

THE UNIVERSITY OF TENNESSEE  
BOARD OF TRUSTEES

MINUTES OF THE RESEARCH, OUTREACH, AND ECONOMIC DEVELOPMENT  
COMMITTEE

October 2, 2014  
Knoxville, Tennessee

The Research, Outreach, and Economic Development Committee of the Board of Trustees of The University of Tennessee met at 1:45 p.m. EDT, Thursday, October 2, 2014, on the campus of the Institute of Agriculture in Knoxville, Tennessee.

**I. CALL TO ORDER**

Chair George Cates called the meeting to order.

**II. ROLL CALL**

Mr. Cates asked Dr. David Millhorn, UT Executive Vice President, to call the roll. The following members of the Research, Outreach, and Economic Development Committee were present:

George E. Cates, Chair  
Shannon A. Brown  
Tim L. Cross  
Joseph A. DiPietro  
Robert J. (R. J.) Duncan  
J. Brian Ferguson  
David A. Golden  
Julius T. Johnson  
Raja J. Jubran  
Bonnie E. Lynch  
Richard G. Rhoda  
Rhedona Rose  
David M. Stern  
Thaddeus A. Wilson

William E. Evans, Kevin S. Huffman, Bonnie E. Lynch and Margaret A. Norris were not present at the meeting.

Dr. Millhorn announced the presence of a quorum of the Committee. Other Trustees, members of the administrative staff, public, and representatives of the media were also present.

### **III. MINUTES OF LAST MEETING - Committee Action**

Chair George Cates asked for any corrections to the minutes of the June 18, 2014, meeting of the Committee. Hearing none, the Chair called for a motion to approve the minutes as written. The motion was made, seconded, and carried unanimously.

### **IV. RESOLUTION ON INTEGRITY IN RESEARCH - Action/Full Board Consent**

Dr. Stacey S. Patterson, UT Assistant Vice President, Director of Research Partnerships and Vice President, Multi-Disciplinary Office, UT Research Foundation, presented the Resolution on Integrity in Research for adoption by the Board (Exhibit 1). Mr. Cates made a motion to approve the Resolution on Integrity in Research; the motion was seconded and was carried unanimously.

### **V. Biofuels Update - Information**

Dr. Millhorn introduced Mr. Steve Mirshak, Global Business Director, DuPont Cellulosic Ethanol, to give a biofuels update presentation (Exhibit 2; Creating the Cellulosic Ethanol Industry in Tennessee).

Mr. Mirshak noted the cellulosic biofuels industry is making a positive impact in Tennessee and in other areas of the nation, and he described the array of economic development benefits, particularly in rural areas, for not only employees but also through the entire supply chain of growers, harvesters, truckers, distributors, consumers and businesses. The Genera Energy collaboration has built DuPont's confidence in the ability to establish a switchgrass supply chain in Tennessee, he stated. Mr. Mirshak discussed the DuPont cellulosic ethanol commercial-scale production enterprises in Iowa and said what is being done in Iowa is the model for Tennessee; in addition, he noted, the experiences and knowledge gained in Iowa will also be taken to Tennessee. Mr. Mirshak pointed out the significant benefits of the collaboration with UT and Genera Energy, noting a thus-far \$85M DuPont research investment in Vonore and the global showcase for Tennessee biotechnology created and utilized within this collaboration.

Mr. Mirshak discussed the 2007 United States Renewable Fuels Standard (RFS) as being a key driver of current large investment opportunities. The RFS, he stated, provides a strong platform to take risks and provides market opportunities and is one of the nation's most far-reaching energy policies. He noted the American Petroleum Institute (API)-funded campaign is creating political uncertainty about the RFS. The API is concerned that the federal government is maintaining the mandated amount of biofuels which must replace oil in the fuel supply over the next few years. Nevertheless, Mr. Mirshak said, policymakers continue to express support for cellulosic ethanol and its strong benefits to the United States. Maintaining the RFS and driving down costs will lead to an explosive growth in the industry across the country, Mr. Mirshak stated. Mr. Mirshak showed graphics indicating global cellulosic ethanol licensing activity.

Mr. Mirshak addressed switchgrass cellulosic ethanol commercial facility progress and outlined keys for Tennessee investment competitiveness, assuming the RFS policy debate is resolved. In summary, he stated the RFS creates a large opportunity and it will be investors who choose where to invest based on the optimal economic enterprise. DuPont appreciates the partnership with UT and the State of Tennessee, Mr. Mirshak stated. The Vonore biorefinery has met its objectives, he said, and the constancy of purpose for cellulosic ethanol production is evident.

Mr. Cates asked Mr. Mirshak what is anticipated in the long term for the RFS? Mr. Mirshak said there is a heavy campaign by the oil industry to repeal the RFS. This is not needed, Mr. Mirshak said, as the EPA (Environmental Protection Agency) makes an annual assessment of the cellulosic ethanol industry's supply progress and makes adjustments as needed as foreseen in the law. Mr. Wharton asked Mr. Mirshak of the likelihood of a switchgrass commercial-scale plant in Tennessee within the next five years? Mr. Mirshak replied that it will be up to investors to decide in any given competitive economic climate, but DuPont is committed to the cellulosic ethanol industry for energy crops like switchgrass that can be grown in Tennessee. Mr. Duncan inquired about aspects of the cellulosic ethanol enterprise and renewable fuels. Mr. Mirshak stated cellulosic ethanol is one of the most environmentally-friendly fuels on the market, with a greater than 100 percent reduction in greenhouse gas emissions for its Nevada (Iowa) cellulosic ethanol versus gasoline.

Mr. Cates thanked Mr. Mirshak for the excellent presentation and update and noted the UT Board of Trustees valued DuPont's commitment to Tennessee.

## VI. UT Knoxville Inductees into the National Academy of Sciences and Engineering - Information

Dr. Millhorn recognized Dr. Taylor Eighmy, UTK Vice Chancellor for Research and Engagement, to give an update on UT Knoxville inductees into the National Academies membership (Exhibit 3). Dr. Eighmy described the prestigious recognition received by faculty and their institutions when invited to be a member in any of the three National Academies. "National Academies' membership is part of our Top 25 benchmarks," Dr. Eighmy stated. Membership into the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), or the Institute of Medicine (IOM) is one of the highest honors academic faculty can achieve, as stated in the *Center for Measuring University Performance, 2012*. Dr. Eighmy discussed the intensely competitive annual process for membership and noted about 30 percent of all current members reside at 10 institutions. Member nomination can only be made by a current member. More than 300 Nobel Laureates are or have been members of the National Academies, Dr. Eighmy stated.

Recognition was given by Dr. Eighmy of the five current UT Knoxville faculty having National Academy membership: Dr. Jack Dongarra (NAE), Dr. Dan Simberloff (NAS), Dr. Mark Dean (NAE), Dr. Steve Zinkle (NAE) and Dr. George Pharr (NAE). Dr. Eighmy noted UT had one member (Jack Dongarra) in the National Academies in 2012 and has added four additional members since that time. Mr. Driver commented that the Board of Trustees' luncheon today had been held at the new Fred Brown Residence Hall and Dr. Brown was founding director of the Minority Engineering Scholarship Program at UT, among other notable accomplishments, and that Dr. Mark Dean, a UT alumnus in Engineering, was one of the early recipients of the Fred Brown Scholarships. In addition to his distinguished career with IBM, Dr. Dean has been an excellent ambassador for the Fred Brown Scholarship program.

Mr. Cates asked Dr. Eighmy what could be done to help more UT faculty gain membership in the National Academies? Dr. Eighmy noted the increasing number of UT faculty as National Academy members would give more opportunities to nominate deserving UT faculty. Mr. Cates thanked Dr. Eighmy for his presentation and said to keep up the good progress in promoting UT faculty members in gaining National Academy membership and the distinguished work this membership represented.

## VII. Personalized Health: An Emerging Opportunity - Information

Dr. Millhorn introduced Bob Davis, M.D., MPH and UT-ORNL Governor's Chair, as well as founding director of the UT Health Sciences Center for Biomedical Informatics, who, along with other presenters, gave a power-point presentation (Exhibit 4) on the "Joint Institute for Personalized Health." Dr. Millhorn noted the proposal represented a collaborative initiative of the University System, the UT Health Sciences Center (UTHSC), The University of Tennessee, Knoxville, and Oak Ridge National Laboratory for a new Joint Institute for Personalized Health (JIPH) and Dr. Davis would provide an overview of this effort. Dr. Davis stated the JIPH presentation was focused through three Centers and each segment would be presented by a member of the collaborative group: Center for Healthcare and Health System Analytics (Dr. Teresa Waters, Chair, UTHSC Department of Preventive Medicine), Center for Health Genomics (Dr. Igor Jouline, ORNL Computer Science and Mathematics Division and Joint Faculty Professor, UTK Department of Microbiology) and Center for Drug Development (Dr. Jeremy Smith, Director, Center for Molecular Biophysics and UT-ORNL Governor's Chair). Another UT-ORNL Governor's Chair appointee, Dr. Rob Williams, is also involved in the proposal initiative but was unable to attend the meeting.

Dr. Davis discussed the concept of creating and using new high-performance computational tools to improve the effectiveness of healthcare by tailoring treatment and systems to maximize cost reduction (particularly TennCare expenditures) and fewer hospital readmissions. Dr. Davis compared part of the concept as being similar to how Amazon.com tracks customer preferences to predict and recommend future purchases.

Dr. Waters, presenting to the ROED Committee via video, noted the explosion in health data. New big-data approaches can create a truly customized approach to healthcare. One in five Medicare patients is readmitted to a hospital, she stated. The Center for Health Care and Health Systems Analytics would combine some of Tennessee's premier research assets to address simultaneously the cost and quality of healthcare delivery and would function as a resource for the state's TennCare program (comprising approximately one-third of the state's budget) and other healthcare institutions. Personalized healthcare will use sophisticated computer analytics to recognize patterns of patient characteristics that can be combined with specific interventions to yield good health outcomes, Dr. Waters stated. Healthcare programs will be tailored to find the perfect intervention for each patient. Timely sharing of healthcare data is a major challenge; JIPH can

support shared databases and rapid feedback and will facilitate benchmarking and quality improvement over time.

Dr. Jouline noted the landmark Human Genome Project (1988-2003) spent nearly \$15B to crack the code of the first human genome; however, every \$1 invested in the Project has triggered \$178 in U.S. economic activity. Genomics hold the promise for earlier detection of complex diseases, such as cancer, Dr. Jouline stated. Advanced, state-of-the-art computational tools are required for linking genome information to specific health conditions, Dr. Jouline said, and he outlined the plan to develop recommendations of treatment for individual patients by using computational genomics. The Center of Health Genomics will aim at improving health outcomes and reducing patient disparities, making cutting-edge medicine available to a much larger portion of Tennesseans, and establishing UT as a leader in advanced medicine.

Dr. Smith described several of the world's mega stars who have found a way to "fit locks/targets" in drug discovery to make major advances in patient treatment. Advanced computer power identifies these drugs that can bind to targets and helps to determine how drugs affect diseases and prevent side effects, Dr. Smith stated. The Center for Drug Development will have a primary focus in the development and commercialization of intellectual property related to the discovery of new diagnostic and therapeutic chemical entities.

Dr. Steve Schwab, Chancellor of the UT Health Science Center, concluded the presentation with remarks saying the proposal for the new Joint Institute for Personalized Health is an example of where science is going, combining synergy and leverage, developing and using tools to magnify discovery, and maximizing unique business applications. Dr. David Stern, UTHSC Executive Dean and Vice Chancellor for Health Affairs, noted science needs the new tools of the 21<sup>st</sup> Century, using large value-based data sets, and this approach is the way medicine is going. Dr. Schwab said the UTHSC College of Medicine and UTHSC enthusiastically support the proposal for the Joint Institute for Personalized Health and the Centers created therein.

Dr. Millhorn noted the now 16 Governor's Chair appointments are making a major difference in such endeavors as the JIPH proposal. Mr. Cates said this kind of opportunity comes along every 5-10 years, if that. Dr. DiPietro said it is the kind of initiative to "get done" because it is the right thing to do and it represents a perfect model of collaboration with UT and Oak Ridge National Laboratory. A brief discussion took place after Ms. Gregg inquired about the

state-of-the-art analytical tools and data bases being used in the process.

Mr. Cates thanked the presenters for their excellent and comprehensive report.

### **VIII. ROED News and Highlights/Cherokee Farm Update - Information**

Dr. Millhorn gave a power-point presentation (Exhibit 5) with news and highlights of research initiatives.

Dr. Millhorn said Dr. Ramamoorthy Ramesh, Deputy for Science and Technology at Oak Ridge National Laboratory (ORNL), is soon returning to UC Berkeley. UT and ORNL have benefitted from Dr. Ramesh's contributions, Dr. Millhorn stated.

The 16<sup>th</sup> Governor's Chair appointee is Dr. Phil Enquist, Dr. Millhorn said. Dr. Enquist is a Fellow of the American Institute of Architects and his specialty is urban design and planning. Dr. Millhorn noted four UT researchers ranked among Thomson Reuters' world's most influential scientific minds: Drs. Karen Johnson (UTHSC), David Mandrus (UTK), Matthew Mench (UTK), and David Nelson (UTHSC). This caliber of faculty enhances UT's research mission, Dr. Millhorn stated.

A Life Science Tennessee annual conference and venture forum, "Bring Technology into Focus," will be held October 20-22 in Nashville. Dr. Millhorn and Dr. Jeff Balsler (Vice Chancellor for Health Affairs and Dean of Vanderbilt University School of Medicine) will kick off the meeting with a discussion of the life science industry and how it relates to the institutions represented at the meeting. Dr. Millhorn noted it is important to hold such exchanges across the state, as was recently done at the NextFarm Agricultural Innovation Accelerator meeting at UT Martin, where UT promoted partnerships as the key to innovating rural economic development in Tennessee.

Dr. Millhorn stated the National Academy of Inventors, which recently named the UT Research Foundation (UTRF) on its Top 100 List. UTRF ranks 80<sup>th</sup> worldwide for universities granted U.S. utility patents. UTRF has shown steady growth over the past five years and ranked ahead of Emory, Yale and Princeton in this listing in 2013. Dr. Millhorn stated it is important to note that of the 29 UTRF patents issued in 2013, 20 have been licensed for commercialization. UT is doing business with its research, Dr. Millhorn said.

Meridian Bioscience, Inc., Dr. Millhorn said, is an example of a potentially significant revenue success for UTRF. Meridian and UTRF have entered into a technology and commercial license agreement for the development of an innovative new technology for a low-cost, point-of-care detection platform capable of detecting proteins, small molecules, bacteria and viruses in minutes.

An update on the West Tennessee Solar Farm and the SPECTRUM exhibit (now having attracted over 24,000 visitors since January 2013 at Knoxville Center Mall in Knoxville) was provided by Dr. Millhorn. When the future TDOT-constructed Information and Welcome Center at the Solar Farm is finished in late 2015, the SPECTRUM interactive and teaching exhibit will be permanently moved to this facility at Interstate 40 and mile marker 45. Overall, the array of ~21,000 solar panels on 25 acres, Dr. Millhorn stated, is exceeding annual power-generation targets. In late 2013 there was a major loss of power for four months due to storm damage.

The UT Space Institute (UTSI) in Tullahoma recently celebrated its 50<sup>th</sup> anniversary, Dr. Millhorn noted. UTSI plays important roles with Air Force hypersonics and in its collaborations with Arnold Engineering Development Center.

Dr. Millhorn concluded his update with saying Cherokee Farm Innovation Campus is nearing phase one completion this year with the 144,000 square-foot, \$50M Joint Institute for Advanced Materials (JIAM) building, the first building located on the property. Many students and faculty will benefit from this new structure, Dr. Millhorn said.

Mr. Anderson inquired about the damage to the Solar Farm. Severe lightning, Dr. Millhorn said, caused extensive panel damage. Dr. Stacey Patterson (UT Assistant Vice President and Director of Research Partnerships) stated precautions had now been taken to help prevent such damage in future situations.

A one-page written report by Cliff Hawks, President and CEO of Cherokee Farm Development Corporation (CFDC), is incorporated at the end of Dr. Millhorn's presentation on the Diligent site.

## **IX. Other Business**

None.



**X. Adjournment**

There being no other business, Mr. Cates adjourned the meeting at 3:00 p.m. EDT.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "David E. Millhorn", written over a horizontal line.

David E. Millhorn, Ph.D.