



Senate Bill No. 287

REPORT TO THE LEGISLATIVE OVERSIGHT COMMISSION
ON EDUCATION ACCOUNTABILITY

WEST VIRGINIA
RESEARCH
TRUST FUND



Senate Bill No. 287

REPORT ON THE RESEARCH TRUST FUND

2013 REPORT ON THE RESEARCH TRUST FUND (RTF)

This report on agency level activities to implement and achieve the goals of WV Code §18B-18A-1 et seq., the Research Trust Fund (RTF) is hereby provided to the Legislative Oversight Commission of Education Accountability (LOCEA). While annual and periodic reports have been provided throughout the first four years of implementation, this report provides a comprehensive assessment in compliance with the authorizing legislation.

Background

Outlined in Series 48, Research Trust Fund Program, the Commission receives annual reports from institutions and is required to submit a combined annual report on the Research Trust Fund to the Governor and the Legislative Oversight Commission on Education Accountability (LOCEA) by January 1 of each year.

In compliance with this statutory requirement, the Commission is provided a draft annual report for 2012 activities within the Research Trust Fund for review, comment, and approval. The report also includes the most up-to-date figures on the \$50 million account, funds drawn down by Marshall University and West Virginia University, gifts received, endowments established, and reports provided to the Commission by the two universities. In addition, the report includes information on the fund's interest account, which supports competitive research opportunities for the state's other eligible institutions as provided by statute. The 2013 report is the fifth in a series of annual reports provided by staff since the program's inception in 2008. Contents of the report are provided on the following pages.

RTF Activities through November 2013

The Commission completed its initial implementation plan during the fall of 2008 which resulted in Title 133 Legislative Rules Series 48, subsequently approved by the legislature during the 2009 regular session. The rule establishes guidelines, procedures and documentation standards for the distribution of funds in the West Virginia Research Trust Fund. The rule designates the Vice Chancellor for Science and Research as the administrator of the program, under the general direction of the Chancellor and the Commission. The final rules are available at https://www.wvhepc.org/resources/rulesandpolicies_files/Series%2048%20%284-16-09%29.pdf.

Commission staff created an electronic "Match Request System" (MRS) in 2008 that allows secure transactions for RTF requests made by the universities. All requests, documentation and invoicing are permanently recorded in files that allow sorting, analysis and up-to-date balance information. The MRS is cross referenced with university records annually to ensure accuracy for this report.

Required "Research Plans" specified by the legislation and approved by institutional Boards of Governors' have been received from both West Virginia University and Marshall University. Both institutional plans are on file at the Commission and are found to be generally compliant with legislative requirements.

The RTF financial account was established in late June 2008 by the State Auditor and made accessible to Commission staff for distribution. This report provides all transaction activities on the RTF to date from its existence.

Interest funds generated by the RTF account have been separately tracked for distribution to State Colleges as defined by the Legislature. On May 15, 2009, the Commission released the first competitive request for proposals for RTF interest funds collected on the account specifically for state colleges and the WV School of Osteopathic Medicine in accordance with provisions of §18B-18A-10 of the code. A second request for proposals was issued on March 9, 2010 a third on June 2, 2011, a fourth on May 30, 2012 and a fifth on September 21, 2012. Proposals for up to \$100,000 each were received from eligible institutions and subsequently reviewed by external peers for program merit. Two awards were issued in 2009, two in 2010 and one in 2011 as a result. No applications were received in response to the May 2012 request for proposals. A request for proposals was issued on September 7, 2012 – one institution was awarded.

TRANSACTION SUMMARY

West Virginia University

- Through 2009, combined funds matched by the RTF and transferred to WVU were \$3,489,235. This represented 9.97% of the total funds available to WVU.
- In 2010, new gifts of \$4,541,851 were submitted and matched by the Trust Fund for a total \$8,031,084 or 22.95% of available funds.
- A total of 37 endowments were created through 2010.
- In 2011, new gifts of \$13,835,180 were submitted and matched by the Trust fund for a total of \$21,866,264 or 62.47% of available funds.
- In 2012, new gifts of \$13,133,763 were submitted and matched by the Trust fund which completed the \$35 million in match funds that were available to WVU.

Marshall University

- Through 2009, combined funds matched by the RTF and transferred to Marshall were \$742,100. This represents 4.95% of the total funds available to MU.
- In 2010, new gifts of \$136,660 were reported but were not submitted for RTF match. Thus, total transfers to Marshall in 2010 were zero.
- A total of (2) endowments were created through 2010.
- In 2011, new gifts of \$8,194,634 were submitted and matched by the Trust Fund for a total of \$8,936,733.93 or 59.6% of available funds
- In 2012, new gifts of \$2,181,245 were submitted and matched for a total of \$11,117,979 or 74.12 percent of available funds.
- In 2013, new gifts of 3,882,021 were submitted and matched by the Trust Fund which completed the \$15 million that were available to MU.

State Colleges and Universities (Fund Interest Earnings)

- Total "RTF Interest" earnings over the five years is \$921,727.
- An award of \$99,892.50 was made to Shepherd University on 9/17/10.
- An award of \$100,000 was made to Fairmont University on 9/17/10.
 - An award of \$100,000 was made to West Liberty University on 11/13/09.
 - An award of \$100,000 was made to Concord University on 11/13/09.
 - An award of \$100,000 was made to West Virginia State University on 9/16/11.
 - A second award of \$100,000 was made to West Virginia State University on 2/06/2013.
 - An award of \$100,000 was made to WVU Institute of Technology on 5/06/2013.
 - Of the commitments totaling \$699,893 to state colleges, \$550,430 has been matched and withdrawn by the institutions.
 - The current uncommitted balance in the "RTF interest" account is \$38,485.

Combined Disbursements

- Total combined distributions from the RTF to date are \$50M and combined distribution from the RTF interest fund are \$550,430.
- Of this amount, \$4,090,341 was distributed during 2013 and includes \$275,878 disbursed from the interest account for state college participants.
- RTF and RTF interest current account balance is \$187,947. This total includes \$149,462 of commitments to state college participants.
- Institutions recently provided updates on their respective fundraising activities that are in agreement with this total.

Earnings and Available Funds from Endowments

- WVU market value of endowments for the fiscal year ending June 30, 2013 was \$32,645,180 for private endowments and \$38,523,005 for state endowments, for a total of \$71,168,185. This is an overall growth in value of \$1,169,185 not taking into account the spending of proceeds from investments in prior years nor the pledges not yet fulfilled.
- Funds available for spending from FY13 returns total \$2,800,443. WVU also has unspent funds from prior years, so the total amount of money available for FY14 is \$3,565,664.

- It is important to note the value and proceeds available from each endowment depends on the length of time since the endowment was created and the investment policies which differ between private and state funds.
- Marshall University completed fundraising for the state match early in 2013. Earnings on MU endowments up to June 30, 2013 were \$430,000 on \$9.7 M in private gifts and pledges received and \$715,000 on \$15M of state match. Overall earnings to date are \$1,145,000 or an increase in value of 4.64%

Pledge Fulfillment

- Marshall University matched the RTF with gifts and 15 pledges in various states of completion. Total amount of pledges was \$10,205,400 and as of April 2013, \$4,343,783.33 had been received. Most of the pledges were up to date on payment; 5 were in arrears.
- West Virginia University reported that \$18,931,076 was pledged to 44 directed Research Endowments. Pledges to 22 of these endowments have been completed for a total of \$5,031,597. Donor pledges to the other 22 endowments totaled \$13,899,479 of which \$7,732,356 has been received. Outstanding pledges of \$6,167,123 are on schedule for fulfillment no later than 3/8/2015.

RTF for State Colleges and Universities Activities and Outcomes

In fall 2010, **Shepherd University** received a \$100,000 Research Trust Fund grant from the West Virginia Higher Education Policy Commission (EPSCoR program) for a three year project entitled, *Undergraduate Research and Experiments in Robotics-Based Accomplishments for STEM (URERAS)*. The overall goal of the project is to use the creativity and fun of the science of robotics to encourage more students to pursue and graduate with a STEM career. The URERAS project is designed to positively impact the number of STEM graduates by increasing recruitment and retention efforts at Shepherd University. The four main activities of the project are: (1) undergraduate research; (2) team-based, hands-on experiments; (3) curriculum development; and (4) establishing a robotics competition at Shepherd University (SU) to increase the awareness of STEM careers throughout the region. Shepherd has matched \$92,500 to date.

Fairmont State University's RTF grant supports the *New Media Assessment Project*, an effort to capture large amounts of national security-related content from new media applications such as Twitter, social networking sites, and discussion boards; parse and database that content into a networked storage system; and apply a variety of search, visualization, and automated warning tools to the content in order to generate new knowledge about national security and law enforcement threats. This program is part of the Open Source Intelligence Exchange (OSIX) which is the laboratory and applied research component of Fairmont State University's National Security and Intelligence (NSI) Program. OSIX Student Analysts gain valuable hands-on experience as they work on real intelligence products for real consumers. Participation in OSIX also serves as a career development opportunity for the students, as they meet routinely with potential employers in national security and law enforcement in the course of their duties with OSIX. Eligible students can receive course credit for their work at OSIX. RTF resources were used to fund IT improvements, provide stipends and travel funds to Student Programmers/System Administrators and Student Intelligence Analysts. FSU has raised the entire \$100,000 for the RTF match.

At **West Liberty State University**, funds raised specifically for this program as well as matching monies from the RTF will be utilized in one of two key components: Stipend Support for Students and High-end Instrumentation. Both aspects are required to complete and extend WLU's vision of continual support and growth of biology and biological research, its STEM "area of distinction." Finding funding for drawing down funds from the RTF continues as an ongoing effort. A total of \$57,930 has been raised and matched with an additional \$2350 of unmatched donations.

Benefits will extend well beyond the 5 year award period at **Concord University** as undergraduate research activities become entrenched within a group of STEM faculty, and laboratory infrastructure developed with RTF funds continue to be utilized for teaching and research. Fundraising by the Office of Institutional Advancement has targeted a new set of donors beyond the usual athletic and scholarship donors. This has opened the door for academic program fundraising beyond the award. The RTF award provides direct funding to students as stipends and provides valuable one-on-one research experience with a PhD scientist, which has effectively become a necessity for admission to top graduate programs in STEM areas. The award also distributes small seed grants to faculty working with CU undergraduates. It has stimulated submission of several external grants to date to private foundations, NIH and HEPC. Faculty-student

grants encourage collaboration on campus and with scientists at other university and federal laboratories. Recent collaborations and use of external laboratory facilities include work with Marshall University, Virginia Tech, Washington State University, and Montana State University. Such contacts are necessary in today's highly collaborative and multidisciplinary STEM research environment, and provide access to facilities and technology not available at CU or even within WV.

In the 2011 – 2012 academic year, **West Virginia State University (WVSU)** was awarded a Research Trust Fund Grant for \$100,000 to purchase a 400 MHz Nuclear Magnetic Resonance Spectrometer (NMR). This grant was matched by a generous donation from the Dow Corporation in compliance with the guidelines for matching funds. Working in connection with the National Institute for Health's Idea Network for Biomedical Research Excellence (INBRE) [which funded an additional \$30,000] and several in-house funding streams, a new NMR was purchased. This instrument brings a host of research opportunities to the Kanawha Valley that has not been seen since the Dow Chemical Company left the West Virginia Regional Technology Park. In addition to the purchase of the new instrument, WVSU has renovated the NMR lab where the instrument is installed.

In 2013, **West Virginia State University** received a second RTF grant to support the Full STEAM Ahead initiative. This initiative is building institutional expertise in the area of bioenergy by integrating research, outreach, and teaching activities. Bioenergy-related research is a core research program within WVSU's research strategic intents, and will be strengthened through the recruitment of a research scholar and by incorporating this expertise within the University's research portfolio. The recruited research scholar will interact with graduate and undergraduate students via teaching bioenergy related curriculum and mentoring students' research. A search is currently underway for the the bioenergy research faculty position. WVSU has raised the entire \$100,000 for the RTF match.

Also in 2013, **WVU Institute of Technology** was awarded an RTF grant of \$100,000. The objective of this project is to create a center of excellence for cyber-physical systems at West Virginia University Institute of Technology (WVU Tech). Cyber-physical systems (CPS) are engineered systems that are built from and depend upon the synergy of computational and physical components. CPS will transform the way people interact with engineered systems, just as the Internet transformed the way people interact with information. Building effective CPS of the future requires multi-disciplinary skills. A series of research enhancement activities will be conducted, including faculty summer salary supplements, undergraduate assistantships, professional development, organization of WV CPS workshop, publication, and travel for coordination. To date, WVU Tech has not drawn down any match from the RTE.

Appendix A: Annual RTF Reports from WVU and MU

WEST VIRGINIA RESEARCH TRUST FUND

from

West Virginia University

August 15, 2013

INTRODUCTION

This fifth annual report provides a brief history of the Research Trust Fund, responds directly to the reporting requirements outlined in Series 48 (§ 133-48-14), describes the impact that the Trust Fund is making on the research environment at West Virginia University, and lays out the proposed spending plan for the earned interest from each endowment for FY 2014.

History of the Research Trust Fund (2008-2009)

In March 2008, the West Virginia Legislature enacted Senate Bill 287, commonly referred to as the Research Trust Fund, as an effort to build a critical mass in selected areas of research and thus lay the groundwork for future economic development. The initial Bill provided a five year window for the deposit of qualified donations into research endowments. Senate Bill 239 (Passed March 12, 2011) amended §18B-18A-9 of the Code of West Virginia to provide a seven year window. Senate Bill 287 committed \$35 million to West Virginia University as a basis for a 1:1 match with private dollars to create endowments that would provide a sustainable source of funds for research and development. West Virginia University's approved Strategic Research Plan identified four areas for investment:

- Energy and environmental sciences;
- Nanotechnology and material science;
- Biological, biotechnological, and biomedical sciences; and
- Biometrics, security, sensing and related identification technologies.

A brief description of each research area is available at

http://research.wvu.edu/home/research_trust_of_west_virginia_university

These areas were selected because they complemented the expertise of WVU's faculty, were critical issues of importance to the public, and were at the core of WVU's land-grant mission.

An Addendum to WVU's Strategic Research Plan for the Research Trust Fund was approved by the WVU Board of Governors in December 2010 and incorporated therein. Three modifications were made:

1. Adding forensic sciences as an area of emphasis under the biometrics, security, sensing, and related identification technologies, providing the opportunity for private investment into this area of research.
2. Adding a Library endowment to support the acquisition of materials in the four research areas, clarifying the importance that library resources provide to a vibrant research agenda.
3. Removing the language "no research area may receive more than \$17.5 million in private donations within the first two years," allowing WVU to maximize private investment regardless of focus area.

West Virginia University continues to balance its tripartite responsibilities for teaching, research, and service in fulfillment of its land-grant mission. The institution is in the third year of its comprehensive strategic plan, WVU's 2020 Strategic Plan for the Future (<http://strategicplan.wvu.edu>). "To excel in research, creative activity and innovation" is one overarching objective of the strategic plan. The Research Strategic Plan for the Research Trust Fund is subsumed within this objective of WVU's 2020 Strategic Plan.

Achieving the Goal: \$70 million in Private and State Endowments

During the first four year period since the inception of the Research Trust Fund, West Virginia University created 86 private endowments. These 86 endowments totaled \$35 million, the total amount allocated to the University through the Research Trust Fund initiative. Each endowment was qualified by the West Virginia University Board of Governors and thus eligible for state matching funds. Thus the University's goal was achieved. Through the combined support of private donors and the state legislature, WVU has established \$70 million in endowments to support research. These endowments include five generic types of gifts: 12 chairs and professorships, 14 undergraduate scholarships, 15 graduate fellowships, 43 broad-based research support funds, and 2 library endowments.

Compliance with Legislative Rule for Research Trust Fund

Three specific reporting requirements are identified in Series 48 (§ 133-48-14), the Research Trust Fund Program.

1. 14.1. By August 15, 2009, and annually thereafter, each participating institution shall provide an annual report to the Commission that includes a full accounting of the trust funds, endowment proceeds, and adherence to the objectives established by the research plan.
2. 14.2. Each participating institution shall detail in its annual report to the Commission the total amount of qualified donations received, the investment earnings realized and any anticipated expenditures of the research endowment proceeds in its annual operating budget.

The data in APPENDIX A summarize much of the information requested by the Legislative Rule.

Through June 30, 2013 the following results have been achieved:

- **FY13 Market Value for all the Private RTF Endowments**
The market value of Directed Research Endowments established with private gifts invested in the Research Trust Fund Program of the WVU Foundation Endowment for fiscal year ending June 30, 2013 is \$32,645,180, up from last year's value of \$25,687,574.
- **FY14 Spend Available for the Private RTF Endowments**
The available proceeds from Directed Research Endowments established with private gifts invested in the Research Trust Fund Program of the WVU Foundation Endowment for FY14 are \$1,547,270, up from last year's value of \$904,037.
- **FY13 Market Value for all the State RTF Endowments**
The market value of Directed Research Endowments established with trust distributions (state funds) to the Research Trust Fund Program of the WVU Foundation Endowment for fiscal year ending June 30, 2013 is \$38,523,005, up from last year's value of \$34,639,059.
- **FY14 Spend Available for the State RTF Endowments**
The available proceeds from Directed Research Endowments established with trust distributions to the Research Trust Fund Program of the WVU Foundation Endowment for FY14 are \$1,253,163, up from last year's value of \$69,376.
- **FY13 Total Number and Amount of Gifts Received that Qualified for State Funds**
The WVU Foundation fulfilled the \$35 million Legislative appropriation in fiscal year 2012.
- **FY13 Total Number and Amount of Gifts Received from the State for Matching Funds**
The WVU Foundation fulfilled the \$35 million Legislative appropriation in fiscal year 2012.
- **Total Number and Amount of Gifts Received since Inception that Qualified for a State Match**
During the period from March 08, 2008 to June 30, 2012, the WVU Foundation received 1210 qualified private gifts (donations and pledges) totaling \$35,000,000; matching funds equal to this amount were requested from the Research Trust Fund.

- Total Number and Amount of Gifts Received since Inception from the State for Matching Funds
During the period from March 08, 2008 to June 30, 2012, the WVU Foundation received 19 distributions from the Research Trust Fund totaling \$35,000,000 to match 1210 qualified gifts (donations and pledges) to Directed Research Endowments.

3. 14.4. Each participating institution's research corporation and/or foundation shall provide the Commission with an audited financial statement annually. These statements shall be treated as confidential.

A copy of the audited financial statements for years ending June 30, 2012 and 2011 for the WVU Foundation has been forwarded to the Policy Commission through Director Jan Taylor under separate cover. Because of timing of submission of this report relative to the receipt of the audited financial statement, the audited financial statement of the WVU Foundation, Inc. will always be a year in arrears.

Impact of the Research Trust Fund Initiative

Six gifts are described to illustrate the impact of the Research Trust Fund initiative.

Chairs and Professorships

The following example illustrates the synergistic impact that the Research Trust Fund can have on the University's broader research endeavors.

The Health Sciences Center interdisciplinary research programs are focused upon health disparities relevant to West Virginia and Appalachia. Biomedical research focuses on discovery and understanding of new treatment strategies that translate into improvements in health and well-being. This effort was provided a substantial boost when WVU was awarded a \$19.6M NIH IDeA (Institutional Development Award) Clinical and Translational Research (CTR) grant, the largest competitive grant ever awarded to West Virginia University. Through the funding of this grant and associated matching funds (\$33.5M), the West Virginia Clinical and Translational Science Institute (WVCTSI) and WVU have the opportunity to greatly expand the capacity to conduct cutting-edge clinical and translational research focused on the health needs of West Virginians.

One example of the work that WVCTSI plans to expand includes that conducted for many years by Dr. William Neal, the James H. Walker Chair of Pediatric Cardiology, a position that is dedicated to the combat of chronic coronary disease related to pediatrics. A WVU physician, Dr. Neal was recognized as the first recipient of the Walker Chair; he is the founder of the CARDIAC (Coronary Artery Risk Detection in Appalachian Communities) Project, designed to raise awareness of risk factors affecting West Virginia's youth and their families culminating in the Healthy Lifestyle Act of 2005. Because of the Walker gift and the match from the RTF, WVU was able to recognize, reward, and retain one of its outstanding faculty members and give even greater prominence to the importance and value of the CARDIAC Project.

The importance of the research being conducted by Dr. Neal and colleagues is now becoming apparent. As recently reported in the Dominion Post (July 15, 2013), childhood obesity and negative cardiovascular indicators of West Virginia children appear to be declining. Dr. Neal indicates the state is making important strides in the fight against obesity, and we may have finally turned a corner in addressing this critical child health issue. For example, in the most recent report, the percentage of second graders who were at a normal weight increased significantly, and there was a significant corresponding decrease in the percentage of second grade children who were obese. Improvements were also observed in our fifth graders, where levels of hypertension and abnormal LDL cholesterol also declined. Significant reductions in non-HDL cholesterol and a marker of pre-diabetes were also improved. This is evidence that the clinical and translational research conducted at WVU by an RTF Named Chair has important health implications for West Virginians.

Undergraduate Scholarships

The Benjamin James Galford Research Scholarship was established in 2008 to support the work of the Department of Physics and memorialize the life of a boy who would never get to attend college. Recipients of the scholarship must engage in undergraduate research with a Department of Physics faculty member in energy and environmental science; nanotechnology and materials science; or biological and biomedical science. Each year, one student benefits from this award.

Last year's winner, Gary Marchiny, was a first-generation student from Lumberport, West Virginia. He has worked as an intern at NASA's Independent Verification and Validation Research Facility, traveled to Sydney, Australia to attend a conference about gravitational wave detection, and studied abroad at England's University of Manchester. While in Manchester, he created an algorithm used to search for high energy radio bursts originating from outside the Milky Way Galaxy. As a result of his undergraduate success, Gary is currently in graduate school following the completion of a second degree in mathematics. The Galford Research Scholarship will support its fifth student this year, and the Research Trust Fund is a direct partner, via matching funds, for the two most recent recipients and all those henceforth.

Graduate Fellowships

Graduate education at WVU took a major step forward with a \$5 million gift for the **WVU Ruby Scholars Graduate Research Fellowships** program from the Hazel Ruby McQuain Charitable Trust to support exceptionally talented graduate students. These students will be tomorrow's leaders in STEM disciplines (Science, Technology, Engineering, and Mathematics); their ideas and innovations will transform our state, nation and world. This gift is the largest ever benefitting graduate students at the university. When matched with funds from the Research Trust Fund, the \$10 million endowment will allow WVU to recruit and retain exceptional students from throughout the world. This gift and the matching RTF funds will create life-changing opportunities heretofore unavailable for WVU's graduate programs. This past year WVU recruited three exceptional graduate students, bringing the total now in the program to five. Each receives a \$30,000 annual stipend and a commitment for three years of support. At capacity, the Ruby Scholars program will support nine students at a minimum and twelve at a maximum. The outcome of the investment by the McQuain Trust, to create a nationally recognized program in STEM disciplines, will place WVU at the forefront of preparing the next generation of STEM leaders.

Broad-based Research Support

The **George B. Bennett Research Opportunity Endowment** broadly supports the advancement and enhancement of research in the Statler College. The Dean has primarily used the annual income to purchase new equipment (or its maintenance) that supports larger groups of researchers and to provide part of the start-up costs for new faculty. In the last fiscal year the endowment was used for three purposes: (1) as start-up support for a new faculty member in energy; (2) to purchase a materials testing machine to replace one that was outdated and not useful for newer materials being made by researchers; and (3) to purchase an ion mill that significantly improves the quality of samples prepared for electron microscopy. The new equipment will eliminate a major bottleneck for many faculty doing energy and biomaterials research. These purchases will continue to complement the shared research capabilities available to faculty researchers and will help them to sustain projects and be more competitive for new external funding.

Library Endowments

Through the estate of a former physics professor, two **Jefimenko Library Endowments** were created. In FY 2013, the WVU Libraries were able to increase the number of electronic resources in the sciences with the purchase of journals essential to research in physics. These include: the ongoing subscription cost for Nature Photonics, an academic, peer-reviewed journal which covers all aspects of research into the fundamental properties of light and how it interacts with matter to the latest designs of optoelectronic devices; and a subscription to Science Express which provides advanced publication of selected Science research papers, perspectives, and other articles. In addition to these two journal subscriptions, the WVU Libraries acquired all available electronic content for the archive for five sections of the Journal of Geophysical Research: Atmospheres, Biogeosciences, Earth Surface, Oceans, and Planets. These journals support a wide variety of scientific research endeavors at the University.

Naming the College of Engineering and Mineral Resources

The \$45 million gift to name the **Benjamin M. Statler College of Engineering and Mineral Resources** in 2012 included an \$11 million contribution matched by the WV Research Trust Fund. The state matching funds were very instrumental to securing this gift to name the Statler College. Twenty million (\$20 million) of the total research endowment of \$22 million will support growth in cutting edge research programs, including three new endowed Statler Chairs (base salary provided by the University) and graduate research fellowships; and \$2 million for 10-15 undergraduate scholarships that will also provide support for the student's research projects under the direction of top Statler College faculty members. This transformational gift will enhance recruitment and support for talented faculty and students. The first individual recruited for an endowed Statler Chair will lead the shale gas utilization initiative that WVU has designated as a pinnacle

area across campus. This search will commence in summer 2013 with an anticipated filling of the position in early to mid-2014. As the endowment fund matures providing additional annual funds, recruitment will begin for two more Statler Chairs to support energy and biomedical research and annual investments will be made to the already significantly enhanced research capabilities in the College.

Nine million dollars of the naming gift (outside of the endowment) are being provided directly to support the new Advanced Engineering Research Building (AERB) now under construction, opening in late 2014. The Staler College envisions this building as a major research and innovation hub to promote collaborations across campus. The AERB includes a clean room to support nanofabrication, wet chemical and biological labs, specialized equipment labs, and graduate student and faculty work spaces. The generous gift provided by Ben and Jo Statler forever changes the ability of the Statler College to fulfill its teaching, research and outreach missions, to become a major contributor among its peer institutions in engineering and mineral resources, and to become a global leader in energy research. This gift enhances the national recognition and reputation of West Virginia University.

The impact of the Research Trust Fund is evident in this sampling of the 86 different endowments that were created. In recognition of the successful completion of the challenge issued to West Virginia University, President Clements has stated, "I want to thank our donors for their incredible support over the past few years. Through their generosity, in tough economic times, WVU has built a strong foundation of support for projects that directly help the State, as well as provide opportunities for undergraduate and graduate students to participate in world-class research with the highest caliber faculty and research staff at WVU. I also want to thank all of the State and University leaders who made the program possible. Our University, and West Virginia, is a better, stronger place because of their efforts." President Clements' statement captures the power of the Research Trust Fund initiative.

BUSINESS PLAN

In addition to the legislatively mandated reporting requirements, the Higher Education Policy Commission requires a business plan for each research area. APPENDIX A reflects the anticipated use of the money available to spend in FY14.

In FY13, \$813,621 of Research Trust Fund dollars, both that from private accounts and matching state accounts, was spent on research – for scholarships, fellowships, prominent scholars, and in support of ongoing research initiatives. For FY14, \$3,565,664 will be available. This number includes the proceeds from each private endowment and its equivalent state matching endowment plus any unspent money from the preceding year. Of this amount, \$1,547,270 (43.4%) will come from the private endowment; \$1,253,163 (35.1%) will come from the matching state endowments established from the Research Trust Fund; and \$765,231 (21.5%) will come from unspent funds from the previous year. It is important to note that the proceeds from an individual endowment, whether established by private or state funds, depend on the amount in the endowment, the length of time since the endowment was created, and the investment policies which differ between the private and state funds. When the amount of available funds was insufficient to meet the objectives of the endowment, the money was allowed to accrue, accounting in part for the carryover of unspent funds from the previous year. The funds for each endowment are being distributed according to the intent of the respective endowment.

WVU looks forward to the significant and sustained impact that programs supported by the Research Trust Fund will have on addressing some of the nation's most important issues in energy, health care and security.

Eminent Scholars Recruitment and Enhancement Program
(2007-2008)

Annual Report

from

West Virginia University

August 15, 2013

Introduction

The predecessor to the Research Trust Fund was the Eminent Scholars Recruitment and Enhancement (ESRA) Program. Under this program, West Virginia University successfully matched the available \$5 million commitment from the State for a total investment of \$10 million to enhance its research and outreach efforts in the areas of cancer and stroke. These initiatives directly enhance WVU's efforts to respond to patient needs in two critical areas of health care. The continuing development of each initiative is reviewed below.

CANCER PROJECT

The focus of the Cancer Project is to recruit and retain eminent scholars in the areas of breast cancer, lung cancer and gynecological cancer. This effort is being funded by:

- The Jo and Ben Statler Chair and Eminent Scholar in Breast Cancer Research, Fund 3V805 - \$1.5 million;
- The Bonnie Wells Wilson Distinguished Professor and Eminent Scholar in Breast Cancer Research, Fund 3V804 - \$1 million; and
- ESRE Program Matching Funds - \$2.5 million.

Fund Purpose Statements:

\$1.5 million from Ben and Jo Statler provides support for a Chair in Breast Cancer Research to benefit the Mary Babb Randolph Cancer Center (MBRCC), West Virginia University. The Fund's spend is designated to be used annually by the MBRCC to support the Chair, including salary and/or fringe benefits, teaching/research assistants, travel expenses, conference attendance, secretarial and other support staff, and to otherwise support the scholarly activities of a regionally, nationally or internationally recognized outstanding scholar in the field of breast cancer research.

\$1 million from Ben and Jo Statler provides support for a Distinguished Professorship to benefit the Mary Babb Randolph Cancer Center, West Virginia University. The Fund's spend shall be used annually by the MBRCC to support the Distinguished Professorship, including salary and/or fringe benefits, teaching/research assistants, travel expenses, conference attendance, secretarial and other support staff, and to otherwise support the scholarly activities of a regionally, nationally or internationally recognized outstanding scholar in the field of cancer research.

\$2.5 million from ESRE provides support for the recruitment and start-up of three physician-scientists in the area of lung, breast and gynecological cancers to conduct Phase I and II clinical trials.

Funding Impact:

The impact of this support for the Cancer Center has been significant in that the funds are directed to grow the Center's research portfolio. It is precisely the type of investment that is needed to prepare a Cancer Center Support Grant (CCSG) application to establish the first NCI-designated Cancer Center in West Virginia. Three research and clinical faculty have been recruited to the MBRCC under this plan as outlined in prior progress reports: Michael Ruppert (MD, PhD) from the University of Alabama-Birmingham, Breast Cancer Research Program; Jame Abraham (MD) from WVU, Breast Cancer Research Program; and William Tse (MD) from the University of Colorado, Osborn Hematopoietic Malignancies and Transplantation Program. Whereas we actively recruited to fill the Associate Center Director (ACD) for Translational Research this past year, we were unsuccessful in filling that position. Given the current funding climate, some laboratory bridge support was provided to the Eminent Scholar scientists over the past year.

There are, however, exciting opportunities that have recently presented themselves to the Cancer Center as discussed herein in which the Center will partner with the West Virginia Institutional Development Award – Clinical Translational Research (WV IDeA-CTR) grant (PI: G. Dillon; U54 GM104942). The IDeA-CTR award will build capacity for a new kind of community-engaged clinical and translational research. This clinical and translational research will enhance the external competitiveness of WVCTSI researchers, shorten time from bench to bedside, and attract productive clinician-scientists to institutions affiliated with the West Virginia Clinical and Translational Science Institute. Through the course of resulting recruitment and studies, the IDeA-CTR funding awarded to the state will produce a direct and positive effect on the state's population. It is anticipated that much of the knowledge gained through the IDeA-CTR funding will be translatable to other regions of the country.

The Specific Aims of the CTR grant include the following:

- Grow the West Virginia Clinical and Translational Science Institute (WVCTSI) as an academic home and a catalyst for clinical and translational research that targets cancer, cardiovascular-stroke, and obesity-related diseases;
- Establish cross-cutting research partnerships among the WVCTSI partnered institutions and collaborating CTSAs at the University of Kentucky, The Ohio State University, and Indiana University to increase our research capacity; and
- Innovative recruitment, training, and mentoring strategies to develop clinical and translational scientists at each of the WVCTSI institutions.

The significance of the establishment, funding, and operation of the WVCTSI cannot be overstated. This infrastructure and capacity building award will position West Virginia University, Charleston Area Medical Center, the West Virginia School of Osteopathic Medicine and the State of West Virginia to greatly expand clinical and translational research capacity, with a specific focus on issues prevalent in the Appalachian region

Dr. Remick leads the *Clinical and Translational Faculty Recruitment and Resources (CTFRR)* effort in this initiative and there are opportunities to link Eminent Scholar recruitment to this expansive recruitment effort. The Cancer Center is very much engaged and supportive of this new opportunity.

Activities this past year under this funding mechanism are summarized below.

- Recruitment activities – The recruitment of Dr. Xue-Zhong Yu, MD, MS, who is a senior physician scientist from the H. Lee Moffitt Cancer Center and Research Institute in Tampa, Florida as Associate Center Director (ACD) for Translational Research this past year was unsuccessful. He had 4 NIH R01 grants and expertise in graft vs. host disease that would have been enormously helpful to grow our translational research platforms in the Osborn Hematopoietic Malignancy and Transplantation Program. Additionally the recruitment of a mid-career clinician scientist, Dr. David Gerber from the University of Texas – Southwestern, was prematurely closed due to a family health matter. He applied for Co-Leader of the Sara Crile Allen and James Frederick Allen Lung Cancer Program (and Eminent Scholar in Lung Cancer Research).
- Laboratory support for Eminent Scholar scientists – Nominal bridge funding support has been provided this past year to the laboratories of Drs. Michael Ruppert (Eminent Scholar in Breast Cancer Research) and William Tse (Eminent Scholar in Hematological Malignancies Research). Dr. Erik Bey (Eminent Scholar in Lung Cancer Research) continues to be supported by these funds as part of his recruitment in Fall 2011.
- Recruitment direction and ways forward – At the time of this report, the MBRCC continues in its recruitment efforts for the two leadership scientific positions above – ACD Translational Research and Co-Leader Allen Lung Cancer Program. The clinical research programs are undergoing transition for the first time in more than 5 years with a senior breast clinician scientist and early stage clinician scientist in hematological malignancies leaving the institution this fall. Collectively, resources of the Cancer Center (including two endowed professorships, the Wilson Distinguished Professor in Breast Cancer Research and the Chamber Chair in Hematological Malignancies Research), the Eminent Scholar funds, and WV CTR funds, should facilitate recruitment of these leadership positions, and may also extend to highly translational PhD scientists. Indeed, the Cancer Center is presently in the early recruitment stages with three PhD scientists with expertise in blood-brain-barrier physiology and CNS tumor microenvironment. Matching Funds from the WV Research Trust Fund and Eminent Scholar funds can be directed toward these recruitment efforts as well.

Questions and/or requests for additional information should be directed to Dr. Scot Remick (scot.remick@hsc.wvu.edu), Director, Mary Babb Randolph Cancer Center.

STROKE PROJECT

The focus of the Stroke Project is to recruit eminent scholars to enhance new interventions to prevent and treat stroke and enhance recovery of brain function. This effort is being funded by:

- West Virginia University Hospital (WVUH) Private Gift, Fund 2R338 - \$2.5 million; and
- ESRE Program Matching Funds - \$2.5 million.

Fund Purpose Statements:

\$1.5 million from WVUH provides support for the recruitment of a Stroke Medical Director. This person will be a clinician-scientist with board certification in stroke neurology who will bring extensive experience with stroke clinical trials and the ability to design new trials based upon research at WVU and other research institutions.

\$1.0 million from WVUH provides support for the recruitment of a clinician-scientist with board certification in stroke neurology and neuro-intensive care. S/he will bring experience in the design and conduct of clinical trials and the necessary credentials to classify the WVU clinical stroke unit as a comprehensive stroke center.

\$1.5 million from the ESRE Program provides support for the recruitment of a Stroke Translational and Basic Science Research Director. This person will be a clinician-scientist with credentials as both a stroke neurologist and laboratory-based scientist. S/he will guide a research team investigating biological mechanisms that underlie stroke events, new diagnostics of stroke, the neuro-vascular response to stroke and neural repair.

\$1.0 million from ESRE provides support for the recruitment of an expert in regenerative medicine who uses stem cells or other means to regenerate neurons and neural circuits. This person will develop therapeutic approaches that will be tested in clinical trials.

Funding Impact:

These funds are providing resources to support development of the Stroke Research Program. Recruits into this program in prior years include a stroke neurologist and a stroke clinical research nurse. This past year has seen considerable activity and advancement of the Stroke Project. Whereas the recruitment of a stroke medical director was unsuccessful, the recruitment of a director for basic and translational stroke research was successful. This individual has brought exceptional vision and leadership to the program, and the positive impact on the overall Stroke Program has been substantial. The potential to effectively leverage the state's investment in this critical program is being realized.

Activities this past year under this funding mechanism are summarized below.

- **Recruitment**– An extensive assessment/recruitment of a candidate to fill the Stroke Medical Director was undertaken. This candidate, an MD/PhD who is currently Associate Professor of Neurology at Johns Hopkins University School of Medicine, is an expert in cerebellar stroke. Unfortunately an agreement could not be reached with this candidate. This position will be advertised again with anticipation of filling this position in FY14.

Following a national search, Dr. James Simpkins was recruited to lead the basic and translational stroke research efforts of the Stroke Project. Dr. Simpkins is an established investigator who is an expert in stroke and neurodegenerative disorders. He has published over 350 papers; his work is widely cited, as evidenced by a Hirsch citation index (H index) of well over 50. He has served as Principal Investigator on more than \$40 million in extramurally funded research, the majority from the National Institutes of Health. He is currently PI on an NIH Program Project Grant (PPG) focused on cognitive decline during age-related neurological events, and is project leader on a second NIH PPG. Dr. Simpkins' research is highly translational; he holds more than two dozen patents and has also had considerable extramural support from industry. At prior institutions, he has served effectively as department chairman and center director, consistently growing research funding of his divisions. Dr. Simpkins joined WVU Health Science Center in November 2012.

- **Establishment of the Center for Basic and Translational Stroke Research** -- The Center for Basic and Translational Stroke Research (CBTSR) at West Virginia University was established following the hiring of Dr. James W. Simpkins. In the initial month of its existence, Dr. Simpkins has focused his efforts on articulating the mission, goals and strategies of the CBTSR, hiring needed personnel, disseminating information about the new Center, recruiting existing faculty into stroke research, establishing connections between basic and clinical stroke research through translational research, establishing core facilities to serve the West Virginia University, and submitting grant applications to support and enhance CBTSR functions.

The Vision of the CBTSR is to reduce the burden of stroke on the citizens of West Virginia and the nation by conducting basic and translational research to achieve a greater understanding of the causes, acute treatments, prevention, and rehabilitation of stroke. This vision will be realized by meeting two objectives:

- o Enhance the human and physical resources at WVU devoted to basic and translational studies of stroke; and
- o Develop programs of research and training focused on the role of mitochondria in stroke susceptibility, prevention, acute injury, and rehabilitation.

This year, the CBTSR has hired four faculty equivalent personnel and two post-doctoral fellows and has recruited five graduate students; all of these individuals are conducting research on stroke. As a result of the activities of the CBTSR, 9 additional faculty are now conducting stroke research at the WVU. The CBTSR has initiated a number of group activities that enhance basic and translational stroke research on campus; established 3 core facilities that serve the greater WVU research community; and submitted 3 NIH grant applications based on our effort in stroke research. Dr. Simpkins also brought to WVU several NIH grants focused on stroke and related central nervous system disorders.

The CBTSR also recently submitted to NIH a grant to support a national conference on stroke entitled “West Virginia Stroke-Immune System Interaction Conference.” This meeting will be held at the Erickson Alumni Center on the West Virginia University campus in Morgantown, WV, and will feature many of the major participants in the national discussion of the interaction of the immune system and stroke. The overall objective of this conference is to provide an authoritative update on new science and reanalysis of the existing science on this important subject.

In the coming year, the aforementioned activities will expand, with specific expectations of hiring new stroke research faculty, increasing NIH and foundation funding, increasing the number of gifts to support students, fellows and junior faculty in conducting stroke research, and improving the overall intellectual environment for basic and translational stroke research.

- Submission of an NIH CoBRE (Center of Biomedical Research Excellence) grant on stroke -- Upon his arrival at WVU, Dr. Simpkins led a successful effort to develop an NIH CoBRE grant focused on stroke, submitted for the February 2013 deadline (PAR-11-286, Centers of Biomedical Excellence P20 mechanism). This grant, entitled “West Virginia Stroke CoBRE,” will support the stroke research efforts of five junior investigators at West Virginia University. It is a multi-school effort, as individual projects are being led by investigators from the schools of medicine, nursing and public health. We recently learned that this \$11M grant received an excellent score (30), and it appears to be “on the bubble” for funding. If the grant is not funded on this first submission, we will submit the revised version in February 2014. Whether funded in 2013 or 2014, this award will provide excellent research support for a new generation of stroke researchers, and help to fuel research advances that will translate to improved reporting on stroke incidence and outcomes in West Virginians. The CoBRE grant and subsequent funding it stimulates will result in an exceptional return on the investment the state has made in this initiative.

Questions and/or requests for additional information should be directed to Dr. James Simpkins (jwsimpkins@hsc.wvu.edu), Director, Center for Basic and Translational Stroke Research.

Annual Report

from

Marshall University Research Endowment Plan Annual Report

2012-2013

Submitted to the Division of Science and Research at the
West Virginia Higher Education Policy Commission

Table of Contents

I.	The Marshall University Research Endowment Plan	2
II.	Research Endowment Plan Fundraising Progress	
	A. Fundraising in Prior Years	3
	B. Summary of Fundraising in FY 2013	3
	C. Description of Existing Endowed Research Areas	6
IV.	ESRE Update- Progress at MIIR	10
	Appendix One – Marshall University Research Endowment Plan Addendum12

I. Review of the Marshall University Research Endowment Plan

The West Virginia Research Trust Fund program has spawned fifteen endowments at Marshall University to fund allowed research-related activity. These endowments span research areas from Engineering to Clinical and Translational Research and specify uses from direct research support to student research stipends. During FY 2013, the full \$15MM in gifts and pledges was raised, along with an excess of over \$500,000.

Marshall's original Research Endowment Plan approved by the University's Board of Governors in 2008, directed donations to:

- Endowment of the Marshall Institute for Interdisciplinary Research (MIIR), continuing with the plan laid out in Marshall's application to the Eminent Scholars Recruitment and Enhancement (ESRE) initiative; and
- Advancement of Intelligent Transportation Systems research at the Rahall Transportation Institute (RTI).

Both of these endowments continued to receive significant support in FY2013.

In November 2010, the Marshall University Board of Governors approved a Research Trust Fund Addendum (Appendix One) that broadened the recognition of Biomedicine/ Biotechnology as a focus for donor activity across the University, and further included aspects of Engineering, Environmental Science and the Physical Sciences.

The rationale for this expansion of the plan was based on the success of the Research Trust Fund program in the initial two areas and its potential to further accelerate other strategic research initiatives at Marshall. For example:

Engineering: With the accreditation of Marshall's engineering program, the potential for development of significant research activity has been enhanced by the construction of The Arthur Weisberg Family Engineering Laboratory facility and this trend will continue with the planned construction of the Biotechnology Incubator and Applied Engineering Complex. The availability of the Research Trust Fund will enhance the Engineering College's ability to attract and sustain research activity in key disciplines crucial to practical development of technology and innovation, and this, in turn will leverage the multidisciplinary research environment called for in Marshall University's Strategic Initiatives.

The Fletcher Endowment in Mechanical Engineering and the BrickStreet Endowment in Safety Engineering were two significant gifts in this area.

Clinical and Translational Research: There has been substantial growth in biomedical research in the School of Medicine and at the Marshall Institute for Interdisciplinary Research, and new facilities developed to promote translation of basic science discoveries to improvements in patient care with the construction of the Translational Genomics facility at the School of Medicine. Based on these investments from ESRE, RTF and other sources, Marshall was a successful co-applicant on the University of Kentucky's Clinical and Translational Science Award from the National Institutes of Health program aimed at speeding the time for laboratory discoveries to benefit patients. This award makes Marshall a member of the Appalachian Translational Research Network, which involves not only UK but Ohio State, West Virginia University and Cincinnati Children's Hospital and makes resources available for further development of Marshall's clinical research effort. Marshall researchers are already accessing pilot funding, mentorship and collaborative opportunities from this partnership, and development of Research Trust Fund endowments to support clinical and translational research will allow Marshall to leverage this support.

The Maier Endowment for Dementia Research was the first gift in this area, and the appointment of Dr. Shirley Neitch as the inaugural of the Maier Clinical Research Professor was announced in June 2012. Subsequently, the Zacharias OB/GYN endowment, which has been directed to the support of the activities of Dr. David C. Jude, and the Cline Family Endowment for Translational Sports Medicine were established, indicating the substantial donor interest in this area. Finally, in 2013, three biomedical research endowments were established: The BrickStreet Wellness Research Endowment, the Hanshaw Endowed professorship of Geriatrics and the Rezulin Research Endowment.

II. Research Endowment Plan Fundraising Progress

A. Fundraising in Prior Years (FY 2009, 2010 and 2011)

Through 2012, \$9MM in qualifying donations and pledges were received and matched for eleven endowments.

B. Summary of Fundraising in FY 2012

During FY 2013 nine of the eleven existing endowments received additional donations, indicating the willingness of donors to support the continued development of these programs (Table One). Both the MIIR endowment and the Chemistry Summer Undergraduate Research Endowment have broad support from a large number of individual contributors. Both the MIIR endowment and the RTI endowment have benefitted from generous corporate support, with RTI receiving gifts from CSX and Norfolk Southern.

MIIR was the recipient of a \$1,000,000 gift from an anonymous source. Proceeds from this endowment will be used to support the Marshall Institute for Interdisciplinary Research and the institute's collaborations with other research initiatives at the university.

Allied Realty made another \$100,000 gift to the MIIR endowment, bringing the Marshall gifts and pledges to \$15,000,000 and closing out the fundraising with the same donor who initiated it.

Table One - Fund Balances for Existing Research Trust Fund Endowments

Research Endowment	Fund Balance FY 2011	Fund Balance FY 2012	Fund Balance FY 2013	Locus
Marshall Institute for Interdisciplinary Research (MIIR)	\$1,200,000	\$2,064,923.50	\$3,114,000	Research Corporation
Rahall Transportation Institute (RTI)	\$100,000	\$150,000	\$200,000	Research Corporation
Fletcher Engineering	n/a	\$125,000	\$846,000	College of Engineering
Chemistry Summer Undergraduate Research Endowment	\$72,431.00	\$93,661.00	\$98,841	College of Science
BrickStreet Safety Research	n/a	\$100,000	\$200,000	College of Engineering

Earnings up to 6/30/13 are \$430,000 on \$9.7MM of private gifts and pledges received, and \$715,000 on the \$15 MM of state match received.

Three new endowments for support of research were created during FY2013:

- The BrickStreet Wellness Research Endowment
- The Huntington Foundation, Inc./ Frank E. Hanshaw, Sr. Endowed Chair of Geriatrics
- The Rezulin Endocrinology Research Fund

Their fund balances and loci are shown in Table Two.

Table Two - Balances and Loci of New Research Trust Fund Endowments Created During FY 2013

Research Endowment	Gifts/Pledges as of 6/30/13	Locus
BrickStreet Wellness Research Endowment	\$2,500,000	SOM
The Huntington Foundation, Inc./ Frank E. Hanshaw, Sr. Endowed Chair of Geriatrics	\$500,000	SOM
The Rezulin Endocrinology Research Fund	\$782,021	SOM

These endowments are dedicated as follows:

BrickStreet Wellness Research Endowment was created to conduct research on workplace health issues that impact



workers' safety, productivity and wellness. There is an enormous range of issues relevant to workplace health which includes specific diseases related to occupations (e.g., carpal tunnel disease in clerical workers, berylliosis in beryllium miners and engineers, etc.) as well as diseases common to the general population (e.g., hypertension, obesity, diabetes).

The charter is to use the endowment to conduct research that will span the spectrum from basic molecular research to practical, work-place based research. A number of common clinical problems (e.g., obesity, metabolic syndrome) still lack easily implemented treatments, and greater understand-

ing of these problems at a basic level is necessary to formulate novel approaches. One example for this is the area of obesity and obesity related diseases such as metabolic syndrome, osteoarthritis and cardiovascular disease. Recent work from Marshall University investigators suggests that alteration in the expression of antioxidant enzymes at a molecular level will have markedly beneficial effects on total body fat burden as well as downstream effects on other organ systems. Furthermore, it appears that there are a number of genetic, pharmacological and nutritional manipulations which can affect marked increases in the expression of these antioxidant enzymes. We firmly believe that tomorrow's clinical therapies are being developed now, and we propose that a portion of the BrickStreet research endowment be used to fund high impact, novel treatments potentially relevant to workplace health at a preclinical level.

The Huntington Foundation, Inc./ Frank E. Hanshaw, Sr. Endowed Chair of Geriatrics

The Huntington Foundation created an endowment fund to support research in the field of geriatrics encompassing a spectrum of issues relevant to aging such as hypertension, obesity, and diabetes. The endowment provides for the appointment of an Endowed Chair of Geriatrics named in honor of Frank E. Hanshaw, Sr.

The Rezulin Endocrinology Research Fund

In a court settlement concluded in 2007, funds were set aside for use in the Marshall University Joan C. Edwards School of Medicine for Endocrinology. In the spirit and intent of the settlement agreement and to dedicate the investment of these settlement funds monies for the benefit of those presently afflicted with diabetes and advance the research related to diabetes and its related metabolic disorders, the Rezulin Endocrinology Research Fund was created.

C. Description of Existing Endowed Research Areas

The endowment plans for MIIR and RTI have been described in the original Research Trust Fund Plan and prior annual reports and MIIR activities are described more fully below. The brief descriptions of the other existing endowments are provided below to show the breadth of support the Research Trust Fund has engendered.

Fletcher Mechanical Engineering Endowment

Following the accreditation of the College of Engineering in the summer of 2010, the Board of Governors has endorsed development of new areas of emphasis in the engineering curriculum. Mechanical Engineering is a high priority, and the Fletcher family's generous gift will support the position of a founding chair of the department of Mechanical Engineering. The \$721,000 second gift has enabled the recruitment to proceed. Dr. Asad Salem will join Marshall as full professor of Mechanical Engineering and will also serve as the new Chair of the Weisberg Division of Engineering. Dr. Salem received his BS degree in Mechanical Engineering from the University of Mississippi in 1983, his MS degree in Mechanical Engineering from Tennessee State University in 1989, and his Ph.D. in Mechanical Engineering from the University of Akron in 1996. He served at the rank of Assistant Professor at Cleveland State University in Cleveland, OH, Associate Professor at Texas A&M, and Director of Engineering and Professor of Mechanical Engineering at the Rochester Institute of Technology in Dubai. Dr. Salem also worked as a consultant, ABET Audit/Reviewer and guided the College of Engineering at the University of Sharjah in Sharjah, UAE.

Pew Endowment for River Research

The proceeds of the requested endowment will be used to support start-up and research operating expenses of the ESRE Aquatic Ecologist, described in Section IV-A in this report. It is anticipated that the endowment proceeds will be used to support the purchase and maintenance of research equipment, the purchase of research supplies, and/or the support of undergraduate and graduate research fellows who are working with the ESRE Aquatic Ecologist.



Maier Endowment for Dementia Research

The endowment will support the work of promising biomedical/clinical scientists in the Marshall University School of Medicine, engaged in translational dementia research. This research support will foster interdisciplinary research dedicated to investigating the cause(s) of dementia, improving the clinical management, treatment and therapeutic outcomes for present and future generations of people who are at-risk or already suffering with dementia with the goal of eventually preventing this debilitating brain condition.

Dr. Shirley M. Neitch, professor of internal medicine and chief of geriatrics at the Joan C. Edwards School of Medicine at Marshall University, has been named the inaugural Maier Clinical Research Professor.

The professorship will support interdisciplinary translational research investigating the causes, management and treatment of dementia, which will significantly impact the lives of persons with the disease.

The first goal is to complete a genetics study of a family whose affected members develop symptoms at a very young age, in their late 20's. The next step will be to pursue treatment options.

BrickStreet Endowment for Safety Engineering Research

The College of Information Technology and Engineering's Safety Engineering Research Program is undertaking an initiative to expand its activity in risk management research. Risk management is a highly interdisciplinary field that involves applying the principles of safety engineering and industrial hygiene and integrating them with economic and financial analysis.

This discipline is extremely important to the transportation and logistics and energy sectors. The BrickStreet endowment will support the development of research expertise in the school of engineering in the area of risk management, by promoting these highly interdisciplinary studies at the interface of management, engineering and applied mathematics.

The Endowment for Summer Undergraduate Research in Chemistry

The endowment has been created by individual donations and departmental royalties set aside for this purpose. The proceeds will be used to support endowed rotating professorships and undergraduate summer research fellowships in Chemistry.

These summer positions are a central component in the Department's long-term strategy to increase research output and obtain sustainable external funding. Each student selected will do an original, collaborative research project with a supervising faculty member.

Fred and Isabella Zacharias Endowment for Obstetrics and Gynecology Research

Physicians of the Department of Obstetrics and Gynecology at the Joan C. Edwards School of Medicine are active in the investigation into improving the pregnancy outcomes of women with obesity, hypertension, and diabetes. Through the Maternal Hypertension Center, there is an ongoing database of pregnancies evaluated and managed through that center for over five years.

Funds from the Fred and Isabella Zacharias Endowment will be used to support the activities of Dr. David C. Jude in biomedical research. His research interests include:

- Identification of characteristics of hypertensive, diabetic, and obese women that increase their likelihood of having poor pregnancy outcomes and investigating the outcomes of the infants born to these mothers.

- Determining what pre-pregnancy and pregnancy related interventions may improve maternal health during pregnancy.
- Determining what interventions before and during pregnancy may impact the short and long term health of these women.

The Cline Endowment for Translational Sports Medicine Research

The endowment will support the Translational Sports Medicine Research at Marshall University where comprehensive interdisciplinary research that translates to advances in human injury prevention, injury recovery and accelerated therapeutic outcomes will be conducted. The endowment proceeds will be used to initiate and develop a nationally-competitive research program that enhances human function and quality of life through discoveries, which protect human health and enhance injury repair, while advancing human performance capacity.

The development of a robust, interdisciplinary research program is envisioned in areas such as:

Musculoskeletal and Ligament Health and Injury - research studies that evaluate predictors of joint and muscle injury, innovative techniques for injury intervention and prevention and the efficacy of conventional and novel treatment practices.

Biomechanics - research studies that identify and ameliorate biomechanical risk factors that predispose individuals to musculoskeletal injury.

Muscle Injury and Genomic - research studies that identify mechanisms of skeletal muscle injury, preventative therapies and underlying genomic factors that predispose humans to injury or limit human performance capabilities.

Comparative Orthobiologics - research studies that examine and discover biologics [e.g., gene therapy, cellular therapy, protein therapy] and other techniques for advancing and accelerating the healing of musculoskeletal injuries while improving the durability of healed sites.

IV. ESRE Update-Progress at MIIR

MIIR continues to thrive, and the search for a new director made substantial progress

Nanobiologist Dr. Jingwei Xie, who joined MIIR's scientific staff in January of 2011, continued to pursue his groundbreaking research in the application of nanofiber scaffolds to tissue repair. His research is focused on translation in development of techniques for tissue repair to alleviate a wide variety of conditions, including myocardial infarction, and in applications such as tendon repair and skin grafts.

Dr. Xie received a pilot award under the UK-Marshall CTSA partnership to investigate the use of nanofiber scaffolds in treating myocardial infarction.

Dr. Xie has been awarded an NIH R15 grant from the National Institutes of Health for \$293,000 to lead a project to develop a technique that may improve surgical repair of rotator cuff injuries. The project will combine the expertise of two research groups at Marshall University. Xie, who is an expert in bone growth and development, and his team at MIIR will be working with Dr. Franklin D. Shuler, associate professor and vice chair of research in the Department of Orthopaedic Surgery at the university's Joan C. Edwards School of Medicine.

Rotator cuff surgery done with current methods has a failure rate that ranges from 20-90 percent, due in large part to the manner in which the tendons are reattached to the bone. For this project, his team will combine principles of engineering and biomedicine to construct a new type of biological device that will better mimic an uninjured tendon-to-bone attachment, and ultimately result in improved healing.

The Chemical Alliance Zone's Chemicals and Materials Commercialization Fund has awarded \$20,000 to Dr. Xie to help bring to market a technology he has developed for repairing skin injuries. He and his colleagues at MIIR, including postdoctoral fellows Dr. Bing Ma and Dr. Jiang Jiang, are using nanotechnology to create scaffolds made of tiny fibers, invisible to the human eye, to be used as skin grafts. These devices also can be used to deliver medications



topically for chemotherapy, anti-infection or pain relief purposes. The treatment of large-area, full-thickness burns still constitutes a major surgical repair challenge. The current clinical 'gold standard' for burn wound treatment and repair is to use patients' own skin as skin grafts to close the wounded area. This method can have a number of drawbacks, including the limited supply of available donor sites on a badly burned patient, heavy scarring and poor functional recovery. The new product shows great promise for addressing all these shortcomings and improving the healing of these types of wounds.

A new permanent Director for MIIR has been selected, and the announcement of the appointment will be made shortly.

Appendix One- Marshall University's Research Trust Fund Addendum

The University's directed research endowment plan has concentrated initially in two domains of interdisciplinary research, which are strengths at Marshall: research clusters in biomedicine/biotechnology/ bionanotechnology and transportation technology/ logistics. Marshall's Research Trust Fund activities are to be expanded to include the following areas:

I. Engineering

Engineering is a foundational discipline essential to the development and implementation of research in the approved areas in the Research Trust Fund legislation . Marshall has recently achieved ABET accreditation of its engineering program, and has experienced dramatic facilities growth with the construction and occupation of The Arthur Weisberg Family Engineering Laboratories facility and is planning for the future addition of an Advanced Engineering and Technology Center Complex. Development of robust undergraduate and graduate programs and the associated integral research opportunities are essential to developing and enhancing the capabilities and profile of the school.

Match from the Research Trust Fund will be requested to enhance private donations for endowed professorships and other research-related positions and initiatives in all aspects of Engineering as they relate to the allowed subject areas of the Research Trust Fund Program and the associated uses allowed in the legislation.

Two examples of gifts that have been received in support of engineering endowments are included, and a third solicitation is discussed:

A. Applied Research- Safety Engineering Program

Risk management is a highly specialized field that involves applying the principles of safety engineering and industrial hygiene and integrating them with economic and financial analysis. Marshall University will expand its Research Trust Fund Plan in this area important to transportation and logistics and energy to support an endowment in risk management research. The proposed endowment will support the development of research expertise in the school of engineering in the area of risk management, a highly interdisciplinary pursuit at the interface of management, engineering and applied mathematics.

The proposed applied research employs advanced risk management concepts and research to identify, trend, estimate and reduce workplace hazards in industry based in WV. The area will be supported by a \$100,000 endowment received from BrickStreet and the corresponding state match.

Risk management is of particular interest to the energy industry in our state because of the safety and economic risks associated with the extraction process. In energy, risk management research is essential to find new ways to:

- deal with its high element of monetary risk due to the uncertainty of the economic and regulatory outlook
- reduce the physical risk associated with extraction and development activities, and improve the safety of individual employee

In transportation and logistics research, risk management has become central to understanding many critical elements such as:

- the robustness and resilience of our transportation systems to interruptions due to system load, natural phenomena, and man-made disruptions
- the risks associated with transport of hazardous materials and the potential benefits of mitigation of those risks
- the robustness of logistics networks
- the risks associated with logistics and supply chain outsourcing

⁴ 4.3.1. Energy and environmental sciences;
4.3.2. Nanotechnology and materials sciences;
4.3.3. Biological, biotechnical and biomedical sciences;
4.3.4. Transportation technology and logistics;
4.3.5. Biometrics, security, sensing, and related identification technologies; and
4.3.6. Gerontology.

These benefits are of particular relevance to the state given current events, and are particular interests of the donor.

B. Mechanical Engineering

Mechanical engineering applies the principles of physics and materials science for analysis, design, manufacturing, and maintenance of mechanical systems. Mechanical engineers use the core principles of mechanics, kinematics, thermodynamics, materials science, and structural analysis along with tools like computer-aided engineering and product lifecycle management to design and analyze items as diverse as manufacturing plants, industrial equipment and machinery, heating and cooling systems, motorized vehicles, aircraft, watercraft, robotics, medical devices and more.

The field has continually evolved to incorporate advancements in technology, and mechanical engineers today are pursuing developments in such fields as composites, mechatronics, and nanotechnology. Mechanical engineering overlaps with aerospace engineering, civil engineering, electrical engineering, and petroleum engineering to varying amounts.

A gift from the Fletcher family will endow a founding Chair of Mechanical Engineering. Mechanical Engineering is an important discipline in Bioengineering and energy sectors. This endowment is essential to developing a Department of Mechanical Engineering, by attracting a senior-level professor to Marshall, with his/her associated research programs.

Another area that is endorsed by the Board of Governors for planning and an active source of solicitation is:

C. Bioengineering

In the translation of biomedical and biotechnology advances, bioengineering is a lynchpin in bridging the transition from academe to commercialization. Marshall University is planning to develop a Bioengineering Department contemporaneously with the construction of the Applied Technology and Engineering Complex. The development of the Department would follow a trajectory very similar to that of Mechanical Engineering, with the attraction of a founding research scientist/bioengineer.

“Biological engineering, biotechnological engineering or bioengineering (including biological systems engineering) is the application of engineering principles to address challenges in the life sciences, which include the fields of biology, ecology, and medicine. Biological engineering is a science based discipline founded upon the biological sciences in the same way that chemical engineering, electrical engineering, and mechanical engineering are based upon chemistry, electricity and magnetism, and statics, respectively”⁶.

“Biological Engineering can be differentiated from its roots of pure biology or classical engineering in the following way. Biological studies often follow a reductionist approach in viewing a system on its smallest possible scale, which naturally leads toward the development of tools such as functional genomics. Engineering approaches using classical design perspectives are constructionist, involving the building and research of new devices, approaches, and technologies from component concepts. Biological engineering utilizes both of these methods in concert relying on reductionist approaches to define the fundamental units, which are then commingled to generate something new”.

⁷ “Although engineered biological systems have been used to manipulate information, construct materials, process chemicals, produce energy, provide food, and help maintain or enhance human health and our environment, our ability to quickly and reliably engineer biological systems that behave as expected remains less well developed than our mastery over mechanical and electrical systems”⁸.

Given Marshall’s research strengths in the biological and biomedical sciences and the emphasis of new initiatives, like the Marshall Institute for Interdisciplinary Research (MIIR), on translating key research findings into commercialization, the discipline of bioengineering sits at a nexus of opportunity for the University. It will be a critical element in fully developing the potential of Marshall’s applied research enterprise and its translation to economic development.

II. Mathematics and the Physical Sciences

Mathematics and the Physical Sciences are basic sciences that have relevance to all aspects of the allowed areas of the Research Trust Fund legislation. Research Trust Fund match will be sought to enhance private donations supporting endowed professorships and other research-related positions and initiatives focusing on research in the allowed areas in these disciplines.

The first application will be for an endowed rotating professorship to promote an undergraduate summer research experience in Chemistry.

This match for the undergraduate research endowment is being requested under the Research Trust Fund because undergraduate summer research in Chemistry is relevant to so many of the legislatively enabled areas:

- Chemistry is one of the fundamental underpinnings of nanoscience because of the molecular nature of the discipline
- The Department of Chemistry at Marshall University has core groups in biochemistry/biotechnology and materials science
- Faculty members also work on energy research and molecular energetics.

These summer positions are a central component in the Department's long-term strategy to increase research output and obtain sustainable external funding. Each student selected does an original, collaborative research project with a faculty member. The relevance to the Research Trust Fund is clear from the work of the two most recent awardees, Austi Sargent Roush (2009) and Tiffany Bell (2010), who worked with Drs. McCunn and Frost respectively. Ms. Roush assisted Dr. McCunn in her first summer at Marshall establishing her lab and generating the preliminary results essential to her obtaining her recent award from the Research Corporation. Tiffany Bell identified transiently palmitoylated proteins while working on Professor Frost's research project "Identifying Post-translational Protein Modifications via Mass Spectrometry".

⁶ Cuello J.C., "Engineering to biology and biology to engineering, The bi-directional connection between engineering and biology In biological engineering design", *Int. J. Eng. Ed.*, 21,1-7 (2005).

⁷ Riley MR, "Introducing Journal of Biological Engineering", *Journal of Biological Engineering* 1, 1 (2007).

⁸ Endy D, "Foundations for Engineering Biology", *Nature*, 438, 449-4 (2005).

REPORT ON THE
**RESEARCH TRUST
FUND**



Senate Bill No. 287