

**NATIONAL SCIENCE FOUNDATION
INDUSTRY/UNIVERSITY
COOPERATIVE RESEARCH CENTERS**

FINAL

1990-1991 STRUCTURAL INFORMATION¹

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NOTE: 1990-1991 TABLE DATA COLLECTED FROM 43/43 CENTER DIRECTOR SURVEYS (100% RESPONSE RATE).²
Case Western (Polymers) provides only partial data.

TABLE 1
1990-1991 GENERAL INFORMATION

STATUS	YEAR FUNDED	UNIVERSITY (CENTER)	DIRECTOR	# OF DEPTS. INVOLVED	
SELF-SUSTAINING	1980	1. University of Massachusetts (Center on Research on Polymers)	Kantor, Simon W.	5	
	1981	2. Case Western Reserve (Center for Applied Polymer Research)	Hiltner, Anne	6	
	1982	3. North Carolina State University (Center for Communications & Signal Processing)	Abbott, George	2	
		4. Rutgers University (Center for Ceramics Research)	Niesz, Dale E.	4	
		5. Georgia Institute of Technology (Materials Handling Research Center)	Pence, I.W. Jr.	3	
	1984	6. Pennsylvania State University (Center for Dielectric Studies)	Dougherty, Joseph P.	4	
		7. Colorado School of Mines (Advanced Steel Processing and Products Research)	Krauss, George	4	
		8. University of Washington (Center for Process Analytical Processing)	Kowalski, Bruce & Callis, James	3	
		9. New Jersey Institute of Technology (Center for Hazardous & Toxic Waste Management)	Magee, Richard S.	15	
		10. University of Arizona (Center for Optical Circuitry)	Gibbs, Hyat M.	4	
		11. Northwestern University (Center for Engineering Tribology)	Chung, Yip-Wah	5	
		12. University of Arizona (Center for Microcontamination & Control)	O'Hanlon, John	5	
		13. Northeastern University (Center for Electromagnetics Research)	Silevitch, Michael B.	5	
		14. Lehigh University (Chemical Process Modeling & Control Research Center)	Georgakis, Christos	5	
		15. Rutgers University (Centers for Plastics Recycling Research)	Wenzel, Jack	9	
	1985	16. University of Texas - San Antonio (Health Science Center)	Boyan, Barbara D.	5	
		17. Carnegie Mellon University (Center for Iron & Steelmaking Research)	Fruehan, R.J.	3	
		18. Lehigh University (Center for Innovation Management Studies)	Bean, Alden S.	2	
		19. University of Texas - Arlington (Center for Advanced Electron Devices)	Mitchell, Robert	1	
		20. University of Tennessee (Measurement & Control Engineering)	Garrison, Arlene A.	6	
MEAN "SELF-SUSTAINING:"				4.8	
1 to 3 YEAR OLDS	1986	21. Oklahoma State University (Web Handling Research Center)	Reid, Karl N.	2	
		22. Alfred University (Center for Glass Research)	Pye, L. David	5	
		23. New Mexico Institute of Mining & Technology (Research Center for Energetic Materials)	Persson, Per-Anders	2	
	1987	24. University of Florida/Purdue (Software Engineering Research Center)	Yau, Stephen S. & DeMillo, R.A.	8	
		25. University of California - Berkeley (Sensors & Actuators Centers)	Muller, Richard	5	
		26. University of Iowa (Center for Simulation & Design Optimization of Mechanical Systems)	Haug, Edward J.	2	
		27. USC/UCLA (Center for Manufacturing Automation)	Bekey, G.A. & Melkanoff, M.A.	5	
	1988	28. North Carolina State University (Center for Aseptic Processing & Packing Studies)	Swartzel, K.R.	3	
		29. University of Colorado (Microwave & Millimeter Computer-Aided Design)	Chang, David	2	
		30. State University of New York at Buffalo (Center for Biosurfaces)	Baier, R. & Gardella, J.	4	
MEAN "1 to 3 YEAR OLDS:"				3.8	
2 YEARS & LESS	1989	31. Iowa State University (Center for Nondestructive Evaluation)	Thompson, Donald O.	4	
		32. University of Pittsburgh (Parallel & Distributive Intelligence Systems Research Center)	Chang, Shi-kuo	2	
		33. University of New Mexico (Center for Micro-Engineered Ceramics)	Smith, Douglas M.	3	
		34. Brown University/University of Rhode Island (Center for Thin Film & Interface Research)	Loferski, Joseph & Mitra, Shashanka	6	
		35. University of California at San Diego (Center for Integrated Circuits & Systems)	Ku, Walter	2	
		36. Georgia Institute of Technology/University of Arizona (Information Management Research)	McCracken, W.M. & Nunamaker, J.	4	
		37. University of Maryland (Center for Life Cycle Engineering)	Pecht, Michael G.	6	
		38. Washington State University (Center for Analog/Digital Integrated Circuits)	Shamash, Yacov	3	
		1990	39. University of Illinois, Urbana (Air Conditioning & Research Center)	Bullard, Clark W.	2
			40. University of Connecticut (Center for Grinding Research & Development)	Howes, Trevor D.	4
	41. University of Michigan (Mechanical & Optical Coordinate Measurement Machines)		Wu, S.M.	3	
	1991	42. Eastern Michigan University (Center for Coatings Research)	Jones, Frank N.	1	
		43. University of North Texas (Center for Nanostructural Materials Research)	Marshall, J.L. & McDaniel, F.D.	2	
MEAN "2 YEARS & LESS:"				3.4	
GRAND MEAN:				4.1	
GRAND SUM:				178	

TABLE 2
1990-1991 OPERATING BUDGET: BREAKDOWN OF DIRECT FUNDING

			4	5	6	7	8	9	10
STATUS	YEAR	ABBREVIATED NAME	TOTAL DIRECT	NSF FUNDING	INDUSTRY MEMBER FEES	OTHER INDUSTRY FUNDING	STATE FUNDING	OTHER FUNDING	UNIVERSITY DIRECT FUNDS
SELF-SUSTAINING	1980	1. Mass. (Polymers)	\$644,469	\$88,141	\$460,133	\$0	\$0	\$0	\$96,195
	1981	2. Case Western (Polymers)	.	.	.	.	.	.	.
	1982	3. NCSU (Communication/Signal Proc.)	\$1,111,000	\$26,000	\$404,000	\$631,000	\$0	\$50,000	\$0
		4. Rutgers (Ceramics)	\$3,826,023	\$133,701	\$368,487	\$566,290	\$2,000,000	\$472,192	\$285,353
		5. Georgia Tech. (Materials Handling)	\$1,814,000	\$231,000	\$930,000	\$17,000	\$0	\$0	\$640,000
		6. Penn. State (Dielectrics Studies)	\$662,260	\$29,160	\$162,000	\$143,100	\$234,000	\$0	\$94,000
	1984	7. Colorado School of Mines (Steel)	\$787,012	\$25,080	\$745,532	\$16,400	\$0	\$0	\$0
		8. Washington (Process Analytical Chem.)	\$2,252,336	\$65,359	\$1,409,922	\$313,018	\$250,000	\$12,037	\$202,000
		9. NJIT (Hazardous Waste Mgmt.)	\$7,108,029	\$362,026	\$742,857	\$562,876	\$3,434,324	\$2,005,946	\$0
		10. Arizona (Optical)	\$450,000	\$75,000	\$200,000	\$0	\$175,000	\$0	\$0
	1985	11. Northwestern (Engineering Tribology)	\$581,000	\$16,000	\$280,000	\$150,000	\$0	\$105,000	\$30,000
		12. Arizona (Microcontamination)	\$190,200	\$28,200	\$160,000	\$2,000	\$0	\$0	\$0
		13. Northeastern (Electromagnetics)	\$908,000	\$58,000	\$450,000	\$100,000	\$0	\$200,000	\$100,000
		14. Lehigh (Chemical Process)	\$337,400	\$37,750	\$283,500	\$10,000	\$0	\$0	\$6,150
		15. Rutgers (Plastics)	\$2,213,802	\$36,585	\$744,178	\$429,842	\$600,000	\$30,569	\$372,628
		16. Texas - San Antonio (Health Science)	\$1,025,721	\$4,630	\$157,500	\$495,000	\$0	\$5,000	\$363,591
		17. Carnegie Mellon (Iron & Steel)	\$541,000	\$25,000	\$420,000	\$96,000	\$0	\$0	\$0
		18. Lehigh (Innovation)	\$251,000	\$11,000	\$240,000	\$0	\$0	\$0	\$0
		19. Texas - Arlington (Adv. Electron Devices)	\$1,074,056	\$75,000	\$299,500	\$116,634	\$503,746	\$54,176	\$25,000
		20. Tennessee (Measurement & Control)	\$787,717	\$71,717	\$485,000	\$50,000	\$0	\$167,000	\$14,000
MEAN *SELF-SUSTAINING*			\$1,198,370	\$73,650	\$470,664	\$194,693	\$378,793	\$163,259	\$117,311
3 to 5 YEAR OLDS	1986	21. Oklahoma State (Web Handling)	\$764,000	\$35,000	\$400,000	\$32,000	\$105,000	\$160,000	\$32,000
	22. Alfred (Glass)	\$600,000	\$0	\$400,000	\$0	\$50,000	\$50,000	\$100,000	
	23. New Mexico Inst. (Energetic)	\$226,919	\$80,153	\$128,674	\$0	\$0	\$0	\$48,092	
	24. Florida/Purdue (Software Eng.)	\$380,804	\$57,375	\$281,073	\$56,472	\$60,000	\$65,904	\$59,980	
	25. UC Berkeley (Sensors & Actuators)	\$1,264,351	\$120,806	\$515,000	\$30,000	\$299,259	\$292,966	\$6,320	
	1987	26. Iowa (Simulation & Design)	\$1,683,434	\$105,944	\$360,000	\$295,083	\$0	\$822,657	\$99,750
		27. S. California (Manufacturing)	\$682,961	\$335,135	\$347,826	\$0	\$0	\$0	\$0
	1988	28. NCSU (Aseptic Processing)	\$464,970	\$78,300	\$330,000	\$28,000	\$28,670	\$0	\$0
		29. Colorado (Microwave)	\$533,565	\$36,440	\$368,125	\$0	\$0	\$129,000	\$0
		30. SUNY at Buffalo (Biosurfaces)	\$611,000	\$80,000	\$240,000	\$150,000	\$0	\$0	\$141,000
MEAN *3 to 5 YEAR OLDS*			\$744,206	\$92,915	\$337,970	\$59,156	\$54,293	\$152,053	\$48,714
2 YEARS & LESS	1989	31. Iowa State (Nondestructive Evaluation)	\$1,165,400	\$40,400	\$738,000	\$0	\$300,000	\$0	\$87,000
		32. Pittsburgh (Intelligence Systems)	\$311,854	\$41,854	\$270,000	\$0	\$0	\$0	\$0
		33. New Mexico (Micro-Engineered Ceramics)	\$3,191,977	\$102,357	\$450,000	\$14,750	\$80,000	\$2,341,870	\$210,000
	1990	34. Brown/Rhode Island (Film)	\$489,800	\$63,000	\$68,000	\$138,800	\$200,000	\$0	\$20,000
		35. Calif. - San Diego (Integrated Circuits)	\$436,000	\$136,000	\$150,000	\$0	\$0	\$150,000	\$0
		36. Ga. Tech./Arizona (Information Mgmt.)	\$317,000	\$125,000	\$187,000	\$125,000	\$0	\$0	\$80,000
		37. Maryland (Life Cycle Engineering)	\$1,384,246	\$34,246	\$1,050,000	\$0	\$250,000	\$250,000	\$0
	1991	38. Washington State (Integrated Circuits)	\$1,421,433	\$62,160	\$380,000	\$622,273	\$200,000	\$57,000	\$100,000
		39. Univ. of Illinois (Air Conditioning)	\$1,093,000	\$53,000	\$620,000	\$150,000	\$168,000	\$0	\$12,000
		40. Univ. of Connecticut (Grinding)	\$757,000	\$80,000	\$400,000	\$100,000	\$67,000	\$0	\$110,000
	1991	41. Univ. of Michigan (Measurement Tech.)	\$350,000	\$50,000	\$400,000	\$50,000	\$50,000	\$0	\$0
		42. Eastern Michigan University (Coatings)	\$286,996	\$36,996	\$180,000	\$0	\$50,000	\$0	\$20,000
		43. Univ. of North Texas (Nanostructure)	\$559,000	\$38,000	\$300,000	\$211,000	\$0	\$0	\$10,000
MEAN *2 YEARS & LESS*			\$944,670	\$66,386	\$399,462	\$108,692	\$105,000	\$215,298	\$49,923
GRAND MEANS:			\$1,102,184	\$75,988	\$416,817	\$135,775	\$216,786	\$176,698	\$89,120
GRAND SUMS:			\$46,291,735	\$3,191,515	\$17,506,307	\$5,702,538	\$9,104,999	\$7,421,317	\$3,365,059

TABLE 3
1990-1991 BUDGET FIGURES & CAPITAL FUNDING

STATUS	YEAR	ABBREVIATED NAME	4				12		13		14		15	
			A	B	C	D	EFFECTIVE BUDGET	CAPITAL TOTAL	NSF OVERHEAD	INDUSTRY OVERHEAD				
			DIRECT FUNDING	OVERHEAD CHARGES	TOTAL BUDGET Cols (A + B)	UNIVERSITY WAIVED OVERHEAD	Col (C + D)	FUNDING	(%)	(%)				
SELF-SUSTAINING	1989	1. Mass. (Polymers)	\$644,469	\$274,926	\$919,395	\$0	\$919,395	\$0	52%	50%				
	1991	2. Case Western (Polymers)	.	.	.	.	.	\$0	.	.
	1982	3. NCSU (Communication/Signal Proc.)	\$1,111,000	\$24,000	\$1,135,000	\$521,000	\$1,656,000	\$0	.	.				
		4. Rutgers (Ceramics)	\$3,826,023	\$431,209	\$4,257,232	\$0	\$4,257,232	\$806,000	64%	64%				
		5. Georgia Tech. (Materials Handling)	\$1,818,000	\$0	\$1,818,000	\$389,000	\$2,207,000	\$0	62%	62%				
		6. Penn. State (Dielectrics Studies)	\$662,260	\$284,740	\$947,000	\$0	\$947,000	\$0	46%	46%				
	1984	7. Colorado School of Mines (Steel)	\$787,012	\$120,567	\$907,579	\$176,059	\$1,083,638	\$0	24%	18%				
		8. Washington (Process Analytical Chem.)	\$2,252,336	\$376,477	\$2,628,813	\$0	\$2,628,813	\$34,000	53%	53%				
		9. NJIT (Hazardous Waste Mgmt.)	\$7,108,029	\$476,665	\$7,584,694	\$1,156,801	\$8,741,495	\$0	64%	5%				
		10. Arizona (Optical)	\$450,000	\$130,000	\$580,000	\$0	\$580,000	\$173,000	49%	49%				
		11. Northwestern (Engineering Tribology)	\$581,000	\$175,000	\$756,000	\$123,000	\$879,000	\$0	54%	10%				
		12. Arizona (Microcontamination)	\$190,200	\$94,800	\$285,000	\$18,900	\$303,900	\$0	49%	49%				
		13. Northeastern (Electromagnetics)	\$908,000	\$0	\$908,000	\$35,000	\$943,000	\$0	62%	0%				
		14. Lehigh (Chemical Process)	\$337,400	\$31,750	\$369,150	\$0	\$369,150	\$61,252	62%	10%				
		15. Rutgers (Plastics)	\$2,213,802	\$374,945	\$2,588,747	\$0	\$2,588,747	\$0	64%	64%				
	1985	16. Texas - San Antonio (Health Science)	\$1,025,721	\$72,870	\$1,098,591	\$72,500	\$1,171,091	\$0	45%	10%				
		17. Carnegie Mellon (Iron & Steel)	\$541,000	\$299,000	\$840,000	\$0	\$840,000	\$0	55%	55%				
		18. Lehigh (Innovation)	\$251,000	\$9,000	\$260,000	\$0	\$260,000	\$0	55%	10%				
		19. Texas - Arlington (Adv. Electron Devices)	\$1,074,056	\$7,220	\$1,081,276	\$458,796	\$1,540,072	\$0	46%	0%				
		20. Tennessee (Measurement & Control)	\$787,717	\$27,283	\$815,000	\$199,000	\$1,014,000	\$0	0%	0%				
MEAN *SELF-SUSTAINING*			\$1,398,378	\$168,971	\$1,567,349	\$168,292	\$1,735,641	\$53,713	54%	31%				
3 to 5 YEAR OLDS	1986	21. Oklahoma State (Web Handling)	\$764,000	\$0	\$764,000	\$210,000	\$974,000	\$0	0%	0%				
		22. Alfred (Glass)	\$600,000	\$100,000	\$700,000	\$100,000	\$800,000	\$0	79%	79%				
		23. New Mexico Inst. (Energetic)	\$256,919	\$439,923	\$696,842	\$0	\$696,842	\$0	31%	31%				
		24. Florida/Purdue (Software Eng.)	\$580,804	\$166,560	\$747,364	\$86,409	\$833,773	\$100,000	47%	37%				
		25. UC Berkeley (Sensors & Actuators)	\$1,264,351	\$272,909	\$1,537,260	\$271,950	\$1,809,210	\$0	49%	0%				
	1987	26. Iowa (Simulation & Design)	\$1,683,434	\$38,189	\$1,721,623	\$219,525	\$1,941,148	\$8,475,000	0%	0%				
		27. S. California (Manufacturing)	\$682,961	\$117,039	\$800,000	\$23,625	\$823,625	\$70,000	48%	15%				
		28. NCSU (Aseptic Processing)	\$464,970	\$56,700	\$521,670	\$238,965	\$760,635	\$50,000	48%	50%				
	1988	29. Colorado (Microwave)	\$533,565	\$32,935	\$566,500	\$38,818	\$605,318	\$50,000	42%	5%				
		30. SUNY at Buffalo (Biosurfaces)	\$611,000	\$0	\$611,000	\$100,000	\$711,000	\$0	52%	14%				
MEAN *3 to 5 YEAR OLDS*			\$744,288	\$122,426	\$866,714	\$128,929	\$995,555	\$874,500	46%	23%				
2 YEARS & LESS	1989	31. Iowa State (Nondestructive Evaluation)	\$1,165,400	\$26,600	\$1,192,000	\$350,000	\$1,542,000	\$0	36%	0%				
		32. Pittsburgh (Intelligence Systems)	\$311,854	\$33,146	\$345,000	\$179,790	\$524,790	\$0	47%	10%				
		33. New Mexico (Micro-Engineered Ceramics)	\$3,198,977	\$899,947	\$4,098,924	\$308,696	\$4,407,620	\$1,718,000	49%	0%				
		34. Brown/Rhode Island (Film)	\$489,800	\$27,200	\$517,000	\$64,000	\$581,000	\$200,000	10%	15%				
		35. Calif. - San Diego (Integrated Circuits)	\$436,000	\$0	\$436,000	\$214,381	\$650,381	\$0	0%	0%				
		36. Ga. Tech./Arizona (Information Mgmt.)	\$517,000	\$263,000	\$780,000	\$0	\$780,000	\$0	61%	61%				
		37. Maryland (Life Cycle Engineering)	\$1,584,246	\$130,754	\$1,715,000	\$483,000	\$2,198,000	\$0	46%	0%				
		38. Washington State (Integrated Circuits)	\$1,421,433	\$31,000	\$1,452,433	\$182,450	\$1,634,883	\$0	45%	0%				
	1990	39. Univ. of Illinois (Air Conditioning)	\$1,003,000	\$2,000	\$1,005,000	\$186,000	\$1,191,000	\$0	53%	28%				
		40. Univ. of Connecticut (Grinding)	\$757,000	\$0	\$757,000	\$380,000	\$1,137,000	\$585,000	58%	0%				
		41. Univ. of Michigan (Measurement Tech.)	\$550,000	\$0	\$550,000	\$313,500	\$863,500	\$100,000	0%	0%				
	1991	42. Eastern Michigan University (Coatings)	\$286,996	\$13,004	\$300,000	\$0	\$300,000	\$130,000	39%	0%				
		43. Univ. of North Texas (Nanotechnology)	\$559,000	\$22,000	\$581,000	\$132,000	\$713,000	\$0	44%	0%				
MEAN *2 YEARS & LESS*			\$944,670	\$111,435	\$1,056,104	\$214,909	\$1,271,013	\$210,731	38%	9%				
GRAND MEANS			\$1,102,184	\$140,080	\$1,242,264	\$172,318	\$1,414,582	\$291,213	44%	27%				
GRAND SUMS			\$46,291,735	\$5,443,358	\$51,735,093	\$7,233,165	\$58,968,258	\$12,357,254	N/A	N/A				

TABLE 4

1990-1991 INDUSTRY MEMBERSHIP DESCRIPTORS

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STATUS	YEAR	ABBREVIATED NAME	CURRENT MEMBERS	1990 - 1991 MEMBERS			LIFETIME MEMBERS			FEES		
				STARTING	NEW	LEFT	STARTING	NEW	LEFT	ANNUAL MEMBERSHIP	MEMBER FEE	MEMBER FEE
										PRIMARY	SECONDARY	TERTIARY
SELF-SUSTAINING	1980	1. Mass. (Polymers)	15	18	0	3	13	17	15	\$40,000	\$0	\$0
	1981	2. Case Western (Polymers)	*	*	*	*	*	*	*	*	*	*
	1982	3. NCSU (Communication/Signal Proc.)	4	9	0	3	8	13	15	\$50,000	\$20,000	\$0
		4. Rutgers (Ceramics)	17	18	0	1	10	28	23	\$35,000	\$0	\$0
		5. Georgia Tech. (Materials Handling)	29	25	5	1	*	*	*	\$40,000	\$0	\$0
		6. Penn. State (Dielectrics Studies)	19	19	0	4	18	21	24	\$20,000	\$5,000	\$0
	1984	7. Colorado School of Mines (Steel)	23	23	1	1	7	21	5	\$37,500	\$0	\$0
		8. Washington (Process Analytical Chem.)	50	48	5	3	21	50	25	\$35,000	\$0	\$0
		9. NJIT (Hazardous Waste Mgmt.)	33	29	4	0	8	33	8	\$30,000	\$15,000	\$0
		10. Arizona (Optical)	16	10	6	0	9	1	6	\$50,000	\$0	\$0
		11. Northwestern (Engineering Tribology)	11	12	1	2	14	5	8	\$27,500	\$0	\$0
		12. Arizona (Microcontamination)	10	10	0	0	26	5	10	\$30,000	\$10,000	\$0
		13. Northeastern (Electromagnetics)	11	11	2	2	9	6	4	\$50,000	\$0	\$0
		14. Lehigh (Chemical Process)	12	15	1	4	4	15	7	\$25,000	\$0	\$0
		15. Rutgers (Plastics)	58	62	3	7	15	52	9	\$60,000	30K-60K	6K-30k
	1985	16. Texas - San Antonio (Health Science)	7	3	6	2	3	8	4	\$75,000	\$0	\$0
		17. Carnegie Mellon (Iron & Steel)	23	23	2	2	11	15	3	\$42,000	\$27,000	\$0
		18. Lehigh (Innovation)	*	*	*	*	12	5	4	\$20,000	\$0	\$0
		19. Texas - Arlington (Adv. Electron Devices)	6	8	0	2	6	5	5	\$50,000	\$25,000	\$0
		20. Tennessee (Measurement & Control)	19	16	4	1	0	0	0	\$35,000	\$25,000	\$5,000
MEAN *SELF-SUSTAINING*			10.1	19.9	2.2	2.1	10.8	16.7	9.7	\$39,579	N/A	N/A
3 to 5 YEAR OLDS	1986	21. Oklahoma State (Web Handling)	18	16	2	0	5	16	3	\$25,000	\$0	\$0
		22. Alfred (Glass)	20	16	5	1	8	12	2	\$25,000	\$0	\$0
		23. New Mexico Inst. (Energetic)	14	15	0	1	9	6	1	\$40,000	\$0	\$0
		24. Florida/Purdue (Software Eng.)	14	14	3	1	13	8	4	\$30,000	\$0	\$0
		25. UC Berkeley (Sensors & Actuators)	16	17	0	1	6	15	5	\$50,000	\$0	\$0
	1987	26. Iowa (Simulation & Design)	*	*	1	1	24	6	*	\$40,000	\$0	\$0
		27. S. California (Manufacturing)	4	7	0	3	4	3	3	\$100,000	\$25,000	\$0
		28. NCSU (Aseptic Processing)	11	9	2	0	8	6	3	\$35,000	\$0	\$0
	1988	29. Colorado (Microwave)	11	11	0	0	10	4	3	\$25,000	\$50,000	\$0
		30. SUNY at Buffalo (Biosurfaces)	7	6	2	1	4	4	1	\$40,000	\$0	\$0
MEAN *3 to 5 YEAR OLDS*			13.0	12.3	1.5	0.9	9.1	8.8	2.8	\$41,000	N/A	N/A
2 YEARS & LESS	1989	31. Iowa State (Nondestructive Evaluation)	21	19	3	1	14	12	5	\$35,000	\$0	\$0
		32. Pittsburgh (Intelligence Systems)	8	6	3	1	2	7	1	\$25,000	\$0	\$0
		33. New Mexico (Micro-Engineered Ceramics)	14	11	4	1	8	7	1	\$30,000	\$10,000	\$0
		34. Brown/Rhode Island (Film)	7	14	3	10	14	3	10	\$25,000	\$10,000	\$0
		35. Calif. - San Diego (Integrated Circuits)	6	6	0	0	6	0	0	\$50,000	\$25,000	\$0
		36. Ga. Tech./Arizona (Information Mgmt.)	8	7	2	1	6	4	2	\$40,000	\$0	\$0
		37. Maryland (Life Cycle Engineering)	21	15	6	0	6	18	3	\$50,000	\$0	\$0
		38. Washington State (Integrated Circuits)	14	14	1	1	11	4	1	\$30,000	\$0	\$0
	1990	39. Univ. of Illinois (Air Conditioning)	16	17	2	3	13	6	3	\$40,000	\$0	\$0
		40. Univ. of Connecticut (Grinding)	8	7	1	0	7	2	1	\$50,000	\$0	\$0
		41. Univ. of Michigan (Measurement Tech.)	10	8	2	0	8	2	0	\$50,000	\$0	\$0
	1991	42. Eastern Michigan University (Coatings)	6	6	0	0	6	0	0	\$30,000	\$0	\$0
		43. Univ. of North Texas (Nanotechnology)	6	6	0	0	6	0	0	\$50,000	\$0	\$0
MEAN *2 YEARS & LESS*			11.2	10.5	2.1	1.4	8.2	5.0	2.1	\$38,846	N/A	N/A
GRAND MEANS:			15.6	15.2	2.0	1.6	9.6	10.9	5.7	\$39,690	N/A	N/A
GRAND SUMS:			613	606	87	65	392	445	227	\$1,667,000	N/A	N/A

TABLE 5
1990-1991 HUMAN RESOURCES

STATUS	YEAR	ABBREVIATED NAME	RESEARCHER BREAKDOWN				STUDENTS		ADMINISTRATIVE			
			TOTAL # RESEARCHERS	# FACULTY SCIENTISTS	NON-FACULTY FT	NON-FACULTY PT	# OF GRADS	# OF UNDERGRAD	PROFESSIONALS FT	PROFESSIONALS PT	CLERICALS FT	CLERICALS PT
SELF-SUSTAINING	1980	1. Mass. (Polymers)	13	16	2	0	21	2	0	1	0	1
	1981	2. Case Western (Polymers)	16	9	6	1	18	5	0	0	2	0
	1982	3. NCSU (Communication/Signal Proc.)	16	16	0	0	32	0	1	0	2	0
		4. Rutgers (Ceramics)	16	16	0	0	42	77	5	1	10	0
	1983	5. Georgia Tech. (Materials Handling)	23	19	0	4	60	3	1	0	2	1
		6. Penn. State (Dielectrics Studies)	15	7	0	8	14	2	0	2	0	1
	1984	7. Colorado School of Mines (Steel)	10	8	1	1	21	1	0	2	0	1
		8. Washington (Process Analytical Chem.)	19	13	6	0	40	2	4	2	4	5
	1985	9. NJIT (Hazardous Waste Mgmt.)	64	54	5	5	65	10	4	0	2	0
		10. Arizona (Optical)	11	7	0	4	8	0	0	1	0	1
	1986	11. Northwestern (Engineering Tribology)	14	6	8	0	14	0	1	0	1	0
		12. Arizona (Microcontamination)	5	5	0	0	3	1	0	0	1	0
	1987	13. Northeastern (Electromagnetics)	25	20	5	0	20	10	1	2	0	1
		14. Lehigh (Chemical Process)	11	8	1	2	6	1	1	1	2	0
	1988	15. Rutgers (Plastics)	32	26	4	2	4	1	5	3	3	2
		16. Texas - San Antonio (Health Science)	12	9	3	0	11	5	4	1	1	1
	1989	17. Carnegie Mellon (Iron & Steel)	13	5	0	8	8	2	0	0	0	1
		18. Lehigh (Innovation)	39	23	16	0	1	1	1	2	1	2
	1990	19. Texas - Arlington (Adv. Electron Devices)	8	5	3	0	16	5	0	2	1	2
		20. Tennessee (Measurement & Control)	13	12	1	0	12	4	1	1	1	2
MEAN *SELF-SUSTAINING*			19.8	14.2	3.1	1.8	20.8	6.6	1.5	1.1	1.7	1.0
3 to 5 YEAR OLDS	1986	21. Oklahoma State (Web Handling)	16	13	2	1	23	4	0	1	0	4
	1987	22. Alfred (Glass)	13	13	0	0	13	4	0	2	1	1
		23. New Mexico Inst. (Energetic)	8	2	0	6	10	14	0	4	0	3
	1988	24. Florida/Purdue (Software Eng.)	13	13	0	0	15	1	0	3	1	0
		25. UC Berkeley (Sensors & Actuators)	9	7	1	1	32	5	1	1	1	1
	1989	26. Iowa (Simulation & Design)	29	11	18	0	54	11	1	1	4	2
		27. S. California (Manufacturing)	12	12	0	0	11	0	1	3	0	2
	1990	28. NCSU (Aseptic Processing)	29	22	3	4	8	2	0	3	0	1
		29. Colorado (Microwave)	19	9	7	3	18	2	4	2	0	1
	1991	30. SUNY at Buffalo (Biosurfaces)	20	12	6	2	12	4	2	0	1	0
MEAN *3 to 5 YEAR OLDS*			16.8	11.4	3.7	1.7	19.6	4.7	0.9	2.0	0.8	1.5
2 YEARS & LESS	1989	31. Iowa State (Nondestructive Evaluation)	26	15	0	11	18	4	0	1	0	3
	1990	32. Pittsburgh (Intelligence Systems)	8	4	1	0	2	0	0	4	1	0
		33. New Mexico (Micro-Engineered Ceramics)	48	17	12	19	29	6	2	0	2	0
	1991	34. Brown/Rhode Island (Film)	14	12	2	0	3	2	0	4	1	0
		35. Calif. - San Diego (Integrated Circuits)	5	3	2	0	16	3	0	1	0	2
	1992	36. Ga. Tech./Arizona (Information Mgmt.)	19	14	1	4	8	0	5	5	2	0
		37. Maryland (Life Cycle Engineering)	34	6	18	10	16	2	0	0	1	1
	1993	38. Washington State (Integrated Circuits)	16	16	0	0	23	2	0	5	1	3
		39. Univ. of Illinois (Air Conditioning)	13	12	1	0	34	12	0	2	1	0
	1994	40. Univ. of Connecticut (Grinding)	13	11	0	2	12	3	4	2	2	1
		41. Univ. of Michigan (Measurement Tech.)	19	7	2	10	15	0	0	2	1	1
	1995	42. Eastern Michigan University (Coatings)	4	4	0	0	5	0	0	1	0	1
		43. Univ. of North Texas (Nanostructure)	10	10	0	0	4	0	0	2	1	0
MEAN *2 YEARS & LESS*			17.4	10.1	3.0	4.3	14.2	2.6	0.8	2.2	1.0	0.9
GRAND MEANS:			18.0	12.3	3.2	2.5	18.5	5.9	1.1	1.6	1.3	1.1
GRAND SUMS:			774	529	137	198	797	213	44	76	54	47

TABLE 6
1990-1991 CENTER DIRECTOR DESCRIPTORS

STATUS	YEAR	ABBREVIATED NAME	DIRECTORS RANK	DIRECTOR TENURE	DIRECTOR REPORTS TO	TIME ALLOCATION							
						CENTER ADMIN. (%)	OTHER ADMIN. (%)	RESEARCH (%)	TEACHING (%)	OTHER (%)	ADMIN. BUDGET (%)	IN KIND (%)	
SELF-SUSTAINING	1981	1. Mass. (Polymers)	Professor	No	Dept. Head	50%	25%	25%	0%	0%	0%	15%	0%
	1981	2. Case Western (Polymers)	Professor	Yes	Dean	100%	0%	0%	0%	0%	0%	12%	1%
	1982	3. NCSU (Communication/Signal Proc.)	Visiting Lecturer	No	Dean	50%	0%	25%	25%	0%	25%	28%	0%
		4. Rutgers (Ceramics)	Director	Yes	Exec. V.P.	60%	10%	10%	0%	20%	12%	0%	0%
		5. Georgia Tech. (Materials Handling)	Associate Professor	No	Director	40%	5%	30%	25%	0%	15%	5%	0%
		6. Penn. State (Dialectics Studies)	Professor	Yes	Dept. Head	25%	5%	40%	30%	0%	15%	0%	0%
		7. Colorado School of Mines (Steel)	Professor	Yes	V-Pres.	20%	10%	40%	20%	10%	25%	3%	0%
		8. Washington (Process Analytical Chem.)	Professor	Yes	V-Pres.	50%	50%	0%	0%	0%	11%	0%	0%
		9. NIT (Hazardous Waste Mgmt.)	Professor	Yes	Director	30%	5%	35%	30%	0%	5%	0%	0%
		10. Arizona (Optical)	Professor	Yes	Dean	25%	10%	25%	40%	0%	6%	0%	0%
	11. Northwestern (Engineering Tribology)	Assoc. Professor	No	Department Head	17%	17%	33%	33%	0%	37%	0%	0%	
	12. Arizona (Microcontamination)	Professor	Yes	Dean	20%	0%	40%	40%	0%	10%	0%	0%	
	13. Northeastern (Electromagnetics)	Professor	No	Dean	15%	15%	55%	15%	0%	39%	0%	0%	
	14. Lehigh (Chemical Process)	Professor	Yes	Director	65%	10%	0%	25%	0%	20%	0%	0%	
	15. Rutgers (Plastics)	Professor	Yes	Medical Dean	25%	5%	60%	10%	5%	24%	13%	0%	
	16. Texas - San Antonio (Health Science)	Professor	Yes	Dean	15%	40%	5%	25%	5%	13%	0%	0%	
	17. Carnegie Mellon (Iron & Steel)	Professor	Yes	Dean	25%	30%	25%	30%	0%	20%	0%	0%	
	18. Lehigh (Innovation)	Professor	Yes	Dean	80%	30%	25%	25%	0%	6%	3%	0%	
	19. Texas - Arlington (Adv. Electron Devices)	None	No	Dean	20%	0%	20%	0%	0%	18%	0%	0%	
	20. Tennessee (Measurement & Control)	N/A	N/A	N/A	N/A	13%	10%	33%	2%	11%	0%	0%	
	MEAN "SUSTAINING" YEARS					25%	21%	25%	18%	7%	23%	2%	
	1983	21. Oklahoma State (Web Handling)	Professor	Yes	Provost	15%	75%	10%	0%	0%	5%	0%	
		22. Alfred (Glass)	Professor	Yes	Dean	30%	20%	30%	15%	5%	25%	0%	
		23. New Mexico Inst. (Energetic)	Professor	No	V-Pres.	20%	20%	40%	10%	10%	15%	10%	
		24. Florida/Purdue (Software Eng.)	Professor	Yes	Dean	25%	50%	0%	15%	5%	30%	0%	
		25. UC Berkeley (Sensors & Actuators)	Professor	Yes	Chair	25%	0%	37%	38%	0%	24%	10%	
		26. Iowa (Simulation & Design)	Professor	Yes	Dean	25%	25%	25%	25%	0%	20%	0%	
		27. S. California (Manufacturing)	Professor	Yes	Dean	20%	0%	40%	20%	20%	35%	0%	
		28. NCSU (Aseptic Processing)	Professor	Yes	Dept. Head	54%	0%	20%	19%	8%	19%	3%	
		29. Colorado (Microwave)	Professor	No	Dean	20%	20%	40%	10%	0%	38%	8%	
		30. SUNY at Buffalo (Biosurfaces)	Asst. Professor	No	V-Provost	20%	2%	30%	30%	18%	20%	10%	
	MEAN "SUSTAINING" YEARS					25%	21%	25%	18%	7%	23%	2%	
	1984	31. Iowa State (Nondestructive Evaluation)	Professor	Yes	Director	15%	65%	5%	5%	10%	15%	0%	
		32. Pittsburgh (Intelligence Systems)	Professor	Yes	Dean	10%	40%	25%	25%	0%	10%	0%	
		33. New Mexico (Micro-Engineered Ceramics)	Professor	Yes	Provost	5%	10%	65%	10%	10%	10%	0%	
		34. Brown/Rhode Island (Film)	Professor	Yes	Dean	20%	20%	60%	0%	0%	10%	10%	
		35. Calif. - San Diego (Integrated Circuits)	Professor	Yes	Chair	10%	0%	40%	50%	0%	12%	0%	
		36. Ga. Tech./Arizona (Information Mgmt.)	Principal Researcher	No	Dean	40%	0%	40%	20%	0%	20%	0%	
		37. Maryland (Life Cycle Engineering)	Assoc. Prof.	Yes	Dean	0%	0%	70%	30%	0%	25%	0%	
		38. Washington State (Integrated Circuits)	Director	Yes	Dean	35%	55%	10%	0%	0%	25%	5%	
		39. Univ. of Illinois (Air Conditioning)	Professor	Yes	Head	20%	0%	30%	30%	20%	6%	2%	
		40. Univ. of Connecticut (Grinding)	Professor	No	Dean	40%	5%	20%	15%	20%	20%	20%	
		41. Univ. of Michigan (Measurement Tech.)	Professor	Yes	Dean	45%	5%	30%	20%	0%	10%	0%	
		42. Eastern Michigan University (Coating)	Professor	No	Director	40%	5%	45%	10%	0%	20%	0%	
		43. Univ. of North Texas (Nanotechnology)	Professor	Yes	Dean	10%	30%	30%	30%	0%	10%	20%	
	MEAN "SUSTAINING" YEARS					22%	18%	36%	19%	5%	15%	0%	
	GRAND TOTALS					20%	18%	30%	19%	4%	18%	4%	

APPENDIX

FOOTNOTES: SPECIAL CONSIDERATIONS

- 1) These Tables are only DRAFTS to be updated in mid-March. In the meantime, *missing data* has been indicated by small "bullets." In addition, ALL averages and sums exclude missing data. NOTE: Footnotes appear on top of columns and/or at end of rows for each Table and are described in this Appendix.
- 2) Please note, that while NOT listed in this year's Tables, Ohio State University (Center for Welding Research) and Rensselaer Polytechnic Institute (Computer Design) remain active, however, they are no longer formally considered to be "IUCRC Centers."
- 3) Currently, there are (3) Joint Centers, they are: a) #24 University of Florida/Purdue University (Software Engineering Research Center); b) #34 Brown University/Rhode Island (Center for Thin Film & Interface Research); and c) #36 Georgia Institute of Technology/University of Arizona (Information Management Research). These three (3) Joint Centers share their resources and have been combined (in each of the three cases). Hence, Florida's and Purdue's data are reported together, etc. In most cases, their data has been summed (e.g., budgetary and membership data). In a few cases, however, their data has been averaged (i.e., where percentages are displayed).
- 4) On Tables 2 and 3, "TOTAL DIRECT" refers to the sum of all direct funding, including: NSF, Industry Member Fees, Other Industry, State, Other, and University Direct funding.
- 5) On Table 2, "NSF FUNDING" refers to support provided by the IUCRC Program. This includes operating grants, self-sustaining center funding, evaluator supplements, TIE awards, ROI/POI awards, etc. This Does NOT include support provided by other NSF groups or divisions.
- 6) On Table 2, "INDUSTRIAL MEMBERSHIP FEES" refers to support from industry derived from membership fees.
- 7) On Table 2, "OTHER INDUSTRY" refers to any additional support for operations provided by industrial members (e.g., enhancements, contracts, donations, etc.).
- 8) On Table 2, "STATE" refers to the support provided by state government and/or an agency or program funded by state government.
- 9) On Table 2, "OTHER" refers to support for Center operations provided by other funding sources, including other divisions in NSF, federal agencies, foundations, national labs, etc.
- 10) On Table 2, "UNIVERSITY DIRECT" refers to actual support for Center operating costs, including: salary, travel, etc. This does NOT include overhead returned to Center, NOR does it include cost of items like utilities or space, which universities are obligated to provide for all grants.
- 11) On Table 3, "OVERHEAD CHARGES" refers to the sum of all overhead, including: NSF, Industry Member Fees, Other Industry, State, and Other. University Direct overhead is NOT applicable for this category.
- 12) On Table 3, "TOTAL BUDGET" refers to the sum of DIRECT FUNDING and OVERHEAD CHARGES.
- 13) On Table 3, "UNIVERSITY-WAIVED OVERHEAD" refers to the value of normal overhead that the university has not charged industry.
- 14) On Table 3, "EFFECTIVE BUDGET" refers to the value of the center's budget if full overhead were collected.
- 15) On Table 3, "CAPITAL TOTAL FUNDING" includes major capital investments/expenses (e.g., equipment, buildings, building renovations, etc.) over \$25,000. Funding for a building should have been reported when the building was occupied.
- 16) On Table 4, "FEES" are broken down into primary, secondary, and tertiary (the latter two represent variable membership fees).
- 17) On Table 5, "FT" means "Full-time" and "PT" means "Part-time."
- 18) On Table 6, "TIME ALLOCATION" refers to allocation of director's full-time equivalent for budgetary purposes.
- 19) On Table 6, "ADMIN. BUDGET (%)" refers to the estimated percentage of direct operating budget allocated to administrative salaries, center supplies, telephone, travel and related costs.
- 20) On Table 6, "IN KIND (%)" refers to the estimated percentage of direct operating budget derived from "in-kind" equipment donations.