New Mexico Institute of Mining and Technology

Center for Leadership in Technology Commercialization

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This document contains a summary of the proposed Center for Leadership in Technology Commercialization, which is an effort started within the Department of Management at New Mexico Tech. Please contact Peter Anselmo (anselmo@nmt.edu; 575 835 5438) for any additional information.

Overall Strategic Mission: The overall mission of the New Mexico Tech (NMT) Center for Leadership in Technology Commercialization will be to stimulate technology-driven economic development and high-wage job creation in New Mexico. This will be done by fostering entrepreneurship at NMT via student commercialization projects, NMT faculty research with commercialization potential, building and expanding linkages with the New Mexico venture-business community and other external (to NMT) entrepreneurs and organizations, and enhancing ongoing entrepreneurship-oriented efforts at NMT. NMT would assist promising students and interested faculty by incubating such projects and research, assisting in the protection of intellectual property, and serving as a platform from which to research and launch new ventures. This is a role that the nation’s leading technical universities are moving to or have already moved to, especially given the importance that innovation has in our modern world.

Goals: The following goals are in support of the global objective of fostering entrepreneurship at NMT which in turn provides for the creation of high-wage jobs in the Central New Mexico area. Entrepreneurship will be fostered at NMT via student/faculty technology research and commercialization projects that are built around faculty research, startup projects from the private sector, and ideas and research results from national laboratories. The Center will achieve these goals by leveraging New Mexico Tech research and teaching capabilities and focusing those capabilities on technology-commercialization endeavors. This will include those endeavors that involve intellectual property derived from a student’s education at NMT and projects where students can start with intellectual property owned and developed initially by the National Laboratories in cases where they want to see the use of such intellectual properties for broad commercial applications.
• Create an undergraduate innovation studies track within the NMT Department of Management that is initially focused on development of internally-generated commercialization ideas. This track could involve adding specific classes and providing entrepreneurial mentorship to students;

• Create an innovation studies track in the NMT Graduate Engineering Management Program that may focus on ideas from either within NMT or from Engineering Management student workplaces. This track could involve adding specific classes and providing entrepreneurial mentorship to students;

• Be the liaison between the NMT Foundation, patent law firms, NMT faculty, venture funding, student projects, and the community at large;

• Foster a continuing culture of entrepreneurship among students, faculty, researchers, and all others in the New Mexico Tech community. One way this will be done is by maintaining connections between funding sources and other market-based entities and NMT researchers interested in commercialization of their research outputs; and

• Build and enhance relationships with funding sources, seek new funding sources, and market the Center throughout New Mexico and to corporate entities throughout the United States.

Coursework: The course offerings supported by the proposed Center will be

• Undergraduate specialization area in Technology Commercialization that is part of the existing BS in Management of Technology featuring:

  o A 9 credit-hour sequence that is available to all NMT students focused on

    ▪ Development of very early-stage ideas
    ▪ Entrepreneurial finance and risky project evaluation
    ▪ An option for students to work on a viable one-year design project with hands-on prototype development, market research and development, and product-development topics culminating in the completion of the technology-development and marketing component of a business plan.

• A new Graduate Engineering Management emphasis on innovation and technology commercialization featuring:

  o A 6-hour graduate sequence leading to the Independent Study (thesis) project required for completion of the Master of Engineering Management (MEM) degree; and

  o Hands-on interaction and management of projects that are either new projects or are projects within the organizations where the students are employed.
Seminars and Conferences: The Center will coordinate and facilitate the sharing of information in support of overall strategic goals and objectives. These include, but are not limited to, the following:

- Entrepreneurship Workshop that will be conducted annually for NMT faculty and students. The instructor from the successful Workshop conducted the week of 10 June 2013 has agreed to return to campus next year for another Workshop;
- Connection with existing Verge Fund Speaker Series program where guest speakers are brought to campus to interact with students and faculty;
- Annual Technology Leadership Conference where selected student projects are evaluated by entrepreneurs and other members of the business community, NMT faculty have the opportunity to do elevator pitches to potential investors and/or mentors, and technology and policy leaders from across New Mexico will discuss innovative ways to build the high-wage job base in New Mexico. This could possibly also include hosting technology and business-plan competitions.

Resources: The following resources will be required to initiate the Center at New Mexico Tech:

- A full-time faculty position within the Department of Management. Technology commercialization teaching and research will be the main responsibilities for this position;
- A full-time marketing coordinator with part-time administrative support;
- Graduate students in the Department of Management and other NMT Departments with faculty interested in research commercialization; and
- Funding for interdisciplinary student projects that are devoted to technology-driven market analyses, product development, and/or other hands-on activities built around creating startup companies.

Timeline and Tentative, General Milestones: We anticipate that the first year of the Center will be devoted to initiating relationships with funding sources, specifically those sources interested in fostering the creation of entrepreneurial ventures in the State and interested in the creation of job opportunities in disadvantaged areas or for disadvantaged students, developing outreach activities inside and outside of campus, and curriculum development and enhancement. By year 3 we anticipate at that at least 2 to 4 new businesses will have come from the Center, and that by year 5 at least 5 to 7 new businesses will have come from the Center and that the Center will be a significant presence in the NMT community as measured by student and faculty involvement in economic development activities.

Future Directions: Once the Center is well-established, the focus will expand to include partnerships with national laboratories, startup companies outside of New Mexico Tech, and firms facing innovation challenges. NMT’s contribution to these partnerships will be in the form of interdisciplinary student-faculty teams focused on outcomes but also on innovation-process
research in very early-stage ventures. The NMT contributions will have a market focus, and technology and market forecasting will be a major component of the NMT contributions. We anticipate the start of these activities in the second year of the Center’s operations.

The purpose of this outline is to encourage and help facilitate formation of an advisory panel to develop a detailed plan for launching the proposed Center. An internal NMT faculty committee has been formed, and we are in the process of forming the panel, which will have members from the business community, the national laboratories, and the internal NMT faculty committee.

Figure 1 on the next page contains a visual overview of how the proposed Center will work to advance the goal of advancing technology commercialization, in part via a research emphasis on the earliest stages of the process.
Figure 1. Interactions between major components of proposed center – see footnotes as indicated on the next page for details. The overall goal of the proposed Center is to enhance the development of new technology companies via emphasis on the engineering-business connection and research on very early stages of the technology development and commercialization process.
Interdisciplinary student teams will analyze technology and market potential, help advise with regard to organizational and engineering issues. Graduate students will work on longer-term projects, undergraduate student teams will work on shorter-term specified tasks within projects.

This will lead to hands-on integration of business and engineering/technology concepts, methods, and processes. The operational model for these team projects will be the existing New Mexico Small Business Assistance (NMSBA) projects currently run by the NMT Management Department. We anticipate that student-team projects run through the Center will not have the same constraints as NMSBA projects. The NMSBA projects will be continued, and projects through the Center will be an addition to the current NMSBA program.

The other existing hands-on model for the student-team projects is the engineering design courses required for the BS degree in engineering from all engineering departments at NMT. The Center will provide resources enabling these teams to focus on the commercialization aspect of their design projects, which in turn will provide faculty with ideas regarding expansion of student projects into potential startup companies.

Partner entities will work with the Center on student projects and on internal innovation processes. Partnership projects with national laboratories and companies outside of NMT will be selected based on publicly-available criteria and will be subject to standard agreements between NMT and partner entities. In addition to providing hands-on technology commercialization opportunities for NMT students, objectives of partnership projects may include assessment of initial and projected future feasibility of a concept or idea, focused technology-driven market research, help with prototype design and associated financial projections, and/or other objectives oriented toward advancing a technology-based product toward commercialization.

NMT faculty and researchers will, through the Center, investigate commercialization possibilities for basic and applied research outputs. The emphasis on very-early stage projects will enable the introduction of market and technology forecasts into early stages of the research-design process. Graduate student projects will be the main way that this market connection will be implemented for NMT faculty and researchers. Research directed toward commercialization potential of specific technologies will be one area of study.
The process of technology commercialization starting from a very early stage will be the second major research focus. Longitudinal research projects focused on development of very-early stage ideas and prototypes that will utilize rich data sources provided as ideas turn into prototypes which (in some cases) will turn into fledgling companies will enable increased understanding of technology, market, and organizational (including demographic) variables and how they interact in the context of technology startups – and how the characteristics of the technologies themselves impact the process. Example applied research questions that could be addressed within the context of the hands-on opportunities offered by the Center include a) converting laboratory processes to manufacturing processes and b) building the value proposition managing the sales process with early adopters (these topics were suggested by a member of the New Mexico venture-capital business community).

4. Initially, 9 credit hours will be added to NMT Management Department undergraduate and 6 credit hours will be added to graduate course offerings. Courses will, where possible, be modular in nature, so that a 3-credit-hour course would consist of three stand-alone 1-credit-hour modules. Modular-content possibilities include (but, are not limited to):

- Creative problem solving and design (this is already being done at NMT; we will investigate whether possible modifications are appropriate for these courses)
- Technology Forecasting
- Market Forecasting
- Managing Groups and Teams
- Very-Early Stage Product Development
- Management of Very-Early-Stage Projects

Other courses, such as a course concerned with management of the new-product development process and valuation of new technologies, will likely be offered in a conventional 3-credit-hour format.