

Industry and Academia: A Personal Journey

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The Research Enterprise and Your Role in It

- The United States learned that a highly trained research community was a major asset in WWII.
- The United States learned that a strong research community was an engine of economic growth.
- What do you value about Research?



Research is Risky and Expensive: Who will pay for it?



- Private sector (Industry) struggles to do basic research.
- Government through Academia and national labs steps in for the common good.
- Philanthropy and not-for-profits are targeted, but minor players

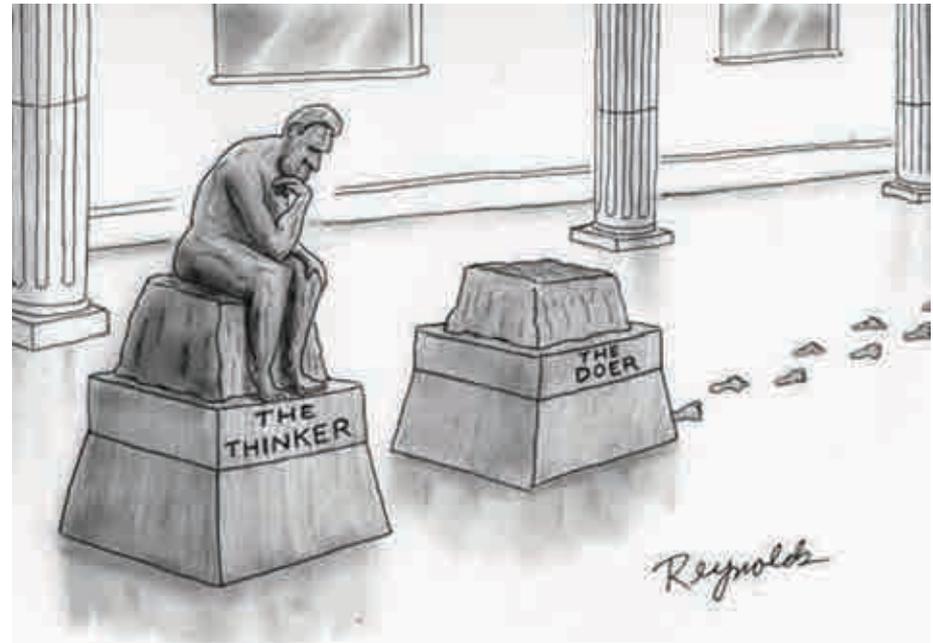
Hope is a Commodity and You are selling it



- **Embrace your inner salesman:** You will spend most of your career selling your vision or someone else's
- **Know your customer:** immediate and long-term

How do you fit in this picture?

- What motivates you?
 - Love of knowledge? Discovering new things?
 - Love of country? Betterment of Mankind?
 - Making things? Making things work?
 - Studying God's creation?
 - Financial security?
 - Prestige? Fame?
- What are the major influences/commitments in your life?
 - Parents?
 - Mentors?
 - Friends? Spouses?



<http://i.imgur.com/GPVoA.png>

My Journey: A little bit of everything

- 1970: Graduated from Palo Alto High School
- 1974: BS from MIT in Biology
- 1981: PhD from The Johns Hopkins University in Biology
- 1981-1982: Post-doc at UMBC
- 1982-2000: **Big Business** (Kodak and J&J)
- 2000-2012: **Small Business** (Egenix, First Wave Technologies, Codevax)
- 2012-2014: **Academia** CMSR
- 2015-present: **Academia and Small Business** CMSR and MicroB-plex, Inc.



My Journey:.....but a lot about Family

- 1970: Graduated from Palo Alto High School
- 1974: BS from MIT in Biology
- **1974: Married; Moved to Baltimore**
- 1981: PhD from The Johns Hopkins University in Biology
- 1981-1982: Post-doc at UMBC
- **1982: Moved to Rochester; Role of my Father-in-law**
- 1982-2000: Big Business (Kodak and J&J)
- **Adopted two Korean Children (Lili 1987, Sam 1991)**
- **2000: Divorced, Laid-off from J&J**
- 2000-2012: Small Business (Egenix, First Wave Technologies, Codevax)
- **2003: Married Susan Dodge-Peters**
- 2012-2014: CMSR
- 2015-present: CMSR and MicroB-plex, Inc.



Big Business

- Big companies do what big companies do best (Big Things!)
- Build and manage systems, preferably systems that grow.
- They want the risk to be in implementation not in fundamental science or technology (not much basic science, lots of manufacturing support, clinical trials, QC/QA)
- Large organizations are often built from highly specialized units and projects are organized around teams

Big Business

- They want all of you (outside engagements very limited)
- They are creatures of their shareholders and of the next quarter
- They are better at moving in a big way than they are at moving quickly.....and the moves can be dramatic!
- They are not stable (Shutdown in 86; Amersham 91, J&J 94, PCR 97,
- Paralysis and accountability

More on Big Business

- Specialization vs breadth (silos)
- Creativity means solving problems within the boundaries of the system (CRB). You are competing in a marketplace of solutions. Competing AND cooperating
- The marketplace can shift your priorities dramatically (CK-MB, CRP)
- So can too much risk (PCR)

Still More on Big Business

- You will need to possess or cultivate the political skills to have an impact out of your assigned area. (travel with sales reps)
- Focus on your assignments and deliver on time. Do not get sucked into the meeting culture.
- Learn how to communicate quickly and clearly
- Compensation:
 - Comes out of earnings
 - Three tiers (Technical, professional and management)
 - Intellectual property

Small Business/Start-Ups

- **Egenix, Inc.:** Confirmatory Dx for prostate cancer
- **First Wave Technologies, Inc.:** Development of nascent technologies emerging from western NY State universities. (Mucosal vaccines, gene therapy, biosynthesis, pill crusher).
- **Codevax, Inc.:** Vaccine technologies emerging from UR
- **MicroB-plex, Inc.:** Dx for infectious diseases
- Consulted for: Calorics, Inc., Zanaqua, Gencyte, Enzymatics

Small Business/Start-ups

- Everyone does everything.....not true but kinda.
- All risk, all the time. Most fail or change direction radically
- Problems generally have formidable technical challenges.
- Results will be acted on before you are ready; you are always selling!
- Everything and everyone counts everyday

Small Business/Start-Ups

- Drinking the Kool-Aid
- Environment can be very intimate and intense (Arguments)
- Fund-raising is a huge task (Angels, VCs, grants)
- Compensation:
 - Comes out of investments/grants
 - negotiable, mix of salary and equity
 - Stock vs stock options
 - Intellectual property

Academia

- From academia, industry was bunch of boring drones; From industry, academics were a bunch of brilliant, undisciplined children.
- Our only resource for long-term, investigator initiated research
- Academia is not a growth industry; there is or needs to be a national debate about how the research needs of the United States are going to be met!
- 27,000 total R01 recipients and 10-15,000 new Life Science PhDs each year, how many can we productively support?

More on Academia

- Shedding some old paradigms: each lab an island; every investigator in competition with every other.
- Instilling some new ones: Competition AND Cooperation (Core labs and centers); crossing disciplines; sharing instruments; translational

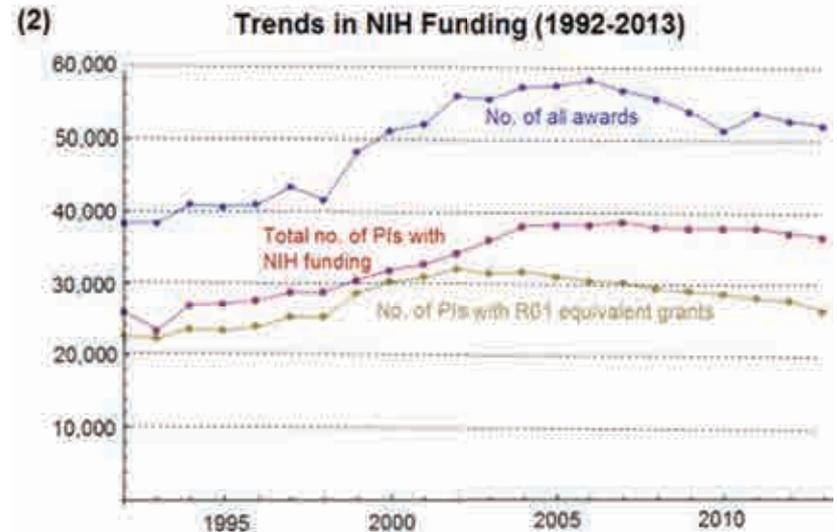
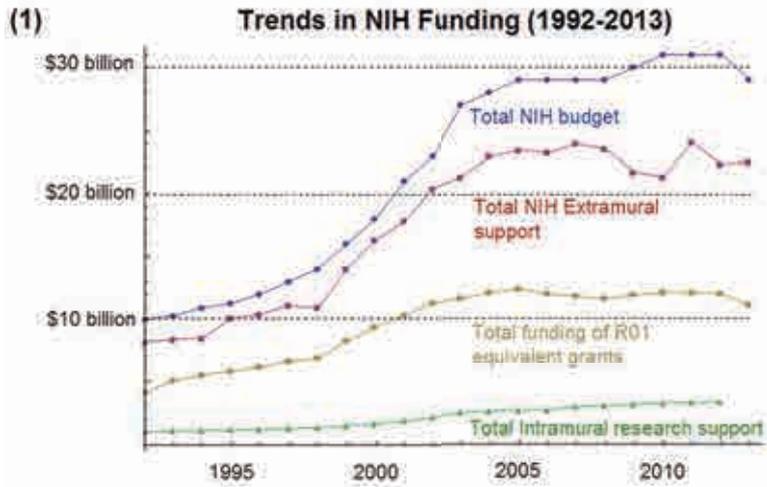
More on Academia

- Coping with declining support; getting more out of each dollar
- Mixed support: government/industry/foundations and grants/contracts

The Center for Musculoskeletal Research

- Cooperative and competitive (individually strong players who also play well together)
- Shared resources (Cores, P50 and P30, T32)
- Shared experience (PI meeting, publishing together)
- Clinical outlook and strong clinical connections
- Excellent training program (committees, access to other faculty, regular reviews, good level of independence, annual CMSR symposium, exposure beyond the UR)

NIH Funding in the past two decades



Take Home Messages

- The US Research Enterprise is stressed in multiple ways (falling support and too much talent)
- There are many opportunities beyond academia big business and lots (I hope) of small business.
- There are important roles in advocacy, policy-making, science writing, teaching, politics and science/technology administration.
- There are no safe havens, but there are a lot of important things to be done.

Take Home Messages

- You have to be nimble:
 - Bring every endeavor to a documented endpoint,
 - Keep up your network of friends and colleagues
 - Strive to set aside money for six months of no income
 - Always have a story to tell, or two (a past one and a current vision)
 - Be prepared to move and/or live in opportunity dense areas (Bay Area, San Diego, Baltimore/Washington, Boston)