

RESEARCH FOR A CHANGING WORLD



TOMORROW TAKES FLIGHT

T a b l e o f C o n t e n t s

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Dear Colleagues:

On behalf of Wright State University and the Office of Research and Sponsored Programs, it is a pleasure for me to present this report of research activities for the fiscal year 2001–02 (July 1, 2001, to June 30, 2002).

For the third year in a row, Wright State faculty and staff exceeded the \$40 million mark in the quest for externally sponsored projects. This is more than double the total of 10 years ago. The explosive growth in funded projects during the past decade is indicative of a talented and energetic faculty and staff.

Wright State University's achievements cannot be measured by simple statistics alone, however. Every day the faculty and staff demonstrate their excellence in the sciences, arts, and education, while simultaneously conducting research and publishing these results in peer-reviewed journals. Sponsors run the gamut from the biggest and best known federal agencies to local governments, industry, and foreign agencies. Obviously, the Wright State University community is making an impact at both the national and international levels.

We are proud of the accomplishments of Wright State University and welcome your comments or requests for further information.

Joseph F. Thomas, Jr.
Associate Provost for Research and
Dean, School of Graduate Studies



Unlocking the Secrets of the Human Genome



GENOME RESEARCH PROMISES TO
LEAD TO BREAKTHROUGHS IN DIS-
EASE PREVENTION AND TREATMENT,
PHARMACEUTICAL INNOVATIONS, AND
TREMENDOUS ADVANCES IN COMMU-
NITY HEALTH.

Now that the human genome has been mapped, the real work begins. In the years ahead, genome research promises to lead to breakthroughs in disease prevention and treatment, pharmaceutical innovations, and tremendous advances in community health.

In Ohio, much of that work will take place among a group of partners who recently were awarded \$9 million by the Ohio Biomedical Research and Technology Transfer (BRTT) Commission. The collaborative partners—Wright State University; University of Cincinnati; the Children’s Hospital Research Foundation (Cincinnati); Procter & Gamble Pharmaceuticals; Acero, Inc.; and the Air Force Research Laboratory at Wright-Patterson Air Force Base—will use this generous award to develop core facilities at the partners’ research centers, including functional genomics and bioinformatics programs at Wright State.

Robert E. W. Fyffe, Ph.D., co-principal investigator on the award, serves Wright State as the director of the Center for Brain Research and associate dean for research affairs in the School of Medicine. He believes this regional partnership, called the Genome Research Infrastructure Partnership (GRIP), will establish Ohio as a national center for genomic research, while advancing Wright State’s research efforts as well.

“The BRTT award will have an immediate impact on Wright State researchers,” says Fyffe. “It will enable us to continue to invest in core facilities at Wright State that can contribute significantly to the growth of the partnership. Those core facilities will also help faculty be more competitive with their individual research projects.”

Creating that “comprehensive research infrastructure” is the first goal of GRIP. Its other goals are to use the infrastructure to conduct basic, clinical, and pharmaceutical research; create an educational program in the genome sciences; and generate commercial products from the research.

“Wright State is a relatively young institution,” says Fyffe. “So in order to grow and make even more significant contributions we must continually recruit and retain the best people around. We can accomplish that best if we have a strong infrastructure.”

Another important aspect of GRIP is the collaboration with research institutions in both the public and private sectors. “Collaborations are imperative,” says Fyffe. “GRIP can pursue significant new research directions that no single partner could manage by itself.”

At Wright State, Fyffe’s own research into the structures and functions of the brain and nervous system beautifully illustrates his commitment to collaboration. He currently is working with Queen’s University in Kingston, Ontario, Canada, to study traumatic spinal cord injury. He’s working with the Australian National University to analyze nerve cell structure and function and with Emory University on a study relating to the effects of nerve damage on spinal neurons.

“All this collaboration adds to the total body of knowledge and may have relevance to a number of diseases,” says Fyffe. “Any therapeutic gain will come from a combination of many people’s research. This is the essence of fundamental research—hoping your findings and insights will be applicable to other systems.”

Tapping Technology's Future to Explore the Past



THE PROJECT WILL SERVE AS A
MODEL TO ADVANCE THE INTERNET'S
POTENTIAL TO ENGAGE THE PUBLIC
WITH HISTORY.

As Daytonians were ringing out the old on New Year's Eve in 1899, they were also ringing in a new era of innovation and change, many taking place right in their hometown.

In just a few short years, two Dayton brothers introduced the world to powered flight, Charles Kettering invented the electric starter, the National Cash Register Company instituted ground-breaking social and welfare programs for its employees, Dayton inaugurated the city manager form of government, and the city's flood prevention projects became a national model for public works.

Today, the Internet is rapidly changing the way people learn and communicate. By tapping into Dayton's past, Marjorie McLellan, Ph.D. (pictured left), associate professor of history and director for WSU's public history program, is investigating how the Internet can transform the way history is experienced and taught.

The result is an interactive, Web-based multimedia history exhibit entitled "Making Progress: Living and Working in Ohio's Miami Valley, 1890–1929," set to go online sometime in 2004.

The project is funded through a \$40,000 grant from the National Endowment for the Humanities (NEH) and matching support from the Montgomery County Historical Society and Wright State's College of Liberal Arts, Special Collections and Archives, and Center for Teaching and Learning. The idea is to use online forums, streaming video and audio, and other innovative multimedia technologies to explore the Miami Valley during a pivotal time in history.

"With so much interest in 1903 and the Wright brothers, there's still a lot of dramatic and distinctive things about the Miami Valley that need to be told, and those themes still resonate today," says McLellan.

Among the sources will be newspaper accounts, census and estate records, city directories, oral histories, personal documents, and photographs from NCR's rich collection.

By clicking on images of Dayton, the Miami Valley, and neighboring communities, the viewer can visit actual sites from Dayton's past. For example, one location will introduce Jacob Moskowitz, a foreign labor contractor who recruited Hungarian immigrants and established two worker colonies in Dayton, one known as the Kossuth Colony, or "Little Hungary."

Online forums moderated by humanities scholars and historians will encourage viewers to contribute their own stories and digitized images. In the schools, students will be invited to delve into different aspects of local history and add their own pages to the site.

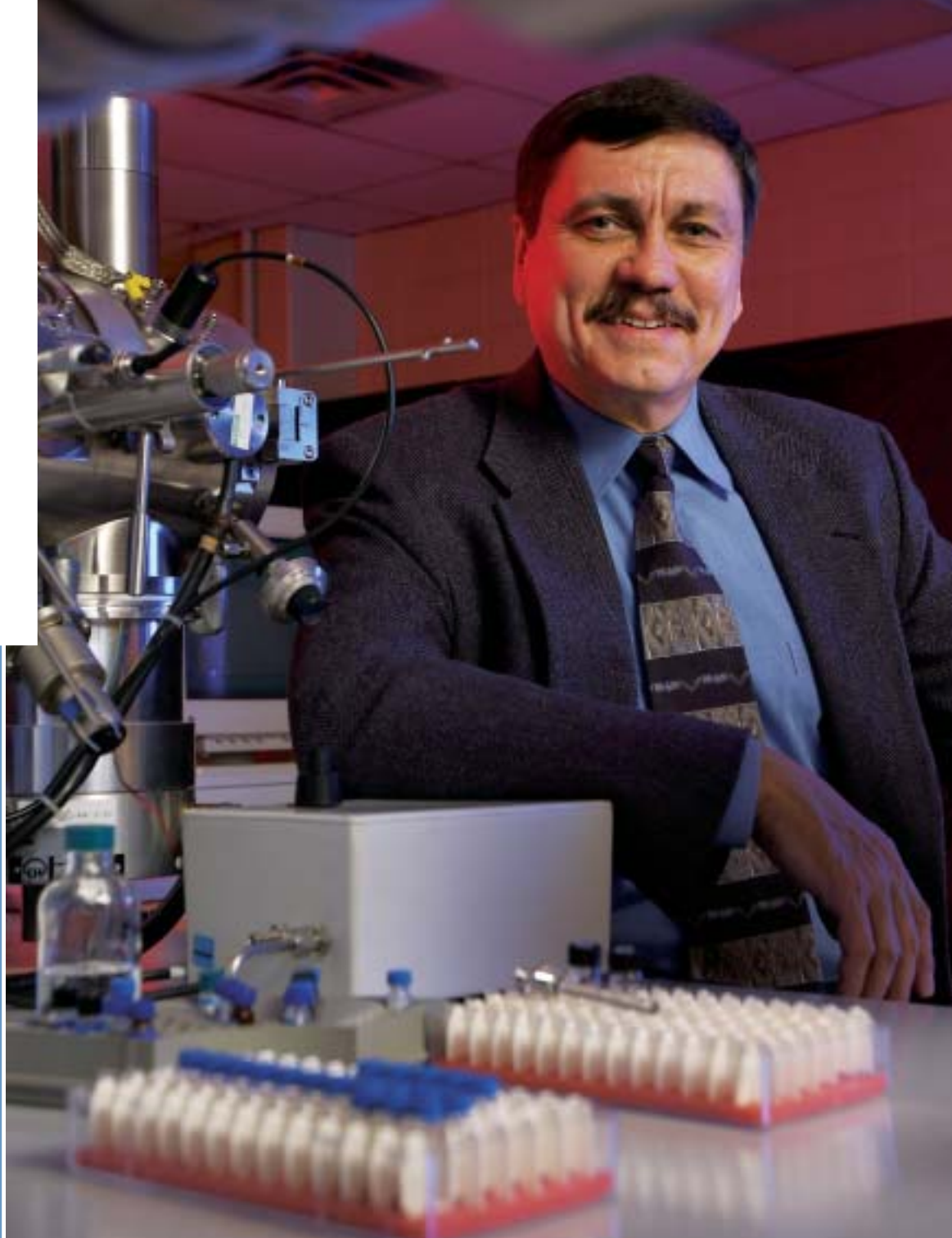
"While there are other online exhibits, this is a new medium for public history. Our project will serve as a model, advancing our understanding of the Internet's potential to engage the public with history," says McLellan.

The seed for this project was planted two years ago with a grant writing exercise in McLellan's public history class. As a result, a \$10,000 NEH grant funded a three-day seminar that brought in noted humanities scholars and historians who served as consultants about developing ideas and themes for a successful Dayton history exhibit.

"The Internet will not replace traditional museums," explains McLellan. "Nothing can replace seeing the real thing. This is going to be a very experimental exhibit. We're looking at the Internet's potential to attract new audiences and to engage the public in new ways."

(Partners on the project are Dawne Dewey, head, WSU Special Collections and Archives; Nancy Garner, WSU Department of History; Bryan Beverly, Jeff Hiles, WSU Center for Teaching and Learning; Claudia Watson, Mary Oliver, Montgomery County Historical Society; Floyd Thomas, National Afro-American Museum and Cultural Center; and Sheila Darr, Central State University.)

Identifying Toxins: Pushing the Limits



WSU's BREHM LAB IS THE ONLY UNIVERSITY LABORATORY TO BE CERTIFIED BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY TO CONDUCT DIOXIN ANALYSIS FOR THE AGENCY'S SUPERFUND PROJECT.

If you think finding a needle in the proverbial haystack is impossible, how about searching for a grain of sand in a mound equal to 100 dump-truck loads? Such is the challenge facing Roger Gilpin, Ph.D., Mead Distinguished Professor and executive director of Wright State's Brehm Research Laboratory. His task? To identify toxic chemicals that occur in extremely low levels—in this case one part per trillion or less—in highly complex systems such as wastewater, soil, and fish and other types of wildlife.

"We are truly pushing the limits of what you can measure," says Gilpin.

Gilpin's research received a boost recently when Wright State was named the lead institution in a \$950,000 grant from the Ohio Board of Regents to establish the Consortium for Environmental and Process Technologies (CEPT). In collaboration with Miami University, University of Cincinnati, Ohio State University, and Kent State University, CEPT will conduct leading-edge research to develop cost-effective ways to isolate, measure, and monitor toxic compounds.

Gilpin is looking primarily for dioxins, and dioxin-like compounds, that are released into the environment from a number of industrial processes including waste incineration. They make their way into the water and food chain, remaining in the environment for decades. When ingested, these compounds disrupt cell reproduction in the body and can lead

to birth defects and life-threatening diseases including cancer.

Gilpin uses precise techniques to isolate the toxic components in environmental samples and then reduces them to one-tenth of a drop of liquid. Following this tedious process, sophisticated instruments such as high-resolution mass spectrometers are used to determine exactly what they contain.

For over 25 years, Brehm Lab has provided environmental analytical services to government and private industry. Along the way, it has earned a reputation as one of the nation's foremost water and environmental quality analysis facilities. In fact, it is one of only three facilities in the nation and the only university laboratory to be certified by the U.S. Environmental Protection Agency to conduct dioxin analysis for the agency's Superfund Project.

Besides the EPA, the states of New York and Tennessee have contracted with Brehm Lab for its services. In Ohio, plants processing one million gallons of water and sludge per day must test for toxic compounds; 30 percent of these assays are conducted by Brehm Lab. Gilpin explains that although only a few states currently mandate wastewater and sludge testing, he believes that in a year or two the whole country will require them.

Funding Highlights

for Awards over \$400,000

**Roger M. Siervogel,
W. Cameron
Chumlea, Shumei
S. Sun, and
Bradford Towne**

Community Health,
School of Medicine

***Subcutaneous Fat, Blood
Lipids, and Subsequent
Outcome***

Abstract: The long-term project focuses on the serial analyses of body composition, fat-related variables, and risk factors for growth, development, and disease.

\$1,166,735
National Institute of
Child Health and
Human Development
(NIH)

Katherine L. Cauley

Center for Healthy
Communities, School
of Medicine

***HealthLink Miami Valley
Network***

Abstract: This project will develop and pilot programs to increase outreach efforts, direct and link people to available resources, and use advanced technology to coordinate health care and human services. The goal is to increase the number of Montgomery County residents who have access to and regularly use health care services including primary care, and mental health and dental care.

\$936,335
Health Resources and
Services Administration



**Harvey A. Siegal,
Russel S. Falck,
Robert G. Carlson,
and Jichuan Wang**

Community Health,
School of Medicine

***Crack and Health Service
Use: A Natural History
Approach***

Abstract: This funding allows the project team to continue obtaining longitudinal data from the original sample population regarding crack-cocaine use and health services use, primarily drug abuse treatment, and to assess the feasibility of extending the study to adolescent crack-cocaine users.

\$612,454
National Institute on
Drug Abuse (NIH)

Stanley R. Mohler

Community Health,
School of Medicine

***Aerospace Medicine
Residency Program***

Abstract: This grant will provide continued support for the training of residents in Aerospace Medicine.

\$600,000
National Aeronautics and
Space Administration

**Robert G. Carlson
and Harvey A.
Siegal**

Community Health,
School of Medicine

***MDMA/Club Drug Use and
STD/HIV Sex Risk Behavior in
Ohio***

Abstract: This funding supports a longitudinal epidemiological study of users of MDMA, often referred to as "ecstasy," and other "club drugs" relative to their use and their high-risk behaviors.

\$586,628
National Institute on
Drug Abuse (NIH)





**Michael L. Raymer
and Travis E. Doom**

Computer Science and
Engineering, College
of Engineering and
Computer Science

Dan E. Krane

Biological Sciences,
College of Science
and Mathematics

***Crossing the Interdisciplinary
Barrier: An Integrated Under-
graduate Program in
Bioinformatics***

Abstract: The project team will design a curriculum to serve as a national model for undergraduate bioinformatics programs. Two new courses will incorporate contemporary research results and emphasize parallel teaching of the two “languages” of biology and computer science. The goal is to facilitate the training of investigative bioinformaticians. WSU’s bioinformatics program incorporates a major in computer science and a minor in biology (or vice versa) with supporting courses in chemistry and mathematics.

\$552,056
National Science
Foundation



Harvey A. Siegal

Community Health,
School of Medicine

***Crack-Cocaine and Health
Services Use in Rural Ohio***

Abstract: This grant will be used to conduct health services research among small town and rural crack users in four nonmetropolitan counties in west-central Ohio.

\$549,017
National Institute on
Drug Abuse (NIH)

Dennis C. Moore

Community Health,
School of Medicine

Rehabilitation Research and Training Centers (RRTC) on Drugs and Disability

Abstract: The RRTC addresses issues of substance abuse, disability, and vocational rehabilitation (VR) outcomes, with an emphasis on VR consumers who experience substance abuse as a co-existing disability. The training center conducts epidemiological and evaluative research studies of substance abuse and substance abuse services for consumers of state VR programs and other people with disabilities.

\$500,000
U.S. Department
of Education

Nicholas V. Reo

Biochemistry and
Molecular Biology,
School of Medicine

Upgrade in NMR Research Instrumentation for the Magnetic Resonance Laboratory

Abstract: This Defense University Research Instrumentation Program (DURIP) funding will be used in part to support facilities improvement (Nuclear Magnetic Resonance [NMR] Spectrometer) in the Magnetic Resonance Laboratory. NMR spectroscopy focuses on chemical analyses and will be used to study cellular biochemistry and tissue metabolism. This technology provides a chemical “fingerprint” that aids in the analyses of complex mixtures.

\$478,485
Department of Defense



**Bradford Towne
and Roger M.
Siervogel**

Community Health,
School of Medicine

***Genetic Epidemiology of
Childhood Skeletal Maturation***

Abstract: The goals of this project are to evaluate genetic involvement in skeletal maturation throughout childhood, locate and determine the significance of as yet undetermined genes influencing skeletal maturation, and evaluate the contributions of multiple gene sites to that process.

\$451,499
National Institute of
Child Health and
Human Development
(NIH)

David C. Look

Semiconductor
Research Center,
College of Science
and Mathematics

***Materials for High Speed
Devices***

Abstract: The research team will study temperature-dependent Hall-effect measurements to determine the concentration and energies of donors and acceptors in the electrical properties of practical semiconductors.

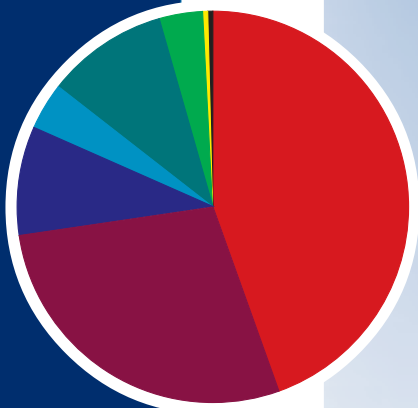
\$450,000
Air Force Research
Laboratory





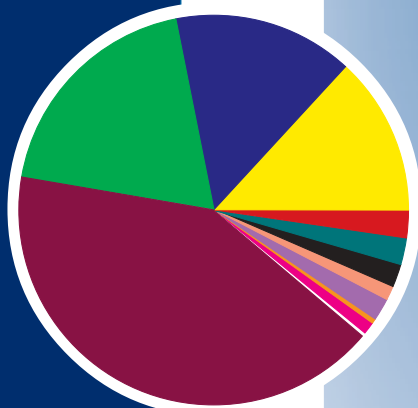
A w a r d s

Table 1 Awards by Major Funding Source FY02



<i>Major Funding Source</i>	<i>Number of Awards</i>	<i>Amount Awarded</i>
Federal Agencies	127	\$18,437,050
State Agencies	78	\$11,720,451
Industry/Business	123	\$3,665,996
Other Government Agencies	43	\$1,607,383
Non-Profits	72	\$4,146,404
Educational Institutions	51	\$1,452,592
Foreign Sponsors	8	\$74,251
Miscellaneous	35	\$258,059
Total	537	\$41,362,186

Table 2 Awards by Campus Area FY02



<i>Campus Area</i>	<i>Number of Awards</i>	<i>Amount Awarded</i>
School of Medicine	118	\$17,183,294
School of Graduate Studies	8	\$8,022,539
College of Science & Mathematics	159	\$6,164,670
College of Engineering & Computer Science	95	\$5,409,240
College of Education & Human Services	18	\$854,214
College of Nursing & Health	9	\$943,921
University wide/Miscellaneous	15	\$832,923
School of Professional Psychology	35	\$478,425
College of Liberal Arts	47	\$728,047
Student Services	15	\$138,128
Raj Soin College of Business	9	\$508,382
Lake Campus	9	\$98,403
Total	537	\$41,362,186

Table 3 Awards by Type of Activity FY02

<i>Type of Activity</i>	<i>Number of Awards</i>	<i>Amount Awarded</i>
Research	300	\$24,237,432
Public Service	93	\$3,891,058
Instruction	77	\$3,186,868
Institutional Support	40	\$9,641,269
Student Aid	15	\$176,439
Development	12	\$229,120
Total	537	\$41,362,186

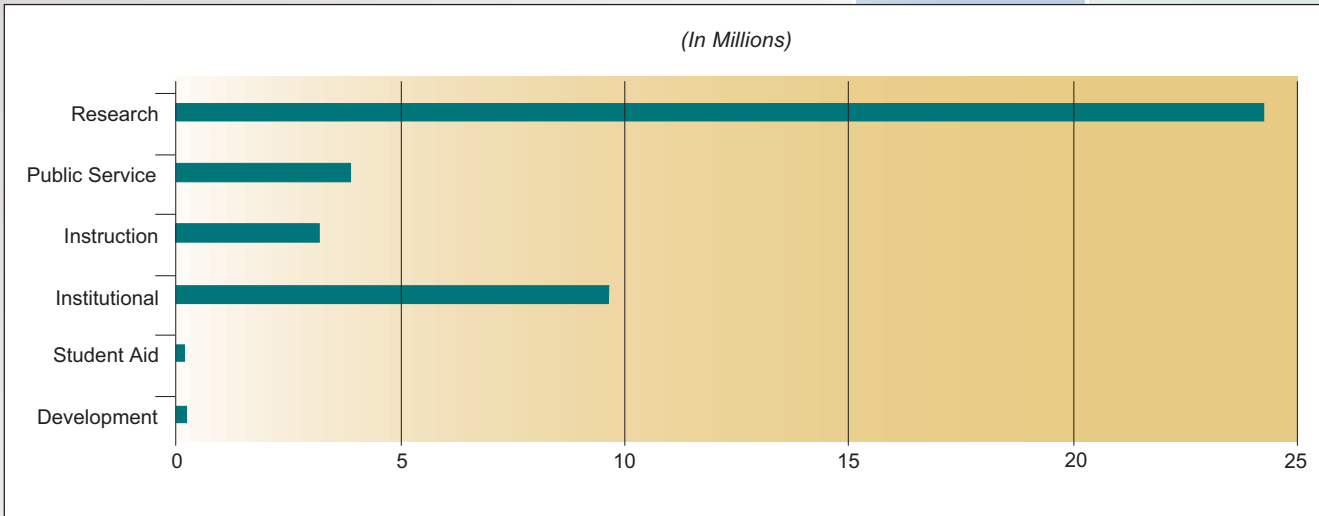


Table 4 Ten Years of Funding: Grant and Contract Awards FY93 to FY02



<i>Fiscal Year</i>	<i>Number of Awards</i>	<i>Amount Awarded</i>
1992-93	376	\$23,771,626
1993-94	378	\$22,972,429
1994-95	439	\$25,207,174
1995-96	457	\$26,104,247
1996-97	535	\$31,336,991
1997-98	462	\$30,283,100
1998-99	460	\$34,642,162
1999-00	475	\$45,339,049
2000-01	481	\$48,510,950
2001-02	537	\$41,362,186

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Table 5 Awards by Type and Campus Area FY02

<i>College/School</i>	<i>Research</i>	<i>Instruction</i>	<i>Pub. Serv.</i>	<i>Other</i>	<i>Total</i>
Medicine	\$12,720,415	\$279,122	\$2,471,331	\$1,712,426	\$17,183,294
Grad. Studies				\$7,258,607	\$7,258,607
Engineering	\$4,767,496	\$602,056		\$39,688	\$5,409,240
Sci. & Math.	\$5,328,493	\$553,141	\$36,941	\$246,095	\$6,164,670
Other	\$1,260,228	\$58,874	\$277,755	\$138,126	\$1,734,983
Nursing	\$143,000	\$394,096		\$406,825	\$943,921
Education		\$827,214	\$27,000		\$854,214
Liberal Arts	\$7,000	\$56,000	\$570,913	\$94,134	\$728,047
Business		\$89,700	\$267,757	\$150,925	\$508,382
Prof. Psych.	\$10,800	\$322,547	\$145,078		\$478,425
Lake Campus		\$4,119	\$94,284		\$98,403
TOTAL	\$24,237,432	\$3,186,869	\$3,891,059	\$10,046,826	\$41,362,186

Table 6 Awards by Federal Agency and Campus Area FY02

<i>College/School</i>	<i>DHHS</i>	<i>DoD</i>	<i>NASA</i>	<i>NSF</i>	<i>Other Fed</i>	<i>EDUC</i>	<i>Federal Total</i>
Medicine	\$9,428,031	\$952,880	\$1,200,000		\$305,256	\$650,273	\$12,536,440
Engineering		\$1,094,938		\$719,169	\$259,583		\$2,073,690
Sci. & Math.	\$627,877	\$1,160,318	\$268,490	\$512,664	\$281,405		\$2,850,754
Other	\$91,395	\$46,733			\$5,180		\$143,308
Nursing	\$628,921						\$628,921
Business					\$102,137	\$81,000	\$183,137
Prof. Psych.					\$10,800		\$10,800
Education							\$0
Liberal Arts					\$10,000		\$10,000
Lake Campus							\$0
Grad. Studies							\$0
TOTAL	\$10,776,224	\$3,254,869	\$1,468,490	\$1,231,833	\$974,361	\$731,273	\$18,437,050



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