INTRODUCTION

MEASURING SUCCESS IN RESEARCH AND creative activity at a comprehensive university is a constantly evolving process. When the Research Statistics and Analysis (RSA) Group was established in 2007 in the Office Vice President for Research, it was charged with helping the University develop and thoughtfully evaluate a variety of metrics for promoting and achieving success in academic scholarship on the Norman and Tulsa campuses. Initial analyses focused on standard measures of research activity, including expenditures, proposal success rates and diversity of funding sources.

RSA then began studying the fundamental output of research and creative activity, namely, publications, performances and exhibits. For the former, commonly used bibliometric data were evaluated to gauge the quality and quantity of published works as a means to assess not only output but also impact. These metrics broadened the evaluation of research activity and afforded equitable comparisons with other institutions.

More recently, RSA began studying Norman campus achievement in research via faculty honors and awards. These metrics are one measure of faculty excellence, and they have important implications for the University’s stature and recognition in the government, academic and private-sector communities.

This report encompasses all three areas of analysis described above. In addition, data from other Norman campus organizations, principally the Office of Institutional Research and Reporting and the Office of Technology Development, have been included to represent the staffing, educational and commercialization aspects of research and creative activity.

In combination, these metrics offer a balanced view of engagement, competitiveness and overall success in research and creative activity.

Numbers and charts alone, however, cannot capture the breadth, richness and impact of scholarship associated with creative Norman campus faculty. Each faculty member is engaged in a lifelong pursuit of activities that improve our world or help us understand it more completely. The individuals highlighted in the Extraordinary People, Extraordinary Scholarship section of this report reflect that pursuit.
The University of Oklahoma’s research enterprise is growing at a phenomenal rate while also achieving national distinction. OU’s Norman campus recently achieved the Carnegie Foundation’s highest tier of research activity classification, which is one of the most important measures that distinguish among institutions of higher education. In addition, this marked the first time a public institution in Oklahoma has received this outstanding honor.

Business and industry leaders often cite proximity to an outstanding research university as one of the most important factors in business start-up or relocation decisions. The success of OU’s Research Campus, with more than a dozen private companies employing over 350 people, underlines OU’s service as an engine for economic growth.

Norman campus faculty (including faculty associated with Norman campus programs at OU-Tulsa) set a record for new grants in 2010, topping the $100 million mark for the first time in OU history. The associated 40 percent increase from the previous year is the largest ever, and this achievement contributed significantly to the near tripling of Norman campus research funding over the past 15 years. Research expenditures in 2010 also set a new record, representing the second-largest yearly increase in a decade.

Of course, grant funding is but one measure of faculty achievement in research and creative activity. OU faculty are receiving prestigious national and international awards and fellowships, publishing in acclaimed journals and books, serving as editors and jurists, and presenting their scholarship at conferences around the world. These activities reflect the values and excellence of the OU family and provide outstanding learning experiences for both our graduate and undergraduate students.

I am deeply honored to be associated with such an outstanding group of faculty, staff and students who, working together, continue to propel OU toward new levels of achievement in research.

A new era in research and creative activity began on the Norman campus in 2010 with the initiation of Aspire 2020, a bold planning activity outlining a decadal strategic roadmap for scholarship. The ultimate goal of Aspire 2020 is for OU to become the nation’s foremost public comprehensive research university of its size. This goal is underpinned by three principal objectives:

• transforming OU’s research competitiveness
• transforming OU’s research engagement
• transforming OU’s research culture

Within these objectives are specific actions, developed by Action Teams comprising faculty from across the University.

Aspire 2020 already is yielding significant results. The Norman campus recently established the Center for Research Program Development and Enrichment to assist faculty in developing their research programs as well as grant proposals. A Strategic Initiative in Defense, Security and Intelligence Research was launched, as well as a Research Liaison Program, in which one faculty member in each academic department serves as a point of contact to the Office of the Vice President for Research. A new Vice President for Research Awards Program was created, and the Research Council conducted a pilot program on Potentially Transformative Research. A new competitive seed funding initiative, known as the Faculty Research Challenge Grant Program, is providing over half a million dollars per year to initiate new projects that show promise for long-term growth.

New emphasis is being placed on multidisciplinary research and engagements with federal agencies and private industry. An applied R&D center is being established, and the Research Campus is closing in on one million square feet of developed space, now housing more than 350 private-sector employees among more than a dozen companies.

OU is an institution on the move. Its scholarly endeavors improve the quality of life for Oklahomans, lead to start-up companies and high-technology jobs, provide unique educational experiences for students, and help us better understand and enjoy the world in which we live.
For May Yuan, it has always been about time and space.

For May Yuan, it has always been about time and space.

As a young girl in Taiwan, Isaac Newton’s theories fascinated Yuan. She thought of becoming a physicist when she grew up. Her subsequent enjoyment of earth system science in high school opened wide her view of time and space.

In graduate school, Yuan discovered that her colleagues had difficulties in spatially and temporally contextualizing their environmental evidence and research outcomes. Then she found Geographic Information Science (GIS) or Geoinformatics. “It was a great platform for showing how events and processes worked together.” GIS could show a holistic picture of both spatial and temporal dimensions.

GIS applications integrate computer mapping and spatial analysis with database and computational science. They emerged in the 1960s, but the discipline did not gel until the late 1980s and ‘90s. The National Science Foundation made the first big splash in GIS when it funded the National Center for Geographic Information and Analysis at three universities.

Yuan commenced her doctoral program at the NCGIA at SUNY-Buffalo. She is now working with a multidisciplinary group of faculty to build an interdisciplinary program in Geoinformatics, offering GIS degrees at OU.

Her research and practice have grown considerably since then, with excellent support from her colleagues and students at the Center for Spatial Analysis. Her team works with OU Health Science Center researchers to track incidences of disease and with Idaho State researchers on spatial dimensions of histories. Her team contributes to OU’s cyberCommons project, in which Oklahoma and Kansas researchers attempt to develop novel cyberinfrastructure with data and tools to forecast how carbon cycles and biodiversity may evolve because of climate change.

“Physicists look at space and time on a more abstract level, the universe. I am looking at space-time on a human scale.”

Yuan is also partnering outside of academia. She and her CSA colleagues have been working with the state’s Election Board, Tax Commission, Department of Education, and Department of Finance on updates and maintenance of geospatial data, voter registration records and broadband coverage. Her research team is working with Naval Research Laboratory and RAND Corporation to map out the probability of risk of various threats in urban areas.

In addition, Yuan’s team assisted Oklahoma City police on spatiotemporal analysis of a suspect’s activities to identify potential crime locations, and they recently received funding from the National Institute of Justice for an analysis of offenders on GPS monitoring.

Yet Yuan’s root curiosity has never changed. “Physicists look at space and time on a more abstract level, the universe. I am looking at space-time on a human scale.”
Camille Hardy endured polio early in her life. She triumphantly overcame the condition at age 4. To celebrate, her parents took her to see the Ballet Russe de Monte Carlo, an offshoot company of Serge Diaghilev’s original Ballets Russes.

That performance, plus pre-ballet lessons endorsed by Hardy’s pediatrician, swept her into the world of dance. Hardy, now an associate professor of dance, studied political science and law at Duke University after realizing a career with the New York City Ballet was not likely to happen.

Yet Hardy never got rid of the dance bug. To fulfill one of her physical education requirements, Hardy took a modern dance course. Duke artist-in-residence Martha Graham conducted a master class for one of its sessions.

Years later, Hardy forsook her legal training and revisited the performing arts. She would go on to earn a master’s degree at the University of North Carolina and a doctoral degree in theater from the University of Michigan. Soon after, she co-taught a dance history course in North Carolina with Mavis Ray, a former assistant to Agnes de Mille. Hardy admitted being nervous about co-teaching with someone who had worked with people she had only read about.

Hardy would eventually establish her own reputation. While teaching dance history at the University of Illinois at Urbana Champaign, she broadened her perspective by writing as the dance critic in Chicago for Dance Magazine. Hardy later spent a 23-year career in New York writing hundreds of pieces for Dance Magazine, Ballet Review and other national and international arts publications, while teaching on the dance faculty at Tisch School of the Arts at New York University.

Hardy was one of the scholars dance history pioneer Selma Jeanne Cohen handpicked in the 1970s to improve the academic quality of dance instruction. Hardy followed through by helping to start the Midwest Institute for Dance Criticism, the Society of Dance History Scholars and serving as the first Guest Scholar in Dance at Cornell University. Hardy also worked as an activist for a cause Cohen led: the move of dance programs from physical education into the fine arts.

OU Dance Department Chair Mary Margaret Holt pulled Hardy out of New York to provide a much-needed historical perspective to the dance program. Hardy acquiesced because, “As a New York snob, I can tell you that this is one of the top five dance programs in the United States.” One of her commitments: oversight of OU’s definitive collection of archives of the Ballets Russes.
These separate paths converged at OU with the WaTER Center.

David Sabatini, Robert Nairn, Randy Kolar and Robert Knox (CEES) took very different, yet parallel paths to become the leadership team of the Water Technologies for Emerging Regions Center at OU.

Sabatini’s original graduate school interests had focused on transportation, but he soon switched gears. As a member of the National Geographic Society, he was interested in the environment. He enrolled in an environmental course, and found he enjoyed it; soon his focus turned to environmental science. As Sabatini stated, “I could see the value in what I was learning, and also protect and preserve the environment.”

Nairn grew up in western Pennsylvania, where his father and uncles were steel workers, and the generations before were coal miners. His first-hand interest in water and air quality problems was further piqued by his high school biology teacher, who taught him that he “could not only pursue science, but also have science make a difference in the world.”

Kolar’s upbringing in Idaho often centered on water recreation, and he was very aware of the scarce resources and effects dams had upon the region’s water. Between his bachelor’s and doctorate degrees, he worked in the private sector before he decided he “wanted to do something to answer the questions” rather than just ask them.

Knox stated that he never really thought he would go to college, but once there, read Replenish the Earth by William Edward Watkins, and wanted to do something for the environment. While environmental engineering wasn’t a degree plan at the time, he became a civil engineering student who pursued all the environmental courses he could find. He later became one of the first students with a doctorate in groundwater contamination at OU.
These separate paths converged at OU with the WaTER Center. Sabatini stated that the impetus for the WaTER Center was primarily a humanitarian motivation; after traveling the world, they had seen the living conditions in which people struggle to survive. Taking a cue from the United Nations Millennium Development Goals, they realized water and sanitation were central to all the goals. Kolar stated that “rarely can you combine a humanitarian gesture like this to fulfill a need and still meet your professional obligation.” To the team, this was a win-win situation.

“Rarely can you combine a humanitarian gesture like this to fulfill a need and still meet your professional obligation.”

Part of the focus of the WaTER Center, according to Sabatini, is taking fundamental scientific advances in the developed world and mimicking them in developing countries using local materials the local populations can make cheaply and sell, incorporating social entrepreneurship into the cause. Sabatini emphasized behavior change is also important, by promoting not only an understanding of the relationship between unsanitary water and health problems, but also by creating a desire for healthier conditions. The WaTER Center has collaborated with the Price Business College as well as the Sociology and Anthropology departments to help people in developing countries create self-sustainable business enterprises while living on less than a dollar a day, as well as assure that the lessons for lifestyle changes are understood and continuous.

Nairn stated that the WaTER Center is “cognizant of [water sanitation] problems closer to home, too, although our focus is on developing nations.” Their work has application in emerging regions in Oklahoma and the western United States, especially in Native American lands with water quality challenges.

Sabatini, Nairn, Kolar and Knox also want to include a teaching component with their work for the WaTER Center. Giving students the opportunities to get involved in humanitarian projects such as water and sanitation, as well as including it as part of the education program through internship programs in other countries, has brought these areas of need to the attention of students. By integrating these experiences into the curriculum, Kolar stated that it “makes them appreciate the vast differences in projects [engineers] might face, depending on where you are working.”

To increase visibility of the WaTER Center, and upon realizing there was no real meeting to bring together the researchers developing technologies but also the social scientists striving for behavioral change, the center has begun to host a WaTER Conference and Symposium to bring visibility and recognition to those in the field. The first conference attracted 170 individuals, doing work in water sanitation and education in 30 countries. Using a juried panel to choose a winner, the first recipient of the Water Prize was Dr. Stephen Luby, who has been working on water sanitation and hygiene in Bangladesh and Pakistan. Just recently, Ben Fawcett was selected as the second Water Prize recipient. His work in sanitation has led to publication of the book, *The Last Taboo: Opening The Door on the Global Sanitation Crisis*. As Knox stated, “The juries have set the bar very high” for future award winners.
Lewis always questioned conventional wisdom.

Cecil Lewis was a child who always questioned conventional wisdom. “Whatever was the party line [of an observation], I was always trying to find ways to contradict it.” Today, he is still trying to do things differently.

Lewis served an internship identifying animal bones at archaeological sites to reconstruct prehistoric diets and habitats while earning his bachelor’s degree in anthropology at the University of Washington. During his undergraduate studies, he realized he loved this marriage of biology and anthropology. He proposed to his professor what he thought was a novel approach to his career: an integration of genetics and archaeology from the study of ancient DNA. The link between genetics and anthropology actually had existed since the beginning of anthropology, but ancient DNA research was still a very young field. It became a major theme for his life’s research.

After earning his doctorate at the University of New Mexico, Lewis was awarded the National Institutes of Health post-doctoral training fellowship, sponsored by the Department of Human Genetics at the University of Michigan’s Medical School. There he gained additional training in statistical genetics.

Lewis began his career at OU in 2007. As an assistant professor of anthropology, Lewis runs two laboratories, for modern and ancient DNA research, respectively. In one of his studies, he hopes to track the evolution of microbial communities harbored by humans through the study of both ancient and modern fecal samples. In additional study, Lewis uses human genetic data to track population history and the evolution of disease-associated genetic variation. Importantly, these studies are connected.

“When the genetic level, [racial] categories are exceptionally poor at predicting genetic variation.”

Lewis’ efforts in the evolution of disease-associated gene variation may have downstream benefits in medical research. Lewis explained that founder effects, which result from the separation of a daughter population from a parent population, result in a decline in human genetic variation. This decline results in changes in the frequencies of gene types (alleles), which includes alleles with health consequences. Thus, tracking founder effects, while informative of population history, also helps scientists determine a population’s probability of certain genetic diseases. Importantly, these founder effects began with the migration of the original human parent population from Africa to the central Asia, and subsequently the rest of the world.

Lewis contends that founder effects research is more useful for addressing genetic health risks in groups than engagement based on current racial categories. “At the genetic level, those categories are exceptionally poor at predicting genetic variation,” hence genetic health risks.
As an undergraduate in English, Francesca Sawaya never saw herself as a professor. She thought law school would be her next step, but Sawaya’s professors recommended she pursue further study in literature. A fellowship from the Mellon Foundation –meant to counter the decline of students in the humanities– enabled her to attend graduate school at Cornell University.

Sawaya took advantage of a Rotary Foundation Fellowship after her first year at Cornell to get a master’s degree at England’s University of York, which helped change her perspective. She had concentrated on British literature, but her major professor asked interesting questions about American economics and social politics. “Being in England and hearing how the English responded to American literature sparked my interest,” Sawaya recalled. Sawaya returned to Cornell to finish her doctorate in American literature instead.

Sawaya’s dissertation focused on regional realism, which illustrated how Americans at the turn of the 20th century adjusted from an agrarian, rural lifestyle to an industrialized, urban existence. These works did not necessarily reject modernization, but refocused on cultures and customs left behind.

Regional realist writers were trying to give value to commonplace lives.

Sawaya realized that many of these realistic works were written by women, and women’s contributions to American literature then became the subject of Sawaya’s first book, Modern Women Modern Work: Domesticy, Professionalism, and Women’s Writing. Sawaya described how women combined the discourse of modern professionalism with that of domesticity in order to create new kinds of writing and new careers for themselves.

Sawaya’s current research interest is philanthropy. Patronage, she asserts, has been critical to the production of art in the United States since the late 19th century.

Building on the Mellon and Rotary honors, Sawaya has continued to earn research fellowships during her career from the National Endowment for the Humanities, the American Philosophical Society, the Radcliffe Institute of Advanced Study and the American Council of Learned Societies. Sawaya uses the fellowships, which in the humanities realm are very competitive, to develop new research as well as new classes.

Sawaya loves her work as a professor. “I hope [my students] get a sense of the wide range of voices, ideas and aesthetic forms –and some of the critical and historical debates about them– that constitute U.S. literary history. I’m one of those teachers who believe an understanding of the past and its conflicts matters to understanding the present and its conflicts.”
McCann cultivated his own ideas for thermoelectricity at OU.

Patrick McCann dreamed of a career as a doctor — that is until a Life magazine article with a graphic picture of open-heart surgery encouraged him to explore other career options.

Intrigued by the work going on in neighboring Silicon Valley, just down the road from his hometown in Northern California, he decided to study engineering physics while a student at the University of California, Berkeley. This set the stage for the ultimate utility of his work involving multiple groundbreaking applications of thin crystalline materials.

McCann’s current research began as a graduate student in electronic materials at the Massachusetts Institute of Technology. While there, he was introduced to applications involving the use of lasers for chemical sensing and believed this technology could have compelling medical applications. McCann’s Ph.D. dissertation explained the growth and characterization of thin crystalline compounds that could be used to make such lasers.

McCann cultivated his own ideas for thermoelectricity at OU. Patrick McCann

“Nationally, that’s a potential for gigawatts of additional power without any new greenhouse gas emissions or need to build new transmission lines.”

This research came to fruition at OU. McCann, a professor of electrical engineering, developed a device that can detect biomarkers of illnesses such as cancer through a laser-based breath test. This device is being perfected and marketed by a company McCann heads, Ekips Technologies.

McCann’s materials research took on a parallel track when he began work on thermoelectric devices – which convert heat to electricity – with the same compounds he uses in his lasers. While following developments in the field, McCann cultivated his own ideas for thermoelectricity at OU.

McCann’s work in thermoelectrics gained notice from industry. When the right partner – an investor from Silicon Valley – came along, his second company, Phononic Devices, was born.

McCann’s thermoelectrics research has two areas of application. The first is a solid state thermoelectric cooler, which is a more efficient, more durable, and a lower-cost alternative to the refrigerators and HVAC systems that typically cool IT data centers. “Half of the cost in running an IT data center is cooling it,” McCann explained.

What may be more significant is McCann’s second area of application: waste heat recovery. More than half of the energy generated by a power plant is lost as waste heat. McCann believes a new class of steam condensers can be developed to capture waste heat and produce additional power, about 100 megawatts for a typical power plant, without burning any additional fuel. “Nationally, that’s a potential for gigawatts of additional power without any new greenhouse gas emissions or need to build new transmission lines.”
When Yun Wang was a teenager, the universe fascinated her. She excelled in all her school subjects, so when it was time for her to go to college and pick a field, she faced quite a choice. Wang arrived at two options: literature and the natural sciences.

Wang’s father made it easy for her. He had been punished for speaking his mind during the Chinese Cultural Revolution. His blunt opinion was, “If you are a writer, it might not end well.” A background in the natural sciences, on the other hand, offered her an indispensability that would provide job security. Plus, he reasoned, she could still write as an avocation.

Wang majored in physics; she saw it as a necessity for understanding the universe. As graduation approached, Wang gained admission to the China-U.S. Physics Examination and Admission program. She was lucky, as the program folded the next year.

Wang applied to Carnegie Mellon University because she thought it offered training in cosmology. In reality, a cosmologist wouldn’t join the faculty until two years later. But Wang became his first graduate student at CMU.

Wang is now a cosmological theorist specializing in dark energy, a mysterious new energy that is causing the expansion of the universe to accelerate. She made waves in the field by being the first author on two papers published in 2004 and 2006 that advanced the study of the phenomenon.

In the 2004 paper, Wang and her co-author made the most accurate measurements at the time of dark energy density. Unlike earlier research, they took into account all the sources of error. The paper made the cover of Physical Review Letters, a prestigious journal in the field.

In the 2006 paper, Wang and her co-author developed a way to simplify and summarize statistical priors that fellow cosmologists could use to conduct their own analyses. In effect, she enabled cosmologists to avoid counting the same factors twice in their calculations.

Wang’s papers are among the most cited for an OU researcher. Incidentally, she has also published two books of poetry, influenced by both the hardship she experienced in China and her cosmological perspective.
FACULTY HONORS

Dozens of Norman campus faculty members have earned prestigious awards in the life of the University, from professional society recognition to competitive fellowships. In the past decade, faculty members have been particularly successful with these awards.

FULBRIGHT SCHOLARS
Administered by the Council for International Exchange of Scholars, the mission of this program is to improve understanding between the United States and other countries. They are given on the basis of academic merit and leadership potential. This list features winners since 1999.

Anthony Sterling Roath, 2010-11
Rita Keresztesi, 2010-11
Kathryn Jenson White, 2010-11
Michael Steven Givel, 2009-10
Austin Stewart Hartel, 2009-10
Gary W. Copeland, 2008-09
Zoe Carey Sherinian, 2008-09
Benjamin Leontif Alpers, 2007-08
Elizabeth Ashley Bergey, 2007-08
Traci Ann Carte, 2007-08
William Leon Megginson, 2007-08
Todd Lyle Sandel, 2007-08
Cesar Guillermo Ferreira, 2005-06
Robert Randolph Lewis, 2005-06
Steven John Livesey, 2005-06
Hester Baer, 2004-05
Joshua M. Landis, 2004-05
Karl Henry Offen, 2004-05
Bret Wallach, 2004-05
Rozmeri Basic, 2003-04 and 2010-11
Peter B. Kutner, 2003-04
Mihajlo-Misha Nedeljkovich, 2003-04 and 2010-11
F. Jamil Ragep, 2003-04
Suzette R. Grillot, 2002-03
Phillip E. Klebba, 2002-03
Thomas Mical, 2001-02
Joyce Palomar, 2001-02
Drew L. Kershen, 1999-00

NSF CAREER AWARDS
The Faculty Early Career Development Program (CAREER) Program is the National Science Foundation’s most prestigious awards program that supports junior faculty. Winners exemplify the role of teacher-scholar through outstanding work integrating research and education. The following are winners since 2000.

PE CASE
The Presidential Early Career Award in Science and Engineering, given by the National Science and Technology Council, is the highest honor bestowed by the U.S. government on outstanding scientists and engineers in the early stages of their careers. Cerato was recommended by the NSF for 2008.

Li Deng, 2010
Ning Jiang, 2010
Cecil Lewis, 2009
Susan Schroeder, 2009
Chuanbin Mao, 2009
Binil Starly, 2009
Yongpei Guan, 2008
Amy McGovern, 2008
Amy Cerato, 2008 (CAREER AND PECASE)
Petra Klein, 2006
David Schmidtke, 2006
Elizabeth Bergey, 2005
Charles Rice, 2005
Qi Cheng, 2003
Lloyd Bumm, 2003
Yun Wang, 2001
Elizabeth Butler, 2001
Tohren Kibbey, 2001
Robert Houser, 2001
Melissa Rieger, 2001
Michael Mooney, 2000

NEH FELLOWS
The National Endowment for the Humanities offers fellowships for individuals conducting advanced research that is of value to humanities scholars and general audiences. The following are winners since 2000.

Sandie Holguin, 2009
Pamela Genova, 2004
Vincent B. Leitch, 2003
Melissa K. Stockdale, 2001
Sarah W. Tracy, 2001

AAAS FELLOWS
The American Association for the Advancement of Science Fellows are Association members who are elected by their peers. The honor recognizes meritorious efforts to advance science or its applications. The following Fellows are currently active Norman campus faculty members.

Penny Hopkins, Zoology
Michael Mares, Sam Noble Museum, Zoology
Gary Schnell, Sam Noble Museum, Zoology
Gordon Uno, Botany/Microbiology
Jizhong Zhou, Botany/Microbiology
INDICATORS POINT TO A VIBRANT and growing research enterprise on the Norman Campus¹, with room for even more growth.

The Norman Campus achieved a record one-year increase in awards for FY 2010, surpassing the previous mark by $28 million for a total of $102.7 million in FY 2010. Most striking is that the largest gains were driven not by stimulus funding (ARRA), but instead by ongoing research activities. This success will translate into greater research expenditures during the next couple of years.

The total number of awards received in FY 2010, and the total dollar amount associated with them, show similar patterns, indicating the average award size remains fairly constant.

Research expenditures – a standard measure of research activity – also reached an all-time high in FY 2010 of $85.8 million. Since 2006, expenditures have demonstrated monotonic growth at an average rate of 7.2 percent annually.

Strategic Initiative hires, which today number 33 in Weather Radar, Integrative Life Sciences, K20 Education, and Applied Social Research, have contributed significantly to expenditure growth on the Norman Campus. In FY 2005, these hires accounted for 3.9 percent of Norman campus expenditures; in FY 2010, their contribution was 12.1 percent of the total.

In FY 2010, Norman campus researchers submitted 873 proposals with an aggregate request of $353.6 million. Proposal volume exhibits a roughly biennial cycle owing to the average few-year duration of a grant.

¹Includes Norman Campus programs at OU-Tulsa.
In FY 2010, 2,580 proposals were submitted and 904 prior proposals were awarded for a yearly success rate of 35.0%.

*As of Dec. 15, 2010. The count includes other forms of scholarship such as reviews, meeting abstracts, conference papers, editorial materials and creative works.
During the fall 2009 semester, the Norman campus employed 946 graduate research assistants.

Continued from page 13

Norman campus researchers have published 1,089 articles as of Dec. 15 in calendar year 2010.

The number of postdoctoral researchers on the Norman Campus increased to 102, continuing a remarkable climb. Furthermore, an analysis of department and center research staffing in 2008 revealed the Norman Campus employed 267 non-faculty doctoral degree-holding researchers.

Graduate student participation in research assistantships has remained between 39 percent and 42 percent the past five years.
OU Technology Transfer Activity in FY 2010

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<th>All Campuses</th>
<th>Norman Campus</th>
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<tr>
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**Royalty/License Income** are earnings received by the University of Oklahoma from entities for use of University-owned technology(ies).

**Patent Reimbursement Dollars** are those funds paid by companies utilizing University-based technology(ies) as reimbursement of expenditures incurred by the University of Oklahoma for filing a patent(s).

**Disclosures** are the descriptive information, including models, drawings, publications and reports, of a technology or invention resulting from research or work conducted at or on behalf of the University of Oklahoma.

A **Patent Application**, generally, is the application filed with the U.S. Patent and Trademark Office for protection of a technology or invention. Such applications vary in the types and requirements associated with each type, including their time of filing, level of protection and patent use.

An **Issued Patent** is the grant of a property right to the inventor or assignee. It is “the right to exclude others from making, using, offering for sale, or selling” the patented invention in the United States or “importing” the invention to the United States.

**Spin-offs (Start-Ups)** are companies whose primary technology is a University-owned technology.

The University of Oklahoma
Office of Technology Development

To increase the economic vitality of Oklahoma, the OU Office of Technology Development fosters technology commercialization through university start-up companies, licenses to university-developed technologies to existing companies, and provides monetary benefits of successful technologies to researchers, their departments, and the University. Under the Vice President for Strategic Planning and Economic Development, OTD works directly with OU researchers and serves as the link between the University research community and commercial market.

Despite the recent economic downturn, OTD has continued to facilitate transfer of innovative ideas into the commercial and economic community.

In FY10, OTD joined the small group of university technology transfer offices who, on a gross basis, achieved more total revenue than their operational costs. The office received 49 Invention Disclosures, filed 52 patent applications, had 29 issued patents awarded worldwide, and achieved gross revenues of $1,850,235.17. In addition to a robust patent portfolio, OTD also has a diverse pipeline of commercially successful non-patented technologies, including the iPhone application, Radarscope and an enhanced oil recovery technology. Overall, OTD will continue to build upon the high-quality research at the University of Oklahoma and to increase OU’s impact in the Oklahoma, national and international economic communities.
FEDERAL AGENCIES FUND RESEARCH BOTH DIRECTLY AND through other mechanisms, one of which is so-called pass-through funding to entities such as state and local governments and nonprofit groups. In FY 2010, federal dollars accounted for $64.5 million or 75.2 percent of Norman campus research expenditures.

The National Science Foundation is the federal government’s largest supporter of basic research in the non-medical science and engineering fields, including the social and behavioral sciences. NSF funded a wide array of research on the Norman campus in FY 2010, including projects involving both the Health Sciences Center and Tulsa campuses.

With respect to non-federal sources, expenditures associated with funding from Devon Energy Corp. accounted for the largest research support in FY 2010, principally for petroleum engineering and geophysics studies. Oklahoma State University led all institutions (in dollars) in providing subcontracting project work to OU. The Oklahoma Department of Transportation was the top sponsor from the State of Oklahoma, and the Norman campus expended $8.2 million in state funding in FY 2010.

FY 2010 Research Expenditures by Source

*Federal Direct* is federal funding straight from the agency. *Federal Flow Through* is federal funding secured through programs administered by other sources, such as universities, nonprofits, industry, and state and local governmients, among others. The non-federal agency amounts detailed in the above External Funders list include these federal funds passed on to OU, in addition to their own funding they disbursed to OU.
FY 2010 Research Expenditures by Federal Agency

FY 2010 Research Expenditures by Unit

*Other Units includes Executive Affairs, Honors College, VP Information Technology, VP Research, and Writing Center.

FY 2010 Research Expenditures Per Capita by College

per tenured and tenure track faculty member
THREE DISTINCT GROUPINGS OF BIG-12 INSTITUTIONS exhibit similar levels of research expenditures. The top cohort consists of institutions that have been leaders in the conference since the turn of the decade – the University of Texas, University of Colorado, Texas A & M University, and the University of Nebraska. Those institutions have maintained expenditure levels double those of schools in the next cohort.

Most impressive is Nebraska, which started the decade as the top institution in the middle cohort and has dramatically increased expenditures to distance itself from that cohort. Yet is has not quite met the level of the top three schools. Several large center grants, the result of an aggressive effort to build and lead research teams, have driven Nebraska’s growth.

The University of Oklahoma – in these charts including expenditures from Health Science Center programs – is in the middle group of Big 12 institutions but has seen modest growth over the decade.

In federally funded activity, the University of Colorado benefits from an extraordinary presence of federal researchers from the National Oceanic and Atmospheric Administration and the National Institute of Standards and Technology. These researchers work with CU faculty and scientists in atmospheric and space sciences, measurement and statistics. Colorado’s considerable edge in federal funding is largely responsible for its top three status in the Big 12 in terms of total expenditures.

In industry-funded activity, the University of Texas and Texas A & M University have consistently led their Big 12 counterparts by wide margins. With support chiefly from the energy sector, OU was fifth in the Big 12, with $13.9 million in expenditures in 2008.

The Norman campus is competitive with its peers in the citation of its scholarship.
The $8.1 million secured by the Cooperative Institute for Mesoscale Meteorological Studies was the largest amount of federal funding disbursed to a Norman campus research organization in FY 2010.
Industry-Financed Research Expenditures for Big 12 Institutions, Federal FY 1999 - 2008
in thousands · excluding Baylor

- More than 60 commercial entities granted research funding to the Norman campus in FY 2010.
Citations Per Article and H-Index with Peer Institutions, CY 2007 - 2009*
main campuses only

*As of Dec. 15, 2010. The count includes other forms of scholarship such as reviews, meeting abstracts, conference papers, editorial materials and creative works. This metric should be used with caution, as the paper counts include works by all main campus researchers.

Citations per article, also known as citation impact, is the total number of citations divided by the total number of papers for a given time period. This normalization of citation statistics minimizes the advantage of institutional size in the metric. The H-Index accounts for both productivity and quality; it counts the highest number of articles that have at least that number of citations. OU has published during the three-year period 35 articles that have at least 35 citations.
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