

Discovery to Innovation: University-Industry Partnerships



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Discovery to Innovation

- Innovation *through* Partnerships
- Partnerships Programs and Funding
- Assessment of Partnerships Programs



NSF's Vision*

Advancing Discovery, **Innovation**, and Education beyond the frontiers of knowledge, and empowering future generations in science and engineering.

*NSF Strategic Plan FY 2006-2011

Innovation through Partnerships

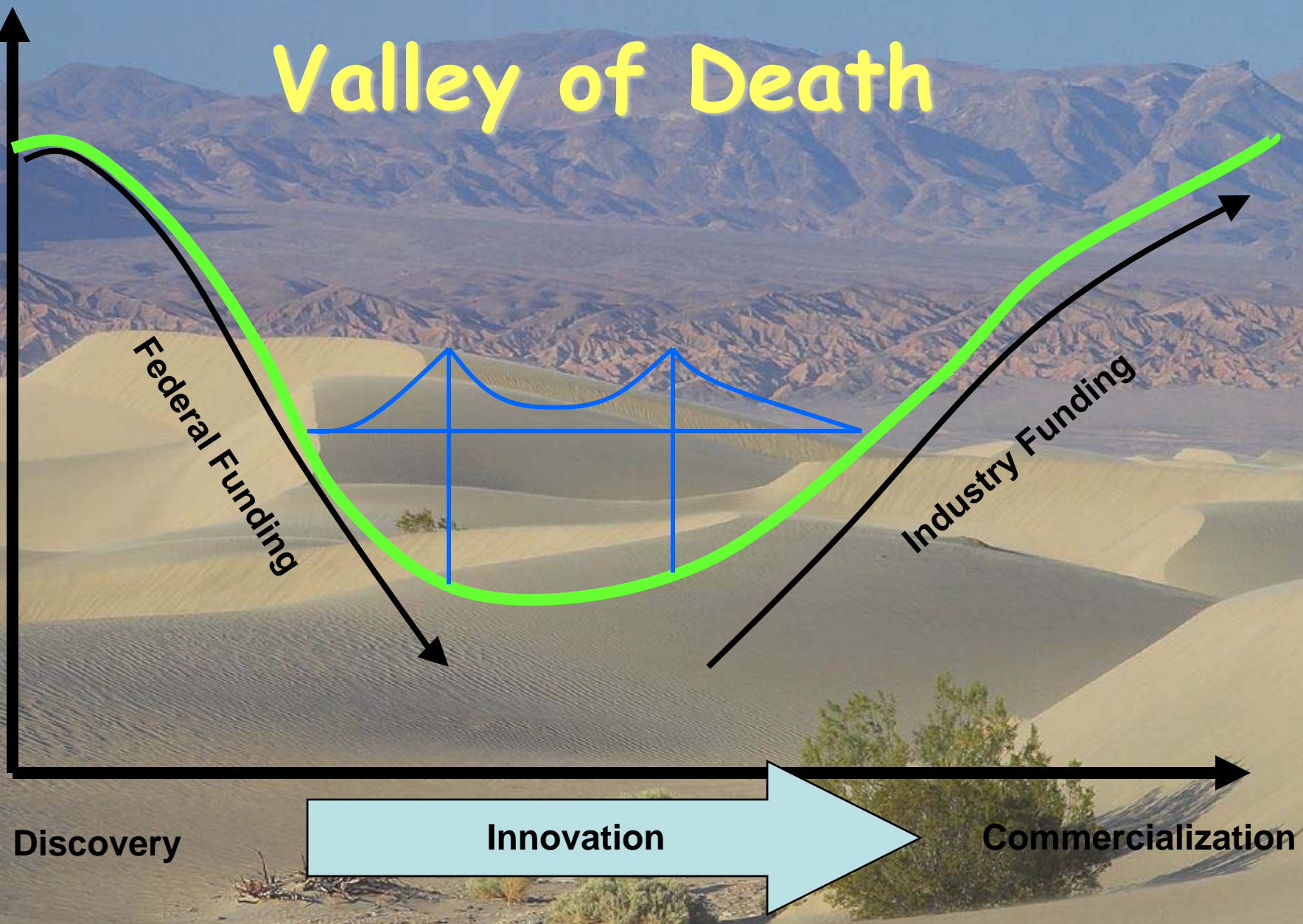


Innovation Definitions

- Carl Schramm
 - The design, invention, development and/or implementation of **new or altered products, services, processes, systems**, organizational structures, or business models for the purpose of creating **new value** for customers and financial returns for the firm
- Peter Drucker
 - "Innovation is **knowledge** applied to **tasks** that are **new** and different."
 - "Innovation: change that creates a **new dimension** of performance."



Valley of Death



Federal Funding

Industry Funding

Discovery

Innovation

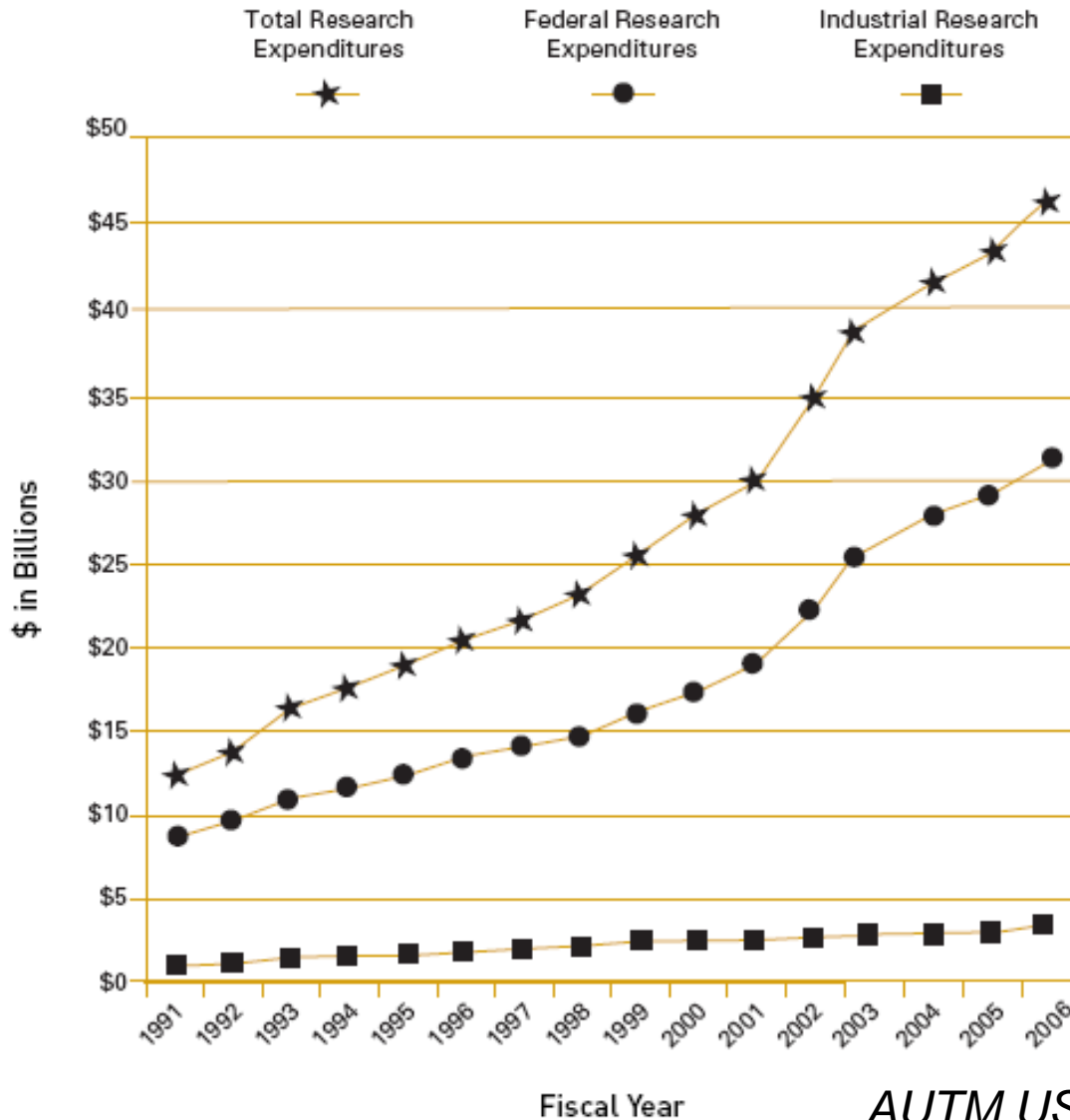
Commercialization

Industry Interest/Investment

- Cloud Computing
- Green Gasoline
- Nano-Electronics
- Green ICT
- Glass
- Coatings
- Green Surfactants
- Hazardous Chemicals
- Service Engineering
- Postdocs in Industry
- Google, IBM, CISCO
- BP
- SRC
- HP, ...
- Corning, ...
- PPG, ...
- P&G, ...
- Dow, ...
- IBM, ...
- HP, Intel, ...



Research Expenditures to U.S. Universities, Hospitals, and Research Institutions



<u>Source</u>	<u>2006</u>	<u>2007</u>
All	47.7	49.5
Feds.	30.1	30.4
Ind.	2.4	2.7
Other States, Foundations,...	15.2	16.4

Members of NSF University-Industry Advisory Subcommittee

- E. Jennings Taylor, Faraday Technology Inc. (Co-Chair)^{1,2,3}
- Cherri Pancake, Oregon State University (Co-Chair)¹
- Albert Johnson, Corning^{2,3}
- Wayne Johnson, Hewlett-Packard³
- Lesa Mitchell, Kauffman Foundation³
- Richard Pearson, National Center for Manufacturing Sciences
- Karthik Ramani, Purdue University²
- Winslow Sargeant, Venture Investors LLC²

1 - ENG AdCom
2 - SBIR AdCom
3 - University/ Industry
Demonstration Project



Strategic Partnerships with Industry

- Founding member of University-Industry Demonstration Project (UIDP)
 - Turbo-Negotiator
 - Agreement Negotiation Workshops
 - Gap Analysis Workshop
- *Corporate Alliance*
 - Corporate Voice to OD
 - Member of IRI
- *Matchmaker*
 - SBIR/STTR
 - Expansion Opportunity
- *Resolve Industry Match to meet NSB ruling*
 - Differentiate industry match as distinct from university cost share
 - Seek to fill the gap



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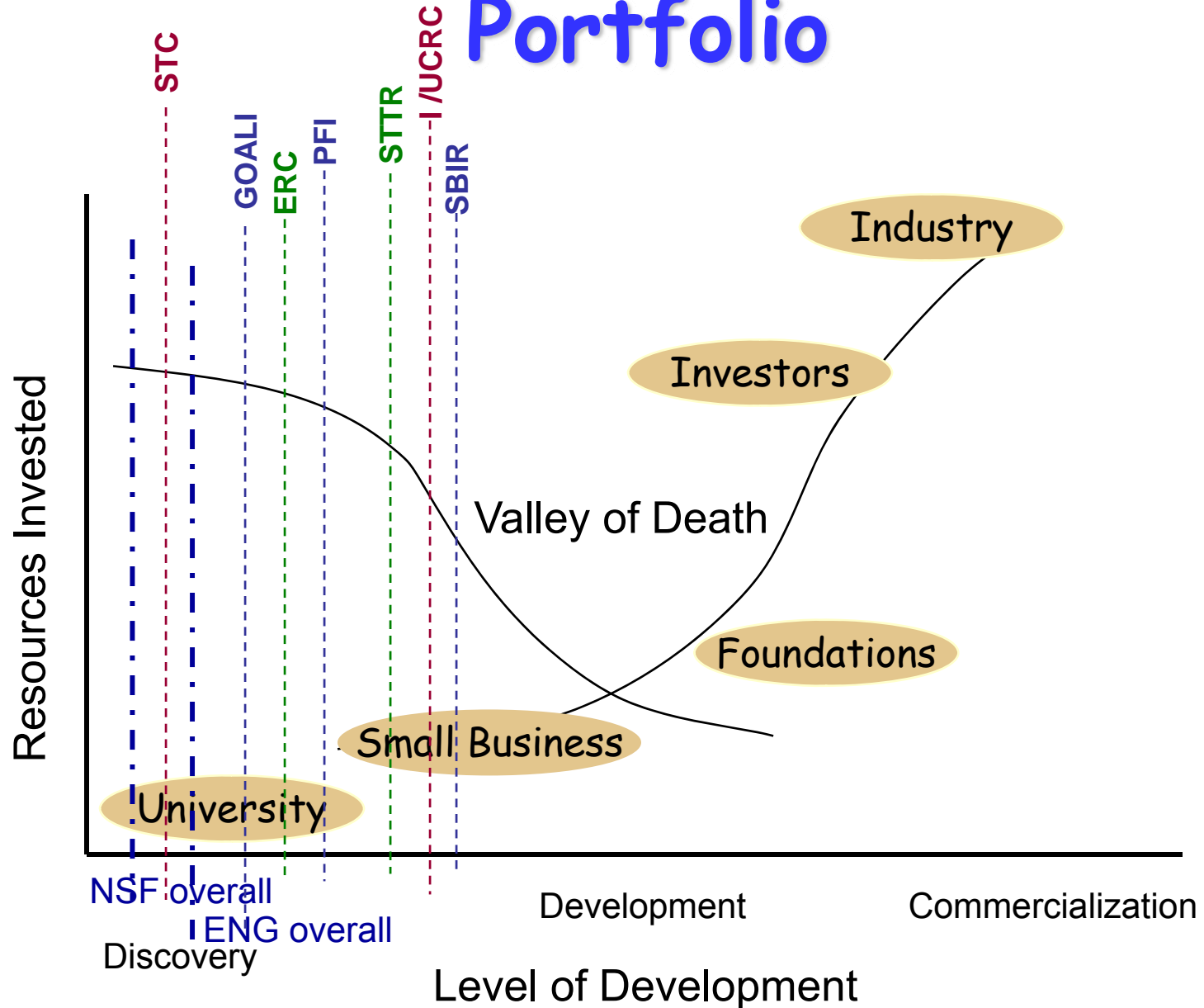


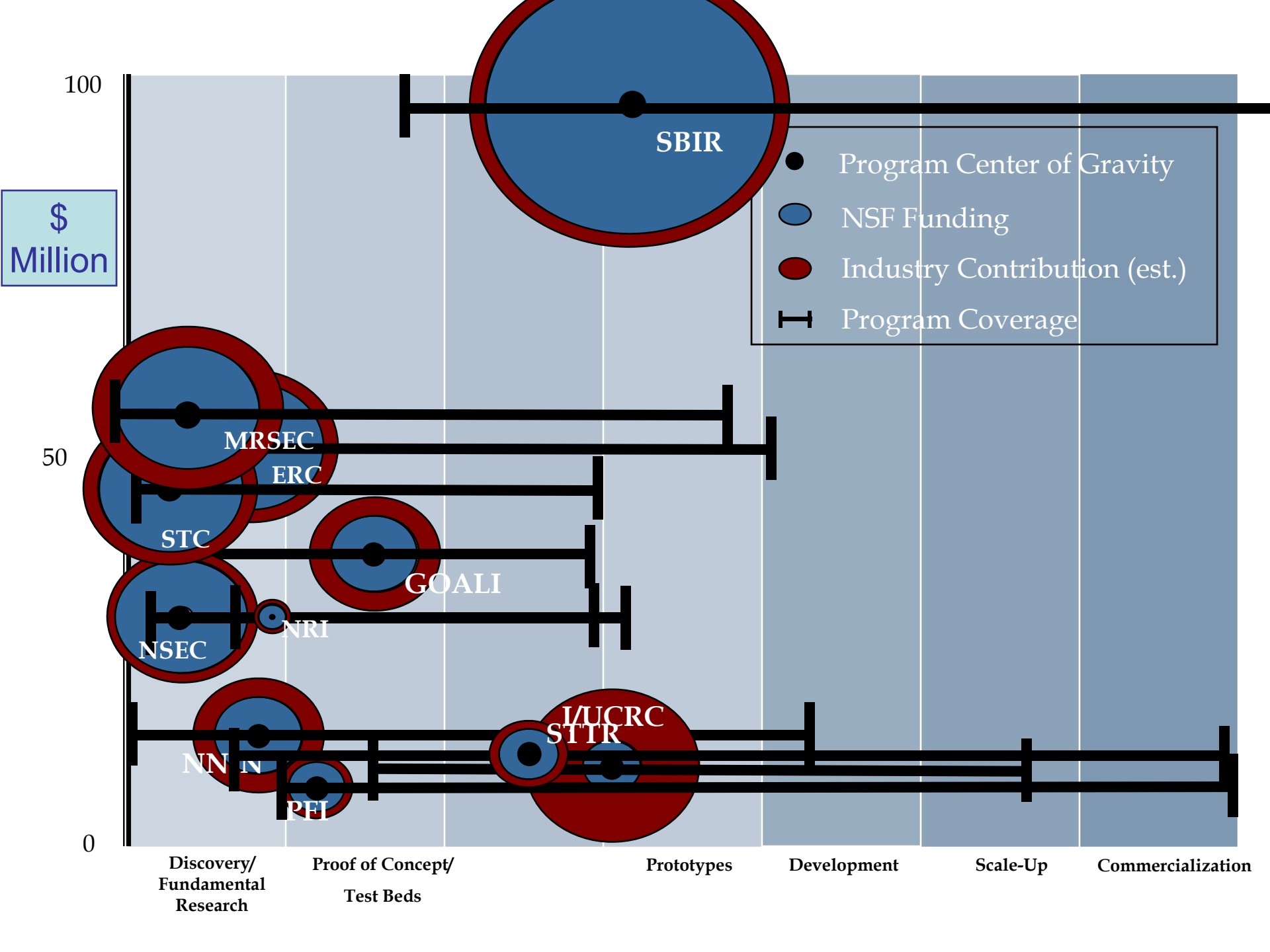
University-Industry Partnerships

- **STC** - Science and Technology Centers
- **MRSEC** - Materials Research Science & Engineering Centers
- **ERC** - Engineering Research Centers
- **PFI** - Partnerships for Innovation
- **GOALI** - Grant Opportunities for Academic Liaison with Industry
- **I/UCRC** - Industry/University Cooperative Research Centers
- **STTR** - Small Business Technology Transfer
- **SBIR** - Small Business Innovation Research
- **NSEC** - NanoScience and Engineering Centers
- **NCN** - Network for Computational Nanotechnology
- **NNIN** - National NanoInfrastructure Networks
- **NRI** - Nanoelectronics Research Infrastructure

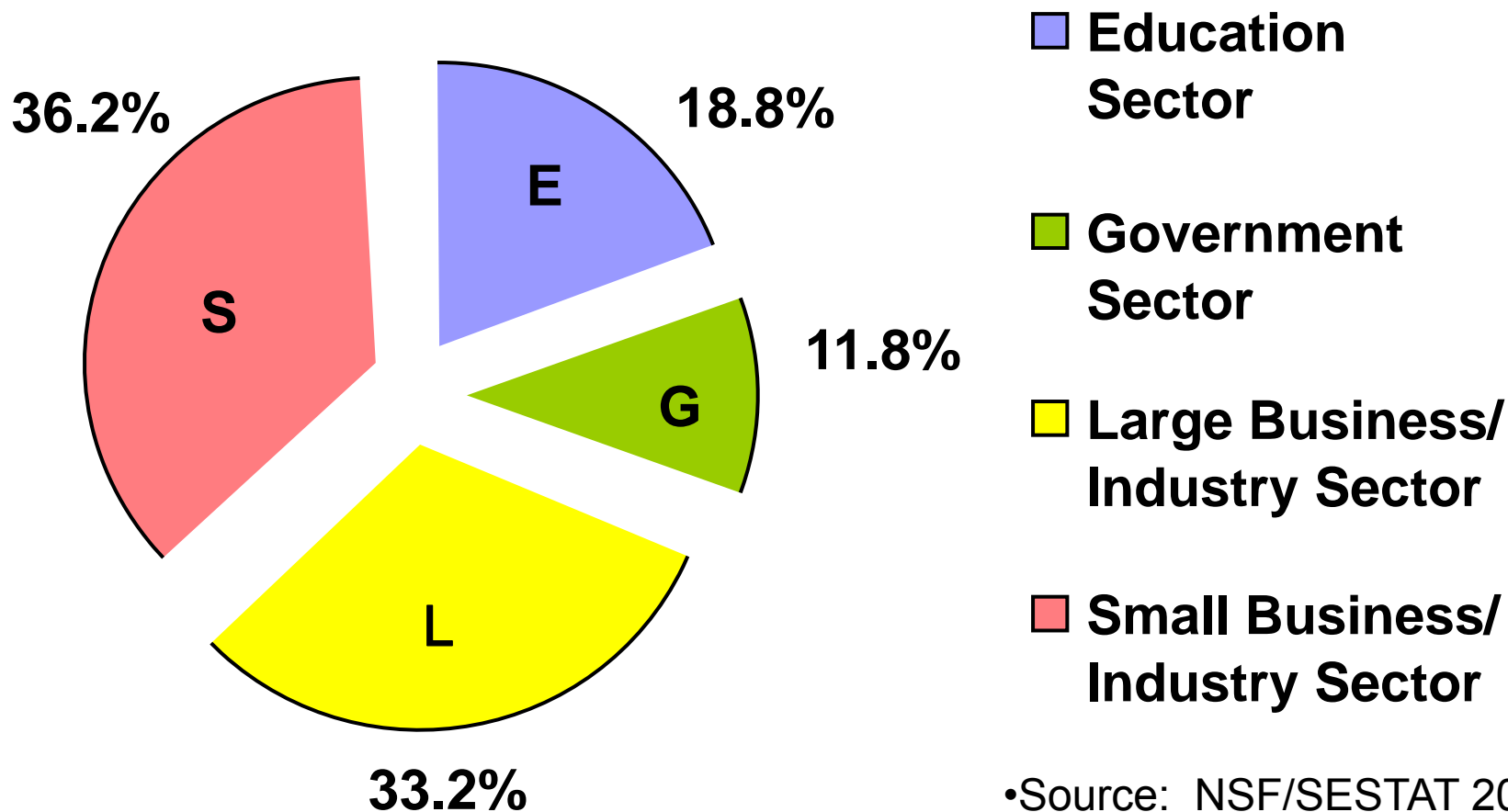


Filling Gaps in Current Portfolio



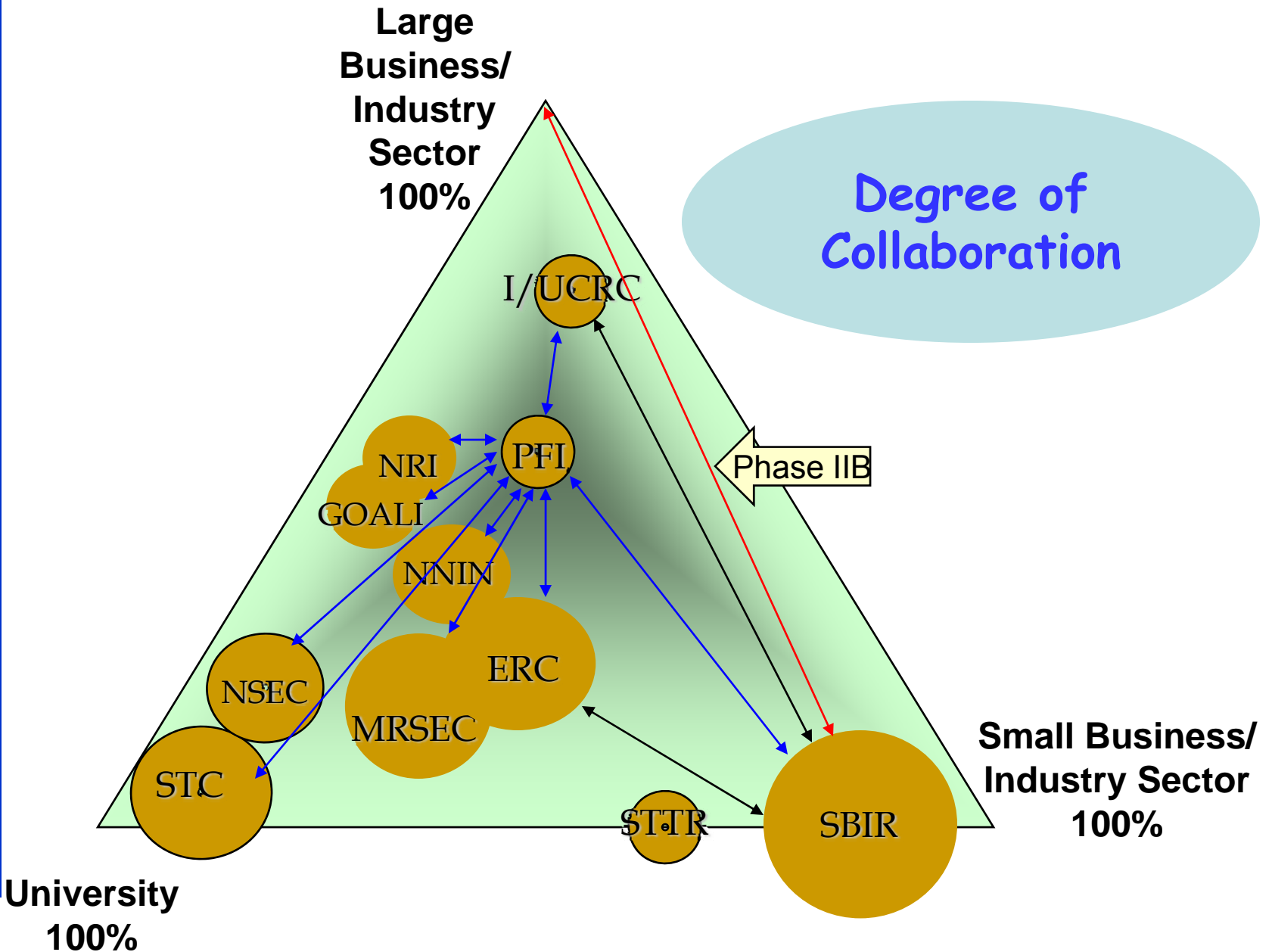


Employment of Scientists and Engineers*



*Source: NSF/SESTAT 2006





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Program-Level Assessment

- ERC benchmark by SRI
- I/UCRC assessment by Denis Gray (evaluator)
- SBIR in-depth assessment by NRC
- SBIR/STTR data collection by George Vermont
- PFI assessment by economists funded by Kauffman Foundation (on-going)



ERC Industrial Involvement

Organization Type	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Memberships	371	352	362	334	355	344	358
Affiliates	64	40	53	42	52	31	34
Contributing Organizations	68	64	103	115	89	64	61
Non-member Sponsors of Associated Projects	0	0	1	26	11	15	14
Total Number of Firms	503	456	519	517	507	454	467
Total Number of Centers	19	19	21	22	24	22	22
Average Number of Firms per Center	27	24	25	24	21	21	21

* Includes only organizations that were reported under the Industry sector

ERC Intellectual Property Outputs

Intellectual Property Output Type	FY 1985–2007 (41 ERCs)			FY 2008 (22 ERCs)		FY 1985–2008 (45 ERCs)		
	Total	Per Center	Per Year	Total	Per Center	Total	Per Center	Per Year
Inventions Disclosed	1,471	36	1.6	112	5	1,583	35	1.5
Patents Awarded	535	13	0.6	43	2	578	13	0.5
Patent Applications Filed	1,083	26	1.1	126	6	1,209	27	1.1
Licenses Issued	1,930	47	2.0	144	7	2,074	46	1.9
Spinoff Companies	119	3	0.1	13	1	132	3	0.1
Spinoff Employees	1,328	32	1.4	48	2	1,376	31	1.3

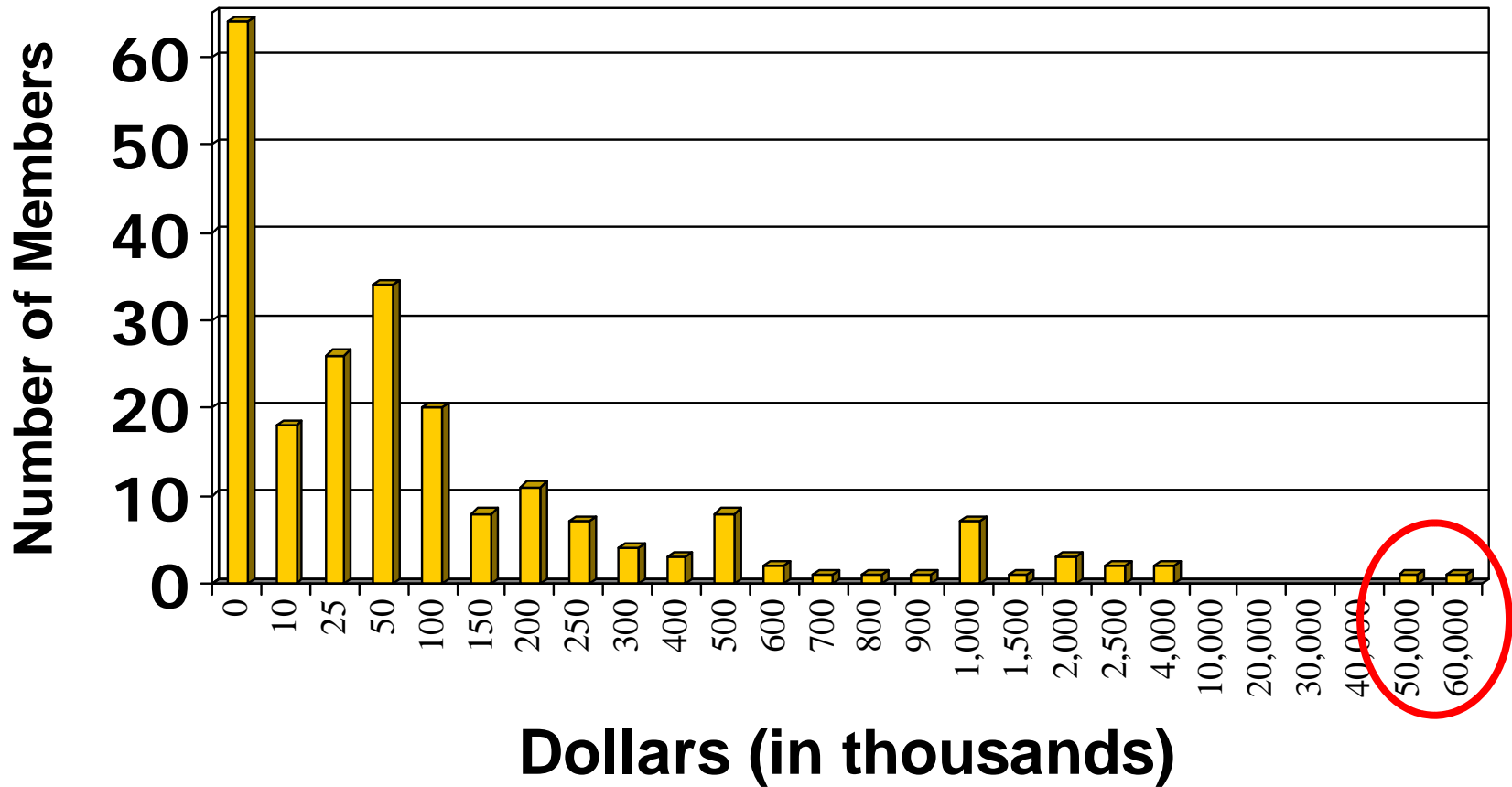


I/UCRC Membership Summary

	Count	Percent
Total memberships	623	100.0%
Industry: large firms (500 + employees)	405	65.0%
Industry: small firms (< 500 employees)	111	18.0%
U.S. Government: Federal	78	12.5%
U.S. Government: State or local	17	2.5%
Non-Profit	10	1.7%
Other	2	0.3%
Number of organizations with memberships *	431	--

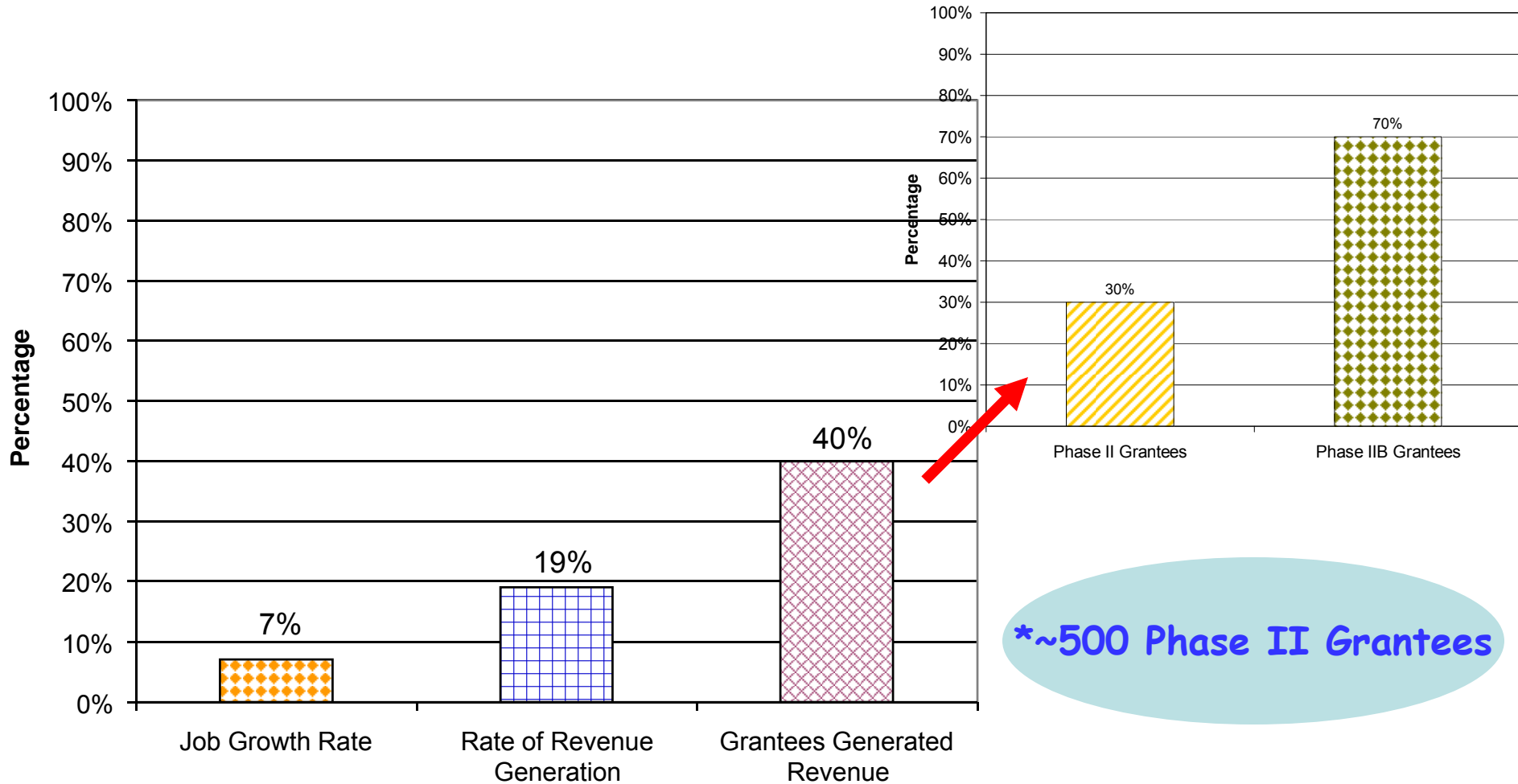
* Many firms and agencies maintain more than one membership in the I/UCRC program.

Follow-On Industry Investment into I/UCRC Projects: FY 2006-2007



50% respondents

SBIR/STTR Commercialization Record



***~500 Phase II Grantees**

M&A* of SBIR Firms

- 2006: 17 SBIR Firms Acquired
- 2007: 19 SBIR Firms Acquired

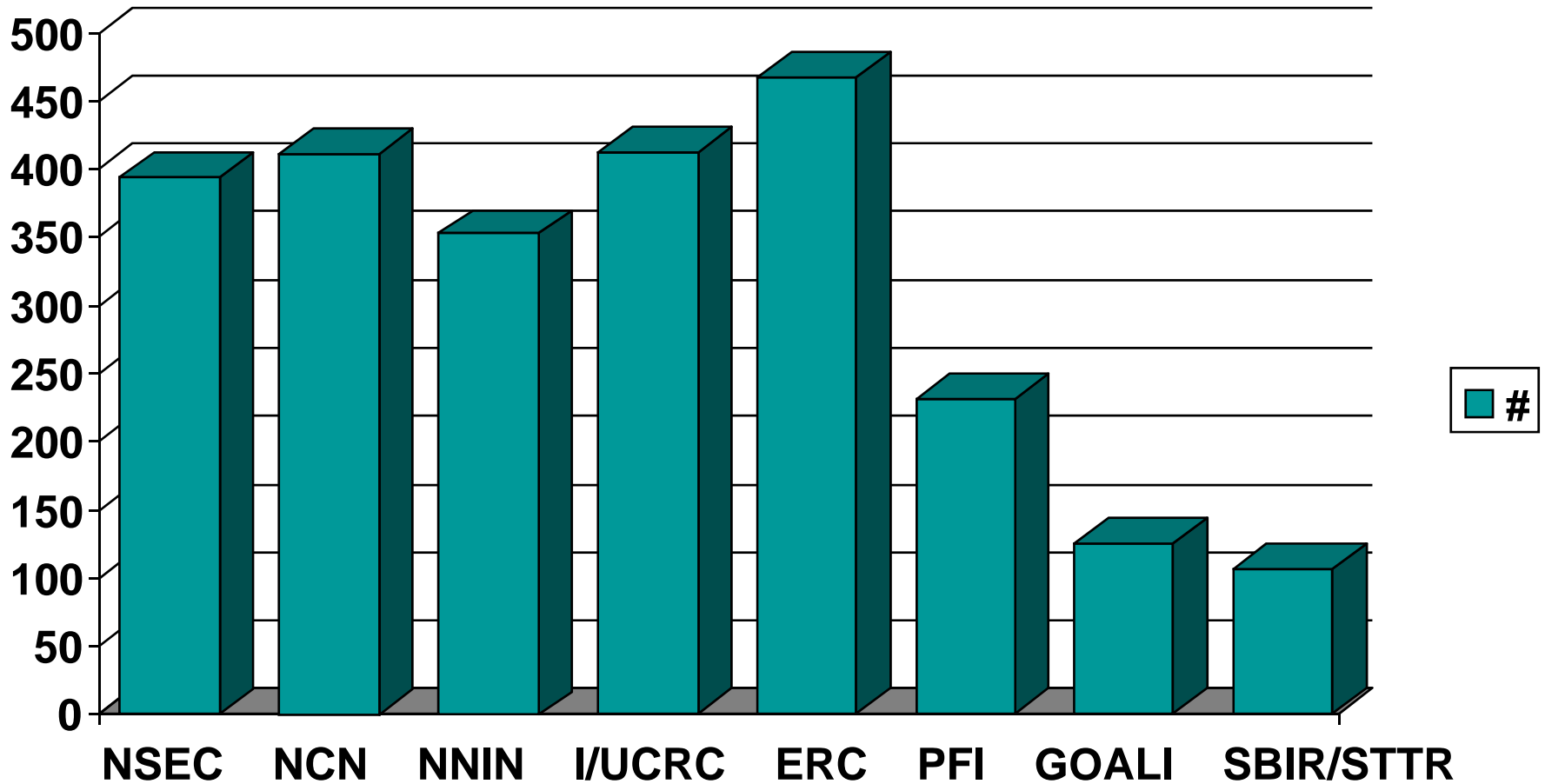
* Mergers and Acquisitions

Examples of Acquisitions

SBIR Firm	Acquired by
Sensors Unlimited	Goodrich Corp.
Angstrom Medical	Pioneer Surgical
Sensant Corp.	Siemens
Intellichem	Symyx



Industry Partners with NSF-funded Institutions





ASHLAND



NORTHROP GRUMMAN

