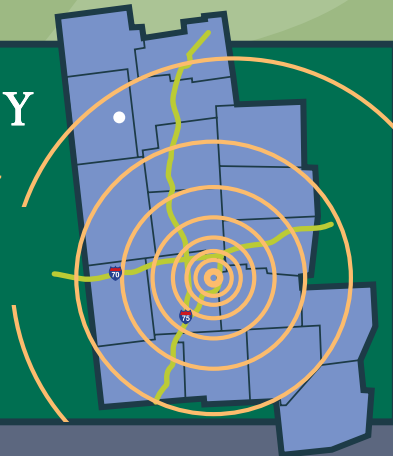


ACCESS, INNOVATION, IMPACT:

**40 Years of
Wright State University
Making a Difference
in People's Lives**

WRIGHT STATE UNIVERSITY
IMPACT STUDY
final report



OCTOBER 18, 2007

PREPARED BY: APPLESEED

Table of Contents

Executive Summary	3
Introduction.....	10
I. Wright State in Context: The West Central Ohio Economy.....	12
Restructuring, recession and renewal.....	13
Wright State University: an overview	15
II. Developing the Region's Human Capital.....	17
Undergraduate and graduate education	18
Where Wright State students come from – and where its alumni live	19
Developing talent for today's leading industries – and tomorrow's	23
Continuing education and local workforce development	26
Strengthening elementary and secondary education.....	29
A university for West Central Ohio	32
III. A Major Regional Enterprise.....	33
A leading employer.....	33
The impact of University purchasing	36
The impact of construction.....	37
The impact of the multiplier effect	40
Accounting for substitution effects.....	41
The impact of student spending	42
The impact of visitor spending	43
Adding it all up	44
IV. Research, Innovation and Business Development	46
A growing research enterprise.....	46
Collaboration with industry partners	51
Graduates and faculty members as entrepreneurs.....	53
An environment that sustains innovation	55
The future of innovation	57
V. Engagement with the Community	59
VI. Looking Ahead: Wright State at 50	65

Executive Summary

Like many other communities throughout the Midwest, Dayton and the surrounding Miami Valley region¹ are in the midst of a decades-long transition from an economy built on skills in mass production to one in which the creation and creative application of new knowledge are the cornerstones of regional prosperity.

Among the region's greatest assets in this ongoing transition are its colleges and universities – none more so than Wright State University. Since its founding just forty years ago, Wright State has helped tens of thousands of residents of western Ohio acquire the knowledge and skills they need to succeed in a changing economy; and in doing so, has itself become one of the region's largest knowledge-based enterprises. Research conducted at Wright State has helped generate the new knowledge that fuels economic growth. And in a variety of ways, the University is helping to sustain and strengthen the environment of innovation and entrepreneurship – symbolized by the brothers whose name it bears – that encourages the translation of new knowledge into new products and services, new businesses and new jobs.

1) Developing western Ohio's human capital

Wright State's most important contribution to the western Ohio economy is the role it has played in educating the region's workforce.

- Wright State is the largest provider of four-year undergraduate, graduate and professional education in the region – and the largest provider of four-year and graduate education to the region's residents. In the fall of 2006, 12,405 undergraduates and 3,539 graduate and professional students – 70 percent of them Miami Valley residents – were enrolled at Wright State,
- During the past decade, enrollment at Wright State has risen by 11 percent; the University ranks second among Ohio's public universities in enrollment growth during this period.
- Of all Wright State graduates whose addresses are known, 56 percent – more than 47,800 people – currently live in the Miami Valley. Another 27 percent live elsewhere in Ohio.
- The percentage of Miami Valley residents who have four-year or higher degrees has increased dramatically since 1970 – from 8.6 percent of all those age 25 and older in 1970 to 24.6 percent in 2006. Wright State has been an important contributor to that increase. Its graduates account for more than one-fifth of the growth in the Miami Valley's college-educated population; and half the increase in the college-educated population in Dayton and Fairborn.

¹ For the purposes of our analysis, we have defined the Miami Valley as the 14-county region encompassing the following counties: Auglaize, Butler, Champaign, Clark, Clinton, Darke, Greene, Logan, Mercer, Miami, Montgomery, Shelby, Preble, and Warren.

- As a result of this growth in the percentage of its residents who have completed college, the Miami Valley, which in 1970 trailed the State of Ohio in educational attainment, now has a slightly higher percentage of its population with four-year or higher degrees than the state as a whole.
- Based on recent research on the impact of increasing educational attainment on overall regional income, we estimate that aggregate annual earnings of the region's workers are about \$600 million higher today than they would have been without Wright State's contribution to the education of the region's population.
- Wright State also offers an extensive program of continuing education for those already in the workforce. During the 2005-06 academic year, for example, the University's Center for Performance Excellence at the Kettering Center for Continuing Education, located in downtown Dayton, offered 110 non-degree programs, providing training to more than 3,400 people.
- Preparing local residents to live and work in a world that increasingly demands higher-level skills is not a process that begins when they enter college. The quality of elementary and secondary education is also critically important. Wright State is involved in a variety of efforts both to strengthen local schools, and to expand the range of educational opportunities available to young Dayton-area residents. For example:
 - The College of Education and Human Services offers professional development courses to teachers and administrators throughout the Miami Valley. About 1,470 teachers and administrators enrolled in professional development courses during 2005-06.
 - In 1987, Wright State, Wright-Patterson Air Force Base and the Dayton Public Schools created Wright STEPP, a program aimed at encouraging minority students in grades 7 through 10 to pursue careers in science, math and engineering. Since the program began, 98 percent of all Wright STEPP students have graduated from high school; and 40 percent of them have been awarded four-year scholarships at Wright State.
 - The Office of Pre-College Programs offers week-long summer courses for K-12 students on a variety of topics, including chemistry, math and business. Between 2003 and 2007, a total of 8,310 students participated in these programs – an average of 1,662 each summer.

2) A major regional enterprise

In addition to being a leading source of educational opportunities for the region's residents and a provider of skilled personnel to local industries, Wright State is itself one of the region's leading knowledge-based enterprises.

- In the fall of 2006, Wright State employed 3,581 people (excluding students), of whom more than 70 percent worked full-time.
- Between 2001 and 2006 – a period when total employment in the Miami Valley declined by 1 percent, and private employment by nearly 2 percent – non-student employment at Wright State grew by 4.7 percent, an increase of 160 jobs.
- In fiscal year 2006, Wright State spent \$137 million on purchases of goods and services, including \$39 million that was paid to companies located in the Miami Valley. University spending on goods and services directly supported approximately 466 full-time-equivalent jobs with Miami Valley companies.
- In fiscal year 2006, Wright State spent \$18.7 million on construction and renovation of campus facilities, about 87 percent of which was paid to contractors located in the Miami Valley. We estimate that this investment directly generated 194 full-time-equivalent jobs with Miami Valley contractors.
- Through the “multiplier effect” – the impact of spending by University vendors and contractors on purchases of goods and services from other local businesses, and of household spending by University employees – generated 1,010 additional FTE jobs in the Miami Valley in 2006, and \$146 million in economic activity.
- In total, we estimate that Wright State's spending on payroll, purchasing and construction generated 5,250 jobs in the Miami Valley in 2006, and \$367 million in economic activity. Wright State University's economic impact as an enterprise is summarized in Table 1.

Table 1: Economic impact of Wright State University on the Miami Valley

	<i>Direct University spending</i>		<i>Indirect and induced impact of spending</i>		<i>Total impact</i>
	<i>Payroll</i>	<i>Purchasing / construction</i>	<i>Impact of employee spending</i>	<i>Impact of vendor and contractor spending</i>	
Miami Valley	\$166 million 3,580 jobs	\$55 million 660 FTE	\$115 million 700 FTE	\$31 million 310 FTE	\$367 million 5,250 FTE

3) New knowledge and new businesses

Research at Wright State is a “growth business” in its own right, attracting tens of millions of dollars each year in federal and other outside funding to the region. Even more important in the long run, however, is the role that Wright State plays – through collaboration with local companies, through creation of new businesses and through its participation in local economic development initiatives – in helping to ensure that creation of new knowledge at the University translates into new opportunities for the region's businesses and residents.

- Research spending at Wright State totaled \$31.9 million in fiscal year 2006 – an increase of 45 percent since 2001.
- Wright State’s research enterprise is particularly strong in computer science and information technology, psychology and the life sciences. Among all Ohio universities, Wright State ranked second to Ohio State in 2005 in spending on math and computer science research; and ranked fourth in psychology and the life sciences.
- Half of the University’s research spending was financed through federal grants and contracts – 26 percent from internal sources – and 10 percent by corporations and foundations. Only 13 percent is funded by state and local government agencies.
- In fiscal year 2006, faculty and students at Wright State engaged in collaborative research with 27 companies based in the region, including major firms such as NCR, LexisNexis and Delphi. By providing a venue for – and the resources to undertake – collaborative research and problem-solving, research centers at Wright State have helped to create an infrastructure for innovation in western Ohio. For example:
 - The Wright Center of Innovation for Advanced Data Management and Analysis – now known as *daytaOhio* – was established in 2003 with a \$12.6 million grant from the state’s Third Frontier program. It has since attracted \$32 million in additional funding from other government and corporate sources. The Center focuses ways to manage more efficiently, and more quickly and effectively glean useful insights from, massive amounts of data. Its partners include major Dayton-area companies such as NCR and Lexis-Nexis, the Air Force Research Laboratory at Wright-Patterson Air Force Base, and several other Ohio universities.
 - The University’s *Appenzeller Visualization Laboratory* allows researchers to project detailed 3D images of everything from protein structures to aircraft components in an immersive environment. Businesses and academic users pay up to \$1,000 a day to use the Lab’s facilities, with practical applications in fields ranging from drug discovery to component design to exploration of potential oil and gas deposits.
 - The *Homeland Emergency Learning and Preparedness (HELP) Center* was initially funded by the state to develop a prototype neighborhood emergency response center; it is now working to develop models that can be used nationwide.
- The University’s strengths in areas such as those cited above have been instrumental in attracting a number of technology-based companies to the region. In 2006, for example, California-based Alien Technologies, a leader in the development of RFID systems, chose Dayton as the location for its new RFID Solutions Center, in part due to its proximity to Wright State. British information technology company, QBase, selected Dayton for its American headquarters in 2005 and is developing a health care informatics facility in Springfield.

- Wright State alumni and faculty are also contributing to the revitalization of the Miami Valley economy through the creation and growth of new businesses. Examples of companies founded or led by Wright State alumni include Peerless Technologies (Dayton), Total Contact (Germantown) and Harvest Info (Mason).
- Just as it collaborates with a wide variety of partners in its efforts to promote research and innovation, Wright State has collaborated with several partners to support economic development in the region. For example:
 - In 1980, Wright State worked with Central State University, the University of Dayton and Sinclair Community College to create the ***Miami Valley Research Park***. Today the Park provides space for 42 tenant companies that employ approximately 4,500 people.
 - Wright State's ***Center for Innovation Management*** is a partner in the Dayton Development Coalition's Entrepreneurship Signature Program (ESP). The Center aims to accelerate the development of small technology-based companies in the region, with a particular focus on composite materials, nanomaterials and sensor applications. With a total of \$22.5 million in funding from the state and several corporate partners, ESP provides a comprehensive array of services – including pre-seed funding, loans, equity investments, incubation space and technical assistance – that are tailored to the needs of its client companies.

4) Engagement with the community

The best universities contribute not only to the process of economic growth and development, but also, in broader terms, to the life of the community. Wright State is extensively engaged with communities throughout western Ohio.

- Wright State is not only an educational resource for residents of the Miami Valley, but an entertainment and cultural resource as well. The University sponsors athletic events, concerts, lectures, theatrical performances and other events that are open to the general public; and also makes its facilities available for events sponsored by others. We estimate that in 2005-06, attendance by residents of the region (excluding those affiliated with the University) at events on the Wright State campus totaled approximately 520,000.
- Wright State also offers a wide range of services that enhance the health and well-being of the region's residents. For example:
 - In 2006 the 100 physicians who belong to Wright State University Physicians handled more than 100,000 patient visits.
 - Wright State's graduates are also making an important contribution to meeting the health of the region's residents. More than 500 School of Medicine alumni reside in the Miami Valley.

- Since 1991, the *Center for Healthy Communities (CHC)*, a joint venture of Wright State and Sinclair Community College, has worked to improve the health and well-being of the community. CHC directly serves close to 20,000 people each year through its programs and seminars.
- The *Alliance for Research in Community Health (ARCH)*, sponsored by the Department of Family Medicine at the Boonshoft School of Medicine, provides a bridge between academic medical research and the needs of the community. For example, ARCH faculty have introduced an asthma intervention program in three Dayton Public Schools; others have focused on improving diabetes management among the low-income elderly.
- University departments and centers provide various forms of technical assistance to communities throughout the region, for example, the *Center for Urban and Public Affairs* helped the City of Dayton develop its Neighborhood Leadership Institute, an annual 12-week program that provides training to Dayton residents in areas ranging from the role of city government to the criminal justice system to housing and neighborhood development.
- Outreach to the region's communities takes other forms as well. Wright State students performed an estimated 400,000 hours of community service work during 2005-06. Faculty and staff are also involved in performing community service for a wide range of organizations throughout the region.

5) Looking ahead: Wright State at 50

In the forty years since its founding, Wright State has been a significant contributor to the region's transition to a twenty-first century economy. By 2017, when the University will be celebrating its fiftieth anniversary, its impact could be even greater than it is today. This is so for several reasons.

- **Growing demand for education.** As the region continues its evolution toward a more knowledge-based economy, demand for higher education is likely to keep growing. As the Miami Valley's largest provider of four-year college and graduate education – and as a university with a particular commitment to serving those who might not otherwise have the opportunity to earn a college degree – Wright State will play a critical role in determining whether the region can meet this demand.
- **A growing research enterprise.** Wright State's research enterprise is likely to keep growing. While the overall outlook for federal funding is uncertain, Wright State is strong in several areas that are likely to attract increased federal and corporate funding in the future, including information technology, the life sciences, and fields related to defense and homeland security.

The University, moreover, is becoming more entrepreneurial in its own approach to research. The Wright State Research Institute, created in 2007, will provide a more flexible way for Wright State to compete for contract research funding, especially from

the Air Force. University officials estimate that the Institute could by 2012 generate \$6 million annually in research funding.

- ***Increased collaboration with regional partners.*** Over the next decade, the University is likely to see an increased payoff from investments in centers and programs, such as daytaOhio, aimed at encouraging and supporting collaboration between University researchers and local companies. This should work to the benefit of both parties, as local companies make greater use of the University's resources – and at the same time, are encouraged to invest more in University research.
- ***Technology transfer and entrepreneurship.*** An increased emphasis on technology transfer – the process of moving new technologies from the lab to the marketplace – is likely to result in an increase in the number of new technology-based businesses in the western Ohio. The increased emphasis on entrepreneurship in the Raj Soin College of Business, the College of Engineering and Computer Science, and the College of Science and Math is likely to have a similar effect.

In the long run, a research university's contribution to regional economic growth depends not only on the university itself – the quality of its educational programs, the strength of its research enterprise, its commitment to collaboration and entrepreneurial orientation – but also on the region's readiness to capitalize on the university's strengths. Recent trends and developments in the region suggest a growing awareness, in both the public and private sectors, of the role that colleges and universities can play in the revitalization of the region's economy – and a growing desire to have them fulfill that role. For Wright State, this represents both a great opportunity and a great challenge.

As its forty-year history has already demonstrated, Wright State is committed to working with its partners to enhance the region's economic vitality, and to improve its quality of life. The University today is well-positioned to help the region address the challenges it will face in the decade ahead – and to help its residents take advantage of the opportunities that an ever-changing economy will present.

Introduction

In the forty years since it was founded, Wright State University has developed into an important asset for western Ohio – a source of growth for the region’s economy, and a source of opportunity for its residents. And as the region seeks to overcome the combined effects of long-term changes in the structure of its economy, a severe recession and a weak recovery, the University could prove to be an even greater asset in the future.

In order to understand more clearly its role in the region’s economy² – and to set the stage for discussions about what that role might be in the future – Wright State University in 2007 asked Appleseed, a New York City consulting firm that has had extensive experience working with universities, to prepare a report examining the University’s impact on the economy of the Miami Valley. This report presents the results of Appleseed’s analysis.

Part One of the report provides a brief overview of the regional economy, and of the University. Part Two examines the University’s role in the development of the region’s “human capital” and in the expansion of educational opportunity for residents of the region.

Part Three of the report analyzes the University’s impact as a major enterprise in its own right – a major employer, and a buyer of goods and services from local companies. Part Four discusses Wright State’s role as a growing center of research and innovation; and Part Five briefly highlights the many ways in which the University contributes to the life of the region through various forms of engagement with communities throughout the region.

Finally, Part Six of the report briefly highlights several reasons why, by the time Wright State reaches the fiftieth anniversary of its founding in 1967, its contribution to the region’s economy is likely to be even greater than it is today.

Acknowledgments

This report could not have been completed without the active support and assistance of many members of the Wright State community. We particularly wish to thank President David Hopkins, Robert Sweeney, Executive Vice President for Planning, Iris Harvey, Associate Vice President for Communications and Marketing, and Kitt Lurie, Senior Data Analyst, Budget Planning & Resource Analysis.

For helping us better understand the role of Wright State University in the community both through interviews and data, we would also like to thank Jack Bantle, Greg Bernhardt, Mike Bodey, Nikolaos Bourbakis, Paul Cashen, Katherine Cauley, Tim Cope, Brenda Dewberry,

² For the purposes of our analysis, we have defined the Miami Valley economy as the 14-county region encompassing the following counties: Auglaize, Butler, Champaign, Clark, Clinton, Darke, Greene, Logan, Mercer, Miami, Montgomery, Shelby, Preble, and Warren.

Linda Dull, Jack Dustin, Berkwood Farmer, Matt Filipic, Robert Fyffe, Mark Gebhart, James Gruenberg, Carol Holdcraft, Carol Hooker, Dan Krane, Mary Jean Henry, Lillie Howard, Bor Jang, Julie Lincks, Katherine Myers, S. Narayanan, J.P. Nauseff, Howard Part, Bruce Pearson, Jacquie Powell, Cindy Schisler, Michael Schulze, Bill Seller, William Tindall, Michele Wheatly, and Scott Williams.

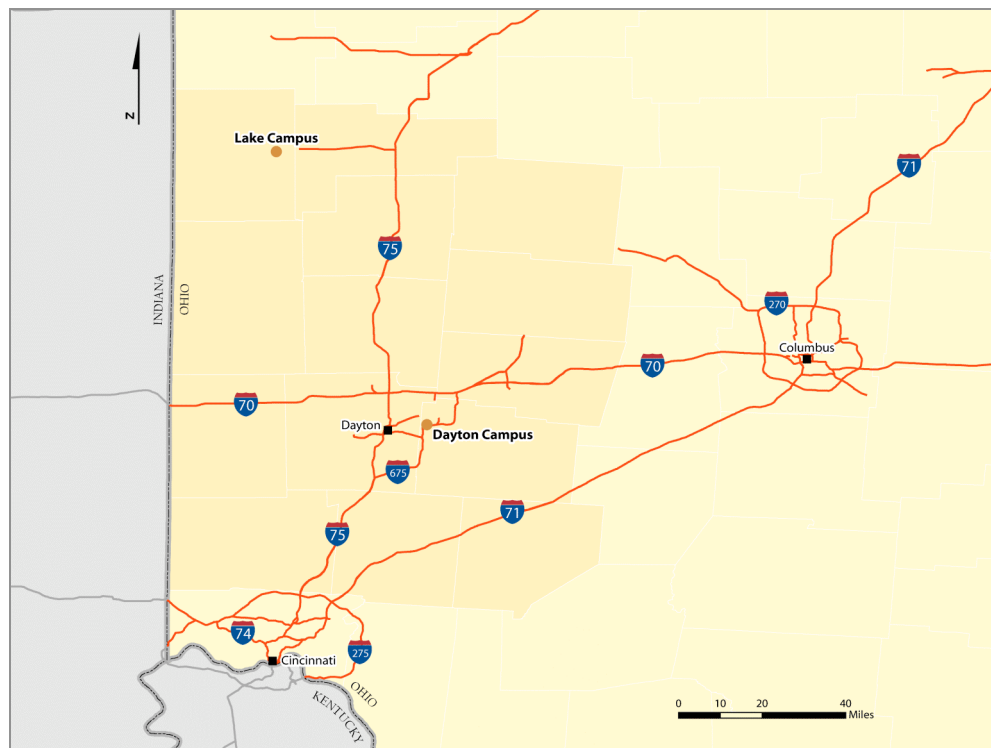
I. Wright State in Context: The West Central Ohio Economy

Accounts of the development of the U.S. economy in the latter half of the twentieth century sometimes sound as if innovation and entrepreneurship first emerged as the driving forces of economic growth some time after the Second World War. But these forces have in fact been driving the growth of the U.S. economy for 200 years. And just as we now think of the regions around Palo Alto, Boston and Austin as being at the leading edge of innovation, other U.S. cities and regions have at various times played a similar role.

In fact, if a century ago an economist or an investor had been seeking to identify the epicenter of innovation and entrepreneurship in the U.S., he might well have found it – not in what is now Silicon Valley, but in and around Dayton, Ohio. For example:

- Dayton in the early twentieth century was home to John Patterson, inventor of the mechanical cash register; his National Cash Register Company had already begun to revolutionize the way business was done, not just in the U.S. but around the world.
- Dayton was also the home of Orville and Wilbur Wright and the Wright Company – the first in the world engaged in the manufacture of airplanes as a commercial venture.
- In 1909 Charles Kettering and Edward Deeds founded Dayton Engineering Laboratories (Delco) to manufacture a new product Kettering had invented – an electric ignition system for automobiles. Its business soon grew to encompass other automotive and electrical products as well.

Figure 1: Location of Wright State University's Dayton and Lake Campuses



In 1917 Deeds, Kettering and Orville Wright started the Dayton-Wright Airplane Company, the leading supplier of aircraft to the U.S. Army during the First World War; more than 3,000 airplanes were built at the company's plant in Moraine. And after the war, both Delco and Dayton-Wright became part of a new conglomerate that included Kettering among its founders – General Motors.

Restructuring, recession and renewal

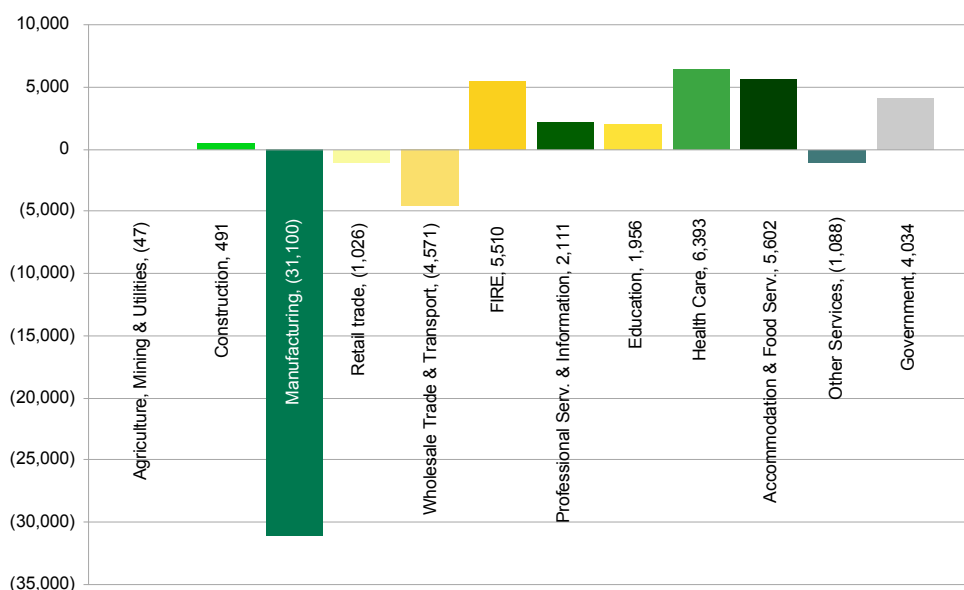
The pioneering work of these men and others like them turned the region into a powerhouse of engineering and sophisticated manufacturing. They set the foundation for an era of prosperity that lasted into the latter part of the century.

Even as other Midwestern cities and regions experienced sharp declines in manufacturing, the greater Miami Valley's industrial sectors remained relatively strong. Between 1979 and 1999, manufacturing employment in the region declined by 5.2 percent – a loss of about 10,300 jobs. By this measure, the Miami Valley area fared much better than most other manufacturing regions in the Northeast and Midwest.

Nevertheless, what had been one of the region's strengths – its concentration in manufacturing – over time was becoming a source of vulnerability.

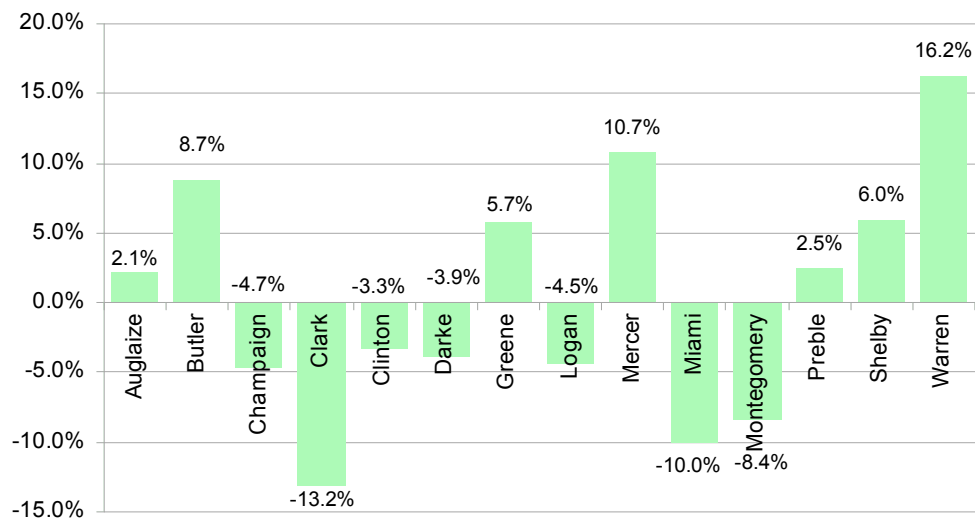
In 2000 and 2001, the Miami Valley, along with the nation, slid into recession. Between 2000 and 2003, private wage-and-salary employment declined by 4 percent – a loss of nearly 27,000 jobs. Employment rebounded somewhat in 2004 and 2005 – but in 2005 was still 1.9 percent below the average for 2000. Gains in finance, health care, hospitality and some other sectors were not enough to offset a 17.9 percent decline in manufacturing employment. Figure 2 highlights these employment trends.

Figure 2: Total employment gains/losses by sector, Miami Valley 2000 – 2005



Montgomery County – the region’s most populous county, which includes Dayton – has been especially hard-hit. Between 2000 and 2005, private wage-and-salary employment in the county declined by 8.4 percent – a loss of nearly 22,600 jobs. (Clark and Miami counties suffered even greater losses in percentage terms, although the losses were smaller in terms of absolute numbers – losses of approximately 6,600 and 4,000 jobs, respectively.) Figure 3 shows employment gains and losses between 2000 and 2005 by county.

Figure 3: Total employment gains/losses by Miami Valley county, 2000 – 2005



As it seeks to overcome the economic problems that have been evident in recent years, the region faces a number of serious challenges – continuing job losses in several of its older manufacturing industries; concentrations of poverty in Dayton and some other communities; and a level of educational attainment that, while slightly above that for Ohio as a whole, still lags behind that of other regions in the U.S., and of the region’s competitors overseas.

But the region also has some significant assets to draw upon. They include:

- Historic and continuing strengths in the information sector;
- A diverse core of small to mid-size manufacturing firms that, despite the sector’s overall decline, can still compete successfully, even in an intensely competitive global economy;
- A strategic location, within 600 miles of more than half of the U.S. population;
- Relatively low costs; according to the ACCRA Cost of Living Index, overall living costs in the Dayton area in 2006 were 4 percent lower than the national average; and the cost of housing was 16 percent below the U.S. average.
- Wright-Patterson Air Force Base, which not only provides a steady flow of federal funds into the region, but represents as well a major addition to the region’s human and intellectual capital; and provides as well the advantages that many local suppliers are able to derive from an ongoing relationship with a sophisticated and demanding customer; and finally,

- A cluster of colleges and universities that have in recent years been a growth industry in themselves, and that are also an important part of the region's economic infrastructure.

Among the region's 11 four-year and 7 two-year colleges and universities, none plays a greater role in its economy than Wright State University. Before examining the University's impact on the Miami Valley economy, we provide below a brief overview of its history and operations.

Wright State University: an overview

Wright State is a public university located in Fairborn, Ohio, 11 miles east of downtown Dayton. The University's history dates to the early 1960's, when a group of local business and civic leaders began to campaign for the establishment of a state college in the area. In 1964 their efforts resulted in the creation of a joint branch campus of Miami University and The Ohio State University at a site adjoining Wright-Patterson Air Force Base. The following year the legislature authorized establishment of a full-fledged, independent state university.

The new university officially came into existence in 1967. It was named for the Wright brothers, who 64 years earlier, from their modest bicycle shop in Dayton, had propelled America and the world into the air age.

Wright State University's main campus is comprised of ten colleges (listed below) that offer 109 undergraduate and 46 graduate and professional degrees. Wright State's mission statement reads:

Wright State University will be a catalyst for educational excellence in the Miami Valley, meeting the need for an educated citizenry dedicated to lifelong learning and service. To those ends, as a metropolitan university, Wright State will provide: access to scholarship and learning; economic and technological development; leadership in health, education, and human services; cultural enhancement, and international understanding while fostering collegial involvement and responsibility for continuous improvement of education and research.

Table 2: Wright State University main campus colleges and schools

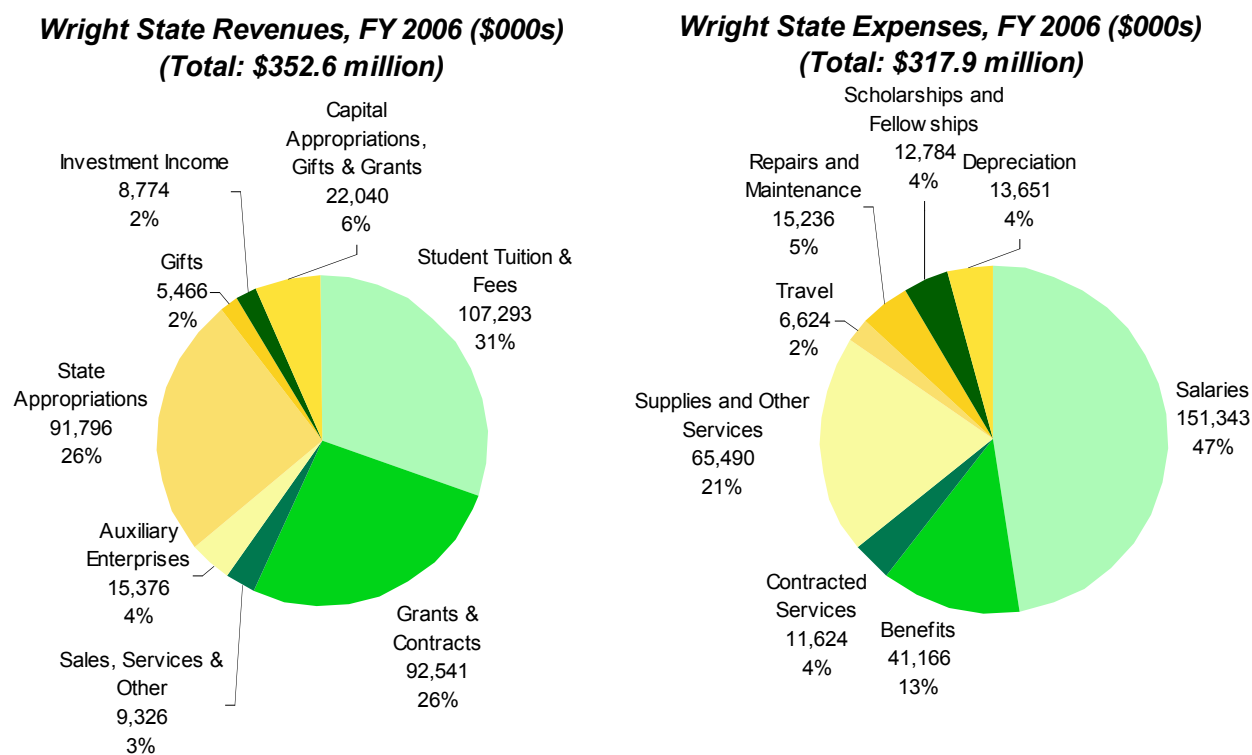
College or School
Boonshoft School of Medicine
College of Education & Human Services
College of Engineering & Computer Science
College of Liberal Arts
College of Nursing & Health
College of Science & Math
Raj Soin College of Business
School of Graduate Studies
School of Professional Psychology
University College

In addition to its 557-acre main campus in Fairborn, the University operates a regional campus – the 173-acre Lake campus, located on the north shore of Grand Lake St. Mary in Celina, Ohio. In the fall of 2006, 16,870 students were enrolled at Wright State, including 12,934 undergraduates and 3,936 graduate and professional students.

As shown below in Figure 4, Wright State's revenues in fiscal year 2006 totaled nearly \$353 million. Payments by students – for tuition, fees and payments to auxiliary enterprises – accounted for roughly a third of the total; and state appropriations, grants and contracts accounted for roughly another third.

Expenses in fiscal year 2006 totaled \$318 million, with salaries and fringe benefits accounting for roughly 60 percent of the total; and supplies and services for another 30 percent.

Figure 4: Wright State University Revenues and Expenses, FY 2006



As the mission statement suggests, Wright State clearly sees the education of the region's residents as its central purpose. Part Two of this report therefore begins our analysis of Wright State's economic impact with an examination of the University's role in the development of the region's human capital.

II. Developing the Region's Human Capital

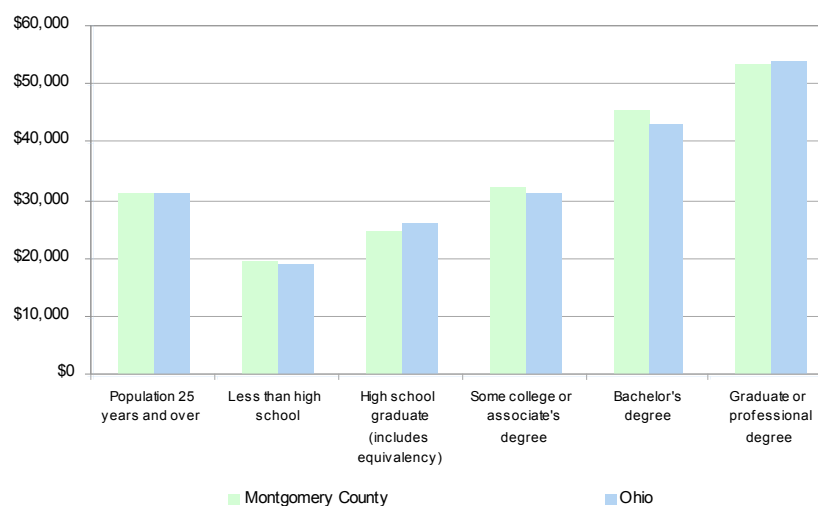
Economists have long recognized that there is a strong correlation between a city's or region's "human capital" – the accumulated knowledge, skills and experience of its people – and its potential for economic growth and development. In Ohio, the Commission on Higher Education and the Economy reached a similar conclusion in 2003. In its report, the commission stated that:

*In a global economy, average is not competitive. The states, regions, and nations that generate new knowledge, innovations, and a ready supply of well-educated, highly skilled citizens will be the winners in the knowledge- and innovation-based economy.*³

The Commission called for a long-term commitment by the state and its colleges and universities to increasing the percentage of Ohio residents who earn college degrees.

The link between educational attainment and earnings is well-known. As Figure 5 shows, in 2000 the median income of Ohio residents with bachelor's degrees exceeded the median income of those with only a high school diploma by \$17,300; and exceeded the income of those with some college experience or an associate's degree by \$11,900. In Montgomery County, the earnings gap between four-year college graduates and less-educated residents was even greater – a \$20,400 differential between four-year college and high school graduates, and \$12,700 between those with four-year degrees and those with some college or an associate's degree.

Figure 5: Median income by educational attainment (25 years and older), 2000



The economic impact of higher education goes beyond the increased earnings of those with college degrees. Higher education also has important spillover effects as well. As the number of people with college degrees increases, so does overall growth in income and employment. For

³ Governor's Commission on Higher Education & the Economy. *Building on Knowledge, Investing in People: Higher Education and the Future of Ohio's Economy*. 2003. p. 9.

example, in a study of 302 U.S. cities (including Dayton) published in 2007, the Brookings Institution found that “a one percentage point increase in the percentage of the city population with at least some college in 1990 was associated with a 0.41 percentage point increase in employment growth over the next ten years.”⁴

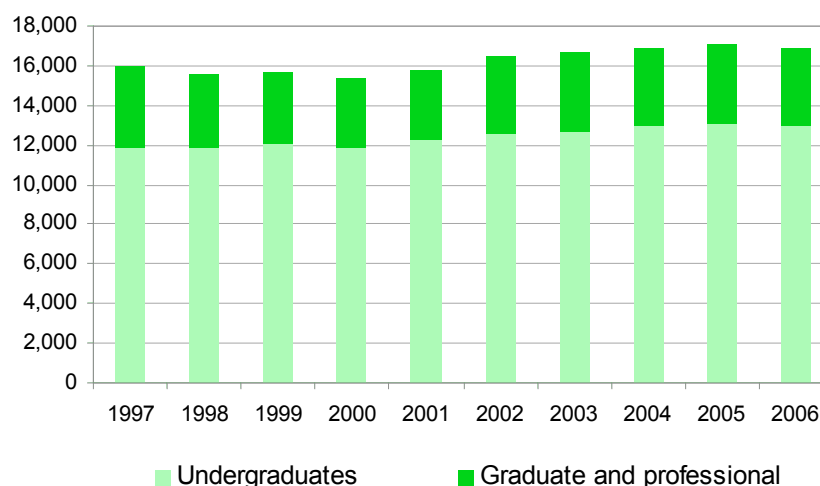
This section discusses the critically important role Wright State University plays in undergraduate and graduate education in the region – in professional and continuing education programs for working residents – and in helping to educate future generations of college graduates through programs for elementary and high school students, school partnerships and teacher training.

Undergraduate and graduate education

Wright State is the largest provider of four-year undergraduate, graduate and professional education in the region. In the fall of 2006, 16,870 degree and non-degree students were enrolled at the university, including 12,934 undergraduates and 3,936 graduate and professional students. Table 3 on the following page shows enrollment in the fall of 2006 by college or school.

Between the fall of 1997 and the fall of 2006, total student enrollment at Wright State grew by 5.2 percent. During this time, degree-seeking enrollment at the University grew by about 9.6 percent – with undergraduate enrollment increasing by 9.3 percent and graduate and professional enrollment by 10.5 percent. Between 2000 and 2006, Wright State ranked second (behind Youngstown State) among Ohio's eleven comprehensive public universities in enrollment growth. Figure 6 summarizes Wright State's enrollment growth between 1997 and 2006.

Figure 6: Wright State total enrollment growth, Fall 1997-Fall 2006



⁴ Brookings Institution, *Restoring Prosperity: The State Role in Revitalizing America's Older Industrial Cities* (Washington, DC, 2007), p. 23.

Table 3: Undergraduate and graduate student enrollment, fall 2006, by college or school

<i>College or School</i>	<i>Enrollment</i>
<i>Undergraduate</i>	
College of Education & Human Services	1,299
College of Engineering & Computer Science	623
College of Liberal Arts	2,253
College of Nursing & Health	692
College of Science & Math	1,319
Raj Soin College of Business	1,220
University College	4,860
Lake Campus (associate's degrees)	139
<i>Subtotal</i>	<i>12,405</i>
<i>Graduate & Professional</i>	
Boonshoft School of Medicine	475
College of Engineering & Computer Science & Engineering	525
College of Education & Human Services	1,098
College of Liberal Arts	311
College of Nursing & Health	203
College of Science & Math	355
Raj Soin College of Business	453
School of Professional Psychology	119
<i>Subtotal</i>	<i>3,539</i>
<i>Non-Degree</i>	
Continuing Education	352
College of Education and Human Services	22
School of Graduate Studies	393
University College	241
<i>Subtotal</i>	<i>1,008</i>
<i>TOTAL⁵</i>	<i>16,870</i>

Where Wright State students come from – and where its alumni live

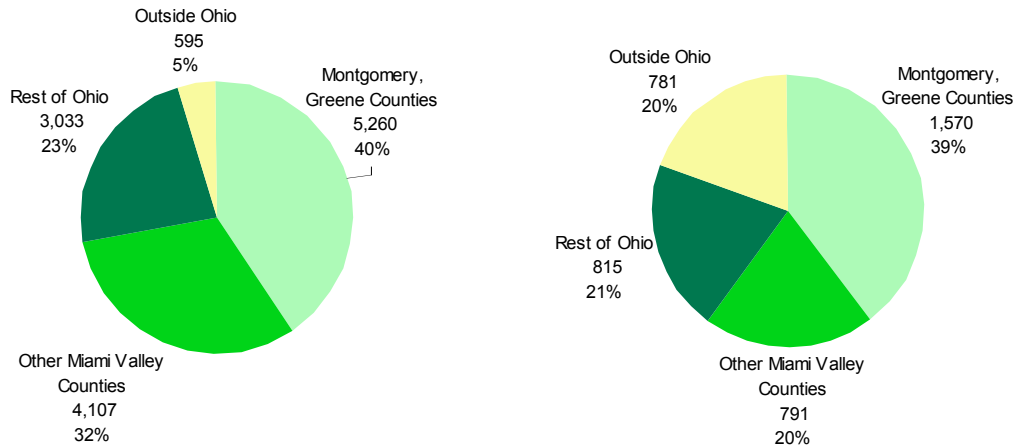
In the fall of 2006, about 68 percent of all enrolled students at Wright State (including both the Dayton and Lake campuses) – a total of approximately 11,000 students – came from the fourteen counties of the greater Miami Valley. Another 24 percent came from other parts of Ohio.

Figure 7 illustrates the distribution of enrolled students on the Dayton and Lake campuses by their permanent address.

⁵ Due to students enrolled in several programs at once, subtotals do not sum to the total, which is an unduplicated student headcount.

Figure 7: Distribution of enrolled students by permanent address, Dayton and Lake campuses, Fall 2006

Undergraduate enrollment, by permanent address, Dayton and Lake campuses, Fall 2006 **Graduate enrollment, by permanent address, Dayton and Lake campuses, Fall 2006**

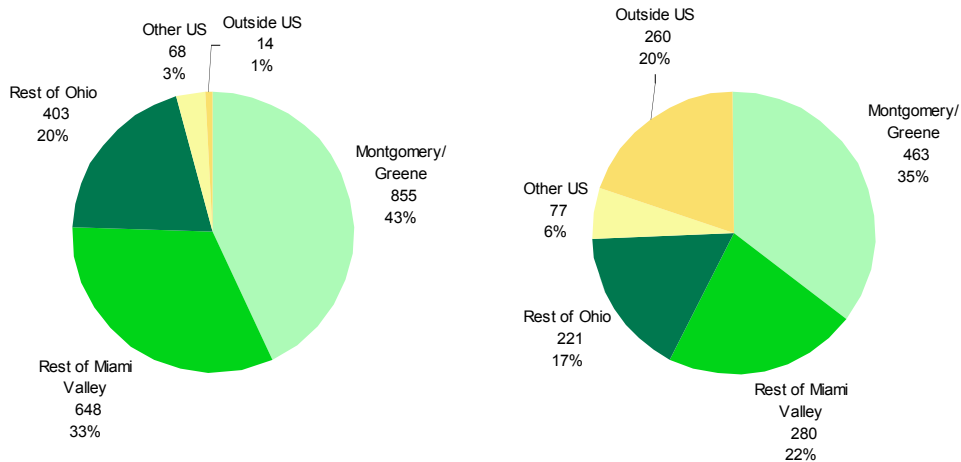


Of the more than 1,300 students who were not Ohio residents in the fall of 2006, 633 were international students, coming to Wright State from 68 other countries. About three-quarters of them were graduate students, with engineering and business the most popular fields. India, China and Korea were the leading countries of origin for international students at Wright State.

Wright State granted 3,547 degrees in 2005-06, including 73 associate's degrees, 2,219 bachelor's degrees and 1,345 graduate and professional degrees. As Figure 8 below shows, most degree recipients are Miami Valley residents.

Figure 8: Undergraduate and graduate/professional degrees granted, 2005-06

Associate and bachelors degrees granted, 2005-06 **Graduate and professional degrees granted, 2005-06,**

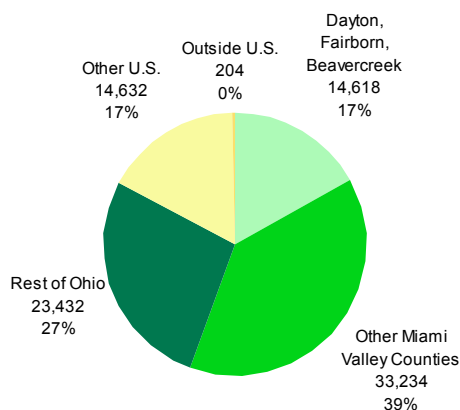


Note: Figures in the pie charts above only include those students for whom address data is available

Most students who graduate from Wright State remain in the Miami Valley after graduating. Of the 86,120 graduates whose addresses are known, 56 percent – more than 47,800 people –

currently live in the Miami Valley. Another 27 percent live elsewhere in Ohio. The distribution of Wright State alumni by place of residence is shown in Figure 9.

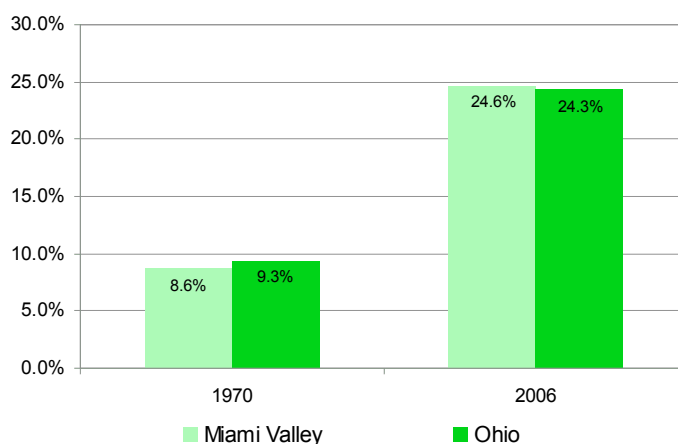
Figure 9: Active Wright State alumni, by address as of spring 2007



We estimate that more than 12 percent of Miami Valley residents with an associate's degree or higher received one or more degrees from Wright State. About 29 percent of Dayton, Fairborn and Beavercreek residents with an associate's degree or higher earned a degree at Wright State.⁶

The percentage of Miami Valley residents who have four-year or higher degrees has increased dramatically since 1970 – from 8.6 percent of all those age 25 and older in 1970 to 24.6 percent in 2006. As a result of this increase, the Miami Valley has gone from trailing the State of Ohio in educational attainment in 1970 (with 8.6 percent of those over 25 having four-year or higher degrees, versus 9.3 percent at the state level) to slightly outperforming the state on this measure in 2006 (24.6 percent versus 24.3 percent). Educational attainment in the Miami Valley is compared to that for the State of Ohio in Figure 10.

Figure 10: Percent of population, age 25 and higher, with a bachelor's degree or higher, 1970 and 2006



Wright State has been an important contributor to the region's increase in educational attainment. Its graduates account for more than one-fifth of the increase in the Miami Valley's college-

⁶ Sources: U.S. Census 1970; DemographicsNow 2006.

educated population. The University's impact is particularly evident in Dayton and Fairborn, where Wright State graduates account for 50 percent of the increase since 1970 in residents age 25 or older who have four-year or higher degrees.

We can estimate the economic "return on education" to the region provided by Wright State University. Analyzing data from U.S. metropolitan areas between 1980 and 1990, Enrico Moretti found that, on average, a one percent increase in a metropolitan area's share of college graduates can explain at least a 1.25 percent increase in its total wages.⁷ If we assume that the college-educated share of the Miami Valley's adult population would be two percentage points lower if not for Wright State University, we can estimate that the wages earned by the region's workers would decline by about \$600 million annually – about \$870 per year for each worker.

Expanding disabled students' access to higher education

In an age when prosperity more than ever depends on human capital, communities and regions need to ensure that all of their residents have a chance to develop their abilities, and to acquire the skills that will allow them to contribute to the process of economic growth. Since its founding, Wright State University has been strongly committed to ensuring that its campuses can accommodate disabled students, and to providing the services they need to succeed.

Wright State's focus on the disabled dates to the late 1960's, when a commitment to meeting the needs of disabled Vietnam veterans shaped the initial development of the University's Dayton campus. In 1970, Wright State created an Office of Disability Services – years before state or federal law required universities to offer such services. Evolving from care of students with spinal cord injuries or cerebral palsy, the Office now provides extensive services to a range of students with special needs. Here we present just a few examples of how Wright State promotes access for students with disabilities:

- All first-year disabled students are matched with a personal assistant – a fellow student charged with providing assistance to the disabled student.
- The University features an extensive network of elevator-accessible walkways below the campus that give students with disabilities that impair mobility a way to get across campus safely and quickly.
- Wright State provides a wide range of assistive technologies, including an adaptive computer lab, screen reading software, text reading software, screen enlargement, and prediction programs.
- The Office of Disability Services employs a vocational support specialist who works with students to learn how to discuss their disability with potential employers. Students can also use the office to help locate internships to obtain work experience.

⁷ Moretti, Enrico. "Estimating the social return to higher education: Evidence from longitudinal and repeated cross-sectional data." *Journal of Econometrics* 121 (2004) 175 – 212.

Developing talent for today's leading industries – and tomorrow's

Wright State offers a wide range of programs that reflect its commitment to providing both a high-quality general education and the preparation its students need to succeed in their chosen careers. In doing so, the University also helps develop the supply of highly-skilled workers needed by many of the region's (and Ohio's) leading industries. Here we offer just a few examples of programs at Wright State that prepare students for careers in such industries.

- Wright State's Department of Computer Science offers undergraduates a concentration in ***bioinformatics*** – using the tools and methods of artificial intelligence, database management and complex algorithms to understand increasingly complex areas of the life sciences, such as the study of the human genome.
- The Department of Biomedical, Industrial and Human Factors Engineering is the only university department in the U.S. that combines these disciplines to focus on complex human-technical systems. Students in ***human factors engineering*** learn to design tools, machines, systems and work environments that maximize both system effectiveness and human safety and comfort.
- From cellular to radio frequency identification (RFID) to "WiFi", wireless is developing rapidly as a commercial and consumer technology; and it has valuable military applications as well. The College of Engineering and Computer Science has developed an undergraduate concentration in ***wireless engineering*** that could eventually lead to a new bachelor's degree program. Wright State is also working with Alien Technologies – a leading RFID firm that has located a new facility in Dayton – to develop a curriculum aimed at preparing a new generation of engineers who not only understand RFID technology, but can also develop new wireless applications.
- The Raj Soin College of Business offers undergraduates in other schools at Wright State a ***minor in international business*** – a 28-credit program that combines business-oriented foreign language training with courses in international relations and international business. The program is aimed at ensuring that, whatever their chosen careers, students are prepared to work in an increasingly-integrated world. In the fall 2006, 12 students were pursuing the minor in international business.
- In the College of Liberal Arts, students majoring in urban affairs can specialize in ***community development***, learning to work with local government agencies and community organizations to promote economic development and improve the quality of life in urban neighborhoods.
- The Raj Soin College of Business offers a ***master's degree in logistics and supply chain management*** – a discipline that is increasingly critical to the success of both companies and regions in a globally integrated economy. The program operates under the guidance of an advisory committee that includes representatives of major global companies – including many headquartered or with operations in Ohio.

Preparing health professionals in western Ohio

Wright State contributes to the development of the region's human capital through education and training programs that prepare graduates (and professionals) to launch careers with companies in the Dayton area's leading industries. This is also true in the health care sector.

Health care has a dual role in the region's economy. First, health care is one of the fastest-growing industries in the Miami Valley, creating jobs at a variety of skill levels and helping to meet fast-growing demand for services. Second, mental and physical health and well-being are themselves important aspects of a region's human capital base: healthy workers are more productive workers.

Data provided by Wright State University indicate that:

- More than 2,800 graduates of Wright State's College of Nursing and Health live in the Miami Valley – about 56 percent of the College's alumni;
 - More than 520 Boonshoft School of Medicine alumni live in the Miami Valley area; and
 - More than 120 School of Professional Psychology alumni live in the Miami Valley area.
-
- The Boonshoft School of Medicine's ***aerospace medicine program***, founded in 1978, was the first in the U.S., and is still one of the leading programs of its kind worldwide. Its graduates include medical directors of several airlines, and medical professionals with the armed forces, NASA and several foreign governments. The program is closely affiliated with the medical and research staff at Wright-Patterson Air Force Base.
 - Wright State University started its baccalaureate nursing program in 1973 and its masters nursing program in 1978. These programs serve a critical need in the region and the state: the National Center for Health Workforce Analysis (NCHWA) expects that the State of Ohio could face a shortfall of more than 10,400 registered nurses by 2010. In response to this growing need, the College's total enrollment grew by 64 percent, and its undergraduate enrollment by 84 percent, between 2000 and 2006
 - Together with the University of Toledo, Wright State University has developed Ohio's first public "practice-oriented" ***Doctor of Nursing Practice*** (DNP) program, to be offered in the College of Nursing and Health. Members of the American Association of Colleges of Nursing have voted to move the current level of preparation necessary for advanced nursing practice from the master's degree to the doctoral level by the year 2015.
 - To address the national need for more professionals to work with the growing disabled population, Wright State launched the ***Learning with Disability*** Ph.D. program with \$3.2 million from a National Science Foundation Integrative Graduate Education Research Training grant. The program is led by a multi-disciplinary team of faculty across the University who train graduate students to work with the disabled, gain an understanding of the challenges they face, and develop new assistive technologies and devices to serve them.

- Wright State partnered with the University of Dayton, Wright-Patterson Air Force Base, The Ohio State University, and the University of Cincinnati to create the ***Dayton Area Graduate Studies Institute*** (DAGSI), an innovative curricular umbrella that permits students to combine classes from all of these institutions to meet the requirements for the Ph.D. in Engineering.
- The new interdisciplinary PhD program in ***Environmental Sciences*** – with faculty from Biological Sciences, Earth and Environmental Sciences, Chemistry, Physics, Biochemistry and Molecular Biology, and Pharmacology and Toxicology – trains students to solve complex environmental problems affecting both human and ecosystem health. Three students from the program have gone on to become EPA fellows.

Expanding educational opportunity in West Central Ohio

Wright State University's Lake Campus, located in Celina, Ohio, traces its history to 1962, when the Western Ohio Educational Foundation began offering college courses to residents of the underserved West Central Ohio area, through an agreement with Ohio Northern University. The Foundation's first courses were offered at a local high school; a few years later, it moved to a 173-acre campus on the shore of Grand Lake St. Marys. In 1969, the Foundation's board voted to affiliate with Wright State, and the Lake campus became the University's sole branch campus.

The Lake campus offers associate degrees in a number of fields. It is particularly strong in information technology, offering programs in office information technology, financial management technology, computer-aided design and computer graphics. The campus also offers an Associate of Technical Study, which allows students, working with individually-designated faculty advisors, to design degree programs in information technology that are tailored to their particular needs and interests. Associate degree programs are also available in other disciplines such as business, biology, chemistry and liberal studies.

Bachelor's degree programs are offered at the Lake campus in organizational leadership, English, liberal studies, early childhood education, middle school education, along with a bachelor's degree completion program for nurses. Students can take business courses through their junior year at the Lake campus, then completing the final year at the Dayton campus. At the graduate level, the campus offers an MBA program and a master's degree in education.

In the fall of 2006, 864 students were enrolled in degree programs at the Lake campus. Of these, 676 – 78 percent of all students – were residents of Auglaize, Darke, Mercer and Van Wert counties. Residents of other Ohio counties accounted for another 17 percent.

- In February 2007, Wright State University and Sinclair Community College received a five-year \$2 million NSF grant through the Science, Technology, Engineering and Mathematics Talent Expansion Program (STEP) to increase the number of local students pursuing degrees in science, technology, engineering, and math-related (STEM) fields.

The funding will support the creation of a summer introductory curriculum that will better prepare students for early success, provide professional development opportunities for faculty at both institutions, and create a new lab class at both WSU and Sinclair.

The goal of the program is to increase the first- to second-year retention of students in STEM degree programs at WSU by 10 percent and increase by 10 percent the number of students transferring from Sinclair to Wright State to pursue a bachelor's degree in a STEM field.

Continuing education and local workforce development

It is not just Wright State's alumni who contribute to the quality of the region's workforce. A majority of those enrolled in degree programs at Wright State are already working. In a survey conducted in the spring of 2007, 21 percent of all University students said that they were employed full-time in off-campus jobs; and 40 percent said they had part-time off-campus jobs. This means that approximately 9,600 Wright State are already part of the region's workforce.

In addition to its regular degree programs, Wright State offers numerous opportunities for working residents of the region to upgrade their skills. The University's Center for Performance Excellence at the Kettering Center for Continuing Education, located in downtown Dayton, offers non-degree programs in labor management, information technology, and professional development. During the 2005-06 academic year, the Center ran 110 non-degree programs, training more than 3,400 people. Other parts of the University also provide opportunities for non-degree, career-oriented training. Table 4 presents data on enrollment in graduate-level non-degree programs for all terms during 2005-06; and we highlight below some examples of non degree programs at Wright State – both for high school graduates and for people who already have college degrees.

Table 4: Non-degree graduate enrollment, by school or college, all terms 2005-06

<i>College</i>	<i>Enrollment</i>
Boonshoft School of Medicine	6
College of Education and Human Services	733
College of Engineering & Computer Science	98
College of Liberal Arts	160
College of Nursing & Health	47
College of Science and Mathematics	115
Raj Soin College of Business	207
School of Professional Psychology	11
<i>Grand Total</i>	<i>1,377</i>

Improving first-generation students' access to college

Since its founding, part of Wright State's mission has been to provide opportunities to students who represent the first generation in their families to attend college. While the number of such students may decline over time, as the percentage of Miami Valley residents with college degrees increases, they are still an important part of the University's market. Wright State estimates that 44 percent of its current undergraduates are first-generation college students.

One of the ways in which the University can expand opportunities for these students is by providing a smooth transition for those who begin the post-high school education at the community college level. Wright State has established over 200 articulation agreements with Clark State Community College, Edison Community College and Sinclair Community College that allow students to begin their studies in a community college and finish their baccalaureate studies at the University.

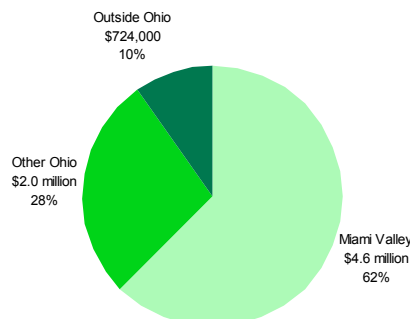
For example, WSU and Sinclair offer several parallel enrollment degree options, including art education; computer science; graphic design; business; nursing; sign language interpretation; and organizational leadership. These programs allow students to begin taking courses at Sinclair and then finish their bachelor's degree at WSU.

Wright State also offers scholarships that can help first-generation college students get a degree:

- The C.J. McLin, Jr., Student Leadership Development Scholarship supports academically talented students from the Miami Valley area who are members of an underrepresented minority group. The scholarship provides \$1,750 per year for four years.
- Students who have received an associate's degree are eligible to receive the Rike Associate Degree Transfer Scholarship or the Transfer Honors Associate Degree Scholarship

In all, Wright State provided a total of \$7.3 million in financial aid from the University's own funds in 2005-06, with about 62 percent of the total going to residents of the Miami Valley (Figure 11).

Figure 11: University-funded financial aid provided to students, by permanent address



Here are some additional examples of continuing education and workforce development opportunities offered to residents of the region.

- At its Lake campus, Wright State offers certificate programs in areas such as medical office administration, computer-aided design, computer graphics, desktop publishing and software applications.
- In 2006, the Raj Soin College of Business announced a new MBA program in Miamisburg – located in the corridor between Dayton and Cincinnati. The two-year program is held on weekends and focuses on innovation and technology. Students will take classes on Friday evenings and Saturdays with full-time Wright State faculty and will also complete a capstone project with a local company.
- Recently, the Raj Soin College of Business, in collaboration with the College of Engineering and Computer Science, has also created a certificate program at the undergraduate and graduate level in Innovation and Entrepreneurship in High Technology.
- The Raj Soin College of Business's Human Resource Management National Certification Preparation Course helps prepare human resources professionals to address topics ranging from labor relations and benefits to compensation and safety. The course is offered weekly for eight weeks.
- The two-year Ohio Certified Public Manager Program prepares public managers to be leaders in their field. The program focuses on four areas, including: administrative and organizational skills; analytical and conceptual skills; technical, quantitative and qualitative skills; and human relations skills. Classes are held two or three times per month and graduates receive the Certified Public Manager designation. The program is co-sponsored by the Ohio Department of Administrative Services.
- The Ohio State University and Wright State University have teamed up to offer a Master of Social Work (MSW) degree program. Classes will be taught by Wright State faculty and will lead to an MSW degree from OSU. The four-year program's classes are offered at Wright State's Center for Performance Excellence at the Kettering Center for Continuing Education in downtown Dayton.
- During 2005-06, enrollment in continuing medical education events at the Boonshoft School of Medicine totaled 3,672. About 450 physicians and residents took a CME program covering the latest in critical and trauma care. The Center for Healthy Communities hosted 12 CME events, including events on children's health and cardiovascular fitness with about 520 attendees during the year.
- The College of Nursing and Health offers a range of courses for nurses that provide the continuing education credits required for re-certification. During 2005-06, the College offered 40 such continuing education courses, enrolling 1,162 participants. Courses addressed topics such as nursing in rural areas, managing pediatric patients with life-threatening illnesses, school nursing, and care for older adults following open-heart surgery.

- The College of Education offers a variety of continuing education programs, discussed further in the following section.

These and other programs help ensure that working residents of West Central Ohio can continue to keep pace with the economy's rapidly-changing demands.

Strengthening elementary and secondary education

Preparing local residents to live and work in a world that increasingly demands higher-level skills is not a process that begins when they enter college. The quality of elementary and secondary education is also critically important. Wright State is involved in a variety of efforts both to strengthen local schools, and to expand the range of educational opportunities available to young Dayton-area residents.

Preparing teachers and improving schools

Wright State is a leading provider of teacher education in the Miami Valley, and a partner in efforts to strengthen local school systems. We cite here several programs designed to train the region's future teachers and to provide support for those already in the classroom.

- At the undergraduate level, the College of Education and Human Services prepares students to begin careers in teaching, and for initial licensure by the State of Ohio. At the graduate level, the College also offers opportunities for current teachers to pursue advanced studies. Wright State University requires students preparing for middle and high school teaching to earn the equivalent of a major in their content field from the College of Liberal Arts and the College of Science and Math. In addition, 15 College of Education and Human Services faculty hold joint appointments with the College of Liberal Arts and the College of Science and Math. More than 15,700 alumni of the College of Education and Human Services live in the Miami Valley area.
- Wright State University's College of Education and Human Services is one of only two Ohio colleges chartered to provide accelerated licensure for professionals from other fields who are interested in becoming teachers. The program is aimed at meeting the need for more qualified teachers in critical fields such as science, math, foreign languages and special education, particularly for hard-to-staff schools.
- The College's Division of Professional Development offers a variety of programs for working teachers, both on the Dayton and Lake campuses and at other locations throughout the region. More than 1,200 teachers and administrators enrolled in professional development courses during 2006-07.
- The Educational Leadership Information Network K-12 (EDLINK-12) is a network of 32 West Central Ohio school systems, anchored by Wright State, devoted to encouraging and

providing technical support for collaborative approaches to school improvement, focusing on areas such as curriculum development, improving the quality of instruction, career incentives, staff development and program evaluation.

- Starting in 2010, Ohio high school students will be required to take a personal finance class in order to graduate from high school. The Center for Economic Education (CEE) at Wright State's Raj Soin College of Business will provide two-day summer workshops to train teachers in personal finance education. The course will address topics such as credit cards, taxes and retirement savings. About 50 teachers are expected to take the first course in 2007.
- Wright State University is one of only two state universities in Ohio that directly trains advanced placement (AP) teachers. The University's Advanced Placement Summer Institute was created at the request of high schools in the region and offers training in AP biology, English literature and composition, calculus, chemistry, and U.S. history. Participants may receive three hours of college credit upon completion of the summer program.
- Since 1993, the College of Education and Human Services has been a member of the National Network for Educational Renewal (NNER), a national network of 40 universities, 140 school districts and more than 400 schools serving more than 15,000 educators and 1.2 million children.

Expanding educational opportunities for the region's young people

In addition to preparing students for careers in teaching, and helping to meet teachers' need for ongoing professional development, Wright State also offers a variety of programs that directly serve the region's primary and secondary school students. These programs are aimed at both enriching students educational experience, and helping them prepare for college.

- The Office of Pre-College Programs offers week-long summer courses for K-12 students on a variety of topics. Between 2003 and 2007, a total of 8,310 students participated in these programs. For example:
 - The ***Discovery/Odyssey*** program is designed for K-9 students and includes daily classes in science, math, literature, and computers. Older students can enroll in residential camps and institutes and classes such as aviation, aerospace engineering, finance, journalism, and theatre. Each summer, 800-1,300 students enroll in the Discovery program.
 - The ***STEM Institute*** is a three week residential summer program for juniors and seniors from Ohio high schools who are interested in science technology, math and engineering. Students will reinforce math and science skills with hands-on lab experience and engineering projects. The courses may be taken for high school or college credit.

Table 5: Participants in Pre-College programs, 2003 – 2007

Program	Participants (2003 - 2007)
Camp Discovery/Odyssey	7,254
Residential Camps	457
Residential Institutes	213
OH Summer Honors Institute	300
Upward Bound (began 2007)	50
STEM (began 2007)	16
Space Camp (2006 only)	20
Total Participants	8,310

- **Summerbridge Dayton** is a cooperative program between Wright State and Dayton Public Schools. The two-year program is designed for eighth and ninth graders and includes a six-week summer program on Wright State's campus. Each student takes four academic courses in the morning and two electives in the afternoons. In 2006, 36 eighth grade students and 13 ninth grade students attended the six-week summer program, and approximately 175 students participated over the past five years. Teachers in the program include Wright State undergraduate and graduate students working under faculty supervision.
- About 15 students at the Dayton Early College Academy (DECA) will benefit from the **Young Business Scholars Program**, a program that started in May 2007. Each student will be paired with student and faculty mentors from the Raj Soin College of Business. The goal is to give the high school students a background in business concepts while encouraging them to apply for college.
- The **Invention Convention** brings together K-8 students in 16 school districts throughout the region to invent a novel solution to a problem. Wright State's College of Engineering and Computer Science hosts the event. The College of Science and Mathematics provides workshops for the children. Winners in each grade category (K-2, 3, 4, 5, 6, 7/8) receive \$500 scholarships; and the first-prize winner for the event – the “Wright Innovator” – a \$2,500 scholarship.
- Wright State students and faculty help introduce children in the region to science through events held on and off campus, including the following programs:
 - For more than 10 years, middle school science teachers have been bringing their students to campus to participate in a **Chem Demo** filled with crowd-pleasing chemical experiments. These chemistry demonstrations are attended by more than 9,000 students each year.
 - Each year, more than 1,000 high school students tour Wright State's anatomy laboratories. Anatomy faculty lead students through an exploration of the organs in the human body.

- The annual ***Trebuchet Competition*** is a fun way for about 500 high school students to apply math, physics and engineering principles in the construction of a trebuchet – a catapult – that will accurately lob squash balls at a target. Most students come from the region, but the competition has attracted students from all over the country.

A university for West Central Ohio

“Knowledge is global,” says Rosalind Williams of the Massachusetts Institute of Technology, “but learning is local.” More than ever, the knowledge that drives today’s economy can originate anywhere in the world, and it is disseminated around the world at ever-increasing speed. Yet the processes by which people acquire and internalize this knowledge – and just as important, figure out what to do with it – are still very much localized. Whether they live in Dayton, Dublin, Durban or Delhi, the extent to which people can take advantage of and build on global knowledge depends in part on their access to institutions that empower them to do so.

That is the role that Wright State University plays in the region. If its founders, and the State of Ohio, had not forty years ago had the foresight to create it, the region today would be a poorer place – both in income and in opportunity.

III. A Major Regional Enterprise

In addition to being a leading source of educational opportunities for the region's residents and a provider of skilled personnel to local industries, Wright State is itself one of the region's leading knowledge-based enterprises. The University is a major employer, a buyer of goods and services from local businesses, and a sponsor of construction projects. Moreover, through the multiplier effect, the University's spending on payroll, purchasing and construction generates additional jobs and economic activity throughout the region. And off-campus spending by people the University attracts to the Dayton area – both its own students and visitors to Wright State – also benefits the local economy.

A leading employer

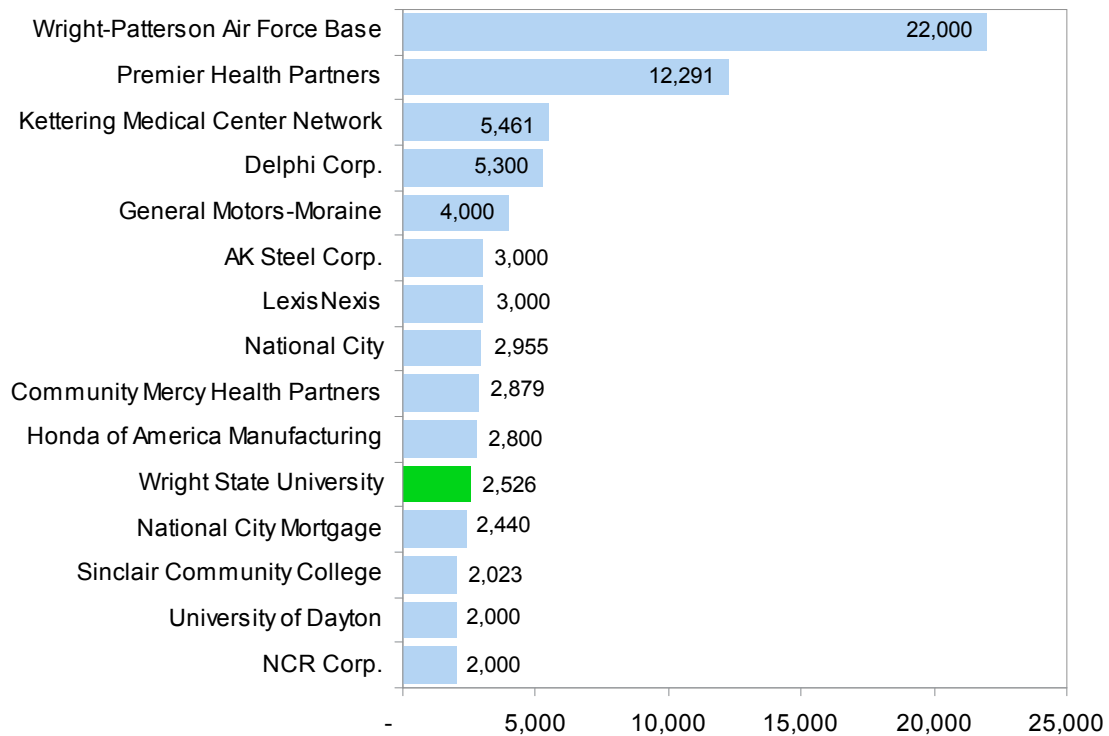
In the fall of 2006, Wright State (including both the Dayton and Lake campuses) employed 3,581 people (excluding students), of whom more than 70 percent worked full-time. In addition to its regular employees, the University employed 3,380 students in a variety of part-time positions, ranging from office support staff to graduate research assistants. The University's payroll for 2006 totaled \$165.9 million. Table 6 summarizes University employment.

Table 6: Employment at Wright State University, Fall 2006

<i>Location</i>	<i>Full-Time</i>	<i>Part-Time</i>	<i>Students</i>	<i>Total</i>
Dayton Campus				
Employees	2,467	941	3,280	6,688
Lake Campus				
Employees	59	114	99	272
GRAND TOTAL	2,526	1,055	3,379	6,960

Wright State ranks among the region's largest employers. Figure 12 shows selected employers in the Dayton area, ranked by locally-based full-time employment.

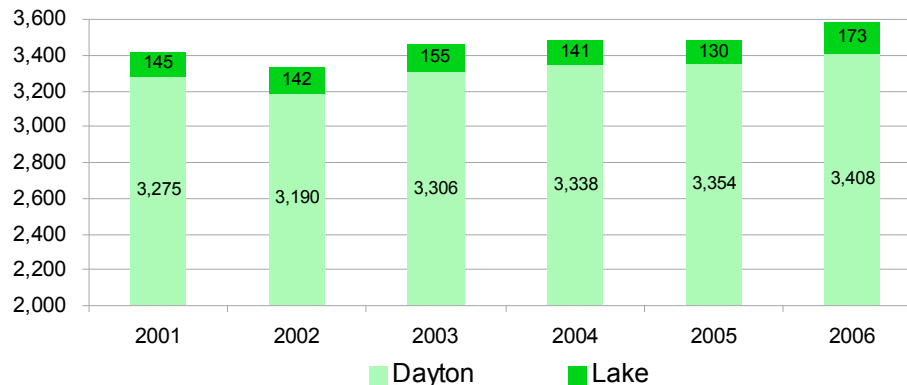
Figure 12: Major Dayton-area employers, by local full-time employment, 2007



(Source: Wright State University; Dayton Business Journal Book of Lists, 2007)

Employment at Wright State University has steadily increased over the past several years. Between 2001 and 2006 – a period when total employment in the Miami Valley declined by 1 percent, and private employment by nearly 2 percent – non-student employment at Wright State grew by 4.7 percent, an increase of 160 jobs (as shown in Figure 13). Student employment also rose during this period.

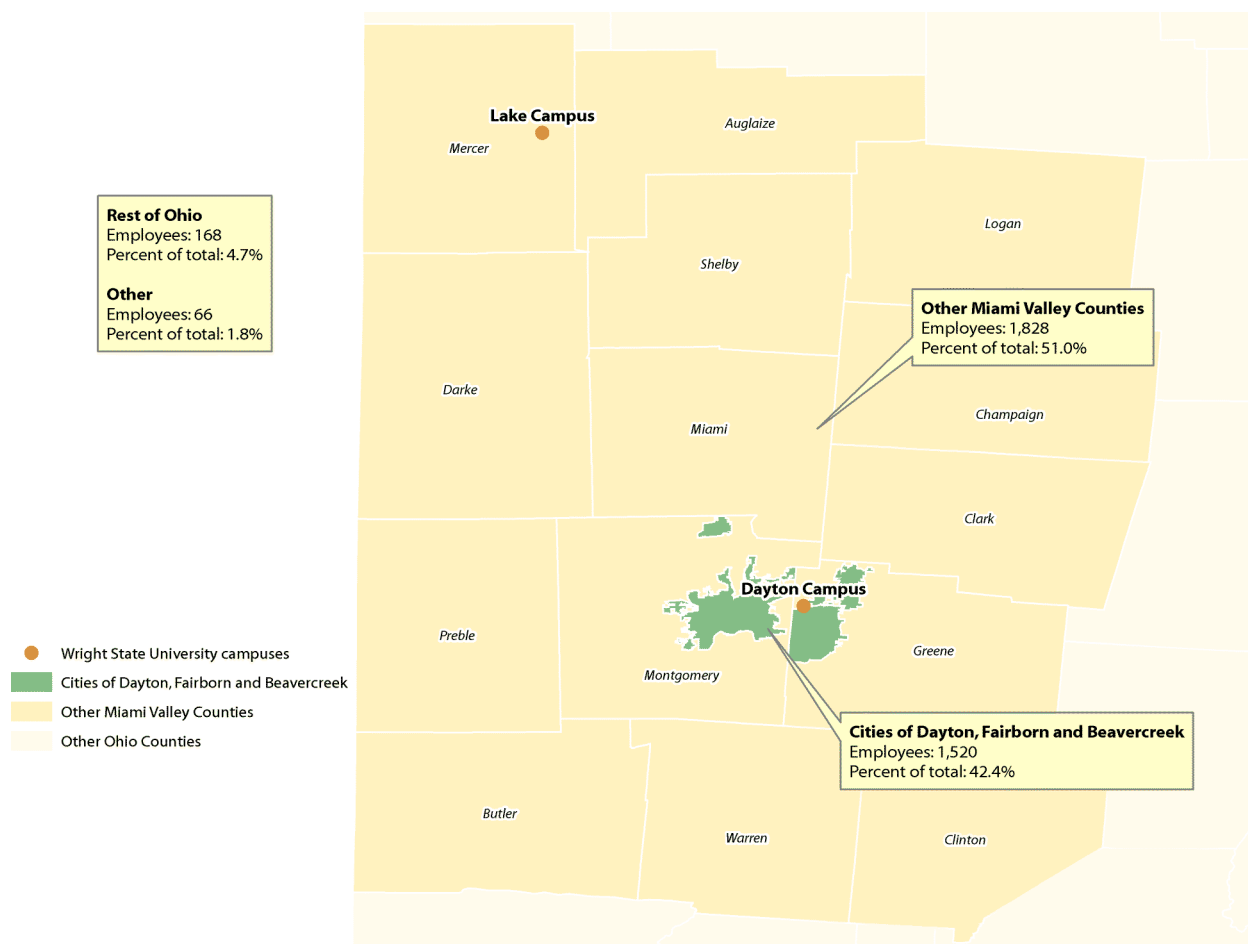
Figure 13: Wright State University employment, by campus, 2001-2006



Nearly all – 93 percent – of Wright State’s regular employees (excluding students) lived within the Miami Valley in the fall of 2006. They accounted for 96 percent of Wright State’s payroll. As shown in Figure 14:

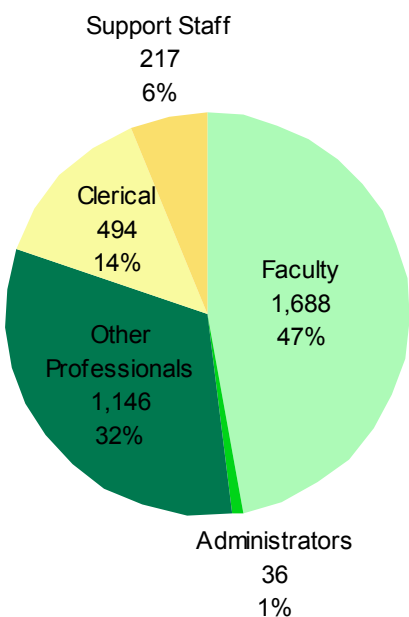
- 1,520 employees, or 42 percent of all University employees excluding students, lived in Dayton, Fairborn, or Beavercreek;
- 1,828 employees, or 51 percent, lived elsewhere in the Miami Valley; and
- 168 employees, or 5 percent, lived elsewhere in Ohio.

Figure 14: Wright State employees by location of residence, Fall 2006



Wright State provides Miami Valley residents with diverse, high-quality employment opportunities. Nearly one half of all employees are faculty and a third of employees fill other professional occupations. Figure 15 shows the composition of employment at Wright State, by occupation.

Figure 15: Wright State employment by occupation (excluding students), Fall 2006



Regular employees at Wright State receive competitive salaries and a comprehensive package of benefits, including health, life and disability insurance; a retirement plan; and an employee assistance program.

The University also provides education benefits. Employees receive full tuition remission for bachelor's, master's and PhD level courses for up to 8 credit hours per quarter. Dependents of employees also receive tuition remission for bachelor's and master's course work. Dependents can take an unlimited number of courses per quarter and pay a cost equal to 20 percent of the current undergraduate tuition rate. During the 2005-06 academic year, 726 employees and their dependents received tuition remission benefits worth \$2.5 million from Wright State.

Wright State employees are also eligible to take courses offered by the Center for Performance Excellence at the Kettering Center for Continuing Education. During 2005-06, more than 1,000 University employees participated in staff development and other programs at the Center.

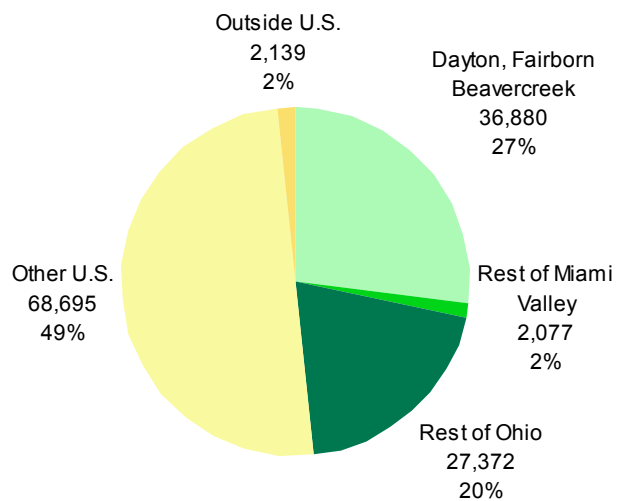
The Center for Teaching and Learning at Wright State offers training sessions with faculty and staff to present new techniques and technologies. During fiscal year 2006, the Center held 119 workshops with 1,234 attendees. Computing and Telecommunications Services (CaTS) also offers training sessions for both faculty and staff. Between July 2005 – June 2006, a total of 1,924 staff and 100 faculty participated in computer program training sessions hosted by CaTS.

The impact of University purchasing

In addition to those it employs directly, Wright State supports local businesses and creates employment opportunities for local residents through its purchases of goods and services.

In fiscal year 2006, Wright State purchased a total of \$137.1 million in goods and services (excluding construction). Approximately \$38.9 million of this total was spent with businesses located in the Miami Valley; and \$27.4 million with businesses located elsewhere in Ohio. Using the IMPLAN input-output modeling system, we estimate that during fiscal year 2006, purchases of goods and services made by Wright State directly supported 466 full-time equivalent jobs with companies in the region.

Figure 16: Wright State purchases by location of vendor, FY 2006 (\$ thousands)



Wright State purchases goods and services from many different industries throughout the region. Table 7 lists types of goods and services on which Wright State spent more than \$1 million with Miami Valley businesses during fiscal year 2006.

Table 7: Leading categories of purchase by Wright State, FY 2006

<i>Category</i>	<i>Miami Valley</i>
Food Service	6,201,193
Hospital Contracts	3,119,308
Utilities	2,650,152
Professional Services	2,103,576
Computer Software	1,704,275
Telecommunication	1,167,141
Furnishings	1,080,443

The impact of construction

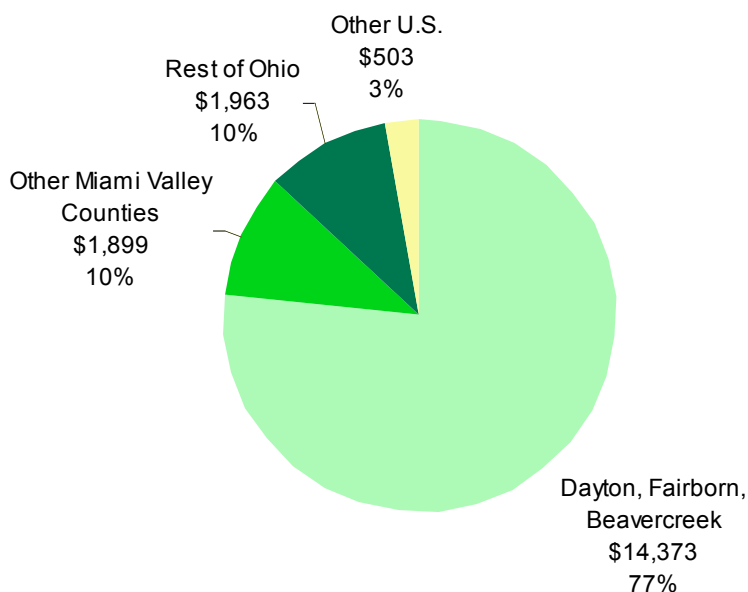
Wright State also creates employment and business opportunities through its investment in University facilities. During fiscal year 2006, Wright State spent \$18.7 million on various

construction and renovation projects across the Dayton and Lake Campuses. Notable projects during this period included:

- **Joshi Research Center** – A \$10 million, 48,000 square-foot research center completed in fall 2006. The Center provides space for data management and analysis as well as the headquarters of daytaOhio. Research at the Joshi Center focuses on areas as diverse as supply chain management and bioinformatics.
- **Student Union Renovation** – A two-year renovation of the Student Union includes additional recreation space, storage, office space, and space for Student Organizations. Completion of the project is estimated for September 2007, costing \$11.5 million and encompassing 120,000 square feet of renovated space.
- **Rike Hall Renovation** – A two-phase, \$5 million project to renovate 22 classrooms and equip them with state-of-the-art technology. The first phase of renovation will be complete by the fall of 2007.

As Figure 4 illustrates, payments to contractors located in Dayton, Fairborn and Beavercreek totaled \$14.4 million in fiscal year 2006, accounting for 77 percent of total University spending on construction. Payments to other Miami Valley contractors totaled \$1.9 million and accounted for 10 percent of spending; and payments to contractors located elsewhere in Ohio accounted for another 10 percent.

Figure 17: Construction spending by location of vendor, FY 2006 (\$ thousands)



Construction and renovation projects undertaken by Wright State create high-wage employment opportunities for residents of the region. We estimate University construction spending with contractors located in the Miami Valley directly created 194 full-time equivalent jobs during fiscal year 2006.

Science Laboratory Rehabilitation

In 2002, Wright State assessed the condition of its science halls and laboratories; And based on this analysis, formulated a plan for developing the space needed to support teaching and research. The plan called for construction of one new building and renovation of four. The three-phase, \$40 million project will renovate or construct 266,000 square feet of research and teaching space; it is to be completed in 2010. The three phases include:

- ***Brehm Lab*** – As part of Phase 1, 42,000 square feet of teaching and lab space has been rehabilitated for the departments of Earth and Environmental Sciences, Science Education and Chemistry. The project was completed during the summer of 2007.
- ***Biological Sciences III (Matthew O. Diggs Laboratory)*** – A new \$15 million, 47,000 square-foot building, also part of Phase 1, is slated for completion in October 2007. The Matthew O. Diggs Laboratory will house biochemical and biological laboratories. It will be one of the first university research laboratories in the State of Ohio that meets LEED (Leadership in Energy and Environmental Design) standards.
- ***Oelman Hall*** – As part of Phase 2, this \$5 million, 67,000 square-foot renovation project will create space to house chemistry research labs, environmental science teaching, general classrooms, and office space for the College of Science and Mathematics.
- ***Biological Sciences II*** – The rehabilitation of 62,000 square feet of teaching and lab space will occur during Phase 2 of the project. Bio II will house teaching classrooms and research labs for the Biology Department and research space for the matrix department of Neuroscience, Cell Biology and Physiology.
- ***Biological Sciences I*** – The last phase of the project, Bio Sci I includes the renovation of 48,000 square feet at an estimated budget of \$3.4 million. Bio I is a science teaching and research building that will have the major utilities and teaching spaces upgraded.

In order to maintain state-of-the-art teaching and research facilities, Wright State anticipates spending \$51.3 million on construction and renovation projects between 2008 and 2012. Examples include:

- ***Lake Campus*** – The \$9 million expansion and renovation of the Lake Campus will include refurbishing of 23,000 square feet of classrooms and computer labs in Andrews and Dwyer Halls, and additions to the science teaching labs. It will also include the 4,600 square-foot Activity Center, a multipurpose space for both campus and community.
- ***White Hall (Boonshoft School of Medicine)*** – The complete overhaul of White Hall will provide first and second year medical students with a state-of-the-art teaching facility.

The project includes renovating the large lecture hall at the north end and creating new computer labs, teaching labs and offices for the Boonshoft School of Medicine. The total cost of the project is \$6.2 million with an anticipated completion date of spring 2008.

The impact of the multiplier effect

In addition to the direct impacts created through operations at Wright State, spending on payroll, purchases and construction also creates indirect benefits for the region and the rest of Ohio. Some of the money Wright State spends with local businesses is then used to purchase more goods and services in the local economy.

Employees at Wright State, and employees of the University's local suppliers, also spend part of their earnings purchasing goods and services – such as housing, food, personal items, utilities – from businesses located within the region. The employees of *those* businesses then do the same. Using IMPLAN, an economic modeling system that measures “indirect and induced” (or “multiplier”) effects, we can estimate the number of additional jobs created as a result of Wright State's direct spending in the economy.

- In the fall of 2006, Wright State employed 3,580 full- and part-time employees with a total payroll of \$165.9 million.
- We estimate that household spending by University employees living in the Miami Valley supported 700 full-time equivalent jobs and \$114.5 million in economic output.
- Wright State spent \$55.2 million in 2006 on construction and purchases of goods and services within the Miami Valley. We estimate these expenses directly supported 660 FTE jobs with Miami Valley contractors and suppliers.
- Spending by these contractors and vendors in turn generated \$31.3 million in output and supported 310 FTE jobs.

We thus estimate Wright State generated a total economic output of \$366.9 million and 5,250 FTE jobs in FY 2006. Wright State's economic impact on the Miami Valley is summarized in Table 8.

Table 8: Direct, indirect and induced impacts of Wright State's spending, FY 2006 (\$ millions)

	<i>Direct University spending</i>		<i>Indirect and induced impact of spending by employees, vendors and contractors</i>		<i>Total impact</i>
	<i>Payroll</i>	<i>Purchasing / construction</i>	<i>Impact of employee spending</i>	<i>Impact of vendor and contractor spending</i>	
Miami Valley	\$165.9 3,580 jobs	\$55.2 660 FTE	\$114.5 700 FTE	\$31.3 310 FTE	\$366.9 5,250 FTE

Impact on local and state taxes

As a state university, Wright State is itself generally exempt from state and local taxes. Nevertheless, the University makes a variety of payments to local and state governments; and its operations also generate state tax revenues.

The University's greatest contribution to state and local revenues is through the income taxes paid by its employees. State income taxes withheld from the salaries and wages paid to Wright State employees in 2006 totaled \$5.1 million and numerous city income taxes withheld totaled \$142,000. The University also paid \$61,369 in unemployment insurance taxes; and paid \$168,983 in fees to various state agencies.

The University also paid \$653,407 to local governments; these payments are detailed below in Table 9.

Table 9: Direct Local and State Tax Revenue Generated by Wright State, 2006

	<i>Total</i>
<i>Direct Local Taxes</i>	
Fees to Local Governments	
City of Fairborn	367,291
Celina Municipal	93,112
Village of Yellow Springs	22,115
City of Dayton	3,446
Village of New Bremen	715
Montgomery County	15,372
Greene County	9,278
City Income Taxes	142,079
<i>TOTAL LOCAL TAXES</i>	<i>653,407</i>
<i>Direct State Taxes</i>	
Fees to State Agencies	168,983
State Income Taxes	5,093,826
Unemployment Insurance Taxes	61,369
<i>TOTAL STATE TAXES</i>	<i>5,324,178</i>

Accounting for substitution effects

Analyses of the impact of university spending on local or regional economies are inevitably complicated by the problem of "substitution effects." To the extent that the money a university is spending represents money that would have been spent within the local area in any case, it can be argued that the institution is not really generating a "net new" economic impact.

In the case of Wright State, a significant portion of the revenue that supports its local spending clearly originates outside the region – federal and corporate research funding, for example, or

tuition and fees paid by students who come to Wright State from outside the region. Moreover, from a local perspective even state support for the University can be counted as non-local revenue; if Wright State did not exist, state funding would most likely have been shifted to other campuses, or to other purposes entirely.

Overall, we estimate that only about 30 percent of Wright State's revenues – just over \$100 million in 2005-06 – is derived from sources within the region. A significant share of this revenue, however, represents money that, if Wright State did not exist, would have left the region (as young Miami Valley residents, for example, left to enroll in, and paid tuition to, colleges elsewhere in Ohio or in other states). There is of course no way to define precisely how much of this local revenue would have remained in the region if Wright State did not exist; but we can speculate that it is unlikely to be more than half.

Thus, of the \$221 million the University spent within the region in 2005-06 – and of the jobs and economic activity directly and indirectly generated by that spending, as summarized in Table 9 – we estimate that at least 85 percent can be counted as a “net new” addition to the region's economy.

The impact of student spending

In the fall of 2006, Wright State University's enrollment totaled 16,870 students, including 864 students at the Lake Campus and 16,006 at the Dayton Campus. Enrollment at the Dayton Campus consisted of 12,215 undergraduate students and 3,791 graduate students.

Many of the students attending Wright State are from West Central Ohio. About 72 percent of undergraduates at the Dayton Campus, and 59 percent of all graduate students, are residents of the Miami Valley. The Lake Campus has a slightly higher percentage of students from the surrounding counties, approximately 78 percent.

Of the total number of students at Wright State, 16 percent reside in on-campus residence halls and university-leased apartments⁸. The remaining 84 percent reside in off-campus housing in and around the Dayton area.

Based on living costs – such as rent, food, personal expenses, and transportation – provided by Wright State, we estimate off-campus spending by students from outside the Miami Valley totaled \$64 million in 2006. Table 10 details spending estimates by place of residence.

⁸ The University contracts with a local real estate firm to construct, own and manage apartment buildings specifically for Wright State students. The University collects rental income from students and then reimburses the firm. This impact is therefore included within University purchasing, not student spending.

Table 10: Annual Off-Campus Spending by Students Based on Place of Residence, 2006⁹

	<i>On-Campus</i>	<i>Off-Campus</i>
<i>From outside Miami Valley</i>		
Number of students	1,615	3,667
Per student spending (\$)	3,899	13,842
<i>Total spending (\$)</i>	<i>6,535,037</i>	<i>57,521,249</i>

Prior to calculating the economic impact of student spending on the region, we must net out the wages earned by students working for the University. Student wages have been included in the impact of employee spending, and to avoid double counting, we remove those wages before calculating the impact of student spending. After adjusting for student wages, we estimate off-campus student spending totaled \$51 million.

Using IMPLAN, we estimate that off-campus spending by Wright State students in the Miami Valley directly supported 770 full-time equivalent jobs. Through the multiplier effect, student spending created an additional \$24.7 million in economic activity and supported an additional 240 full-time equivalent jobs.

The impact of visitor spending

In addition to the faculty, researchers and students that Wright State attracts to the region, it also draws visitors. University related events and activities held throughout the year bring visitors from outside of the area. Examples include:

- Commencement
- Athletic events
- Academic conferences
- Lecture series
- Music and theater performances
- Art shows and other cultural events
- Visits by prospective students

Use of Wright State facilities, such as the Nutter Center, by outside parties – such as concerts, conferences, and family events – also draws people to the region.

Using information provided by University departments and facilities, Wright State estimates that it attracted 720,000 non-university related attendees as a result of events it hosted or that were held at its facilities during the 2005 – 2006 academic year.

Many of the people who attend these events come from within the region. Though residents benefit from the opportunity to attend such entertainment events, many of which would not take place without the presence of Wright State, their attendance at these events does not generate new spending within the local economy.

⁹ Summer school students are not included in fall enrollment numbers. Their spending is, however, included in total spending.

Wright State does, however, attract a significant number of visitors from outside the region. Of the overall attendees to events hosted by Wright State or at Wright State facilities, the University estimates that nearly 165,000 are from outside of the Miami Valley. These visitors spend money within the local economy – purchasing goods and services such as lodging, food, entertainment and transportation – and support local businesses.

Based on data prepared for the Ohio Division of Travel and Tourism,¹⁰ we estimate in 2005-06 visitors that came to the Miami Valley to attend events at Wright State spent \$24 million locally – excluding money spent on-campus for game tickets, food, etc. We further estimate visitor spending supported 450 full-time equivalent jobs in the Miami Valley and through the multiplier effect generated an additional \$13.2 million in economic output and 125 FTE jobs.

Adding it all up

Combining our calculation of the impact of University spending (Table 8) with the estimates of the impact of student and visitor spending presented above, we can estimate that in the aggregate the University, its students and visitors directly or indirectly generated \$479.8 million in economic activity in the region and 6,835 jobs. The total economic impact generated in Miami Valley by Wright State is summarized in Table 11 on the following page.

¹⁰ Daily visitor spending patterns were calculated for the Ohio Division of Travel and Tourism by Rovelstad & Associates.

Table 11: Wright State's economic impact in Miami Valley

	<i>Employment</i>	<i>Output (\$ millions)</i>
<i>Impact of University spending</i>		
Direct impact		
University employment	3,580	165.9
University vendors and contractors	660	55.2
Indirect and induced impact		
Impact of employee spending	700	114.5
Impact of vendor/contractor spending	310	31.3
<i>Subtotal</i>	<i>5,250</i>	<i>366.9</i>
<i>Impact of student and visitor spending</i>		
Direct impact		
Student off-campus spending	770	51
Visitor off-campus spending	450	24
Indirect and induced impact		
Student off-campus spending	240	24.7
Visitor off-campus spending	125	13.2
<i>Subtotal</i>	<i>1,585</i>	<i>112.9</i>
<i>Total</i>	<i>6,835</i>	<i>479.8</i>

IV. Research, Innovation and Business Development

It has long been acknowledged that university research and development played a critical role in the expansion of the U.S. economy during the twentieth century. This is also true at the state and regional level.

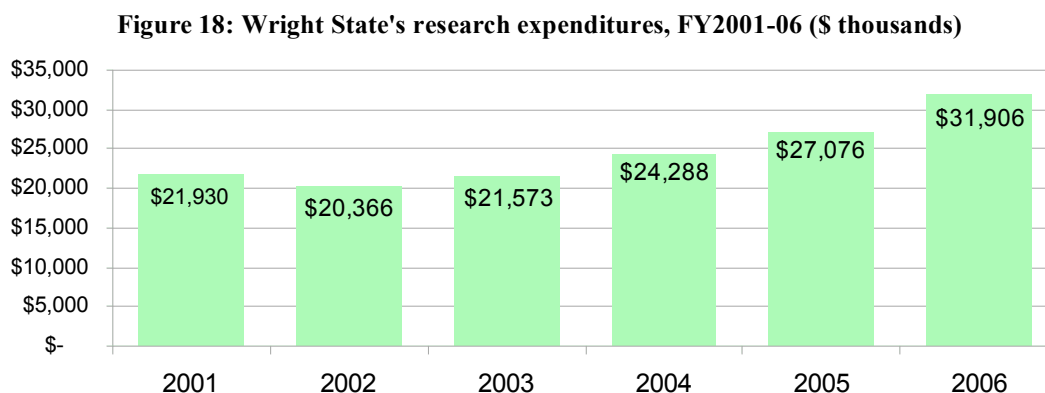
In 2002, Battelle Memorial Institute released a report assessing Ohio's research and development enterprise – and how the State could further leverage the work of existing institutions, including universities, research labs and companies, in creating technology-based economic growth in the state.

Technology driven economies have outstanding research institutions committed to building and sustaining technology-intensive industrial sectors. Successful states and regions depend on institutional world-class excellence in pertinent areas of applied science and engineering research to drive the economy.¹¹

Great research is not by itself enough, however. If the potential contribution of university research to regional growth is to be fully realized, the University needs to be an active participant in the ongoing process of translating new knowledge into new products, new businesses and new jobs.

A growing research enterprise

Especially during the past few years, research at Wright State has been a growth enterprise. Between 2001 and 2006, research expenditures grew by 45 percent – from about \$22 million in 2001 to \$32 million in 2006.¹² Figure 18 shows Wright State's increase in research spending since 2001.

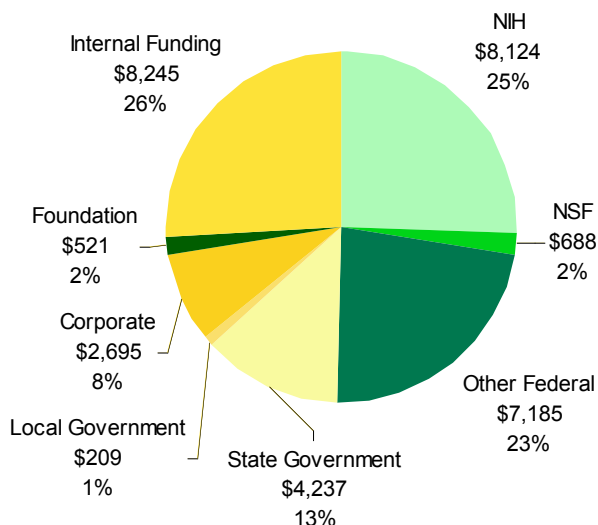


¹¹ Battelle Memorial Institute. *Innovation-The Future of Ohio's Economy: An Ohio technology-based economic development strategy*. Prepared for the Ohio Department of Development. May 2002. p. 45.

¹² Research is just one component of Wright State's sponsored program funding, which also includes funding for the University's educational programs and community service initiatives. Wright State's sponsored program funding has grown from \$48.5 million to \$64.4 million between fiscal year 2001 and 2006 – nearly 33 percent. Sponsored program funding grew to \$72 million in fiscal year 2007.

The federal government is the leading source of Wright State's research funding, accounting for 50 percent of total research spending in fiscal year 2006. As Figure 19 shows, internal University funding accounted for about 26 percent of Wright State's research spending, and state and local sources accounted for about 13 percent. Corporate partners and foundations together account for about 10 percent of Wright State's research spending.

Figure 19: Wright State's research expenditures, by source, FY2006 (\$ thousands)



The growth of Wright State's research enterprise has been driven in part by its strength in several areas, including information technology, human performance and effectiveness and the life sciences. Among all Ohio universities, Wright State ranked second to The Ohio State University in spending on math and computer science research in fiscal year 2005 (the last year for which National Science Foundation data are available). Wright State also ranked fourth in the state in research spending in psychology and the life sciences.

Information technology and data management

Wright State is among Ohio's leading academic institutions in studying how massive amounts of information can be processed faster and can lead to better insights in virtually every discipline – from medicine to engineering to business operations.

Through its Third Frontier program, the State of Ohio funded the establishment of the Wright Center of Innovation for Advanced Data Management and Analysis with a \$12.6 million grant in 2003. Now known as *daytaOhio*, the Center has attracted another \$32 million in additional government, non-profit and corporate sponsorship. Wright State is the Center's lead institution; other collaborators include other Ohio research universities, several technology-related non-profits, the Air Force Research Laboratory, and seventeen corporate partners, including Lexis-Nexis, NCR and Proctor & Gamble.

daytaOhio focuses on several areas of information technology – techniques for collecting, integrating and managing very large volumes of data; RFID technology; database technology; data mining; data security; and visualization and human-computer interaction. Its facilities include a Teradata platform for warehousing and analyzing data, a visualization lab (described below), a data center, offices and meeting rooms.

The Center's work has already begun to pay off in a number of areas. In 2007, for example, Lexis-Nexis and Wright State announced the establishment of a new post of "eminent scholar" in data management. This position enabled the University to recruit a top faculty member, Amit Sheth, to Wright State. Sheth – who brought a team of researchers and graduate students with him from the University of Georgia – leads the newly-created ***Kno.e.sis Center*** (Knowledge Enabled Information and Services Science) in the College of Engineering and Computer Science. Sheth and his team are part of a network of researchers working on development of the "semantic web," a next-generation version of the World Wide Web in which additional content-specific data is associated with web links and pages. Development of the semantic web could revolutionize not only the search process, but also the process of finding connections among disparate bits of information scattered across tens of millions of on-line documents. By 2009, the Center could help the University recruit five new faculty and twenty graduate students.

Investments in facilities

To stay on the leading edge of research and innovation, universities need to invest in new facilities and new capabilities. At Wright State, the \$10 million ***Krishan and Vicky Joshi Research Center***, which opened in the fall of 2006, added 50,000 square feet of academic and research space in more than 25 new laboratories.

The Joshi Center's \$2 million ***Appenzeller Visualization Laboratory*** uses technology developed by one of daytaOhio's industry partners, Barco Simulation, to project detailed 3-D images of everything from protein structures to aircraft components to the ocean floor in an immersive environment. Businesses and researchers pay up to \$1,000 per day to use the facility, which can reduce product prototyping costs for consumer products companies and reduce drilling costs for oil and gas exploration.

Reflecting Wright State's strong commitment to translating University research into practical innovation, the Joshi Center's inaugural event was a workshop, "From Research to Reality," that brought together university researchers and leaders from industry and the military to discuss commercialization of new technologies.

Developing – and teaching – more effective responses to disaster

The Boonshoft School of Medicine together with other colleges at Wright State are working to develop a facility in the Dayton area that could be used to develop and train medical first receivers, first responders and other allied civilian and military personnel in more effective approaches to medical disaster response and recovery. Known as ***Calamityville: Tactical Laboratory***, the facility would provide a complex physical environment in which to conduct scholarly research, design new operational approaches to recovery efforts, and train disaster workers.

As currently planned, the site would contain various functional training and exercise areas, including: hazmat/medical decontamination, aircraft mishap, ground transportation mishap, post-disaster debris fields, a training tower and confined space maze, as well as a training building that would include classrooms and simulation facilities. This facility could support research in several areas, including:

- Developing a flexible, cost-effective medical logistics concept, which supports disaster medical needs while ensuring supplies are circulated within a system that losses due to expiration dates;
- Better applying military technologies to civilian post-disaster environments;
- Developing and testing new approaches to on-scene medical care; and
- Exploring human factors as they relate to fatigue and decision-making.

In 2007, Wright State established a multi-disciplinary Calamityville Working Group to develop a business and building plan for the project.

Human performance and effectiveness in challenging environments

The hurricanes that destroyed Gulf Coast communities in 2005 are a reminder of the challenges inherent in disasters that disrupt critical infrastructure, including the health care system, the supply chain and telecommunications. Wright State researchers are at the leading edge of a multidisciplinary field that studies how people perform in challenging physical and mental environments – and how they can perform better.

Founded in 2005, Wright State's ***Homeland Emergency Learning and Preparedness Center*** (HELP) was initially contracted by the Ohio Department of Health to help the state develop a pilot neighborhood emergency response center that could provide localized health care in the event of an emergency. The Center worked with the Greater Dayton Area Hospital Association and local officials to coordinate and develop a community-wide response plan.

Focusing on areas such as risk assessment, ensuring access to medical care, evacuations and emergency response system recovery, HELP Center faculty and staff are using the expertise developed as part of the program to develop a model that can be applied nationwide. Center

faculty are also working with their counterparts at Dayton, Ohio to develop grant proposals for the Department of Homeland Security to support research in several areas, including:

- Developing information analysis tools that can lead to better detection and risk assessment of potential threats;
- Building improved sensors; and
- Techniques for better decision making in complex situations.

Strengths in the life sciences

Since the mid-1990's, the life sciences have seen some of the strongest growth in research funding, from both federal and corporate sources. Wright State's strengths in the life sciences – in neurosciences, genomics and several other areas – have allowed the University to participate in this continuing growth. For example:

- The ***Lifespan Health Research Center*** at the Boonshoft School of Medicine is home to the Fels Longitudinal Study – the largest and longest-running study of human growth in the world. The first participants in the study were enrolled pre-natally in 1929; many of their children and grandchildren are now part of the study. The Center's researchers have in recent years focused on studying the relationship between body composition and genetics factors in cardiovascular disease and osteoporosis.
- Wright State researchers in the ***Sensor Aided Vigilance Lab*** are working with the Sensors Directorate of the Air Force Research Lab at Wright-Patterson Air Force Base to develop sensors that can operate effectively in challenging environments.
- The ***Comprehensive Neuroscience Center (CNC)***, established in 2007, is an expansion of the former Wright State Center for Brain Research. The Center brings together scientists and clinicians from several disciplines to work toward a better understanding of a variety of nervous-system disorders – neurological, developmental, cognitive, psychiatric and trauma-induced. The CNC was awarded the prestigious Program Project Grant from the National Institute of Neurological Disorders and Stroke – a \$5 million grant to research nervous system disorders.
- The ***Center for Genomics Research*** provides core facilities and support services for scientific and clinical faculty working in areas such as gene expression and genotyping. In 2003, the Genome Research Infrastructure Partnership (GRIP), a collaboration among Wright State, the University of Cincinnati and several private firms, was awarded a \$9 million grant as part of Ohio's Third Frontier Project. Research at GRIP aims to develop new medical therapies through genome research.

Promoting innovative research

In research as in business, modest up-front investments can often have a major payoff. Wright State provides a variety of resources that are designed to help faculty members get new research projects under way, and secure the funds they need to sustain them. For example, the ***Research Incentive*** program provides \$90,000 to \$100,000 in small grants – for meetings with potential sponsors or presentations at scientific conferences – as well as grants of up to \$10,000 to prepare proposals for external funding of promising research projects.

The University's ***Research Challenge*** is a competitive program, funded by the State, which provides somewhat larger grants for a variety of purposes – for example, grants of up to \$50,000 to allow researchers to get an early start on promising projects while proposals for external funding are being reviewed. Research Challenge funds may also be used to support work by faculty or staff on commercialization of the results of University research – for example, for development of a working prototype or preparation of a business plan.

The newest of these resources is the ***Boonshoft Innovation Fund***. Endowed by philanthropist Oscar Boonshoft, this resource is potentially the most significant as well. The Fund provides larger grants (typically in the range of \$200,000 to \$600,000) to support collaborative research projects in the School of Medicine that are consistent with the School's strategic plan, and have the potential to be self-sustaining.

Through resources such as these, the University helps sustain the growth of its own research enterprise – especially in strategically significant areas – and also helps ensure that the creation of new knowledge contributes to the growth of the region's economy.

Collaboration with industry partners

One of the most important ways in which University research helps strengthen the region's (and Ohio's) economy is through collaboration with industry partners. Several examples – including the multiple private-sector partners involved in daytaOhio, and Wright State's collaboration with Lexis-Nexis on the development of the semantic web – have already been cited. There are other examples as well.

- ***Barco Simulation***, a division of Barco, Inc., supplied the immersive 3D technology used in Wright State's Appenzeller Visualization Lab. With access to the company's technology in the Appenzeller Lab – combined with Wright State faculty who can apply the technology to business and analytical questions – businesses have begun to express an interest in taking advantage of the facility. This could lead to further job growth.

- Wright State's human factors researchers are working together with human factors experts at **Delphi** to determine the best way to alert drivers to potential collisions. Their goal is to create a combination of audio and visual stimuli that cause drivers to take a near-immediate course of action without distracting them.
- Researchers in Wright State's College of Science and Mathematics are helping to develop fuel cell technology together with **Universal Energy Systems**. Their goal is to develop ionic liquids that can be used as electrolytes in fuel cells – an approach that could allow fuel cells to operate efficiently at room temperature.
- Together with researchers in the College of Engineering and Computer Science, **NCR** software engineers are developing software and systems tools that can improve business' ability to monitor the supply chain and quickly respond to problems.

In all, Ohio companies sponsored about \$2.4 million in research expenditures at Wright State in fiscal year 2006 – \$2 million of which was with companies in the Dayton area. These companies are listed in Table 12 and shown on the map in .

Competing more effectively for applied research work

Along with their academic research, universities sometimes provide applied research services on a contractual basis to both corporate and government clients. To provide a clearer focus for such work – and greater flexibility to meet the needs of clients – some universities have established separate research institutes. Examples include MIT's Lincoln Laboratories and the University of Dayton Research Institute.

In 2007, Wright State created its own entry in this field – the **Wright State Research Institute** (WSRI). Taking advantage of the University's proximity to Wright-Patterson Air Force Base, its initial focus will be on providing contract research for the Air Force, although it may undertake work for the other services and for corporate clients as well. The Institute's goal is to reach up to \$6 million annually in contract research work within the next five years.

In addition to strengthening local companies, collaborative research can also be a resource for attracting companies to the region. For example:

- RFID manufacturer **Alien Technologies** opened its RFID Solutions Center in Dayton in 2006 with 20 employees and plans to grow to between 75 and 100. The company's decision to locate in Dayton was in part due to its proximity to Wright State. The company has an agreement with Wright State in which Raj Soin College of Business faculty will take on projects for Alien Technologies. Alien has also contracted with Wright State to develop an RFID curriculum and has provided equipment for Wright State's RFID Application Lab.

- **QBase**, a British IT company, selected Dayton for its American headquarters in 2005, and is developing a health care informatics facility in Springfield. A QBase representative cited proximity to corporate partners and clients – and researchers at Wright State, the University of Dayton and Wright-Patterson AFB – as reasons for choosing Dayton. QBase expects to employ more than 100 people in Ohio by the end of 2007.

Table 12: Wright State's industrial research collaborators in the Miami Valley, FY2006

Company	City	Collaborating College
Advanced Information Engineering Services	Dayton	College of Engineering and Computer Science (CECS)
Alion Science and Technology	Fairborn	Boonshoft School of Medicine (BSOM)
Anteon Corporation	Dayton	CECS
Applied Imaging Sciences	Dayton	CECS
Ball Systems Engineering	Fairborn	College of Science and Mathematics (COSM)
Cemex	Xenia	COSM
Daychem	Vandalia	COSM
Delphi Chassis Systems	Moraine	CECS
General Dynamics	Dayton	CECS, COSM
Iams Company	Lewisburg	COSM
JXT Applications	Beavercreek	COSM
Kettering Medical Center	Kettering	CECS, BSOM
Kodak Versamark	Dayton	COSM
LexisNexis	Miamisburg	CECS
Mound Laser and Photonics Center	Miamisburg	CECS
MRlets Technologies	Beavercreek	CECS
NCR Corporation	Dayton	COSM, CECS
Northrop Grumman	Fairborn	COSM
Prime Controls	Dayton	COSM
RNET Technologies	Dayton	CECS
Science Applications International Corporation	Beavercreek	CECS
Systran Federal Systems	Dayton	CECS
HR Chally Group	Dayton	COSM
Universal Energy Systems	Dayton	COSM, CECS
Universal Technology Corporation	Dayton	CECS
Wallace Kettering Neuroscience Institute	Kettering	BSOM, CECS
Wyle Laboratories	Dayton	CECS

Graduates and faculty members as entrepreneurs

University-industry collaboration is by no means the only way in which the University contributes to innovation and business development in the region. For example:

- Dayton-based ***Peerless Technologies*** was founded in 2000 by a Wright State alumnus. The company provides information technology and intelligence research and development services. The firm got its start in Wright State's technology incubator and used SBDC's services to refine its human resources policies. The company employs 35 employees and expects to eventually grow to 100 employees.
- In order to reduce scarring on burn victims' faces, physicians apply burn masks that put pressure on tissues to restrict blood flow. Traditional face masks were created using a mold – a process that is uncomfortable for patients and can result in an ill-fitting mask. A Wright State biomedical engineering alum developed a system in which a laser scanner creates a facial profile without touching the patient; a plastic face mask is created automatically by this precise scan. Her company, ***Total Contact***, is based in Germantown.
- Dayton-based ***DRT Manufacturing Company*** manufactures custom medical and electronic components and provides custom research and development and product design services. The company employs 230 workers in its two Dayton area facilities. The company also operates facilities in South Carolina and Germany.

A "Mecca" for DNA analysis

For hundreds of molecular biologists and attorneys, Dayton is on the map. DNA analysis in legal proceedings has evolved significantly during the past two decades. However, the process remains complex and the results are open to a high degree of interpretation. Combining molecular biology and computer science in a field now called bioinformatics. Wright State Professor of molecular biology, Dan Krane, has helped to demystify the process of analyzing and interpreting DNA samples.

Dr. Krane founded ***Forensic Bioinformatics*** in 2002 in order to provide DNA analysis software and services to attorneys worldwide. The company's technology can also be used for analysis across a range of a laboratory's samples to identify chronic mistakes in DNA sampling – or even detect fraud. The company now has 3 full-time-equivalent employees – all Wright State faculty, students, or alumni.

Wright State University hosts an annual conference – now in its sixth year – that brings together the world's foremost legal and scientific experts in DNA sampling, analysis, and interpretation. Last year, 100 attorneys and 30-40 scientists attended the conference.

Wright State alumni have founded or lead more than 70 businesses in Ohio – most of which are based in the region. The companies in Table 13 represent a sample of those founded or led by Wright State alumni. Collectively, these companies employ more than 920 people in Ohio – mostly in the Dayton metropolitan area.

Table 13: Sample of Ohio businesses started or led by Wright State alumni

<i>Company</i>	<i>City</i>	<i>Business</i>	<i>Alumni position</i>
AcuTemp	Dayton	Pharmaceutical supplies	President & CEO
Concord Financial Planners	Solon	Financial planning	Founder
Crowe Manufacturing	Dayton	Manufacturing	President & CEO
Dayton Machine Tool Company	Dayton	Machine tool retrofitting and repair	Owner
Dayton-Phoenix	Dayton	Transportation equipment manufacturing	President
DRT Manufacturing	Dayton	Medical and electronic manufacturing	President & CEO
HarvestINFO	Mason	Search engine optimization	Founder & CEO
Initial Point	Beavercreek	Information technology	President & CEO
Johannes/Stoermer Company	Dayton	Insurance underwriters	Owner
LBK Health Care	Dayton	Accounting	President
Peerless Technologies Corporation	Dayton	Consulting services	Founder & President
Pohlman & Talmage	Dayton	Accounting	Founder
SonicRim	Columbus	Marketing and design services	Founder
TesTech	Dayton	Engineering services	Founder
Total Contact	Germantown	Medical technology	President
WrightChoice	Columbus	Workforce training	Founder

Figure 20 shows the location of selected businesses founded or led by Wright State alumni, or engaged in collaborative research.

An environment that sustains innovation

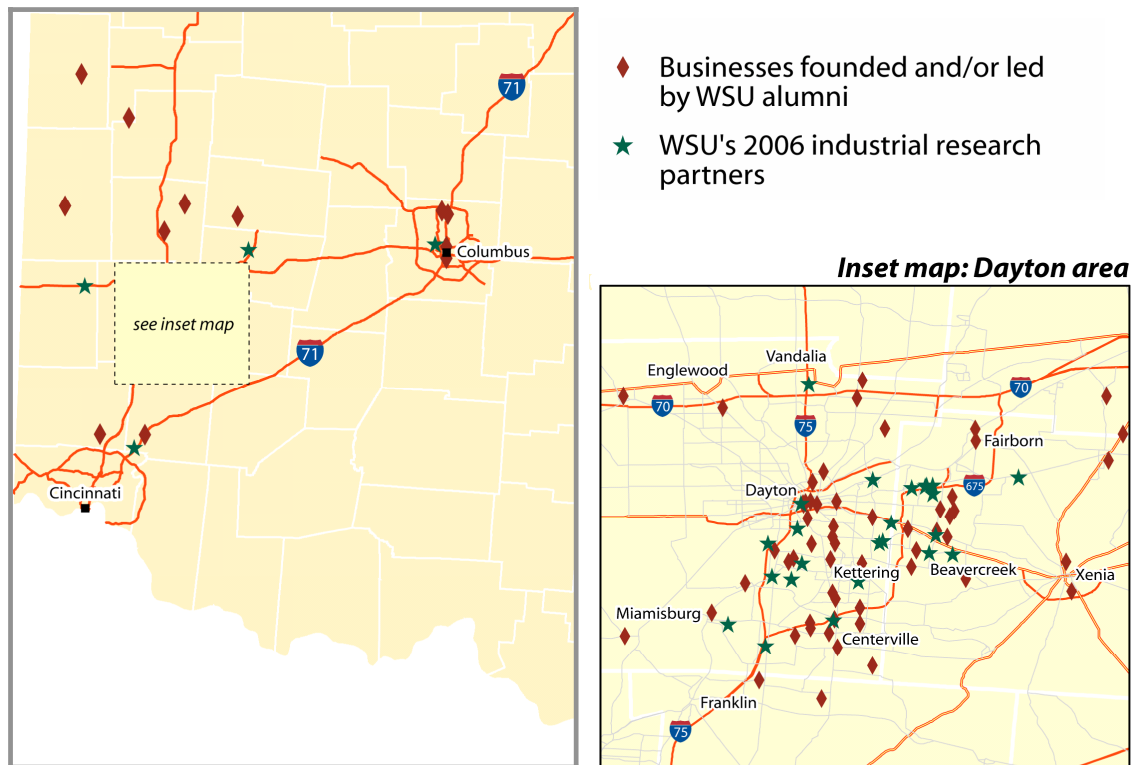
Beyond specific industry relationships, and companies that have roots at Wright State, the University contributes to the economy of the region by helping to maintain an environment that supports innovation and entrepreneurship. It does so by providing services to entrepreneurs throughout the region, and through its participation in regional development efforts.

Assistance to entrepreneurs

Wright State offers a number of programs aimed at supporting the creation and ongoing development of small businesses,

- The ***Small Business Development Center*** (SBDC) provides resources to small businesses in the region. Since the Center was created in 1993, it has logged some impressive statistics. The Center has worked on about 420 projects with its clients – either existing businesses or entrepreneurs interested in starting a business.

Figure 20: Wright State alumni businesses and industrial research partners in West Central Ohio



With students from the Raj Soin business school, the Center conducts about 30 technical assistance projects per year for its clients. Most of the Center's projects fall into one of four categories: human resources policy, website and database development, accounting, or small business operations (which can include marketing, pricing, or management). During the past 14 years, the Center estimates that it has supported creation of 700 jobs and has helped retain 3,500 more.

- The ***Business Enterprise Center***, located on the University's Lake campus, provides customized training and technical assistance to small businesses in west central Ohio. The Center's programs are specifically tailored to the needs of three types of clients – prospective entrepreneurs, new businesses and more established small businesses. For prospective entrepreneurs, for example, the Center offers assistance in market research, the development of business plans, and analysis of financial requirements.
- The ***Center for Innovation Management*** launched in September 2006. The Wright State-funded Center employs 2 FTEs and provides services to inventors who think they have an idea that can be commercialized. MBA students help the entrepreneurs conduct market research and write business plans.

A partner in economic development

Wright State University has for more than twenty-five years collaborated with public agencies and private-sector organizations in efforts to revitalize the economy of the region.

In 1980, Wight State joined with Central State University, the University of Dayton and Sinclair Community College to establish the *Miami Valley Research Park*. The 1,250-acre park is located in Kettering and Beavercreek, east of Dayton. The Park currently hosts 42 tenant companies and organizations employing 4,500 workers on 300 developed acres. Wright State is also a tenant. The Center for Global Health Systems, Management, and Policy is a lead tenant in the newest development in the park, the 50,000 square foot Tech Center IV.

The Center for Innovation Management (described in the section above) is a partner in the Dayton Development Coalition's *Entrepreneurship Signature Program (ESP)*, which aims to accelerate the development of small technology-based companies in the region, with a particular focus on composite materials, nanomaterials and sensor applications. With a total of \$22.5 million in funding from the state and several corporate partners, ESP provides a comprehensive array of services – including pre-seed funding, loans, equity investments, incubation space and technical assistance – that are tailored to the needs of its client companies. Through the Center, faculty and students at the Raj Soin College of Business will serve as consultants to ESP client companies.

The future of innovation

In their book *Innovation: The Missing Dimension*, Richard Lester and Michael Piore dispel the notion that innovation is the product of lone inventors or freelance entrepreneurs working in isolation.¹³ They describe innovation as primarily a social process, dependent on the interaction of people and organizations with different skills, different perspectives, and sometimes different interests. They suggest that in the long run, a research university's contribution to the process of innovation (and by extension, to the economic growth it generates) is best defined not by the patents the university secures or the licensing revenue it earns, but by its role in helping to create the kind of environment that helps sustain this social dimension of innovation.

In many respects, what Lester and Piore prescribe is a fitting description of what happens every day at Wright State. Paul Cashen, the former director of daytaOhio, has described the center as being “in the business of developing collaborations.” It provides a place where researchers from Wright State and other universities, public agencies, companies that are developing new technologies and companies that use them can all come together to wrestle with common problems and explore common opportunities. Other centers at Wright State, such as the HELP Center, play similar roles in other fields and other sectors of the economy.

¹³ Lester, Richard K. and Michael J. Piore. *Innovation: The Missing Dimension*. Harvard University Press. Cambridge, MA: 2004. p. 192.

The social dimension of innovation is evident elsewhere at Wright State as well – in the Boonshoft Innovation Fund’s emphasis on *collaborative* research as being central to innovation; in the workshops for aspiring entrepreneurs conducted by the Small Business Development Center and the Lake Campus’s Business Enterprise Center; in the ESP program.

This social dimension, moreover, helps explain why Wright State’s role in the revitalization of the region may be even greater in the future than it is today – a topic to which we will return in the final section of this report.

V. Engagement with the Community

The best universities – especially public universities – contribute not only to the process of economic growth and development, but also, in broader terms, to the life of the community. Wright State is no exception. The University is extensively engaged with communities throughout the Miami Valley.

This engagement takes a variety of forms, and affects multiple aspects of community life. One of the most visible areas of engagement – not surprisingly, given the nature of the institution – is with local schools. Some notable examples of the University’s work with local school systems were highlighted in Part Two of the report. As discussed in Part Four, the University also provides a variety of services to aspiring entrepreneurs and small business owners.

This Part of our report highlights examples of other forms of community engagement at Wright State, including:

- The University’s role as a resource for cultural enrichment and entertainment;
- Enhancing the health and welfare of communities and residents;
- Involvement in community development efforts.

Cultural enrichment and entertainment

Wright State is not only an educational resource for residents of the Miami Valley, but an entertainment and cultural resource as well. Many University departments and organizations host concerts, performances and lectures open to the general public. The University also rents out space, providing a venue for outside parties to hold such events within the region.

Table 14: Attendance of cultural events hosted at Wright State by members of the community, 2006

<i>Events</i>	<i>Non-WSU Attendance</i>
<i>Theater Productions</i>	22,500
<i>Art Galleries</i>	7,057
<i>Music Department</i>	
Concert/Performances	2,000
Summer Camps	10,000
Festivals/Workshops	1,000
<i>COLA Arts Gala</i>	500
<i>Nutter Center</i>	
WSU Sports Events*	106,162
Concerts	121,052
High School Sports Events	26,032
Trade Show/Conference	104,806
Graduation/Community Events	126,777
Other Sporting Events	32,404
<i>University Event Services</i>	66,153
<i>Total</i>	<i>626,443</i>

*Includes students, faculty, and staff at Wright State

We estimate that about 520,000 non-university visitors from the community attended Wright State events and events held in Wright State's facilities.¹⁴

The University's Ervin J Nutter Center, for example, with a seating capacity of 12,000, is the region's second-largest entertainment venue. In addition to providing a home for Wright State athletic teams and a place for university-sponsored concerts – all of which are open to the public – the Nutter Center hosts a wide range of other events, including concerts and community events, such as high school athletics and graduations.

The *Creative Arts Center* similarly serves as a resource for both the University and the broader community. It houses the University Art Galleries, two concert halls and two theaters. These venues provide settings for plays and dance performances; concerts by the orchestra, chorus, and several bands; and other performances and exhibitions by visiting artists, student groups, faculty and alumni.

Since 1989, the University Art Galleries have become a collecting institution, focusing on art created since 1967 (the year of the University's founding). The Galleries' permanent collection now consists of more than 200 works.

Wright State University Event Services also provides on-campus meeting space for events organized by students, faculty and staff as well as the local community. Many events organized by University-related parties are hosted for or open to the local community. Examples include:

- Conferences and concerts hosted by student organizations;
- Summer camp programs;
- Rental of on-campus facilities by community organizations and local non-profits; and
- University-hosted lecture series and symposiums.

The University brings cultural experience directly to the region through its *Academy of Fine Art*, a program offered by the Department of Art and Art History. The four-week Saturday program is open to juniors and seniors in high school and provides college-level instruction in drawing. The program can help high school students develop their portfolios and connect with other students interested in the arts.

Wright State University's Department of Music presents the music of 24 different ensembles, including the Wind Symphony, the Collegiate Chorale – which annually performs with the Dayton Philharmonic Orchestra, the University Brass Choir and the Community Orchestra.

Protecting and enhancing the health of the community

Wright State also offers a wide range of services that enhance the health and well-being of the region's residents. For example, by attracting talented physician faculty members, the Boonshoft School of Medicine ensures that residents of the Dayton area have access to high-quality

¹⁴ This does not include the 106,000 visitors to athletic events as we are unable to separate community members from students, faculty and staff. However, it is likely that many of those visitors were from the greater region.

specialty care. In 2006 the 100 physicians who belong to Wright State University Physicians handled more than 100,000 patient visits.

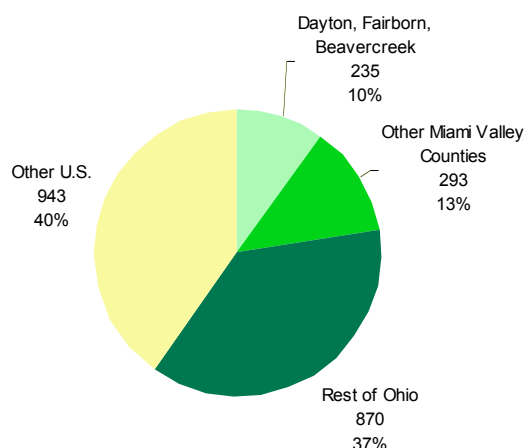
In order to effectively expose students to clinical practice, conduct clinical research, and directly offer patient care services, the Wright State University School of Medicine is affiliated with seven major teaching hospitals and more than 20 other health care institutions in the region. These health care partners are indicated on the map in Figure 20.

Figure 20: Map of Wright State University's regional health care partners



Wright State's graduates help to preserve the health of the region's residents. More than 500 School of Medicine alumni reside in the Miami Valley. Figure 21 below shows the distribution of School of Medicine alumni based on their residence as of spring 2007.

Figure 21: Current residence of Boonshoft School of Medicine graduates



Other programs at Wright State also provide direct service to patients and clients. For example:

- About 250 students volunteer for ***Reach Out Montgomery County*** each year. Reach Out is a partnership between the Boonshoft School of Medicine, the Montgomery County Medical Society, the Combined Health District of Montgomery County, and local hospitals. Reach Out provides poor and underserved residents of Montgomery County with access to healthcare services, including diagnostic testing, referrals, and direct patient care in three community clinics. During the past 12 years, patients have made 16,000 visits with Reach Out volunteers and professional staff.
- In the college of Education and Human Services, students working toward master's degrees in counseling are required to complete a practicum and an internship. Students work at a variety of sites in the Dayton area – in community mental health clinics, drug and alcohol rehabilitation programs, hospitals and other human service programs. Students pursuing degrees in rehabilitation counseling must complete 600 hours of professionally-supervised on-site work; and those in mental health counseling, 900 hours.

Addressing individual, family and community problems in downtown Dayton

Wright State's School of Professional Psychology offers one of the country's top-rated doctoral programs for clinical psychologists. In 1989 the School opened the Duke E. Ellis Human Development Institute in downtown Dayton. The Institute serves both as the School's principal clinical training site, and as an important resource for the community. In addition to its General Practice Clinic, which is open to the public on sliding-scale, fee-for-service basis, the Institute offers a variety of more specialized programs. They include assessment and counseling programs for Alzheimer's patients and their families; domestic violence prevention services; and a program aimed at fostering healthy development and responsible behavior among young African-American males.

Other programs seek to improve the health of the community through education, training and research.

- Since 1991, the *Center for Healthy Communities* (CHC), a joint venture between Wright State and Sinclair Community College, has worked toward improving the health and well-being of the community, educating its health professionals and instituting policy change. CHC directly serves close to 20,000 people per year through its programs and seminars. Approximately 600 students per year, mostly from Wright State, work with CHC through clinical and non-clinical training.
- The *Alliance for Research in Community Health* was established in 1997 from a National Institute of Health grant. ARCH, which is sponsored by the Department of Family Medicine at the Boonshoft School of Medicine, seeks to provide a bridge between academic medical research and the needs of the community. For example, ARCH faculty have introduced an Asthma Intervention Program in three Dayton Public Schools – Louise-Troy Elementary, Miami Chapel Elementary, and Franklin Elementary. Others have focused on improving diabetes management among the low-income elderly. And an interdisciplinary health team at ARCH, with funding from Yellow Springs-based Vernay Laboratory, is helping the company learn how to better manage the health care costs of its active employees and retirees.
- For 28 years, *Horizons in Medicine* has prepared Dayton area high school students for an education – and career – in health care. High school juniors who have completed a chemistry course are eligible for the six-week summer program. Students spend mornings in classrooms and laboratories at Wright State, studying anatomy, biochemistry and physiology. During the afternoons, the students work in hospitals, doctors' offices and community clinics affiliated with the Boonshoft School of Medicine. Students are paid for their work and are eligible to receive a scholarship upon completion of the program. More than 550 Dayton-area high school students have completed the program since 1979 and about 90 percent went on to attend college.
- Medical students in the Boonshoft School of Medicine give hands-on talks to Dayton area students ranging in age from pre-school to high school. The program, known as *Student to Student*, includes talks on ten topics including the dangers of smoking, AIDS prevention, nutrition, and what it's like studying medicine and becoming a doctor.
- Each year, Wright State physicians, nurses, and medical and nursing students conduct free health care screenings in Dayton area malls, supermarkets and shelters. For some residents these screenings can identify serious problems at an early stage. For example, during 2006 Wright State dermatologists and their community partners screened 594 patients for skin cancer. More than 300 participants were given referrals for follow-up. Of the 34 biopsies performed as a result – 17 were found to contain cancerous cells.

Other community outreach

Outreach to the communities of the Miami Valley takes other forms as well. For example, Wright State students performed an estimated 400,000 hours of community service work during the 2005-06 academic year. Faculty and staff are also involved in performing community service, for organizations such as the Fairborn Art Association, the Washington Centerville Public Library, and the Kettering Moraine Oakwood Chamber of Commerce.

Wright State's *Center for Urban and Public Affairs* provides technical assistance to public agencies and community groups in the Miami Valley. For example:

- CUPA helped to design the Economic Development/Government Equity (ED/GE) model for tax revenue sharing. This model has been recognized as a model for promoting regional cooperation and resource-sharing.
- CUPA's partnered with the City of Dayton, the WSU Center for Groundwater Management, and Department of Geology for the Wellfield Business Education program resulted in the National Groundwater Management Award.
- CUPA helped develop the City of Dayton Neighborhood Leadership Institute, an annual 12-week program that provides training to Dayton residents in areas ranging from the role of city government to the criminal justice system to housing and neighborhood development.

The value of community engagement

The value of community engagement is not as easily quantified as is the impact of the jobs the University creates, or the impact of raising the overall level of educational attainment in the region. But its value is nonetheless real. Engagement with the community enhances the education of Wright State students, and helps prepare them for the responsibilities of citizenship. This in itself has an impact on the community – especially since more than half of all Wright State graduates stay in the Miami Valley area.

The services and resources that the University provides strengthen the Miami Valley in other ways as well. They help residents of the area take advantage of the opportunities offered by a changing economy; and at the same time, they help individuals, families and communities deal with the strains that inevitably accompany far-reaching economic and social change. And by making the region a more interesting and attractive place to live and work, they help the Miami Valley attract and keep the talented people on whom its future in part depends.

VI. Looking Ahead: Wright State at 50

In the forty years since its founding, Wright State has been a significant contributor to the region's transition to a twenty-first century economy. By 2017, when the University will be celebrating its fiftieth anniversary, its impact could be even greater than it is today.

Growing demand for education

As the region continues its evolution toward a more knowledge-based economy, demand for higher education is likely to keep growing, especially in high-priority areas such as science, math, engineering, information technology and health care. As the region's largest provider of four-year college and graduate education – and as a university with a particular commitment to serving those who might not otherwise have the opportunity to earn a college degree – Wright State will play a critical role in determining whether the region can meet this demand.

Wright State's commitment to keeping higher education affordable – to helping K-12 students prepare for college – to expanding access for women, minorities and people with disabilities – to providing a smooth transition for entering students, and helping them to stay in school and complete their degrees – should help ensure that the percentage of the region's population completing four-year and higher degrees continues to increase.

A growing research enterprise

Wright State's research enterprise is likely to keep growing. While the overall outlook for federal funding is uncertain, Wright State is strong in several areas that are likely to attract increased federal and corporate funding in the future, including information technology, the life sciences, and fields related to defense and homeland security.

The next decade could also bring opportunities for increased research funding from sources other than the federal government – especially from corporations that are seeking to expand their access to new knowledge, while at the same time limiting their spending on in-house research.

The University, moreover, is becoming more entrepreneurial in its own approach to research. University initiatives such as the Research Challenge program and the Boonshoft Innovation Fund should lead over time to greater success in the competition for research contracts and grants. Wright State could benefit from this trend.

The Wright State Research Institute, created in 2007, will provide a more flexible way for Wright State to compete for contract research funding – from the Air Force, from other government agencies and from corporate partners. University officials estimate that the Institute could by 2012 generate \$6 million annually in research funding.

Technology transfer and entrepreneurship

An increased emphasis on technology transfer – the process of moving new technologies from the lab to the marketplace – is likely to result in an increase in the number of new technology-based businesses in the Dayton area. The increased emphasis on entrepreneurship in both the Raj Soin College of Business and the College of Engineering and Computer Science is likely to have a similar effect.

Increased collaboration with regional partners

Over the next decade, the University and the region are likely to see an increased payoff from investments in centers and programs, such as daytaOhio, aimed at encouraging and supporting collaboration between University researchers and local companies. This should work to the benefit of both parties, as local companies make greater use of the University's resources – and at the same time, are encouraged to invest more in University research.

The benefit of such partnerships goes beyond the funding they generate. By recognizing that innovation is an inherently collaborative process, they help create the kind of environment that encourages and supports innovation and entrepreneurship. As new centers that have been at Wright State in areas such as assistive technology, sensor technology and supply chain management grow and evolve, they will help foster a culture of innovation throughout the region.

A changing region

In the long run, a research university's contribution to regional economic growth depends not only on the university itself – the quality of its educational programs, the strength of its research enterprise, its commitment to collaboration and entrepreneurial orientation – but also on the region's readiness to capitalize on the university's strengths. Recent trends and developments in the region suggest a growing awareness, in both the public and private sectors, of the role that colleges and universities can play in the revitalization of the region's economy – and a growing desire to have them fulfill that role.

As its forty-year history has already demonstrated, Wright State is committed to working with its partners to enhance the region's economic vitality, and to improve its quality of life. The University today is well-positioned to help the region address the challenges it will face in the decade ahead – and to help its residents take advantage of the opportunities that an ever-changing economy will present.