

# *Graduated I/UCRCs: Factors in Success After NSF Funding*

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IUCRC Evaluation Project

# *Outline*



- Background
- Purpose
- Methodology
- Results
- Next Steps

# Background



- Federally supported research centers including IUCRCs are typically funded for a time-limited period ~ 10 years
  - Concerns about entitlement
- An explicit goal of IUCRCs is to create “self-sustaining” centers
  - “NSF intends to seed partnered approaches to ... research, not to sustain the Centers indefinitely. The Foundation intends for Centers gradually to become fully supported by university, industry, state, and/or other non-NSF sponsors.” (NSF I/UCRC website)



# *Purpose of Research*

- To assess the extent to which graduated IUCRC centers become self-sustaining
- To determine what factors predict center sustainability post graduation from NSF support
- To determine the level of sustainability achieved by graduated I/UCRCs – how successful are they
- To assess the extent to which graduated Centers maintain fidelity to their program model
- To determine the indirect impact of the I/UCRC program in achieved by graduated centers

# General Model of Sustainability



- Definition (Shediac-Rizkallah & Bone, 1998):
  - Sustainability is understood as continued program activities, continued benefits to stakeholders, & organizational capacity to continue to support the program once initial federal support is exhausted
- Measure
  - Program activities
  - Benefits to key stakeholders
  - Infrastructure

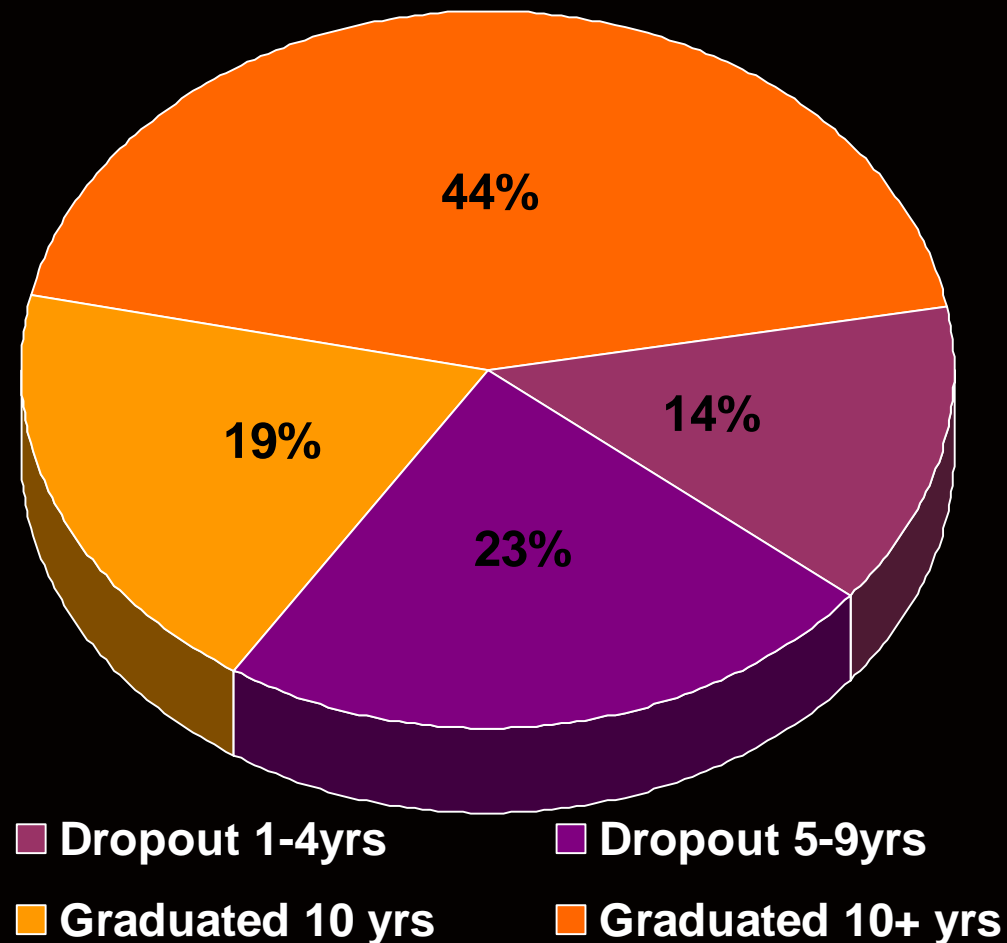
# Method



- Design
  - Semi-structured interview protocol
- Participants
  - Sampling Criteria
    - » Center received an NSF I/UCRC operating grant
    - » Center no longer funded by an NSF I/UCRC operating grant
    - » Center graduated and merged with a newer Center
    - » Center has not received NSF I/UCRC money for at least 1 year
      - » Population N = 73
  - Respondents
    - » Key Informant hierarchy
      - » 1) current director; 2) recent director; 3), director at the time of transition, 4) site director, 5) University official, and/or 6) involved faculty/staff

# Graduation Status

- There are 73 Centers that were started and are no longer funded by the I/UCRC Program
  - 37% Do Not Graduate
    - » 14% did not reach 5 year renewal
    - » 23% reached the 5 year renewal, but not 10 yr graduation
  - 63% Graduate
    - » 19% graduate after 10 years of funding
    - » 44% are funded longer than 10 years
      - » 11 - 22yrs





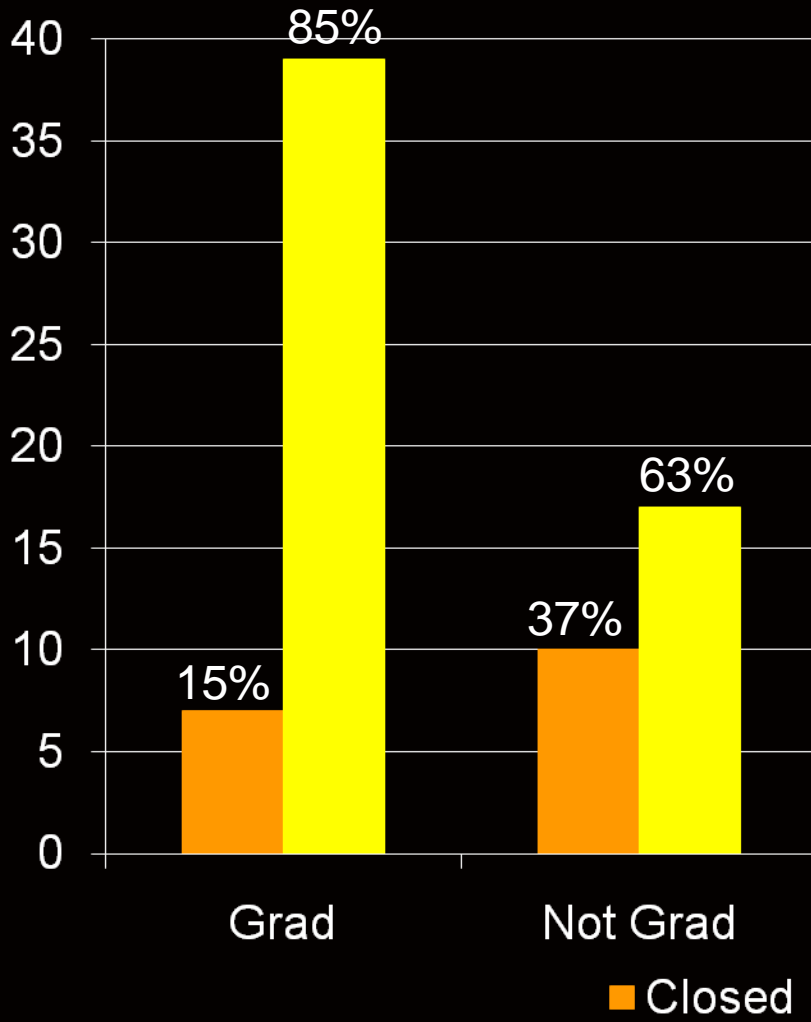
Industry/University  
Cooperative  
Research Centers

# *Center Status*

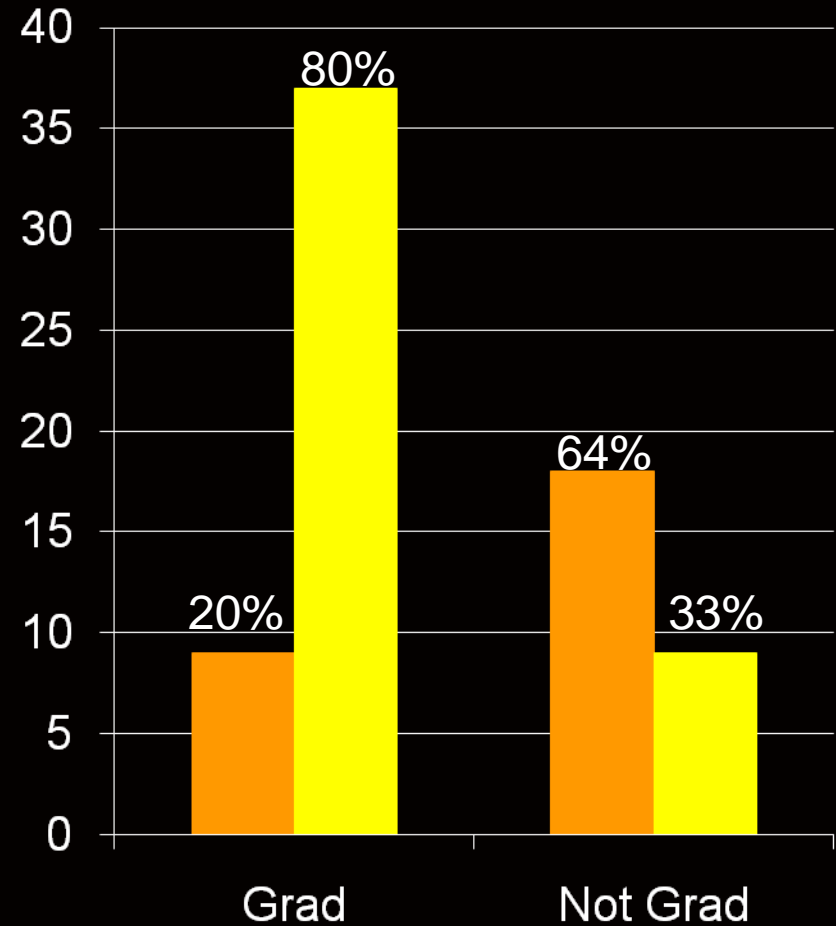


# Center Status

## Outcome Status



## Current Status



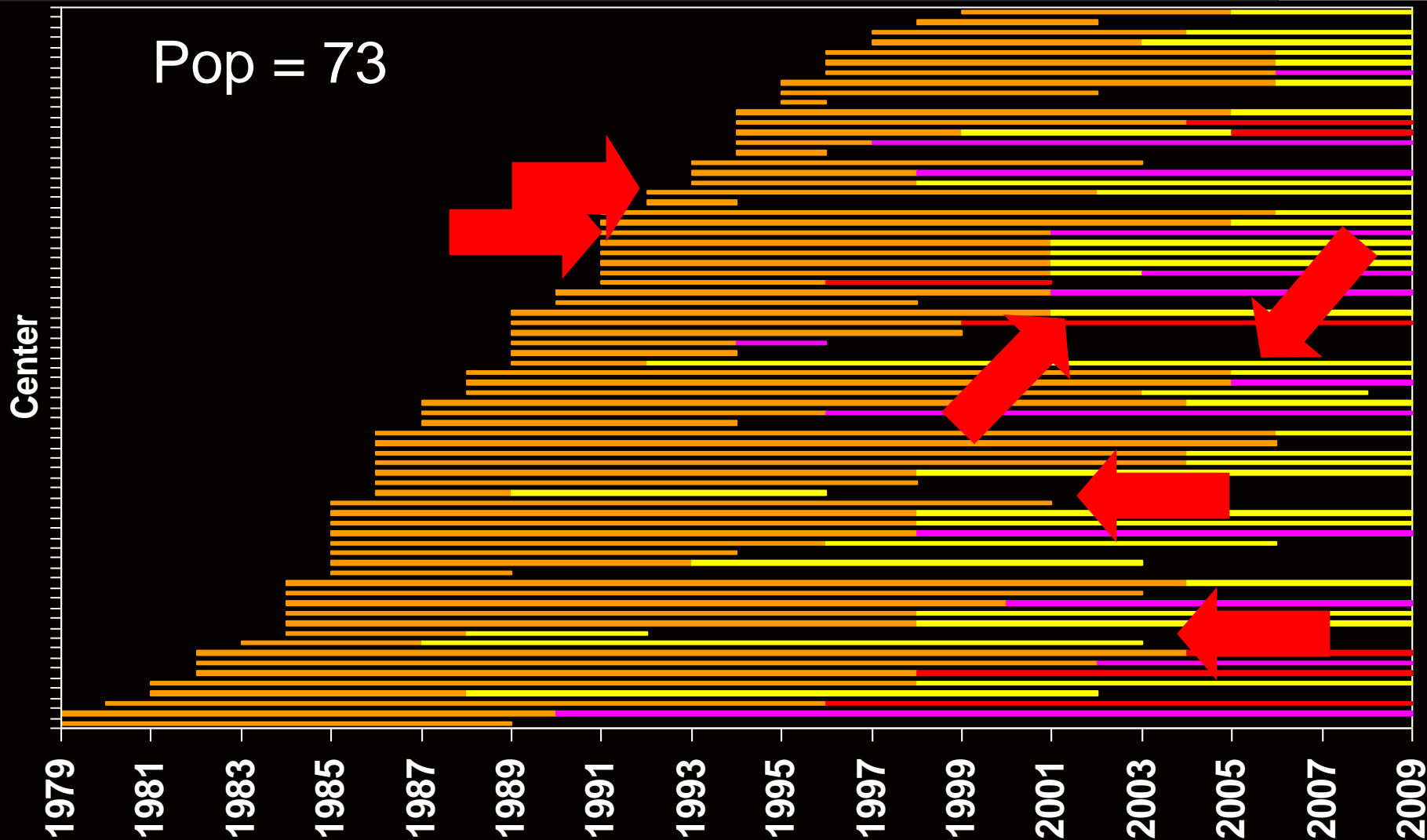
# Center Timeline



Industry/University  
Cooperative  
Research Centers

■ Years Funded ■ Transform ■ Merged ■ Sustained

Pop = 73



# *Outcome Categories*



- Closed: Did not continue to operate (as a center)
- Merged: Joined another existing/graduated I/UCRC
- Sustained: Continues to operate as a research entity, while maintaining at least 2 of the 3 core features of an I/UCRC
  - University based, Industry funded, shared research
- Transformed: Continues to operate, but:
  - Funded under another program, i.e. branded as a new center
  - Absorbed and/or integrated into another pre-existing entity
  - Discontinuous change in research focus
  - Has not maintained at least 2 of the 3 core I/UCRC features

# *Outcome Categories: Examples*



- Closed: Measurement & Control Engineering Center
  - Leadership turn-over, member retention problems, university pressure
- Merged: Microengineered Ceramics + Ceramics Research + Particulate Materials = Composite & Ceramic Materials
- Sustained: Pharmaceutical Processing Research Center
  - University-based, industry funded, consortia, on-site evaluator, etc

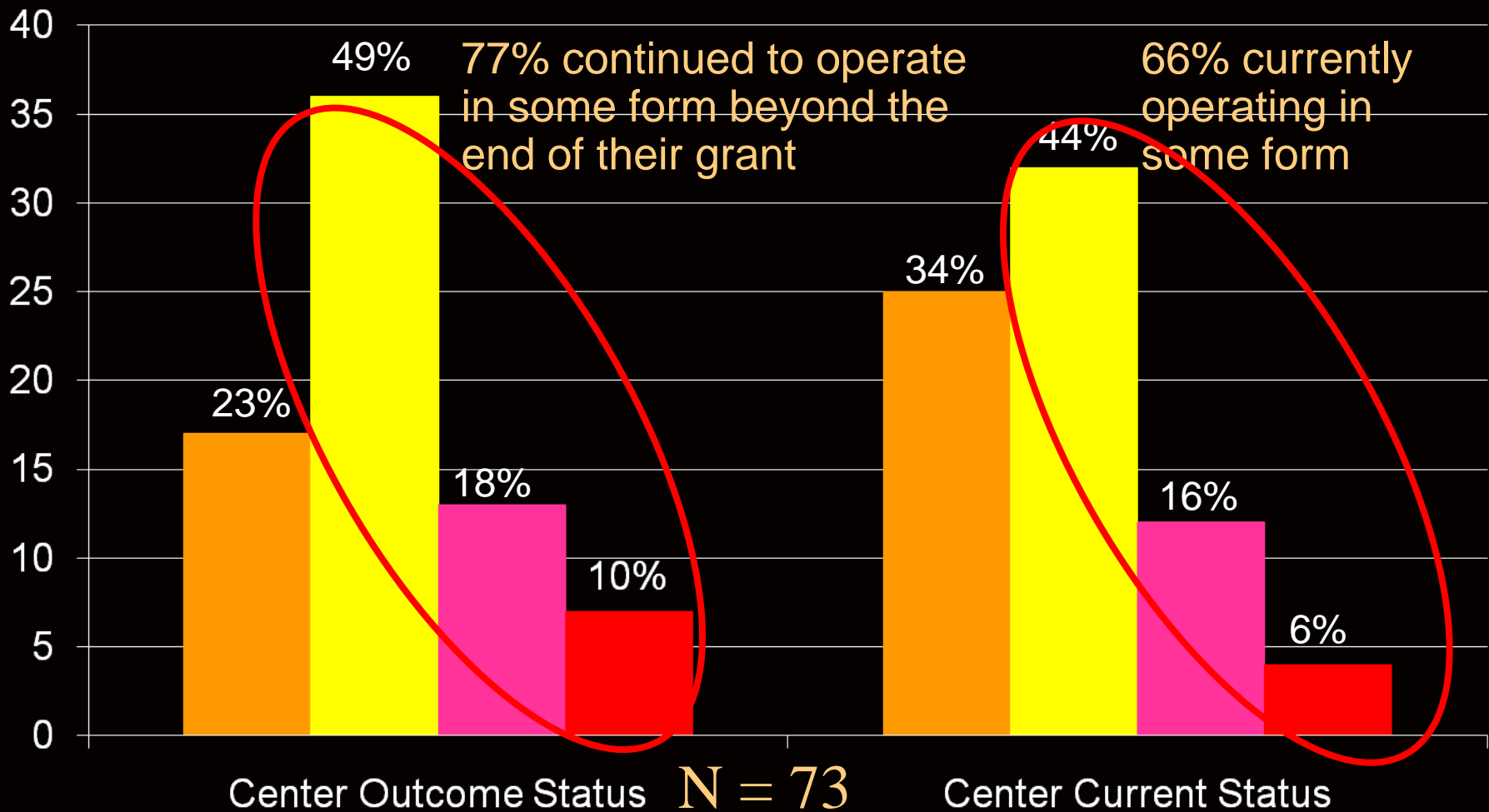
# *Outcome Categories: Examples*



- Transformed: Continues to operate, but:
  - Funded under another program:
    - » Center for Electromagnetics Research → Department of Homeland Security Center of Excellence called ALERT
  - Absorbed/integrated into another pre-existing entity:
    - » Virtual Proving Ground > Center for Computer Aided Design
  - Discontinuous change in research focus:
    - » Thin Film & Interface Research ≠ Sensors and Surface Technology Partnership
  - Has not maintained at least 2/3 core I/UCRC features:
    - » Ocean Technology Research is now the RI Slater Technology Fund (not Univ. based, not consortia, industry is client, not sponsor)

# Center Status

■ Closed ■ Sustained ■ Transformed ■ Merged





Industry/University  
Cooperative  
Research Centers

# *Graduated I/UCRC Level of Success*

# Success Measures



	08-09 Active I/UCRCs	Graduated Active I/UCRCs
	Mean	Mean
Budget	\$2.4M	\$1.9M
Industry	\$846K	\$825K
University	\$201K	\$96K
Government	\$1.2M	\$768K
Members	20.6	15.2
Grad Students	30.3	32.5
Publications	25.0	31.3

N = 36

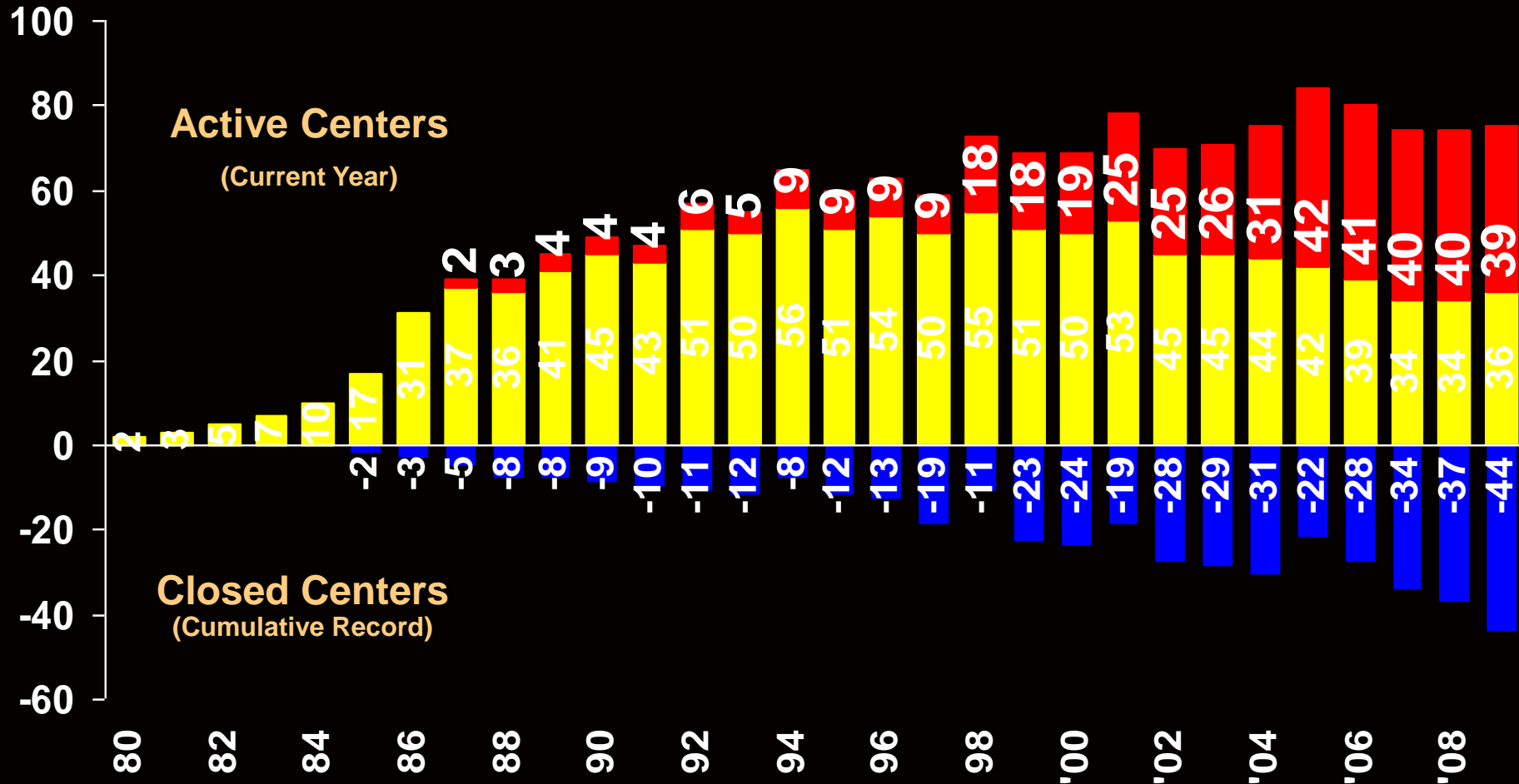




Industry/University  
Cooperative  
Research Centers

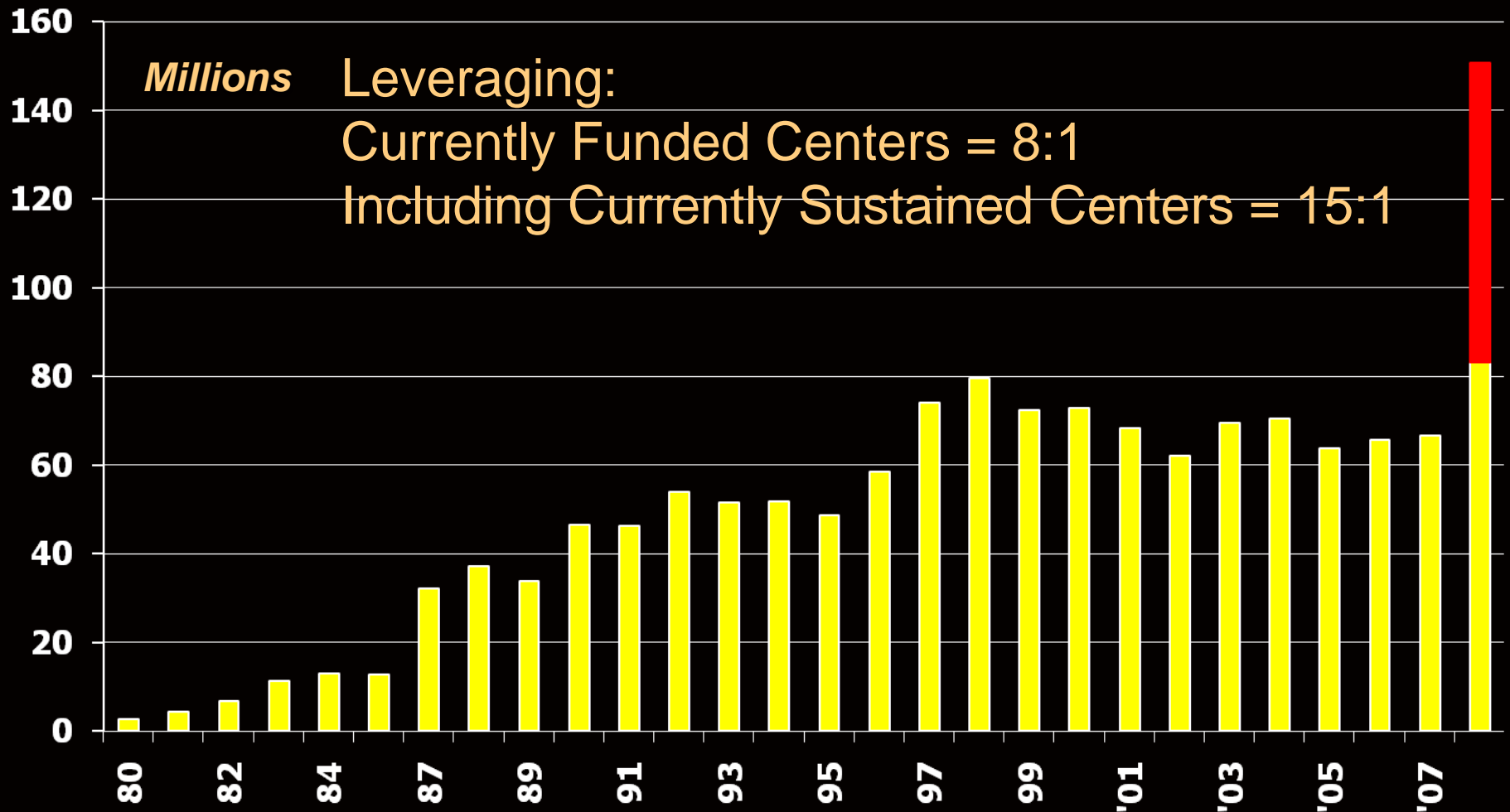
# *Program Impact*

# CENTER LIFE CYCLE



\* Study sample does not include centers graduated in the last 2 years, information about their current status is not reflected

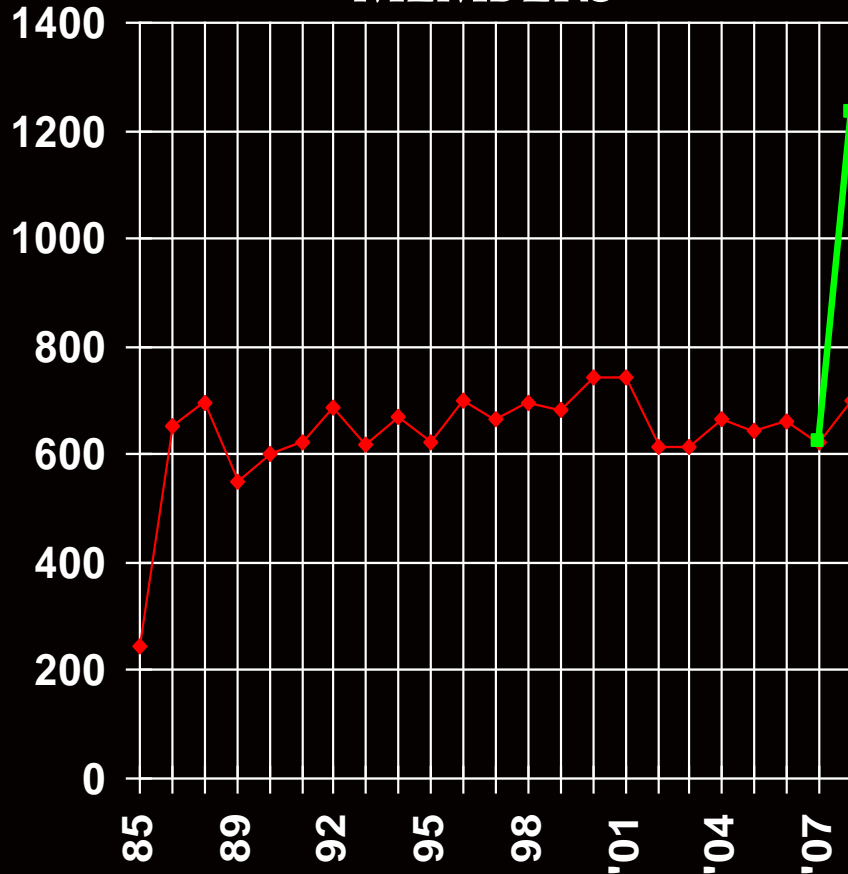
# TOTAL PROGRAM FUNDING



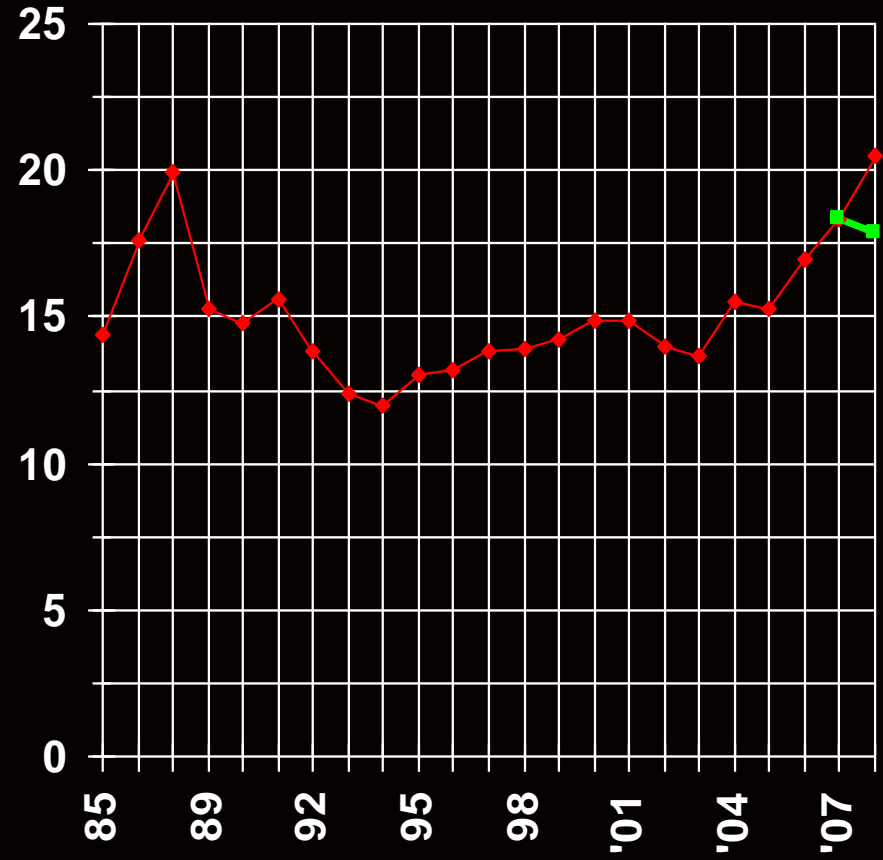
# INDUSTRIAL MEMBERSHIPS BY YEAR: Plus Currently Operating\* Graduated I/UCRCs (N = 35)



TOTAL NUMBER OF MEMBERS



AVERAGE NUMBER OF MEMBERS PER CENTER



\*Does not include merged centers or those for which current member data is missing



Industry/University  
Cooperative  
Research Centers

# *Graduates Center Impacts*

# *CAPPS: YamCo*



- Center Developed new sweet potato processing technology
  - Increased quality & safety of food, reduced cost, higher yield
- Worked with NC Dept of Agriculture to ID tech transfer potential
- Spun out technology to a farmer co-op: YamCo
- \$6M company, increases usable product 35-40%, potential for new sweet potato products

# *Center for Electromagnetics Research*



- ERC: Center for Subsurface Sensing and Imaging Systems (CenSSIS)
  - About to graduate
- Department of Homeland Security Center of Excellence: Awareness Localization of Explosives and Related Threats (ALERT)
  - Started in 2008

# *Lessons Learned & Next Steps*



- Original Coding Scheme too liberal
  - Does not distinguish between sustained and transformed
  - Most directors continue research in some form
- Evaluator Surveys
  - Ready for data collection
- Quantitative analysis
  - What predicts sustainability?
    - » Archival data



# Grad $\leq$ 10 yrs (i.e. Phase III eligible)



Advanced Control of Energy and Power Systems	1999	Center for Polymer Interfaces	
Microengineered Ceramics Research Center	1999	Center for Wireless Information Networks	
Center for Ultra High-speed Integrated Circuits & Systems	1999	Corrosion in Multiphase Systems Research Center	2002
Center for Hazardous & Toxic Waste Management	2000	Logistics Institute	2002
Center for Advanced Communications	2001	Next Generation Video	2002
Center for Advanced Electron Materials Devices & Systems	2001	Ergonomics Research Center	2003
Air Conditioning & Refrigeration Center	2001	Center for Intelligent Biomedical Devices & Musculoskeletal Systems	2003
Center for Building Performance & Diagnostics	2001	Center for Machine Tool Systems Research	2003
Center for Dimensional Measurement & Control in Manufacturing	2001	Center for Optoelectric Devices Interconnects & Packaging	2003
Center for Integrated Pest Management	2001	Quality & Reliability Engineering Research Center	2003

# Grad $\leq$ 10 yrs (i.e. Phase III eligible)



Center for Advanced Computing & Communication	2004	Center for Coatings Research	
Center for Advanced Processing & Packaging Studies	2004	Center for Fundamentals & Applications in Photopolymerizations	
Center for the Design of Analog/Digital Integrated Circuits	2004	Center for Pharmaceutical Processing Research	2005
Center for Glass Research	2004	Center for Advanced Polymer & Composite Engineering	2006
Particulate Materials Research Center	2004	Center for Built Environments	2006
Software Engineering Research Center	2004	Center for Health Management	2006
Center for Surface Engineering & Tribology	2004	Measurement & Control Engineering Center	2006
Center for Wireless Electromagnetic Compatibility	2004	Center for Microcontamination Control	2006
Advanced Manufacturing & Packaging of Microwave, Optical & Digital Electronics	2005	Power Systems Engineering Research Center	2006
Industry/University Center for Biosurfaces	2005	Virtual Proving Ground Simulation	2006

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