

MINUTES OF THE MEETING  
OF THE  
MICHIGAN STATE UNIVERSITY  
BOARD OF TRUSTEES

June 22, 2012

President Simon called the meeting of the Board of Trustees to order at 9:30 a.m. in the Board Room.

Trustees present: Brian Breslin, Dianne Byrum, Joel Ferguson, Melanie Foster, Mitch Lyons, Faylene Owen, George Perles, and Diann Woodard.

University officers present: President Simon, Provost Wilcox, Vice President Poston, Secretary Beekman, Vice President and General Counsel Noto, Vice Presidents Burnham, Gray, Groves, and Swain, Interim Vice President Maybank, and Senior Advisor and Director Granberry Russell. Faculty liaisons present: William Anderson, John Foss, and Mary Noel. Student liaisons present: Evan Martinak and David Mitchell.

All actions taken were by unanimous vote of the Trustees present, unless otherwise noted.

1. On a motion by Trustee Foster, supported by Trustee Owen, the **BOARD VOTED to approve** the agenda, including the revised Finance Committee agenda.
2. On a motion by Trustee Byrum, supported by Trustee Ferguson, the **BOARD VOTED to approve** the minutes of the Board meeting of April 13, 2012.
3. President's Report

President Simon provided the following report to the Board.

A. MSU's 2012-13 Participant in the Presidential Fellows Program

MSU's nominee for the Presidential Fellows Program sponsored by the Center for the Study of the Presidency and Congress has been accepted. Hannah Brookhart is an Honors College member majoring in Social Relations and Policy and Anthropology. As a fellow, Hannah will attend two conferences in Washington, DC during the 2012-13 academic year and complete an original research paper.

B. Collegiate Minority Retention Programs in Engineering Recognized

The National Society of Black Engineers (NSBE) and ExxonMobil recently honored three universities with the 2012 Impact Award for their efforts to retain underrepresented minority students in engineering programs. MSU, the University of Houston, and the University of Maryland—College Park were each awarded \$10,000 from ExxonMobil and NSBE during an event held at the Carnegie Institution for Science in Washington, DC.

C. MSU Ranked as one of the Nation's Top Employers

MSU is one of the top 10 universities in the nation to work for, according to a recent ranking by the Business Research Guide. In ranking MSU number six, the online publication calls the university, "one of the top family-friendly colleges in the country" and highlights its Family Resource Center. MSU is the only Big Ten University on the list.

D. Emmy Nominations

The *MSUToday* Productions team has again been honored with a number of Emmy nominations this year. The team was recognized in the categories of light feature, environment, sports feature, magazine program, PSA, PSA campaign, commercial, excellence in audio production, excellence in editing, and societal concerns. The team has already won four national Telly awards, including a silver award, which is the highest award for online work.

E. Organic Growth Puts America's Universities to the Test

MSU was among six campuses in the United States to receive a perfect score in the Organic Farming Research Foundation's Organic Land Grant Assessment. The assessment sheds light on America's ability to meet growing consumer demand with organic farmers and research on organic farming. MSU is one of eight land grant universities that provides students the opportunity to pursue an academic career in the fastest growing form of agriculture in the country.

F. CIMS-GB Certification

MSU has achieved CIMS-Green Building Certification. CIMS-Green Building is part of the ISSA Cleaning Industry Management Standard & Certification Program, providing cleaning organizations with the opportunity to certify that their green cleaning program

meets an industry standard. In order to achieve CIMS-GB certification, an organization is required to undergo a comprehensive on-site assessment that includes document review, interviews with personnel and customers, and visits to individual customer sites.

G. James A. Pritchett Elected to African Studies Association

Dr. James A. Pritchett, Director of the African Studies Center, has been elected Vice President of the African Studies Association (ASA). The ASA is the world's premier Africanist organization, based in the United States, with a global membership devoted to enhancing the exchange of information on Africa.

H. APLU Malone Award for International Leadership

Dr. Dan Clayhas has been awarded the APLU 2012 Malone Award (faculty category) for a career of outstanding contributions that further international education. This award provides national recognition for individuals who have made significant contributions to international programs.

I. IUPAP Young Scientist Prize in Fundamental Metrology

Dr. Ryan Ringle, Physicist at the National Superconducting Cyclotron Lab, has been chosen to receive the International Union of Pure and Applied Physics (IUPAP) Young Scientist (Early Career) Prize in Fundamental Metrology, in recognition of his outstanding contribution to mass measurements of short-lived radioactive isotopes.

J. MSUFCU Internship Opportunity

The inaugural MSUFCU Internship Opportunity Program was a tremendous success. Twenty-four students were selected from 285 applicants. This is an exciting result for the pilot effort. The President expressed thanks to the MSU Federal Credit Union for this wonderful collaboration.

K. MSU a Member of the Servicemembers Opportunity Colleges Consortium

Michigan State University has joined the Servicemembers Opportunity College Consortium. SOC aims to provide fair and effective policies that recognize and address the conditions faced

by military students who want to obtain a college education. Dr. Nicole Rovig, University Registrar, is the SOC Institutional Representative.

L. New Assistant Vice President for Human Resources

Vice President Poston introduced Sharon Butler as the new Assistant Vice President for Human Resources. Ms. Butler comes to MSU from the University of Cincinnati.

M. Mark Hollis Named SportsBusiness Journal's 2012 Athletic Director of the Year

Mark Hollis has been selected as the 2012 Athletic Director of the Year by Street & Smith's SportsBusiness Journal/Daily. Mark was honored May 23<sup>rd</sup> during the fifth annual SportsBusiness Awards Ceremony. Dr. Simon stated that Mark is a visionary and innovative leader and takes pride in this well-deserved recognition for Mark, his department, and Team MSU.

4. There was no Public Participation on Issues Germane to the Agenda.

5. Personnel Actions

Provost Wilcox presented the following personnel actions:

Devers, Cynthia E, AY—Associate Professor, Department of Management, \$180,000, with Tenure, effective August 16, 2012.

Smith, Alan Lyle, AN—Professor, Department of Kinesiology, \$150,556, with Tenure, effective August 16, 2012.

Imberman, Scott Andrew, AY—Associate Professor, Departments of Economics; Counseling, Educational Psychology and Special Education, \$145,000, with Tenure, effective August 16, 2012.

Trustee Ferguson **moved to approve** the recommendations, with support from Trustee Owen.

Professor Devers received her Ph.D. from MSU in 2003 and has served on the faculty of Texas A&M University, the University of Wisconsin-Madison, and Tulane University.

Professor Smith has been at Purdue University since 1998. He was the Director of Graduate Studies, Department of Health and Kinesiology, and

the Director of the Purdue University Sport and Exercise Psychology Laboratory.

Professor Imberman has been at the University of Houston since 2007 and comes to MSU with interests in economics of education, public economics, health economics, and labor economics.

**THE BOARD VOTED to approve** the recommendations.

Provost Wilcox presented the candidates for the awarding of tenure effective July 1, 2012. (Appendix A)

Trustee Owen **moved to approve** the recommendation, with support from Trustee Ferguson.

**THE BOARD VOTED to approve** the recommendation.

6. Gifts, Grants, and Contracts

Vice President Gray presented the Gifts, Grants, and Contracts Report for the period of March 24, 2012 through June 4, 2012. The report is a compilation of 522 Gifts, Grants and Contracts plus 41 Consignment/Non-Cash Gifts, with a total value of \$85,904,020.

Trustee Ferguson **moved to approve** the recommendation, with support from Trustee Breslin.

Vice President Gray noted that overall grant activity, both research and non-research, has exceeded \$500 million.

President Simon stated that the growth has not been significantly fueled by FRIB.

**THE BOARD VOTED to approve** the recommendation.

Vice President Gray introduced Dr. Kathryn Meek, College of Veterinary Medicine. Dr. Meek made a presentation to the Board on her research on DNA: The Blueprint of Life. (Appendix B)

7. Finance Committee

Trustee Breslin presented the Trustee Finance Committee Report and recommendations.

A. 2012-13 Budget Development Guidelines and 2013-14 Preliminary General Fund Budget Guidelines Implementation

It was recommended that the Board of Trustees adopt the 2012-13 Budget Development Guidelines (Budget Guidelines) and 2013-14 Preliminary General Fund Budget Guidelines (Preliminary Guidelines), which include revenue and expenditure totals and tuition and fee rates for 2013-14.

In accordance with the Budget Guidelines, the administration is directed to develop and implement the 2012-13 General Fund, MSU AgBioResearch, Michigan State University Extension, and Intercollegiate Athletics budgets.

To provide students and families an extended opportunity to plan, MSU has developed the Preliminary Guidelines. The Preliminary Guidelines establish 2013-14 tuition and fee rates, revenue totals, and expenditure totals. The Preliminary Guidelines also establish the financial aid budget and the estimated State appropriation for 2013-14. The administration is directed to develop the 2013-14 Budget Development Guidelines in accordance with the Preliminary Guidelines.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Owen.

**THE BOARD VOTED to approve** the recommendation.

**Trustee Woodard voted no.**

B. FFE—ASMSU Spartan Scholarship Challenge Fund Conversion

It was recommended to the Board of Trustees that the endowment fund currently known as the Associated Students of Michigan State University (ASMSU) Spartan Scholarship Challenge (ASMSU SSC Endowment) be reconstituted as a fund functioning as an endowment entitled the Associated Students of Michigan State University (ASMSU) Spartan Scholarship Challenge Fund (ASMSU SSC FFE), with the Spartan Scholarship Challenge matching funds previously allocated to the ASMSU SSC Endowment to be included in the ASMSU SSC FFE upon the establishment thereof; and further that the ASMSU SSC FFE be managed pursuant to the terms of, and in coordination with, the Spartan Scholarship Challenge Matching Gift Program approved by the Board on October 30, 2009.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Ferguson.

**THE BOARD VOTED to approve** the recommendation.

C. FFE—R.E.S.P.E.C.T Scholarship Fund

It was recommended that the Board of Trustees establish a fund functioning as an endowment entitled R.E.S.P.E.C.T. Scholarship Fund (R.E.S.P.E.C.T. FFE); and further that the purpose of the R.E.S.P.E.C.T. FFE be the purpose set forth in the University Endowment Guidelines for the R.E.S.P.E.C.T. Endowed Scholarship dated February 16, 2005.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Foster.

**THE BOARD VOTED to approve** the recommendation.

D. FFE—COGS Childcare Support Award

It was recommended that the Board of Trustees establish a fund functioning as an endowment entitled Council of Graduate Students Childcare Support Award (COGS Childcare FFE), with a term of five years which may be renewed for additional terms of five years at the request of the Vice President for Student Affairs and the Council of Graduate Students.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Lyons.

**THE BOARD VOTED to approve** the recommendation.

E. FFE—Sylvan H. Wittwer Horticulture Endowment, Harley N. Hotchkiss Fund for Geological Sciences, Roland A. Helwig Fund, Richard A. Sellers Scholarship Fund

It was recommended that the Board of Trustees establish a fund functioning as an endowment entitled Sylvan H. Wittwer Horticulture Endowment.

It was recommended that the Board of Trustees establish a fund functioning as an endowment entitled Harley N. Hotchkiss Fund for Geological Sciences.

It was recommended that the Board of Trustees establish a fund functioning as an endowment entitled Roland A. Helwig Fund.

It was recommended that the Board of Trustees establish a fund functioning as an endowment entitled Richard A. Sellers Scholarship Fund.

Trustee Breslin **moved to approve** the recommendations, with support from Trustee Ferguson.

**THE BOARD VOTED to approve** the recommendations.

Trustee Byrum was not present for the vote.

F. New Investment Manager—EnCap Investments LP

It was recommended that the Board of Trustees select EnCap Investments LP as an investment manager.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Lyons.

**THE BOARD VOTED to approve** the recommendation.

Trustee Byrum was not present for the vote.

G. Sale of 15677 Niles Road Property, Clinton County

It was recommended that the Board of Trustees authorize the sale of approximately 1.24 acres of the Morris Property, located at 15677 Niles Road, Clinton County, to Brian Raymond for \$33,000, with such other terms and conditions as may be acceptable to the Vice President for Finance and Operations and Treasurer.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Owen.

President Simon noted that proceeds from the sale will be divided per the gift agreement.

**THE BOARD VOTED to approve** the recommendation.

H. Purchase of East Lansing Property—Planned Relocation of the College of Music's Community School



It was recommended that the Board of Trustees authorize the purchase of real property located at 4930 and 4950 Hagadorn Road, East Lansing, Michigan, for \$1,300,000 and upon other terms and conditions as may be acceptable to the Vice President for Finance and Operations and Treasurer.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Owen.

**THE BOARD VOTED to approve** the recommendation.

I. College of Music's Community Music School—Renovations

It was recommended that the Board of Trustees authorize the Administration to plan for the project entitled College of Music's Community Music School—Renovations.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Ferguson.

**THE BOARD VOTED to approve** the recommendation.

J. Parking—Lot 67 (Jenison) Reconstruction

It was recommended that the Board of Trustees authorize the Administration to plan for the project entitled Parking—Lot 67 (Jenison) Reconstruction.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Byrum.

**THE BOARD VOTED to approve** the recommendation.

K. Plant Biology—North Wing Lab Exhaust System Replacement

It was recommended that the Board of Trustees authorize the Administration to plan for the project entitled Plant Biology—North Wing Lab Exhaust System Replacement.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Byrum.

**THE BOARD VOTED to approve** the recommendation.

L. Facility for Rare Isotope Beams—New High Bay

It was recommended that the Board of Trustees authorize the Administration to plan for the project entitled Facility for Rare Isotope Beams—New High Bay.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Byrum.

**THE BOARD VOTED to approve** the recommendation.

M. Anthony Hall—Energy Conservation Measures

It was recommended that the Board of Trustees authorize the Administration to plan for the project entitled Anthony Hall—Energy Conservation Measures.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Owen.

**THE BOARD VOTED to approve** the recommendation.

N. Auditorium—Alterations to Fairchild Theatre

It was recommended that the Board of Trustees authorize the Administration to proceed with the project entitled Auditorium—Alterations to Fairchild Theatre, and to approve a budget of \$18,000,000.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Owen.

**THE BOARD VOTED to approve** the recommendation.

O. Clinical Center—Replace Fire Alarm System

It was recommended that the Board of Trustees authorize the Administration to proceed with the project entitled Clinical Center—Replace Fire Alarm System and to approve a budget of \$1,287,000.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Byrum.

**THE BOARD VOTED to approve** the recommendation.

P. Administration Building—Renovations to the First and Ground Floor

It was recommended that the Board of Trustees authorize the Administration to proceed with the project entitled Administration Building—Renovations to the First and Ground Floors, and to approve a budget of \$3,300,000.

Trustee Breslin **moved to approve** the recommendation, with support from Trustee Byrum.

**THE BOARD VOTED to approve** the recommendation.

8. Policy Committee

Trustee Byrum presented the Trustee Policy Committee Report and recommendations.

A. Proposed Amendments to Bylaws for Academic Governance

It was recommended that the Board of Trustees approve the revised Bylaws for Academic Governance. (Appendix C)

Trustee Byrum **moved to approve** the recommendation, with support from Trustee Breslin.

**THE BOARD VOTED to approve** the recommendation.

Trustee Foster was not present for the vote.

B. Merger of the Departments of Crop and Soil Sciences and Plant Biology

It was recommended that the Board of Trustees approve the merger of the Departments of Crop and Soil Sciences and Plant Pathology to form the Department of Plant, Soil and Microbial Sciences. (Appendix D)

Trustee Byrum **moved to approve** the recommendation, with support from Trustee Owen.

**THE BOARD VOTED to approve** the recommendation.

C. Liquor License Signature Authority

It was recommended that the Board of Trustees confirm the authorization of the Secretary of the Board of Trustees to submit applications to the Michigan Liquor Control Commission for the issuance of special liquor licenses for the sale of alcoholic liquor at events on lands governed by the Board of Trustees.

Trustee Byrum **moved to approve** the recommendation, with support from Trustee Breslin.

**THE BOARD VOTED to approve** the recommendation.

D. Authorization to Create a University Research Organization

It was recommended that the Board of Trustees authorize the Administration to create a University Research Organization, and to implement special policies specifically regarding its operation. (Appendix E)

E. Approval of Contract Terms

It was recommended that the Board of Trustees approve the execution of an option agreement with *Bio Plastic Polymers and Composites, LLC*, consistent with earlier public notice given at a Board meeting and with the "Option Agreement Term Sheet" presented to the Board. (Appendix F)

It was recommended that the Board of Trustees approve the execution of a research contract with *Biophotonic Solutions, Inc.*, consistent with earlier public notice given at a Board meeting and with the "Research Agreement Term Sheet" presented to the Board. (Appendix G)

It was recommended that the Board of Trustees approve the execution of a purchase agreement with Mr. Jack Wikle, consistent with earlier public notice given at a Board meeting and with the "Purchase Agreement Term Sheet" presented to the Board. (Appendix H)

It was recommended that the Board of Trustees approve the execution of a research contract with *Metna Corporation*, consistent with earlier public notice given at a Board meeting with the "Research Contract Term Sheet" presented to the Board. (Appendix I)

It was recommended that the Board of Trustees approve the execution of a research contract with *Northern Technologies International Corporation* consistent with earlier public notice given at a Board meeting and with the "Research Contract Term Sheet" presented to the Board. (Appendix J)

It was recommended that the Board of Trustees approve the execution of a subcontract with *Technova Corporation*, consistent with earlier public notice given at a Board meeting and with the "Contract Term Sheet" now presented to the Board. (Appendix K)

It was recommended that the Board of Trustees approve the execution of a research contract with *Technova Corporation*, consistent with earlier public notice given at a Board meeting and with the "Research Contract Term Sheet" presented to the Board. (Appendix L)

It was recommended that the Board of Trustees approve the execution of a research contract with *Ubiquitous Energy, Inc.*, consistent with earlier public notice given and with the "Research Contract Term Sheet" presented to the Board. (Appendix M)

It was recommended that the Board of Trustees approve the execution of a license agreement with *Zon Labs, LLC*, consistent with earlier public notice given at a Board meeting and with the "License Agreement Term Sheet" presented to the Board. (Appendix N)

It was recommended that the Board of Trustees approve the execution of an option agreement with *ZuvaChem, Inc.*, consistent with earlier public notice given at a Board meeting and with the "Option Agreement Contract Term Sheet" presented to the Board. (Appendix O)

Trustee Byrum **moved to approve** the recommendations, with support from Trustee Lyons.

**THE BOARD VOTED to approve** the recommendations.

F. Notice of Intent to Negotiate Contracts

Pursuant to State Law, the Chair of the Policy Committee gave public notice of the University's intent to negotiate contracts with *nanoRETE, Inc.*, a company based in Lansing, Michigan. Dr.

Evangelyn Alocilja, a Professor in the Department of Biosystems & Agricultural Engineering, and her family own or have options to buy an ownership interest of more than one percent of the company.

Pursuant to State Law, the Chair of the Policy Committee gave public notice of the University's intent to negotiate contracts with *STEM ED., LLC*, a limited liability company based in East Lansing, Michigan. Dr. Julie Libarkin, an Associate Professor in the College of Natural Sciences, and Dr. Stephen Thomas, an Assistant Professor in the College of Natural Sciences, and their families own or have options to buy an ownership interest of more than one percent of the company. Drs. Libarkin and Thomas are also managers of *STEM ED., LLC*.

#### 9. Compensation Committee

Trustee Owen presented the Trustee Compensation Committee Report.

The Compensation Committee met on Wednesday as part of the Board of Trustees' annual retreat. The review of President Simon reaffirmed the Committee's confidence in her leadership.

President Simon was uniformly recognized as a strong leader. She is intelligent and wise, with great vision and drive. President Simon truly has a passion for Michigan State and an unrelenting drive to continue to make MSU better.

In this year when we celebrate the 150<sup>th</sup> anniversary of the Morrill Act, Dr. Simon leads Michigan State by emphasizing the strengths inherent in its land grant legacy. She constantly reminds us that Michigan State's values are quality, inclusion, and connectivity. These values, also inherent in the land grant/world grant traditions, are, in fact, her personal values.

The Board remains very pleased with President Simon's leadership of Team MSU and enthusiastic about her leadership of our great institution in the years to come.

#### 10. Trustees' Comments

Trustee Ferguson congratulated Mark Hollis on being selected as the 2012 Athletic Director of the Year.

Trustee Owen said that MSU was fortunate to have Mark Hollis as its Athletic Director, and she congratulated him on his recent award.

Trustee Lyons thanked President Simon for her leadership and congratulated Mark Hollis on his award.

Trustee Breslin thanked President Simon for her service. He commended Michael Hudson, Director of the Resource Center for Persons with Disabilities, and the Tower Guard students for their hard work and dedication to public service. Trustee Breslin thanked Professor Dave Kreulen, Interim Chair of the Departments of Physiology and Pathology, for the tour of his laboratories.

Trustee Byrum said that the Board retreat was productive. She is impressed by the initiatives MSU is undertaking to improve undergraduate education.

Trustee Woodard said it was a pleasure working with everyone.

Trustee Perles thanked Vice President Gray for the outstanding research presentations at each meeting.

Trustee Foster said the retreat was informative, and she thanked Dave Byelich, Director of Planning and Budgets, for his budget presentation. Trustee Foster noted that she and Trustee Breslin toured the Edythe and Eli Broad Art Museum and that she found the space to be dramatic and is excited about the opening this fall.

11. There was no Public Participation on Issues Not Germane to the Agenda.
12. Request to Adjourn

On a motion by Trustee Ferguson, supported by Trustee Owen, **THE BOARD VOTED to adjourn** at 11:35 a.m.

Respectfully submitted,



William R. Beekman  
Secretary of the Board of Trustees

# **RESEARCH PRESENTATION**

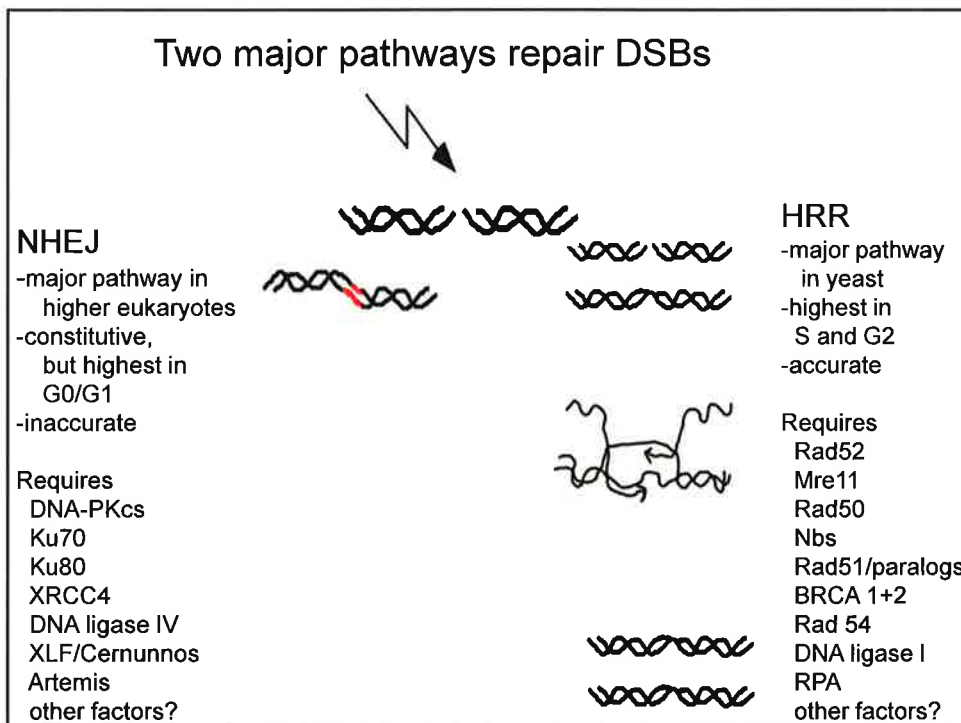
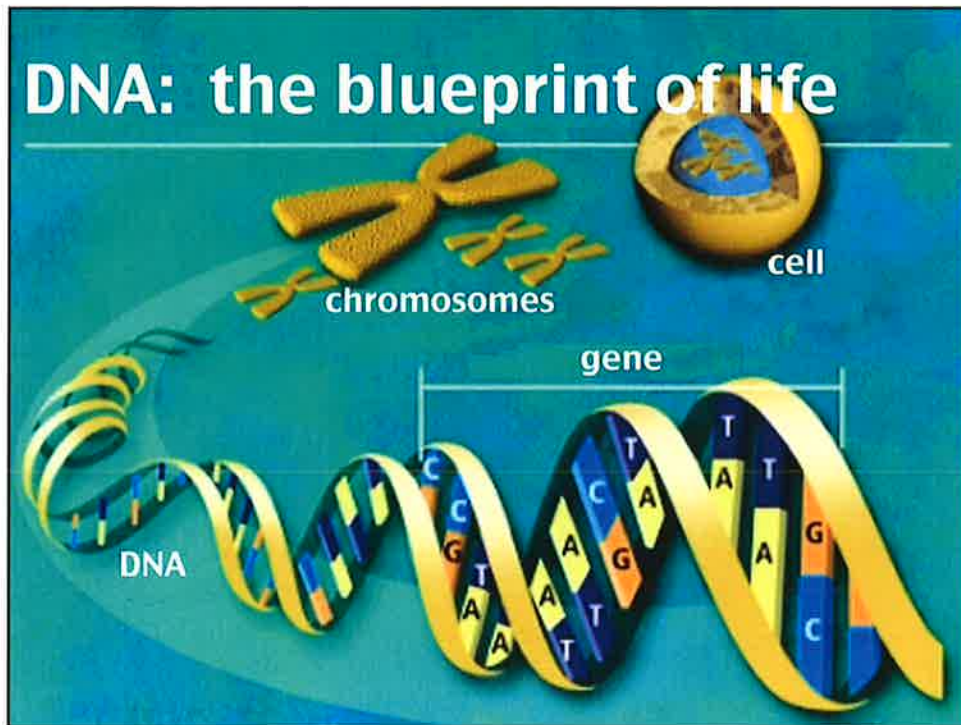
**TO THE MSU BOARD OF TRUSTEES**

**JUNE 22, 2012**

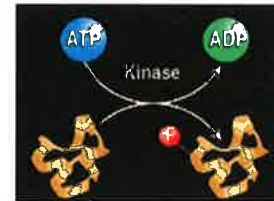
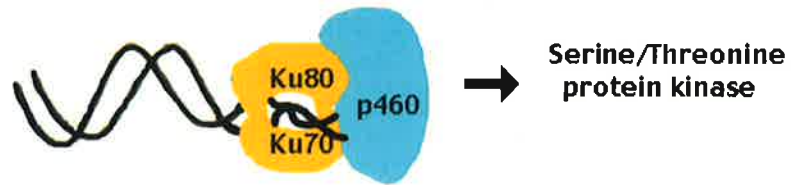
**KATHERYN MEEK**  
**COLLEGE OF VETERINARY MEDICINE**

Facilitated by the Office of the Vice President for  
Research and Graduate Studies



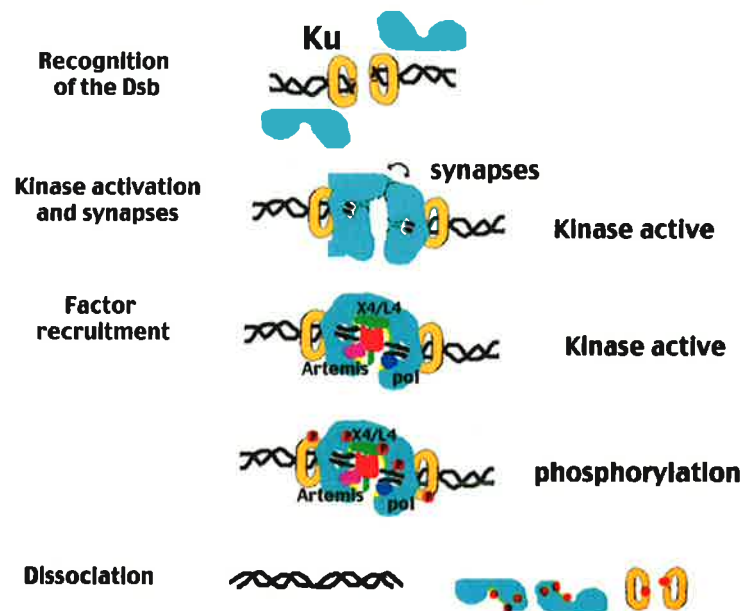


## DNA Dependent Protein Kinase

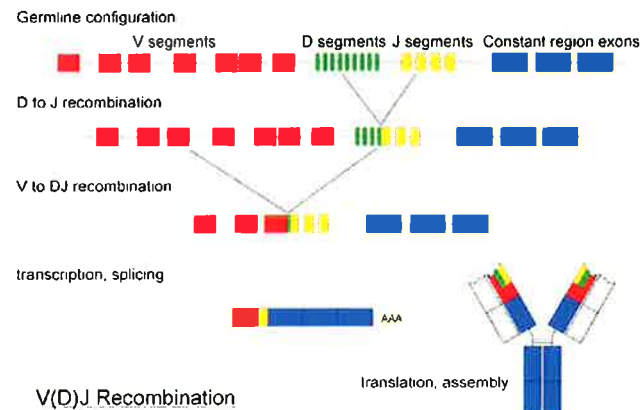


## Current Model of NHEJ

### DNA-PKcs



DNA double strand breaks are **purposefully** introduced into the genome in lymphocytes during VDJ recombination; these breaks are repaired by NHEJ. This provides a mechanism to generate millions of different antibody molecules that allows the immune system to recognize and destroy many different kinds of infectious agents.



### Consequences of faulty NHEJ:

SCID... Severe Combined ImmunoDeficiency;  
 “bubble boy disease”  
 because of faulty VDJ recombination

Examples...

DNA-PKcs mutations in mice, horses, and dogs  
 Artemis or XLF mutations in children

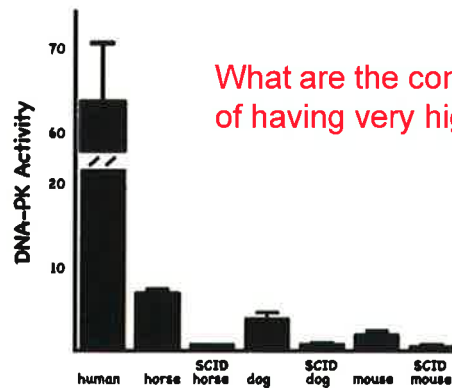
If immunity is rescued by bone marrow transplantation..  
 genomic instability  
 increased tumor incidence  
 extreme radiosensitivity

-- in collaboration with Jeggo and colleagues from University of Sussex:

## DNA-PKcs mutations in a human SCID patient with profound neurological abnormalities.



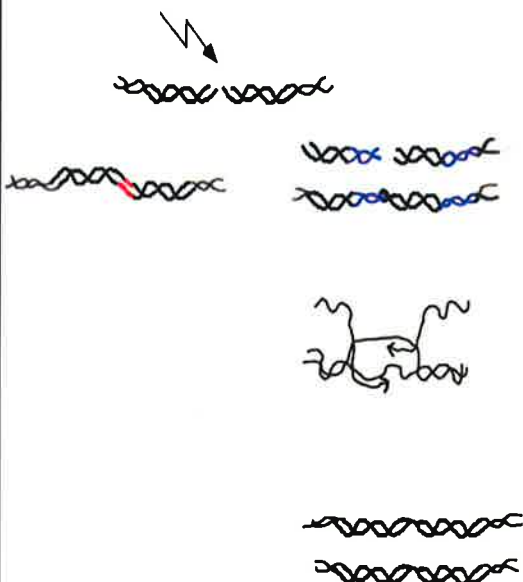
DNA-PK levels in all human cells are ~ 50 times more abundant than in non-primates



What are the consequences of having very high levels of DNA-PK?

Neal, JA, Dang, V, Douglas, P, Wold, MS, Lees-Miller, SP, Meek, K. Inhibition of HR by DNA-PK requires kinase activity, is titratable, and is modulated by autophosphorylation. MCB 2011.

Primate genomes have unique repetitive sequences



High levels of DNA-PK in human cells inhibits inappropriate HR between repetitive regions, unique to the primate genome.

Why is this so important in the developing human brain?

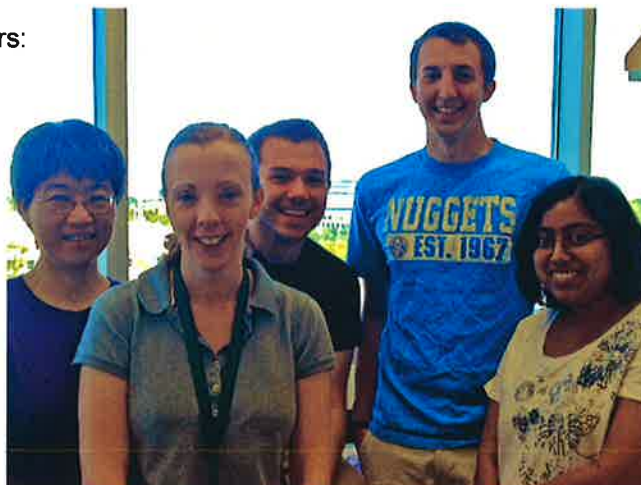
Current questions we are trying to address:

- 1) how do phosphorylations by DNA-PK promote, or impede repair by NHEJ and other pathways
- 2) why do human cells express such huge amounts of DNA-PK and why are humans more dependent on this enzyme than other vertebrates
- 3) how do XRCC4/XLF filaments function in NHEJ and how are they regulated by DNA-PK.

Current lab members:

Jessica Neal  
Yao Xu  
Sunetra Roy

EJ Kohler  
Peter Ferszt  
Matt Dowling



Collaborators:

Susan P. Lees-Miller  
Mauro Modesti  
Murray Junop  
Penny Jeggo  
Tom Glover  
Kefei Yu

University of Calgary  
CNRS, Marseilles  
McMaster University  
University of Sussex  
University of Michigan  
Michigan State

Funding:

NIH, 1990-2018

# MICHIGAN STATE UNIVERSITY

Attachment 1

June 6, 2012

## MEMORANDUM

TO: Board of Trustees Policy Committee

FROM: Kim A. Wilcox, Provost *KAW*

SUBJECT: Revisions to Bylaws for Academic Governance

### RECOMMENDATION:

**BE IT RESOLVED** that the Trustee Policy Committee recommends to the Board of Trustees approval of the recommended revised Bylaws for Academic Governance (attached), as approved by University Council.

In accordance with those Bylaws (8.3.2.1), I have reviewed the changes, concur with the proposed revisions, and now request action by the Board of Trustees.



### OFFICE OF THE PROVOST

Michigan State University  
Hannah Administration Building  
426 Auditorium Road, Room 430  
East Lansing, Michigan 48824

Phone: 517-355-6550  
Fax: 517-355-9601  
provost.msu.edu

### BACKGROUND

On April 24, 2012, University Council approved the recommended revisions to the Bylaws for Academic Governance (Attachment A), upon the recommendation of the University Committee on Academic Governance (UCAG). Members of UCAG noted inconsistencies in some long-time practices in nomination processes, and the language of the By-Laws.

Bylaw 4.3.2 addresses the ways in which representatives are nominated from colleges to standing committees of academic governance. Colleges elect their representatives to standing committees, but these have not been formally acted upon by the University Council. The proposed changes reflect that procedure.

The recommended changes for By-Law 3.4.1.2.2.1 broadens the opportunities for nominations to The Steering Committee by soliciting nominations from all faculty, rather than the list of nominees being generated from the Faculty Senate. The practice has been to solicit nominations from faculty, so again, this change will bring congruence to the practice and the By-Law.

c: Trustee Finance Committee  
President Simon  
Secretary Beekman  
Vice President Poston  
Vice President Noto



**2) Current Bylaw 4.3.2:**

4.3.2. The University Committee on Academic Governance shall nominate to the University Council individuals who may be appointed to University-level Standing Committees, The Steering Committee, Advisory-Consultative Committees, and other committees as may be requested by the University Council.

**Proposed Amendment:**

4.3.2. The University Committee on Academic Governance shall nominate to the University Council individuals who may be appointed to University-level Standing Committees, to The Steering Committee, Advisory-Consultative Committees, and other committees as may be requested by the University Council.

**3) Current Bylaw under 3.4 The Steering Committee:**

3.4.1.2.2.1. A nomination slate will be developed by Faculty Senate. The University Committee on Academic Governance will solicit recommendations from all faculty.

**Proposed Amendment:**

3.4.1.2.2.1. The University Committee on Academic Governance will solicit recommendations from all faculty. A nomination slate will be developed for Faculty Senate to endorse and send to Academic Congress for election.

Attachment 2

# MICHIGAN STATE UNIVERSITY

June 6, 2012

## MEMORANDUM

**TO:** MSU Board of Trustees

**FROM:** Kim A. Wilcox, Provost *KAW*

**RE:** Recommended Merger of the Departments of Crop and Soil Sciences and Plant Pathology to form the **Department of Plant, Soil and Microbial Sciences**

### Recommendation:

BE IT RESOLVED that the Trustee Policy Committee recommends to the Board of Trustees that the Department of Crop and Soil Sciences and the Department of Plant Pathology be merged to form the Department of Plant, Soil and Microbial Sciences.



### OFFICE OF THE PROVOST

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provost.msu.edu

### Background

As you know, all Colleges have been exploring ways to promote synergy, effectiveness, and efficiency through program alignments and structural changes. Such changes should also provide the opportunity for enhancing academic reputation and distinction.

The College of Agriculture and Natural Resources has proposed the merger of the two departments which represents a significant and important change in the structure of plant, soil plant-pathogen, and microbial sciences at Michigan State University. The new department will build on the disciplinary alignments in the current departments in the areas of microbiology and microbial ecology, plant-microbe interactions and disease resistance, pest management, and plant breeding and genetics. The new Department will promote horizontal integration across major issues facing plant, soil, plant disease, and microbial science, but will support vertical disciplinary organization.

The merger will not adversely affect currently enrolled students: graduate and undergraduate students currently enrolled will complete their degree programs under the conditions under which they enrolled.

The merger will not change the tenure status or current rank of any of the faculty. New bylaws will ensure that no current faculty will be disadvantaged by

Recommended Merger of Departments  
Provost Kim A. Wilcox  
June 6, 2012  
Page 2

this process, and will describe a mentoring system for junior faculty. It will also outline the process by which faculty evaluations and promotion and tenure recommendations are developed and communicated.

Consultation about the merger has included faculty and students within the affected departments, including a joint faculty meeting held in May, 2011. Academic Governance consultation included Committee on Academic Policy, the University Graduate Council, and the University Committee on Faculty Affairs. There were no concerns relative to the merger.

I support the recommendation and President Simon concurs with the request for approval of the merger of the Departments of Crop and Soil Sciences and Plant Pathology to form the **Department of Plant, Soil and Microbial Sciences**. The effective date of the change would be July 1, 2012. The effective date for the academic program/curriculum is Fall, 2013.

C: Interim Dean Doug Buhler  
Associate Provost Linda Stanford  
Director Dave Byelich

Attachment 4

# **MICHIGAN STATE UNIVERSITY**

June 11, 2012

## **MEMORANDUM**

**TO:** Board of Trustees

**FROM:** Lou Anna K. Simon, President *LAKS*  
J. Ian Gray, Vice President for Research & Graduate Studies

**SUBJECT:** Authorization to Create a University Research Organization (URO)  
Internal to Michigan State University, and to Implement Special  
Policies Specifically Regarding Its Operation

### **RECOMMENDATION:**

BE IT RESOLVED that the Trustee Policy Committee recommends to the Board of Trustees that:

(a) the Administration be authorized to create a new unit of the University (the "University Research Organization" or "URO") for the specific purpose of hosting projects that are envisioned as unclassified research but will be subject in their funded conduct to external publication approval, participant citizenship restrictions, or other forms of significant government control on project access or the dissemination of results. The URO is to be created within the explicitly reaffirmed MSU policy context that such research is unacceptable in all other units of the University absent an exception based upon an exigency of national defense;

(b) the President be delegated authority to approve, upon the written recommendation of the cognizant vice president(s), policies and procedures specific to the URO, specifically indicating any interim exceptions to general University policies, procedures, and regulations, provided that all such interim exceptions are:

- (1) specific to the URO alone,
- (2) reasonably necessary for its operation,
- (3) communicated promptly to academic governance, and
- (4) superseded upon the completed approval of the next amendment of the general University policy, procedure, or regulation via normal channels, unless the President earlier revokes the exception or its need (and hence the exception itself) should lapse naturally at an earlier time;



### **Office of the President**

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- (c) the administration be charged to ensure that the URO is housed, now and in the future, in space sufficiently separate from normal academic and support activity as to avoid diminishing the openness of the MSU campus to an international community of scholars; and
- (d) the President be delegated on-going authority to determine the administrative reporting line of the URO.

#### BACKGROUND:

As approved by the Board of Trustees on March 20, 1970, MSU's *Major Guidelines for Sponsored Research and Creative Activities* state in part:

“The University should retain for its scholars the right of first publication. The imposition of restriction on publication of research results is incompatible with the basic concept of an educational institution. Exigencies of national defense may at times make exceptions to this policy on publication necessary.”

That assertion in the *Major Guidelines* embodies an academic freedom principle that is embraced generally by AAU institutions. In addition, observance of the guideline is necessary to ensure that campus-based fundamental research is excluded from export control under the U.S. Government's International Traffic in Arms Regulations (ITAR) and the Export Administration regulation (EAR).

Put another way, the acceptance by MSU of restrictions on research access, or of research dissemination controls, makes otherwise excluded fundamental research subject to ITAR and EAR, creating the hazard that normally open academic discourse within a globalized community may result in civil or criminal offenses and/or institutional liabilities. That hazard is particularly problematic in an academic setting that seeks to introduce very inexperienced scholars to research work. Hence overall the University strives to protect academic freedom in inquiry and publication, and to preserve the applicability to its scholarship of the “Fundamental Research Exclusion” provided under ITAR and EAR. Those efforts must continue.

At the same time, significant Federal and private sector funding now exists for research projects involving publication approval by funders and/or restrictions on participant citizenship. A growing number of MSU faculty wish to pursue such projects, both to support their own trajectories of professional expertise, relevancy, and growth, and to obtain access to the potential funding resources on offer. Unsurprisingly, many such project opportunities arise in the defense realm, and implicate ITAR controls in the absence of the Fundamental Research Exclusion. However, Federal use of export controls to impede human rights abuses, nuclear proliferation, and terrorism extends the reach of EAR to so-called “dual use”

technologies with long-standing civilian applications. “Dual use” technologies may be found in areas such as criminal justice, geographic information, biofuels, robotics, and food safety. MSU faculty members possess expertise and seek to pursue funded projects in many such areas.

Michigan State University seeks to act in the best scholarly traditions of its AAU peer group, thus emphasizing its commitment to academic freedom, human and intellectual openness, and the overarching proposition that research can and must benefit all of humanity. At the same time, MSU seeks to act in the land-grant tradition of addressing real societal needs through faculty expertise, fully deployed in the national interest – an interest which may sometimes demand restrictions on research participation and dissemination.

A number of other major universities have confronted this dilemma. To meet it, they created variously named university research organizations, or “URO’s”, beginning after World War II: roughly two decades before Michigan Agricultural College had matured into MSU. Additional waves of URO creation were catalyzed by Viet Nam-era social concerns with defense-related research and by later Federal agency funding of University Affiliated Research Centers (UARC’s). A list of UARCs and other URO-like organizations and their university hosts or progenitors is provided in Appendix A. The list illustrates that today some URO’s are internal to peer universities, and others have an independent, 501(c)(3) corporate existence. Their annual funding varies, with URO sponsored research totals exceeding \$200 M per year in some cases.

For the reasons summarized above, the time now seems ripe for MSU to institute its own URO.

In April 2011, Research & Graduate Studies provided academic governance with two prospectus documents: one for an internal URO and one for an independent 501(c)(3)-based URO, together with a Frequently Asked Questions (FAQ) list spanning both. The chairperson of the then-Executive Committee and now-Steering Committee of Academic Governance, Prof. John Powell, appointed a Faculty Exploratory Committee (FEC).

The FEC met during the summer and autumn of 2011, conducted phone interviews with URO administrators and participants at other universities, and returned a report to the Steering Committee on November 1, 2011. The report endorsed the concept of creating a URO subject to six caveats, which are discussed below. The FEC membership list, the committee’s report, minutes of the meetings, a bibliography, identity-redacted summaries of the interviews, and other resources compiled by the FEC may be found at <https://uro.egr.msu.edu>. (An MSUnet password is required to access the site.)

Viewed in retrospect, the process described above was noteworthy in that the administration initially placed two competing URO models before the campus community for review. Thereafter, the FEC endorsed in concept the implementation of a URO under either model, as did the Faculty Senate and the University Council after review by multiple standing committees of academic governance.

Based upon a variety of policy and feasibility considerations, the administration has concluded that implementation of an internal URO should now be recommended to the Board of Trustees.

Key points in the underlying analysis include the following:

- Relative to the external, independent 501(c)(3) option, the internal option permits unambiguous crediting of the University and its constituent colleges for the research funds attracted by the URO. (This is an important consideration vis-à-vis institutional rankings, accreditations, and peer grouping.)
- The path to URO research inception and funding growth should be shorter, due to the use of existing support infrastructure and the utilization of broadly familiar personnel policies, institutional assurances, and regulatory compliance mechanisms (including research integrity, conflict of interest, human subjects, animal use, export control, etc.).
- The possibility of “spinning off” the URO into an independent existence, after an appropriate maturation period, will remain available to the University, consistent with the incubation trajectory often followed elsewhere.

As envisioned, the internal MSU URO would:

- (i) be designed and implemented for the fullest possible recovery of actual costs, using resources not deriving from tuition or state general fund appropriations;
- (ii) not submit proposals for classified projects;
- (iii) involve undergraduates, graduate students, post-docs, and junior academic staff and faculty only in accord with appropriate protocols applicable to each group, requiring as a prerequisite to participation personal advisement by administrative staff exterior to the URO regarding the career implications and constraints entailed in such participation;
- (iv) conduct only projects that could not be conducted normally elsewhere in the University, under general MSU policies and procedures<sup>1</sup>;
- (v) be itself governed by normal University policies, procedures, and regulations, except as formal exceptions for it are established pursuant to the recommended Board of Trustees resolution;

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<sup>1</sup> Projects that qualify for the “exigencies of national defense” exception included in *Major Guidelines for Sponsored Research and Creative Activities* would be conducted in the MSU venue (i.e., URO or non-URO) judged most suitable on a case-by-case basis.

regarding the career implications and constraints entailed in such participation;

- (iv) conduct only projects that could not be conducted normally elsewhere in the University, under general MSU policies and procedures<sup>1</sup>;
- (v) be itself governed by normal University policies, procedures, and regulations, except as formal exceptions for it are established pursuant to the recommended Board of Trustees resolution;
- (vi) be designed, implemented, and administered so as to preserve the ability of the Board of Trustees to “spin out” the entity as an independent corporation in the future, should the Board conclude that it is in the best interests of the University to do so;
- (vii) function organizationally like the NSCL/FRIB -- i.e., as a major administrative unit independent of the colleges; and
- (viii) report administratively as determined by the President, with periodic advisory input concerning it from one or more advisory boards appointed by the President with input from the MSU academic governance system.

The Vice President for Research & Graduate Studies and the URO administrative reporting line will work with the Provost to ensure that URO-related policy matters are resolved appropriately. The Board of Trustees will be kept apprised of URO projects and progress.

The administration now requests approval of the resolution presented above by the Board Policy Committee, and subsequently by the full Board of Trustees.

cc: Secretary Beekman  
Provost Wilcox  
Vice President Poston  
Vice President Noto

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<sup>1</sup> Projects that qualify for the “exigencies of national defense” exception included in *Major Guidelines for Sponsored Research and Creative Activities* would be conducted in the MSU venue (i.e., URO or non-URO) judged most suitable on a case-by-case basis.



## Appendix A

Independent URO-like organizations “spun off” by major research universities:

- Altarum Institute, from ERIM and predecessors, from University of Michigan
- Draper Laboratory, from MIT
- RTI International, from Duke, UNC / Chapel Hill, and NCSU
- SRC, from Syracuse University
- SRI International, from Stanford University

University Affiliated Research Centers (UARCs)

- Army
  - Georgia Tech
  - MIT
  - University of California at Santa Barbara
  - University of Southern California
  - University of Texas / Austin
- Navy
  - Johns Hopkins University
  - Penn State University
  - University of Hawaii
  - University of Texas / Austin
  - University of Washington
- NASA
  - University of California at Santa Cruz
- NSA
  - Stevens Institute of Technology

### OPTION AGREEMENT TERM SHEET

**Party:** Bioplastic Polymers and Composites, LLC

**License:** Option on patent rights

**Term:** From the effective date of the agreement to June 30, 2015.

**Technology:** MSU Invention Disclosure Nos.:

TEC2004-0132 "Bulk Reactive Extrusion Polymerization of 1,4-Dioxan-2-One Producing Thermal Stabilized 1,4 Dioxan-2-One (Co)polymers"

TEC2006-0079 "Novel Tryglycerides and Method of Preparation Thereof"

TEC2006-0080 "Improved Biodiesel Additive and Method of Preparation Thereof"

TEC2009-0007 "Moisture Curable Natural Oil and Fat Compositions and Preparation Thereof"

TEC2011-0102 "Polyurethanes Derived from Proteins Biomass"

TEC2011-0103 "Process for the Control of Sulfate-Reducing Bacteria"

U.S. Patent Nos.:

5,801,224; 5,906,783; 5,969,089; 7,361,727; 7,367,995; 7,589,222; 7,601,677; 8,110,036; and U.S. Patent Application Nos. 12/148,049; 12/584,914; and U.S. Provisional Patent Nos. 61/403,199; and 61/403,494.

The parties may add or remove technologies under the agreement, including improvements generated under a separate sponsored research agreement, provided that the change does not affect the financial consideration of the parties or the nature or extent of any pecuniary interest of MSU personnel.

**Technology's Potential Commercial Utilization:**

Environmentally friendly polymers.

**Payment Terms:**

\$50,000 option fee paid in annual installments over three years.

**Services Provided:**

By MSU to Bioplastic Polymers and Composites, LLC: None.

By Bioplastic Polymers and Composites, LLC to MSU: None.

**Organization Type:**

Michigan-based limited liability company.

**Personnel interest:**

Dr. Ramani Narayan, a Professor in the Department of Chemical Engineering, and his immediate family own or have options to buy an equity interest of more than 1% of the company. Dr. Narayan is also an officer of Bio Plastic Polymers and Composites, LLC.

**RESEARCH AGREEMENT TERM SHEET**

**Party:** Biophotonic Solutions, Inc.

**License:** Sponsored research agreement  
“Single Ultrafast Pulse Excitation for Remote Coherent Anti-Stokes Raman Scattering for Standoff Detection of Explosives”

**Term:** From the effective date of the agreement to September 30, 2012

**Payment Terms:** \$50,001

**Services Provided:** By MSU to Biophotonic Solutions, Inc.: none  
  
By Biophotonic Solutions, Inc. to MSU: research regarding pulse excitation for detection of explosives

**Use of University Facilities/Personnel:**  
Use of MSU facilities/personnel by Biophotonic Solutions, Inc. provided at prevailing rates for industrial research

**Organization Type:** Michigan-based corporation

**Personnel Interest:** Dr. Marcos Dantus, a Professor in the Department of Chemistry, and his immediate family own or have options to buy an equity interest of more than 1% of the company. Dr. Dantus is also an officer of Biophotonic Solutions, Inc.

## **PURCHASE AGREEMENT TERM SHEET**

**Party:** Mr. Jack Wikle

**Agreement:** MSU to purchase ten trees owned by Mr. Wikle, summarized in Exhibit A

**Payment Terms:** \$3318.00

**Services Provided:** By MSU to Mr. Wikle: None.  
By Mr. Wikle to MSU: None.

**Use of University Facilities/Personnel:**  
No use of MSU facilities/personnel under the contemplated agreement.

**Personnel Interest:** Dr. Jack Wikle is a part-time employee at MSU's Hidden Lake Gardens.

**RESEARCH CONTRACT TERM SHEET**

**Party:** Metna Corporation

**Contracts:** Sponsored Research Agreement  
"First Generation of Controlled-Release Bacteriocins/Anti-microbials"

**Term:** From the effective date of the agreement to July 30, 2012

**Payment Terms:** \$22,998

**Services Provided:** By MSU to Metna Corporation: selection of antimicrobial complex and evaluation of the antimicrobial activity of nanoencapsulated bacteriocins

By Metna Corporation to MSU: none

**Use of University Facilities/Personnel:**  
Use of MSU facilities/personnel by Metna Corporation provided at prevailing rates for industrial research.

**Organization Type:** Delaware corporation based in Lansing, Michigan.

**Personnel Interest:** Dr. Parviz Soroushian, a Professor in the Department of Civil and Environmental Engineering, and his family own or have options to buy an ownership interest of more than 1% of the company. Dr. Soroushian is also the President of Metna Corporation.

**RESEARCH CONTRACT TERM SHEET**

**Party:** Northern Technologies International Corporation

**Contract:** Sponsored research agreement

“Design & Engineering of Non-Plastic Waste Bags Based on Biofiber-Organic & Inorganic Modifier Hybrids”

**Term:** From the effective date of the agreement to November 6, 2013

**Payment Terms:** \$249,253

**Services Provided:** By MSU to Northern Technologies International Corporation:  
research regarding non-plastic waste bags

By Northern Technologies International Corporation to MSU:  
none

**Use of University Facilities/Personnel:**

Use of MSU facilities and personnel by Northern Technologies International Corporation provided at prevailing rates for industrial research

**Organization Type:** Delaware Corporation based in Circle Pines, Minnesota

**Personnel Interest:** Dr. Ramani Narayan, a Professor in the Department of Chemical Engineering and Materials Science, and his family own or have options to buy an ownership interest of more than 1% of the company. Dr. Narayan is also an officer of Northern Technologies International Corporation.

**CONTRACT TERM SHEET**

**Party:** Technova Corporation

**Contracts:** Subcontract from MSU to Technova

“Demonstration of a Solar-Bio-Powered Wastewater Treatment System for Platoon-Sized Forward Operating Bases”

**Term:** From the effective date of the agreement to February 21, 2015

**Payment Terms:** MSU to pay Technova \$149,973

**Services Provided:** By MSU to Technova: none

By Technova to MSU: Establishment and evaluation of a small pilot-scale system; technical and economic evaluation of the technology; and development of strategies toward commercialization.

**Use of University Facilities/Personnel:**  
None

**Organization Type:** Incorporated Michigan-based small business

**Personnel Interest:** Dr. Parviz Soroushian, a Professor in the Department of Civil and Environmental Engineering, and his family own or have options to buy an ownership interest of more than 1% of the company. Dr. Soroushian is also the president of Technova Corporation.

**RESEARCH CONTRACT TERM SHEET**

**Party:** Technova Corporation

**Contracts:** Sponsored research agreement  
"Processing of Adhesive Materials"

**Term:** October 1, 2012 to December 31, 2019

**Payment Terms:** MSU contract eight year total: \$30,000.

**Services Provided:** By MSU to Technova: testing and evaluation of sustainable materials intended to replace conventional materials

By Technova to MSU: none

**Use of University Facilities/Personnel:**  
Use of MSU facilities/personnel by Technova provided at prevailing rates for industrial research.

**Organization Type:** Incorporated Michigan-based small business.

**Personnel Interest:** Dr. Parviz Soroushian, a Professor in the Department of Civil and Environmental Engineering, and his family own or have options to buy an ownership interest of more than 1% of the company. Dr. Soroushian is also the president of Technova Corporation.



**RESEARCH CONTRACT TERM SHEET**

**Party:** Ubiquitous Energy, Inc.

**Contracts:** Sponsored research agreement  
"Near-Infrared Selective Semiconductors for Visibly  
Transparent Organic Solar Cells"

**Term:** September 1, 2012 to February 28, 2013

**Payment Terms:** MSU contract six month total: \$16,177.

**Services Provided:** By MSU to Ubiquitous: fabrication and evaluation of  
molecular photovoltaic cells.

By Ubiquitous to MSU: none.

**Use of University Facilities/Personnel:**  
Use of MSU facilities/personnel by Ubiquitous  
provided at prevailing rates for industrial research.

**Organization Type:** Delaware corporation based in Boston, Massachusetts.

**Personnel Interest:** Dr. Richard Lunt, an Assistant Professor in the  
Department of Chemical Engineering and Materials  
Science, and his family own or have options to buy an  
ownership interest of more than 1% of the company.

**LICENSE AGREEMENT TERM SHEET**

**Party:** Zon Labs, LLC

**License:** Exclusive license with equity on copyright works in the field of instructional software

**Term:** 20 years from the effective date of the agreement

**Technology:** MSU Invention Disclosure No. TEC2011-0035: Zon the New Chengo Chinese

**Technology's Potential Commercial Utilization:**

Institutional language learning; general gaming

**Payment Terms:** Payment of \$2,500; a running royalty of 5% on net sales in 2013 and 10% in 2014 and subsequent years of the agreement; \$5,000 minimum royalty payment in 2014 and \$50,000 minimum royalty payment in 2015 and subsequent years of the agreement; 50% on all sublicensing revenues; ownership interest in Zon Labs consisting of 5% of preferred shares upon the earlier of Zon Labs' (a) total net sales of \$5,000,000 or (b) \$1,000,000 of financing/capital investment by third party.

The parties may add or remove technologies under the agreement, including improvements generated under a separate sponsored research agreement, provided that the change does not affect the financial consideration of the parties or the nature or extent of any pecuniary interest of MSU personnel.

**Services Provided:** By MSU to Zon Labs: None under contemplated agreement

By Zon Labs to MSU: None under contemplated agreement

**Organization Type:** Limited Liability Company based in East Lansing, Michigan.

**Personnel Interest:** Dr. Ken Dirkin, an Information Technology Professor in the College of Education, and his family own or have options to buy an ownership interest of more than 1% of the company. Dr. Dirkin is also an officer of Zon Labs, LLC.

**OPTION AGREEMENT TERM SHEET**

**Party:** ZuvaChem, Inc.

**Contracts:** Option on patent rights

**Term:** From the effective date of the agreement to June 30, 2013

**Technology:** TEC2011-0085 "Novel Platforms for Isoprene Synthase Construction."

**Technology's Potential Commercial Application:**

"Green" production of isoprene, the monomer building block used to make rubber.

**Payment Terms:** ZuvaChem to pay costs associated with prosecution and maintenance of patents on the optioned technology during the term of the option agreement.

**Services Provided:** By MSU to ZuvaChem: none.

By ZuvaChem to MSU: none

**Organization Type:** Delaware corporation with principal place of business in Baltimore, Maryland.

**Personnel Interest:** Dr. Thomas Sharkey, a Professor in the Department of Biochemistry and Molecular Biology, and his immediate family hold an ownership interest which exceeds 1% of the company.