

**Exploratory Meeting – Space Propulsion and Power
Industry/University Collaborative Research Center**

Prof. Lyon B. King

*July 24, 2008
Hartford, CT*

Meeting Goals

- Describe structure of I/UCRC system
- Collect questions for after-meeting responses
- Display Center faculty capabilities through past research
- Review missions/activities of potential Members
- Identify possible research thrusts
- Gauge interest in going forward
- Describe necessary next steps and timeline

NSF Established the I/UCRC Program in 1978

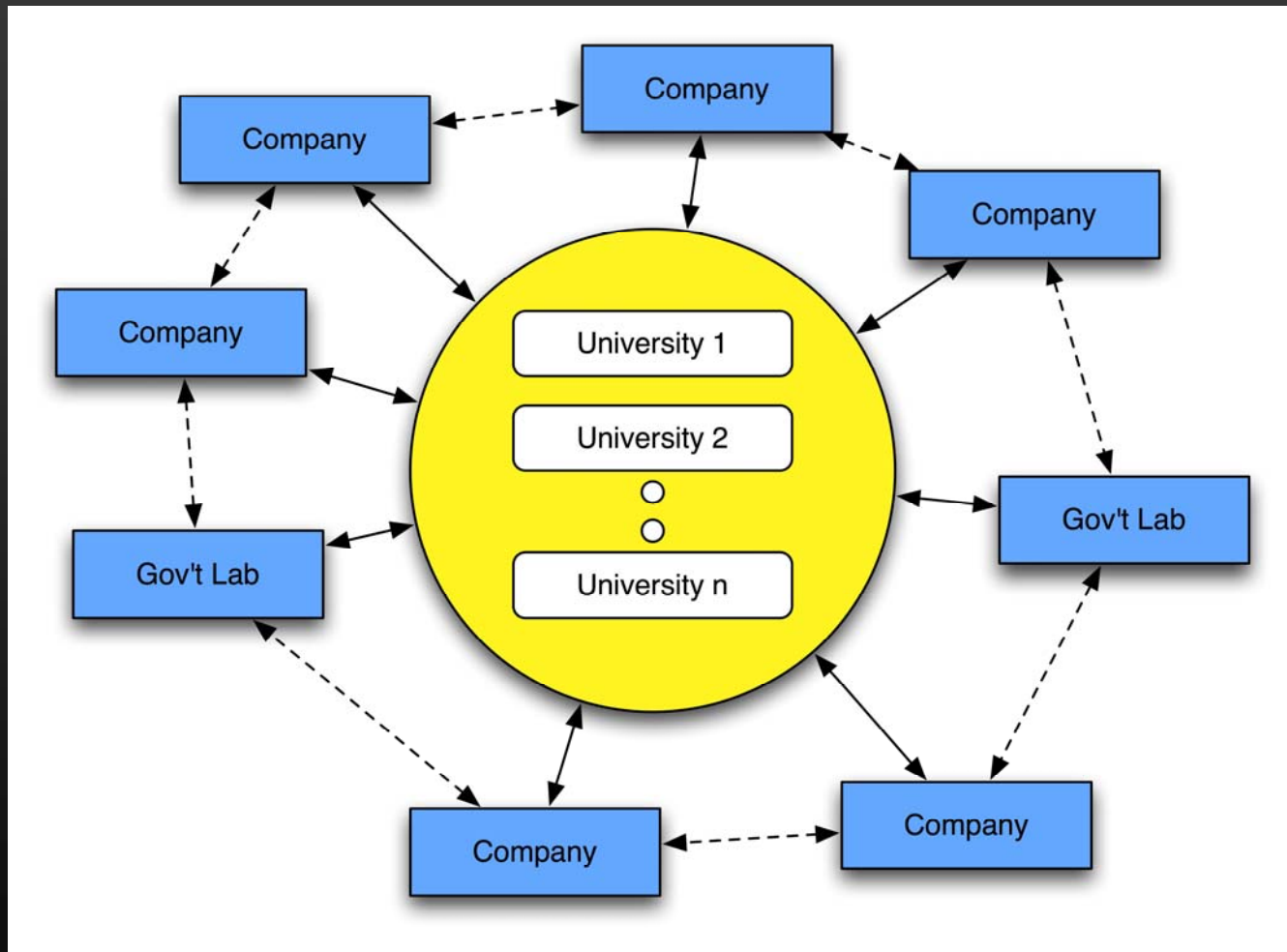
Mission:

- To contribute to the nation's research infrastructure base by developing long-term partnerships among industry, academe, and government
- To leverage NSF funds with industry to support graduate students performing industrially relevant research

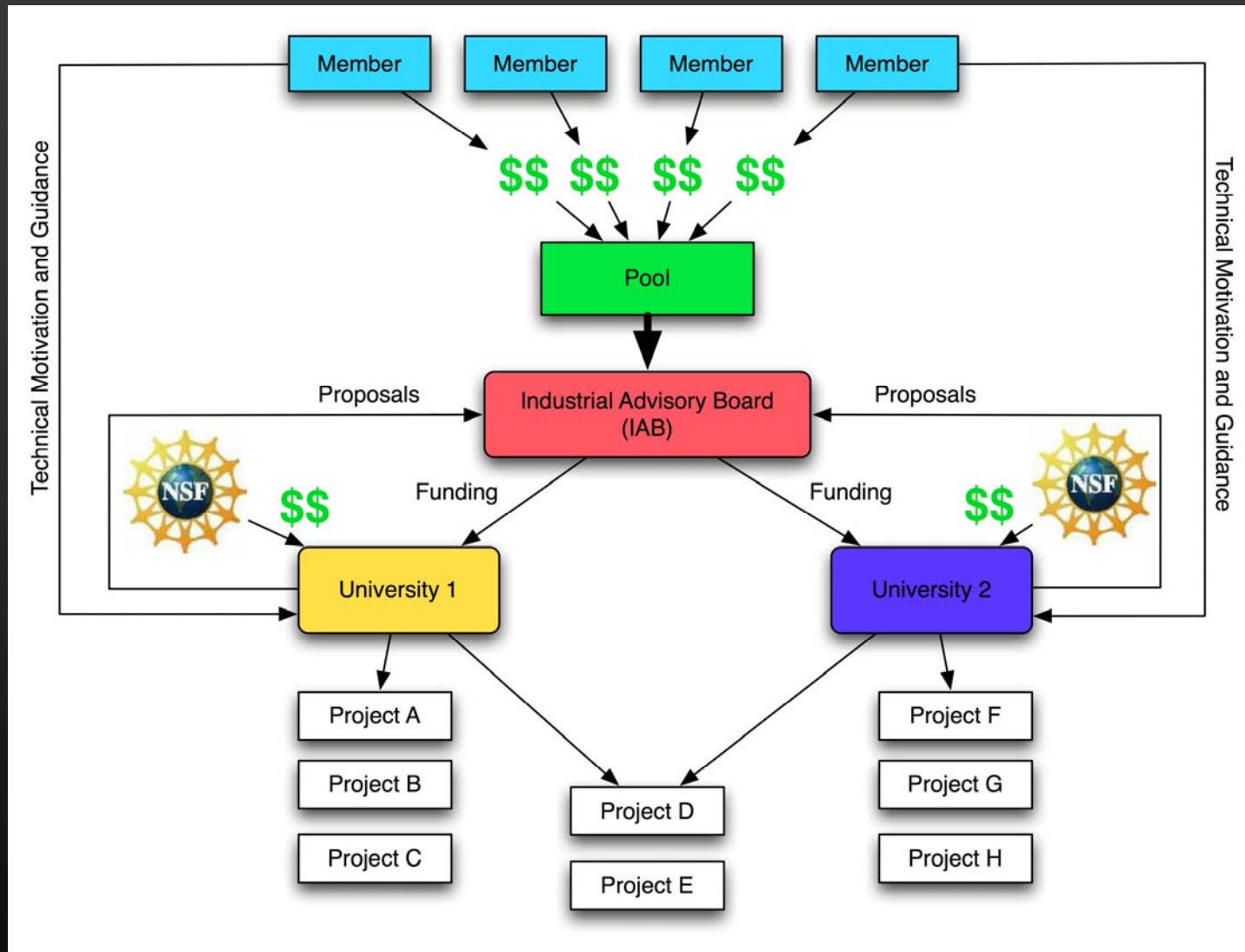
Vision:

- To expand the innovation capacity of our nation's competitive workforce through partnerships between industries and universities

Industries interact with **pre-competitive** research Multi-university base provides wealth of capabilities



Funding Structure



Win-Win (?)

Academic Community

- Stable (?) funding source
- Exposure and motivation from “real world”
- Meaningful research – industrially relevant
- Provides support for research and students

Industry/Gov't

- An avenue to investigate topics not otherwise possible
- Leverage \$ => \$\$\$\$\$\$\$
- Low-cost research
- Utilize talents and resources of multiple U's
- Excellent recruiting/training tool

Funding Structure

- Membership dues set by IAB at initial planning meeting
- Typical dues range from \$35k - \$70k for existing Centers
- Allowance for ½ memberships (at ½ voting rights) for small biz
- Members may withdraw from Center w/ 90 days notice

Minimum Requirements for Center Formation

- 10 Members – assume \$50k dues => \$500k
- 2 Universities
- NSF provides \$50k/university => \$100k
- NSF provides \$10k to lead U for admin

MINIMUM AVAILABLE CENTER FUNDING = \$660K/year

NSF Commits 5-year award at conception

Center Cash Flow Projection: First Four Years

	<i>Summer 09</i>	<i>Fall 09</i>	<i>Winter 10</i>	<i>Summer 10</i>	<i>Fall 10</i>	<i>Winter 11</i>	<i>Summer 11</i>	<i>Fall 11</i>	<i>Winter 12</i>	<i>Summer 12</i>	<i>Fall 12</i>	<i>Winter 13</i>
CASH REVENUES												
NSF Funding	100000			100000			100000			100000		
Member Contributions		250000	250000		300000	300000		350000	350000		350000	350000
CASH DISBURSEMENTS												
Director Salary Offset ¹	15600	15600	15600	15600	15600	15600	15600	15600	15600	15600	15600	15600
Center Admin Assistant ²	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000
Faculty Summer Salary ³	0			91000			91000			91000		
Graduate Student Support ⁴	0	64000	64000	128000	128000	128000	128000	128000	128000	128000	128000	128000
Supplies ⁵	0	16000	16000	32000	32000	32000	32000	32000	32000	32000	32000	32000
Promotion and Marketing	15000	2000	2000	5000	2000	2000	5000	2000	2000	5000	2000	2000
University F&A ⁶	10900	27650	27650	71150	47650	47650	71150	47650	47650	71150	47650	47650
RECONCILIATION OF CASH												
Total Revenues	100000	250000	250000	100000	300000	300000	100000	350000	350000	100000	350000	350000
Total Disbursements	54500	138250	138250	355750	238250	238250	355750	238250	238250	355750	238250	238250
Period Opening Cash Balance	0	45500	157250	269000	13250	75000	136750	-119000	-7250	104500	-151250	-39500
Period Revenues minus Disbursements	45500	111750	111750	-255750	61750	61750	-255750	111750	111750	-255750	111750	111750
PERIOD CLOSE CASH BALANCE	45500	157250	269000	13250	75000	136750	-119000	-7250	104500	-151250	-39500	72250

¹ Assumes offset of 30% x \$120k annual salary plus 30% fringe benefits is required to release Director from University teaching

² \$30k annual salary plus 30% fringe benefits

³ Assumes seven faculty each drawing one month of summer salary at a rate of \$120k/year plus 30% fringe benefits

⁴ Assumes average full-time graduate student cost of \$16k/semester

⁵ \$4k supplies per-semester for each graduate student

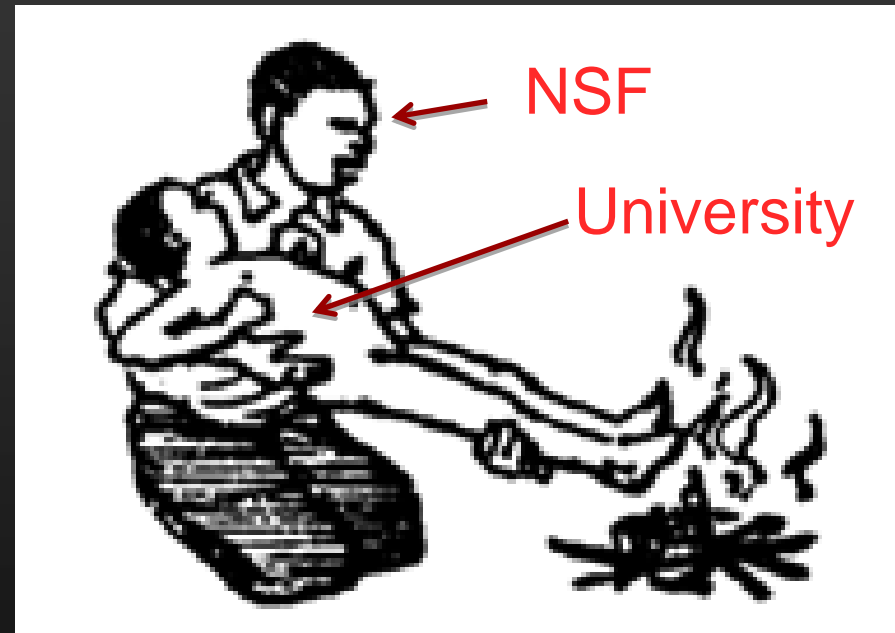
⁶ University F&A calculated at 25% of total cash disbursements

- Assumes 12 Members steady-state @ \$50k/Member
- Sustainable funding: 8 graduate students w/7 faculty
- More collaboration can focus this by reducing faculty time

What does NSF do?

An I/UCRC operates as a “franchise” business

- \$50k/year per university
- SBIR Opportunities for small companies to join I/UCRC
- Governance policies and legal agreements
- Intellectual property
- Annual reporting – Director’s Report
- Hires external evaluator each year – Evaluator’s Report
- Seeks to transition I/UCRC to other funding vehicle



50 Active Centers

Directory of I/UCRCs

http://www.nsf.gov/eng/iip/iucrc/directory/index.jsp

Aerowiki Parallels Basecamp Topo Isp Wiki Google Image Google Scholar Gazette SpaceDaily Weather Freep

Industrial Innovation and Partnerships (IIP)

IIP Home
About IIP
Funding Opportunities
Awards
News
Events
Discoveries
Publications
Career Opportunities
I/UCRC Program Homepage
PFI Program Homepage
SBIR Program Homepage
See Additional IIP Resources
View IIP Staff

Search IIP Staff

ENG Organizations

- Chemical, Bioengineering, Environmental, and Transport Systems (CBET)
- Civil, Mechanical and Manufacturing Innovation (CMMI)
- Electrical, Communications and Cyber Systems (ECCS)
- Engineering Education and Centers (EEC)
- Emerging Frontiers In Research

Directory of I/UCRCs

CONTENTS

[Center instructions for updating the directory.](#)
Please Note: Planned or provisional centers and institutions are in **orange type**, are listed as "planned" and/or do not link.

- [Overview](#)
- [Advanced Electronics](#)
- [Advanced Manufacturing](#)
- [Advanced Materials](#)
- [Biotechnology](#)
- [Civil Infrastructure Systems](#)
- [Information, Communication, and Computing](#)
- [Energy and Environment](#)
- [Fabrication and Processing Technology](#)
- [Health and Safety](#)
- [System Design and Simulation](#)
- [Graduated Centers - former I/UCRC's](#)

ADVANCED ELECTRONICS

- [Center for Advanced Vehicle Electronics \(CAVE\)](#)
Auburn University
- [Center for Telecommunications -Connection One: Communication Circuits & Systems Research](#)
Arizona State University, University of Arizona, Rensselaer Polytech, University of Hawaii, Ohio State University
- [Center for Electromagnetics - Planned](#)
University of Missouri - Rolla, Oklahoma University, University of Houston, Clemson University.
- [Cooling Technologies Research Center \(CTRC\)](#)
Purdue University

ADVANCED MANUFACTURING

- [Center for Advanced Cutting Tools - Planned](#)
Michigan State University, Georgia Tech
- [Center for Advanced Sustainable Iron and Steel - Planned](#)
Michigan Tech, University of Utah
- [Center for Intelligent Maintenance Systems \(IMS\)](#)
University of Cincinnati, University of Michigan at Ann Arbor, University of Missouri, Rolla - Planned.
- [Center for Lasers and Plasmas for Advanced Manufacturing \(LAM\)](#)
University of Virginia, University of Michigan, Southern Methodist University, University of Illinois - Planned
- [Center for Precision Forming \(CPF\)](#)
Ohio State University, Virginia Commonwealth University
- [Smart Vehicle Concepts Center \(SVC\)](#)

Center Members are in Good Company

3M Corporation	Certain Teed Corporation	General Electric Company	Merck & Co.	Rolls Royce/Allison	U.S. Dept. State
Air Products & Chemicals, Inc.	Champion International	General Motors	Microsoft	Samsung	U.S. Federal Aviation Administration
Alcoa Inc.	Chevron PTC	Gerber Products Co.	Missouri Department of Transportation	Seagate Technologies	U.S. General Services Administration
Allegheny Power	Cisco Systems, Inc.	Gillette Company	MITRE Corporation	Sharp HealthCare	U.S. Jet Propulsion Lab
Amana Refrigeration	Coca-Cola	Gintic	Mitsubishi	Siemens	U.S. Los Alamos National Laboratory
AMD	Consolidated Edison	Goodyear Tire and Rubber Company	Monsanto	Westinghouse Power Corporation	U.S. National Security Agency
American Concrete Institute	Corning Cable, Inc	Guardian Industries	Motorola, Inc.	Sperry Rail Service	U.S. Naval Surface Warfare Center
American Electric Power	Corning Cable, Inc	Hewlett-Packard	NAPP Systems	Sprint Corp	U.S. Navy
Amway Corporation	Critchfield Mechanical	Honda	National Semiconductor	Sun Chemicals	U.S. Oak Ridge National Laboratory
Analog Devices	Cummins Engine	Honeywell, Inc.	NEC USA, Inc.	TDK Corporation	U.S. Sandia National Laboratories
Arizona Department of Environmental Quality	Daimler Chrysler Corp.	IBM Corporation	Nokia Corporation	Tecumesh Products Company	U.S. Veterans Administration
Armstrong World Industries	DePuy, Inc	Intel Corporation	Nortel, Inc.	Tektronix	Union Carbide Corporation
AT&T	Dow Chemical	Intellisense Corporation	Northrup Grumman	Tennessee Valley Authority	United Parcel Service
Bayer Corporation	Dow Corning	International Concrete Repair Institute	Owens Corning	Teradyne	United Technologies
Bell South	Du Pont	International Facility Management Assn	Panasonic Technologies	Texas Instruments	US Borax Company
Boeing	Eastman Kodak Co.	International Paper Co	Payless Shoesource	Thermo King Corporation	Verizon Wireless
Bose Corporation	Electric Power Research Institute	Johnson Controls Inc.	Peak Communications	Toshiba Corp.	Westinghouse Corp.
BP	Eli Lilly & Co.	Kraft Foods	Peerless of America	Turtle Wax Company	Westvaco
Bristol-Myers Squibb	Estee Lauder Companies	Lennox International	Pfizer	Tyco Electronics	Weyerhaeuser Company
British Telecom	ExxonMobile Chemical Company	Lockheed Martin Corp.	Pharmacia & Upjohn	U.S. Air Force	Whirlpool Corporation
California Department of General Services	Exempla Healthcare	Lucent Technologies	Phillip Morris Company	U.S. Army	Xerox Corporation
Canon Information Systems	Fisher Price/Mattel	Master Builders, Inc	Phillips Petroleum	U.S. Bureau of Reclamation	
Carrier Corporation	Florida Power & Light	MEMS Technology Inc.	Pratt & Whitney	U.S. DARPA	
Caterpillar, Inc	Ford Foundation		Progress Group	U.S. Dept. of Agriculture	
	Ford Motor Company		Qualcomm, Inc	U.S. Dept. of Energy	
	Frigidaire Company		Raytheon/Texas		
	General Dynamics		Reynolds Metal		
			Rockwell International		

National Science Foundation's  Industry/University Cooperative Research (I/UCRC) Program 

Intellectual Property

- Patent rights held by university, with royalty-free, non-exclusive rights to Center Members
- Companies wishing to exercise rights to a royalty-free license pay for the cost of patent application
- If only one company seeks a license, that company may obtain an exclusive fee-bearing license
- Government retains march-in rights (Bayh-Dole)
- Companies can exercise publication delay for 1 year

Companies can provide individual support/funding for separate “enhancement” projects that spin-off I/UCRC results. Enhancements are subject to separate IP negotiations.

Sample Membership Form

Collaborating Faculty Structure

