

Fountains vs. Forums:

The evolution of knowledge networks in Akron and Rochester

Sean Safford

Massachusetts Institute of Technology
Industrial Performance Center



Sloan Industries Conference
Atlanta, Georgia
April 2004

Industrial Performance Center's Local Innovation Systems Project

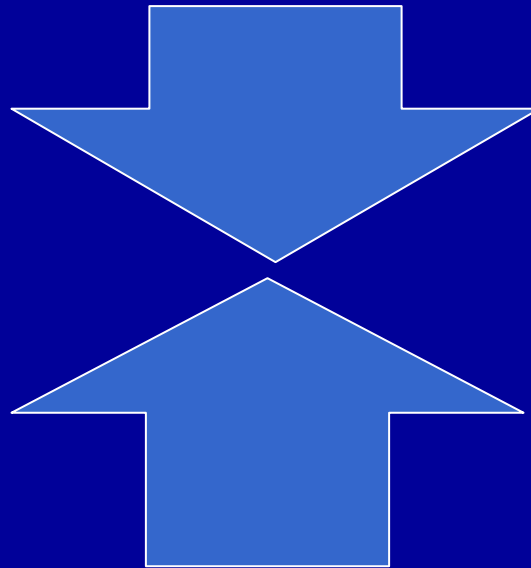
- Research is part of a project examining the role of universities in local systems of innovation
- Researchers currently from the U.S., the U.K., Finland and Japan
- Range of sectors including optoelectronics, motor sports, biotechnology, advanced materials, machinery and wireless communications.
- Focus on evolutionary dynamics involving qualitative, comparative historical approach.

Transformation of Knowledge Flows in the Rust Belt

- The organization of knowledge flows in U.S. industry was contained within silos of large industrial companies.
- Competitive pressures in the 1980s led to radical restructuring of these flows.
- The big question: is it possible to retain knowledge and shape the structure of its flows in ways that maintain regional competitive advantage.

Opposing Forces on Knowledge Networks in the 1980s and 1990s

Communities seek to strengthen relationships within localities and find alternative means of bringing knowledge in... universities play a central role.



Large and increasingly small companies search for new sources and outlets of knowledge outside of parochial boundaries.

“How” Knowledge Networks Change

- What policies were put in place to affect the structure of knowledge networks?
- What strategies did universities and other local actors pursue?
- What impact on the organization of knowledge within the community?

Methodology

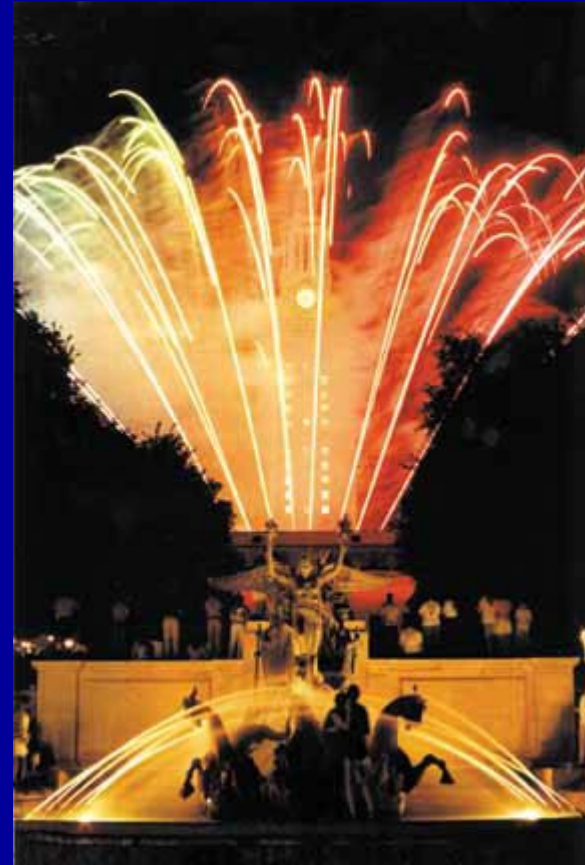
- Selection: well-matched local innovation systems
 - Akron: Goodyear, Goodrich, Firestone and General Tire
 - Rochester: Eastman Kodak, Xerox and Bausch & Lomb
- Broadly comparable underlying technologies and associated scientific disciplines.
 - Akron: Polymers and advanced materials
 - Rochester: Optics and opto-electronics.
- Universities with comparable capabilities in relevant disciplines
 - Akron: University of Akron and Kent State
 - Rochester: University of Rochester and Rochester Institute of Technology

Methodology

- Network Analysis:
 - Co-Authored Scientific Papers in 1980-1982 & 2000-2002
- Historical Comparison:
 - Interviews with key actors in each of the communities
 - Akron: 20 interviews (2 visits, 2002 and 2003)
 - Rochester: 28 interviews (3 visits, 2002 and 2003)
 - Supplemented with secondary and tertiary data

University of Akron: Fountain Approach

- “Dragged kicking and screaming into economic development”
- Sought to isolate academic research from purely commercial interests.
- Window on Technology :
Give companies a view onto cutting edge technologies coming out of the university.



University of Rochester: Forum Approach

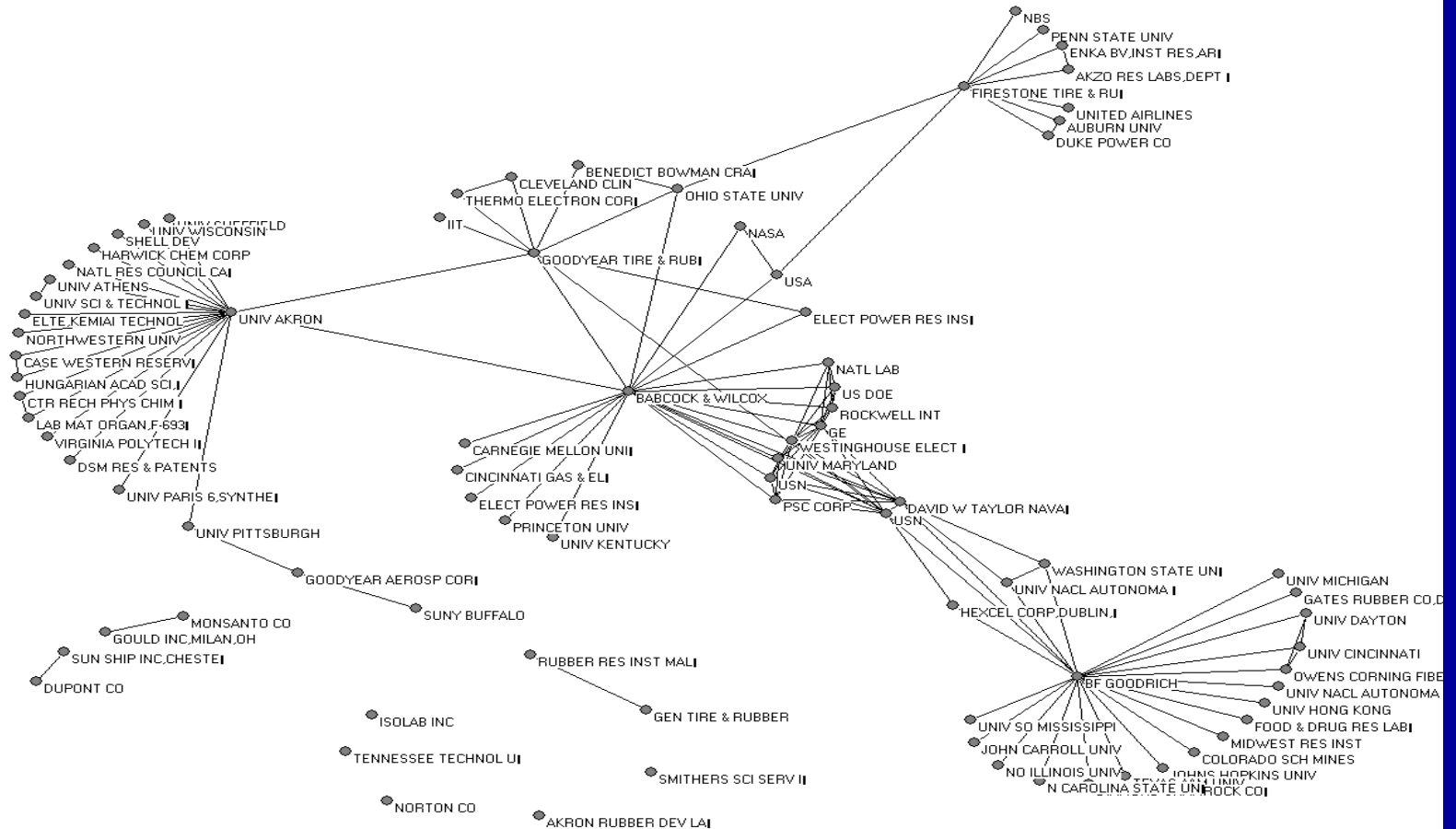
- Faculty resistance. Happy with philanthropic relationship.
- Mandate from New York State to address the needs of SMEs.
- Result was two separate entities; one focused on large companies, the other on SMEs. Eventually created spaces where large and small companies could share ideas.



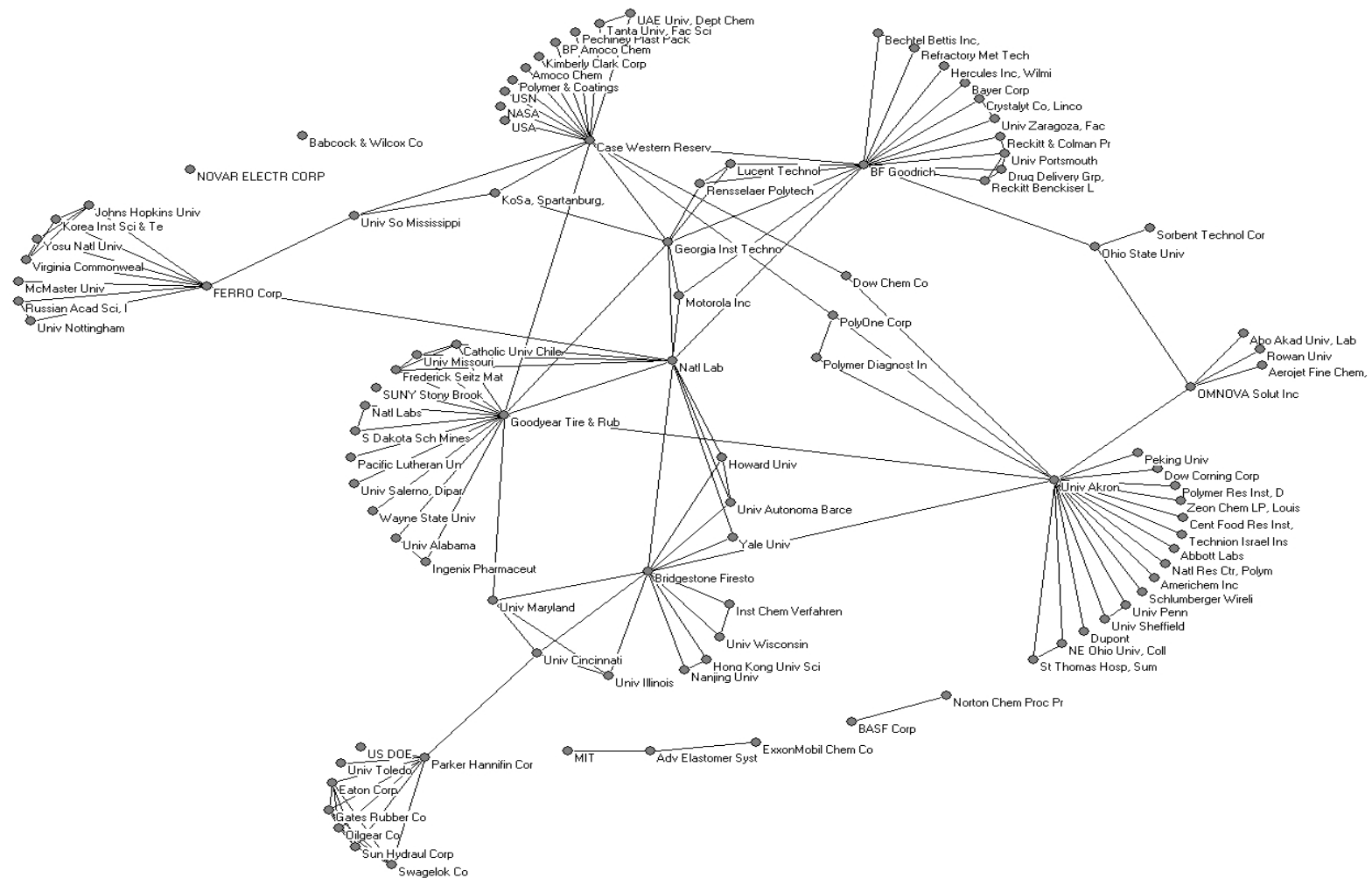
Industry/University Co-Evolution

- Akron's tire companies → Advanced Polymers which maintained world class R&D
- Emergence of a large group of SME's suddenly thrust into much more competitive (contingent ala Herrigel) supplier relationships
- University approach failed to capture the interest of the large companies and offered very little to SMEs.

Akron 1980



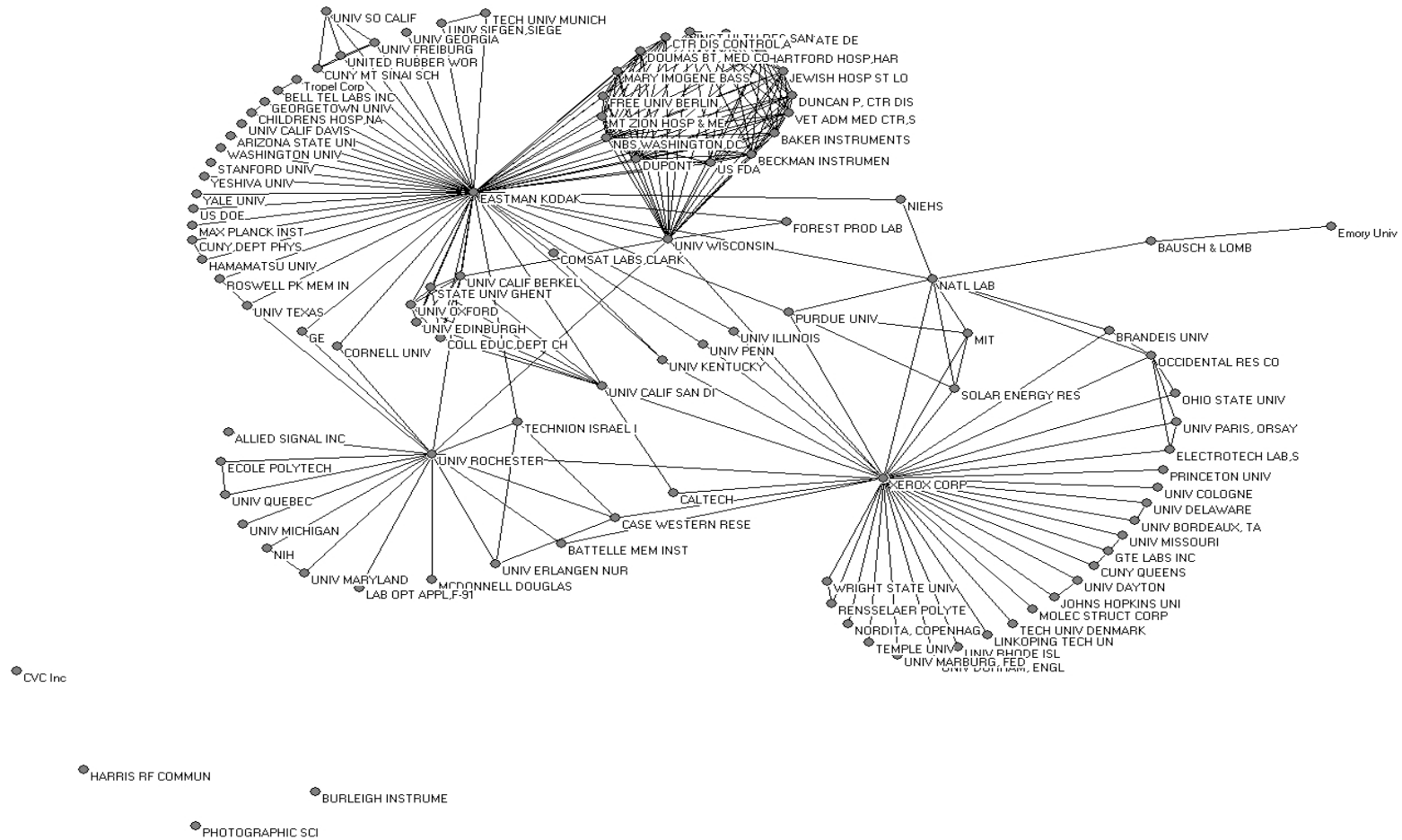
Akron 2000



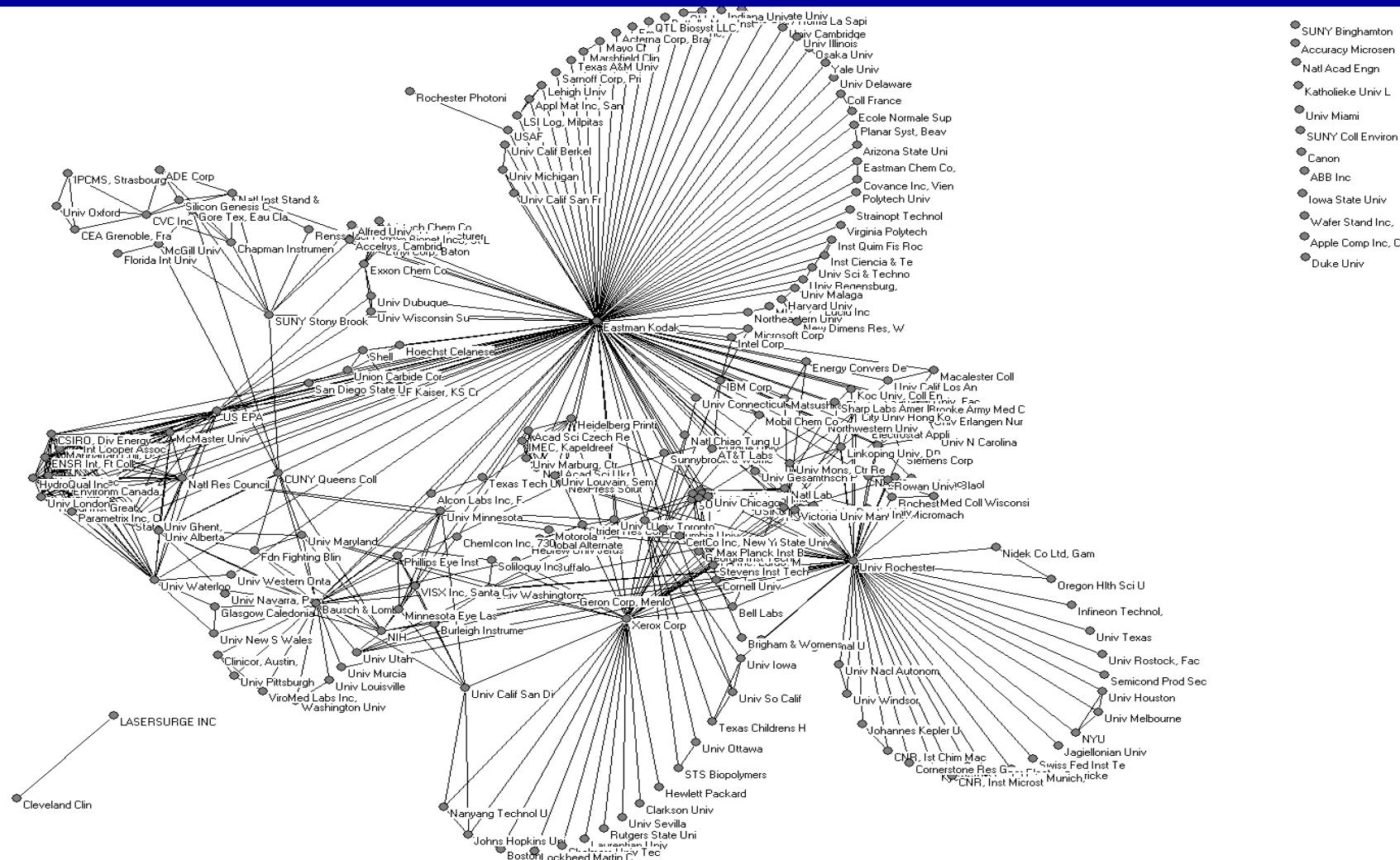
Industry/University Co-Evolution

- Major companies in Rochester maintain presence, though pushed out—not more helpful than Akron!
 - Xerox PARC; Kodak's purchase of Eastman Chemical; Bausch & Lomb establishes R&D center in Europe
 - Large companies maintained “not invented here” attitude
 - Kodak and Xerox move in on each other's markets

Rochester 1980



Rochester 2000



Akron: 1980 → 2000

	Local MNC	Local Tech	Local Univ	Local MNC	Local Tech	Local Univ
Local MNC	86%	>1%	>1%	62%		4%
Local Tech	2%	95%			65%	6%
Local Univ	2%		77%	2%	2%	77%
Total	71%	4%	11%	20%	13%	43%
Group Total		86%			75%	

Rochester: 1980 → 2000

	Local MNC	Local Tech	Local Univ	Local MNC	Local Tech	Local Univ
Local MNC	67%	>1%	3%	68%	1%	8%
Local Tech	9%	57%		7%	62%	8%
Local Univ	3%		77%	8%	2%	78%
Total	35%	1%	39%	37%	7%	38%
Group Total		75%			82%	

Impact on Entrepreneurship

	Akron Polymers	All Polymers	Rochester Optical Elec.	All Optical Elect.
SBIR Awards	9	1796	45	6241
Percent of Total Awards	0.5%		0.7%	
Venture Capital \$	\$122M	\$2,505M	\$103M	\$1,066M
Percent of Total Funds	4.9%		9.7%	

The Pudding

- Akron, in the last several years, has moved strongly in the direction of Rochester's forum building approach.

Implications

- What: Shows that universities roles within local systems of innovation is not (and should not) be limited to producing and disseminating knowledge. They can have an important impact by helping to shape the flow of knowledge across firm boundaries within the LIS.
- How: University of Akron wanted to be the “third that benefits” (Burt 1990). University of Rochester took on the role of a liaison (Fernandez and Gould 1994) bringing together disconnected actors rather than exploiting their separation

END