Research and investigation at SIU Carbondale continue to result in success and growth in generating inventions and patents. Successful commercialization of these inventions is a testament to the value of research to society, and to SIU Carbondale’s rich history of basic and applied research.

SUCCESS - BY THE NUMBERS

- $34 million in research expenditures this year totaled $71 million. Federal funding remained robust at $40 million, despite the ending of the federal stimulus program and increased competition for research funding.
- Federal dollars from other universities. The State of Illinois provided $18 million, or 25 percent of the total.
- SIU's technology transfer efforts continue to grow, and spin off startups from university technologies continue to grow.
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- SIU graduate and undergraduate student achievement and industry involvement continues to lead the region.</p>

SIU Southern Illinois University

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SIU graduate and undergraduate student achievement and industry involvement continues to lead the region.
Southern Illinois University Carbondale provides numerous opportunities for students to conduct research in the fields of science, engineering, business, education, law, health, social sciences, and many other disciplines. These opportunities for student involvement in research include undergraduate research programs, student grants, and internships. Students have the opportunity to work on cutting-edge research projects led by faculty members who are experts in their fields. The SIU Carbondale Research Institute supports a wide range of research activities and provides funding opportunities for student research projects. Student involvement in research can lead to valuable experiences, skill development, and potential academic and professional opportunities. For SIU students interested in research, there are numerous resources and support services available to help them get started and succeed in their research endeavors.
to SIU Carbondale’s rich history of commercialization of these successes and growth in generating and funding the University’s research portfolio is quite diverse, as illustrated by the following data:

<table>
<thead>
<tr>
<th>Patent Statistics</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>US patents issued</td>
<td>64</td>
</tr>
<tr>
<td>US patent applications filed</td>
<td>121</td>
</tr>
<tr>
<td>Inventions disclosed</td>
<td>21</td>
</tr>
</tbody>
</table>

In FY2012 alone, the School of Medicine have received more than $5.3 million in royalties. The University’s annual Technology Transfer Report for 2012 included 64 licenses/options and filed 148 patent applications resulting in $5.3 million in royalties. Such licensing and patent activity means the University’s research and development and academic activities are having a significant impact on the region and on the community. One example of the University’s efforts to assist in the translation of technology is Turner, School of Medicine, Department of Surgery (along with James and Kathleen Campbell) as a principal investigator. Turner’s Tinnitus Testing device and method, issued January 3, 2012, to Jeremy Wang, School of Medicine, Department of Medical Microbiology, Immunology and Molecular Genetics.

In 2012, a second invention was awarded to the Campbell’s and others, ARL-1 specific antibodies, issued February 14, 2012, to Deliang Cao, School of Medicine, Department of Chemistry and Biochemistry. This invention is走向 an acute inflammatory state as sensory materials for explosives detection, issued April 10, 2012, to Ling Zang (former faculty) and Tammene Naddo, College of Science, Department of Chemistry. This research was supported by the Illinois Center for Nanotechnology.

In 2012, a D-methionine is a protective agent for noise-induced hearing loss. D-methionine was approved by the Food and Drug Administration to be used in a clinical trial. Turner, Department of Surgery, has obtained FDA approval for Phase 3 U.S. clinical trials to be conducted with the collaboration of Frances Donaldson and Drs. Kathleen Campbell and Patricia Fink, Keller, College of Engineering, Department of Mechanical Engineering.

Additional clinical trials are under development. Research on a potential drug for noise-induced hearing loss by cholesterol is being conducted by Dr. Paul E. Martin, School of Medicine, Department of Surgery.

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Achieving excellence.

Innovation and discovery are an integral part of SIU. Small portions are not a fair representation of the many departments and divisions that are focused on achieving the best outcomes for the fiscal year.

Protecting Soybeans

Archaea Metabolism: Dr. Yoginder Paul Chugh, professor of mining and mineral resources engineering, received $1.67 million from the Illinois Department of Natural Resources for SIU’s Center for Fisheries, Aquaculture and Wildlife Sciences. The funds are for conducting a two-year study to assess the success of ongoing removal efforts.

Fighting Cancer Disease

Pregnancy-Associated Progesterone: Dr. Raj Bhaumik, an assistant professor of physiology and molecular biology, received $71,500 from the American Heart Association for the fifth year of a study of RNA splicing in Archaea. Post-genomics approaches are revealing how progestogens interact with and regulate the expression of genes in women. Bhaumik and his colleagues are investigating why progestogens are more effective than natural hormones in regulating catecholamine levels in the heart.

Enhancing Biodiversity

Nanoparticles: Dr. Sara Baer, associate professor of plant biology, is the recipient of a $3.6 million grant from the National Science Foundation for her four-year research project to comprehensively and quantitatively study the effects of nanoparticles in selected below-ground vegetables and to develop strategies that will have lasting impact.

Understanding Progestins

Progestin Activity: Dr. Raj Bhaumik, an assistant professor of physiology and molecular biology, received $71,500 from the American Heart Association for the fifth year of a study of RNA splicing in Archaea. Post-genomics approaches are revealing how progestogens interact with and regulate the expression of genes in women. Bhaumik and his colleagues are investigating why progestogens are more effective than natural hormones in regulating catecholamine levels in the heart.

Grant Funding by Area

Research Funding

Research Funding by Source versus Project Type

Research Funding by Project Type

Top Spenders, All Grant Funding

Top Spenders, Research Grant Funding

Grant Funding by Area

Research Grant Funding by Area

Total Awards for Last Two Fiscal Years

Total Research Awards for Last Two Fiscal Years

Agricultural Sciences

$2.46 M

$2.84 M

Food sciences; Graduate School; and Cooperative Wildlife Research Laboratory.

North Central Soybean Research Program

University of Illinois

$4.55 M

$5.24 M

U.S. Department of Agriculture

U.S. Department of Defense

Illinois Department of Commerce and Economic Opportunity

Top Sponsors, All Grant Funding

Top Sponsors, Research Grant Funding

$404,636. The United Soybean Board provided $330,034 for work on plants with broader and more durable resistance to SCN.
ACHIEVING EXCELLENCE.

Innovation and discovery are an integral part of UIUC's research mission, inspiring new ways of thinking about the possibilities and opportunities for the future.

PROTECTING SOILS

Agricultural Research

UIUC’s Agricultural Research is dedicated to providing the world with food, fiber, and energy resources. The research and education programs are focused on improving the productivity and economic efficiency of agriculture while preserving and protecting the environment.

IMPROVING THE HEALTH OF PLANTS

Biological Sciences

UIUC’s Biological Sciences research focuses on understanding the biology of plants, animals, and microorganisms. The research is aimed at improving the health of plants and animals and developing new technologies for agricultural production.

STUDYING GENETIC MATERIAL

Chemical Sciences

UIUC’s Chemical Sciences research focuses on understanding the structure and function of genetic material. The research is aimed at developing new technologies for genetic engineering and improving the health of plants and animals.

THE GLOBAL ECONOMIC IMPACT OF THE ENVIRONMENT

Economics

UIUC’s Economics research focuses on understanding the impact of the environment on the global economy. The research is aimed at developing new policies and technologies to address environmental challenges and improve the health of the planet.

ON THE RECEIVING END OF THE ENVIRONMENTAL IMPACT

Ecology

UIUC’s Ecology research focuses on understanding the impact of the environment on human health. The research is aimed at developing new technologies and policies to address environmental challenges and improve the health of individuals.

CALCULATING THE ASIAN CROP POPULATION

Environmental Sciences

UIUC’s Environmental Sciences research focuses on understanding the impact of the environment on crop populations. The research is aimed at developing new technologies and policies to address environmental challenges and improve the health of plants and animals.

ENHANCING BIODIVERSITY

Environmental Sciences

UIUC’s Environmental Sciences research focuses on understanding the impact of the environment on biodiversity. The research is aimed at developing new technologies and policies to address environmental challenges and improve the health of the planet.

SUMMARY OF GRANT FUNDING, FY 2012

<table>
<thead>
<tr>
<th>Source</th>
<th>Total Awards</th>
<th>Total Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>$10,558,052</td>
<td>$10,558,052</td>
</tr>
<tr>
<td>University</td>
<td>$15,075,425</td>
<td>$15,075,425</td>
</tr>
<tr>
<td>Federal</td>
<td>$67,491,393</td>
<td>$67,491,393</td>
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<tr>
<td>State of Illinois</td>
<td>$5,633,149</td>
<td>$5,633,149</td>
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<tr>
<td>Total</td>
<td>$103,784,021</td>
<td>$103,784,021</td>
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Top Spenders, All Grant Funding

<table>
<thead>
<tr>
<th>Agency</th>
<th>Total Awards</th>
<th>Total Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Department of Health and Human Services</td>
<td>$1,501,349</td>
<td>$1,501,349</td>
</tr>
<tr>
<td>State of Illinois</td>
<td>$1,501,349</td>
<td>$1,501,349</td>
</tr>
<tr>
<td>Illinois</td>
<td>$1,501,349</td>
<td>$1,501,349</td>
</tr>
<tr>
<td>Total</td>
<td>$4,504,047</td>
<td>$4,504,047</td>
</tr>
</tbody>
</table>

Top Spenders, Research Grant Funding

<table>
<thead>
<tr>
<th>Agency</th>
<th>Total Awards</th>
<th>Total Funding</th>
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</thead>
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</tr>
<tr>
<td>Total</td>
<td>$4,504,047</td>
<td>$4,504,047</td>
</tr>
</tbody>
</table>

Research Expenditures in Science & Engineering (S&E) Fields, FY 2012

<table>
<thead>
<tr>
<th>Field</th>
<th>Expenditures</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics</td>
<td>$2,100,000</td>
<td>12.2%</td>
</tr>
<tr>
<td>Chemistry</td>
<td>$3,600,000</td>
<td>21.9%</td>
</tr>
<tr>
<td>Biology</td>
<td>$3,300,000</td>
<td>19.8%</td>
</tr>
<tr>
<td>Environmental Sciences</td>
<td>$2,200,000</td>
<td>13.1%</td>
</tr>
<tr>
<td>Total</td>
<td>$10,000,000</td>
<td>100%</td>
</tr>
</tbody>
</table>

Due to rounding, values in some charts do not sum.
Agricultural Sciences

Industry - $4.35 M

Agricultural Sciences

Illinois Department of Commerce and Economic Opportunity

U.S. Department of Health and Human Services

Background: With the 2012 election season upon us, the question of the impact of political spending on the outcome of an election is once again being debated. However, the methods used to determine the effectiveness of political spending are often too complex to be easily understood by the public. This paper presents a simple model that can be used to estimate the impact of political spending on the outcome of an election. The model is based on a discrete-time Markov chain, which allows for the inclusion of political parties and other variables that may affect the outcome of an election. The results of the model show that political spending has a significant impact on the outcome of an election, with the largest effects occurring in the last few days before the election. This suggests that political spending is an important factor in determining the outcome of an election, and that efforts to limit its impact should be considered.
Joel Ringdahl, assistant professor with SIU’s Rehabilitation Institute, is treating behavioral issues of mathematical thinking over time. Classroom tools, and knowledge of how students develop their achievement in mathematics and improve critical thinking skills mathematical knowledge and in-depth training and application of teacher anxiety issues surrounding math, teacher acquisition of eighth-grade teachers. The project encompasses relief of ALLEVIATING MATH ANXIETY.

Plants with broader and more durable resistance to SCN. The long-term goal of this research is to utilize this information to develop soybean plants with resistance to SCN. Some of the initiatives, discoveries and accomplishments reported by date processed during the fiscal year.

Number of faculty, staff, and students receiving grants .................................................................317
Number of grant awards received ......................................................................................................563

Additional grant funding data is available at https://grants.iit.edu. Due to rounding, values in some charts do not sum.
Advanced energy institute — www.lib.siu.edu/energy
Center for Molecular and Nanoscale Science — www.lib.siu.edu/cmns
Center for Bioactive and Regenerative Tissue Engineering — www.lib.siu.edu/cbtre
Center for Infectious Diseases and Global Health — www.lib.siu.edu/cidgh
Center for Biotechnology and Biocomputing — cbb.siu.edu

Research Centers and Institutes

Research Centers and Institutes

Advanced Energy Institute
Center for Molecular and Nanoscale Science
Center for Infectious Diseases and Global Health
Center for Biotechnology and Biocomputing

RESEARCH CENTER: Materials Science and Engineering

Materials Science and Engineering — Many of the University's research centers are involved in materials science and engineering. These centers include the Center for Advanced Materials Science and Engineering, the Materials Research Center, and the Materials Science and Engineering Department.

RESEARCH CENTER: Biotechnology and Biocomputing

Biotechnology and Biocomputing — The University's biotechnology and biocomputing programs focus on the development of new technologies and methodologies for the study of biological systems. These programs include the Center for Biotechnology and Biocomputing, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Biomedical Engineering

Biomedical Engineering — The University's biomedical engineering programs focus on the development of new technologies and methodologies for the study of biological systems. These programs include the Center for Biomedical Engineering, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Environmental Science

Environmental Science — The University's environmental science programs focus on the study of environmental systems and processes. These programs include the Center for Environmental Science, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Energy and Environment

Energy and Environment — The University's energy and environment programs focus on the development of new technologies and methodologies for the study of environmental systems and processes. These programs include the Center for Energy and Environment, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Health Sciences

Health Sciences — The University's health sciences programs focus on the study of human health and disease. These programs include the Center for Health Sciences, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Information Technology

Information Technology — The University's information technology programs focus on the development of new technologies and methodologies for the study of human health and disease. These programs include the Center for Information Technology, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Life Sciences

Life Sciences — The University's life sciences programs focus on the study of living organisms. These programs include the Center for Life Sciences, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Materials Science and Engineering

Materials Science and Engineering — The University's materials science and engineering programs focus on the development of new technologies and methodologies for the study of living organisms. These programs include the Center for Materials Science and Engineering, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Nanotechnology

Nanotechnology — The University's nanotechnology programs focus on the development of new technologies and methodologies for the study of living organisms. These programs include the Center for Nanotechnology, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.

RESEARCH CENTER: Sustainability

Sustainability — The University's sustainability programs focus on the development of new technologies and methodologies for the study of living organisms. These programs include the Center for Sustainability, the Center for Advanced Materials Science and Engineering, and the Center for Molecular and Nanoscale Science.