



Successful Industry- University Teaming: Innovation Is Not a Commodity

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Outline

- 1. Context: No matter where you work, innovativeness is something you use to differentiate your organization in the market.**
- 2. Motivation: When do industry-university teams really work?**
- 3. Considerations for the proposal team: Non-starters, show-stoppers, potential frustrations, and one or two positive things.**
- 4. Getting started and making it work.**
- 5. Examples.**
- 6. Questions, comments, and wild applause.**

Context: Setting Oneself Apart

- **Market differentiation is critical to successful proposal writing and business development.**
- **The question is whether we choose the wrong attributes of our organization or product. What we regard as a unique qualification, product, or service might appear to be just a commodity from the other side of the table.**

Context: Setting Oneself Apart

“A product becomes a commodity within a specific market segment when the repeated changes in the basis of competition . . . completely play themselves out, that is, when market needs on each attribute or dimension of performance have been fully satisfied by more than one available product.”*

In other words, if every competitor can deliver more than the customer really needs, the product is a commodity. The decision-maker will select a winner based on price, service, or convenience rather than the product attributes.

* Christensen, C.M. (1997) *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business School Press, Boston, p. 169.

Context: The Implications for Us

- **When every proposer is uniquely qualified to do something brilliant, then being uniquely qualified to do something brilliant becomes a commodity.**
- **To set ourselves apart in the market, we start by doing all those things the consultants and books advise:**
 - **Know yourself.**
 - **Know your customer.**
 - **Be known and trusted by your customer and the community.**
 - **Get out in front with innovative ideas to help the customer. Even if the customer didn't know he or she had this need, it can make the difference between being perceived as a commodity and being perceived as a partner for success.**

Context: An Example

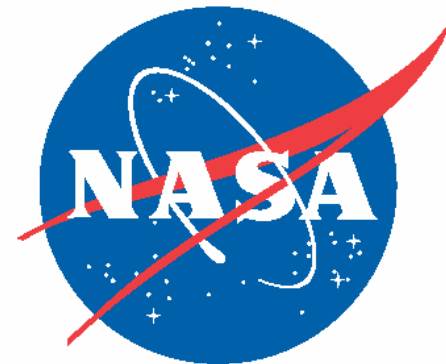
- Every NASA program solicitation begins with boilerplate language about the agency’s mission:

“The NASA vision is:

To improve life here

To extend life to there

To find life beyond.



“The NASA mission is:

To understand and protect our home planet

To explore the Universe and search for life

To inspire the next generation of explorers

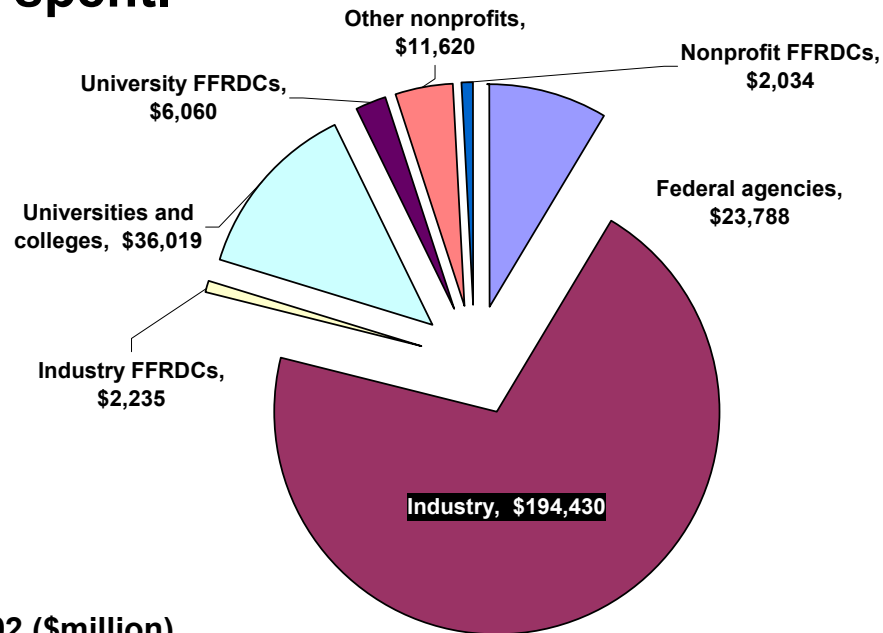
...as only NASA can.”

Context: The Point

- **So, if your *product* can't beat the competition on performance alone, your *organization* can beat the competition by showing its contribution to the sponsor's broader mission.**
 - **In NASA's case, this means you would want to show how choosing your proposal will improve life, extend exploration, and inspire the next generation.**
- **This, I say, is where industry/university partnerships come in, even if your product is not research-based.**

Context: Wrapping Up

Before we go on, and I promise that I'll try to keep this relevant to everyone in the room, a look at where research money comes from and where it gets spent.



Research expenditures by sector, 2002 (\$million)

National Science Foundation, *Science and Engineering Indicators 2004*. Arlington, VA.

Motivation: Stand Together to Stand Out

- **For companies in high-technology industries, the potential benefits of partnering with academic institutions are obvious:**
 - **Access to leading-edge innovation.**
 - **Application of advances in basic science and engineering to current problems.**
 - **Access to well-trained students: your future employees.**
 - **Potential “halo effect” of a prestigious institution: particularly valuable if the work is risky or controversial.**

Motivation: Stand Together to Stand Out

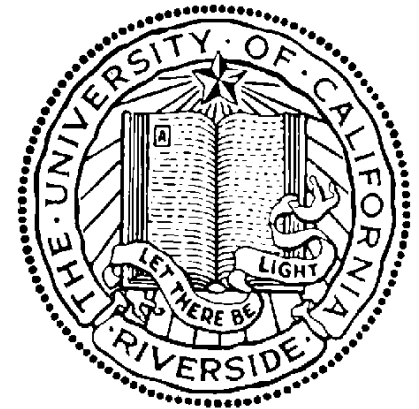
- **For companies inside *and* outside of high-tech, some non-obvious considerations:**
 - **Academic institutions can tap into funding sources that you can't (and vice versa).**
 - **Outreach, community education expertise.**
 - **Diversity.**

Motivation: The Bottom Line

- A well designed team can:
 - **Exceed the customer's requirements for the product or service being procured.**
 - **Contribute to the customer's broader mission.**
 - **Contribute to the participants' own goals.**
 - **Win.**

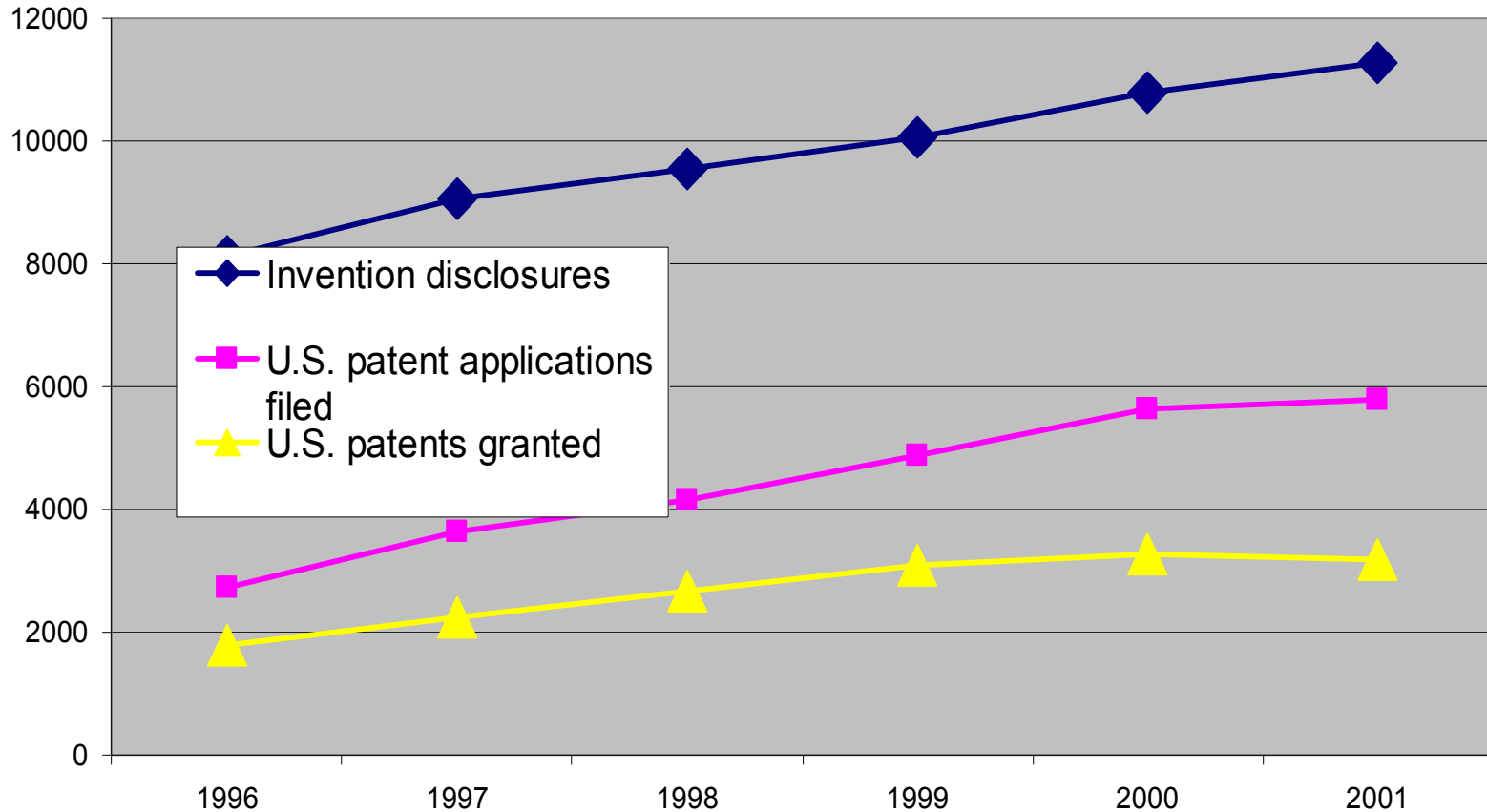
Motivation: Access to Innovation

- The mission of a public institution of higher education is written into law.* For the University of California, it includes:
 - To serve as the state’s primary institution of higher education, training students at the bachelor’s and graduate levels.
 - To perform research for the public benefit.
- Public benefit is broadly defined and includes producing innovations for commercialization, leading to improved economic opportunity and quality of life in California, the nation, and the world.



* Education Code of the State of California (Section 66010.1-66010.8)

Motivation: Access to Innovation



Source: *NSF Science and Engineering Indicators 2004*, p. 5-56, and Assn. of University Technology Managers

Motivation: Access to Innovation

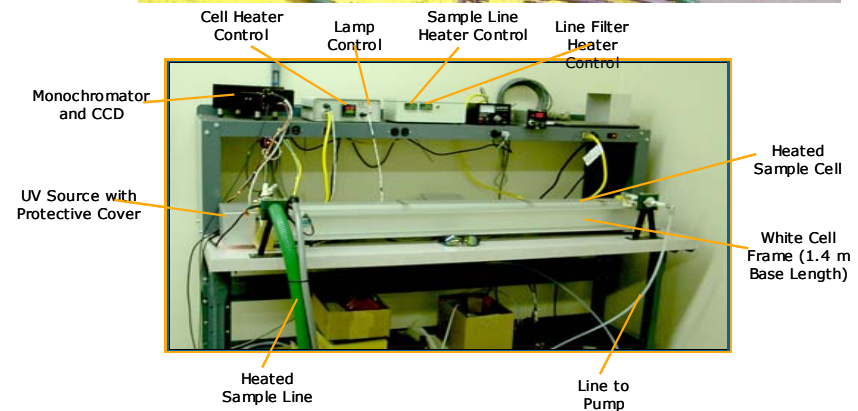
- **Universities are producing more innovations and taking more steps to commercialize them.**
 - **Usually, academic institutions have effective and transparent (which is not to say easy) licensing mechanisms.**
 - **Intellectual property developed jointly or under a prime/sub relationship can be owned jointly, if the award and subaward agreements are written well.**

Motivation: Applications

- **Universities are very good at basic science. Industry is very good at making new products for its own use or for public needs. When they work together, successful projects can results.**
- **Two real-life examples:**

Motivation: Applications

- A consortium of automobile and oil companies needed to understand how changing fuel standards and vehicle technologies affect ammonia emissions.
 - UCR's proposal was the most risky and by far the most expensive.
 - Half of the review panel did not believe the approach would work.
 - After two conference calls and written responses to 30 questions, we won.



Motivation: Applications

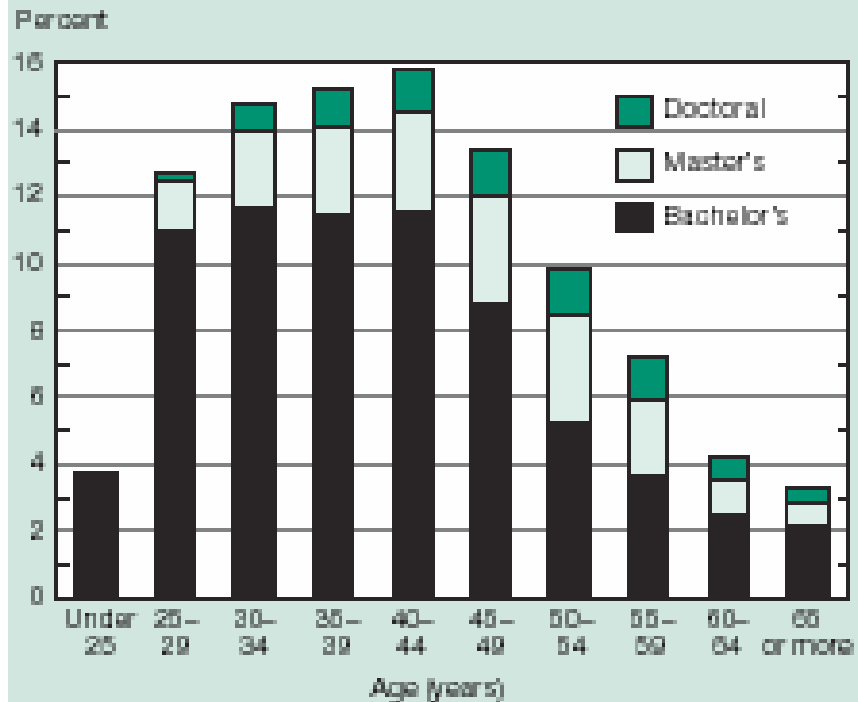
- **Honda produced a new engine so clean that traditional technologies could not quantify the emissions. Honda developed its own emissions measurement approach but knew that regulators would not believe numbers coming from an automaker.**
 - **UCR took a contract from Honda and leveraged it with additional funding from state and federal environmental agencies and other companies.**
 - **Honda's emission measurement approach was quickly shown to be wrong. UCR corrected it and documented the emissions benefits of these new cars.**



Motivation: Workforce

- In the United States, scientists and engineers are retiring faster than new ones are entering the workforce. Partnering with academic institutions is an effective way to gain access to new workers.

Age distribution of labor force with S&E highest degree, by degree level: 1999



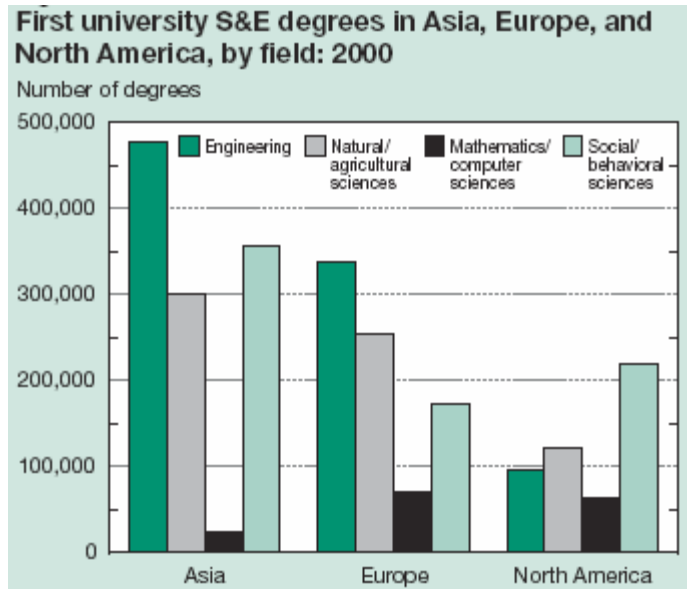
SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT), 1999. See appendix table 3-16.

Science & Engineering Indicators – 2004

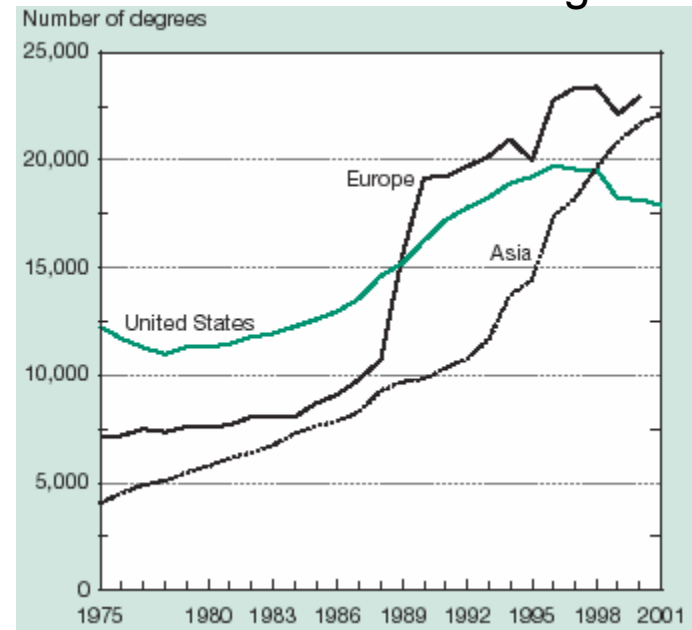
Motivation: Workforce

- Partnering also stimulates student interest in these fields, which can help to increase matriculation.

Bachelor's in science/engr by region



Ph.D.s in science/engr



Motivation: Workforce

- Partnering between industry and universities creates opportunities for “real world” student experience.
- The company gets a free look at potential new hires.
- Student workers are relatively cheap. The sponsor sees cost savings and a contribution to larger national goals.
- In the proposal, you now have a page showing photos of young, smiling, safety-goggled, and ethnically diverse students. Reviewers love that.

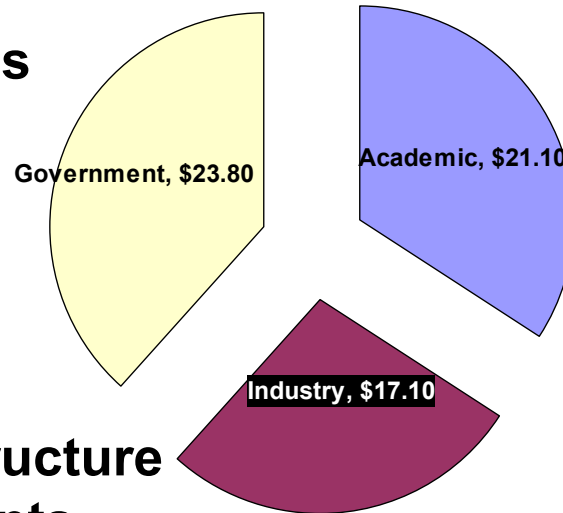


Motivation: Diversity

- Whether you get extra points during evaluation or not, agencies like to see participation by:
 - Minority Institutions (MIs) or Minority Serving Institutions (MSIs).
 - Historically Black Colleges and Universities (HBCUs).
 - Hispanic Serving Institutions (HSIs).
 - Tribal Colleges (TCs).
 - Universities in states with below-average government R&D funding (EPSCOR).
- **Most public universities in California are classified as MIs. Some are HSIs.** For a list of qualifying institutions, see <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>

Motivation: Funding Sources

- Although industry spends more on R&D than other sectors, universities receive more Federal funding for research.
- In addition to tradition, universities have infrastructure to capture contracts, grants, cooperative agreements, and other funding from these agencies, such as:
 - Indirect cost rate agreements.
 - Conforming intellectual property policies.
 - Human and animal subject protocols.



Dollar figures in billions for FY 2002. Source: NSF Science & Engineering Indicators 2004, Appendix Table 4-3. Other sources place academic number as high as \$36 billion (see NSF 04-319).

Motivation: Outreach

- **Does the agency need the public to understand and support the project? Universities are very strong in community outreach, K-12 student and teacher training, and business/industry outreach.**
- **Universities generally have good relationships with elected officials, but we are not lobbyists.**

Considerations: Now the Bad News

- Does the academic person have what it takes to do the job? This involves more than the technical capabilities.

“But I very much fear,” he added, “that he will have all the usual academic virtues, especially Pride, Envy, and Incompetence.”

Byrd, M. (2004) *Shooting the Sun*. Bantam Dell, New York, p. 47.

Considerations: Appropriateness

- Is the proposed work true to the academic institution's mission?

“One can imagine a university of the future tenuring professors because they bring in large amounts of patent royalties and industrial funding; paying high salaries to recruit ‘celebrity’ scholars who can attract favorable media coverage; admitting less than fully qualified students in return for handsome parental gifts;...encouraging professors to spend more time delivering routine research services to attract corporate clients, while providing a variety of symposia and ‘academic’ conferences planned by marketing experts...”

Bok, D.. (2003) *Universities in the Marketplace*. Princeton University Press, p. 200.

Considerations: Legal

- **Almost no university in America can do classified work. No University of California campus can do work subject to export control/NOFORN requirements (because many of our graduate students are not citizens).**
- **Universities and professors are hawks on intellectual property. Take the time to get IP issues right before contracts are signed and work begins.**
- **Some different FAR clauses and terms and conditions may apply to universities. Don't assume that we can sign the same documents that you routinely sign.**

Considerations: Academic Freedom

- **A few professors refuse to do work for the Department of Defense. This is rarely an issue, but be careful that the team does not have any potentially fatal personality conflicts.**
- **A researcher might agree to delay publication of results, but should never agree to suppress results for any reason.**
- **Invention and discovery don't always obey the Gantt chart and schedule of milestones. Be prepared to encounter some delays and wrong turns.**
- **Education is central to what we do. Students might slow things down, but they usually are critically important to a university research project.**

Considerations: Fake Halos

- **Prominent people from prestigious institutions are not immune from making asses of themselves.**
 - **What are their areas of expertise? Does your plan call for them to be contributing outside of their fields?**
 - **What have they published, and where?**
 - **If they are innovators, it means their success will displace someone else's established idea. Who are your collaborator's enemies? Is it likely that any of those enemies will be reviewers on your proposal?**

Considerations: Cost Share

- **Often, cost sharing is built into a professor's salary. He or she can contribute a portion of academic year level of effort to the project (usually equivalent to 1-2 months FTE) at the institution's expense. Labor and benefits can count toward cost share.**
- **Not true at all institutions. Cal State campuses, for example, are teaching institutions, and faculty must buy out their time if they want to do research.**
- **The institution may be able to make other commitments, such as equipment or student stipends, or hosting conferences.**

Making It Work: Finding Teammates

- Editorial boards of prominent journals.
- ISI Highly Cited: <http://www.isihighlycited.com>.
- Names your people remember from reading journals and attending conferences.
- Don't just rent a name. You don't want a Nobel Prize winner who will dump the proposal writing and actual research on a grad student. Look for genuine interest in the project and a good interpersonal fit.

Making It Work: Structure

- **Joint proposals.**
 - **Sometimes it matters who is prime and who is sub; sometimes it doesn't.**
- **Industry sponsorship of university research.**
 - **Look for matching funds, such as UC Discovery Grants (<http://ucdiscoverygrant.org>).**
- **Research centers.**
- **Personnel exchanges.**
 - **Sabbatical visitors.**
 - **Industry visiting researchers on campus.**
 - **Student interns.**
- **Sponsoring student capstone design projects.**

Examples: High Tech

- **NASA is exploring new communications architectures for deep-space probes.**
 - **Universities have hardware and software concepts that have been demonstrated in theory but never tested.**
 - **Aerospace companies know how to build, package, and test high-tech equipment.**
 - **A small private-launch company might be able to launch a nanosatellite to test the concept, if needed.**

Examples: Health Care

- **A state or major employer wants affordable and efficient health insurance for its workers and retirees. To set itself apart in the market, a health care provider might participate in an academic study of effective delivery of services.**
 - **University can get an NIH grant to study or model different approaches.**
 - **Company can provide real-world data sets on costs and level of service.**
 - **Possibly access to actual users for interviews.**
 - **In future proposals, the company can justify its proposed approach based on a university's findings. (And for nine months, you will be using the results before the competition even knows they exist, because of the time it takes to publish.)**

Examples: Lab Management

- **A certain university has trouble keeping people in a national lab from going home with disks full of classified information each night.**
 - **To win the contract for continuing to operate the lab, it might need help from a company that knows how to handle secret material.**

Conclusions

- **Questions.**
- **Comments.**
- **Wild applause.**

Conclusions

- **Enough with the wild applause already.**

Thank you.