

Meeting the Challenge of Self-Sufficiency

Concurrent Breakout
IUCRC Annual Meeting

Panelists



- Moderator
 - John Ringo, Analog/Digital Devices, Washington State U.
- Panelists
 - Lindsey McGowen, IUCRC Evaluation Project, NC State U.
 - Wilson McGarel, Questor Centre, Queens University, Belfast
 - David Matlock, Advanced Steel Processing, Colorado School of Mines

Goals



- To provide an update on the status of graduated IUCRC centers
- To help shed some light on strategies and practices that contribute to meeting the challenge of IUCRC self-sufficiency
- Stimulate discussion of what NSF, directors, host universities and other stakeholders can do to promote self-sufficiency

*Meeting the Challenge of Self-
Sufficiency:
An Update on a Follow-up
Assessment of Graduated IUCRCs*

Lindsey McGowen & Denis Gray
IUCRC Evaluation Project

Panelists



- Moderator
 - John Ringo, Analog/Digital Devices, Washington State U.
- Panelists
 - Lindsey McGowen, IUCRC Evaluation Project, NC State U.
 - Wilson McGarel, Questor Centre, Queens University, Belfast
 - David Matlock, Advanced Steel Processing, Colorado School of Mines

Goals



- To provide an update on the status of graduated IUCRC centers
- To help shed some light on strategies and practices that contribute to meeting the challenge of IUCRC self-sufficiency
- Stimulate discussion of what NSF, directors, host universities and other stakeholders can do to promote self-sufficiency



*Meeting the Challenge of Self-
Sufficiency:
An Update on a Follow-up
Assessment of Graduated IUCRCs*

Lindsey McGowen & Denis Gray

IUCRC Evaluation Project

Outline



Industry/University
Cooperative
Research Centers

- Background
- Purpose
- Literature
- Methodology
- Preliminary Findings

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 identify best practices that promote post-NSF success
- To assess the extent to which graduated Centers maintain fidelity to their program model

Literature

- What do we know about Center sustainability?
 - General literature
 - » Modest literature on program sustainability primarily from public health literature
 - » Meta analysis (Scherier, 2005)
 - » 19 studies; 2 multivariate
 - Centers
 - » Tiny, inconclusive literature based on ERCs
 - » Ailes, Roessner, & Coward (2000): data collected at graduation
 - » Mudjamar (2005): ~ informal survey with 50% response rate
 - » IUCRC: no systematic information about graduated centers

General Model of Sustainability

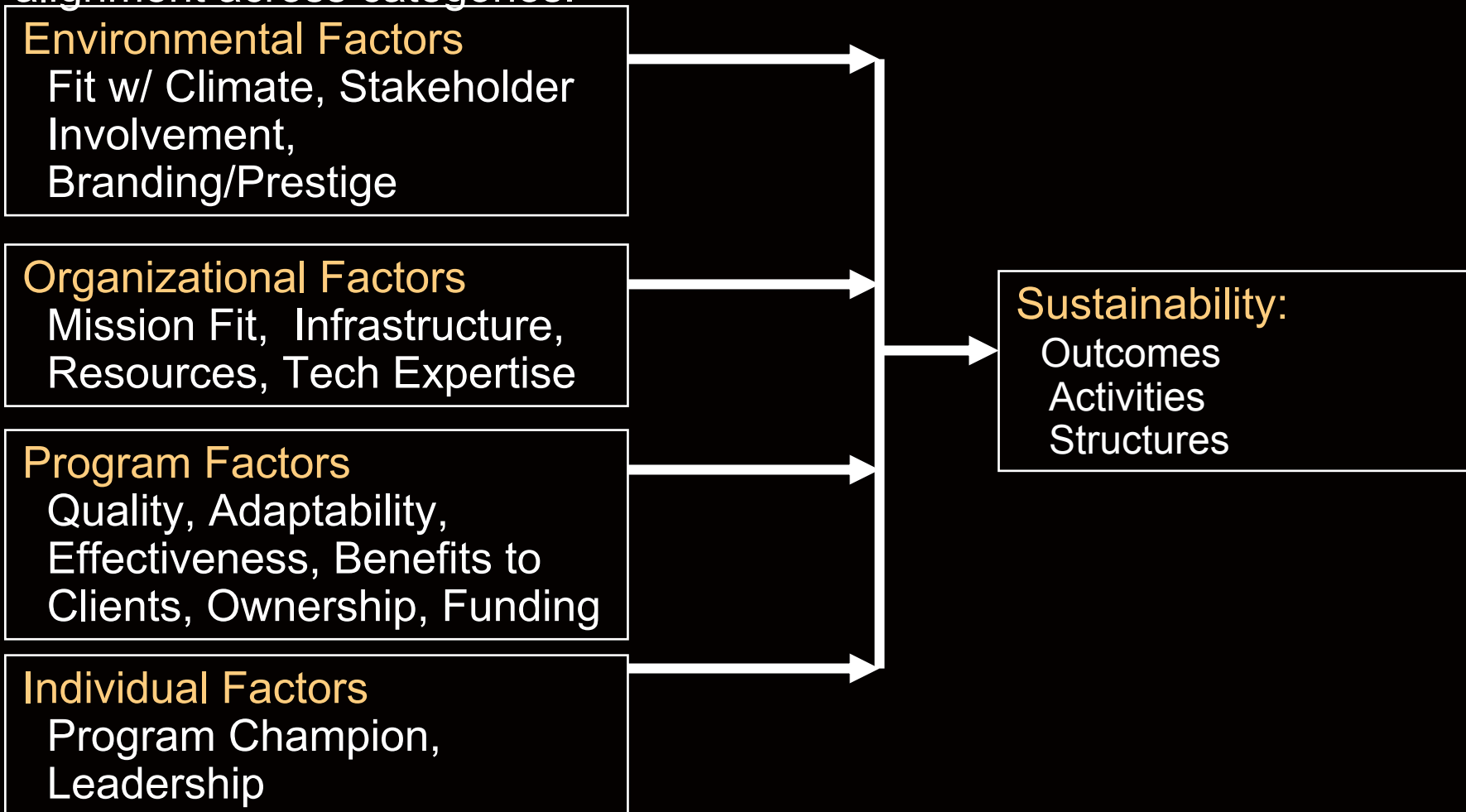


- **Definition** (Shediac-Rizkallah & Bone, 1998):
 - Sustainability is understood as continued program activities, continued benefits to stakeholders, & organizational capacity to continue to support the program once initial federal support is exhausted
- **Measure**
 - Program activities
 - Benefits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



Program Sustainability Model

Four categories of factors that influence sustainability. Emphasis on alignment across categories.



Research Questions

- What is the status of graduated Industry-University Cooperative Research Centers (I/UCRCs)?
 - To what extent do they still operate under the I/UCRC model?
- What strategies do Centers use to achieve self-sustainability?

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
 - » Current Sample N = 56
 - 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

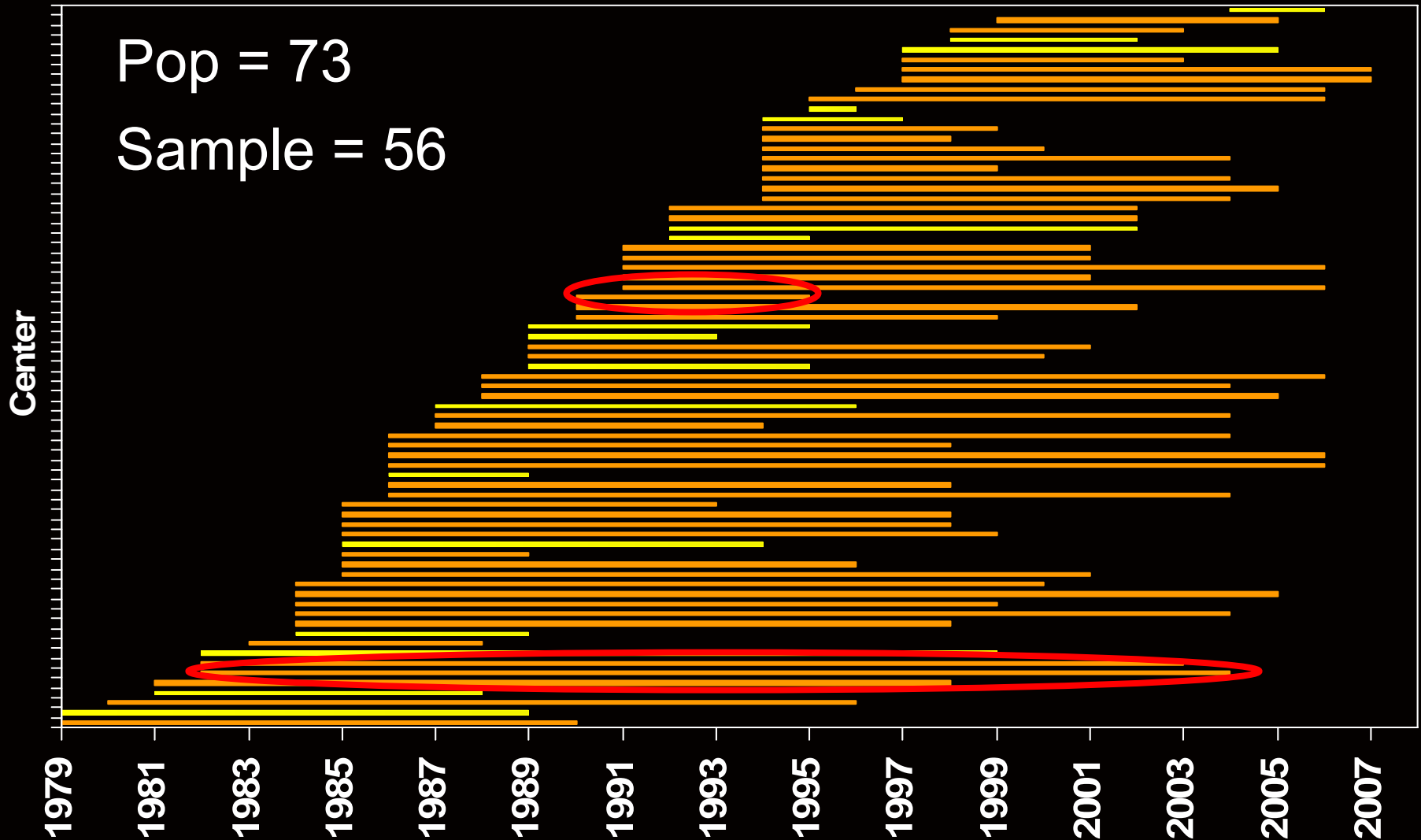
Center Timeline: I/UCRC Funded



Industry/University
Cooperative
Research Centers

■ Data Collected

■ Data Collection On-going

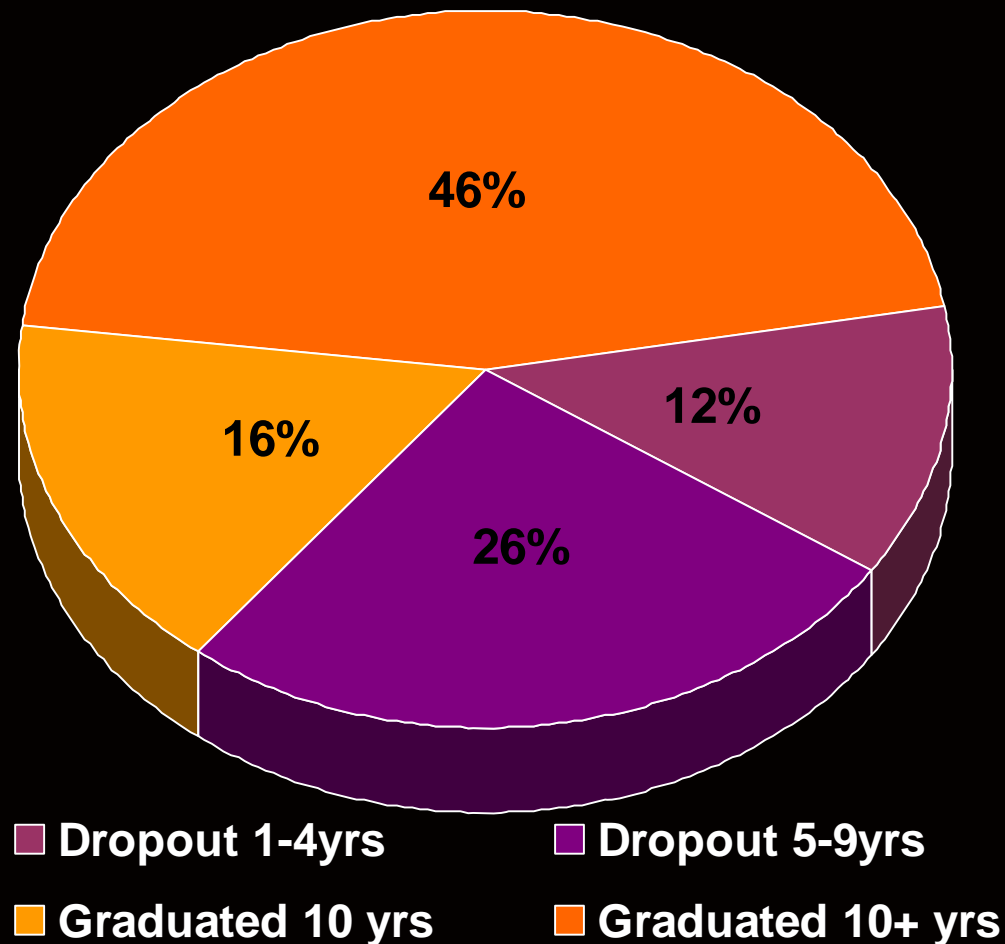


Graduation Status



Industry/University
Cooperative
Research Centers

- There are 73 Centers that were started and are no longer funded by the I/UCRC Program
 - 38% Do Not Graduate
 - » 12% did not reach 5 year renewal
 - » 26% reached the 5 year renewal, but not 10 yr graduation
 - 62% Graduate
 - » 16% graduate after 10 years of funding
 - » 46% are funded longer than 10 years
 - » 11 - 22yrs



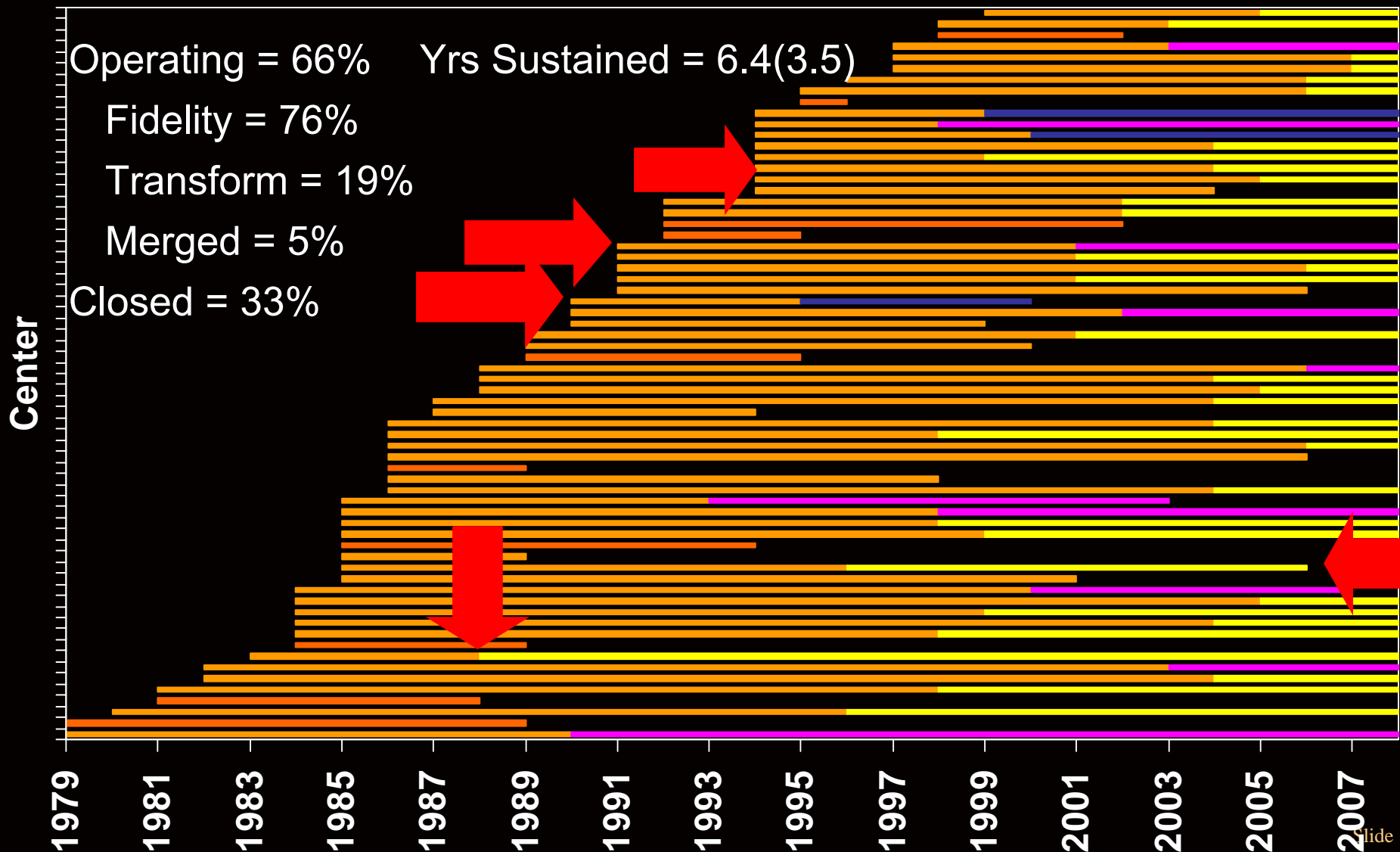
Center Timeline: Sample

$N = 66$



Industry/University
Cooperative
Research Centers

■ IUCRC Funded ■ Status only ■ Merged ■ Transform ■ Fidelity



Center for Advanced Computing & Communication: Sustained



- I/UCRC funded 1982-2004
 - 25th anniversary
- 1 University (was 2)
- Current Status: Operating
- Sustainability
 - \$400k/year, 6 members, 35 faculty, 9 students, 26 projects
 - Computer Science, Electrical Computer Engineering, Physical & Math Science, College of Management: Services Science
- Fidelity
 - IAB
 - » \$50K & \$20K
 - » Consortial
 - » Weighted voting
 - » Shared results
 - » 1 year funding cycle
 - No evaluator
 - » Alternative evaluation
 - Service Enhancements
 - University Cost Sharing
 - » Typical: 48.5%
 - » Negotiated: 26%

Integrated Pest Management: Transformed



- IUCRC funded 1992-2002
- 1 University
- Current Status: Operating
- Sustainability
 - \$7.5 mill/year, 16 members
 - Entomology, plant pathology, crop science, economics animal science, horticulture, computer science
- Fidelity: Low
 - IAB
 - » \$5K & \$25K
 - University cost-sharing
 - » Typical: 27.3%
 - » Negotiated: 9.5%
 - 3 priorities
 - » Industry Networking
 - » USDA consulting
 - » Information management

Integrated Pest Management: Transformed



- Center Structure

- “Having the support of industry has made us much more attractive for [other] programs.”
- Industry Networking
 - » “We bring leaders from an area that’s new or there is some controversy and we’re bringing folks together to talk with each other. We don’t produce a white paper, we don’t put out anything. The idea is to let people get in the room and say what’s really on their mind and talk to each other and learn something.”
- Consulting/Program Management
 - » “all this networking has a big big impact, but maybe not like you’d think. ...[we] give USDA lists of priorities that then become the priorities in RFAs that USDA writes. ... It’s not like we are deciding US policy, but we have a lot of impact.”
- Contract
 - » “we do a huge amount of computer based research... in developing the software and tools that people use in pest management... That combination of agriculture and computing makes us very valuable”

BioTech Center: Closed



- IUCRC funded 1985-1990
- 3 Universities
- Current Status: Not Operating
- Sustainability: None
- Closed with 2 members, \$320K, university cost sharing, 14 researchers, 10 students
- Reasons for closing
 - Maturation of the field
 - Director time allocation
 - Lack of host support

“The technology became much more generic. By the time the center ended it was just another technique. So it would have meant changing the general thrust of the center. ... But if you did that you’d have to go out and be very aggressive about getting more companies involved. ... Also I didn’t really feel that I could devote the time that would have been necessary.”

Descriptives



Industry/University
Cooperative
Research Centers

	Sustained (N=47)	Not Sustained (N=9)
Years funded	11.7(4.5)	11.6(5.6)
Grad Budget	\$1.59M(\$1.24M)	\$850K(\$756K)
Member Fees	\$560K(\$471K)	\$208K(\$155K)
Add. Industry	\$115K(\$274K)	\$24K(\$60K)
University	\$134K(\$241K)	\$54K(\$57K)
% Admin Budget	15.6%(15.6%)	28.3%(30.1%)
Members	20.0(31.8)	6.9(5.8)
Grad Students	15.2(12.2)	10.6(12.6)
Publications	21.4(29.2)	17.8(21.6)

Strategies for Post-Graduation Success



- Stakeholders
 - Support
 - » Industry voluntarily provided more funding to off-set loss of grant
 - » Increase # of members
 - » “The best sales is when a company decides that this is such a good thing, we want our competitors to join. You need to co-opt your industrial members to help you get more members.”
 - Relationships
 - » “we designated [someone to] maintain contact with our members and we made a visit to each company every 2 yrs”
 - » Getting beyond champions
 - » Multiple contacts within member companies
 - Benefits
 - » Industry expectation
 - » “getting well trained students is a big plus; [they] have 1st dibs”

Strategies for Post-Graduation Success



- Long term perspective
 - Center \neq Grant
- University support
 - Continued cost-sharing
 - “they pretty much let us operate on our own”
- Research Focus
 - “faculty do research on what’s **currently relevant** to the companies.”
 - “the work which we do in the center, our member companies still feel it’s worth putting their money into it.”
 - Work is **complementary** to industry research

Strategies for Post-Graduation Success



- Transition planning
 - Start early
 - » “we were organized ... over the years we had revised our operating style ... so there wasn’t much to do at [graduation]”
 - Stakeholder involvement
 - » “we have an IAB and an executive committee...both groups were involved”
 - » “we did involve our sponsored research project office”

Strategies for Post-Graduation Success



- Funding
 - Entrepreneurial orientation
 - » “we go after money anywhere I can find it. I’ve learned to become very entrepreneurial and that continues on with my staff. We are always looking for new ideas new projects new ways to do things.”
 - Be opportunistic even if it means significant transformation
 - » Industry contracts, federal and state center programs, cooperation with other research entities
 - Leveraged investment
 - » “our members get a 21 to 1 return on their investment”
 - » “they benefit from the [government] research too”

Remaining Interviews



Industry/University
Cooperative
Research Centers

Center Name	I/UCRC Funded	University	Last Director
building performance and diagnostics (CBPD)	92-01	Carnegie Mellon	Hartkopf
ceramics research (CRC)	82-98	Rutgers	Niesz/Haber
chemical process modeling and control research (CPMCR)	85-96	Lehigh	Luyben/Kothare
composite design (CCD)	94-96	Stanford	Tsai (retired)
grinding research and development (GRD)	90-98	Uconn	Brody/Ting
high speed image processing (HSIP)	92-94	UC irvine	Ferrari (moved to NPS)
integrated circuits and systems/ultra high-speed integrated circuits and systems (UHICS)	89-99	UCSD	Ku
integrated information and telecommunications systems (IITS)	86-89	IIT	
interactive computer graphics (CICG)	79-89	RPI	Kolb/Wozny

Remaining Interviews



Center Name	I/UCRC Funded	University	Last Director
life cycle engineering/electronics packaging research (EPR)	89-92	UMD	Pecht
manufacturing automation (MA)	87-94	USC/UC	Bekey
material handling research/logistics institute (LI)	82-02	GAIT/Univ. of AR	Nemhauser
mechanical and optical coordinate measurement machines/dimensional measurement and control in manufacturing (DMCM)	90-01	Umich	Hu
manufacturing and packaging of microwave, optical and digital electronics (AMPMODE)	88-05	CU	Mahajan (moved VATech)
packaging and resource recovery (PRR)	95-95	Rutgers	Saba
plastics recycling institute (PRI)	85-94	Rutgers	McLaren (dead)
polymer biodegradation (PB)	94-98	Umass	McCarthy
Robotics (ROB)	81-87	URI	Viets

Remaining Interviews



Industry/University
Cooperative
Research Centers

Center Name	I/UCRC Funded	University	Last Director
technology and innovation management (TIM)	03-05	NWU	Radnor
thin film and interface research (TFIR)	89-94	Brown / URI	Loferski (dead)
welding research (EWI)	79-90	OH State	Cialone
wireless electromagnetic compatibility (WEC)	97-04	Univ. OK	Grant
mathematical modeling and computation/petroleum research (PR)	84-88	UWY	Ewing (dead)

Lessons Learned & Next Steps



Industry/University
Cooperative
Research Centers

- Directors are hard to find!
- Original Coding Scheme too liberal
 - Does not distinguish between sustained and transformed
 - Most directors continue research in some form
- Need to interview or drop remaining centers
 - Drop from some analyses
- Evaluator Surveys
 - revise
- Quantitative analysis
 - What predicts sustainability?
 - » Archival data

Acknowledgements:

This project is supported by a grant from
the National Science Foundation

Contact Lindsey McGowen:

lcmcgowe@ncsu.edu