year one, additional temporary staff may be needed to support the admissions process.

Academic Advising: The Entrepreneurship Program Director, program assistant and key members of the College of Engineering and Ross School of Business faculties will share advising responsibilities for the program. The Entrepreneurship Administrative Committee will develop a structure of governance that will ensure faculty coverage of advising for the long term. This governance structure will provide for accountability, balanced representation of faculty from the collaborating schools and colleges, mechanisms to establish and document academic precedents and exceptions to established program requirements.

Academic Policies and Procedures: The Entrepreneurship Administrative Committee is already discussing an approach for developing academic policies and procedures. In many cases, existing policies and procedures from one or both schools will be adopted. In some cases, new policies will be developed. The governance structure described above will provide for balanced decision-making regarding academic policies and procedures.

Student Data Systems: The proposed joint program model required modifications to University of Michigan student data systems, and a preliminary framework has been put in place through the Office of the Registrar.

The Program Assistant will communicate program requirements to the Office of the Registrar and other central campus units such as the Office of Financial Aid and continue to liaise with appropriate offices throughout and after the launch of the program.

Student Life: Student support services, student organizations and student activities that are available to students in the College of Engineering and Ross School of Business will be made available to all Entrepreneurship students. The program assistant will collaborate with academic affairs and student services staff from the participating schools to plan and implement additional events that target students interested in or enrolled in the entrepreneurship program such as conversion events, new student orientation, special programs and graduation.

Career Services: Entrepreneurship students will have access to career services available to students in the College of Engineering. The Entrepreneurship Program Assistant will work with members of the career services staff from both schools to develop a strategy that best suits the entrepreneurship students.

Alumni Relations and Development: Because the academic program and student support services will be co-delivered, it is expected that the joint model will foster among students an allegiance not only to the program in Entrepreneurship but also to the College of Engineering and Ross School of Business. Leadership and alumni relations and development staff from both Schools are prepared to begin working together to engage entrepreneurial alumni and prospective donors. The Executive Committee will help shape a strategic plan for and support alumni tracking and relationship development with Entrepreneurship alumni.

D. PROGRAM INCOME AND EXPENSES

Members of the Entrepreneurship Administrative Committee are preparing program income and expense projections for three years. Program income includes gift funds, application fees and tuition. Funds supporting the Joint Entrepreneurship Program staff are currently paid by the College of Engineering. Both Schools are committed to continued academic and administrative support, including but not limited to funding for faculty salaries, staff salaries, scholarships, marketing and recruitment funds, a speaker series and other related programs and events.

E. LEARNING RESOURCES

Library: Entrepreneurship students, faculty and staff will depend upon the support of professional staff in the University of Michigan libraries. The University library is consistently ranked as one of the top ten academic research libraries in North America and makes available an extraordinary array of resources and services. The University Library has physical locations throughout the University of Michigan campus and offers a wealth of resources in traditional as well as digital formats. The Library's expert staff is committed to helping patrons tap into the full potential of these information resources and to providing a full spectrum of assistance for research and teaching. Staff help students at every step in their educational career and work closely with faculty and graduate students to support their research needs. As part of the University Library System, Entrepreneurship students and faculty will have access to the Kresge Business Administration Library at the Ross School of Business. The Kresge Library has access to over 90 business databases, and resources of the University of Michigan Libraries. In addition, Kresge provides full text access to over 60,000 journals, newspapers, magazines and

other periodicals. The Library has an open collaborative workspace on the second floor where students may work in teams. In addition, there are 25 group study rooms that can be reserved online through the iMPact system. Entrepreneurship students will have access to Kresge librarians through email, instant message, phone, and in-person appointments.

F. FACILITIES, EQUIPMENT AND TECHNOLOGY

All equipment, network access, computing support services and facilities available to students in the College of Engineering and Ross School of Business will be available to Entrepreneurship students.

Entrepreneurship students will have the unique opportunity to leverage facilities across campus that support entrepreneurial endeavors including College of Engineering facilities, Ross School of Business facilities, student incubator space (TechArb) and University incubator space sponsored by the Tech Transfer Office on the North Campus Research Complex. This breadth of access will enable the students to interact with the entire entrepreneurial ecosystem at University of Michigan and give them access to numerous resources and networks.

The College of Engineering is located on North Campus and supported by the Computer Aided Engineering Network (CAEN). CAEN provides the College of Engineering community with a wide range of computing and other information technologies in support of the College's instructional, research, administrative and service missions. There are 45 state-of-the-art instructional classrooms. All of the classrooms support presentation systems, while some classrooms can accommodate student response systems and room-based lecture systems. Students will have 24 hour access to the several Engineering-only computer labs on North campus. Computers in "CAEN labs" are dual-boot desktops that run both the Microsoft Windows and Red Hat Linux operating systems.

The new Ross School of Business facilities were built to enhance action-based learning. Students will have access to spaces designed to provide teams with access to pioneering innovations that set the global standards for connecting the world of business education to business practice. The building has 12 tiered, U shaped discussion classrooms with a capacity of 85 adjacent to group study rooms to support the conversations so essential to successful learning. In addition, there are five smaller classrooms with a capacity of 40.

In addition, Entrepreneurship students will have access to seamlessly integrated technology that enables students and faculty to interact with one another on campus and across the globe. Specifically:

- State of the art wireless with data access available at each classroom seat
- Three mounted and pre-set video cameras per classroom
- One touch media site lecture capture devices in each classroom
- More than 20 group study rooms with plasma screens
- 26 high speed print/scan/copy/fax devices located throughout the school

Network Access: All College of Engineering and Ross School of Business classrooms, offices, and meeting/assembly rooms offer network access, either through wires (Ethernet) or wirelessly (WiFi). This network is part of the UM campus network, which is in turn a part of the global Internet. The network allows all College of Engineering and Ross Business School computer users to share digital information with each other; to take advantage of high-quality printers in both Schools; and to communicate directly with systems used by other researchers, students, and developers at other sites around the world. The network is also accessible from UM public computing sites and over home broadband connections.

Computing Support: The College of Engineering and Ross School of Business computing staff provide first-rate information technology services to the College of Engineering and Ross School of Business community, respectively. The computing staff support the high-quality research and education that occurs in the College of Engineering and Ross School of Business with the latest in technological services, including the Schools' own servers for storage and computational services. All Entrepreneurship students will receive a College of Engineering computer account, which will provide access to additional computer resources. Entrepreneurship students will also receive access to the Ross School of Business iMpat award winning information and communication portal which provides relevant student information and improves both social and professional communications.

G. PROGRAM EVALUATION AND OUTCOMES ASSESSMENT

Effective evaluation is an integral part of our program plan. Both the College of Engineering and the Ross School of Business have significant experience in program evaluation and conduct a number of surveys each year. We will build on the collective experience of the participating Schools to articulate and assess specific outcomes for the joint entrepreneurship program. At a minimum, we will evaluate learning outcomes, student satisfaction and the impact of the program on the careers of its graduates.

H. ACCREDITATION

Currently there is no official accreditation body specifically for entrepreneurship programs.

I. TIMELINE

During the 2009-2011 academic years, an *ad hoc* committee of faculty members from the College of Engineering and Ross School of Business prepared a rationale for proposing a joint graduate program in Entrepreneurship. Since September of 2010, cross-School Entrepreneurship Faculty and Administrative Committees have been working to develop and refine curricular and administrative aspects of the program. The schedule of program review follows:

- Oct 2010 College of Engineering Curriculum Committee (*approved*)
- April 2011 Ross School of Business (*approved*)
- June 2011 Office of the Provost
- July 2011 Regents of the University of Michigan
- Oct 2011 Presidents Council of the State Universities of Michigan

Pending approval at the University and state levels, our goal is to enroll the first master's degree students in the Fall of 2012.

J. ENTREPRENEURSHIP PROGRAM COMMITTEES

FACULTY COMMITTEE – COE

- Thomas Zurbuchen - Associate Dean for Entrepreneurial Programs, Professor of Aerospace Engineering and Professor of Atmospheric, Oceanic and Space Sciences, College of Engineering
- James Holloway - Associate Dean for Undergraduate Education and Professor of Nuclear Engineering and Radiological Sciences, College of Engineering
- Alec Gallimore - Associate Dean for Research and Graduate Education and Professor of Aerospace Engineering, College of Engineering (effective 9/1/11)
- Doug Neal - Managing Director, Center for Entrepreneurship and Adjunct Assistant Professor of Entrepreneurship, College of Engineering
- Aileen Huang-Saad - Assistant Director for Academic Programs, Center for Entrepreneurship, Lecturer IV of Biomedical Engineering, College of Engineering
- William (Bill) Hall - Adjunct Professor of Entrepreneurial Programs, College of Engineering and Intermittent Lecturer in Business, Stephen M Ross School of Business
- Marc Weiser - Adjunct Assistant Professor, Entrepreneurial Programs, College of Engineering

FACULTY COMMITTEE – ROSS SCHOOL OF BUSINESS

- George Siedel - Williamson Family Professor of Business Administration & Thurnau Professor of Business Law (*chair*), Stephen M Ross School of Business
- David Brophy - Director of the Office for the Study of Private Equity Finance, Associate Professor of Finance, Stephen M Ross School of Business
- Tom Kinnear - Eugene Applebaum Professor of Entrepreneurship & Professor of Marketing, Director Samuel Zell and Robert H. Lurie Institute for Entrepreneurial Studies, Stephen M Ross School of Business
- William Lovejoy - Raymond T. Perring Family Professor of Business Administration & Professor of Operations and Management Science, Stephen M Ross School of Business

ADMINISTRATIVE COMMITTEE

- Virginia Wait – Executive Director, Resource Planning and Management, College of Engineering
- Thomas Zurbuchen - Associate Dean for Entrepreneurial Programs, Professor of Aerospace Engineering, and Professor of Atmospheric, Oceanic and Space Sciences, College of Engineering
- Eugene Anderson, Senior Associate Dean for Academic Affairs, Ross School of Business
- Sean O’Neil, Chief Financial Officer, Ross School of Business

SECTION IV: CONCLUSION

The past twenty years have seen a renewed interest in innovation and entrepreneurship, with a particular focus on technology-enabled entrepreneurship. As the world becomes more global and converges on the theory that the “world is flat,” businesses, policy makers and universities are attempting to redefine themselves in terms of innovation and entrepreneurship. In doing so, strategists have been trying to identify the best business practices to foster innovation, while policy makers and funding agencies are trying to identify policies to facilitate innovation and metrics on how to measure innovation success for future investments. Lastly, universities are responsible for educating the best and brightest future leaders of tomorrow and for “teaching innovation,” while also becoming innovative themselves in promoting a more healthy economy for their local communities.

The Deans of the College of Engineering and the Ross School of Business support the creation of the Joint Master’s Degree in Entrepreneurship and are committed to its success. The creation of this joint degree aligns with the primary goals of the University as outlined by President Mary Sue Coleman at the 2009 National Summit (Detroit, MI):

Research universities can be major hubs for entrepreneurial activity and technology innovation, but this environment is not inherent.

Our economic survival as a region and nation is dependent upon a willingness to embrace untested ideas and inventions, encourage risk-taking, and acknowledge failure as simply part of the creative process. Research universities, particularly those in the Midwest, have the opportunity to deliver a profound impact upon tomorrow’s knowledge-driven industries: advanced manufacturing, alternative energy, health care delivery, and drug development.

Scholarship and generating new knowledge will always be the foundation of research universities. That must include teaching and nurturing entrepreneurs, be they faculty, staff or students. We do this through coursework, incubator space, student-driven organizations, technology transfer initiatives, and supportive leadership.

Equally important, our job is to convince those holdouts within the academy that “entrepreneurism” is not a dirty word.

When an English professor writes a novel or a collection of poetry, and that work is rewarded with a Pulitzer Prize or the National Book Critics Circle Award, we in higher education celebrate the achievement. When a bioengineering professor develops a medical device with the potential to improve lives, or a scientist licenses a software innovation to industry, we should be just as effusive with our institutional praise and rewards. It should not be viewed as sacrilege, as it sometimes is from wary corners of campus, for entrepreneurial faculty and students to commercialize their work.

Research universities have long been engines of technology and innovation in America. We have shaped the Internet, created the artificial heart and the integrated circuit chip, and developed vaccines to prevent polio and cervical cancer. Now more than ever, we must embolden the academy to provide a thriving culture for entrepreneurs in our community who are determined to make a difference with their innovation and invention.

Point of Contact

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251 Chrysler Center
2121 Bonisteel Boulevard
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Stephen M. Ross School of Business
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APPENDIX A. : GRADUATE PROGRAMS IN ENTREPRENEURSHIP

Institution	Program	Assists Student's Research	Geared to Science and Engineering Students	Inclusive to fields	Certification	Length of Program
Georgia Tech	Graduate Certificate in Engineering Entrepreneurship	No	Yes	Yes/mainly for BMEs	Certificate	1 year
Purdue University – BIOMEDSHIP program	Biomedical Entrepreneurship Program	No	Engineering Specifically	Yes/mainly for BMEs + MBAs	Certificate	2 semesters
Purdue University	Technology Realization Program	No	Yes	Yes	Certificate	2 years
North Carolina State University	MBA Concentration in Innovation Management	No	MBA program, so can be	Yes	MBA	N/F
North Carolina State University	MBA Concentration in High Technology Entrepreneurship and Commercialization	No	Yes	Yes	Minor (Certificate)	1 semester

Institution	Program	Assists Student's Research	Geared to Science and Engineering Students	Inclusive to fields	Certification	Length of Program
Stanford University	Product Creation and Innovative Manufacturing Graduate Certificate	No	Yes	Yes	Certificate	1 year
University of Southern California	Graduate Certificate in Technology Commercialization	No	Yes	Yes	Certificate	1 year
Duke University	Master of Engineering Management	No	Yes	Yes	Masters	1 year
University of Notre Dame	ESTEEM (Engineering, Science, and Technology Entrepreneurship Excellence Master's Program)	No	Yes	Yes	Masters	1 year
Case Western Reserve University	Science and Technology Entrepreneurship Program (STEP) Master of Science	No	Yes	Yes	Masters	3-4 semesters

Institution	Program	Assists Student's Research	Geared to Science and Engineering Students	Inclusive to fields	Certification	Length of Program
Brown University	Program in Innovation Management and Entrepreneurship Engineering (PRIME)	No	Yes	Yes	Masters	1 year
University of Florida	Thomas S. Johnson Master of Science in Entrepreneurship Program	No	Yes	Yes	Masters	1 – 1.5 years
University of Central Florida	Graduate Certificate in Technology Ventures	No	Yes	Yes	Certificate	1 semester
Massachusetts Institute of Technology	Sloan Certificate in Entrepreneurship & Innovation	No	No, MBA Specific Concentration	MBA	Certificate	2 years interspersed through MBA
Clemson University	Technology Entrepreneurship Certificate	No	Yes	Yes	Certificate	1 year
University of Texas at Austin	Master of Science in Technology Commercialization (MSTC)	No	Yes	Yes	Masters	3 semesters
Georgia Tech	TIGER	Yes	Yes	Yes	Certificate	1.5 – 2 year
Wayne State	Engineering Entrepreneurship Certificate (primarily undergraduate program)	No	Yes	Yes (mostly engineering undergrads)	Certificate	1-2 semesters

APPENDIX B: COLLEGE OF ENGINEERING FACULTY

The following list includes members of the College of Engineering committed to the Entrepreneurship Program:

- Thomas Zurbuchen - Associate Dean for Entrepreneurial Programs, Professor of Aerospace Engineering and Professor of Atmospheric, Oceanic and Space Sciences, College of Engineering
- Farnam Jahanian - Edward S. Davidson Collegiate Professor of Electrical Engineering and Computer Science and Professor of Electrical Engineering and Computer Science, Computer Science and Engineering Division, College of Engineering (Currently on leave 2-3 years)
- Mohammed Islam - Professor of Electrical Engineering and Computer Science, Division of Electrical and Computer Engineering, College of Engineering
- Peter Adriaens - Professor of Civil and Environmental Engineering, College of Engineering, Professor of Natural Resources and Environment, School of Natural Resources and Environment, and Professor of Entrepreneurship, Stephen M. Ross School of Business
- Elliot Soloway - Arthur F. Thurnau Professor, Professor of Electrical Engineering and Computer Science, Computer Science and Engineering Division, College of Engineering, Professor of Education, School of Education, and Professor of Information, School of Information
- Aileen Huang-Saad - Lecturer IV, Biomedical Engineering and Assistant Director for Academic Programs, Center for Entrepreneurship, College of Engineering
- Doug Neal - Managing Director, Center for Entrepreneurship and Adjunct Assistant Professor of Entrepreneurship, College of Engineering
- William (Bill) Hall - Adjunct Professor of Entrepreneurial Programs, College of Engineering and Intermittent Lecturer in Business, Stephen M. Ross School of Business

The Office of Technology Transfer has provided the following list of entrepreneurial faculty that should be invited to participate in the program.

- Daryl Kipke - Professor of Biomedical Engineering, College of Engineering

- Steven (Steve) Skerlos – Associate Chair and Associate Professor of Mechanical Engineering and Associate Professor of Civil and Environmental Engineering, College of Engineering
- Stephen Forrest - William Gould Dow Collegiate Professor of Electrical Engineering, Professor of Electrical Engineering and Computer Science, Electrical and Computer Engineering Division, Professor of Materials Science and Engineering, College of Engineering, Professor of Physics, College of Literature, Science and the Arts, and Vice President for Research, Office of the Vice President for Research
- Levi Thompson - Richard E. Balzhiser Collegiate Professor of Chemical Engineering, Professor of Chemical Engineering, and Professor of Mechanical Engineering, College of Engineering
- Ann Marie Sastry - Arthur F. Thurnau Professor, Professor of Mechanical Engineering, Professor of Biomedical Engineering, and Professor of Materials Science and Engineering, College of Engineering
- Shu Takayama - Professor of Biomedical Engineering and Professor of Macromolecular Science and Engineering, College of Engineering
- Michael Bernitsas – Professor of Naval Architecture and Marine Engineering, College of Engineering
- Sugih Jamin - Associate Professor of Electrical Engineering and Computer Science, Computer Science and Engineering Division, College of Engineering
- Joerg Lahann - Associate Professor of Chemical Engineering, Associate Professor of Materials Science and Engineering, Associate Professor Biomedical Engineering, and Associate Professor of Macromolecular Science and Engineering, College of Engineering
- Almantas Galvanauskas - Professor of Electrical Engineering and Computer Science, Electrical and Computer Engineering Division, College of Engineering
- Khalil Najafi – Chair and Professor of Electrical Engineering and Computer Science, Electrical and Computer Engineering Division and Professor of Biomedical Engineering, College of Engineering
- Sridhar Kota – Professor of Mechanical Engineering, College of Engineering
- Jignesh Patel – showing no current appt., left University
- Erdogan Gulari - Donald L. Katz Collegiate Professor of Chemical Engineering, Professor of Chemical Engineering, College of Engineering

- Noel Perkins –Associate Chair and Professor of Mechanical Engineering, College of Engineering
- Kensall (Ken) Wise – Professor Emeritus of Electrical Engineering and Computer Science, Electrical and Computer Engineering Division, Professor Emeritus of Biomedical Engineering, and Professor Emeritus of Atmospheric, Oceanic and Space Sciences, College of Engineering
- Roy Clarke – Professor of Physics, College of Literature, Science and the Arts
- Jerome (Jerry) Lynch - Associate Professor of Civil and Environmental Engineering and Associate Professor of Electrical Engineering and Computer Science, Electrical and Computer Engineering Division, College of Engineering
- Alec Gallimore - Associate Dean for Research and Graduate Education and Professor of Aerospace Engineering, College of Engineering (effective 9/1/11)
- Brian Gilchrist – Professor of Electrical Engineering and Computer Science, Electrical and Computer Engineering Division, Professor of Atmospheric, Oceanic and Space Sciences, and Director of the Multidisciplinary Design Programs, College of Engineering
- Jyoti Mazumder - Robert H. Lurie Professor of Engineering, Professor of Mechanical Engineering, and Professor of Materials Science and Engineering, College of Engineering
- Kathleen Sienko - Assistant Professor of Mechanical Engineering, Assistant Professor of Biomedical Engineering, College of Engineering

APPENDIX C. ROSS SCHOOL OF BUSINESS FACULTY

The following list includes members of the Ross School of Business committed to the Entrepreneurship Program

- Professor Thomas C. Kinnear - Professor of Marketing and Executive Director of the Samuel Zell Lurie & Robert H. Institute for Entrepreneurial Studies, Stephen M Ross School of Business
- Professor David Brophy - Associate Professor of Finance and Director of the Center of Venture Capital and Private Equity at the Ross School of Business, Stephen M Ross School of Business
- Adjunct Professor Tim Faley - Adjunct Professor of Entrepreneurial Studies
Managing Director, Samuel Zell & Robert H. Lurie Institute for Entrepreneurial Studies,
Stephen M Ross School of Business
- Professor Wayne Baker - Professor, Stephen M Ross School of Business, Professor, College of Literature, Science & Arts
- Professor William Lovejoy - Professor, Stephen M Ross School of Business, Professor, School of Art and Design
- Professor Cindy Schipani - Professor of School of Business Administration, Stephen M Ross School of Business
- Professor George Siedel -Williamson Family Professor of Business Administration
Thurnau Professor of Business Law, Stephen M Ross School of Business

APPENDIX D: COMMITTED OUTSIDE AFFILIATES/PARTNERS

Several strong supporters of entrepreneurship education at the University of Michigan have agreed to participate in and support the Joint Master's Degree in Entrepreneurship.

- Arvids A. Ziedonis, Ph.D., MBA
Academic Director, Lundquist Entrepreneurship Center
Assoc Professor of Management
Charles H. Lundquist College of Business
University of Oregon
- Rosemarie Ziedonis, Ph.D.
Assoc. Professor of Management
Charles H. Lundquist College of Business
University of Oregon
- Jeff Schox, Esq.
Schox, PLC
- Ben Dubin
Managing Partner
Asset Management
- Paul Vlastic
Manger
Vlastic Investments LLC
- Susan Kornfield
Partner
Bodman, LLP
- Marc Weiser,
Managing Partner
RPM Ventures
- Steve Blank
Serial Entrepreneur
Stanford, University of California, Berkley, Columbia University
- C. Robert Kidder
Chairman and CEO
3Stone Advisors LLC

- Mark Slezak
CEO
Lurie Investments, Inc.
- Rick Bolander
Managing Director, Co-Founder
Gabriel Venture Partners
- Amy Cell
Senior Vice President, Talent Enhancement
Workforce Development Agency
- Steve Carnevale
Point Cypress Ventures

APPENDIX E: MASTER'S PROGRAM IN ENTREPRENEURSHIP VISUALIZATION

	August	Fall		Winter		Summer
Eng. School Led	Technology Bootcamp	How to Identify an Opportunity/Innovation	IP Strategy	Entrepreneurial Ownership	Ethics in Technology Development and Entrepreneurship	
		Design Process	Technology Business Models	Technology Elective	Technology Elective	
Business School Led	Business Bootcamp	Accel for the Entr. Firm	Business Econ. For the Entr.	Entr. Strategy	Finance for the Entr. Firm	
		Entr. Marketing	Entr. Operations	Leading Startups	Legal Aspects of Entr.	
Joint		Practicum 1: Problem Identification, Business Formulation, Customer Validation, Influence of Regulatory Environment, Technology Validation and Development		Practicum 2: Technology Development and Hypothesis Testing, Validating the Business Model, Operational Planning, Launching the Technology Venture		
						Launch/Internship