



NATIONAL SCIENCE FOUNDATION  
INDUSTRY/UNIVERSITY COOPERATIVE RESEARCH CENTERS

# FINAL Report

## *2016-2017 STRUCTURAL INFORMATION<sup>1</sup>*

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<sup>1</sup>**NOTE:** 2016-2017 data collected from 70/70 Center Director Surveys (100% response rate).

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**Table 1: 2016-2017 GENERAL CENTER INFORMATION (Sorted Chronologically)\*\***

Yr Started:	Center Name	University Name: Director	Partner University 1 Director	Partner University 2 Director	Partner University 3 Director	Partner University 4 Director
<b>Active</b>						
2001*	Identification Technology Research	Clarkson Univ. Schuckers	West Virginia Univ. Valenti	Univ. of Arizona Burgoon	Univ. of Buffalo Govindaraju	
2002*	Connection One: Telecommunications	Arizona State Univ. Kiaei	Ohio State Univ. Volakis			
2002*	Cooling Technologies Research Center	Purdue Univ. Garimella				
2002*	Excellence in Logistics and Distribution	Univ. of Arkansas Rossetti	Univ. of Missouri, Columbia Noble	Virginia Tech. Ellis		
2002*	Plasmas & Lasers in Advanced Manufacturing	Univ. of Virginia Gupta	Southern Methodist Univ. Kovacevic	Univ. of Illinois, Urbana Champaign Ruzic		
2003	E-Design <sup>a</sup>	Pennsylvania State Univ. Terpenny (Finke)	Univ. of Massachusetts Krishnamurty	Wayne State Univ. Kim	Univ. of Buffalo Lewis	Brigham Young Univ. Salmon
2005	Child Injury Prevention Studies	Children's Hospital of Philadelphia Winston (Arbogast)	Ohio State Univ. Bolte			
2006*	High-Performance Reconfigurable Computing	Univ. of Florida George	Brigham Young Univ. Wirthlin	Virginia Tech. Athanas		
2007	Advanced Forestry Systems <sup>b</sup>	North Carolina State Univ. Goldfarb	Oregon State Univ. Howe	Purdue Univ. Jacobs	Virginia Tech. Fox	Univ. of Georgia Montes
2007	Smart Vehicle Concepts	Ohio State Univ. Dapino				
2008	Advanced Knowledge Enablement	Florida International Univ. Rishe	Florida Atlantic Univ. Furht	Dubna International Univ. (Russia) Cheremisina		
2008	Cloud & Autonomic Computing	Texas Tech. Sill	Univ. of Arizona Hariri	Mississippi State Univ. Banicescu		
2008	Health Organization Transformation <sup>c</sup>	Texas A&M Health Science Center Kash	Georgia Institute of Tech. Lee	Pennsylvania State Univ. Tucker	Univ. of Alabama, Birmingham Weech-Maldonado (Borkowski)	Florida Atlantic Univ. Agarwal
2008	Particulate and Surfactant Systems	Univ. of Florida Moudgil	Columbia Univ. Somasundaran	Dharmsinh Desai Univ. (India) Mukherjee		
2009	Electromagnetic Compatibility	Missouri Univ. of Science & Tech. Fan	Univ. of Houston Chen			
2009	Embedded Systems	Arizona State Univ. Vrudhula	Southern Illinois Univ., Carbondale Tragoudas			
2009	Grid-Connected Advanced Power Electronic Systems	Univ. of Arkansas Mantooth	Univ. of South Carolina Dougal	Univ. of Wisconsin, Milwaukee Nasiri		
2009	Hybrid Multicore Productivity Research <sup>d</sup>	Univ. Maryland, Baltimore County Halem	Rutgers Univ. Adam	North Carolina State Univ. Chirkova	Univ. of Utah DuVall	
2009	Integration of Composites into Infrastructure	West Virginia Univ. GangaRao	Univ. of Miami Nanni	North Carolina State Univ. Seracino	Univ. of Texas, Arlington Pupalla	
2009	Net-Centric and Cloud Software and Systems	Univ. of North Texas Kavi	Univ. of Texas, Dallas Bastani	Arizona State Univ. Spanias		
2009	Research in Intelligent Storage	Univ. of Minnesota Du	Temple Univ. Kant	Texas A&M Reddy		
2009	Water and Environmental Technology	Temple Univ. Suri	Univ. of Arizona Pepper	Arizona State Univ. Abbaszadegan		

\*\* Report sorted by Status. Organized by Year Started. Starting in 2013-2014 report, centers' Year Funded changed to Year Started. \* = Last year funded by NSF.

IUCRC Structure Database, FY 2016-2017

# International site data not included in this report.

a) Additional universities for e-Design are Oregon State Univ. (Stone) and Iowa State Univ. (Kremer).

b) Additional universities for the Center for Advanced Forestry Systems are: Univ. of Georgia (Kane), Univ. of Washington (Turnblom), Univ. of Idaho (Coleman) and Auburn Univ. (Enebak).

c) For Health Organization Transformation, no data provided for Northeastern Univ. (award ended April 2017).

d) For Hybrid Multicore Productivity Research, no data provided for Univ. of Utah. while on no-cost extension.

<i>Yr Started:</i>	<i>Center Name</i>	<i>University Name: Director</i>	<i>Partner University 1 Director</i>	<i>Partner University 2 Director</i>	<i>Partner University 3 Director</i>	<i>Partner University 4 Director</i>
2010	Ceramics Composites and Optical Materials Center	Rutgers Univ. Haber	Clemson Univ. Brown			
2010	Energy Harvesting Materials and Systems	Virginia Tech. Hajj	Leibniz Univ. (Germany) Tweifei			
2010	Manufacturing and Materials Joining Innovation Center	Ohio State Univ. Ramirez	Univ. of Tennessee, Knoxville Rawn	Lehigh Univ. DuPont	Colorado School of Mines Liu	
2010	Membrane Science, Engineering & Technology Center	Univ. of Arkansas Wickramasinghe	Univ. of Colorado, Boulder Ding	New Jersey Institute of Technology Sirkar		
2010	Pharmaceutical Development <sup>e</sup>	Georgia Institute of Tech. Bommarius	Univ. of Kentucky Munson	Univ. of Delaware Roberts		
2010	Resource Recovery and Recycling	Worcester Polytechnic Institute Mishra	Colorado School of Mines Anderson	KU Leuven (Belgium) Blanpain	Univ. of Tokyo (Japan) Fujita	
2010	Security and Software Engineering Research Center	Ball State Univ. Zage	Virginia Tech. Clancy	Georgetown Univ. Burger		
2010	Surveillance Research	Wright State Univ. Rigling	Ohio State Univ. Potter			
2010	Water Equipment and Policy	Univ. Wisconsin, Milwaukee Chen	Marquette Univ. Zitomer			
2010	Wood-Based Composites	Virginia Tech. Frazier	Oregon State Univ. Kamke			
2011	Advanced Non-Ferrous Structural Alloys	Colorado School of Mines Kaufman	Iowa State Univ. Collins			
2011	Biophotonics Sensors and Systems	Boston Univ. Bifano (Dudley)	Univ. of California, Davis Matthews			
2011	Energy-Smart Electronic Systems	Binghamton Univ., State Univ. of New York Sammakia	Villanova Univ. Ortega	Univ. of Texas, Arlington Agonafer	Georgia Institute of Tech. Joshi	
2011	Metamaterials	Univ. of North Carolina, Charlotte Aggarwal	Clarkson Univ. Crouse			
2011	Next Generation Photovoltaics	Univ. of Texas, Austin Korgel	Colorado State Univ. Sampath	Texas A&M Harvey		
2011*	Dynamic Data Analytics	Rutgers Univ. Metaxas	State Univ. of New York Kaufman			
2011**	Berkeley Sensor & Actuator Center <sup>f</sup>	Univ. of California, Berkeley Cable	Univ. of California, Davis Horsley			
2012	Tire Research	Virginia Tech. Taheri	Univ. of Akron Batur			
2012	Visual and Decision Informatics	Univ. of Louisiana, Lafayette Raghavan (Gottumukkala)	Drexel Univ. Hu	Tampere Univ. of Technology (Finland) Gabbouj		
2012*	Sustainably Integrated Buildings and Sites	Univ. of North Carolina, Charlotte Cox				
2013	Arthropod Management Technologies	Iowa State Univ. Bonning	Univ. of Kentucky Palli			
2013	Broadband Wireless Access and Applications	Univ. of Arizona Bose	Virginia Tech. Park	Notre Dame Laneman	Univ. of Mississippi Viswanathan	Catholic Univ. of America Liu
2013	Configuration Analytics and Automation	Univ. of North Carolina, Charlotte Al-Shaar	George Mason Univ. Jajodia	Colorado State Univ. Ray		

\*\* Report sorted by Status. Organized by Year Started. Starting in 2013-2014 report, centers' Year Funded changed to Year Started. \* = Last year funded by NSF.

IUCRC Structure Database, FY 2016-2017

# International site data not included in this report.

e) For Pharmaceutical Development, Univ. of Delaware had an open award with NSF ending September 2020, but it did not go through due to changes in solicitation. As a result, Univ. of Delaware became an affiliate site.

f) For Berkeley Sensors and Actuator, Univ. of California, Davis is an affiliate site that provided data which included in this report.

<i>Yr Started:</i>	<i>Center Name</i>	<i>University Name: Director</i>	<i>Partner University 1 Director</i>	<i>Partner University 2 Director</i>	<i>Partner University 3 Director</i>	<i>Partner University 4 Director</i>
2013	Cyber-Physical Systems for the Hospital Operating Room	Houston Methodist Garbey	Univ. of Florida Bercceli			
2013	Freeform Optics	Univ. of Rochester Rolland	Univ. of North Carolina, Charlotte Davies			
2013	Research in Storage Systems	Univ. of California, Santa-Cruz Miller				
2013	Science Center for Marine Fisheries	Univ. of Southern Mississippi Powell	Virginia Institute for Marine Science Mann			
2013	Spatiotemporal Thinking, Computing and Application	George Mason Univ. Yang	Harvard Univ. Ur	Univ. of California, Santa Barbara Clarke		
2013	Unmanned Aircraft Systems	Brigham Young Univ. McLain	Univ. of Colorado Frew	Virginia Tech. Woolsey		
2013	Wheat Genetics	Kansas State Univ. Gill	Colorado State Univ. Byrne			
2014	Advanced Design and Man of Integrated Microfluidics	Univ. of California, Irvine Lee	Univ. of Cincinnati Papautsky			
2014	Bioplastics and Biocomposites	Iowa State Univ. Grewell	Washington State Univ. Kessler			
2014	Dielectrics and Piezoelectrics	North Carolina State Univ. Dickey	Pennsylvania State Univ. Trolier-McKinstry			
2014	Disruptive Musculoskeletal Innovations	Univ. of California, San Francisco Lotz	Univ. of Toledo Goel			
2014	iPerform - IUCRC for Assistive Technologies to Enhance Human Performance	Univ. of Texas, Arlington Makedon	Univ. of Texas, Dallas Daescu			
2014	Multi-functional Integrated System Technology	Univ. of Florida Nishida	Univ. of Central Florida Yuan			
2014	Novel High-Voltage/Temperature Materials and Structures	Univ. of Denver Kumosa	Michigan Technological Univ. Odegard	Univ. of Illinois, Urbana Champaign Jasiuk		
2014	Robots and Sensors for the Human Well-being	Univ. of Minnesota, Twin Cities Morellas	Univ. of Pennsylvania Daniilidis	Univ. of Denver Andrews	Univ. of North Carolina, Charlotte Xiao	Purdue Univ. Voyles
2014	Wind Energy Science, Technology and Research <sup>g</sup>	Univ. of Massachusetts, Lowell Niezrecki	Univ. of Texas, Dallas Rotea (Leonardi)			
2014*	Electrochemical Processes and Technologies	Ohio Univ. Botte				
2015	Atomically Thin Multifunctional Coatings	Pennsylvania State Univ. Terrones	Rice Univ. Lou			
2015	Fiber-Wireless Integration and Networking <sup>h</sup>	Georgia Institute of Tech. Chang	Univ. of Maryland Davis			
2015	Rational Catalyst Synthesis	Univ. of South Carolina, Columbia Regalbuto	Virginia Commonwealth Univ. Gupton			
2016	Advanced Electronics through Machine Learning	Univ. of Illinois, Urbana Champaign Rosenbaum	Georgia Institute of Tech. Swaminathan	North Carolina State Univ. Franzon		
2016	Advanced Mammalian Biomanufacturing Innovation Center	John Hopkins Univ. Betenbaugh	Univ. of Massachusetts, Lowell Yoon	Univ. of Delaware Lee	Clemson Univ. Harcum	
2016	Advanced Research in Drying	Worcester Polytechnic Institute Yagoobi	Univ. of Illinois, Urbana Champaign Feng			

\*\* Report sorted by Status. Organized by Year Started. Starting in 2013-2014 report, centers' Year Funded changed to Year Started. \* = Last year funded by NSF.

# International site data not included in this report.

g) For Wind Energy Science, Technology and Research, Dr. Leonardi served as interim site director during the reporting period.

h) For Fiber-Wireless Integration and Networking, no data provided for Univ. of Maryland while on no-cost extension.

IUCRC Structure Database, FY 2016-2017

<i>Yr Started:</i>	<i>Center Name</i>	<i>University Name: Director</i>	<i>Partner University 1 Director</i>	<i>Partner University 2 Director</i>	<i>Partner University 3 Director</i>	<i>Partner University 4 Director</i>
2016	Computational Biotechnology and Genomic Medicine	Univ. of Illinois, Urbana Champaign Iyer	Mayo Clinic Wang			
2016	Efficient Vehicles and Sustainable Transportation Systems	Univ. of Louisville Prater	Univ. of Alabama, Tuscaloosa Hong	Arizona State Univ. Yu	Univ. of Texas, Austin Matthews	
<b>New/Recompeted</b>						
2017	Advanced Research in Forensic Science	Florida International Univ. Almirall	George Washington Univ. Schanfield	Northeastern Univ. Hall	Texas A&M Tomberlin	Univ. of South Alabama Yasinsac
2017	Building Reliable Advances and Innovation in Neurotechnology	Arizona State Univ. Contreras-Vidal	Univ. of Houston Santello			
2017	Space, High-Performance, and Resilient Computing	Univ. of Pittsburgh George	Univ. of Florida Lam	Brigham Young Univ. Wirthlin		

**\*\* Report sorted by Status. Organized by Year Started. Starting in 2013-2014 report, centers' Year Funded changed to Year Started. \* = Last year funded by NSF.  
# International site data not included in this report.**

*IUCRC Structure Database, FY 2016-2017*

**Table 2: 2016-2017 OPERATING BUDGET AND TOTAL FUNDING**

<i>Center Name</i>	<i>Total <sup>4</sup> Funding</i>	<i>NSF/<sup>5</sup> IUCRC</i>	<i>Other <sup>6</sup> NSF</i>	<i>Member <sup>7</sup> Fees</i>	<i>Add'l <sup>8</sup> Industry</i>	<i>State <sup>9</sup></i>	<i>Other<sup>10</sup> Federal</i>	<i>Non-<sup>11</sup> Federal</i>
Advanced Design and Man of Integr	\$1,458,175	\$191,175	\$693,000	\$350,000	\$0	\$0	\$0	\$224,000
Advanced Electronics through Mac	\$1,058,000	\$458,000	\$0	\$600,000	\$0	\$0	\$0	\$0
Advanced Forestry Systems	\$4,791,192	\$466,000	\$33,271	\$3,242,401	\$237,765	\$672,686	\$38,860	\$100,209
Advanced Knowledge Enablement	\$2,057,345	\$229,750	\$980,579	\$367,000	\$0	\$0	\$318,543	\$161,473
Advanced Mammalian Biomanufact	\$1,400,000	\$600,000	\$0	\$800,000	\$0	\$0	\$0	\$0
Advanced Non-Ferrous Structural A	\$783,000	\$213,000	\$0	\$480,000	\$0	\$0	\$0	\$90,000
Advanced Research in Drying	\$680,000	\$300,000	\$0	\$380,000	\$0	\$0	\$0	\$0
Arthropod Management Technologi	\$762,500	\$162,500	\$0	\$550,000	\$0	\$5,000	\$45,000	\$0
Atomically Thin Multifunctional Coat	\$705,838	\$187,605	\$0	\$518,233	\$0	\$0	\$0	\$0
Berkeley Sensor & Actuator Center	\$10,673,062	\$0	\$712,909	\$3,141,875	\$995,803	\$63,032	\$5,216,442	\$543,001
Biophotonics Sensors and Systems	\$565,000	\$10,000	\$0	\$425,000	\$20,000	\$0	\$50,000	\$60,000
Bioplastics and Biocomposites	\$791,391	\$210,499	\$142,892	\$360,000	\$10,000	\$68,000	\$0	\$0
Broadband Wireless Access and Ap	\$1,213,037	\$411,760	\$60,000	\$741,277	\$0	\$0	\$0	\$0
Ceramics Composites and Optical	\$572,750	\$143,250	\$0	\$429,500	\$0	\$0	\$0	\$0
Child Injury Prevention Studies	\$2,152,713	\$463,164	\$736,541	\$815,000	\$138,008	\$0	\$0	\$0
Cloud & Autonomic Computing <sup>a</sup>	\$475,000	\$175,000	\$0	\$300,000	\$0	\$0	\$0	\$0
Computational Biotechnology and	\$600,000	\$300,000	\$0	\$300,000	\$0	\$0	\$0	\$0
Configuration Analytics and Automa	\$780,000	\$280,000	\$0	\$500,000	\$0	\$0	\$0	\$0
Connection One: Telecommunicatio <sup>b</sup>	\$513,521	\$38,697	\$0	\$474,824	\$0	\$0	\$0	\$0
Cooling Technologies Research Ce	\$1,610,000	\$30,000	\$0	\$480,000	\$400,000	\$200,000	\$500,000	\$0
Cyber-Physical Systems for the Ho	\$925,703	\$361,903	\$0	\$350,000	\$0	\$0	\$85,000	\$128,800
Dielectrics and Piezoelectrics	\$1,597,288	\$205,379	\$0	\$807,000	\$0	\$0	\$429,909	\$155,000
Disruptive Musculoskeletal Innovati	\$1,364,047	\$168,100	\$0	\$320,000	\$0	\$0	\$90,840	\$785,107
Dynamic Data Analytics	\$90,000	\$0	\$0	\$90,000	\$0	\$0	\$0	\$0
E-Design <sup>c</sup>	\$1,159,406	\$213,500	\$0	\$945,906	\$0	\$0	\$0	\$0
Efficient Vehicles and Sustainable	\$1,225,000	\$600,000	\$0	\$625,000	\$0	\$0	\$0	\$0
Electrochemical Processes and Tec	\$383,365	\$83,365	\$0	\$300,000	\$0	\$0	\$0	\$0
Electromagnetic Compatibility <sup>d</sup>	\$3,303,000	\$110,000	\$65,000	\$2,936,000	\$192,000	\$0	\$0	\$0
Embedded Systems	\$642,362	\$92,980	\$0	\$549,382	\$0	\$0	\$0	\$0
Energy Harvesting Materials and Sy	\$450,000	\$0	\$0	\$450,000	\$0	\$0	\$0	\$0
Energy-Smart Electronic Systems	\$1,433,000	\$83,000	\$0	\$490,000	\$80,000	\$780,000	\$0	\$0
Excellence in Logistics and Distribu <sup>e</sup>	\$585,104	\$85,960	\$0	\$492,894	\$0	\$0	\$0	\$6,250
Fiber-Wireless Integration and Netw	\$1,262,000	\$183,000	\$0	\$450,000	\$125,000	\$330,000	\$0	\$174,000
Freeform Optics	\$2,171,415	\$171,000	\$43,000	\$725,000	\$1,094,815	\$0	\$75,000	\$62,600
Grid-Connected Advanced Power E	\$922,928	\$335,732	\$16,000	\$390,000	\$0	\$0	\$0	\$181,196
Health Organization Transformation	\$1,587,457	\$562,457	\$0	\$1,025,000	\$0	\$0	\$0	\$0
High-Performance Reconfigurable <sup>f</sup>	\$2,196,434	\$106,000	\$0	\$1,743,790	\$250,000	\$0	\$18,000	\$78,644
Hybrid Multicore Productivity Resea	\$2,311,948	\$400,916	\$0	\$667,213	\$0	\$0	\$1,079,479	\$164,340
Identification Technology Research <sup>g</sup>	\$2,597,333	\$301,000	\$356,011	\$644,950	\$0	\$0	\$1,245,372	\$50,000
Integration of Composites into Infra	\$1,405,095	\$546,850	\$0	\$858,245	\$0	\$0	\$0	\$0
iPerform - IUCRC for Assistive Tec	\$586,686	\$198,000	\$0	\$356,843	\$31,843	\$0	\$0	\$0
Manufacturing and Materials Joinin <sup>h</sup>	\$2,006,915	\$276,300	\$0	\$1,730,615	\$0	\$0	\$0	\$0
Membrane Science, Engineering & <sup>i</sup>	\$1,098,000	\$168,000	\$0	\$930,000	\$0	\$0	\$0	\$0
Metamaterials	\$781,121	\$200,000	\$0	\$581,121	\$0	\$0	\$0	\$0

\* Report sorted Alphabetically by Center

IUCRC Structure Database, FY 2016-2017

\*\* The centers in gray are on no cost extension, they did not receive any additional NSF IUCRC funding during the reporting period.

a) For Cloud and Autonomic Computing, funding from NSF IUCRC Award and Supplements is low because Mississippi State Univ. was on no-cost extension during the reporting period.

b) For Connection One, funding from NSF IUCRC Award and Supplements is low because Ohio State Univ. was on no-cost extension during the reporting period.

c) For E-Design, funding from NSF IUCRC Award and Supplements is low because Univ. at Buffalo-SUNY, Brigham Young Univ., and Iowa State Univ. were on no-cost extension during the reporting period.

d) For Electromagnetic Compatibility, funding from NSF IUCRC Award and Supplements is low because Univ. of Houston was on no-cost extension during the reporting period.

e) For Excellence in Logistics and Distribution, funding from NSF IUCRC Award and Supplements is low because Virginia Tech was on no-cost extension during the reporting period.

f) For High-Performance Reconfigurable Computing, funding from NSF IUCRC Award and Supplements is low because Univ. of Florida was on no-cost extension during the reporting period.

g) For Identification Technology Research, funding from NSF IUCRC Award and Supplements is low because Univ. of Arizona was on no-cost extension and then left the center in February 2017.

h) For Manufacturing and Materials Joining Innovation Center, funding from NSF IUCRC Award and Supplements is low because Colorado School of Mines was on no-co

i) For Membrane Science, Engineering and Technology Center, funding from NSF IUCRC Award and Supplements is low because NJIT was on no-cost extension during the reporting period.

<i>Center Name</i>	<i>Total<sup>4</sup> Funding</i>	<i>NSF/<sup>5</sup> IUCRC</i>	<i>Other<sup>6</sup> NSF</i>	<i>Member<sup>7</sup> Fees</i>	<i>Add'l<sup>8</sup> Industry</i>	<i>State<sup>9</sup></i>	<i>Other<sup>10</sup> Federal</i>	<i>Non-<sup>11</sup> Federal</i>
Multi-functional Integrated System	\$744,080	\$192,500	\$0	\$549,580	\$2,000	\$0	\$0	\$0
Net-Centric and Cloud Software an	\$883,318	\$393,318	\$0	\$490,000	\$0	\$0	\$0	\$0
Next Generation Photovoltaics	\$2,314,978	\$371,000	\$0	\$1,037,187	\$0	\$656,791	\$0	\$250,000
Novel High-Voltage/Temperature M	\$986,532	\$246,532	\$240,000	\$460,000	\$0	\$0	\$0	\$40,000
Particulate and Surfactant Systems	\$842,693	\$138,500	\$111,441	\$359,480	\$160,000	\$0	\$53,272	\$20,000
Pharmaceutical Development <sup>j</sup>	\$540,610	\$225,610	\$0	\$315,000	\$0	\$0	\$0	\$0
Plasmas & Lasers in Advanced Ma	\$758,150	\$131,000	\$0	\$552,150	\$75,000	\$0	\$0	\$0
Rational Catalyst Synthesis	\$506,000	\$166,000	\$0	\$340,000	\$0	\$0	\$0	\$0
Research in Intelligent Storage	\$1,167,000	\$392,000	\$0	\$775,000	\$0	\$0	\$0	\$0
Research in Storage Systems	\$478,000	\$48,000	\$0	\$430,000	\$0	\$0	\$0	\$0
Resource Recovery and Recycling	\$649,000	\$110,000	\$33,000	\$506,000	\$0	\$0	\$0	\$0
Robots and Sensors for the Human <sup>k</sup>	\$1,168,187	\$341,919	\$0	\$826,268	\$0	\$0	\$0	\$0
Science Center for Marine Fisheries	\$1,117,839	\$177,868	\$0	\$400,000	\$0	\$317,868	\$222,103	\$0
Security and Software Engineering	\$2,018,432	\$315,000	\$0	\$1,198,433	\$0	\$0	\$504,999	\$0
Smart Vehicle Concepts	\$623,725	\$64,000	\$21,725	\$538,000	\$0	\$0	\$0	\$0
Spatiotemporal Thinking, Computin	\$1,399,883	\$264,000	\$70,000	\$765,883	\$0	\$0	\$300,000	\$0
Surveillance Research	\$735,118	\$103,919	\$0	\$516,506	\$114,693	\$0	\$0	\$0
Sustainably Integrated Buildings an	\$318,000	\$93,000	\$0	\$225,000	\$0	\$0	\$0	\$0
Tire Research	\$1,587,837	\$947,837	\$0	\$520,000	\$0	\$120,000	\$0	\$0
Unmanned Aircraft Systems	\$1,946,250	\$422,450	\$0	\$752,000	\$771,800	\$0	\$0	\$0
Visual and Decision Informatics	\$634,415	\$135,000	\$16,000	\$255,000	\$0	\$178,472	\$49,943	\$0
Water and Environmental Technolo	\$1,146,000	\$196,000	\$0	\$589,000	\$130,000	\$231,000	\$0	\$0
Water Equipment and Policy	\$949,386	\$262,337	\$0	\$687,049	\$0	\$0	\$0	\$0
Wheat Genetics	\$806,000	\$196,000	\$0	\$500,000	\$0	\$110,000	\$0	\$0
Wind Energy Science, Technology	\$480,199	\$178,949	\$0	\$301,250	\$0	\$0	\$0	\$0
Wood-Based Composites	\$976,397	\$207,999	\$0	\$768,398	\$0	\$0	\$0	\$0
<b>Grand Mean</b>	\$1,307,231	\$237,780	\$61,877	\$691,018	\$68,982	\$53,326	\$147,468	\$46,780
<b>Grand Sum</b>	\$91,506,158	\$16,644,580	\$4,331,368	\$48,371,253	\$4,828,727	\$3,732,849	\$10,322,762	\$3,274,619

\* Report sorted Alphabetically by Center

IUCRC Structure Database, FY 2016-2017

\*\* The centers in gray are on no cost extension, they did not receive any additional NSF IUCRC funding during the reporting period.

j) For Pharmaceutical Development, no NSF IUCRC Award Supplement data provided by the lead site. Last year's funding amount listed instead.

k) For Robots and Sensors for Human Well-being, funding from NSF IUCRC Award and Supplements is low because Purdue Univ. was on no-cost extension during the reporting period.

**Table 3: 2016-2017 CAPITAL AND IN-KIND SUPPORT**

<i>Center Name</i>	<i>Total Funding</i>	<i>Capital and In-Kind Support</i> <sup>12</sup>					<i>Other Support</i>	<i>Admin</i> <sup>13</sup> <i>Budget</i>
		<i>Total Cap In-Kind</i>	<i>Equip-ment</i>	<i>Facilities</i>	<i>Personnel</i>	<i>Software</i>		
Advanced Design and Man of Integrated Mi	\$1,458,175	\$100,000	\$0	\$0	\$0	\$50,000	\$50,000	20
Advanced Electronics through Machine Lea	\$1,058,000	\$0	\$0	\$0	\$0	\$0	\$0	34
Advanced Forestry Systems	\$4,791,192	\$876,493	\$154,000	\$432,429	\$216,000	\$41,000	\$33,064	25
Advanced Knowledge Enablement	\$2,057,345	\$692,550	\$157,000	\$0	\$80,000	\$455,550	\$0	20
Advanced Mammalian Biomanufacturing In	\$1,400,000	\$0	\$0	\$0	\$0	\$0	\$0	21.7
Advanced Non-Ferrous Structural Alloys	\$783,000	\$0	\$0	\$0	\$0	\$0	\$0	21
Advanced Research in Drying	\$680,000	\$0	\$0	\$0	\$0	\$0	\$0	29.5
Arthropod Management Technologies	\$762,500	\$0	\$0	\$0	\$0	\$0	\$0	14
Atomically Thin Multifunctional Coatings	\$705,838	\$0	\$0	\$0	\$0	\$0	\$0	26
Berkeley Sensor & Actuator Center	\$10,673,062	\$100,000	\$25,000	\$75,000	\$0	\$0	\$0	5
Biophotonics Sensors and Systems	\$565,000	\$5,000	\$0	\$0	\$5,000	\$0	\$0	5
Bioplastics and Biocomposites	\$791,391	\$473,750	\$0	\$0	\$286,550	\$0	\$187,200	20
Broadband Wireless Access and Applicatio	\$1,213,037	\$5,000	\$5,000	\$0	\$0	\$0	\$0	15
Ceramics Composites and Optical Material	\$572,750	\$0	\$0	\$0	\$0	\$0	\$0	25
Child Injury Prevention Studies	\$2,152,713	\$613,172	\$21,250	\$32,000	\$44,222	\$0	\$515,700	10
Cloud & Autonomic Computing	\$475,000	\$57,000	\$57,000	\$0	\$0	\$0	\$0	10
Computational Biotechnology and Genomic	\$600,000	\$135,600	\$135,600	\$0	\$0	\$0	\$0	25
Configuration Analytics and Automation	\$780,000	\$0	\$0	\$0	\$0	\$0	\$0	5
Connection One: Telecommunications	\$513,521	\$0	\$0	\$0	\$0	\$0	\$0	5
Cooling Technologies Research Center	\$1,610,000	\$0	\$0	\$0	\$0	\$0	\$0	5
Cyber-Physical Systems for the Hospital O	\$925,703	\$0	\$0	\$0	\$0	\$0	\$0	12
Dielectrics and Piezoelectrics	\$1,597,288	\$0	\$0	\$0	\$0	\$0	\$0	4
Disruptive Musculoskeletal Innovations	\$1,364,047	\$224,000	\$0	\$56,500	\$167,500	\$0	\$0	10
Dynamic Data Analytics	\$90,000	\$0	\$0	\$0	\$0	\$0	\$0	3
E-Design	\$1,159,406	\$101,900	\$0	\$0	\$0	\$101,900	\$0	55
Efficient Vehicles and Sustainable Transpor	\$1,225,000	\$5,000	\$0	\$0	\$5,000	\$0	\$0	26.8
Electrochemical Processes and Technologi	\$383,365	\$0	\$0	\$0	\$0	\$0	\$0	10
Electromagnetic Compatibility	\$3,303,000	\$0	\$0	\$0	\$0	\$0	\$0	7
Embedded Systems	\$642,362	\$0	\$0	\$0	\$0	\$0	\$0	24
Energy Harvesting Materials and Systems	\$450,000	\$30,000	\$0	\$0	\$0	\$0	\$30,000	16
Energy-Smart Electronic Systems	\$1,433,000	\$395,000	\$395,000	\$0	\$0	\$0	\$0	10
Excellence in Logistics and Distribution	\$585,104	\$0	\$0	\$0	\$0	\$0	\$0	10
Fiber-Wireless Integration and Networking	\$1,262,000	\$0	\$0	\$0	\$0	\$0	\$0	5
Freeform Optics	\$2,171,415	\$48,000	\$0	\$0	\$0	\$0	\$48,000	7.4
Grid-Connected Advanced Power Electroni	\$922,928	\$22,500	\$22,500	\$0	\$0	\$0	\$0	10
Health Organization Transformation	\$1,587,457	\$200,000	\$0	\$100,000	\$100,000	\$0	\$0	40
High-Performance Reconfigurable Computi	\$2,196,434	\$358,000	\$100,000	\$100,000	\$25,000	\$133,000	\$0	10
Hybrid Multicore Productivity Research	\$2,311,948	\$195,000	\$125,000	\$0	\$0	\$70,000	\$0	10
Identification Technology Research	\$2,597,333	\$300,000	\$0	\$0	\$0	\$300,000	\$0	10
Integration of Composites into Infrastructur	\$1,405,095	\$0	\$0	\$0	\$0	\$0	\$0	4
iPerform - I/UCRC for Assistive Technologi	\$586,686	\$0	\$0	\$0	\$0	\$0	\$0	40
Lasers & Plasmas in Advanced Manufacturi	\$758,150	\$70,000	\$70,000	\$0	\$0	\$0	\$0	15
Manufacturing and Materials Joining Innova	\$2,006,915	\$2,041,862	\$492,000	\$0	\$0	\$195,000	\$1,354,862	5.5
Membrane Science, Engineering & Technol	\$1,098,000	\$0	\$0	\$0	\$0	\$0	\$0	10
Metamaterials	\$781,121	\$32,000	\$0	\$0	\$0	\$0	\$32,000	15
Multi-functional Integrated System Technol	\$744,080	\$0	\$0	\$0	\$0	\$0	\$0	17
Net-Centric and Cloud Software and Syste	\$883,318	\$146,200	\$32,000	\$40,000	\$74,200	\$0	\$0	13
Next Generation Photovoltaics	\$2,314,978	\$50,000	\$0	\$50,000	\$0	\$0	\$0	7
Novel High-Voltage/Temperature Materials	\$986,532	\$190,000	\$0	\$70,000	\$120,000	\$0	\$0	10
Particulate and Surfactant Systems	\$842,693	\$0	\$0	\$0	\$0	\$0	\$0	14
Pharmaceutical Development	\$540,610	\$104,437	\$0	\$0	\$84,437	\$0	\$20,000	18

\* Report sorted Alphabetically by Center

IUCRC Structure Database, FY 2016-2017



**Capital and In-Kind Support <sup>12</sup>**

<i>Center Name</i>	<i>Total Funding</i>	<i>Total Cap In-Kind</i>	<i>Equip-ment</i>	<i>Facilities</i>	<i>Personnel</i>	<i>Software</i>	<i>Other Support</i>	<i>Admin<sup>13</sup> Budget</i>
Rational Catalyst Synthesis	\$506,000	\$62,934	\$0	\$0	\$62,934	\$0	\$0	15
Research in Intelligent Storage	\$1,167,000	\$0	\$0	\$0	\$0	\$0	\$0	10
Research in Storage Systems	\$478,000	\$0	\$0	\$0	\$0	\$0	\$0	15
Resource Recovery and Recycling	\$649,000	\$0	\$0	\$0	\$0	\$0	\$0	10
Robots and Sensors for the Human Well-be	\$1,168,187	\$136,072	\$51,372	\$0	\$0	\$65,900	\$18,800	5
Science Center for Marine Fisheries	\$1,117,839	\$280,727	\$50,000	\$0	\$207,727	\$13,000	\$10,000	45
Security and Software Engineering Researc	\$2,018,432	\$1,035,924	\$0	\$18,000	\$300,905	\$0	\$717,019	15
Smart Vehicle Concepts	\$623,725	\$0	\$0	\$0	\$0	\$0	\$0	9
Spatiotemporal Thinking, Computing and A	\$1,399,883	\$445,000	\$200,000	\$150,000	\$35,000	\$60,000	\$0	15
Surveillance Research	\$735,118	\$0	\$0	\$0	\$0	\$0	\$0	4
Sustainably Integrated Buildings and Sites	\$318,000	\$0	\$0	\$0	\$0	\$0	\$0	20
Tire Research	\$1,587,837	\$40,000	\$0	\$0	\$0	\$0	\$40,000	9
Unmanned Aircraft Systems	\$1,946,250	\$0	\$0	\$0	\$0	\$0	\$0	14
Visual and Decision Informatics	\$634,415	\$40,050	\$0	\$0	\$0	\$0	\$40,050	44
Water and Environmental Technology	\$1,146,000	\$132,000	\$57,000	\$0	\$0	\$25,000	\$50,000	10
Water Equipment and Policy	\$949,386	\$0	\$0	\$0	\$0	\$0	\$0	15
Wheat Genetics	\$806,000	\$1,723,419	\$0	\$1,723,419	\$0	\$0	\$0	10
Wind Energy Science, Technology and Res	\$480,199	\$0	\$0	\$0	\$0	\$0	\$0	12
Wood-Based Composites	\$976,397	\$626,013	\$25,000	\$45,605	\$486,934	\$68,474	\$0	21
<b>Grand Mean</b>	\$1,307,231	\$172,780	\$31,067	\$41,328	\$32,877	\$22,555	\$44,953	15.54
<b>Grand Sum</b>	\$91,506,158	\$12,094,603	\$2,174,722	\$2,892,953	\$2,301,409	\$1,578,824	\$3,146,695	N/A

\* Report sorted Alphabetically by Center

**Table 4: 2016-2017 INDUSTRY MEMBERSHIP DESCRIPTORS**

Center Name	2016-2017 MEMBERSHIPS			LIFETIME MEMBERSHIPS <sup>14</sup>			ANNUAL FEES <sup>15</sup>			
	Current	Starting	New	Left	Starting	New	Left	Primary	Secondary	Tertiary
Advanced Design and Man of Integrate	10	14	1	5	13	16	6	\$50,000	\$25,000	
Advanced Electronics through Machine	12	12	0	0	12	12	0	\$50,000		
Advanced Forestry Systems <sup>a</sup>	148	147	7	6	68	234	81	\$25,000	\$5,000	
Advanced Knowledge Enablement	30	32	2	4	10	82	55	\$50,000	\$5,000	
Advanced Mammalian Biomanufacturin	16	16	0	0	16	16	0	\$50,000		
Advanced Non-Ferrous Structural Alloy	12	13	1	2	9	20	8	\$48,000	\$16,000	
Advanced Research in Drying	9	9	0	0	9	9	0	\$50,000	\$5,000	
Arthropod Management Technologies	11	9	2	0	7	12	1	\$50,000		
Atomically Thin Multifunctional Coatings	12	12	1	1	12	13	1	\$43,500	\$21,750	
Berkeley Sensor & Actuator Center <sup>b</sup>	35	37	7	9	35	68	33	\$135,000	\$105,000	\$50,000
Biophotonics Sensors and Systems	8	8	1	1	9	18	10	\$50,000	\$25,000	
Bioplastics and Biocomposites	20	26	1	7	31	32	12	\$30,000	\$15,000	
Broadband Wireless Access and Applic	18	22	3	7	16	32	14	\$40,000		
Ceramics Composites and Optical Mate	15	17	1	3	19	32	17	\$40,000	\$15,000	
Child Injury Prevention Studies <sup>c</sup>	22	20	2	0	8	30	7	\$50,000	\$25,000	\$15,000
Cloud & Autonomic Computing	6	3	3	0	13	46	28	\$50,000		
Computational Biotechnology and Geno	7	7	0	0	7	7	0	\$50,000		
Configuration Analytics and Automation	10	6	5	1	7	13	4	\$50,000		
Connection One: Telecommunications	6	10	0	4	9	75	79	\$50,000		
Cooling Technologies Research Center	16	14	2	0	14	94	53	\$30,000		
Cyber-Physical Systems for the Hospita	7	7	0	0	6	10	3	\$35,000		
Dielectrics and Piezoelectrics	26	25	3	2	24	29	4	\$36,000	\$12,000	
Disruptive Musculoskeletal Innovations	8	8	2	2	7	11	3	\$40,000		
Dynamic Data Analytics	4	10	0	6	5	17	13	\$35,000	\$10,000	
E-Design	19	25	5	11	9	87	75	\$30,000	\$10,000	
Efficient Vehicles and Sustainable Tran	14	14	0	0	14	14	0	\$50,000		
Electrochemical Processes and Techno	6	6	2	2	5	9	3	\$50,000	\$25,000	
Electromagnetic Compatibility	29	27	4	2	15	68	36	\$60,000	\$30,000	
Embedded Systems	10	10	1	1	7	22	12	\$50,000	\$25,000	\$5,000
Energy Harvesting Materials and Syste	8	10	0	2	11	26	18	\$40,000	\$20,000	
Energy-Smart Electronic Systems	18	21	2	5	15	35	19	\$50,000	\$25,000	
Excellence in Logistics and Distribution	11	11	1	1	29	97	120	\$60,000	\$30,000	
Fiber-Wireless Integration and Networki	11	9	2	0	9	11	0	\$100,000	\$50,000	\$25,000
Freeform Optics	18	16	3	1	7	23	5	\$48,000	\$24,000	
Grid-Connected Advanced Power Electr	18	17	3	2	17	38	20	\$40,000	\$5,000	
Health Organization Transformation	21	25	8	12	10	50	28	\$50,000	\$25,000	
High-Performance Reconfigurable Com	35	37	7	9	21	119	74	\$40,000		
Hybrid Multicore Productivity Research	20	16	7	3	14	45	24	\$45,000	\$20,000	\$5,000
Identification Technology Research	18	17	4	3	8	66	54	\$40,000	\$10,000	
Integration of Composites into Infrastruc	33	31	5	3	15	72	39	\$50,000	\$40,000	\$15,000
iPerform - IUCRC for Assistive Technol	9	9	2	2	8	12	2	\$50,000	\$20,000	
Lasers & Plasmas in Advanced Manufa	18	15	4	1	9	56	40	\$35,000	\$10,000	
Manufacturing and Materials Joining Inn	42	38	10	6	25	66	24	\$50,000	\$25,000	\$10,000
Membrane Science, Engineering & Tec	17	19	2	4	8	24	7	\$60,000		
Metamaterials	12	14	2	4	8	18	6	\$45,000	\$25,000	

\* Report sorted Alphabetically by Center

IUCRC Structure Database, FY 2016-2017

a) Advanced Forestry Systems includes 45 second memberships not reported prior 2017. Lifetime total members added was adjusted to reflect the previously unreported addition of memberships. However, data in this report does not reconcile with previous years count of members.

b) For Berkeley Sensor Actuator Center, a higher primary "Collaborative Membership" fee level of \$135,000 and a secondary membership fee of \$105,000 were established that provides members with enhanced benefits and privileges.

c) For Child Injury Prevention Studies, three member firms have left and rejoined the center more than once. Each addition and termination of these members is reflected in the lifetime membership counts.

<i>Center Name</i>	<i>2016-2017 MEMBERSHIPS</i>			<i>LIFETIME MEMBERSHIPS<sup>14</sup></i>			<i>ANNUAL FEES<sup>15</sup></i>			
	<i>Current</i>	<i>Starting</i>	<i>New</i>	<i>Left</i>	<i>Starting</i>	<i>New</i>	<i>Left</i>	<i>Primary</i>	<i>Secondary</i>	<i>Tertiary</i>
Multi-functional Integrated System Tech	11	10	2	1	10	14	3	\$50,000	\$25,000	
Net-Centric and Cloud Software and Sy <sup>d</sup>	23	15	9	1	12	55	32	\$35,000	\$10,000	
Next Generation Photovoltaics	17	16	5	4	6	34	17	\$50,000		
Novel High-Voltage/Temperature Materi	13	12	2	1	13	17	3	\$40,000	\$20,000	
Particulate and Surfactant Systems	11	15	0	4	43	66	54	\$35,000	\$15,000	
Pharmaceutical Development	7	8	0	1	4	19	11	\$50,000	\$25,000	
Rational Catalyst Synthesis	10	7	3	0	7	10	0	\$40,000	\$20,000	
Research in Intelligent Storage	17	20	5	8	8	41	24	\$50,000	\$15,000	
Research in Storage Systems	9	9	3	3	10	18	9	\$50,000	\$15,000	
Resource Recovery and Recycling	16	17	2	3	14	40	24	\$33,000		
Robots and Sensors for the Human Wel	22	20	3	1	15	28	5	\$35,000	\$10,000	
Science Center for Marine Fisheries	13	10	3	0	9	14	1	\$50,000	\$25,000	
Security and Software Engineering Res	19	17	7	5	20	54	35	\$40,000	\$5,000	
Smart Vehicle Concepts	16	18	3	5	14	43	27	\$40,000	\$12,000	\$10,000
Spatiotemporal Thinking, Computing an <sup>e</sup>	16	12	8	4	10	27	9	\$50,000	\$25,000	\$5,000
Surveillance Research	10	11	1	2	8	15	5	\$50,000	\$25,000	
Sustainably Integrated Buildings and Sit	5	7	2	4	4	12	7	\$50,000	\$25,000	\$15,000
Tire Research	15	15	0	0	18	15	10	\$40,000	\$20,000	
Unmanned Aircraft Systems	20	22	2	4	9	26	6	\$44,000		
Visual and Decision Informatics	8	9	3	4	17	24	16	\$45,000	\$30,000	
Water and Environmental Technology	32	37	6	11	33	70	38	\$30,000	\$10,000	\$3,000
Water Equipment and Policy <sup>f</sup>	14	15	0	1	6	20	6	\$50,000	\$10,000	\$12,049
Wheat Genetics	10	12	0	2	12	13	3	\$50,000	\$20,000	
Wind Energy Science, Technology and	8	10	1	3	10	13	5	\$40,000	\$15,000	\$5,000
Wood-Based Composites	17	15	2	0	8	22	5	\$35,000		
<b>Grand Mean</b>	17.34	17.57	2.71	2.94	13.57	37.09	19.90	\$46,607	\$20,784	\$13,465
<b>Grand Sum</b>	1214	1230	190	206	950	2596	1393			

\* Report sorted Alphabetically by Center

IUCRC Structure Database, FY 2016-2017

d) Net-Centric and Cloud Software and Systems includes one second membership not reported prior 2017. Lifetime total members added was adjusted to reflect the previously unreported addition of memberships. However, data in this report does not reconcile with previous years count of members.

e) Spatiotemporal Thinking and Computing includes two second memberships not reported prior 2017. Lifetime total members added was adjusted to reflect the previously unreported addition of memberships. However, data in this report does not reconcile with previous years count of members.

f) For Water Equipment and Policy, tertiary fee rate is available to utility companies. Fee rate is determined on sliding scale of 1,000 per year per 1 million revenue.

**Table 5: 2016-2017 HUMAN RESOURCES**

<b>Center Name</b>	<b>RESEARCHERS</b>				<b>STUDENTS</b>		
	<b>Faculty<sup>16</sup> Scientists</b>	<b>Research Staff</b>	<b>Post Docs</b>	<b>Admin- istrative</b>	<b>PhD</b>	<b>Masters</b>	<b>Under- graduate</b>
Advanced Design and Man of Integrated Microfluidics	12	0	3	1	16	0	1
Advanced Electronics through Machine Learning	9	0	0	1	11	2	2
Advanced Forestry Systems	48	27	9	9	6	15	44
Advanced Knowledge Enablement	34	11	1	4	10	17	14
Advanced Mammalian Biomanufacturing Innovation Cente	9	1	3	3	17	8	3
Advanced Non-Ferrous Structural Alloys	8	3	2	1	7	5	7
Advanced Research in Drying	5	1	2	2	8	0	0
Arthropod Management Technologies	19	5	10	2	6	3	5
Atomically Thin Multifunctional Coatings	9	2	2	3	9	0	2
Berkeley Sensor & Actuator Center	14	0	14	3	89	0	0
Biophotonics Sensors and Systems	10	1	4	6	14	0	0
Bioplastics and Biocomposites	8	2	3	3	6	2	8
Broadband Wireless Access and Applications	30	2	4	4	41	5	4
Ceramics Composites and Optical Materials Center	10	2	2	3	16	2	3
Child Injury Prevention Studies	11	4	0	6	8	7	24
Cloud & Autonomic Computing	11	1	0	1	11	21	5
Computational Biotechnology and Genomic Medicine	4	0	1	2	2	0	0
Configuration Analytics and Automation	7	2	0	1	6	0	1
Connection One: Telecommunications	15	0	1	2	4	8	0
Cooling Technologies Research Center	13	0	5	1	25	5	8
Cyber-Physical Systems for the Hospital Operating Room	9	4	2	1	4	8	5
Dielectrics and Piezoelectrics	17	0	1	2	8	1	1
Disruptive Musculoskeletal Innovations	14	15	7	8	5	8	8
Dynamic Data Analytics	5	0	0	2	6	2	0
E-Design	30	2	5	4	22	17	10
Efficient Vehicles and Sustainable Transportation System	22	1	2	3	16	0	0
Electrochemical Processes and Technologies	3	1	2	0	5	0	0
Electromagnetic Compatibility	14	1	14	4	33	27	3
Embedded Systems	14	0	0	2	16	4	0
Energy Harvesting Materials and Systems	6	0	5	2	6	1	0
Energy-Smart Electronic Systems	10	0	0	2	27	10	5
Excellence in Logistics and Distribution	14	1	0	0	8	11	8
Fiber-Wireless Integration and Networking	4	11	1	3	11	0	0
Freeform Optics	13	0	0	6	24	7	13
Grid-Connected Advanced Power Electronic Systems	6	2	1	8	22	10	5
Health Organization Transformation	32	2	4	6	18	18	42
High-Performance Reconfigurable Computing	13	1	2	1	22	36	26
Hybrid Multicore Productivity Research	15	2	2	6	14	9	1
Identification Technology Research	23	1	1	2	27	11	45
Integration of Composites into Infrastructure	12	8	3	1	19	18	12
iPerform - I/UCRC for Assistive Technologies to Enhance	4	1	2	2	8	1	2
Manufacturing and Materials Joining Innovation Center	12	1	2	2	15	17	9
Membrane Science, Engineering & Technology Center	21	0	6	3	18	1	3
Metamaterials	13	5	1	2	11	2	6
Multi-functional Integrated System Technology	17	0	1	1	25	6	26
Net-Centric and Cloud Software and Systems	6	0	2	2	28	2	10
Next Generation Photovoltaics	14	1	4	3	11	3	8
Novel High-Voltage/Temperature Materials and Structures	10	1	4	0	15	6	4
Particulate and Surfactant Systems	2	2	2	3	4	2	3
Pharmaceutical Development	9	4	2	3	10	0	7
Plasmas & Lasers in Advanced Manufacturing	6	1	2	0	10	2	5

\* Report sorted Alphabetically by Center

IUCRC Structure Database, FY 2016-2017

<i>Center Name</i>	<b>RESEARCHERS</b>				<b>STUDENTS</b>			
	<i>Faculty<sup>16</sup> Scientists</i>	<i>Research Staff</i>	<i>Post Docs</i>	<i>Admin-istrative</i>	<i>PhD</i>	<i>Masters</i>	<i>Under-graduate</i>	
Rational Catalyst Synthesis	13	1	5	1	7	1	2	
Research in Intelligent Storage	8	0	1	0	17	2	0	
Research in Storage Systems	6	0	0	1	9	4	3	
Resource Recovery and Recycling	6	0	3	4	4	0	3	
Robots and Sensors for the Human Well-being	21	4	3	5	25	13	11	
Science Center for Marine Fisheries	8	6	2	2	5	5	4	
Security and Software Engineering Research Center	27	0	0	1	9	6	11	
Smart Vehicle Concepts	6	3	5	1	15	9	4	
Spatiotemporal Thinking, Computing and Application	11	9	1	2	11	2	4	
Surveillance Research	13	1	0	1	10	5	5	
Sustainably Integrated Buildings and Sites	1	1	0	0	5	1	11	
Tire Research	3	0	1	1	14	2	0	
Unmanned Aircraft Systems	18	0	1	4	24	26	43	
Visual and Decision Informatics	10	3	0	9	14	3	8	
Water and Environmental Technology	19	7	4	4	6	8	5	
Water Equipment and Policy	15	1	2	1	13	6	10	
Wheat Genetics	11	6	0	1	2	1	21	
Wind Energy Science, Technology and Research	12	0	0	2	10	2	6	
Wood-Based Composites	16	0	0	3	10	6	13	
	<b>Grand Mean</b>	12.86	2.49	2.49	2.64	14.14	6.31	8.03
	<b>Grand Sum</b>	900	174	174	185	990	442	562

**Table 6: 2016-2017 CENTER DIRECTOR DESCRIPTORS**

<i>Center Name</i>	<i>TIME ALLOCATION</i> <sup>17</sup>				
	<i>Center Administration</i>	<i>Other Administration</i>	<i>Research</i>	<i>Teaching</i>	<i>Other</i>
Advanced Design and Man of Integrated Microfluidics	10	35	40	10	5
Advanced Electronics through Machine Learning	15	0	40	30	15
Advanced Forestry Systems	25	0	15	50	10
Advanced Knowledge Enablement	10	10	40	20	20
Advanced Mammalian Biomanufacturing Innovation Cent	11	0	45	40	4
Advanced Non-Ferrous Structural Alloys	20	40	0.2	10	10
Advanced Research in Drying	20	35	15	20	10
Arthropod Management Technologies	35	10	45	0	10
Atomically Thin Multifunctional Coatings	10	10	40	20	20
Berkeley Sensor & Actuator Center	75	0	0	0	25
Biophotonics Sensors and Systems	10	50	20	20	0
Bioplastics and Biocomposites	50	20	25	5	0
Broadband Wireless Access and Applications	15	50	20	10	5
Ceramics Composites and Optical Materials Center	15	35	30	10	10
Child Injury Prevention Studies	10	30	50	0	10
Cloud & Autonomic Computing	60	30	5	0	5
Computational Biotechnology and Genomic Medicine	15	5	30	20	30
Configuration Analytics and Automation	30	0	70	0	0
Connection One: Telecommunications	5	40	20	15	20
Cooling Technologies Research Center	5	80	15	0	0
Cyber-Physical Systems for the Hospital Operating Room	10	10	70	10	0
Dielectrics and Piezoelectrics	20	10	50	18	2
Disruptive Musculoskeletal Innovations	5	25	40	20	10
Dynamic Data Analytics	10	10	40	30	10
E-Design	5	60	15	15	5
Efficient Vehicles and Sustainable Transportation System	13	2	45	35	5
Electrochemical Processes and Technologies	15	5	50	30	0
Electromagnetic Compatibility	35	5	15	40	5
Embedded Systems	15	15	40	15	15
Energy Harvesting Materials and Systems	10	24	36	30	0
Energy-Smart Electronic Systems	10	55	35	0	0
Excellence in Logistics and Distribution	25	10	30	35	0
Fiber-Wireless Integration and Networking	25	25	25	10	15
Freeform Optics	30	5	40	20	5
Grid-Connected Advanced Power Electronic Systems	15	35	30	10	10
Health Organization Transformation	20	5	40	30	5
High-Performance Reconfigurable Computing	15	40	25	15	5
Hybrid Multicore Productivity Research	30	0	40	30	0
Identification Technology Research	25	0	40	25	10
Integration of Composites into Infrastructure	13	6	45	30	6
iPerform - I/UCRC for Assistive Technologies to Enhance	25	5	30	30	10
Manufacturing and Materials Joining Innovation Center	15	20	45	15	5
Membrane Science, Engineering & Technology Center	11	4	50	30	5
Metamaterials	10	30	35	15	10
Multi-functional Integrated System Technology	25	20	25	25	5
Net-Centric and Cloud Software and Systems	15	10	45	30	0
Next Generation Photovoltaics	10	10	50	30	0
Novel High-Voltage/Temperature Materials and Structures	20	5	30	45	0
Particulate and Surfactant Systems	15	5	49	28	3
Pharmaceutical Development	15	25	30	25	5

\* Report sorted Alphabetically by Center

IUCRC Structure Database, FY 2016-2017

\*Includes only primary center director

**TIME ALLOCATION <sup>17</sup>**

<i>Center Name</i>	<i>Center Administration</i>	<i>Other Administration</i>	<i>Research</i>	<i>Teaching</i>	<i>Other</i>
Plasmas & Lasers in Advanced Manufacturing	15	5	40	25	15
Rational Catalyst Synthesis	30	10	30	20	10
Research in Intelligent Storage	15	5	40	30	10
Research in Storage Systems	15	35	25	25	0
Resource Recovery and Recycling	15	15	40	20	10
Robots and Sensors for the Human Well-being	15	15	60	0	10
Science Center for Marine Fisheries	35	5	45	10	5
Security and Software Engineering Research Center	50	0	25	25	0
Smart Vehicle Concepts	25	0	40	20	15
Spatiotemporal Thinking, Computing and Application	15	5	30	30	20
Surveillance Research	15	25	25	25	10
Sustainably Integrated Buildings and Sites	20	0	45	30	5
Tire Research	15	10	55	20	0
Unmanned Aircraft Systems	15	15	30	30	10
Visual and Decision Informatics	25	5	35	20	15
Water and Environmental Technology	20	25	25	25	5
Water Equipment and Policy	20	5	45	25	5
Wheat Genetics	20	10	60	5	5
Wind Energy Science, Technology and Research	10	30	45	10	5
Wood-Based Composites	10	5	50	30	5
<b>Grand Mean</b>	19.33	16.94	35.65	20.37	7.43

**Table 7: 2016-2017 CENTER OUTCOMES**

Center Name:	STUDENTS RECEIVING DEGREE <sup>18</sup>			STUDENTS HIRED BY MEMBERS <sup>19</sup>			PROJECTS <sup>20</sup>	PUBLICATIONS <sup>21</sup>		
	BS Grad	MS Grad	PhD Grad	BS Hired*	MS Hired*	PhD Hired*		w/ Ctr Research	w/ IAB Members	Present.
Advanced Design and Man of Integrated	0	1	7	0	0	0	6	16	4	14
Advanced Electronics through Machine L	1	0	0	1	0	0	6	4	0	17
Advanced Forestry Systems	17	22	12	2	5	0	47	36	2	147
Advanced Knowledge Enablement	10	10	4	0	2	1	15	20	5	21
Advanced Mammalian Biomanufacturing I	0	4	5	0	0	0	12	2	0	12
Advanced Non-Ferrous Structural Alloys	2	3	2	0	0	0	13	20	4	21
Advanced Research in Drying	0	1	0	0	0	0	9	2	0	7
Arthropod Management Technologies <sup>a</sup>	0	3	3	0	0	2	12	3	1	1
Atomically Thin Multifunctional Coatings	0	0	2	0	0	1	10	6	2	13
Berkeley Sensor & Actuator Center	8	1	17	0	0	1	83	78	1	40
Biophotonics Sensors and Systems	0	0	4	0	0	0	8	11	1	11
Bioplastics and Biocomposites	0	1	0	0	1	0	8	5	3	11
Broadband Wireless Access and Applicati	3	7	20	1	1	0	16	87	4	46
Ceramics Composites and Optical Materi	0	2	2	0	0	1	13	5	0	5
Child Injury Prevention Studies	11	0	2	0	0	0	16	6	1	14
Cloud & Autonomic Computing	3	13	2	0	2	0	8	37	2	33
Computational Biotechnology and Genom	0	0	1	0	0	0	2	5	0	5
Configuration Analytics and Automation	0	2	4	0	2	0	11	4	0	30
Connection One: Telecommunications	1	18	1	0	4	0	8	5	0	39
Cooling Technologies Research Center	1	2	6	1	0	2	15	28	1	20
Cyber-Physical Systems for the Hospital	2	3	3	0	0	0	10	15	0	20
Dielectrics and Piezoelectrics	2	0	4	0	0	3	11	24	7	69
Disruptive Musculoskeletal Innovations	1	2	2	0	1	0	10	11	0	7
Dynamic Data Analytics	0	0	0	0	0	0	4	0	0	11
E-Design	6	8	3	1	2	0	23	45	5	64
Efficient Vehicles and Sustainable Transp	0	0	0	0	0	0	14	0	0	0
Electrochemical Processes and Technolo	0	0	0	0	0	0	6	2	0	3
Electromagnetic Compatibility	0	16	6	0	7	12	25	62	0	27
Embedded Systems	0	6	2	0	2	0	14	24	0	27
Energy Harvesting Materials and Systems	0	0	0	0	0	0	10	30	1	20
Energy-Smart Electronic Systems	0	19	6	0	0	3	13	39	14	105
Excellence in Logistics and Distribution	3	3	3	0	0	0	9	5	1	21
Fiber-Wireless Integration and Networking	0	0	2	0	0	2	5	32	8	4
Freeform Optics	9	1	2	2	0	2	21	41	4	32
Grid-Connected Advanced Power Electro	2	4	6	0	0	3	15	5	0	20
Health Organization Transformation	15	7	6	1	2	1	20	37	12	56
High-Performance Reconfigurable Compu	15	11	5	1	0	2	10	39	4	30
Hybrid Multicore Productivity Research	0	3	3	0	2	1	17	14	1	12
Identification Technology Research	3	4	11	1	0	3	18	25	1	47
Integration of Composites into Infrastructu	1	6	2	0	1	0	16	49	18	40
iPerform - I/UCRC for Assistive Technolog	0	0	6	0	0	3	7	11	2	17
Manufacturing and Materials Joining Inno	3	6	4	0	0	3	33	74	42	142
Membrane Science, Engineering & Techn	0	1	2	0	0	0	20	17	6	22
Metamaterials	3	1	4	0	0	0	14	21	18	17
Multi-functional Integrated System Techn	1	3	4	0	0	0	14	5	0	3
Net-Centric and Cloud Software and Syst	9	6	8	0	0	2	19	30	5	43
Next Generation Photovoltaics	2	2	4	0	0	1	17	13	2	9
Novel High-Voltage/Temperature Material	0	3	3	0	0	0	14	20	0	20
Particulate and Surfactant Systems	3	2	0	0	0	0	9	10	2	58
Pharmaceutical Development	2	0	1	0	0	0	14	12	2	40

\* Report sorted by Alphabetically by Center

\* See Table 8 for additional alumni career outcomes.

a) For Arthropod Management Technologies, two postdocs were hired by non-member industry firms.



	STUDENTS RECEIVING DEGREE <sup>18</sup>			STUDENTS HIRED BY MEMBERS <sup>19</sup>			PROJECTS <sup>20</sup>	PUBLICATIONS <sup>21</sup>		
<i>Center Name:</i>	<i>BS Grad</i>	<i>MS Grad</i>	<i>PhD Grad</i>	<i>BS Hired*</i>	<i>MS Hired*</i>	<i>PhD Hired*</i>		<i>w/ Ctr</i>	<i>w/ IAB</i>	
								<i>Research</i>	<i>Members</i>	<i>Present.</i>
Plasmas & Lasers in Advanced Manufact	1	1	7	1	1	2	12	16	8	10
Rational Catalyst Synthesis	1	0	1	0	0	0	11	7	0	11
Research in Intelligent Storage	0	0	5	0	0	2	16	15	1	20
Research in Storage Systems	1	3	2	0	1	0	8	4	0	8
Resource Recovery and Recycling	0	4	1	0	0	0	7	5	0	10
Robots and Sensors for the Human Well-	3	3	8	0	0	4	20	32	2	31
Science Center for Marine Fisheries	1	1	0	1	0	0	15	12	0	38
Security and Software Engineering Resea	3	7	0	0	1	0	27	15	0	63
Smart Vehicle Concepts	0	4	3	0	1	0	13	37	4	25
Spatiotemporal Thinking, Computing and	0	2	4	0	1	1	15	25	8	61
Surveillance Research	1	2	3	0	0	0	14	9	0	43
Sustainably Integrated Buildings and Site	8	0	0	0	0	0	7	7	0	15
Tire Research	4	4	2	0	0	2	10	17	3	17
Unmanned Aircraft Systems	16	14	3	1	0	0	24	31	0	23
Visual and Decision Informatics	0	1	4	0	0	0	6	20	2	9
Water and Environmental Technology	2	7	1	0	0	0	20	14	1	50
Water Equipment and Policy	5	6	7	0	2	2	14	9	0	30
Wheat Genetics	8	0	0	1	0	0	6	9	0	14
Wind Energy Science, Technology and R	0	1	0	0	0	0	8	5	0	15
Wood-Based Composites	4	2	2	0	1	0	23	15	0	39
<b>Grand Mean</b>	2.81	3.84	3.56	0.21	0.60	0.89	14.66	19.94	3.07	28.93
<b>Grand Sum</b>	197	269	249	15	42	62	1026	1396	215	2025

\* Report sorted by Alphabetically by Center  
 \* See Table 8 for additional alumni career outcomes.

**Table 8: 2016-2017 ALUMNI CAREER OUTCOMES**

**Table 8a: Centers Reporting One or More Alumni Career Outcome Last Fiscal Year**

<b>Alumni Outcome</b>	<b># of Centers</b>	<b>% of Centers</b>
Hired by Industry Members	39	56%
Hired by Governmental Members	14	20%
Hired by Non-Member Industry	52	74%
Hired by Non-Member Governmental Agency	16	23%
Faculty Positions	14	20%
Postdoc Positions	24	34%

**Table 8b: Total Number and Means of Alumni Career Outcomes Last Fiscal Year**

<b>Alumni Outcome</b>	<b>Total for All Centers</b>	<b>Mean for All Centers</b>
Hired by Industry Members	97	1.39
Hired by Government Members	22	0.31
Hired by Non-Member Industry	236	3.37
Hired by Non-Member Governmental Agency	41	0.59
Faculty Positions	20	0.29
Postdoc Positions	46	0.66

**Table 9: 2016-2017 INTELLECTUAL PROPERTY  
AND COMMERCIALIZATION EVENTS**

**Table 9a: Centers Reporting One or More Intellectual Property and Commercialization Event Last Fiscal Year**

<b>Intellectual Property Event</b>	<b># of Centers</b>	<b>% of Centers</b>
Invention Disclosures	32	46%
Patent Applications	26	37%
Patents Granted/Derived	15	21%
Licensing Agreements	4	6%
Royalties Realized	1	1%
Software Copyrights	4	6%
Spinoff Companies Formed	5	7%

**Table 9b: Total Number and Means of Intellectual Property and Commercialization Events Last Fiscal Year**

<b>Intellectual Property Event</b>	<b>Total for All Centers</b>	<b>Mean for All Centers</b>
Invention Disclosures	91	1.30
Patent Applications	71	1.01
Patents Granted/Derived	23	0.33
Licensing Agreements	21	0.30
Royalties Realized	16	0.23
Software Copyrights	5	0.07
Spinoff Companies Formed	5	0.07

# 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 2016-2017 fiscal year.
- 3) On Table 1, "YEAR FUNDED" indicates the year NSF gave the center the operating grant under which it was originally established as an IUCRC.
- 4) On Table 2, "TOTAL FUNDING" refers to the total cash income coming into the Center from the sources listed.
- 5) On Table 2, "NSF IUCRC" refers to the total funding provided by the IUCRC program, including operating grant, self-sustaining Center funding, evaluator support, Clusters for Grand Challenges awards, etc.
- 6) "OTHER NSF" refers to funding for the Center provided by other NSF groups or divisions. Neither of these categories includes money transferred through NSF from other Federal Agencies (MIPRs).
- 7) On Table 2, "MEMBER FEES" refers to the total funding collected by a center from membership fees, including MIPRs covering membership support.
- 8) On Table 2, "ADDITIONAL INDUSTRY" refers to additional member funding (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). This includes additional support provided by members through MIPRs that is above and beyond the membership fee paid.
- 9) On Table 2, "STATE TOTAL" refers to the funding provided by state government and/or an agency or program funded by state government.
- 10) On Table 2, "OTHER FEDERAL AGENCY" refers to funding for the Center provided by other Federal funding sources, but does NOT include funding from NSF.
- 11) On Table 2, "OTHER NON-FEDERAL AGENCY" refers to funding for the Center provided by other non-Federal funding sources, foundations, etc.
- 12) 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.
- 13) On Table 3, "ADMIN. BUDGET (%)" refers to the estimated percentage of the primary site's direct operating budget allocated to administration (e.g., administrative salaries, travel, telephone).
- 14) On Table 4, "LIFETIME MEMBERSHIPS" are calculated at the membership level, not the organization level. Lifetime "starting" is the sum of all original memberships. Lifetime "new" is the sum of all original memberships plus all reported new memberships. Lifetime "Left" is the sum of all terminated memberships. Members who leave and then rejoin a center are counted for every addition and every departure.
- 15) On Table 4, "FEES" are broken down into primary, secondary, and tertiary (the latter two may represent variable membership fees).
- 16) On Table 5, "FACULTY SCIENTISTS" includes the Center Director(s) and Faculty Researchers.
- 17) On Table 6, "TIME ALLOCATION" refers to allocation of the primary site director's full-time equivalent for budgetary purposes.
- 18) On Table 7, "STUDENTS RECEIVING DEGREE" refers to the number of Center trained Ph.D.'s, M.S.'s, and B.A./B.S.'s that received a degree during the reporting period.
- 19) On Table 7, "STUDENTS HIRED BY MEMBERS" refers to the number of Ph.D.'s, M.S.'s, and B.A./B.S.'s that were hired by industry and government members during the reporting period. Additional alumni career outcomes are reported in Table 8.
- 20) On Table 7, "PROJECTS" refers to the number of research projects funded by a) IAB member fees, b) NSF IUCRC support, or c) any other support that would not have been obtained without the existence of the Center AND the results of which are shared with ALL center members. Does NOT include project that are not shared with all Center's members. Does NOT include projects carried out by Center affiliated researchers which are unrelated to the Center AND/OR the results of which are not shared with Center members.
- 21) 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 member as an author.

*Additional Notes:* Starting with 2015-2016 FY we are no longer capturing university contributions nor other cash support. Because we are no longer capturing these funding sources, the total funding for the center is not comparable to prior year's reports.