



UNIVERSITY
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MĀNOA

Technology Transfer: a University Point of View

by

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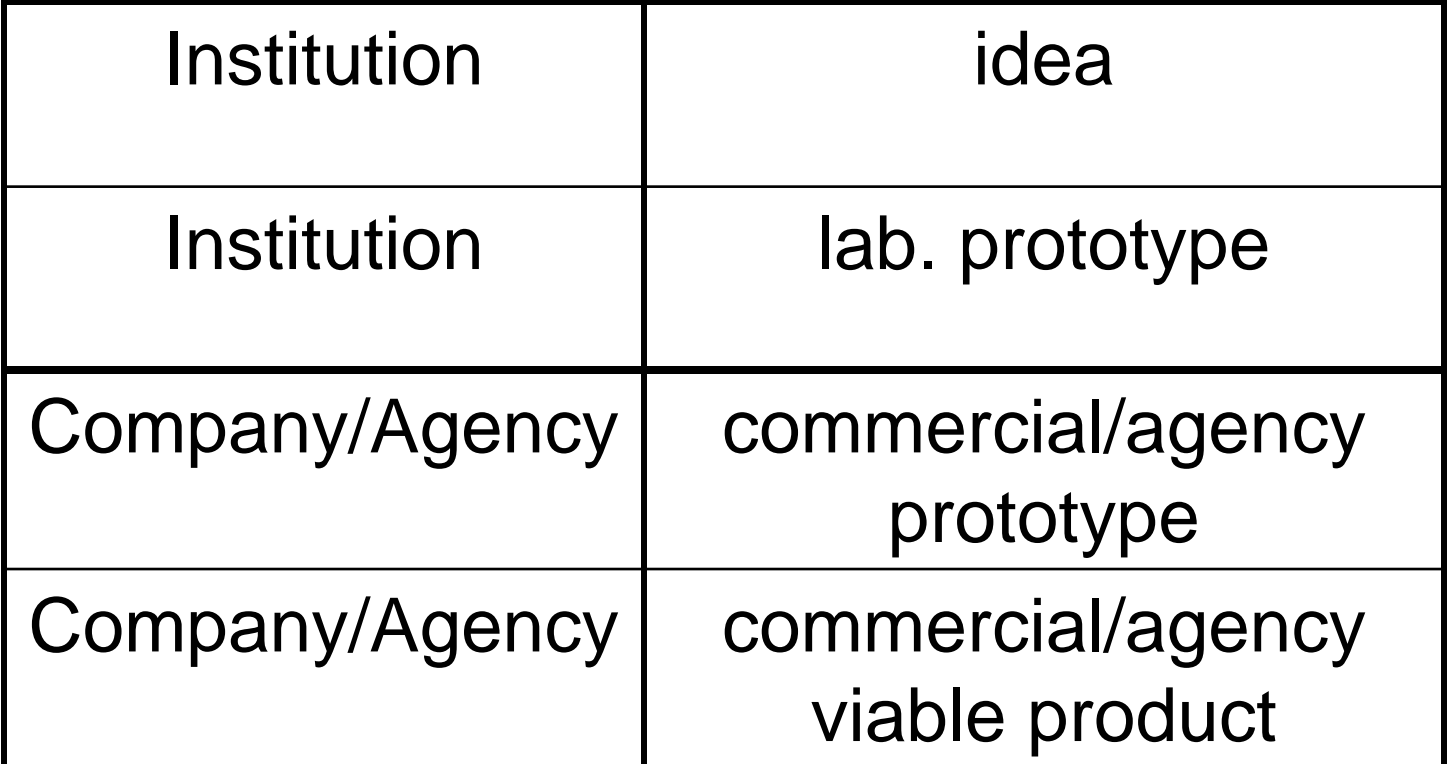
- Technology Transfer:
 - A personal perspective
- A few remarks about Soft Power and Improving Tech Transfer Process
- Remarks about the process at UH Manoa and a few examples

The Process

Transition of an Idea to a “viable product”

– either a commercial product, or an agency product, or both!

Investment level
Increases
Transition



Institution	idea
Institution	lab. prototype
Company/Agency	commercial/agency prototype
Company/Agency	commercial/agency viable product

Pasteur's Quadrant

Donald E. Stokes

What should **“the right”** University faculty be striving for?

Consideration of Use

Quest for
Fundamental
Understanding

	No	Yes
Yes	Niels Bohr	Louis Pasteur ↑
No		Thomas Edison

Creating Innovative Solutions: A DHS view – Tara O'Toole undersecretary for DHS S&T

- Deep understanding of the problem: operational, reality and limitations
- Far reaching recognition of the universe of possible solutions
- Testing and Evaluation – “tinkering”
- Improvement

Tech-Transfer

- **We've done it before**: Long tradition of Tech Transfer at universities...best exemplified by DARPA (initiated the internet and many military innovations) – Now ARPA-E in Energy
- Faculty in science and engineering need a context for their work to be useful...they need to be attached to a **community of practice** depending on the field - Clinicians, NIH research directors, DoD research directors, DHS research directors, NIH, DoD and DHS customers, & companies that manufacture for these customers

Tech-Transfer

- Faculty/Researchers can “push” ideas/IP into a community or ideas/IP can be “pulled” from faculty/researchers – who is pulling? Incentives?
- University/Institute can let faculty/staff take their own work to market “with rules” – “Stanford model”

And/Or

- University/Institute can “engage” the tech transfer process on behalf of the faculty/staff member – “Columbia model”
- These competing models add friction to the process – especially Hawaii

Tech-Transfer

- As technology content and system complexity increase then commercialization/agency adoption becomes harder and more expensive
- Companies working with Universities to transition technology must usually either buy or seek exclusive license for IP – hard for companies to judge when/if to do this because most ideas do not result in commercially viable or agency viable products

Tech-Transfer

- Belief – some/many Agency challenges can be solved by low technology and/or simple system solutions:
- e.g. DHS seeking to pick low hanging fruit in their search for S&T solutions – ease of transfer to agency commercially viable products
- e.g. Industrial/Commercial design has a long history of providing instant commercial rewards for good ideas with little technical sophistication – prompts search to replicate this success for Agency needs?
- e.g. I-phone – matches industrial design & high tech innovation

Soft Power Considerations

- May be some “low hanging fruit” as in DHS case
- May be “lower tech” than the sophisticated DARPA examples
- May be able to involve students more in the development of solutions— students are not employees of the university and hence slightly easier to negotiate with on IP (but they have advisors who are!)
- Probably better suited to small business – where systems and technology sophistication is lower

Improving the Tech-Transfer process

- Help connect faculty with community of practice – especially the end user and companies – important for faculty to “meet the military user” – e.g. DHS efforts
- Faculty are not great at existing technology assessment - important for solution trade off considerations – how to get this? – work with users!
- Better funding/knowledge of the “transition”- Involve faculty in SBIR/STTR like processes – needs better ties between faculty and **(small/medium)** companies

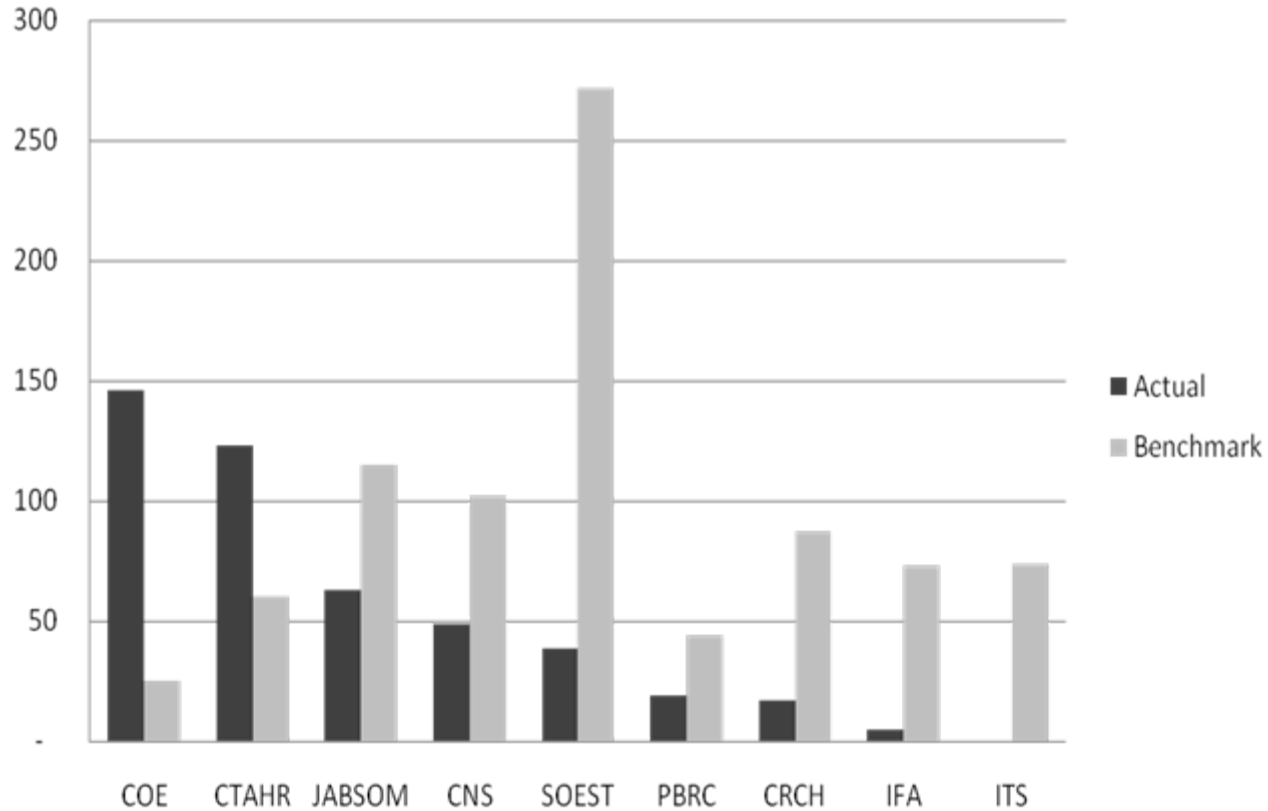
A UHManoa / College of Engineering View



- UH Manoa is a very successful **Science Focused** university – especially astronomy and oceans
- It is **not** an engineering focused University – Engineering is a relatively small enterprise at UH Manoa
- Next slide demonstrates that Engineering outperforms other units at UH Manoa in invention disclosures – absolutely and in regard to the other productivity measures
- Does **not** mean that Engineering is good at Tech transfer, or transfers technology in the “right” areas for Hawaii – but its faculty try hard!

UH Invention Disclosures - 1996 to 2009

Actual vs. Benchmark



Flash Carbonization

Michael Antal, Professor of Renewable Energy Resources at Hawai'i Natural Energy Institute (used to be in Engineering) - developed a technology that can use virtually any type of green waste, including corn cobs, coconut husks, and switch grass, to produce fuel cell grade charcoal.

Has patented flash carbonization reactor. The chamber is stuffed with green waste and then pressurized. When ignited, a high-temperature flash fire rapidly incinerates the green waste, converting it into charcoal. The process has been licensed to a number of companies in different markets in Hawai'i and the US.

"SiloXel" Nanocomposite Coating for Aluminum Corrosion Protection

A novel silicone-based, hybrid ceramic-polymer nano-coating has been developed by Profs. Lloyd Hihara and Atul Tiwari at the Corrosion Research Lab. in Hawaii.

The coating has low viscosity, long term stability and durability, antifouling and water repellent qualities, and UV and corrosion resistance in marine environments. A manufacturer of conversion coatings that are used to pre-treat aluminum is testing the technology and reports that the coating is out performing the current industry standard product.

Pipeline Micro

Prof. Weilin Qu, Director of the College of Engineering's Micro-Scale Thermal/Fluid Laboratory, was a founder of Pipeline Micro, a Hawai'i-startup that was based on a liquid cooling system developed at the University of Hawai'i and licensed by the company.

Pipeline Micro develops small and efficient liquid cooling systems for consumer and home electronics products, including video graphics cards, computers, and various appliances. Its liquid cooling systems use a patented thermal system design that dramatically improves heat transfer, stabilizes temperature, and enables products to run faster, perform longer, and use less energy.

Examples

Adama Materials

Adama Materials is an early-stage, Hawaii-based, materials company focused on the commercialization of patent-pending nanotechnologies to produce novel nanoresins developed by Prof. Mehrdad Nejhad, Director of the College of Engineering's Composites, Smart Structures, and Nanotechnology Laboratories.

Adama seeks to redefine high performance materials, by creating the next generation of lighter, tougher, and stronger land/sea/air vehicles, windmill blades, and sporting equipment.