



STRATEGIC ANALYSISSM

Crafting Better Proposals: Using The Heilmeyer Criteria

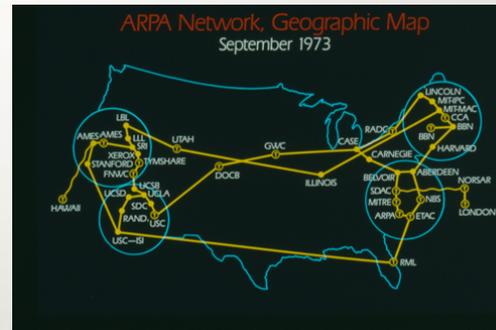
Lindsey Hillesheim, PhD
Advisory Scientist

May 23, 2012



DARPA

Created in 1958 // Mission is to create and prevent strategic surprise // Focus on high-risk, high-reward research for military applications.



George Heilmeier



RCA Lab, holding liquid crystal display (LCD)
1958-1970



Bellcore CEO
1991-1996

b. 1936

1975
Director of DARPA

1978-1990
Texas Instruments
Senior VP and CTO

2009
Inducted into National
Inventors Hall of Fame





The Heilmeier Criteria (or Catechism)

1. What are you trying to do? Articulate your objectives using absolutely no jargon.
2. How is it done today, and what are the limits of current practice?
3. What is new in your approach and why do you think it will be successful?
4. Who cares?
5. If you're successful, what difference will it make? What applications are enabled as a result?
6. What are the risks?
7. How much will it cost? How long will it take?
8. What are the midterm and final "exams" to check for success?





Writing Sample



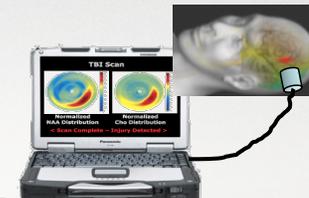
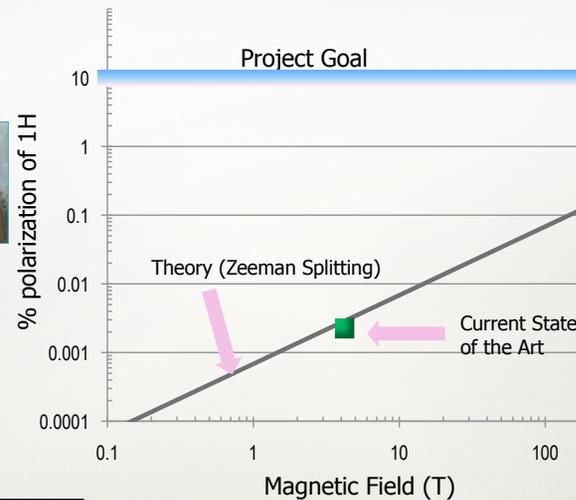
How many words is a picture worth?



Problem:

Current Magnetic Resonance Imaging & Spectroscopy are hampered by:

- Low polarization (~0.001%)
- Slow (30 min)
- Large, expensive magnets (\$1M)
- Restricted to 1H spectra

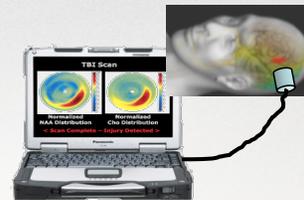


What is needed:

A new non-invasive method for directly hyperpolarizing tissues that does not require a large magnet.

- High polarization (1-10%)
- Fast (sec to min)
- Compact, inexpensive system (\$100k)
- Other atomic spectra (e.g. 13C)

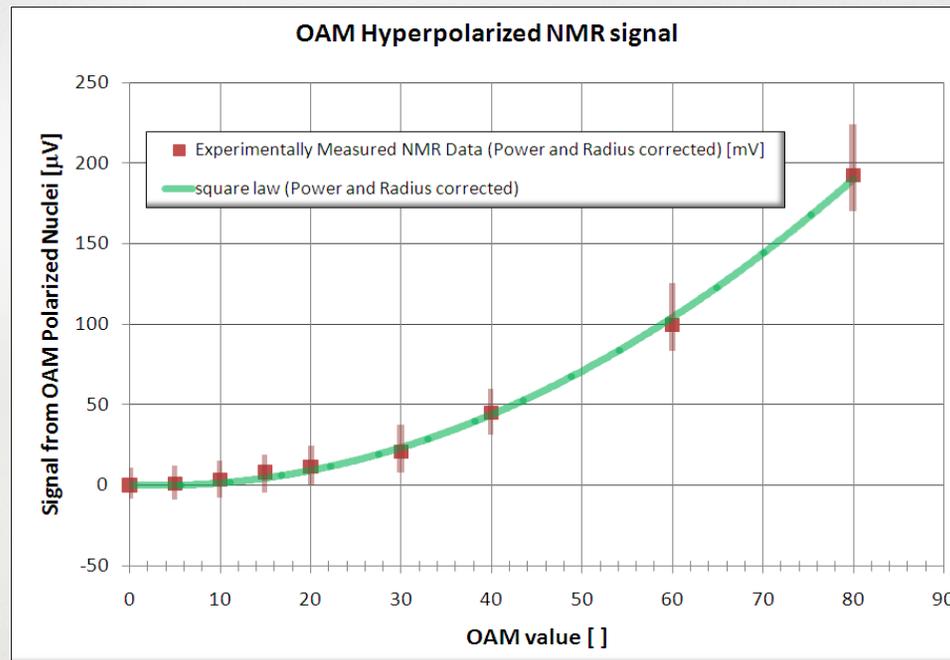




	Magnetic Resonance Imaging & Spectroscopy (MRI/MRS)	Quantum Orbital Resonance Spectroscopy (QORS)
Polarization	0.001% / Zeeman Splitting	1-10% / OAM hyperpolarization
Time	30 min	sec to min
Size	Requires large, shielded rooms and liquid He or N	Compact, portable
Cost	\$1-10M	\$100-500k
Chemical information	^1H	^1H , ^{13}C , ^{17}O , etc.
Spatial Resolution	$\text{mm}^2 - \text{cm}^2$	$\mu\text{m}^2 - \text{mm}^2$ *using an array of beams



Expository vs. Persuasive Figures



The Heilmeier Criteria (or Catechism)

1. What are you trying to do? Illustrate the use of rhetorical tools for writing better presentations.
2. How is it done today, and what are the limits of current practice? Many proposals are still written and illustrated in an expository manner and are not effective in persuading reviewers.
3. What is new in your approach and why do you think it will be successful? Program managers are BUYING IDEAS, so you need to SELL IDEAS.
4. Who cares? You do! So do the government PMs! Nobody wants to read bad proposals and we don't want to miss out on good ideas just because they are poorly communicated.
5. If you're successful, what difference will it make? What applications are enabled as a result? Your PIs will get more funding, and that will lead to new technologies and knowledge that will change the world.
6. What are the risks? Your PI doesn't get funded. You can lead a horse to water...
7. How much will it cost? How long will it take? No more and no longer, unless you want to offer specific training on rhetorical writing.
8. What are the midterm and final "exams" to check for success? If the rate of funded proposals increases.

