Research to Innovation to Venture: An Education and Venture Development Process..

GOAL: Sustainable Materials Commercialization and Innovator Preparation

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VALLEY OF DEATH:

University science and engineering innovators are challenged in converting research into commercial innovations, the so-called "Valley of Death"





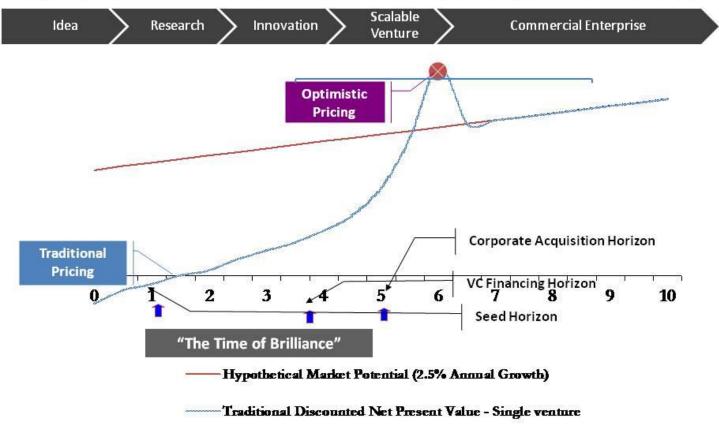
TIME OF BRILLIANCE





TIME OF BRILLIANCE

Figure 2: Stage Dependent Value of Research to Commercial Enterprise – years versus arbitrary \$

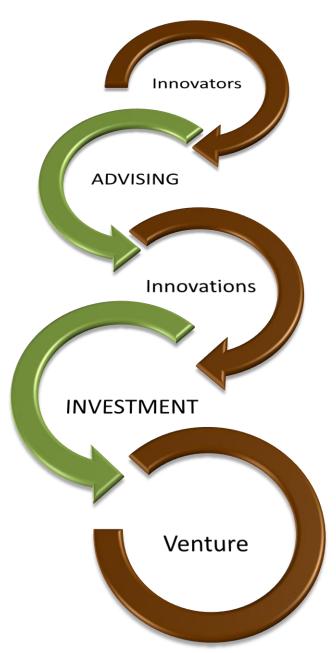




Nir Kossovsky Steel City re Transforming the Valley of Death to a Time of Brilliance and REAP the benefits!

- Respect the innovator at least as much as the innovation
- Educate for research and fast innovation and iteration.R2I2V is an interdisciplinary process – which can be taught and learned.
- Address the challenges in venture formation head-on
- Provide rewards and recognition for innovation in an expanded view of the academic role

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PUBLICATION....PREPRINT

ASEE

- Defines pedagogic background
- Discusses original research and lit references

Transforming the Practices and Rationale for Educational Programs to Aid Academic Researchers in Translating Research

Judith C. Giordan, Joseph Steig, Angela Shartrand, Phil Weilerstein National Congular Inventors and Innovators Accepted for Publication ASEE, March 2011

I. The innovation challenge

One of our hopes is that... there will be full employment, and that the production of goods and some will not not those by etanding of the standing of the sta One of our hopes is that... there will be full employment, and that the production of goods and services will serve to raise our standard of living... Surely we will not get there by standing still, making the common things were made helders and colling them of the common thinks a minute. services will serve to raise our standard of living... Surely we will not get there by standing still was not about in international trade unlace we offer now and more attractive and Merety by maxing the same inings we made before and setting them at the same or night will not get ahead in international trade unless we often new and more attractive attractive and more attractive and more attractive We will not get anead in international trade unless we offer new and more attractive and cheaper products... There must be a stream of new scientific knowledge to turn the wheels of private and public enterprise. - Vannevar Bush, 1945 [1]

The translation of basic scientific research to practical and deployable innovations that benefit and the planst is as all as human hierary itself. From the discovery of the uses of fire to The translation of basic scientific research to practical and deployable innovations that benefit people and the planet is as old as human history itself. From the discovery of the uses of fire to people and the planet is as old as human history itself. From the discovery of the uses of the transformative basic research that is the basis for space exploration, humans have translated

To address the complex challenges faced by our planet and its inhabitants, many studies over the last fifteen wears have pointed to the pand for those formally trained in the science technology. To address the complex challenges faced by our planet and its inhabitants, many studies over the last fifteen years have pointed to the need for those formally trained in the science, technology, and mark (CTEM) disciplinate to be more broadly and flavible advantator many that last fifteen years have pointed to the need for those formally trained in the science, technology, engineering and math (STEM) disciplines to be more broadly and flexibly educated to meet the hope disciplines to the hope beautiful to the hope disciplines to the science of the engineering and math (STEM) disciplines to be more broadly and liexibly educated to meet the demands of the 21st century. It has been suggested that this broader education consist not only of a continuous consist not only of the continuous continuous consist not only of the continuous demands of the 21° century. It has been suggested that this broader education consist not only of greater depth in a given STEM discipline but also include additional interdisciplinary scientific to participate in the translation of presearch into innovations that becomes greater depin in a given STEM discipline but also include additional interdisciplinary scients skills, ^{1,3} the ability to participate in the translation of research into innovations that become and standard additional interdisciplinary scients. The desire and skill to work skills, the ability to participate in the translation of research into innovations that become products and processes that address societal problems, and the desire and skill to work

Engineering education has traditionally been focused on preparing students to effectively apply Engineering education has traditionally been focused on preparing students to effectively apply scientific principles in order to design and develop useful things. While this remains the essence of engineering training there is an urgent need to equip engineers with better translational skills. scientific principles in order to design and develop useful trings. While this remains the essence of engineering training, there is an urgent need to equip engineers with better translational skills and translational skills and translational skills. of engineering training, there is an urgent need to equip engineers with better translational skills and the ability to see opportunity in and translate scientific research into practical applications. and the ability to see opportunity in and translate scientific research into practical applications. This is even more important in the increasingly interdisciplinary environment of science and anainage has bacome loss than This is even more important in the increasingly interdisciplinary environment of science and engineering. The once clear demarcation between scientist and engineer has become less sharp. engineering. The once clear demarcation between scientist and engineer has become less sharp. Biologists engineer life forms and engineers increasingly pursue research that is at the boundary of interdisciplinary engineering knowledge. But engineers often remain key mediators of Biologists engineer me torms and engineers increasingly pursue research mai is at the boundary to heaful and commandable vitable applications? discovery to useful and commercially viable applications.



RESPECTing innovator and innovation

- Providing a systematic, focused, cost-effective, scalable approach to venture development and innovator support.
- BOTH build value!

Innovation

Idea	Research	\nearrow	Innovation		Scalable Venture	Commercial Enterprise
Acknowledge	Aware	\nearrow	Accept	\nearrow	Act	Accomplish

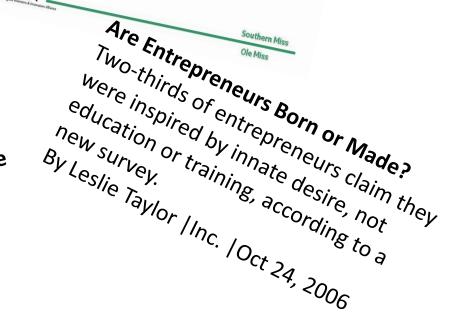
Innovators



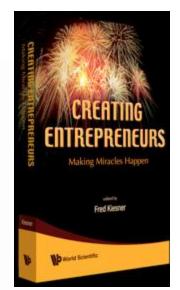
EDUCATE... TO INNOVATE

Only 1 percent of more than 200 U.S. entrepreneurs surveyed cited higher education as a significant motivator toward starting their own venture, while 61 percent cited their "innate drive." Northeastern University Entrepreneurs are born, but can they be Survey

taught? By Jim Hopkins, USA TODAY









ADDRESS - CHALLENGE #1: dealflow

Innumerable undifferentiated "top of funnel" opportunities

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CHALLENGE #2: PROCESS, ADVICE, SUPPORT and PRACTICE

An ecosystem that efficiently validates and structures seed stage deals exists only in Web 2.0, not for STEM ventures









CHALLENGE #3: Lost in translation

- Low success of STEM translation to commercialization
- Need to "fail fast and iterate"..not easy in STEM

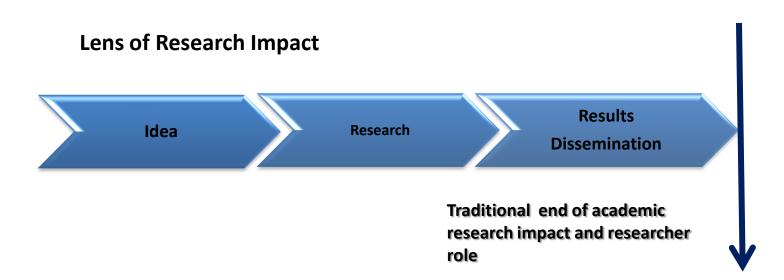




PROVIDing reward and recognition

Academic Research Mission

- Gain knowledge and an understanding of the "world"
- Disseminate and share results
- Train future STEM practitioners





PROVIDing reward and recognition

Embracing and extended view

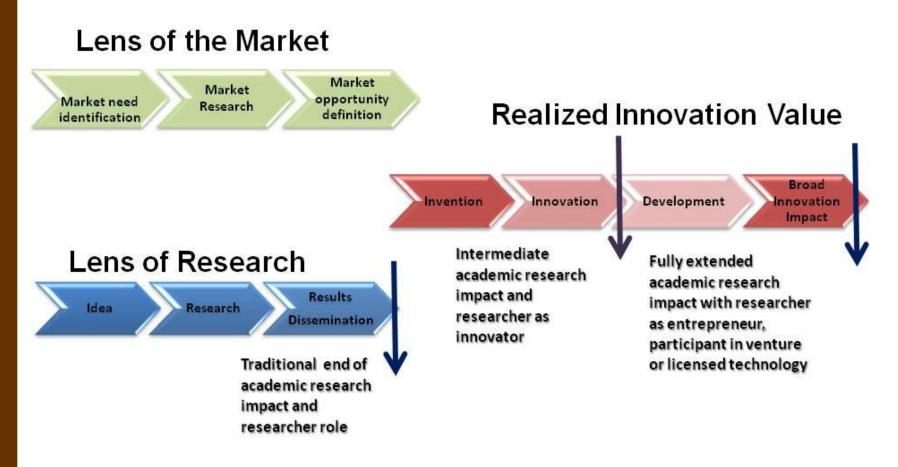


Figure 1: Fully Extended Academic Research to Broad Impact (Market) Value Chain

SOLUTIONS TO REAP REWARDS

- Respect the R2I2V PERSONAL CHANGE process
 - NO person builds a company alone
- Lens of the MARKET as important as Lens of RESEARCH
 - STEM ventures are not the same as Web 2.0 BUT build for "failing fast" based on business insights
- It is not a single event...NO one learned P Chem the first time round!



Centers for Chemical Innovation

 The Centers for Chemical Innovation (CCI) Program supports research centers focused on major, long-term fundamental chemical research challenges. CCIs that address these challenges will produce transformative research, lead to innovation, and attract broad scientific and public interest..... CCIs integrate research, innovation, education, and public outreach and include a plan to broaden participation of underrepresented groups.

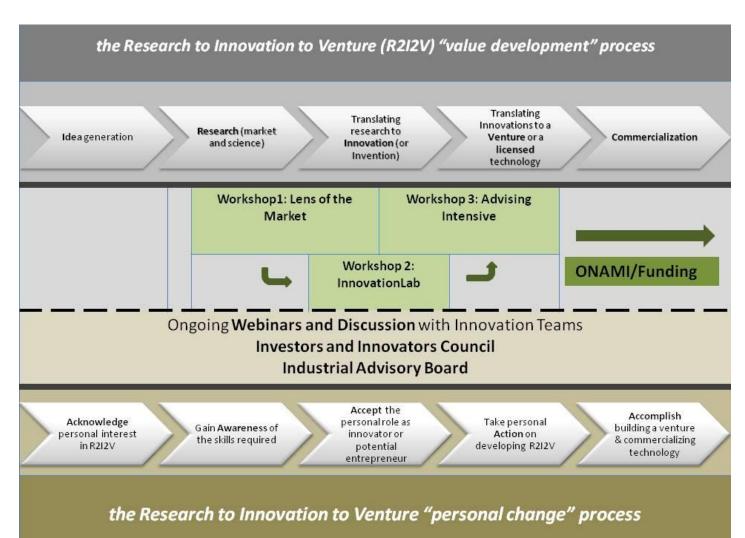


National Science Foundation

The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..."



Center for Sustainable Materials Chemistry





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Transforming the Valley of Death to a Time of Brilliance





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ecosVC Portfolio Examples

- Natural Composites Inc.: university spin-out using natural materials as a petroleum polymer filler and replacement
- Qteros: a university spin-out in cellulosic ethanol.
- Ecovative Design: university spin-out creating a biodegradable alternative to expanded polystyrene
- A privately held oil processing equipment company developing a process for algae oil extraction
- A privately held natural composites company creating structural materials in a wide range of sectors
- Numerous Fortune 500 companies expanding their portfolios through Open Innovation

