

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

Final Report

1998-1999 STRUCTURAL INFORMATION^{1,2}

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NOTE: 1998-1999 data collected from 48/48 Center Director Surveys (100% response rate).

PLEASE DIRECT CORRECTIONS, QUESTIONS, AND COMMENTS TO THE AUTHORS

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Table 1: 1998-1999 GENERAL CENTER INFORMATON* (Sorted Chronologically)

Yr Funded:	Center Name	University Name: Director	Partner University 1 Co-Director 1	Partner University 2 Co-Director 2	Partner University 3 Co-Director 3	Partner University 4 Co-Director 4
Active						
1983	Dielectric Studies	Pensylvania State Univ., Univ. Park Randall				
1984	Microcontamination & Control	Univ. of Arizona O'Hanlon	Rensselaer Polytech Institute Rose			
1985	Nondestructive Evaluation	Iowa State Univ. Thompson				
1986	Sensors and Actuators	Univ. of California, Berkeley Muller	Univ. of California, Davis Solgaard			
1988	Building Performance and Diagnostics	Carnegie Mellon Univ. Hartkopf				
1989	Advanced Air Conditioning and Refrigeration	Univ. of Illinois Urbana-Champaign Bullard				
1989	Ultra-high Speed Integrated Circuits & Systems	Univ. of California, San Diego Ku				
1990	Dimensional Measurement and Control in Manufacturing	Univ. of Michigan, Ann Arbor Ni				
1990	Membrane Applied Science and Technology	Univ. of Colorado, Boulder Greenberg				
1991	Advanced Communications	Villanova Univ. Di Giacomo				
1991	Integrated Pest Management	North Carolina State Univ. Stinner				
1991	Materials Handling/Logistics Institute	Georgia Institute of Technology Nemhauser	Univ. of Arkansas Taylor			
1991	Polymer Interfaces	Lehigh Univ. Chaudhury				
1991	Wireless Information Networks	Rutgers Univ. Goodman				
1993	Advanced Computing and Communication	North Carolina State Univ. Snyder	Duke Univ. Trivedi			
1993	Corrosion in Multiphase Systems	Ohio State Univ. Jepson				
1993	Machine-tool Systems	Univ. of Illinois Urbana-Champaign Kapoor				
1994	Advanced Processing and Packaging Studies	North Carolina State Univ. Swartzel	Univ. of California, Davis Shoemaker	Ohio State Univ. Schwartz & Sastry		
1994	Analog/Digital Integrated Circuits	Washington State Univ. Ringo	Univ. of Washington Sechen	State Univ. of NY, Stony Brook Carlson	Oregon State Univ. Stonick	
1994	Engineering Tribology	Northwestern Univ. Keer	Georgia Institute of Technology Danyluk			
1994	Software Engineering	Purdue Mathur	West Virginia Cowan			
1995	Adv Man & Packaging of Micro, Optical & Digital Electro	University of Colorado, Boulder Mahajan				
1995	Advanced Control of Energy and Power Systems	Arizona State Univ. Heydt	Colorado School of Mines Shoureshi			
1995	Advanced Electronic Materials, Devices and Systems	Univ. of Texas, Arlington Taylor	Texas A&M Fitzer			
1995	Coatings Research	Eastern Michigan Univ. Mathur				
1995	Ergonomics	Texas A&M Congleton				

<i>Yr Funded:</i>	<i>Center Name</i>	<i>University Name: Director</i>	<i>Partner University 1 Co-Director 1</i>	<i>Partner University 2 Co-Director 2</i>	<i>Partner University 3 Co-Director 3</i>	<i>Partner University 4 Co-Director 4</i>
1995	Optoelectronic Devices, Interconnects and Packaging	Univ. of Arizona Peyghambarian	Univ. of Maryland, College Park Dagenais			
1995	Particulate Materials	Pensylvania State Univ., Univ. Park Adair				
1995	Pharmaceutical Processing Research	Purdue Nail	Univ. of Connecticut Pikal			
1996	Glass Research	Alfred Univ., College of Ceramics Seward	Univ. of Missouri, Rolla Moore			
1996	Hazardous & Toxic Waste Management	New Jersey Institute of Technology Lederman				
1996	Health Management	Univ. of Washington Zuckerman	Univ. of California, Berkeley Shortell			
1996	Power Systems Engineering	Cornell Univ. Thomas	Univ. of California, Berkeley Oren	Univ. of Illinois Urbana-Champaign Sauer	Univ. of Wisconsin, Madison Lasseter	Washington State Univ. Bose
1997	Advanced Polymer and Composite Engineering	Ohio State Univ. Lee				
1997	Biological Surface Science	State Univ. of New York at Buffalo Baier	Univ. of Memphis Turitto	Univ. of Miami Hwang	Alfred Univ., College of Ceramics Clare	
1997	Built Environment	Univ. of California, Berkeley Arens				
1997	Management of Information	Univ. of Arizona Nunamaker				
1997	Quality and Reliability Engineering	Rutgers Univ. Elsayed				
1997	Silicon Wafer Engineering and Defect Science	North Carolina State Univ. Rozgonyi				
1997	Virtual Proving Ground Simulation	Univ. of Iowa Haug	Univ. of Texas, Austin Longoria			
1997	Wireless Electromagnetic Compatibility	Univ. of Oklahoma Grant				
1998	Precision Metrology	Univ. of North Carolina, Charlotte Hocken				
1999	Information Technology and Organization	Univ. of California, Irvine Kraemer				
New/Recompeted						
1985	Measurement and Control Engineering	Univ. of Tennessee, Knoxville Garrison				
1988	Microengineered Materials	Univ. of New Mexico Datye	Rutgers Univ. Niesz			
1999	Advanced Studies in Novel Surfactants	Columbia Univ. Somasundaran				
1999	Advanced Vehicle Electric	Auburn Univ. Johnson				
1999	Digital Video/Media Research	Rensselaer Polytech Institute Pearlman	New Jersey Institute of Technology Wolf			
1999	Intelligent Biomedical Devices and Musculoskeletal Syst	Colorado School of Mines Shoureshi	Rose Musculoskeletal Research Lab Komistek			
1999	Reinforcing Composites	Univ. of Missouri, Rolla Nanni				
1999	Tree Genetics	Oregon State Univ. Strauss				
1999	Water Quality	Univ. of Arizona Pepper				

Table 2: 1998-1999 OPERATING BUDGET AND TOTAL FUNDING

CenterName	Total ⁴ Funding	NSF ⁵		INDUSTRY		OTHER				
		NSF/ IUCRC	Other NSF	Member ⁶ Fees	Addl ⁷ Industry	State ⁸	University ⁹	Other ¹⁰ Federal	Non- ¹¹ Federal	Other ¹² Cash
Adv Man & Packaging of Micro, Optical and Digital EI	\$2,031,053	\$80,000	\$0	\$310,000	\$0	\$0	\$21,767	\$1,619,286	\$0	\$0
Advanced Air Conditioning and Refrigeration	\$3,211,000	\$48,000	\$50,000	\$820,000	\$0	\$0	\$190,000	\$1,523,000	\$0	\$580,000
Advanced Communications	\$576,558	\$43,000	\$0	\$466,288	\$0	\$40,000	\$27,270	\$0	\$0	\$0
Advanced Computing and Communication	\$2,102,964	\$180,000	\$779,104	\$260,000	\$40,937	\$5,000	\$138,721	\$232,309	\$181,751	\$285,142
Advanced Control of energy and Power Systems	\$1,575,000	\$150,000	\$0	\$600,000	\$750,000	\$0	\$75,000	\$0	\$0	\$0
Advanced Electronic Materials, Devices and Systems	\$1,030,000	\$90,000	\$15,000	\$315,000	\$15,000	\$553,000	\$27,000	\$0	\$0	\$15,000
Advanced Polymer and Composite Engineering	\$952,151	\$100,000	\$100,000	\$302,000	\$0	\$100,000	\$95,151	\$15,000	\$0	\$240,000
Advanced Processing and Packaging Studies	\$795,361	\$128,000	\$0	\$527,720	\$86,641	\$0	\$50,000	\$0	\$0	\$3,000
Advanced Studies in Novel Surfactants	\$520,000	\$100,000	\$105,000	\$303,000	\$12,000	\$0	\$0	\$0	\$0	\$0
Analog/Digital Integrated Circuits	\$2,242,916	\$190,000	\$171,657	\$805,000	\$0	\$35,000	\$611,259	\$0	\$15,000	\$415,000
Biological Surface Science	\$898,200	\$288,000	\$0	\$360,000	\$15,000	\$0	\$65,000	\$87,000	\$0	\$83,200
Building Performance and Diagnostics	\$1,449,651	\$38,000	\$0	\$585,000	\$397,396	\$0	\$0	\$304,255	\$80,000	\$45,000
Built Environment	\$1,028,192	\$75,000	\$0	\$360,000	\$43,000	\$0	\$145,192	\$0	\$0	\$405,000
Coatings Research	\$527,274	\$85,000	\$88,274	\$330,000	\$0	\$0	\$24,000	\$0	\$0	\$0
Corrosion in Multiphase Systems	\$988,000	\$43,000	\$25,000	\$450,000	\$320,000	\$0	\$130,000	\$0	\$0	\$20,000
Dielectric Studies	\$1,856,000	\$8,000	\$0	\$418,000	\$1,060,000	\$0	\$100,000	\$200,000	\$0	\$70,000
Digital Video and Media Center	\$675,250	\$150,000	\$182,000	\$300,000	\$0	\$0	\$43,250	\$0	\$0	\$0
Dimensional Measurement and Control in Manufactur	\$717,994	\$43,000	\$199,994	\$275,000	\$50,000	\$0	\$0	\$0	\$0	\$150,000
Engineering Tribology	\$892,000	\$65,000	\$240,000	\$210,000	\$0	\$0	\$0	\$230,000	\$147,000	\$0
Ergonomics	\$315,666	\$65,000	\$5,000	\$186,666	\$0	\$0	\$0	\$59,000	\$0	\$0
Glass Research	\$1,539,790	\$88,000	\$0	\$941,000	\$0	\$0	\$91,000	\$0	\$4,000	\$415,790
Hazardous & Toxic Waste Management	\$4,265,102	\$43,000	\$285,000	\$332,500	\$0	\$1,567,800	\$650,000	\$1,354,802	\$0	\$32,000
Health Management	\$703,000	\$93,000	\$0	\$560,000	\$0	\$0	\$50,000	\$0	\$0	\$0
Information Technology and Organization	\$3,800,050	\$100,000	\$0	\$305,000	\$0	\$0	\$75,000	\$0	\$0	\$3,320,050
Integrated Pest Management	\$395,500	\$48,000	\$0	\$306,500	\$0	\$0	\$0	\$11,000	\$30,000	\$0
Intelligent Biomedical Devices and Musculoskeletal S	\$980,000	\$150,000	\$0	\$745,000	\$0	\$0	\$65,000	\$20,000	\$0	\$0
Machine-tool Systems	\$446,184	\$48,000	\$0	\$270,000	\$128,184	\$0	\$0	\$0	\$0	\$0
Management of Information	\$1,390,000	\$70,000	\$0	\$525,000	\$0	\$0	\$100,000	\$0	\$0	\$695,000
Material Handling/Logistics Institute	\$1,998,611	\$140,861	\$188,838	\$675,284	\$45,000	\$84,824	\$715,944	\$147,860	\$0	\$0
Measurement and Control Engineering	\$692,800	\$20,000	\$100,000	\$490,000	\$34,300	\$0	\$0	\$0	\$0	\$48,500
Microcontamination & Control	\$388,000	\$80,000	\$0	\$230,000	\$0	\$0	\$78,000	\$0	\$0	\$0
Microengineered Materials	\$2,547,813	\$197,369	\$1,081,475	\$314,856	\$15,000	\$78,800	\$146,024	\$608,419	\$105,870	\$0
Nondestructive Evaluation	\$4,502,135	\$70,000	\$97,052	\$665,000	\$0	\$0	\$1,476,827	\$1,532,904	\$0	\$660,352
Optoelectronic Devices, Interconnects and Packaging	\$716,000	\$48,000	\$0	\$250,000	\$100,000	\$318,000	\$0	\$0	\$0	\$0
Particulate Materials	\$1,082,000	\$75,000	\$10,000	\$330,000	\$17,000	\$0	\$165,000	\$0	\$0	\$485,000
Pharmaceutical Processing Research	\$275,000	\$0	\$0	\$275,000	\$0	\$0	\$0	\$0	\$0	\$0
Polymer Interfaces	\$453,951	\$58,000	\$10,000	\$195,000	\$110,486	\$0	\$80,465	\$0	\$0	\$0
Power Systems Engineering	\$1,340,000	\$200,000	\$200,000	\$840,000	\$100,000	\$0	\$0	\$0	\$0	\$0
Precision Metrology	\$869,022	\$80,000	\$219,000	\$366,000	\$0	\$0	\$204,022	\$0	\$0	\$0
Quality and Reliability Engineering	\$450,000	\$75,000	\$50,000	\$300,000	\$0	\$0	\$0	\$25,000	\$0	\$0
Sensors and Actuators	\$10,608,155	\$202,650	\$557,300	\$1,266,064	\$0	\$0	\$6,903	\$7,632,856	\$942,382	\$0
Seperations Using Thin Films	\$1,010,093	\$43,000	\$5,000	\$410,682	\$0	\$56,000	\$40,000	\$0	\$0	\$455,411
Silicon Wafer Engineering and Defect Science	\$446,000	\$90,000	\$5,000	\$350,000	\$1,000	\$0	\$0	\$0	\$0	\$0
Software Engineering	\$759,000	\$95,000	\$130,000	\$379,000	\$155,000	\$0	\$0	\$0	\$0	\$0
Ultra-high Speed Integrated Circuits & Systems	\$528,848	\$60,000	\$0	\$75,000	\$5,000	\$0	\$0	\$388,848	\$0	\$0
Virtual Proving Ground Simulation	\$3,496,869	\$103,000	\$190,000	\$582,669	\$0	\$704,141	\$0	\$1,917,059	\$0	\$0
Wireless Electromagnetic Compatibility	\$494,000	\$75,000	\$0	\$385,000	\$34,000	\$0	\$0	\$0	\$0	\$0
Wireless Information Networks	\$1,678,267	\$48,000	\$397,027	\$660,000	\$35,000	\$4,079	\$6,707	\$516,454	\$0	\$11,000
Grand Mean	\$1,505,030	\$91,039	\$114,307	\$441,838	\$74,374	\$73,888	\$118,635	\$383,855	\$31,375	\$175,718
Grand Sum	\$72,241,420	\$4,369,880	\$5,486,721	\$21,208,229	\$3,569,944	\$3,546,644	\$5,694,502	\$18,425,052	\$1,506,003	\$8,434,445

* Report sorted Alphabetically by Center

Table 3: 1998-1999 CAPITAL AND IN-KIND SUPPORT

CenterName	Capital and In-Kind Support ¹³							Overhead	Budget	
	Total Funding	Total Cap In-Kind	Equipment	Facilities	Personnel	Software	Other Support	% to Mem ¹⁴	Typical ¹⁵	Admin ¹⁶
Adv Man & Packaging of Micro, Optical and Digital Elec	\$2,031,053	\$0	\$0	\$0	\$0	\$0	\$0	5	46	15
Advanced Air Conditioning and Refrigeration	\$3,211,000	\$10,000	\$10,000	\$0	\$0	\$0	\$0	0	70	10
Advanced Communications	\$576,558	\$0	\$0	\$0	\$0	\$0	\$0	0	85	25
Advanced Computing and Communication	\$2,102,964	\$332,167	\$327,000	\$0	\$1,667	\$3,500	\$0	10	49	29
Advanced Control of energy and Power Systems	\$1,575,000	\$84,500	\$50,000	\$15,000	\$18,000	\$1,500	\$0	0	0	10
Advanced Electronic Materials, Devices and Systems	\$1,030,000	\$0	\$0	\$0	\$0	\$0	\$0	0	45	0
Advanced Polymer and Composite Engineering	\$952,151	\$417,100	\$305,600	\$0	\$10,000	\$100,000	\$1,500	0	46	4
Advanced Processing and Packaging Studies	\$795,361	\$5,000	\$5,000	\$0	\$0	\$0	\$0	0	9	18
Advanced Studies in Novel Surfactants	\$520,000	\$19,300	\$14,300	\$0	\$0	\$0	\$5,000	0	5	15
Analog/Digital Integrated Circuits	\$2,242,916	\$55,000	\$40,000	\$0	\$0	\$5,000	\$10,000	0	45	15
Biological Surface Science	\$898,200	\$170,000	\$40,000	\$40,000	\$34,000	\$0	\$56,000	12	54	10
Building Performance and Diagnostics	\$1,449,651	\$0	\$0	\$0	\$0	\$0	\$0	0	56	30
Built Environment	\$1,028,192	\$50,750	\$10,000	\$38,250	\$2,500	\$0	\$0	0	50	15
Coatings Research	\$527,274	\$120,000	\$120,000	\$0	\$0	\$0	\$0	0	46	14
Corrosion in Multiphase Systems	\$988,000	\$550,000	\$150,000	\$0	\$50,000	\$350,000	\$0	10	45	15
Dielectric Studies	\$1,856,000	\$300,000	\$50,000	\$0	\$200,000	\$0	\$50,000	0	0	15
Digital Video and Media Center	\$675,250	\$110,000	\$100,000	\$0	\$0	\$10,000	\$0	10	54	5
Dimensional Measurement and Control in Manufacturin	\$717,994	\$1,250,000	\$1,000,000	\$250,000	\$0	\$0	\$0	0	52	10
Engineering Tribology	\$892,000	\$0	\$0	\$0	\$0	\$0	\$0	10	47	10
Ergonomics	\$315,666	\$35,000	\$10,000	\$25,000	\$0	\$0	\$0	11	44	20
Glass Research	\$1,539,790	\$0	\$0	\$0	\$0	\$0	\$0	7	75	28
Hazardous & Toxic Waste Management	\$4,265,102	\$7,000	\$0	\$0	\$7,000	\$0	\$0	5	46	17
Health Management	\$703,000	\$0	\$0	\$0	\$0	\$0	\$0	0	0	20
Information Technology and Organization	\$3,800,050	\$50,000	\$0	\$50,000	\$0	\$0	\$0	5	0	25
Integrated Pest Management	\$395,500	\$0	\$0	\$0	\$0	\$0	\$0	10	48	16
Intelligent Biomedical Devices and Musculoskeletal Sy	\$980,000	\$210,000	\$150,000	\$0	\$20,000	\$40,000	\$0	25	50	15
Machine-tool Systems	\$446,184	\$448,560	\$447,660	\$0	\$0	\$0	\$900	15	0	15
Management of Information	\$1,390,000	\$0	\$0	\$0	\$0	\$0	\$0	0	0	0
Material Handling/Logistics Institute	\$1,998,611	\$29,269	\$0	\$0	\$29,269	\$0	\$0	0	45	15
Measurement and Control Engineering	\$692,800	\$130,000	\$0	\$0	\$40,000	\$90,000	\$0	0	43	24
Microcontamination & Control	\$388,000	\$25,000	\$25,000	\$0	\$0	\$0	\$0	26	26	21
Microengineered Materials	\$2,547,813	\$50,000	\$50,000	\$0	\$0	\$0	\$0	0	47	6
Nondestructive Evaluation	\$4,502,135	\$0	\$0	\$0	\$0	\$0	\$0	0	44	15
Optoelectronic Devices, Interconnects and Packaging	\$716,000	\$30,000	\$30,000	\$0	\$0	\$0	\$0	0	52	10
Particulate Materials	\$1,082,000	\$281,000	\$280,000	\$0	\$0	\$1,000	\$0	0	37	22
Pharmaceutical Processing Research	\$275,000	\$75,000	\$75,000	\$0	\$0	\$0	\$0	0	47	0
Polymer Interfaces	\$453,951	\$0	\$0	\$0	\$0	\$0	\$0	13	58	15
Power Systems Engineering	\$1,340,000	\$0	\$0	\$0	\$0	\$0	\$0	0	0	10
Precision Metrology	\$869,022	\$313,000	\$286,000	\$0	\$0	\$27,000	\$0	0	53	6
Quality and Reliability Engineering	\$450,000	\$50,000	\$50,000	\$0	\$0	\$0	\$0	22	57	15
Sensors and Actuators	\$10,608,155	\$753,000	\$750,000	\$0	\$0	\$3,000	\$0	0	50	3
Seperations Using Thin Films	\$1,010,093	\$0	\$0	\$0	\$0	\$0	\$0	6	43	0
Silicon Wafer Engineering and Defect Science	\$446,000	\$0	\$0	\$0	\$0	\$0	\$0	9	9	16
Software Engineering	\$759,000	\$0	\$0	\$0	\$0	\$0	\$0	25	52	33
Ultra-high Speed Integrated Circuits & Systems	\$528,848	\$147,000	\$30,000	\$75,000	\$15,000	\$17,000	\$10,000	0	5	100
Virtual Proving Ground Simulation	\$3,496,869	\$137,000	\$0	\$0	\$0	\$137,000	\$0	0	47	10
Wireless Electromagnetic Compatibility	\$494,000	\$0	\$0	\$0	\$0	\$0	\$0	26	47	15
Wireless Information Networks	\$1,678,267	\$170,549	\$74,549	\$96,000	\$0	\$0	\$0	0	57	26
Grand Mean	\$1,505,030	\$133,650	\$93,336	\$12,276	\$8,905	\$16,354	\$2,779	5	46	15
Grand Sum	\$72,241,420	\$6,415,195	\$4,480,109	\$589,250	\$427,436	\$785,000	\$133,400	N/A	N/A	N/A

* Report sorted Alphabetically by Center

Table 4: 1998-1999 INDUSTRY MEMBERSHIP DESCRIPTORS

CenterName	1998-1999 MEMBERS				LIFETIME MEMBERS			ANNUAL FEES ¹⁷		
	Current Members	Starting	New	Left	Life Start	Life New	Life Left	Primary	Secondary	Tertiary
Adv Man & Packaging of Micro, Optical and Digital Electronics	9	11	4	6	10	9	10	\$45,000	\$30,000	
Advanced Air Conditioning and Refrigeration	22	20	5	3	13	21	12	\$40,000		
Advanced Communications	13	12	8	7	4	18	9	\$35,000	\$5,000	\$1,000
Advanced Computing and Communication	10	11	2	3	8	24	22	\$50,000	\$20,000	
Advanced Control of energy and Power Systems	12	14	3	5	5	14	7	\$50,000	\$25,000	
Advanced Electronic Materials, Devices and Systems	9	9	3	3	6	16	13	\$30,000	\$15,000	
Advanced Polymer and Composite Engineering	14	19	3	8	5	17	8	\$35,000	\$25,000	\$5,000
Advanced Processing and Packaging Studies	14	7	11	4	8	21	15	\$35,000	\$20,000	
Advanced Studies in Novel Surfactants	15	0	15	0	15	0	0	\$25,000	\$9,500	
Analog/Digital Integrated Circuits	21	21	6	6	11	27	17	\$35,000		
Biological Surface Science	13	12	4	3	6	13	6	\$40,000	\$40,000	\$40,000
Building Performance and Diagnostics	17	16	4	3	4	19	6	\$50,000	\$30,000	\$25,000
Built Environment	14	11	6	3	11	7	4	\$30,000	\$10,000	
Coatings Research	12	13	2	3	11	12	11	\$30,000		
Corrosion in Multiphase Systems	4	20	1	17	4	20	20	\$25,000		
Dielectric Studies	19	20	2	3	18	36	35	\$26,000	\$7,000	
Digital Video and Media Center	7	0	7	0	7	0	0	\$40,000	\$5,000	
Dimensional Measurement and Control in Manufacturing	9	8	1	0	8	6	5	\$50,000	\$25,000	
Engineering Tribology	11	8	6	3	14	20	23	\$27,500	\$20,000	
Ergonomics	11	8	8	5	9	10	8	\$25,000	\$15,000	\$10,000
Glass Research	31	30	1	0	8	27	4	\$31,500		
Hazardous & Toxic Waste Management	13	13	0	0	8	32	27	\$30,000	\$15,000	
Health Management	29	14	16	1	6	32	9	\$35,000	\$15,000	
Information Technology and Organization	12	0	12	0	12	0	0	\$25,000		\$5,000
Integrated Pest Management	15	12	4	1	7	12	4	\$262,500	\$44,000	
Intelligent Biomedical Devices and Musculoskeletal Systems	14	0	14	0	14	0	0	\$50,000		
Machine-tool Systems	7	6	2	1	6	5	4	\$50,000	\$20,000	\$20,000
Management of Information	6	8	0	2	8	0	2	\$100,000	\$50,000	\$25,000
Material Handling/Logistics Institute	18	24	6	12	18	4	4	\$50,000	\$25,000	
Measurement and Control Engineering	17	13	8	4	14	17	14	\$35,000	\$15,000	
Microcontamination & Control	14	16	0	2	26	28	40	\$40,000	\$10,000	
Microengineered Materials	16	12	7	3	8	16	8	\$30,000	\$10,000	\$5,000
Nondestructive Evaluation	21	22	7	8	14	32	25	\$35,000		
Optoelectronic Devices, Interconnects and Packaging	11	18	4	11	9	21	19	\$50,000	\$25,000	
Particulate Materials	18	8	10	0	12	12	6	\$35,000	\$10,000	
Pharmaceutical Processing Research	11	16	1	6	11	7	7	\$25,000		
Polymer Interfaces	6	8	1	3	10	7	11	\$35,000	\$20,000	
Power Systems Engineering	20	16	10	6	17	12	9	\$40,000		
Precision Metrology	15	0	15	0	15	0	0	\$30,000		
Quality and Reliability Engineering	12	11	4	3	11	4	3	\$30,000	\$15,000	
Sensors and Actuators	29	21	9	1	6	37	14	\$50,000	\$7,500	
Separations Using Thin Films	12	11	3	2	8	11	7	\$40,000		
Silicon Wafer Engineering and Defect Science	9	7	2	0	6	3	0	\$50,000	\$25,000	
Software Engineering	13	8	8	3	10	25	22	\$30,000	\$5,000	
Ultra-high Speed Integrated Circuits & Systems	3	5	0	2	6	1	4	\$50,000	\$25,000	
Virtual Proving Ground Simulation	17	4	13	0	24	17	24	\$40,000	\$20,000	
Wireless Electromagnetic Compatibility	17	14	4	1	14	4	1	\$35,000	\$15,000	\$5,000
Wireless Information Networks	22	23	6	7	20	17	15	\$30,000		
GRAND MEAN	14.25	12.08	5.58	3.42	10.52	14.44	10.71	\$42,194	\$19,229	\$14,001
GRAND SUM	684	580	268	164	505	693	514			

Table 5: 1998-1999 HUMAN RESOURCES

CenterName	RESEARCHERS		STUDENTS		ADMINISTRATION ¹⁸			
	Faculty	Non-Faculty	Grads	Undergrads	Professional	Professional	Clerical	Clerical
	Scientists	Scientists			Full Time	Part Time	Full Time	Part Time
Adv Man & Packaging of Micro, Optical and Digital Electronics	5	2	14	4	2	0	0	0
Advanced Air Conditioning and Refrigeration	16	5	43	20	0	1	1	0
Advanced Communications	19	7	18	0	0	0	0	0
Advanced Computing and Communication	15	4	31	1	1	1	1	3
Advanced Control of energy and Power Systems	8	2	8	6	0	0	0	1
Advanced Electronic Materials, Devices and Systems	17	1	54	3	0	4	1	0
Advanced Polymer and Composite Engineering	9	0	25	4	1	0	0	0
Advanced Processing and Packaging Studies	16	10	8	4	0	4	0	3
Advanced Studies in Novel Surfactants	4	4	8	1	0	1	1	1
Analog/Digital Integrated Circuits	18	0	49	3	5	1	2	0
Biological Surface Science	15	5	12	10	4	0	3	0
Building Performance and Diagnostics	3	2	10	5	1	2	0	1
Built Environment	16	6	13	1	1	2	0	1
Coatings Research	9	6	14	5	0	4	0	5
Corrosion in Multiphase Systems	2	6	10	6	0	0	1	0
Dielectric Studies	1	2	9	2	2	0	1	0
Digital Video and Media Center	11	1	14	0	0	5	0	1
Dimensional Measurement and Control in Manufacturing	8	5	8	1	3	0	1	0
Engineering Tribology	8	4	9	0	0	1	0	1
Ergonomics	5	0	12	5	0	2	1	0
Glass Research	19	2	22	7	3	0	1	1
Hazardous & Toxic Waste Management	16	2	18	2	1	1	1	0
Health Management	23	2	3	1	4	0	3	0
Information Technology and Organization	10	1	10	2	0	1	0	1
Integrated Pest Management	49	20	11	19	1	0	1	0
Intelligent Biomedical Devices and Musculoskeletal Systems	0	0	0	0	0	0	1	0
Machine-tool Systems	8	2	10	3	0	2	0	1
Management of Information	2	4	15	3	0	4	0	1
Material Handling/Logistics Institute	18	5	5	7	1	4	2	4
Measurement and Control Engineering	12	3	30	16	0	4	2	0
Microcontamination & Control	5	1	4	1	2	0	0	1
Microengineered Materials	15	7	20	9	3	1	2	0
Nondestructive Evaluation	3	15	5	14	19	4	0	32
Optoelectronic Devices, Interconnects and Packaging	6	0	0	1	0	0	0	0
Particulate Materials	10	4	16	7	1	1	1	0
Pharmaceutical Processing Research	15	2	14	0	3	0	2	0
Polymer Interfaces	12	6	6	2	0	2	1	0
Power Systems Engineering	0	0	0	0	0	0	0	0
Precision Metrology	20	3	24	7	0	1	0	0
Quality and Reliability Engineering	8	0	10	1	1	1	1	0
Sensors and Actuators	19	10	97	20	0	8	2	5
Separations Using Thin Films	11	2	10	16	2	1	1	0
Silicon Wafer Engineering and Defect Science	7	7	7	1	0	2	0	1
Software Engineering	9	1	8	8	1	4	0	1
Ultra-high Speed Integrated Circuits & Systems	4	1	10	3	1	0	0	0
Virtual Proving Ground Simulation	5	18	19	0	0	3	0	2
Wireless Electromagnetic Compatibility	1	2	7	5	1	0	0	1
Wireless Information Networks	8	0	17	7	4	0	3	0
Grand Mean	10.83333	4.00	15.98	5.06	1.42	1.50	0.77	1.42
Grand Sum	520	192	767	243	68	72	37	68

* Report sorted Alphabetically by Center

Table 6: 1998-1999 CENTER DIRECTOR DESCRIPTORS

CenterName	Rank	Tenure	Reports To	TIME ALLOCATION 19				
				Center Admin	Other Admin	Research	Teaching	Other
Adv Man & Packaging of Micro, Optical and Digital Electr	Professor	Tenured	Dean	15	5	40	30	10
Advanced Air Conditioning and Refrigeration	Professor	Tenured	Department Head	30	0	30	30	10
Advanced Communications		Non-Tenure Track	Vice President	50	0	25	0	25
Advanced Computing and Communication	Professor	Tenured	Dean	13	5	32	40	10
Advanced Control of energy and Power Systems	Professor	Tenured	Dean	3	0	30	67	0
Advanced Electronic Materials, Devices and Systems	Professor	Tenured	Dean	10	0	45	40	5
Advanced Polymer and Composite Engineering	Professor	Tenured	Dean	20	5	35	35	5
Advanced Processing and Packaging Studies	Distinguished Professor	Tenured	Dean	0	8	80	12	0
Advanced Studies in Novel Surfactants	Professor	Tenured	Dean	10	5	40	35	10
Analog/Digital Integrated Circuits	Professor & Assoc. Dean	Tenured	Dean	35	50	0	15	0
Biological Surface Science	Professor	Tenured	Vice President	20	2	40	30	8
Building Performance and Diagnostics	Professor	Tenured	Dean	15	0	50	35	0
Built Environment	Professor	Tenured	Vice Chancellor	20	20	15	40	5
Coatings Research	Professor	Tenured	Director	25	5	62	8	0
Corrosion in Multiphase Systems	Professor	Tenured	Dean	70	0	10	20	0
Dielectric Studies	Associate Professor	Tenure Track	Director	20	5	40	30	5
Digital Video and Media Center	Professor	Tenured	Dean	15	5	35	25	20
Dimensional Measurement and Control in Manufacturing	Professor	Tenured	Dean	15	0	20	65	0
Engineering Tribology	Professor	Tenured	Dean	10	50	10	25	5
Ergonomics	Professor	Tenured	Director	20	5	50	20	5
Glass Research	Professor	Tenure Track	Dean	75	0	10	10	5
Hazardous & Toxic Waste Management	Director	Non-Tenure Track	Provost	20	50	0	10	20
Health Management	Professor	Tenured	Department Chair	25	0	60	15	0
Information Technology and Organization	Professor	Tenured	Vice Chancellor	25	25	25	25	0
Integrated Pest Management	Professor	Tenured	Director	35	0	38	10	17
Intelligent Biomedical Devices and Musculoskeletal Syst	Professor	Tenure Track	Division Head	15	15	50	20	0
Machine-tool Systems	Professor	Tenured	Dean	10	10	40	40	0
Management of Information	Regents Professor	Tenured	Dean	20	20	10	40	10
Material Handling/Logistics Institute	Professor	Tenured	Department Head	25	0	50	25	0
Measurement and Control Engineering	Director	Non-Tenure Track	Dean	50	50	0	0	0
Microcontamination & Control	Professor	Tenured	Dean	30	4	33	33	0
Microengineered Materials	Professor	Tenured	Associate Provost	20	10	40	30	
Nondestructive Evaluation	Professor	Tenured	Director	53	5	20	15	7
Optoelectronic Devices, Interconnects and Packaging	Professor	Tenured	Director	20	20	50	0	10
Particulate Materials	Associate Professor	Tenured	Director	55	0	25	20	0
Pharmaceutical Processing Research	Associate Professor	Tenure Track	Department Head	25	5	30	35	5
Polymer Interfaces	Associate Professor	Tenured	Department Chair	20	0	40	40	0
Power Systems Engineering	Professor	Tenured	Dean	40	0	30	30	0
Precision Metrology	Professor	Tenured	Associate Dean	10	10	25	50	5
Quality and Reliability Engineering	Professor	Tenured	Dean	15	25	30	20	10
Sensors and Actuators	Professor	Tenured	Department Chair	20	10	50	10	10
Seperations Using Thin Films	Professor	Tenured	Department Chair	10	10	40	40	0
Silicon Wafer Engineering and Defect Science	Professor	Tenured	Dean	5	15	40	30	10
Software Engineering	Professor	Tenured	Associate Dean	10	35	30	20	5
Ultra-high Speed Integrated Circuits & Systems	Professor	Tenured	Chairman	20	10	40	20	10
Virtual Proving Ground Simulation	Distinguished Professor	Tenured	Vice President	20	30	25	25	0
Wireless Electromagnetic Compatibility	Professor	Tenured	Director	25	0	50	25	0
Wireless Information Networks	Professor	Tenured	Chairman	40	0	20	40	0
Grand Mean				24.04	11.02	33.13	26.67	5.26

* Report sorted by Status, Organized by Year Funded then Alphabetically by Center

Table 7: 1998-1999 CENTER OUTCOMES

CenterName:	STUDENTS RECEIVING DEGREE ²⁰			STUDENTS HIRED BY INDUSTRY ²¹			PUBLICATIONS ²²		
	BA Grad	MA Grad	PhD Grad	BA Hired	MA Hired	PhD Hired	w/ Ctr Research	Pubs w/ Members	Presentation
Adv Man & Packaging of Micro, Optical and Digital Electronics	0	0	0	0	0	0	0	0	0
Advanced Air Conditioning and Refrigeration	14	8	3	0	1	0	15	3	7
Advanced Communications	0	3	0	0	0	0	6	6	6
Advanced Computing and Communication	1	9	11	1	0	1	0	6	71
Advanced Control of energy and Power Systems	4	8	5	2	2	0	21	9	13
Advanced Electronic Materials, Devices and Systems	2	7	8	0	0	0	4	1	12
Advanced Polymer and Composite Engineering	0	6	3	0	0	0	28	4	26
Advanced Processing and Packaging Studies	0	1	0	0	0	0	12	0	8
Advanced Studies in Novel Surfactants	0	2	2	0	0	2	25	1	6
Analog/Digital Integrated Circuits	0	5	9	0	0	0	20	0	29
Biological Surface Science	3	3	1	0	0	0	10	4	7
Building Performance and Diagnostics	0	0	4	0	0	0	75	0	20
Built Environment	0	2	0	0	1	0	5	1	3
Coatings Research	2	4	2	0	0	0	25	4	20
Corrosion in Multiphase Systems	0	2	1	0	0	0	20	4	20
Dielectric Studies	1	0	0	0	0	0	30	1	7
Digital Video and Media Center	0	3	3	0	0	0	14	0	13
Dimensional Measurement and Control in Manufacturing	0	1	3	0	0	0	6	0	10
Engineering Tribology	0	3	1	0	0	0	15	3	11
Ergonomics	3	6	0	0	0	0	8	0	0
Glass Research	5	10	5	3	3	6	48	14	50
Hazardous & Toxic Waste Management	2	5	2	2	2	0	4	0	12
Health Management	0	0	1	0	0	0	4	1	14
Information Technology and Organization	1	0	0	0	0	0	5	0	10
Integrated Pest Management	1	1	2	0	0	0	40	0	21
Intelligent Biomedical Devices and Musculoskeletal Systems	4	9	2	0	0	1	14	10	20
Machine-tool Systems	1	7	1	0	0	0	10	2	9
Management of Information	0	0	0	0	0	0	12	4	6
Material Handling/Logistics Institute	3	6	4	2	2	0	17	3	45
Measurement and Control Engineering	6	1	7	2	0	0	10	0	8
Microcontamination & Control	1	1	0	0	2	0	18	0	11
Microengineered Materials	1	8	3	0	0	1	12	0	15
Nondestructive Evaluation	4	4	1	1	1	0	55	9	45
Optoelectronic Devices, Interconnects and Packaging	0	0	0	0	0	0	0	0	0
Particulate Materials	6	5	0	0	0	0	24	0	33
Pharmaceutical Processing Research	0	1	4	10	0	4	0	0	0
Polymer Interfaces	0	2	3	0	0	0	0	6	6
Power Systems Engineering	0	15	5	15	2	0	27	2	22
Precision Metrology	0	4	0	0	0	0	1	0	7
Quality and Reliability Engineering	0	0	2	0	0	0	15	0	5
Sensors and Actuators	0	2	7	0	0	0	22	0	37
Separations Using Thin Films	0	0	1	0	0	0	19	1	6
Silicon Wafer Engineering and Defect Science	0	6	4	0	1	1	16	2	23
Software Engineering	0	2	0	0	0	0	6	2	4
Ultra-high Speed Integrated Circuits & Systems	4	2	3	0	1	0	4	0	6
Virtual Proving Ground Simulation	0	2	0	0	0	0	32	0	15
Wireless Electromagnetic Compatibility	1	8	3	0	0	1	15	0	12
Wireless Information Networks	0	11	2	0	6	1	25	27	27
Grand Mean	1.46	3.85	2.46	0.79	0.50	0.38	15.79	2.71	16.54
Grand Sum	70	185	118	38	24	18	758	130	794

* Report sorted by Status, Organized by Year Funded then Alphabetically by Center

Table 8
1998-1999 INTELLECTUAL PROPERTY EVENTS

Table 8a: Centers reporting One or More Intellectual Property Event Last Fiscal Year		
INTELLECTUAL PROPERTY EVENT	# of Centers	% of Centers
Inventions Disclosures	19	40%
Patent Applications	15	31%
Software Copyrights	5	10%
Patents Granted	6	13%
Licensing Agreements	6	13%
Royalties Realized	3	6%

Table 8b: Total Number and Means of Intellectual Property Event last Fiscal Year		
INTELLECTUAL PROPERTY EVENT	Total for All Centers Centers	Mean for All Centers
Inventions Disclosures	45	.94
Patent Applications	25	1.29
Software Copyrights	11	.23
Patents Granted	8	.17
Licensing Agreements	10	.21
Royalties Realized	4	.08

APPENDIX

FOOTNOTES AND SPECIAL CONSIDERATIONS

Footnotes appear on top of columns and/or at end of rows for each Table and are described in this Appendix.

- 1) All averages and sums exclude missing data. With the exception of percentages, data from multi-university centers has been aggregated across universities; percentages represent averages for the reporting universities.
- 2) This report includes only data on Centers which were considered active participants in the NSF IUCRC Program during the 1997-98 fiscal year. Some Centers are reporting data from different fiscal years (1996-1997 & 1997-1998), depending on when the Center had completed their fiscal year at the time NSF requested the Center Director data.
- 3) On Tables 1, "YEAR FUNDED" indicates the year NSF gave the center the operating grant it is currently operating under.
- 4) On Table 2, "TOTAL FUNDING" refers to the total cash income coming into the Center.
- 5) On Table 2, "NSF FUNDING" refers to two kinds of support, "IUCRC FUNDING" which refers to the total support provided by the IUCRC program, including operating grant, self-sustaining Center funding, evaluator support, TIE awards, RUI/PUI awards, etc. "NSF OTHER" refers to cash support for Center operations provided by other NSF groups or divisions. Neither of these categories include money transferred through NSF from other Federal Agencies (MIPRs).
- 6) On Table 2, "INDUSTRY MEMBERSHIP FEES" refers to the total cash membership fees from Center members.
- 7) On Table 2, "INDUSTRY OTHER" refers to additional industry cash funding for operations provided by industrial members (e.g., enhancements, donations, etc.) which is applied to the Center as a whole (e.g., income that results in outcomes shared equally by all Center members).
- 8) On Table 2, "STATE TOTAL" refers to the support provided by state government and/or an agency or program funded by state government.
- 9) On Table 2, "UNIV. TOTAL" refers to the support for the Center operating costs including salary, travel, and overhead returned to the Center. It does NOT include items such as utilities and space.
- 10) On Table 2, "OTHER FEDERAL AGENCY" refers to cash support for Center operations provided by other Federal funding sources, but does NOT include funding from NSF.
- 11) On Table 2, "OTHER NON-FEDERAL AGENCY" refers to cash support for Center operations provided by other non-Federal funding sources, foundations, etc.
- 12) On Table 2, "OTHER FUNDING" refers to any other cash support, such as contracts, received by Center researchers that would not have been received if the Center did not exist. The funding would not result in outcomes shared equally by Center members.
- 13) On Table 3, "CAPITAL AND IN-KIND CONTRIBUTIONS" refers to capital support for items of value over \$25,000 and includes equipment, facilities, personnel, and software.
- 14) On Table 3, "ADMIN. BUDGET (%)" refers to the estimated percentage of the Center's direct operating budget allocated to administration (e.g., administrative salaries, travel, telephone).
- 15) On Table 3, "% to MEM" refers to the overhead rate charged to industry membership fees.
- 16) On Table 3, "TYPICAL OVERHEAD" refers to the typical overhead rate charged to funding sources.
- 17) On Table 4, "FEES" are broken down into primary, secondary, and tertiary (the latter two represent variable membership fees).
- 18) On Table 5, "PROFESSIONAL ADMINISTRATIVE" includes the Center Director and Co- or Site Director.
- 19) On Table 6, "TIME ALLOCATION" refers to allocation of director's full-time equivalent for budgetary purposes.
- 20) On Table 7, "STUDENTS RECEIVING DEGREE" refers to the number of Ph.D.'s, M.S.'s, and B.A./B.S.'s that received a degree during the reporting period.
- 21) On Table 7, "STUDENTS HIRED BY INDUSTRY" refers to the number of Ph.D.'s, M.S.'s, and B.A./B.S.'s that were hired by member companies during the reporting period.
- 22) On Table 7, "PUBLICATIONS" refers to the publications in the open literature the Center researchers produced based on Center research including publications reported that have a Center industry member as an author.