

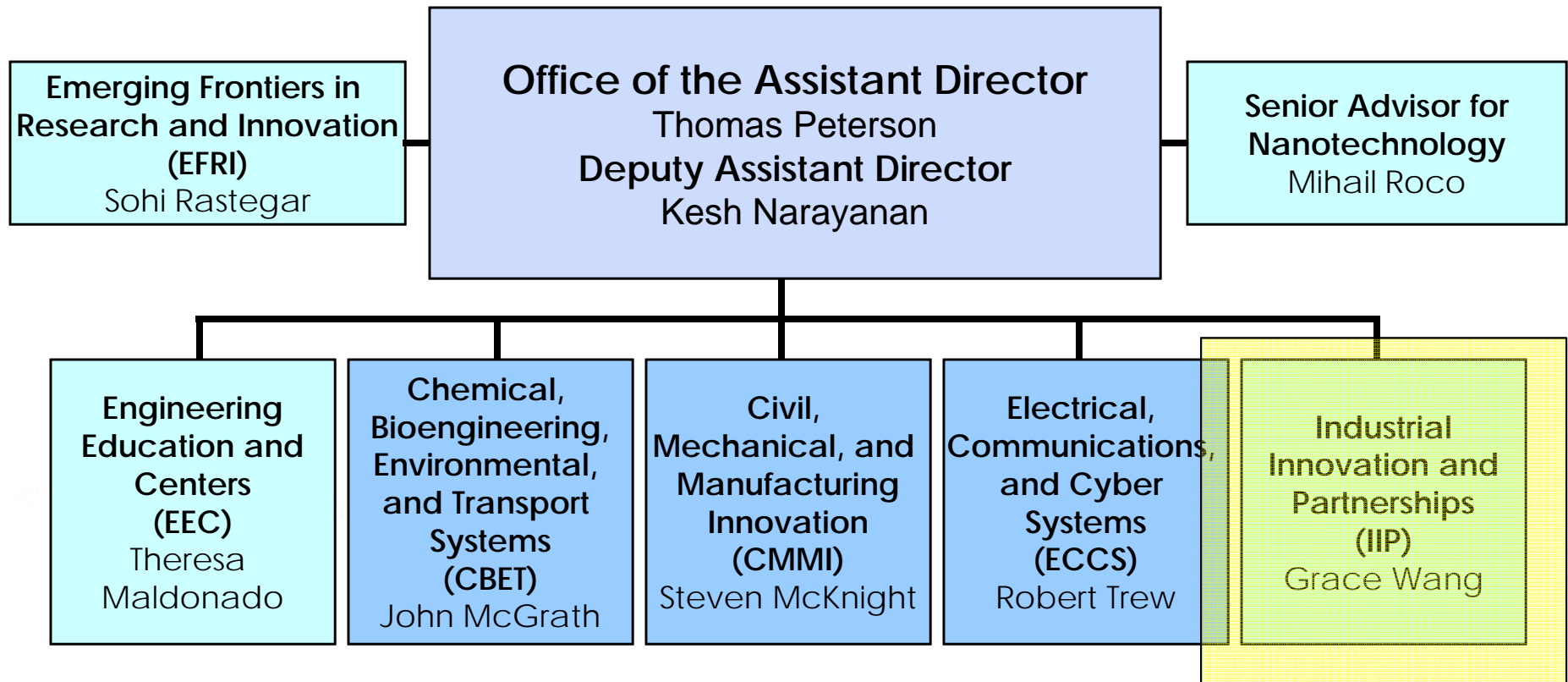
I/UCRC Showcase
**Security and Software Engineering Research
Center**
May 8, 2013

Larry Hornak & Rathindra (Babu) DasGupta
Engineering – IIP
Rita Rodriguez – CNS/CISE
Alex Schwarzkopf – NSF Expert
Eric Sundstrom, NSF Evaluator

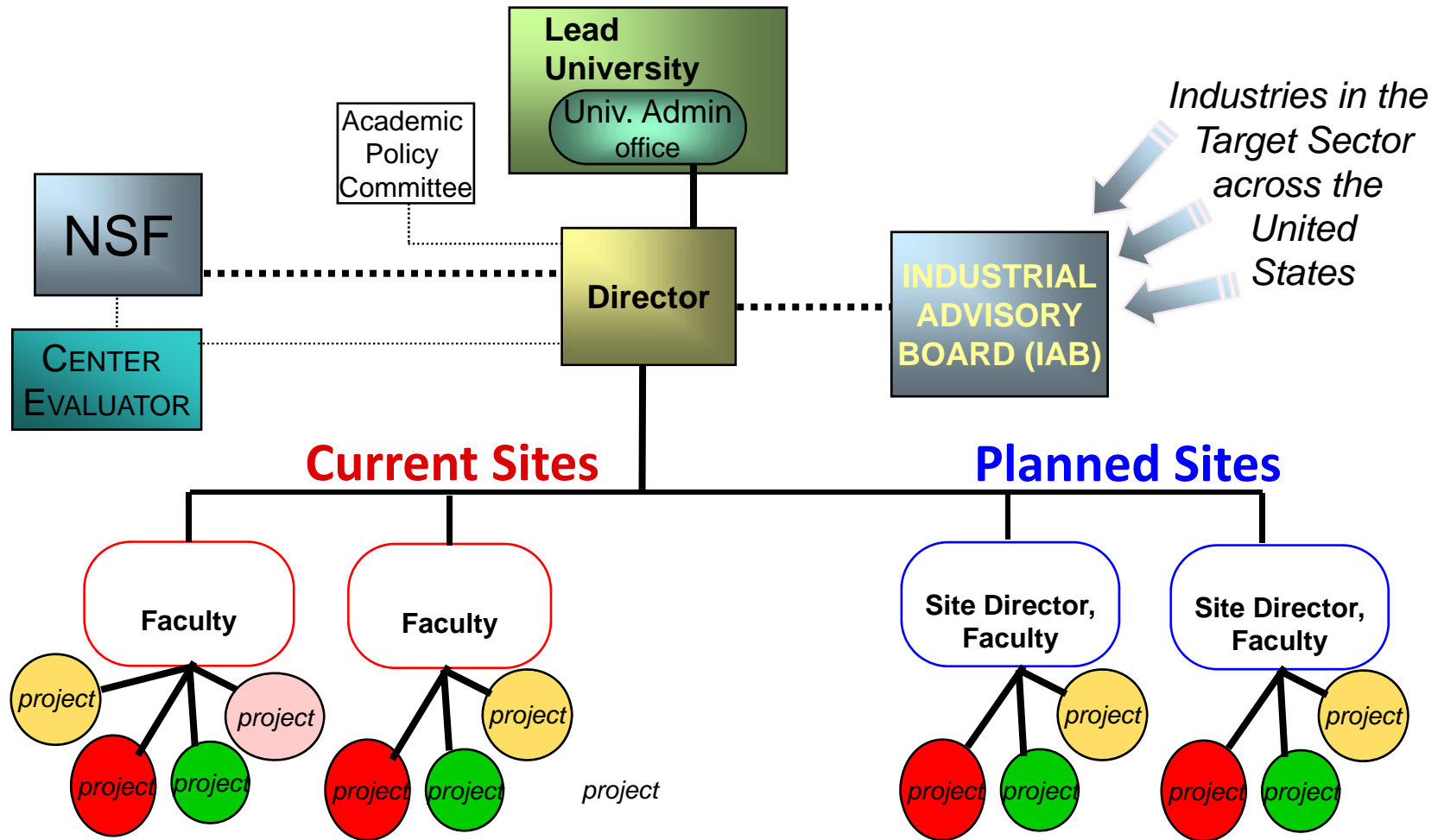
*Welcome to the Industry / University
Cooperative Research Center (I/UCRC)
Program*



ENG Organization



UAS/ Typical Organization Chart

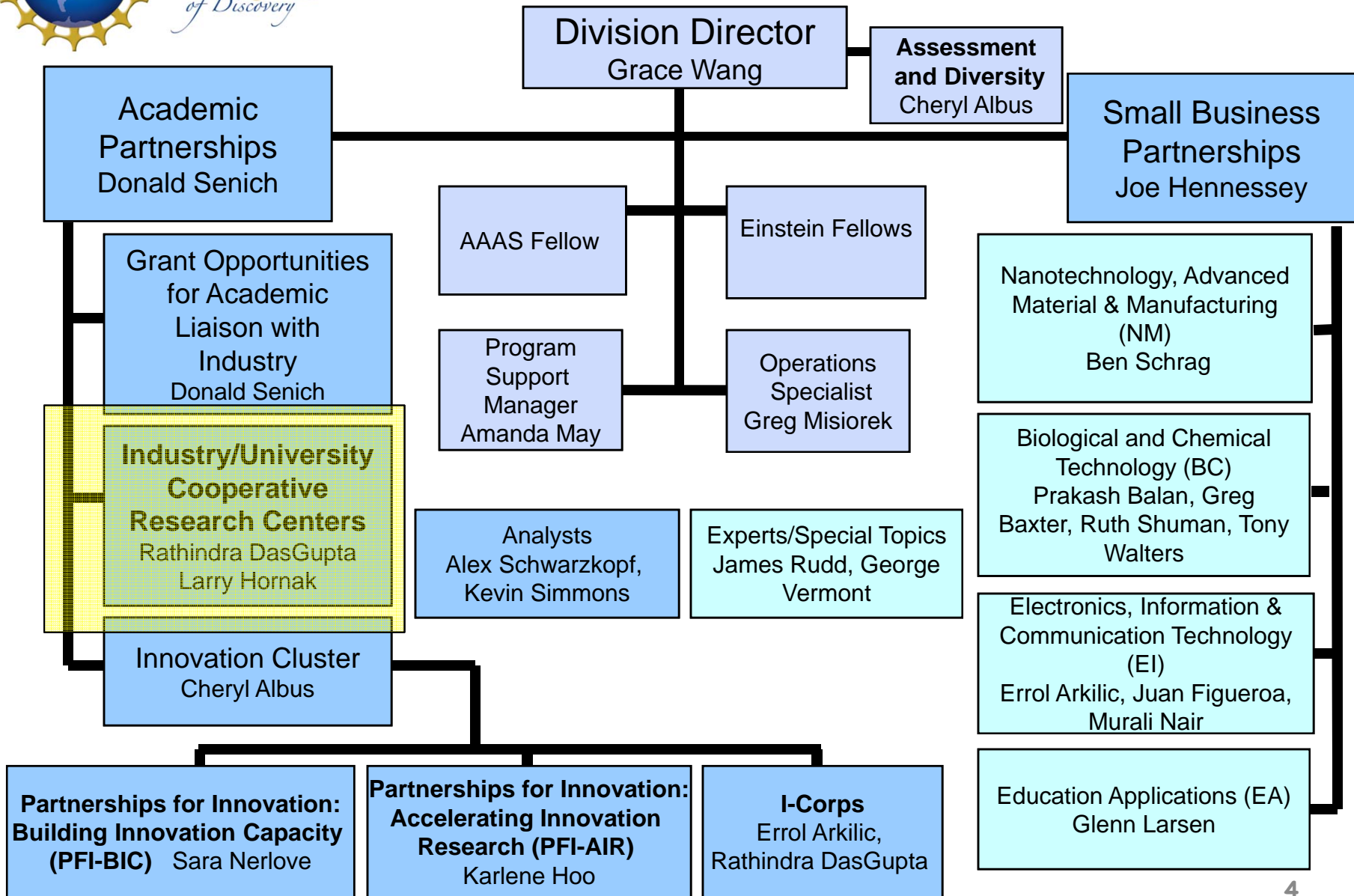


- Center provides a seamless interface to its talent
- Center has ONE IAB which recommends, monitors portfolio
- Each academic site cluster carries its own weight





Industrial Innovation and Partnerships



The Industry/University Cooperative Research Centers (I/UCRC) Program

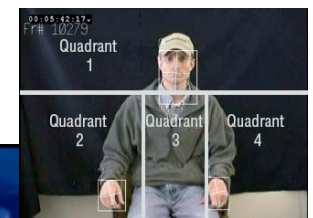
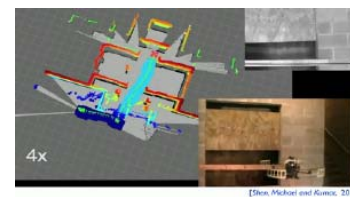
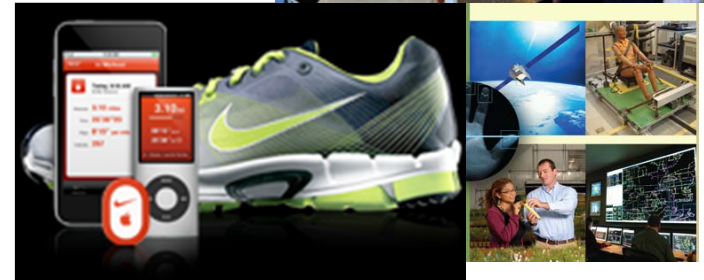
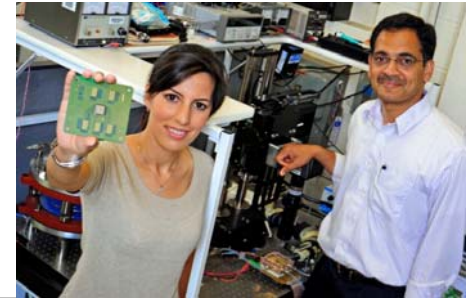
Mission:

- 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**

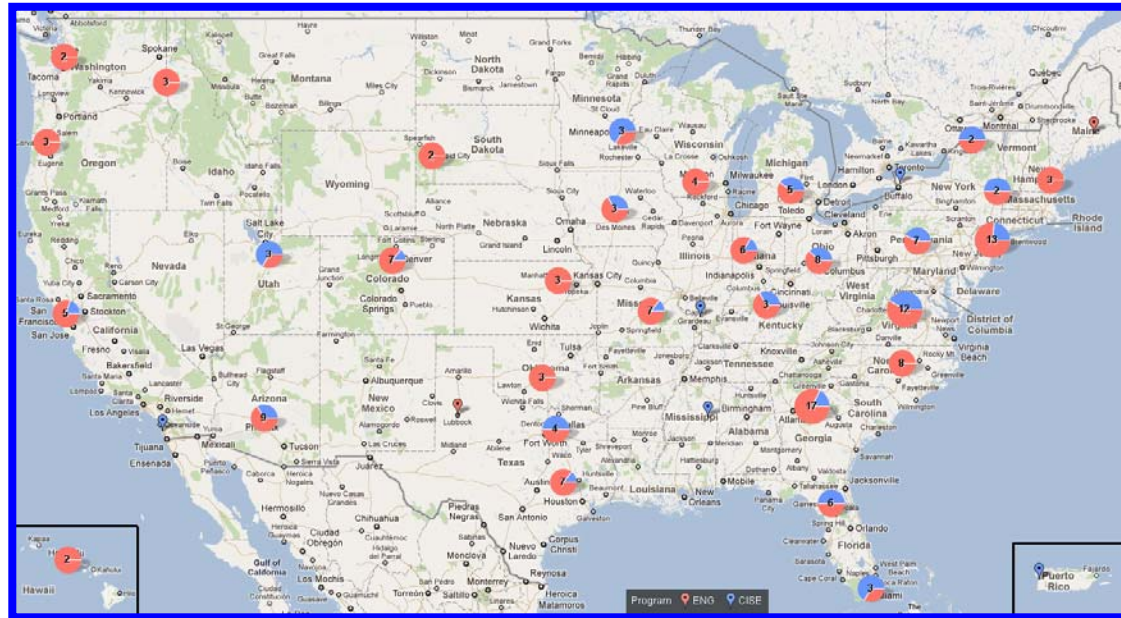
Vision:

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

Challenge: Foster and grow long-term trusted relationships between Industry and academe based on shared value



I/UCRC Fast Facts – FY11 Snapshot



ENG – Engineering

CISE – Computer
and Info. Sci and Eng.

Program Funding

- \$15M in Program Funding (ENG, CISE)
- \$118M in Total Center Funding,
- Nearly 8:1 Leveraging of NSF funds.

Centers Nationally:

- **61 Centers with 178 Sites**
- Over 760 Members representing over 500 distinct organizations holding over 1000 Memberships

- 55% Large Business, 23% SB, 15% Federal Members

Students

- 225 PhDs, 249 MS & 128 UGs graduated in 2010, trained in Center research
- Over 30% hired by members

Sustainability

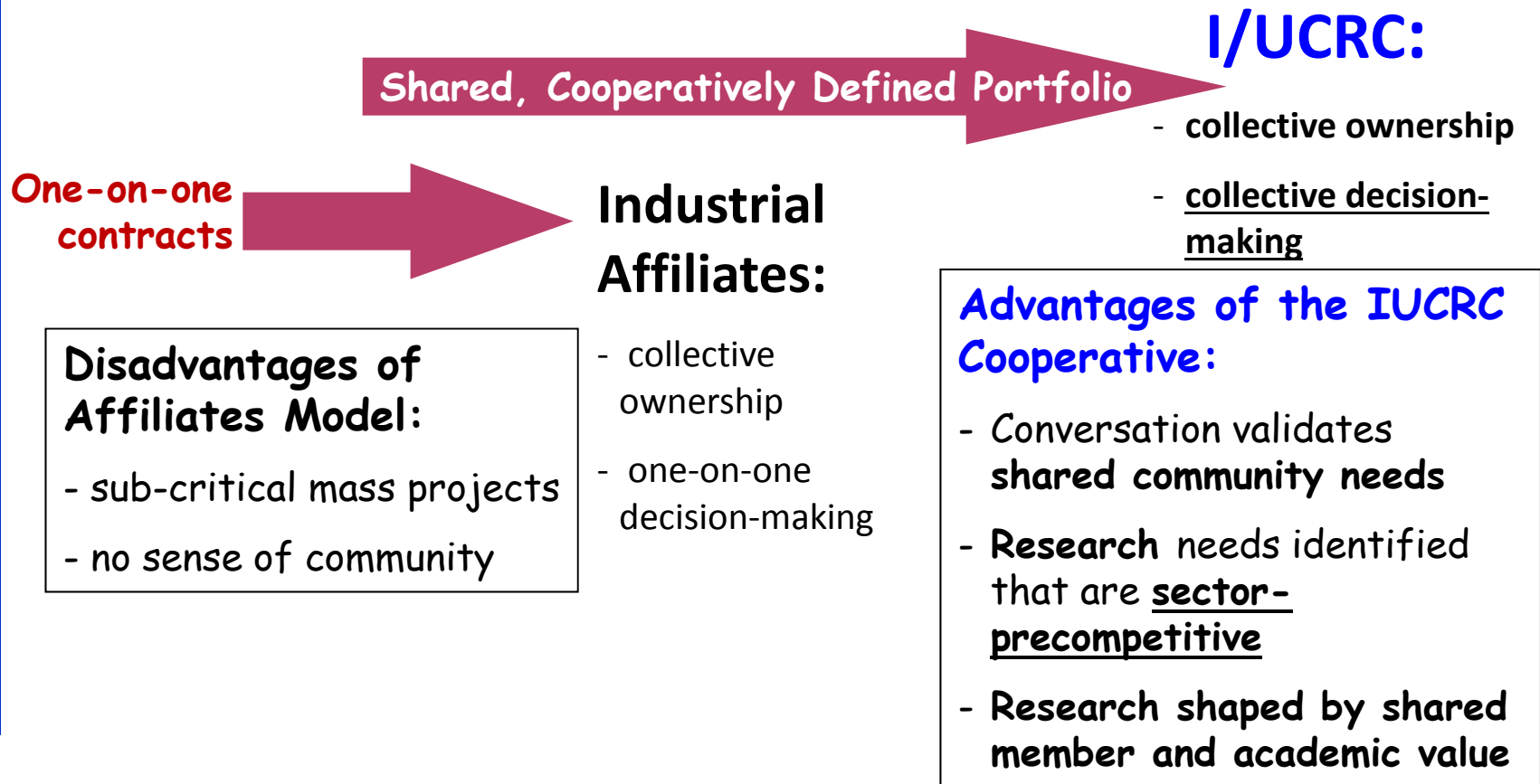
- 44 Graduated I/UCRCs remain in operation in 2010 true to model





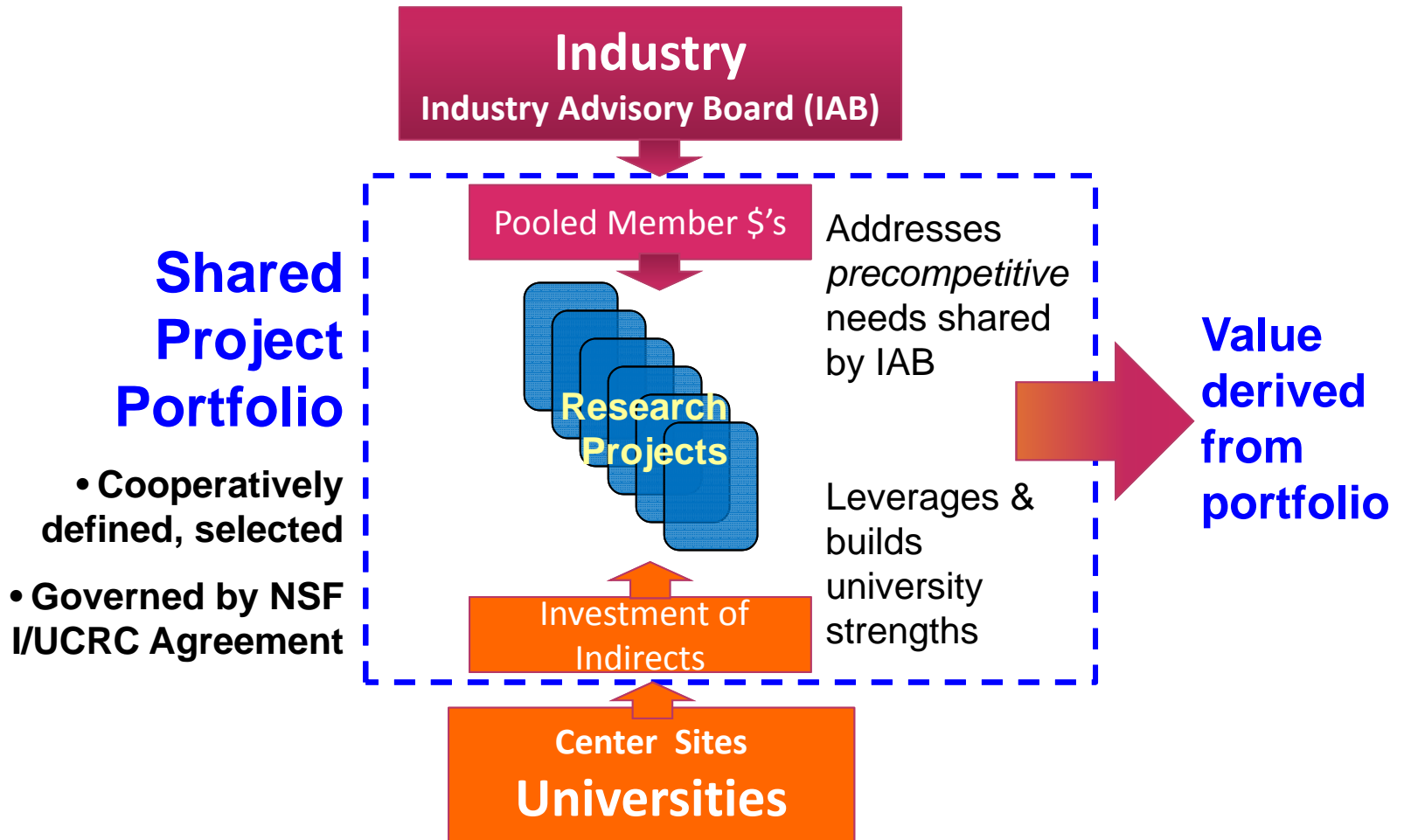
The I/UCRC Model

- Builds trusted long-term relationships for effective industry linkage to university fundamental research



Much more than collective ownership: Collective Value

I/UCRC Nucleus: A Cooperatively Defined, Funded & Shared Research Portfolio

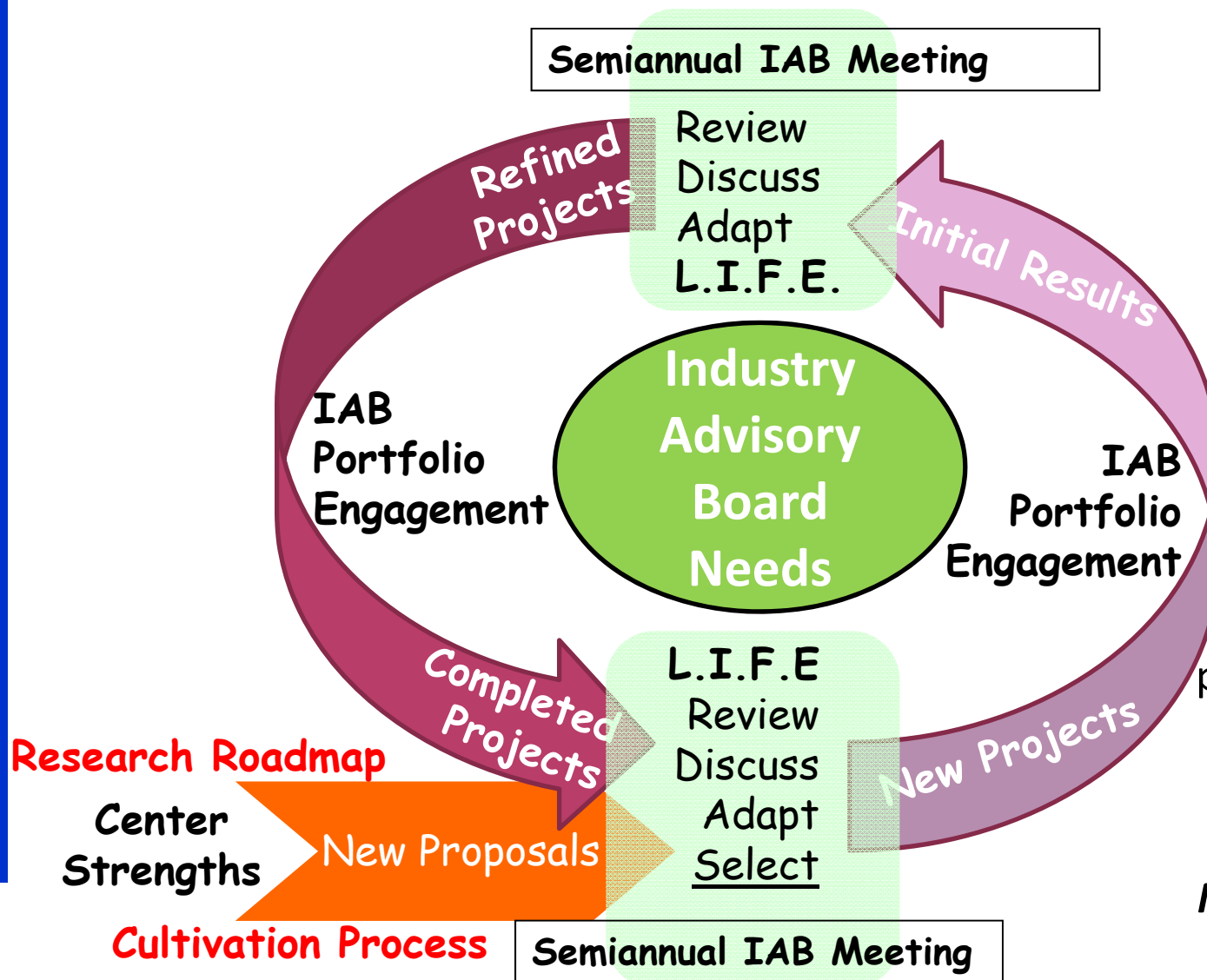


Requires trust be built in the model, and between all partners in the center.





The I/UCRC Portfolio Cycle: Maximizing Value while Building Trust

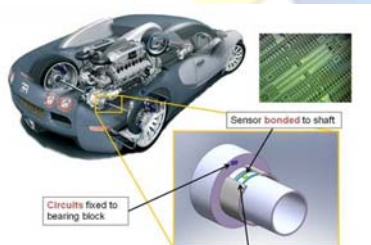


The co-operative process focuses & aligns the Shared Portfolio with **Member Needs** and **University strengths**

Industry/University Cooperative Research Centers

Advanced Electronics, Photonics Fabrication and Processing

Berkeley Sensor & Actuator Center – UC-Berkeley, UC-Davis
 Center for Advanced Vehicle and Extreme Environment Electronics – Auburn
 Center for Design of Analog Digital Integrated Circuits – WSU, OSU
 Center for Dielectric Studies – PSU
 Center for Electromagnetic Compatibility – MUST, Clemson, Oklahoma, Houston,
Center for Optical Wireless Apps – PSU, Georgia Tech
 Cooling Technologies Research Center - Purdue



Capacitively coupled rings wirelessly transmit power and signal. Independent of rotation.



Advanced Manufacturing

Center for Friction Stir Processing – BYU, MUST, South Carolina, SDSMT, Wichita State
Center for Tire Research – Virginia Tech, U Akron
 Center for Particulate and Surfactant Systems – UF, Columbia
 Laser and Plasma for Advanced Manufacturing – UVa, Michigan, SMU, Illinois
 Membrane Science, Engineering and Technology Center – NJIT, Colorado
 Intelligent Maintenance Systems – Cincinnati, Michigan, MUST
 Smart Vehicles Concepts – Ohio State, Texas A&M

Biotechnology, Health & Safety

Center for Agricultural, Biomedical, and Pharmaceutical Nanotechnology – Illinois
 Center for Biophotonic Sensors and Systems – Boston University, UC-Davis
 Center for Pharmaceutical Development – Georgia Tech, UK
 Bio Energy Research and Development – SDSMT, Hawaii-Manoa, NCSU, Stony Brook
 Center for Health Organization Transformation – Texas A&M, Northeastern, PSU, Georgia Tech
 Child Injury Prevention Studies – UPenn, Ohio State



Industry/University Cooperative Research Centers

Advanced Materials

Advanced Processing and Packaging Studies
– Ohio State, UC Davis, NCSU

Center for Advanced Non-Ferrous Structural Alloys – CSM, North Texas

Center for Energy Harvesting Materials and Systems – Virginia Tech, UT-Dallas

Center for Integrative Materials Joining Science for Energy Applications – Ohio State, Lehigh, Wisconsin - Madison , CSM

Center for Metamaterials – CUNY, Western Carolina, UNCC, Clarkson

Computational Materials Design – PSU, Georgia Tech.

Center for Nondestructive Evaluation – Iowa State

Ceramics, Composites and Optical Materials Center – Clemson, Rutgers

Wood-Based Composites Center – Virginia Tech, OSU

Civil Infrastructure Systems

Center for Electric Vehicles - Transportation and Electricity Convergence – UT-Austin, Texas A&M

Center for the Integration of Composites into Infrastructure - WVU, Rutgers, NCSU, Miami

Grid-Connected Advanced Power Electronics - Arkansas-Fayetteville, South Carolina

Sustainable Integrated Buildings and Sites – UNCC, CMU

Energy & Environment

Center for Advanced Forestry Systems – NCSU, Georgia , Idaho , Maine , Washington, Virginia Tech , OSU, Purdue, Florida

Center for Fuel Cells (CFC) – South Carolina, Connecticut

Center for Resource Recovery and Recycling – WPI, CSM, Katholieke Universiteit Leuven

Energy-Efficient Electronic Systems Center – Binghamton, UT-Arlington, Villanova

Next Generation Photovoltaics – UT-Austin, Colorado State

Power Systems Engineering Research Center – Arizona State, UC-Berkeley , CMU, CSU, Cornell, Georgia Tech, Howard, Illinois, Iowa State, Texas A&M, Washington State, Wichita State, Wisconsin

Silicon Solar Consortium – NCSU, Georgia Tech

Water and Environmental Technology – Temple, Arizona, Arizona State

Water Equipment & Policy – Wisconsin-Milwaukee , Marquette



Industry/University Cooperative Research Centers

System Design & Simulation

- Advanced Space Technologies Research & Engineering Center – Florida , NC A&T State
- Center for e-Design – Virginia Tech, Iowa State, Massachusetts-Amherst , Central Florida, CMU, SUNY Buffalo, BYU, Puerto Rico-Mayaguez , Wayne State
- Center for Excellence in Logistics and Distribution – Arkansas , Oklahoma, Oklahoma State, Clemson, Missouri , Virginia Tech, Arizona State, UC-Berkeley
- Center for unmanned Aircraft Vehicles – **BYU, CSU**
- Telecommunications (Connection One) – Arizona State, Ohio State, Hawaii, Rensselaer, Arizona



Information, Communication & Computing

- Advanced Knowledge Enablement – Florida Intl, Florida Atlantic, Dubna Intl
- Autonomic and Cloud Computing – Florida , Mississippi State, Arizona, Rutgers
- Center for Identification Technology Research – Clarkson, Arizona, WVU
- Center for Research in Intelligent Storage – Minnesota, UC-Santa Cruz,
- Center for Surveillance Research – Ohio State, Wright State
- Center on Optical Wireless – PSU, Georgia Tech
- Embedded Systems – Arizona State, Southern Illinois-Carbondale
- Experimental Research in Computer Systems – Georgia Tech, Ohio State
- Hybrid Multicore Productivity Research - UMBC, UC-San Diego, Georgia Tech
- Net-Centrics System and Software – North Texas , UT-Dallas , Southern Methodist, Arizona State, MUST
- Center for High-Performance Reconfigurable Computing – Florida , BYU, GW, Virginia Tech
- Center for Visual Decision Informatics – **UL-Lafayette, Drexel**
- Safety, Security, Rescue Research – Minnesota, Denver, UPenn
- Visual and Decision Informatics – Louisiana-Lafayette, Drexel,
- Wireless Internet Center for Advanced Technology Polytechnic Inst of NYU, UVa, Virginia Tech, Auburn, UT-Austin

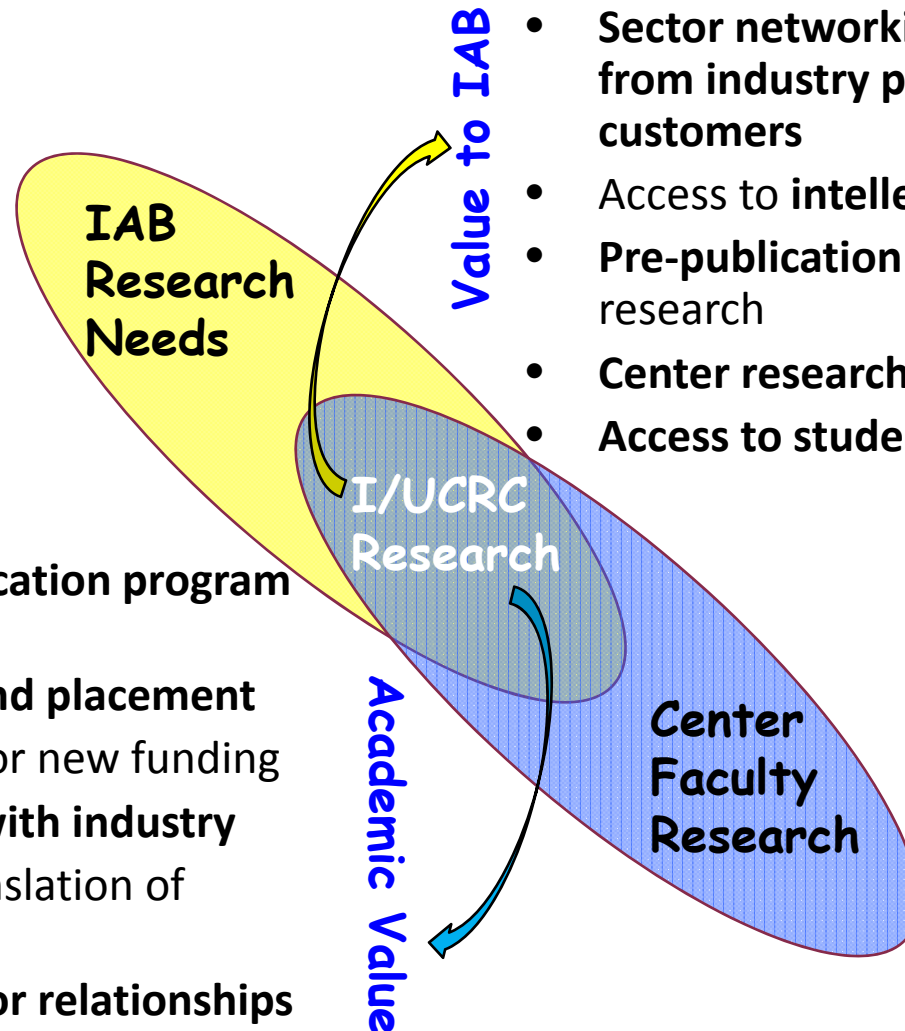




What *value* does an I/UCRC offer?

Outcomes from a cooperatively defined and managed, portfolio of industry-precompetitive research.

- New research and education program dimensions
- Student recruitment and placement
- Leverage POC results for new funding
- Trusted relationships with industry
- Ready partners for translation of discoveries
- Organize industry sector relationships
- Means to achieve institutional mission.

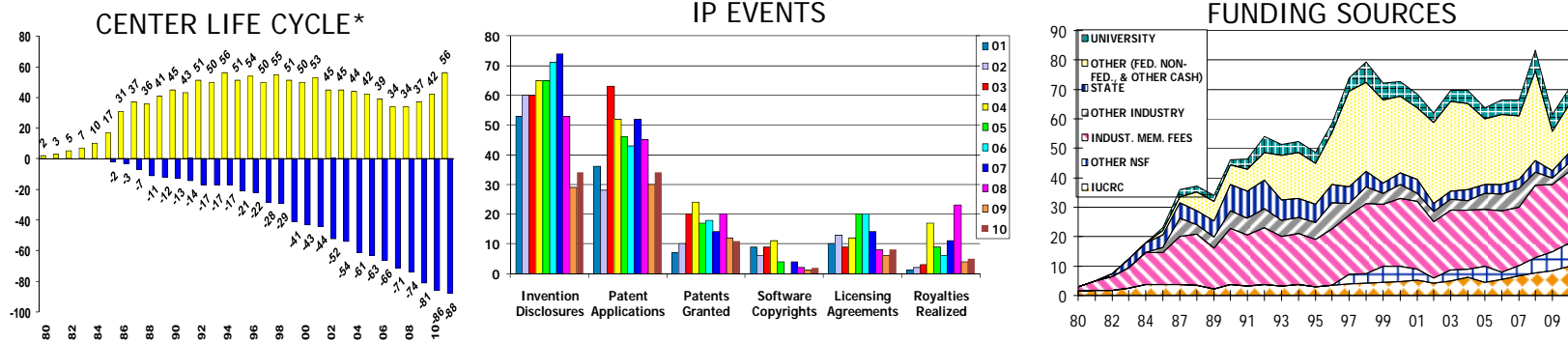


- High value research projects
- Investment leveraging
- Sector networking, learning from industry peers and customers
- Access to intellectual property
- Pre-publication access to research
- Center researchers & facilities
- Access to students

I/UCRC Evaluation & Assessment

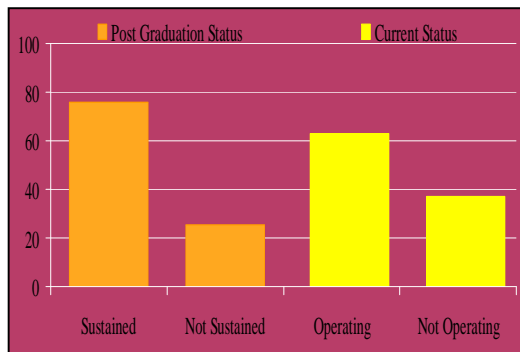
30 + year commitment to integrating evaluation with program planning, implementation and operation . *Local Evaluation – Global Assessment*

CENTER INPUTS AND OUTPUTS ASSESSMENTS

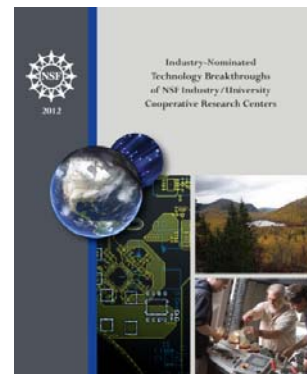


TARGETED ASSESSMENTS AND RELATED WORK PRODUCTS

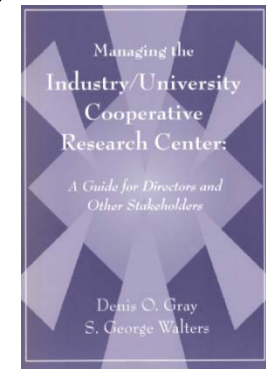
IUCRC GRADUATION STATUS



Breakthrough Compendium



Gray & Walters Director's Guide



Plus publication in open literature: > 80 publications in journals, national & international conferences: *Research Policy; AAAS; Journal of Technology Transfer; Sc. Public Policy; New Directions in Evaluation*

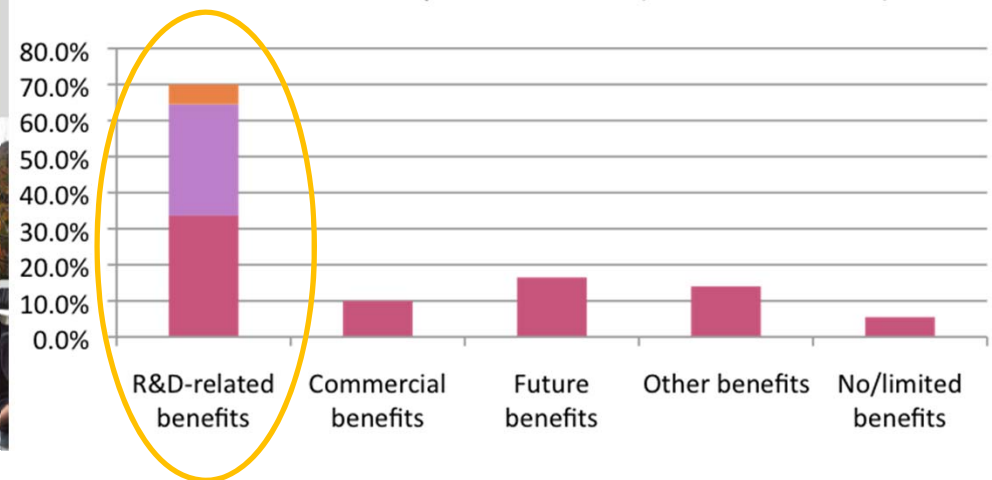


I/UCRC Outcomes

From Trusted, Long-Term Center Relationships built on Industry-University Research



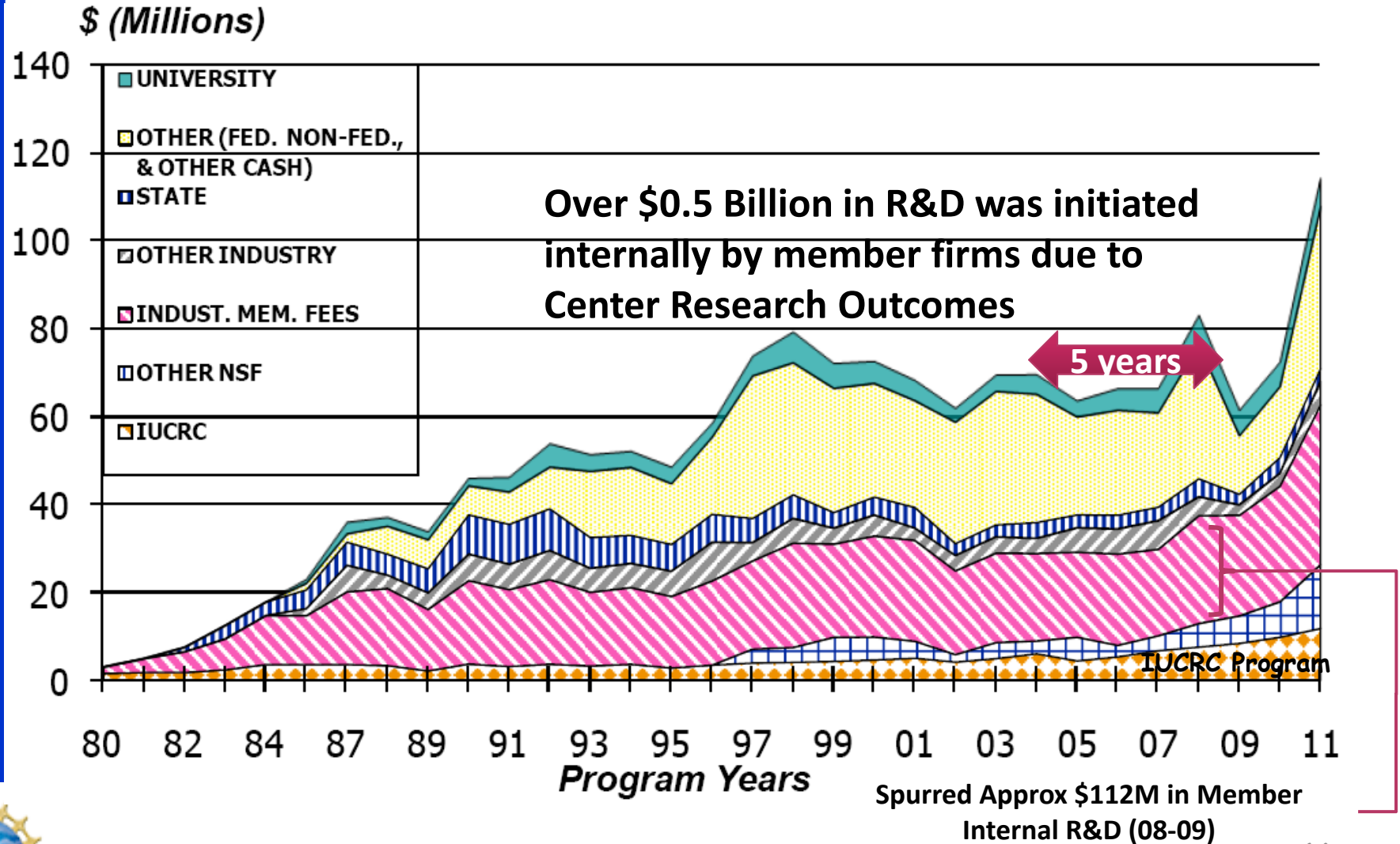
Percentage reporting different benefits from IUCRC participation
Process/Outcome, open comments (2008-2009, n=91)



See the IUCRC Compendia at
www.nsf.gov/eng/iip/iucrc/tech_breakthroughs.jsp

Building Innovation Capacity

TOTAL FUNDING BY SOURCE BY YEAR IN DOLLARS



The NSF's Role

Facilitate a Center environment in which long-term relationships between industry and academia can thrive.

- **Cooperative Agreement & Operational Framework**
- **Franchise of centers for collaboration**
- **Best practices based on decades of evaluation**
- **NSF Award - Funding Opportunities**
 - CORBI Projects – Between I/UCRC Centers (NSF matching!)
 - Fundamental Research (Industry Defined)
 - Research Experience for Undergraduate Students (REU)
 - Research Experience for Teachers (RET)
 - Federal Government Interagency Exchange of Funds
 - International Collaboration/Projects
 - Supplemental Opportunity for SBIR/STTR Memberships





I/UCRC Membership Agreement

- **Parties to Agreement, University and Center**
- **Annual membership fee structure**
- 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 costs of patent application
- If only one company seeks a license, that company may obtain an exclusive fee-bearing license
- March-in Rights
- Publication delay policy
- Industrial Advisory Board – one representative from each company per membership
- **Indemnification clause(s)**

- Must sign the membership agreement form
- ONE center, and ONE membership agreement form

NSF I/UCRC Funding Formula

Phase 1: First five years

- \$60 – \$80k each year based upon industrial membership level (\$150k - \$300k)
- Lead university receives \$10K for each additional research partner, annually
- Lead receives up to 20K for operations and communications, annually
- NSF provides funds for an evaluator

Phase 2: Second five years

- Universities receive \$40K-\$60K each year depending upon industrial support
- Lead university receives \$10K for each additional research partner
- NSF provides funds for an evaluator

Phase 3: Third Five Years

- \$15K each year based upon industrial membership level (\$175k minimum)
- Lead university receives \$25K
- NSF provides funds for an evaluator



National Science Foundation I/UCRC Contacts

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for more information: <http://www.nsf.gov>
and: <http://www.nsf.gov/eng/iip/iucrc>

Program phone: (703) 292-8383

Note: The best way to contact us is via e-mail. Many are on the road frequently

