Federally funded, university-based basic research is an essential component of America's economic recovery. As these examples show, basic research stimulates the economy, drives innovation and helps to secure America's global competitiveness.

The Science Coalition is comprised of 48 of the leading public and private research universities from around the country.

## California

**Northern California**
In northern California, the local economy benefits profoundly from the presence of research universities. **Stanford** University and several campuses of the **University of California, Berkeley, Davis and San Francisco**, employ hundreds of thousands of people. What's more, when research universities attract federal research dollars, those funds not only support individual labs, but buoy the state's economy as well. These institutions also attract talent and foster economic opportunity beyond their campuses. There is a reason why northern California is home to so many biotech and high-tech companies. For example, Genentech, the first biotech company, was founded by Herbert Boyer, a Professor from UCSF, based on his research.

**Southern California**
Southern California's research universities have long been a driving force in innovation across all sectors and industries: **University of Southern California, University of California – Los Angeles, University of California–San Diego, University of California-Santa Barbara, University of California–Irvine** and **Caltech** today rank among the world's leading research universities. Together, their annual economic impact is estimated at more than $15 billion, and they are among the largest employers in the region.

Research universities – with their prodigious technology transfer and creation of knowledge industry workers – are a very important reason that Southern California in 2007 received more venture funding than New England and was surpassed only by Silicon Valley. In their position at the capital of the Pacific Rim, these universities together provide a unique position for global innovation expansion. These universities are the principal reason that the principal digital communications companies are located in this area. For example, the founder of Qualcomm, Irwin Jacobs, was a Professor at UCSD, and the founder of Broadcom, Henry Samueli, was a Professor at UCLA.

The **University of Southern California** is the largest private employer in the city of Los Angeles and is responsible for $4 billion annually in economic activity in the local economy. In the 2005-06 fiscal year, USC provided jobs for 26,446 people and stimulated the creation of about 16,318 non-USC jobs in the community. In fact, for every dollar spent by the university in L.A., an additional 39 cents of economic output was created.

USC is more than a job-creating engine, it is also an incubator for the ideas and technologies that will fuel the local economy for decades to come. The university has over $508 million in annual research expenditures. In 2007, for the first time ever, USC helped Southern California edge out New England to be second only to Silicon Valley in annually invested venture capital dollars. Since March 2008, USC licensees made over $50 million in new product sales and created 8 startup companies already employing 56 people, most of them in the region.

## Florida

In Florida, university-based research has fueled the state economy, helping create new companies and high-quality jobs. The **University of Florida**, for example, contributes an estimated $6 billion and 75,000 jobs to the state economy and brought in more than $560 million in sponsored research funding last year. In addition, UF's Office of Technology Licensing has helped transfer hundreds of technologies from UF to the private sector. Examples of UF research that has made the successful move to the marketplace include the glaucoma drug Trusopt; the Sentricon termite control system; a process for making ethanol from yard waste; and perhaps the best-known product, Gatorade thirst quencher.

## Georgia

Georgia benefits considerably from the presence of leading research universities – **Emory, Georgia Tech and University of Georgia**. The research conducted here contributes significantly to the state economy by bringing into the state hundreds of millions of federal dollars in research grants, creating jobs, and by supporting the development of hundreds of start-up businesses. Combined, the three institutions bring more than $1 billion to Georgia each year.

## Illinois

The technology transfer from Illinois' university-based research centers, which conduct research across many fields, has fueled economic growth and contributed to the creation of scores of new businesses and helped create high quality jobs throughout the state. At the **University of Illinois at Urbana-Champaign**, federal research funding has led to a cluster of start-up companies relating to energy such as SmartSpark (renewable energy transformation and storage), PowerWorld (electronic power grid modeling), Semprius (flexible silicon devices for solar power), Phoenix (clean coal technology), Tekion and INI Power (fuel cells), Eden Park Illumination (energy efficient lighting), and Tetravitae Bioscience (Biofuels).

## Indiana

Indiana benefits considerably from the presence of research universities like **Indiana University** and **Purdue**. The research conducted at these institutions contributes significantly to the state economy by bringing into the state hundreds of millions of federal dollars in research grants, creating jobs, and by supporting the development of hundreds of start-up businesses. Indeed, Indiana's successful and growing biotech industry is a testament to the world class research being conducted at academic and medical institutions in the state.

## Iowa

In Iowa, research conducted at **Iowa State University** and the **University of Iowa** has resulted in significant advances in a wide array of disciplines including agriculture, energy, physics, education, health care, engineering and the arts and humanities and has directly benefited Iowans and enhanced the local and state wide economy. Iowa State University has assisted a variety of start-up and established companies to position Iowa as a leader in the emerging bioeconomy. The University of Iowa has promoted economic development in the state through biomedical start-ups, such as Optherion, Inc., which will pursue advanced treatments for age-related macular degeneration and other diseases through a new corporate and academic laboratory at the University of Iowa Research Park.

## Kentucky

In Kentucky, research is an important contributor to the economy. Externally supported research in 2007 accounted for almost 9,000 jobs in the Commonwealth – 6,530 jobs at **University of Kentucky** and another 2,300 jobs throughout the state due to spending from supported research activities. University-based research also is fueling innovation and the formation of start-up companies in Kentucky. University of Kentucky ranks among the top public and private universities in number of start-up companies supported per $10 million of research expenditures.

## Maryland

In Maryland, the **University of Maryland** College Park, the flagship campus, raised over $400 million in research money in FY07 alone, while providing a $3.4 billion impact to the state. If you combine other University of Maryland campuses in the state they collectively raised over $1 billion in research alone in FY 07, making research and development one of the state's largest employment clusters.

In FY 2007, federal research funding for **Johns Hopkins** totaled $1.363 billion—more than any other university in the country. Every year, the Johns Hopkins Institutions generate about $10 billion in economic activity in the state of Maryland. With 45,000 employees Johns Hopkins is the largest private employer in Maryland.

## Massachusetts

In Massachusetts, the state economy benefits profoundly from a dense concentration of colleges and universities. The state's research universities employ tens of thousands of people and provide a total regional economic impact of several billion dollars. Importantly, the impact of the federal research dollars that come here are felt well beyond the labs they support.

Some examples of the many ways research benefits Massachusetts:

- In 2007, **Worcester Polytechnic Institute** opened Gateway Park which serves as the focal point for the University's graduate-level education and research in the life sciences and at full build-out will showcase Worcester's vibrant and growing life sciences and bioengineering industries.
- More than 70 energy companies and 150 life sciences companies are located in close proximity to the **Massachusetts Institute of Technology** (MIT).
- The **MIT** Technology Licensing Office reports that in 2008, 20 companies started that were venture capitalized and/or with minimum of $50K of other funding.
- One example of a company born from university-based research is A123 Systems. This company, founded in 2001 with technologies initially developed at **MIT**, today employs more than 1,100 people and is one of the world's leading suppliers for high-power lithium ion batteries. It also has one of the largest lithium ion R&D teams in the U.S.
- In the fall of 2008, **Harvard** had 18,750 full- and part-time employees (excluding students). Of this total, about 18,350 worked in the Boston metropolitan area, making Harvard the region's second-largest private employer, behind Massachusetts General Hospital.
- In fiscal year 2008, **Harvard** spent approximately $1.7 billion on purchases of goods and services (excluding construction), of which about $850 million was paid to companies located in the Boston area. We estimate that in fiscal year 2008, Harvard's purchases of goods and

services directly supported approximately 6,400 full-time-equivalent jobs in the five-county Boston area.

- In fiscal year 2008, **Harvard** spent a total of $660 million on research funded from external sources – an increase of 22.5 percent during the past five years. Federal agencies accounted for about 82 percent of this total; and corporations and foundations; for about 15 percent.
- **Harvard**'s increased focus on innovation, entrepreneurship and technology transfer is translating into new businesses, new investment and new jobs in the Boston metropolitan area. In the past two years alone, for example, two dozen young Boston-area companies with roots at Harvard – working in areas as diverse as biotechnology, medical devices, nanotechnology, defense and Internet services – have collectively secured more than $280 million in venture capital and other private equity financing. As of December 2008, these 24 companies – almost all of which are less than 5 years old – collectively employed a total of about 500 people.

- For more information on the impact of research on the Boston-area economy: http://www.community.harvard.edu/economic_impact.php

## Michigan

In Michigan, home to several leading research universities including **Michigan State**, **Michigan Tech**, the **University Of Michigan And Wayne State University**, our researchers are helping to fuel economic growth and attract new businesses in the state. Recently, the state's 15 public universities all joined forces to create the Michigan Initiative for Innovation and Entrepreneurship (MIIE), aimed at creating 200 start-ups in Michigan. And U-M, MSU and Wayne State have been actively working as the University Research Corridor to develop cutting-edge technologies and to attract new industry. Those three universities alone attract more than $1 billion in research funding to the state. University-based research is key to making Michigan a hub for innovation, technology transfer, knowledge generation and economic development.

## Minnesota

In Minnesota, federal support of research is a cornerstone of the **University of Minnesota's** budget and strategic plan. Currently, U researchers have secured more than $600 million in federal grants and support to research everything from food safety to biofuels to inner-city education. This funding supports scientists at the university, but it also produces tens of thousands of jobs in Minnesota's private economy.

## Nebraska

In Nebraska, university-based research contributes significantly to the state economy. In 2006, the **University of Nebraska** conducted more than $250 million worth of research and development, creating more than 8,000 Nebraska jobs. The University of Nebraska Medical Center and the related Nebraska Medical Center also make a significant statewide contribution – in 2006, $1.5 billion per year and 17,000 jobs

## New York

### Binghamton

Binghamton and the surrounding area benefit significantly from the presence of a major research university. **Binghamton University** generates $859 million annually in statewide economic activity,

including $673 million for the region. Every dollar invested in Binghamton University is returned eight-fold to the state and six-fold to the Southern Tier of New York. Beyond supporting the local and regional economies, the University also helps launch new businesses and attract innovation-intensive businesses to the area. The University's Small Business Development Center has created or saved over 6,800 jobs, while the Start-Up Suite in the Innovative Technologies Complex has launched several companies in the past two years based on faculty research at Binghamton. This activity pays off in another way - it enhances the financial stature of the County. The Center for Advanced Microelectronics Manufacturing (CAMM) research and development lab on the Huron Campus was a positive factor in Standard & Poors recently released improved bond rating for Broome County.

**Buffalo**

**University of Buffalo** is the region's second largest employer, with an annual economic impact of $1.5 billion dollars on the Western New York economy. The University at Buffalo spent more than a quarter of a billion dollars on research in 2007 – new funds from outside that otherwise would not support the local economy. University of Buffalo research has yielded real-world applications, fueling top area businesses, from Atto Technology and Praxair, to Lockheed Martin and Moog, to SmartPill and Greatbatch. Sixty-three firms already have graduated from UB's technology incubator and now stand on their own. And the presence of UB's Center of Excellence in Bioinformatics and Life Sciences has prompted three life sciences companies from other parts of the country to relocate to Buffalo.

**Ithaca**

**Cornell**, has become one of the fastest growing major employers in central New York; the university is the fourth largest employer in the region. In 2007, Cornell accounted for $3.3 billion in New York State economic activity and an additional 31,445 jobs. Cornell spent $659.4 million in research in 2006-07. From 2003-2007 the university facilitated the launch of 39 startup companies based on technology first developed at Cornell; the university was issued 277 patents. Additionally, more than 90 technology companies in New York have their roots in Cornell research.

**Long Island**

**Stony Brook University**, Long Island's only public research university, is also Long Island's largest single site employer, generating almost 14,000 direct jobs and 16,000 indirect jobs. A newly published 2008 study conducted by the Center for Regional Policy Studies details the University's enormous contribution to the economic health of the region. Stony Brook's annual economic impact on Long Island is a staggering $4.65 billion. Stony Brook accounts for approximately 4% of economic activity in Nassau and Suffolk counties and approximately 7.5% of the total jobs in Suffolk County.

Stony Brook's economic development programs bring $59.4 million in revenue to the Long Island region, and last fiscal year (FY 07/08) our sponsored research program expenditures totaled $170 million. The University's operating expenditures result in an additional $1.73 billion in economic output and almost 29,000 additional jobs. The regional economy receives a 2300% return on the state's direct investment in the university, or an economic gain of $23 for each dollar the state invests. These figures only begin to outline the tremendous economic impact Stony Brook has on the Long Island region. It is a driving force in the region's flourishing economy.

**New York City**

**New York University** and **Columbia University** have a significant impact on the economy in New York City. With over 50,000 students enrolled in 14 schools and over 16,000 employees, NYU is a strong economic and intellectual presence in New York City, the northeast region and beyond.

Indeed, NYU-developed technologies licensed to New York-based companies generated approximately $600 million in sales for these companies last year. New York's oldest institution of higher learning, Columbia University, with nearly 25,000 enrolled students and 18,000 faculty and staff, is currently home to nine Nobel Prize winners. With regard to venture capital alone, Columbia-developed technologies are responsible for more than 70 start-up companies, which together have raised more than $1 billion in venture and public market financings and have generated more than 1,500 jobs. These pioneering people and ideas provide the intellectual capital that allows New York City, the region and the nation to remain at the forefront of economic growth in a wide range of new and existing industries that depend on constant innovation and the translation of breakthrough research into new products and services that create jobs and improve lives.

**Rochester**

Thanks to the support and commitment it receives from the federal government, the **University of Rochester** is the region's largest employer and among the top employers in New York State. It is also the largest health care provider in the region and the generator of an increasing number of new jobs and businesses. The University and its affiliates employ 19,441 full time equivalents (FTEs) and more than 24,000 employees total. According to a recent economic impact study, the University paid wages of over $1.07 billion and spent an average of $175 million per year on capital projects, supporting 2,800 construction-related jobs annually.

The University is highly successful at converting university-based federal research into tangible products or methods that advances knowledge and serves the public good, while supporting further research and innovation. The University is among the top ten nationwide in terms of the royalty revenues it receives for its technology licenses; in 2007, it received more than $50 million in royalty revenue. Over the last two decades, the University has produced more than 30 local companies that have made a significant contribution to the region's growing high-technology and bio-technology commercial sectors.

**Troy**

**Rensselaer Polytechnic Institute** (RPI) is home to one of the country's first business incubators. Since its inception, about one-third of the Rensselaer incubator companies have been started by Rensselaer professors, another third by Rensselaer students, and the final third by those within the surrounding community. To date, it has helped launch 250 companies, including MapInfo, ILINC and Albany Molecular Research, creating more than 2,500 jobs and bringing significant economic growth to the Albany area.

## North Carolina

**North Carolina State University's** dedication to solving the problems facing our country is evident in cutting edge research projects such as our NSF-supported smart grid technology center, our patented process for making bio-based jet fuel and our continued leadership in high performance, microelectronic materials. NC State University has been a leader in developing and commercialized wide-band gap semiconductors for low and high power applications including white LEDs. North Carolina-based Cree and Nitronics are two commercial companies that make devices incorporating this technology."

The largest privately owned software company in the world, SAS, is also a result of work done at NC State and founded by NC State faculty.

## Ohio

**The Ohio State University** is a $4 billion economic engine for the state by providing a world-class education for our students and by partnering with business and government to advance discoveries and innovations that create and keep jobs here in Ohio. Funding directed to the National Institutes of Health, National Science Foundation, Department of Energy, and National Institutes of Standards and Technology will be competitively awarded to scientists, doctors, engineers, and students at Ohio State and throughout the state of Ohio. This investment will lead to short-term job growth related to construction of new facilities, and it will educate the future workforce and generate discoveries that lead to long-term job creation across the state of Ohio.

## Pennsylvania

The **University of Pennsylvania's** total economic impact is nearly $10 billion. More than 6,900 full and part-time Penn employees receive compensation through some 600 sponsored research projects that occur on our campus. Penn's research programs have resulted in the launch of nearly 60 start-up companies over a five-year period, creating new high-paying jobs for the region.

Research grants and other sponsored programs provide more than 18 percent of the University's total revenue, with $787 million in total awards received in FY2007. These figures, which translate roughly to $25 million daily, represent nearly 3 percent of the Philadelphia economy and 2 percent of the Pennsylvania economy. The University is one of the largest nongovernmental employers in the state.

## Rhode Island

In Rhode Island, university research has significantly helped the local economy. For example, from 2000-2005 **Brown University** spurred on the development of 22 start-up companies, many of which are on the cutting edge of scientific research and leaders in their respective fields. These companies include IAM Technologies., NABsys, Inc., and Ryon Technologies, Inc. The development of these companies has helped Rhode Island progress toward a research and knowledge intensive economy. Further, Brown has helped to develop the human capital in Rhode Island, making the Providence area a leading center for biomedical research.

For more information on the impact of research on the Providence, R.I., economy:
http://www.providencechamber.com/files/DataAnalysis.pdf

## South Carolina

The South Carolina Centers of Economic Excellence Endowed Chairs program at the major research universities has created more than 2,000 jobs in South Carolina: 895 associated with endowed chair research by such companies as BMW, Timken and others; 40 at the 11 spin-off companies that have been created from endowed chair research; and 1,100 due to the $122 million in new research grants awarded to individual Centers. Through the end of fiscal year 2008, $66 million in state funds have been disbursed to the research universities. For the state's investment, an additional $205 million in non-state investment has been added to the state economy ($82.8 million from non-state sources + $122.2 million in competitive research awards won by CoEE-affiliated researchers = $205 million). An additional $41 million in non-state funds are pledged to be invested in the state economy within the next several years.

The CoEE Program has raised the national and international reputations of the universities and made South Carolina more competitive in the global economy. The report cites several examples of this: in 2007, **University of South Carolina** was one of 62 public universities classified by the Carnegie Foundation as a research university with "very high research activity"; Clemson has climbed to 22nd on U.S. News and World Report's ranking of U.S. public universities; MUSC's annual research funding has risen from $116 million in 2001 to more than $200 million in 2008.

## Texas

In Texas, university-based research contributes significantly to the state economy in terms of employment and the additional business activity that is attracted by the research centers in the state. As with most states, the largest outside source of research expenditures in Texas is the federal government. In 2005, $1.6 billion was spent on basic research in Texas by the federal government. Applying an economic multiplier effect of $3.32 (as determined by a 2005 Texas Comptroller study) means that the impact on the state's economy was $5.312 billion.

## Virginia

Virginia's research universities, including the **University of Virginia**, **Virginia Tech** and **Virginia Commonwealth University**, are helping to drive the state's economy. University-based research conducted at these institutions creates jobs, spawns start-up companies and attracts innovation-intensive businesses to the state.

And top-notch universities contribute to Virginia's business climate. For example, the business web site Forbes.com specifically cited higher education as one of the important factors in giving Virginia its "Best State for Business" award in 2006. In addition, basic research conducted at the University of Virginia contributed to the founding of start-up companies like Microlab Diagnostics, which is at the forefront of molecular diagnostics and genetic testing, and Tau Therapeutics, which is at the cutting edge of cancer drug discovery.

Additionally, the University of Virginia's world-renowned research centers attract a wealth of grants and fellowships and drive the local economy through employment and expenditures. In fiscal year 2005, University of Virginia faculty received almost $300 million in research funding from outside Virginia. On average, each full-time faculty position at U.Va. now generates in excess of $100,000 in sponsored research funding, most of which comes from sources outside the state. Locally, University of Virginia's impact on Charlottesville and Albemarle County exceeded $1 billion in 2005. The University is the largest single employer in the Charlottesville metropolitan area, with 19,487 employees, or one-fifth of the area's total non-farm payroll employment of 95,300, in 2005.

## West Virginia

At **West Virginia University**, hundreds of faculty researchers and graduate students are engaged in research projects that add to the knowledge of the laws of nature, which are then transitioned into practical purposes. WVU research and discoveries in energy, biomedicine, homeland security, nanotechnology and a host of other fields and interdisciplinary initiatives are aimed at making people's lives better. That work represents an engine with potential to create new projects, industries and jobs.

## Wisconsin

**University of Wisconsin-Madison** is a powerful economic engine for the state of Wisconsin. UW-Madison total research expenditures for FY 2007 were $840 million, including over $480 million from the federal government. This directly translates into roughly 32,000 jobs in Wisconsin - making academic R&D one of the largest employment sectors in the state.

In addition, the University Research Park is home to 110 companies - many of which are based in biotechnology and life sciences - directly creating or supporting an additional 9,100 jobs. The park has been so successful that the university is already planning Research Park II, which will bring an estimated additional 200 companies and 15,000 more new jobs to Wisconsin.