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SUBJECT

State General Education Committee Nominations

REFERENCE

February 2014	The Board received a CCI Plan update that focused exclusively on General Education Reform and approved the first reading of proposed new policy III.N, General Education.
April 2014	The Board approved the second reading of proposed new Policy III.N, General Education.

BACKGROUND/DISCUSSION

In April 2014, the Board approved a new policy that provides alignment for General Education statewide through a common general education framework.

Board Policy III.N, states that the Board will establish the State General Education Committee, who will be responsible for reviewing competencies and rubrics for institutionally-designated General Education categories and ensure transferability. Consistent with this policy, the composition of the committee consists of a representative from each of the eight public postsecondary institutions. Nominations for the committee were solicited from the eight public institutions and the following represents the nominations submitted to the Board office.

Boise State University	Vicki Stieha	Director, Foundations/General Education
Idaho State University	James DiSanza	Chair/Professor Communication, Media, & Persuasion
Lewis-Clark State College	Mary Flores	Dean for Academic Programs
University of Idaho	Rodney Frey	Director, General Education
College of Southern Idaho	Cindy Bond	Instructional Dean
College of Western Idaho	Brenda Pettinger	AVP, Academic Affairs
North Idaho College	Larry Briggs	Dean of General Studies
Eastern Idaho Technical College	Peggy Nelson	Division Manager, General Education

IMPACT

Board action will formally appoint the members of the new committee.

ATTACHMENTS

STAFF COMMENTS AND RECOMMENDATIONS

Board Policy III.N also provides that faculty discipline groups representing the eight public institutions will have ongoing responsibilities to ensure consistency and relevance of General Education competencies related to their discipline.

Institutions are currently in the process of identifying courses that will satisfy, or will be revised to satisfy, the new General Education Matriculation (GEM) competencies. A complete list of GEM courses is due to the Board office by January 1, 2015, with a goal of having a transparent, statewide general education curriculum in place by August 2015.

Board staff recommends approval of the committee nomination.

BOARD ACTION

I move to appoint the members of the General Education Committee as presented in Attachment 1.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Cindy Bond is an Instructional Dean at the College of Southern Idaho. She holds a doctorate in Education a masters in Administration both from the University of Idaho. She also holds a bachelor's degree in Accounting from Boise State University.

Larry Briggs came to North Idaho College after 17 years at Eastern Washington University. He serves as the Dean of General Studies.

James DiSanza received his PhD in Organizational Communication from Penn State University in 1989. He teaches courses in conflict management, leadership, and management communication. His research interests include corporate image management, especially examining persuasive attack strategies used by individuals and groups to damage organizations and the image repair strategies organizations use in response to such attacks.

Mary Flores is the Dean for Academic Programs at Lewis-Clark State College. She was a past Chair of the Humanities Division and joined the College in 1988.

Rodney Frey came to the University of Idaho in 1998, having received a Ph.D. in Cultural Anthropology from the University of Colorado in 1979. He taught at Carroll College in Helena, Montana from 1980 to 1986, and Lewis-Clark State College in Coeur d'Alene, Idaho from 1987 to 1998, where he also served as Director for the college's north Idaho programs.

Peggy Nelson is the Division Manager for the General Education Division at Eastern Idaho Technical College.

Brenda Pettinger is the Associate Vice President for Academic Affairs at the College of Western Idaho.

Vicki Stieha is an Assistant Professor, Curriculum, Instruction and Foundational Studies. She joined Boise State University in August 2011 as the director of the Foundational Studies Program, and was appointed to the faculty of the Department of Curriculum, Instruction and Foundational Studies in 2012. She has a Ph.D. in Educational Studies from the University of Cincinnati, a M.Ed. in English Secondary Education from Xavier University, and a B.S. in Communication from Florida State University.

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SUBJECT

Waiver of Board Policy III.S.4.e, Developmental and Remedial Courses

REFERENCE

August 2007 The Board approved second reading of changes to policy.

APPLICABLE STATUTES, RULE OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.S.

BACKGROUND/DISCUSSION

Board Policy III.S., Development and Remedial Education provides Idaho's public institutions with definitions and general provisions for meeting the remedial education needs of students within Idaho' higher education system.

Board Policy III.S.4.e, states that "developmental and remedial courses will not apply toward the requirements for graduation." The Council on Academic Affairs and Program (CAAP) held discussion regarding this provision at their March 20, 2014 meeting, specifically the use of remedial courses for advanced technical certificates. CAAP concluded that remedial courses could be used for technical certificates; however, they did not recommend counting those remedial credits toward academic or technical degrees, or technical certificates.

CAAP's recommendations have not yet been incorporated into Board Policy III.S., as Board staff is currently working on additional proposed revisions. That the revisions have not yet been made presents a challenge North Idaho College (NIC) since several NIC programs require MATH 024. Most of the institutions consider MATH 024 a remedial math course but, in contrast, NIC views this course as one "designed specifically to meet industry standards for occupations" and the requirement of an Advanced Technical Certificate. While NIC is working to remedy this situation, current practice violates current Board policy.

North Idaho College (NIC) requests a waiver of Board Policy III.S.4.e related to math requirements associated with Advanced Technical Certificates, as the curriculum for the Academic Technical Certificate is designed to specifically meet industry standards for occupations and does not meet general education requirements for a college level course.

IMPACT

Approval of the waiver will allow NIC to continue using lower level occupational specific courses – considered remedial courses at an Associate's or higher degree level - for the awarding of technical certificates. Once Policy III.S is updated to incorporate proposed changes from CAAP, NIC will no longer need this waiver.

ATTACHMENTS

STAFF COMMENTS AND RECOMMENDATIONS

Technical Certificate competencies are based on specific occupational needs. It is reasonable to use courses for these certificates that are specific to those needs rather than broader requirements of academic degrees.

Staff recommends approval.

BOARD ACTION

I move to waive Board Policy III.S.4.e as it applies to Advanced Technical Certificates and remedial courses for the 2014-2015 academic year.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Idaho State Board of Education
GOVERNING POLICIES AND PROCEDURES

SECTION: III. POSTSECONDARY AFFAIRS

SUBSECTION: S. ~~Development and~~ Remedial Education **August ~~2007~~2014**

1. Coverage

   All students at the University of Idaho, Idaho State University, Boise State University, Lewis-Clark State College, College of Southern Idaho, North Idaho College, the College of Western Idaho and Eastern Idaho Technical College are included in this subsection.

2. Definitions

~~a. It is worth noting that what the general public refers to as "remedial education" is often also defined as "developmental education" by the academic community. The State Board of Education believes that a distinction can be made between the two teDevelopmental education (review courses) is aimed at developing the diverse talents of students, both academic and nonacademic. It is designed to develop strengths as well as to review previous curricular areas of students who have not been involved in postsecondary education for some time. Developmental education implies improvements (i.e., review) of a student's skills and knowledge deemed necessary to enter a particular course of study or program in order to ensure a greater likelihood of success.~~

Remedial education ~~, for purposes of this policy,~~ is ~~defined as~~ a duplication of a secondary program/course and support services in basic academic skills~~.~~ to prepare students for college level, *i.e.* gateway, course work. ~~Remediation usually involves recent high school graduates or those students who did not complete their secondary curriculum. Further, these students have little probability of success without first developing special skills and knowledge through remedial course work.~~

a.

b. Delivery Models: The State Board of Education has approved the use of three models for delivering remedial education.

   i. Accelerated Model – A combined delivery series model whereby remedial content is embedded into credit bearing courses.

   ii. Co-Requisite Model – A delivery model whereby remedial instruction is delivered alongside college-level content.

   iii. Emporium Model – A delivery model whereby remedial education is delivered in a computer lab setting where students receive individualized instruction from faculty and engagement with technology based programs.

3. ~~Philosophy~~Policy

~~Meeting the need for developmental education and remedial education is a function of Idaho's higher education system.~~

a. Regardless of upgraded secondary school graduation requirements or more rigorous admission standards, there will be students in the college and universities who have chosen not to enter the postsecondary system after gradation from high school, or who exhibit deficiencies in certain basic academic skills.

~~Thus, in the future, review courses will be directed primarily toward students who have a potential for success but have been away from school for some time. With the acceptance of such a reality, the college or universities have an obligation to provide review courses for those individuals in need of developmental instruction. Further, the role of the college and universities in remedying basic academic deficiencies and reinforcing those cognitive abilities necessary for likely success is justified, particularly when for some it determines whether or not they become productive citizens.4. Policy~~

~~a~~b. The college and universities ~~will establish~~shall maintain a mechanism for diagnostic testing in English~~, reading,~~ and mathematics, ~~and natural sciences,~~ and provide the opportunity for corrective measures.

~~b~~c. ~~The college and universities will provide review courses for those individuals in need of developmental instruction.c. The college and universities should determine the feasibility of developing individualized approaches (using available technology) as an alternate delivery system in responding to developmental and remedial education needs of studen~~

c~~d~~. ~~Students~~ Students with identified postsecondary weaknesses should be ~~limited in the number of credits taken during the first semester of the freshman year and furthermore should be~~ the beneficiaries of special support and advisement tailored to their particular needs.

e~~d~~. ~~Developmental and~~Credits earned in remedial courses ~~will~~ do not apply toward the requirements for graduation from any academic degree or certificate program. Remedial course credits may be counted towards the completion of a technical certificate.

f~~e~~. ~~Developmental and~~ Remedial credit hours will be funded in the same manner as other credit hours. Fees for these courses will be the same as academic and professional technical education courses, and the institutions may charge laboratory fees as provided in Section V, Subsection R. ~~Developmental credit hours will be separately identified and reported to the Board.~~

~~5. Institutional Policif. Each institution will develop internal policies and procedures on developmental and remedial education that are consistent with Board poli~~

g~~f~~. Board staff shall include an update on remediation education success rates in its annual Performance Measurement report to the Board.

SUBJECT

Board Policy III.Y. Advanced Opportunities – First Reading

REFERENCE

April 2012	Board approved the first reading of amendments to Board Policy III.Y.
June 2012	Board approved the second reading of amendments to Board Policy III.Y.
February 2014	Board approved the first reading of amendments to Board Policy III.Y.
April 2014	Due to the large number of changes between first and second reading, Board approved the amendments as a second first reading.
June 2014	The Board did not approve the second reading of amendments to Board Policy III.Y and directed Board Staff to prepare another first reading of policy.

APPLICABLE STATUTES, RULE OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.Y.

BACKGROUND/DISCUSSION

Over the last year and a half, Board Staff, the Division of Professional-Technical Education (PTE) and a diverse stakeholder group evaluated Idaho's Advanced Opportunities programs and is proposing amendments to the TechPrep program.

The "traditional" TechPrep Program contained in Board policy allows any secondary professional-technical student the opportunity to participate in a TechPrep Program that allows them to receive postsecondary credits at the conclusion of the program when they matriculate to a postsecondary institution. The TechPrep Programs must have an approved articulation agreement between the high school and the postsecondary institution; this agreement outlines how the credits will transfer at the conclusion of the program.

Technical Competency Credit (TCC) students – students who are currently called TechPrep students - would not be considered postsecondary students. They do not earn credits until they have (a) successfully demonstrated the program competencies, (b) completed the transcription request process, a process governed by this policy and the transcribing institution's TCC transcription policy, and (c) paid a $10 transcription fee.

The Technical Competency Credit standards are based on the current TechPrep Program standards. Standards for all Advanced Opportunities include requirements for program administration, evaluation, and student advising, as well as requirements that the course content is comparable to courses at the

institutions and that the students are assessed based on the same standards as those taking postsecondary courses. The TCC standards included these same requirements as they apply to professional-technical courses within the technical colleges.

IMPACT

Proposed amendments clarify how secondary students may earn postsecondary technical credits using either Technical Competency Credit and Dual Credit.

ATTACHMENTS

Attachment 1 – Board Policy III.Y, Advanced Opportunities – First Reading Page 3

STAFF COMMENTS AND RECOMMENDATIONS

At the June 2014 Board meeting, the Board asked Board Staff to prepare this policy for a new first reading. The Chief Academic Officer prepared a new version based on previously received comments. This version was widely disseminated to numerous stakeholder groups, including PTE, Dual Credit Coordinators, and Transition Coordinators. Feedback from these groups was incorporated into a revised version and again disseminated to them. Additional feedback was again incorporated.

The proposed amendments to this policy were presented to the Council on Academic Affairs and Programs (CAAP) at its September 25, 2014 meeting; CAAP recommends approval.

The Instruction, Research, and Student Affairs (IRSA) Committee reviewed this policy at their October 2, 2014 meeting.

This policy outlines the process and minimum standards for the various Advanced Opportunity options available to secondary students. It does not dictate how the secondary schools or postsecondary institutions internally manage the processes.

Staff recommends approval.

BOARD ACTION

I move to approve the first reading of proposed amendments to Board Policy III.Y. Advanced Opportunities as submitted in Attachment 1.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Idaho State Board of Education
GOVERNING POLICIES AND PROCEDURES

SECTION: III. POSTSECONDARY AFFAIRS
SUBSECTION: Y. Advanced Opportunities ~~**June 2012**~~ **December 2012**

1. Coverage

Boise State University, Idaho State University, the University of Idaho, Lewis-Clark State College, Eastern Idaho Technical College, North Idaho College, the College of Southern Idaho, and the College of Western Idaho are covered by these policies. Postsecondary programs intended for transfer come under the purview of the Board.

2. Purpose

The State Board of Education ~~has made a commitment to improve~~is committed to improving the educational opportunities available to Idaho citizens by creating a seamless system of public education. The purpose of this policy is to provide program standards for advanced opportunities for secondary students. To this end, the intent of Advanced Opportunities is:

a. ~~Board has instructed its postsecondary institutions to p~~For postsecondary institutions to provide educational programs and training to their respective service regions~~, to~~;
b. ~~support~~ Support and enhance regional and statewide economic development~~, ~~;~~ and~~
c. ~~to c~~Facilitate collaboration ~~ollaborate~~ between ~~with the~~all school levels, including public elementary and secondary schools~~.~~; ~~In addition~~
~~a.~~d. ~~to the Board's desire to prepare~~ Prepare secondary graduates for postsecondary programs;~~, the Board is also addressing advanced opportunities programs for qualified secondary students. These programs have the potential for reducing the overall costs of secondary and postsecondary programs to the students and institution~~
~~b.~~e. Enhance ~~their~~ postsecondary goals;
~~c.~~f. Reduce duplication and provide for an easy transition between secondary and postsecondary education; and
~~d.~~g. Reduce the overall cost of educational services and training to the student.

3. Definitions

~~There are various advanced opportunities programs students may access to receive post-secondary credit for education completed while enrolled in the secondary system. Examples include Advanced Placement® (AP), dual credit courses that are taken either in the high school or on the college campus, Tech Prep, and International Baccalaureate programs. For the purpose of this policy the~~ The State Board of Education recognizes four ~~different types of~~ advanced opportunities programs~~ depending upon the delivery site and faculty~~. They are: Advanced Placement®, Dual Credit, Technical Competency Credit (formerly known as Tech Prep), and the International Baccalaureate program.

a. Advanced Placement® (AP)

The Advanced Placement® Program ~~is,~~ administered by the College Board, is a series of~~. AP students may take one or more college level~~ courses in a variety of subjects. AP courses are not tied to a specific college curriculum, but rather follow national College Board curricula. While taking the AP exam is optional, students may earn college credit by scoring well on the national AP exams. Individual postsecondary institutions have ~~is up to~~ the discretion ~~of the individual colleges~~ to accept the scores from the AP exams to award college credit or advanced standing.

b. Dual Credit

i. Dual ~~credit~~ Credit is a program allowing ~~allows~~ high school students to simultaneously earn credit toward a high school diploma and a postsecondary degree or certificate. Dual Credit is simultaneously awarded to a student on his or her postsecondary and high school transcript for the successful completion of a single course. Postsecondary institutions work closely with high schools to deliver college courses that are identical to those offered on the college campus. Credits earned in a ~~dual~~ Dual ~~credit~~ Credit class become part of the student's permanent college record. Students may enroll in Dual Credit programs taught at the high school or on the college campus.

ii. Two types of post-secondary credit may be earned: *Academic* and *Technical*. Academic credits apply to postsecondary academic programs and some postsecondary technical programs. Technical credits generally only apply to postsecondary technical programs. Students must work closely with their advisor(s) to ensure the credit earned in their Dual Credit course will apply to their intended postsecondary degree program.

c. ~~Tech Prep~~Technical Competency Credit (TCC)

~~Professional-technical education programs are delivered through comprehensive high schools, professional-technical schools, and technical colleges. Tech Prep allows secondary professional-technical students the opportunity to simultaneously earn secondary and postsecondary technical credits. A Tech Prep course must have an approved articulation agreement between the high school and a technical college. Tech Prep is an advanced learning opportunity that provides a head start on a technical certificate or an associate of applied science degree.~~

i. Technical Competency Credit (TCC) allows secondary students to document proficiency in the skills and abilities they develop in approved high school professional-technical programs to be evaluated for postsecondary transcription at a later date. In addition to the standards outlined in section 4.d below, additional policies of the transcribing post-secondary institution may also apply.

~~i.~~ii. Technical Competency Credits are awarded for skills and competencies identified as eligible TCC through a TCC Agreement with at least one Idaho postsecondary institution. Eligible skills and competencies are included in approved high school professional-technical programs and approved by the postsecondary institution in advance. Students participating in a high school program approved for TCC are not considered postsecondary students until they matriculate to a postsecondary institution.

d. International Baccalaureate (IB)

Administered by the International Baccalaureate Organization, the IB program provides a comprehensive liberal arts course of study for students in their junior and senior years of high school. IB students take end-of-course exams that may qualify for college-credit. Successful completion of the full course of study leads to an IB diploma.

4. Idaho Programs Standards for Advanced Opportunities Programs

All advanced opportunities programs in the state of Idaho shall be developed and managed in accordance with these standards which were designed to help school districts, colleges and universities plan, implement, and evaluate high quality advanced opportunities programs offered to high school students before they graduate. Students must work closely with their advisor(s) to ensure the credit earned in their Advanced Opportunities course will apply to their intended postsecondary degree program.

a. Dual Credit Standards for Students Enrolled in Courses Taught at the High School

Curriculum

Curriculum 1 (C1**)**	Courses administered through a Dual Credit program are catalogued courses and approved through the regular course approval process of the postsecondary institution. These courses have the same departmental designation, number, title, and credits; additionally these courses adhere to the same course description and course content as the postsecondary course.
Curriculum 2 (C2)	Postsecondary courses administered through a Dual Credit program are recorded on students' official academic record of the postsecondary institution.
Curriculum 3 (C3)	Postsecondary courses administered through a Dual Credit program reflect the pedagogical, theoretical and philosophical orientation of the sponsoring faculty and/or academic department at the postsecondary institution.

Faculty

Faculty 1 (F1)	Instructors teaching college or university courses through Dual Credit meet the academic requirements for faculty and instructors teaching ~~in~~

	at a postsecondary institution or provisions are made to ensure instructors are capable of providing quality college-level instruction through ongoing support and professional development.
Faculty 2 (F2)	The postsecondary institution provides high school instructors with training and orientation in course curriculum, student assessment criteria, course philosophy, and Dual Credit administrative requirements before certifying the instructors to teach the college/university's courses.
Faculty 3 (F3)	Instructors teaching Dual Credit courses are part of a continuing collegial interaction through professional development, such as seminars, site visits, and ongoing communication with the postsecondary institutions' faculty and dual credit administration. This interaction addresses issues such as course content, course delivery, assessment, evaluation, and professional development in the field of study.
Faculty 4 (F4)	High school faculty is evaluated by using the same classroom performance standards and processes used to evaluate college faculty.

Students

Students 1 (S1)	High school students enrolled in courses administered through dual credit are officially registered or admitted as degree-seeking, non-degree or non-matriculated students of the sponsoring postsecondary institution.
Students 2 (S2)	High school students are provided with a student guide that outlines their responsibilities as well as guidelines for the transfer of credit.
Students 3 (S3)	Students and their parents receive information about Dual Credit programs. Information is posted on the high school's website regarding enrollment, costs, contact information at the high school and the postsecondary institution, grading, expectations of student conduct, and other pertinent information to help the parents and students understand the nature of a Dual Credit course.
Students 4 (S4)	Admission requirements have been established for Dual Credit courses and criteria have been established to define "student ability to benefit" from a Dual Credit program such as having junior standing or other criteria that are established by the school district, the institution, and State Board Policy.
Students 5 (S5)	Prior to enrolling in a Dual Credit course, provisions are set up for awarding high school credit, college credit or Dual Credit. During enrollment, the student declares what type of credit they are seeking (high school only, college only or both high school and college credit). To earn college credit, the student must be enrolled at the post-secondary institution. ~~Students are awarded academic credit if they successfully complete all of the course requirements.~~

Assessment

Assessment 1 (A1)	Dual Credit students are held to the same course content standards and standards of achievement as those expected of students in postsecondary courses.
Assessment 2 (A2)	Every course offered through a dual credit program is annually reviewed by postsecondary faculty from that discipline and dual credit teachers/staff to assure that grading standards meet those in on-campus sections.

Assessment 3 (A3)	Dual Credit students are assessed and awarded credit using the same methods (e.g. papers, portfolios, quizzes, labs, etc.) as their on-campus counterparts.

Program Administration and Evaluation

Admin & Evaluation 1 (AE1)	The Dual Credit program practices are assessed and evaluated based on criteria established by the school, institution and State Board to include at least the following: course evaluations by dual credit students, follow-up of the Dual Credit graduates who are college or university freshmen, and a review of instructional practices at the high school to ensure program quality.
Admin & Evaluation 2 (AE2)	Every course offered through a Dual Credit program is annually reviewed by faculty from that discipline and Dual Credit staff to assure that grading standards meet those in postsecondary sections.
Admin & Evaluation 3 (AE3)	Dual Credit students are assessed using the same methods (e.g. papers, portfolios, quizzes, labs, etc.) as their on-campus counterparts.
Admin & Evaluation 4 (AE4)	A data collection system has been established based on criteria established by the high school, institution and State Board to track Dual Credit students to provide data regarding the impact of Dual Credit programs in relation to college entrance, retention, matriculation from high school and college, impact on college entrance tests, etc. A study is conducted every 5 years on dual credit graduates who are freshmen and sophomores in a college or university.
Admin & Evaluation 5 (AE 5)	Costs for high school students have been established and this information is provided to students before they enroll in a Dual Credit course. Students pay a reduced cost per credit that is approved annually at the Board's fee setting meeting and defined in Board Policy V.R. Fees. ~~The approval process will consider comparable rates among institutions within the state and the cost to deliver instruction for dual credit courses~~.
Admin & Evaluation 6 (AE 6)	Agreements have been established between the high school and the postsecondary institution to ensure instructional quality. Teacher qualifications are reviewed, professional development is provided as needed, course content and assessment expectations are reviewed, faculty assessment is discussed, student's costs are established, compensation for the teacher is identified, etc.
Admin & Evaluation 7 (AE 7)	Postsecondary institutions have carefully evaluated how to provide services to all students regardless of where a student is located.

b. Dual Credit Standards for Students Enrolled in Courses at the College/University Campus

A.	The student is admitted by the postsecondary institution as a non-~~matriculating~~ degree seeking student.
B.	The student is charged the part-time credit hour fee or tuition and additional fees as established by the institution.
C.	Instructional costs are borne by the postsecondary institution.
D.	Four (4) semester college credits are typically equivalent to at least one

	(1) full year of high school credit in that subject.
E.	~~In compliance with Idaho Code 33-5104,~~ As part of the enrollment process, institutions must ensure the student and the student's parent/guardian ~~must~~ receive ~~sign and submit a~~ counseling ~~form~~ that ~~provided by the school district or institution that~~ outlines the ~~provisions of the section of this Code. The counseling form includes written permission from the student's parent/guardian, and principal or counselor~~risks and possible consequences of enrolling in postsecondary courses, including but not limited to the impacts on future financial aid, and the consequences of failing or not completing a course in which the student enrolls. It is the responsibility of the postsecondary institution to provide advising for all students taking courses on the postsecondary campus.
~~F.~~	~~Any high school student may make application to one of the public postsecondary institutions provided all of the following requirements are met:~~ ~~The student has reached the minimum age of 16 years or has successfully completed at least one-half of the high school graduation requirements as certified by the high school.~~ ~~Submission of the appropriate institutional application material for admission. Written notification of acceptance to the institution will be provided to the student after he or she submits the appropriate application.~~ ~~If required by institutional policy, a student must obtain approval of the college or university instructor to enroll in a course.~~ ~~Those high school students meeting the above requirements will be permitted to enroll on a part-time basis or full-time basis as defined in Board policy.~~
~~G~~F.	~~Students seeking admission who do not meet the above requirements may petition the institution's admission committee for consideration.~~ Students under the age of 16 who are enrolled in a ~~public~~ secondary school may seek admission to enroll in courses provided on the postsecondary campus by submitting a petition to the high school principal's office and to the admissions office of the postsecondary institution.

c. Advanced Placement Standards

Advanced Placement (AP) courses are taught by high school teachers following the curricular goals administered by The College Board. These ~~college level~~ courses are academically rigorous and conclude with the optional comprehensive AP exam in May. Students taking AP courses accept the challenge of a rigorous academic curriculum, with the expectation of completing the complex assignments associated with the course and challenging the comprehensive AP exam. The AP Examination is a national assessment based on the AP curriculum, given in each subject area on a specified day at a specified time, as

outlined by the College Board. Students and parents are responsible for researching the AP policy of the postsecondary institution the student may wish to attend. College/university credit is based on the successful completion of the AP exam, and dependent upon institutional AP credit acceptance policy.

Curriculum

Curriculum 1 (C1**)**	Postsecondary institutions evaluate AP scores and award credit reflecting the pedagogical, theoretical, and philosophical orientation of the sponsoring faculty and/or academic department at the institution.
Curriculum 2 (C2)	High school credit is given for enrollment and successful completion of an AP class.

Faculty

Faculty 1 (F1)	AP teachers shall follow the curricular materials and goals outlined by The College Board.
Faculty 2 (F2)	The AP teacher may attend an AP Institute before teaching the course.

Students/Parents

Students 1 (S1)	A fee schedule has been established for the AP exam. Students and their parents pay the fee unless other arrangements have been made by the high school.
Students 2 (S2)	Information must be available from the high school counselor, AP coordinator or other faculty members regarding admission, course content, costs, high school credit offered and student responsibility.

Assessment

Assessment 1 (A1)	Students are assessed for high school credit according to the requirements determined by the high school.

Program Administration and Evaluation

Admin & Evaluation 1 (AE1)	To evaluate the success of the programs and to improve services, the school district must annually review the data provided by The College Board.
Admin & Evaluation 2 (AE2)	The school district must carefully evaluate how to provide services to all students, regardless of family income, ethnicity, disability, or location of educational setting.

d. ~~Tech Prep~~Technical Competency Credit (TCC) Standards

Professional-Technical Education programs in Idaho are delivered through comprehensive high schools, professional-technical schools, and the technical college system. ~~Tech Prep~~Technical Competency Credit allows secondary professional-technical students the opportunity to ~~simultaneously~~ earn secondary and postsecondary technical credits. ~~A Tech Prep~~Technical Competency Credit ~~course~~is offered through ~~must~~ approved secondary professional-technical programs and ~~have~~ with an ~~approved~~ articulation agreement between the high school and a postsecondary institution. ~~Tech Prep~~Technical Competency Credit is an advanced learning opportunity that provides a head start on a technical

certificate~~,~~ or an associate of applied science degree~~, or towards a baccalaureate degree~~.

Curriculum

Curriculum 1 (C1**)**	~~A Tech Prep course must have an approved articulation agreement with a postsecondary institution.~~ The high school professional-technical program must have competencies comparable with a postsecondary institution technical program and be identified as eligible for TCC consideration through a TCC Agreement (e.g., articulation agreement) with at least one Idaho postsecondary institution.
Curriculum 2 (C2)	Secondary and postsecondary educators must agree on the technical competencies, the student learning outcomes, and ~~agree to~~ the level of proficiency to be demonstrated by the student.

Faculty

Faculty 1 (F1)	Secondary ~~and postsecondary~~ educators must hold appropriate professional-technical certification in the program area for which ~~articulated~~ credit is to be awarded.

Students~~/Parents~~

Students 1 (S1)	~~Tech Prep~~Technical Competency Credit (TCC) students are high school students; they are neither enrolled in the postsecondary institution nor counted as Dual Credit students. Students may request transcription of TCCs onto a postsecondary transcript after demonstrating the required level of proficiency; they must follow the transcribing institution's TCC transcription policy and pay the transcription fee discussed in standard AE1. After completing a TCC course or sequence according to the articulation agreement, the credits must be transcribed within the time period required by the transcribing institution and in no instance longer than two years.
Students 2 (S2)	High school students are provided with a student guide that outlines their responsibilities, guidelines for credit transfer and information regarding how the technical credit will apply to postsecondary certificates and degree requirements. The student guide must include an explanation of the difference between technical and academic credit, how a professional-technical course is a part of a professional-technical program sequence, and how the courses may impact their academic standing when they fully matriculate after high school.
Students 3 (S3)	At the completion of the ~~Tech Prep~~Technical Competency Credit ~~course~~ program, the instructor ~~will~~ shall identify ~~recommend~~ students ~~eligible for college credit based on their performance. To be eligible for college credit students must receive a grade of B or complete a minimum of 80% of the~~who have met program competencies ~~in the course~~.

Assessment

Assessment 1 (A1)	The students are assessed for ~~high school and~~ postsecondary technical credit according to the requirements of the Technical Competency Credit ~~articulation~~ agreement.

Program Administration and Evaluation

Admin & Evaluation 1 (AE1)	~~The technical college in each region administers the Advanced Learning Partnership (ALP). The school districts in each region are members of the ALP. The Tech Prep program is administered through the six Advanced Learning Partnerships and each of the technical colleges serves as the fiscal agent. The ALP Advisory Committee meets at least twice per school year.~~When the student requests the transcription of a TCC credit, they are assessed a transcription fee consistent with ~~the current Workforce Training Fee (~~Board Policy Section V.R ~~.3.a.ix)~~ for qualifying TCC earned in high school.
Admin & Evaluation 2 (AE2)	~~Each~~ TCC ~~articulation~~ agreements between a secondary professional-technical program and a postsecondary institution must be reviewed annually by the institution.

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HIGHER EDUCATION RESEARCH COUNCIL

SUBJECT

Technology Transfer Feasibility Study

REFERENCE

June 2012	Board requested UI, BSU, and ISU to jointly conduct a feasibility study around a centralized technology transfer organization similar to WiSys and to follow up with the Instruction, Research and Student Affairs Committee.

BACKGROUND/DISCUSSION

The three Vice Presidents of Research discussed the most appropriate way to conduct the study with the Instruction, Research and Student Affairs (IRSA) Committee. It was determined that the Higher Education Research Council (HERC) should take the lead on facilitating the study and bring the findings back to the Board when completed.

HERC hired Dr. William Tucker to conduct the study. Dr. Tucker currently works for the Office of Technology Transfer at the University of California, in Oakland CA. In 2004, Dr. Tucker became the Executive Director, Research Administration and Technology Transfer. During his career, Dr. Tucker has experience both the consolidation of technology transfer offices within a higher education system and the de-consolidation of these functions. Based on these experiences, HERC felt he would have in-depth knowledge of what it would require for Idaho to move to a similar structure and if that structure was feasibly given Idaho's unique geological and infrastructure capabilities. In the process of conducting the study Dr. Tucker traveled to Boise to interview the members of HERC as well as industry stakeholders that were identified by the Department of Commerce. Dr. Tucker also interviewed staff working in the technology transfer offices at each of the research institutions as well as additional industry partners identified by each of the institutions. Dr. Tucker also studied each universities individual technology transfer structures and resources.

Dr. Tucker completed his work and provided HERC with the final report in May 2014. The final conclusion of Dr. Tucker's work is that given Idaho's limited resources for research and technology transfer and unique geographical challenges it would not be feasible for Idaho to move to a centralized Technology Transfer organization. In addition to this finding, Dr. Tucker, at the request of HERC look for areas where there could be efficiencies and stronger collaborations formed between the institutions.

HERC has reviewed the report and has discussed the recommendations contained in the report and how those recommendations could be implemented. In addition

to the report itself HERC is providing the Board with an outline on how the recommendations could be addressed in the near future.

IMPACT

This presentation with allow HERC to provide the Board with the requested study as well as discuss next steps in response to the study with the Board.

ATTACHMENTS

STAFF COMMENTS AND RECOMMENDATIONS

Dr. Mark Rudin, Vice-President for Research at Boise State University and the current Chair for HERC will present the findings from the report to the Board.

BOARD ACTION

This item is for informational purposes only. Any action will be at the Board's discretion.

Higher Education Research Council (HERC)
Response to Opportunities to Enhance Technology Transfer Report

Key Findings	Action	No Action	Comments
Consolidation of Idaho research institutions technology transfer activities.		X	The review of Idaho's patenting and licensing infrastructure at its research universities reveals that, while small on the scale of the leading U.S. research universities, it is operating reasonably well given its size and the unique geographical and historical characteristics of the institutions. It does not appear that much real benefit can be gained by centralizing functions in an attempt to create either economies of scale or standardized processes. Successful technology licensing depends on creating strong, trust-based relationships with both researchers and industry, which is best facilitated at the local level. At the current scale of Idaho's combined operations, the costs associated with creating any centralized structure far outweigh any benefits, and may actually degrade quality of the interactions being created at the local level.

Observation	Action	No Action	Comments
Educate all stakeholders, internal and external to the capabilities of the research institutions and necessary process and procedures to work with the institutions.	X		Institutions will coordinate efforts with the Board office to tell success stories involving applied research at the institutions, technology transfer and commercialization, and other success working with industry partners and benefits to Idaho's economic development The three Vice Presidents of Research (VPR's) will work collaboratively to identify specific barriers and misconceptions and then direct institution's sponsored projects staff to address the specific issues.
Institutions need to evaluate their mission in relation to the state education system as well as economic development and establish policies and procedures in alignment with both, including institution policies that incentivize faculty to conduct applied research.	X		The VPR's will reconstitute the Technology Transfer Consortium, the Consortium is made up of staff from each of the institutions who work with technology transfer on each campus. The Consortium will work together to identify and streamline process that are common to each institution and ways to reduce the current timeline involved with contracting with industry partners HERC's industry partners will approach the Idaho Technology Council regarding the creation of an award for faculty at the institutions that have particularly active/instrumental working with industry to commercialize institution research Board staff will follow-up with institutions on Board request to look at institution specific tenure policies to incentivize applied research

Observation	Action	No Action	Comments
Identify successful ecosystems the develop environments the support expanded and diversified networks to support innovation to better connect existing business, the investment community and the institutions.	X		Each Institution will continue to experiment with programs the consolidate and categorize the institutions academic and technical expertise so as to make them more visible to partners seeking collaborations. The VPR's will identify best practices in other states that have similar geographic and population density issues. Institutions will identify ways to influence research to address issues that are important to the local economy and/or industry as well as meet the needs and expertise of institution researches.
Land Grant institutions have this public-facing obligation built in to their charter to the extent that it supports the agricultural community, but in the 21st Century, perhaps this notion of supporting the community has to extend beyond agriculture to advancing non-agrarian frontiers that are essential to supporting State economies.	X		Currently under review at the University of Idaho
The Board and the institutions need to continually evaluate existing policies and laws to identify barriers and ways to address those barriers as applicable. This includes barriers to negotiations with other state agencies as well as the private sector.	X		The Technology Transfer Consortium will continue to meet and identify barriers and bring those issues to the attention of the appropriate institution staff as well as Board staff Board staff and legal counsel will work to address specifics issues with state agencies and work with other state agencies in understanding and meeting compliance with Board policy.

General Recommendations	Action	No Action	Comments
Developing common messaging/materials related to tech transfer			
HERC could charge the four institutions to develop some common documents that discuss the basic principles to which all institutions ascribe that underpin all interactions with external sponsors and licensors.	**X**		Consortium will identify which documents can be common and create and distribute the documents to the applicable institutions staff for incorporation in to institution processes.
….the universities could collaborate to develop licensing guidelines that would give staff charged with identifying and managing inventions some common understanding of how to manage frequently occurring situations in their day-to-day interactions with faculty and licensees.	**X**		Consortium will review the Board approved licensing guidelines and make sure all necessary staff at the institutions are aware of and use the guidelines.
HERC could sponsor some more formal gathering of technology licensing professionals on a regular or topic-specific basis.	**X**		The Consortium will identify topic and audience and work with appropriate institution staff to facilitate on a regional basis.
Using modern technologies to increase visibility and outreach to showcase Idaho technologies			
While all universities showcase their particular research through websites and other "portals", creating a coordinated approach across the four universities (and perhaps Idaho National Laboratory) could help foster new interactions with industry –an Idaho Researcher Profile.	**X**		Work with various entities to establish pathways to reach institutions and links to specific institution sites. It was felt that the Board office would be the logic host of a single portal, however, the Board office does not have the resources to maintain the necessary information, nor do the institutions have the resources to devote staff time to continually updating Board staff on the content of the portal. It was determined that it would be more efficient for the Board office to provide a single site with general information and then provide links to the specific institution sites.

Increasing industry engagement and seeding new collaborations			
To increase university-industry engagement, HERC could advocate for some form of "matching grant" program for companies that are willing to work with Idaho universities, and establish some research presence in Idaho. A parallel program could aim to strengthen existing relationships with large corporations, where deeper and richer interactions will help secure long-term interactions.		**X**	This is currently being accomplished through the grants awarded by HERC and the IGEM Council
Any new direction has to fit with the broad parameters of the institutions particular specialty so as to add to their professional qualifications. With this caveat, researchers generally look for ways in which to make their research useful, so if the state can define some "grand challenges" that align Idaho's needs with research competencies across the universities and which also have national or global implications, it could be possible to create programs that benefit all constituencies.	**X**		ISU and UI VPR will take the lead in developing a proposal and bring back to HERC on a proposal for bring key stakeholders together and identify "grand challenges" for Idaho.
Creating and supporting a more entrepreneurial culture			

HERC could sponsor a state-wide business plan competition to showcase the "best of the best" to an Idaho-wide audience, including potential investors from around the region.		**X**	This is currently being done by each of the institutions; by leaving it at the institution level each institution can meet specific regional needs. No addition action is necessary at this time, institutions will continue with current efforts.

….sponsoring the creation of Idaho-centric networks of individuals with affinity to the state to advise new and emerging companies.		**X**	This is currently being done by each of the institutions; they institutions will work to better identify and utilize existing resources like the UI law clinic, this will be done in part through the collaborations of the Technology Transfer Consortium. No addition action is necessary at this time, institutions will continue with current efforts.
Enhancing new business creation through modest investment in individuals, technologies and companies			
Idaho could enhance venture-creation by modest investments in individuals, technologies and companies seeking to create opportunities in the state.		**X**	The Idaho Department of Commerce is currently working in this area. Each institutions is working with Commerce at some level (through participation on the IGEM Council) to keep Commerce up to date with each institutions capabilities
Entrepreneurship education is becoming almost mandatory for 21st century research universities. Idaho could enhance the entrepreneurial culture by challenging it research universities to develop programs that give budding entrepreneurs the knowledge and experience they need to succeed.		**X**	Each institution has programs in place to this end.
….Idaho could provide modest financial support, possibly as Entrepreneurial Fellowships that allow scientists and engineers to grow their entrepreneurial talents. Fellowships could include participation in existing formal programs, such as i-Corps, or by working with mentors to create business opportunities around emerging technologies from the university community.		**X**	

Idaho could support new business creation by establishing a state-wide mechanism that funded commercial proof-of-concept research that demonstrated the commercial utility of promising new discoveries.		**X**	This is currently being accomplished through the IGEM Council
….companies attempting to develop new technologies into viable businesses could benefit from an infusion of very early stage capital to help them achieve the business milestones needed to secure traditional follow-on funding.		**X**	This is currently one of the purposes of the IGEM Council

Dr. William Tucker

Dr. Tucker was born in the UK and educated in Australia. He holds a B. Sc. (Hons) and a Ph. D. in Microbiology from the University of Queensland. He also holds an MBA degree from St. Mary's College in Moraga, California. Dr. Tucker held post-doctoral research fellowships at Stanford University (with Prof. Stanley Cohen) and at the Research School of Biological Sciences at the Australian National University in Canberra Australia. He also holds an MBA degree from St. Mary's College in Moraga, California.

Dr. Tucker's career began as a research scientist in agricultural biotechnology and then in technology management and business development at Advanced Genetic Sciences, DNA Plant Technology, Applied Biosystems, Celera Genomics and Paradigm Genetics.

In 2003, Dr. Tucker joined the Office of Technology Transfer at the University of California, Office of the President, in Oakland CA. In 2004, Dr. Tucker became the Executive Director, Research Administration and Technology Transfer. In 2010 following a reorganization of the Office of Research and Graduate Studies, his office was renamed Innovation Alliances and Services to reflect a broader role in supporting and enhancing interactions with industry to help move technology from the laboratory to the marketplace.

Opportunities to Enhance Technology Commercialization at Idaho's Public Higher Education Institutions

A Report to the Higher Education Research Council of the Idaho State Board of Education

William Tucker, Ph.D., MBA

5/27/2014

A. Executive Summary

This report summarizes observations made during a series of telephone interviews with internal and external stakeholders on the subject of how to enhance the technology commercialization efforts of Idaho's public research universities and makes a series of recommendations on ways Idaho can enhance technology commercialization. While originally designed to look at organizational structure and administrative processes associated with the patenting and licensing activity traditionally associated with "technology transfer", technology commercialization and its resultant economic impact encompasses a much broader spectrum of activities where state-wide coordination and programs could add value.

The review of Idaho's patenting and licensing infrastructure at its research universities reveals that, while small on the scale of the leading U.S. research universities, it is operating reasonably well given its size and the unique geographical and historical characteristics of the institutions. It does not appear that much real benefit can be gained by centralizing functions in an attempt to create either economies of scale or standardized processes. Successful technology licensing depends on creating strong, trust-based relationships with both researchers and industry, which is best facilitated at the local level. At the current scale of Idaho's combined operations, the costs associated with creating any centralized structure far outweigh any benefits, and may actually degrade quality of the interactions being created at the local level.

Based on the interviews, this report makes some general recommendations on way that the Higher Education Research Council and the State Board of Education could enhance technology commercialization. These recommendations fall into four areas:

1. Developing common messaging/materials related to technology transfer
2. Using modern technologies to increase visibility and outreach to showcase Idaho technologies
3. Increasing industry engagement and seeding new collaborations
4. Creating and supporting a more entrepreneurial culture
5. Enhancing new business creation through modest investment in individuals, technologies and companies

The funding environment in which U.S. research universities operate and the expectations of national, regional and local governments are evolving rapidly. Idaho needs to be able to embrace and adapt to these changes to ensure that its research universities continue to deliver a high quality education experience that is relevant to the future aspirations of its students and also create strong and durable links to industry that enhance their ability to create economic value for Idaho.

B. Introduction: Technology Commercialization in the Context of the "Innovation Economy"

From the White House to Main Street, government and civic leaders of all political stripes recognize that the future of our nation's economy depends on innovation to create new growth opportunities. In the 21st Century, the research that will create this innovation occurs almost exclusively within our nation's research universities. Gone are the much-vaunted corporate research laboratories that drove post-World War II innovation and led to America's technological dominance of the late 20th century. The legacy of Bell Labs, Xerox Parc, Dupont Corporate R&D, etc. live on, but such structures succumbed to the Wall Street-driven financial pressure of quarterly earnings reports. Corporations can no longer afford to employ top-tier scientists and give them the freedom to explore ideas that do not immediately translate into product opportunities. Indeed, many of the leading scientists from these much vaunted organizations are now at the helm of some of the nation's leading academic research institutions where the same curiosity-driven research once housed in corporations is the raison d'etre.

Government leaders are asking the academic research community to play a more active role in local, regional and national economic development, and, implicitly or explicitly, demanding that universities and national laboratories demonstrate a "return on investment" of Federal research dollars. Concurrently, the academic research community has seen a significant decrease in the amount of Federal funding for basic and applied research which is leading all research universities to look increased industry sponsorship of research to make up for decreased Federal funding. These two elements are causing universities to rethink both the structures and the processes by which they engage with industry so as to make their research programs more visible and attractive, and their technology commercialization processes more facile.

This desire for increased engagement is playing out in an environment that is replete with apocryphal stories of difficult and failed interactions between universities and industry. While most university leadership understands and acknowledges that much of this rhetoric is used to leverage negotiation of business terms, the perception of intransigent university negotiators and outlandish or unrealistic technology valuations permeates the political dialog. When former UC President Mark Yudof took the reins at UC after heading the University of Texas system and before that, the University of Minnesota, he commented that at every institution he led, the first comment from certain industry segments was "Your university is the hardest university I have ever had to deal with" which he clearly saw as a negotiation tactic. In part, the views of industry are based on the differing fundamental philosophical and strategic goals of universities and industry and, in part, because of the differing role intellectual property plays with industry segments. Creating and nurturing successful industry relationships will and does require a significant investment from both university and industry leadership and front line negotiators to establish and build the mutual trust needed to overcome such ingrained misconceptions.

C. The structure of Idaho's research universities and the challenges to enhancing technology commercialization

Idaho, with its small population, an economy heavily weighted towards primary industry, and a geographically dispersed research university network finds itself in a challenging situation when it comes to commercializing technology originating from basic research. However, Idaho is by no means unique and many other states far from major population centers and industry hubs are wrestling with the same issues. As noted above, the expectations of all levels of government is that universities will be the catalyst of new economic growth, but elected officials rarely understand the inter-related components that are needed to establish and maintain an innovation ecosystem, most of which are not present, or at the best nascent in many university-based communities.

In the aggregate, the four research universities; University of Idaho, Idaho State, Boise State and Lewis and Clark College have a total research expenditure of approximately $150 Million, which makes them equivalent to UC Santa Cruz and UC Riverside, the smallest long-established campuses of the University of California ("UC") system (UC Merced, UC's newest campus has only been in existence for less than 10 years). A comparison of the traditional licensing metrics, as reported in the process of this review, indicates that the combined Idaho schools perform comparably with these UC campuses, notwithstanding the support that these UC campuses get by being part of the UC system. Thus, the initial observation is that current operations are not significantly underperforming relative to like-sized institutions. It should be noted that both Boise State and Idaho State are working at increasing the visibility of their programs to the research community.

An initial question posed at the start of this review was whether some form of centralized structure would benefit the overall technology commercialization efforts of the Idaho schools. The overwhelming reality is that technology transfer and the other elements associated with creating economic value from basic research are relationship-driven. In the past 10 years, UC fully decentralized the management of individual inventions to staff located in campus offices that report through each campus' research administration organization. This change was driven by a range of factors, but underlying all these elements was the understanding that decisions made centrally for the most important aspects of technology transfer fail to recognize and respect the nuanced nature of these decisions, as well as the "political" implications of any decision on the local campus environment. Granted, decentralized invention management may create some inefficiency in terms of staffing, but the loss of the immediacy of interactions between local staff and their researchers is far more telling.

The general observation within all universities is that the overwhelming pressure is to decentralize, even to the school/department level, so that control over decisions resides as locally as possible. University leadership has to strike a fine balance between

achieving economies of scale, serving faculty, and preserving consistency and integrity in decisions, but evidence points to the fact that "embedding" technology commercialization staff within units (even if managed centrally) creates greater opportunities for faculty education and engagement which results in more and better quality disclosures. At UC Berkeley, recent experiment in embedding a very experienced technology licensing officer with a wealth of experience in patent drafting and prosecution in a department increased disclosure in that department by almost 40%. While modern information technology and communications systems can create vast virtual communities, direct interpersonal interactions are still the most effective way to engage with and educate faculty about technology commercialization.

The other element of Idaho's structure that is challenging is that, unlike other systems, Idaho has no very large campus to provide administrative infrastructure to the smaller campuses, as is the case in Wisconsin, where WARF provides the administrative backbone to WiSys, which serves the smaller campuses. The University of Texas system created a regional "hub" office in San Antonio to serve the UT San Antonio general campus and the health science campus as well as smaller regional campuses, but even that structure failed to survive the tension between the two San Antonio-based institutions. The NIH is also embarking on a plan to decentralize transactional decision-making to its Institutes so as to solve the operational dysfunction created by unlinked operational and budgetary authority.

For University leadership, the brutal reality is that technology commercialization is expensive, and few effective lower-cost alternatives exist. One can achieve economies of scale, but these tend to happen at the biggest schools where one has the opportunity to leverage consolidated administrative infrastructure and information technology. As noted above with the University of Wisconsin system, and with UC, the smaller campuses can avail themselves of services resident centrally for things such as financial management, patent prosecution management and information systems. However, even at UC, campuses still express a desire to increase local control over these functions and processes so they can be responsive to the nuanced nature of technology transfer. For operations of the scale of Idaho universities together with the largely independent management of each university, it is hard to identify how to create centralized administrative economies in a way that will function optimally for the professionals who are charged with the day-to-day task of indentifying, protecting and licensing research-created inventions.

Campus technology transfer office leaders explained that are using vended information systems solutions to help manage inventions and workflow. Fortunately, the few vendors in this space bring a wealth of experience to the table and they are constantly upgrading their offering to increase functionality and (hopefully) office productivity. UC created a custom "Patent Tracking System" in the 1980's after the passage of Bayh-Dole when no commercial solution existed because it recognized that it needed to have such a system to manage what was going to be a burgeoning invention portfolio. The same was true of Harvard, Stanford and like universities. A painful lesson for UC was that it

failed to adequately invest in its system for almost two decades, which created "functionality gap" between the UC system and the "best of class" systems available commercially, which can only be addressed by investing significant sums over many years to bring the system into the 21st century. Modern systems and information technology solutions do have the potential to make office operations more efficient, which allows more resources to be devoted to professional staff to create, nurture and grow the relationships that will increase engagement with faculty and the business community alike so investing in this component of technology commercialization operations is essential to success.

D. Creating economic impact is more than patenting and licensing

While it is easy to point to the Boston area, the San Francisco Bay area and the San Diego area as inspirational goals for a technology-centric economy, these three, and all like entrepreneurial ecosystems have evolved over many decades due to the presence of many factors beyond the mere presence of powerful research universities. The original goal of this analysis was to identify way in which Idaho could enhance technology commercialization resulting from the basic research through changes to administrative structures and processes. However, technology commercialization has to be considered in a much broader context, which requires that leadership look beyond the historical "patenting and licensing" functions of technology transfer, and consider how to create more holistic interactions between universities and their local, regional and even national industry partners to create the economic value that is being asked all universities.

The practical reality for the vast bulk of university research is that it is so early-stage that major businesses are unable to realize its potential due to lack of resources for internal follow-on research and development. The consequence of this fact is that the innovation ecosystem needs intermediary structures or organizations to translate/transform these raw ideas to a state where businesses or investors recognize the commercial potential to create a product or service. In some instances, the university itself can be the intermediary, but doing so brings with it challenges, both philosophical and practical.

Philosophically, universities exist primarily to educate students and create new knowledge, and are funded (in part) by government to do just that. Universities must ask if taking on more "applied" research will achieve their fundamental goal. Practically, the traditional funding mechanisms and the academic reward system rarely support the research needed to demonstrate commercial potential. Government agencies fund basis research and judge the research competency of the principle investigator on peer-reviewed publications, and these academic publications do not highly value applied or translational research. Add to this that universities' promotion and tenure systems are weighted heavily toward publication, which creates a strong disincentive for faculty to

pursue commercially-directed research relative to exploring basic questions presented by (perhaps) the same underlying research result. Universities must decide whether the "economic imperative" is sufficiently compelling for them to rethink their reward systems to incentivize research that could lead to commercial application of basic discoveries over further basic research. In regions where the university is literally "the only game in town", it universities may be compelled to take this course of action to, at least, attempt to initiate an innovation ecosystem.

As noted previously, building an innovation ecosystem requires more than great ideas. It requires entrepreneurial management and financial resources. It also requires other societal attractors such as affordable housing, good schools, robust social and business networks and quality of life. Universities can be a source of ideas, and in some aspects help create and nurture the societal attractors in their immediate communities. Unfortunately, universities do not (especially in today funding environment) have the financial resources nor the seasoned entrepreneurial management talent required for success. However, universities are well stocked with nascent entrepreneurs, be they undergraduate or graduate students, or faculty. An almost a universal theme at U.S. research universities is to increase entrepreneurial training and experience for students and faculty, be it through formal programs at business schools or elective "hands on" boot camps or similar programs. Even the Federal government has recognized this need and is beginning (in a very modest way) to support entrepreneurial education thorough programs like the NSF i-Corps network.

Another recurring theme in our institutions is the need to reevaluate our graduate education programs, recognizing that an academic tenure-track career is a low probability outcome for the vast majority of our graduate students. Providing opportunities for entrepreneurially minded students to "test their mettle" in the relative safety of the university community and at a time when failure has little long term financial or personal ramifications will inure to the university's long term benefit. However, one large technology company was recently quoted as saying their strategy for hiring the next generation of engineers was not to look to traditional internships for talent, but to acquire small businesses and retaining the entrepreneurial talent, as these individuals had the passion to drive the next generation of the company's products and services.

The innovation ecosystem is built on networks and relationships. The preeminent innovative environments have rich existing networks that are expanded and diversified with each successive wave of innovation. Successful innovative businesses become the center of technology networks in their particular area, partly though the "out migration" of talent to new entrants in that field. Private investors also create networks through their participation in investment partnerships and connections to entrepreneurial management. Incubators and accelerators also create networks of young entrepreneurs all seeking similar goals, albeit in different specific product areas. Universities who can plug into these networks benefit from this intricate web of connections. The inability to benefit from this "network effect" is perhaps the biggest hurdle for universities in states

such as Idaho where the existing business and investment community is not well connected and certainly not particularly "tech savvy". In this situation, universities have to work even harder to create and build networks that support technology commercialization. Often, this network has to include links beyond the local communities to bring in the knowledge, talent and funding needed for success. Alumni can be a source of these things, as can others who have an affinity for the region for other reasons. In creating the entrepreneurial ecosystem in Utah, universities were able to tap into the investment community that frequents Park City for summer and winter recreation to increase the power of their local networks.

Another complicating factor is that more isolated universities lack some of the connections to industry that their "big city" counterparts use to great effect. The historical heavy dependence of Federal funding can create to an insular perspective with respect to industry, especially when industry is not "in the back yard". Connections with industry are strengthened by the employment of students in companies, but if those companies are not proximate to the university, and have no prior experience working with that particular institution, convincing them to enter into collaborative relationships is much more difficult. Universities have to create "bait" to attract new industry partners; this could be matching funding to entice companies to engage with an unfamiliar partner; or it could be lowering barriers to access to intellectual property.

Recently, other institutions, both in the U.S. and elsewhere have begun to rethink how they use existing intellectual property. Every university has unlicensed patents its portfolio and struggles with whether maintain them as costs increase. The concept of Easy Access IP, pioneered by Kevin Cullen at the University of Glasgow, and now at the University of New South Wales uses royalty free access to these unlicensed patents as a way to encourage companies to partner with the university to move the research forward. As reported by UNSW, this program has successfully induced companies to collaborate with faculty on research projects. The University of Minnesota is experimenting with a program that provide license rights for IP generated by the research to sponsoring companies for the payment of a "premium" at the time the research project is originated. These, and other similar approaches, are all relatively new and untested, but in certain circumstances, they may catalyze a new, productive, and long term relationship as both the university and industry use the experience to understand how to work collaboratively together for mutual benefit.

Another challenge that all universities, especially more geographically isolated universities, face is showcasing their research capabilities to a broad industry audience. If a university has "brand recognition", those looking for technology or expertise start there and rarely go much further. Many universities are experimenting with programs that consolidate and categorize ("profile") their academic and technical expertise so as to make them more visible to partners seeking collaborations. Such profiles can make identifying relevant research easier than searching for sites of individuals with a particular research background or technical expertise. Beyond enhancing outreach to external stakeholders, such systems can facilitate internal collaborations as researchers

can more easily locate potential collaborators from outside their direct circle of contacts. One example of how a state has leveraged this capability is "Reach NC", (www.reachnc.org) which uses a commercial platform marketed by Elsevier to create profiles of researchers based on publicly available publication, grant and patent information from a wide range of academic disciplines at universities large and small in North Carolina. Other vendors, such as Thomson Reuters offer similar services, while some universities have developed analogous systems using open source software (e.g., http://profiles.ucsf.edu/search/) to create the same functionality. The goal of all such systems is to increase the visibility of their research and researchers to as broad an audience as possible. Such sites can move beyond mere catalogs of competencies to highlight innovative research, breakthrough inventions and successful partnerships, all of which enhance the public perception of the value that universities bring to society.

E. Observations from interviews with external stakeholders

A series of telephone interviews were conducted with individual selected by the HERC. These interviews revealed some very positive interactions as well as some areas where the interviewee expressed frustration with the interaction. Inevitably in such interviews, those with frustrations are more likely to air their grievances than those happy with the process, so negative reactions tend to outweigh positive feedback.

Overall, the discussions had positive feedback on the current technology commercialization process. Interviewees with direct experience working with Idaho universities spoke of the value created by their relationships with faculty and the support of the technology transfer offices. In particular, Karen Stevenson at University of Idaho was cited twice as being instrumental in creating value for the interviewee.

Interviewees also were complimentary of the role of the IGEM program and its ability for foster new relationships with local small businesses. State-supported programs that help build linkages between universities and industries can be important in breaking down real and perceptual barriers that limit technology commercialization. For a 14 year period from the late 1990s to the early 2010s, UC operated a Discovery Grant program that provided matching funding to collaborative research projects with companies with a California research presence. It also focused on graduate training which further strengthened the relationship if the graduate was employed by the sponsoring company. By and large, the program was very successful, but California's deep fiscal crisis in the past few years and the reduction in State appropriations for the university led to the termination of this program, much to the chagrin of researchers and administrators alike. To be successful, such programs need to have a "light touch" so as to facilitate negotiation of business terms that create the most value for all parties.

A common thread in these discussions was a degree of frustration in setting up and maintaining ongoing research collaborations. The criticisms expressed were not unusual

or uncommon, and often voiced when industry discusses their opinions about attempting to connect to universities. Often this disconnect can, in part, be attributed to fundamental differences between university and industry. Universities have a different approach to research, different funding models and different timescales, all of which can frustrate a company seeking to more a product idea forward as quickly as possible in a ruthless competitive environment for investment and market share.

One interviewee was frustrated that the collaborative relationship lacked the continuity needed to advance the product. Basically, the company was expecting continuous outsourced research support, when the reality is that faculty and graduate students have other equally important demands on their limited time and resources. Perhaps the company's project, while interesting, was not (and rightly so) their highest priority. Such discussions point out the need for increased communication with potential industry collaborators at the earliest stages of engagement. In an era where all universities are looking to industry to back-fill gaps in traditional funding, as well as create local economic development, establishing a clear set of "ground rules" is a key to success.

Another interviewee raised a related point of the motivation or incentives for researchers to collaborate with industry. The notion of social or administrative "penalties" for researchers choosing to collaborate with industry is not unusual, but if universities are to build successful corporate research relationships, executive leadership has to promote and reward researchers who do.

Lastly, one interviewee mentioned a frustration with the speed of the administrative contracting process. Again, such criticism is not uncommon. One cause for such frustration is the inexperience of the contract negotiator with industry-sponsored agreements. In institutions where research is heavily weighted toward traditional Federally-funded research, industry contracts with their attendant (and necessary) focus on deliverables and intellectual property are outside the norm of most negotiators experience. In many larger institutions, and at a number of campuses in the UC system, industry sponsored research negotiators are differentiated from those who negotiate government grants, and located either in the same administrative management unit as the technology transfer office or closely aligned to it, so that they benefit from, and/or work collaboratively with technology transfer officers in negotiating the contractual language.

Beyond the "transactional" challenges noted above, another thread in these discussions related to the strategic direction of research programs at Idaho's universities, which might make the research more attractive to Idaho companies. Again, such comments are not unusual as States seek to advance their own economies. Historically, research universities have not played a major role in the strategic direction of their faculty's research endeavors, largely because that direction is determined by the priorities of funding agencies, and institutional funding is usually not sufficient or consistent to create and maintain a stable research program over many years. Also, any overt efforts to influence research direction can be perceived as challenging academic freedom.

However, as traditional funding shrinks and stakeholder's expectation of university contribution to economic development increase, universities may have to evaluate how, albeit with a light touch, they can influence research to address issues that are important to the local economy and/or industry. Failure to do so may disenfranchise the research institution from the broader public they serve, and compromise the political support needed to fund the basic education and research functions of the institution. Land Grant institutions have this public-facing obligation built in to their charter to the extent that it supports the agricultural community, but in the 21st Century, perhaps this notion of supporting the community has to extend beyond agriculture to advancing non-agrarian frontiers that are essential to supporting State economies.

The final area of concern noted related to more macro scale issues at the State level. Competition for resources amongst the schools leading to inefficiencies, and governmental resolve to maintain State-funded programs long enough to realize the benefit were two that were specifically mentioned. The former is not unexpected as all university leadership is intrinsically self-centered. When performance is judged using such criteria, doing otherwise would be counter-productive. Any multi-institutional program has to create the "wins" that all participants can claim, and funding has to be tied explicitly to collaboration. The latter is also real and perhaps more difficult to manage. Political will and politically-inspired programs have a periodicity directly linked to election cycles, and so programs with long term objectives are prone to criticism if they have not achieved their goal with the context of the election cycle, or, more importantly, not done a good job of timely communicating the positive steps they have made toward the goal in ways that satisfy those charged with oversight.

F. Observations from interviews with technology transfer leadership.

Discussions with technology transfer leaders were conducted after discussions with external stakeholders, so the participants were questioned about some points raised by the earlier interviews.

The leaders of the technology transfer offices at University of Idaho, Boise State and Idaho State, like most university technology commercialization offices, indicated that resources are the factor limiting performance. At universities with small research budgets, the budget of the technology transfer office is often commensurately larger as a percentage of the total research expenditure than larger schools because of the inability to benefit from economies of scale, so increasing the budget can be even more difficult to justify. In terms of evolution, the University of Idaho has a mature program, where as Boise State has more recently begun to invest in their technology transfer operation and Idaho State is just beginning to develop a dedicated program. Lewis and Clark College's research budget is small that creating a dedicated program is a real challenge.

All interviewees discussed the fact that they strive to work collaboratively with their sponsored projects offices to address industry-specific issues as they arise. Again, because of the size of the research program, creating specific "industry-sponsored research" offices in not practical, so creating a good collaborative environment with a commitment to timely responses to questions, and rewarding such behavior by staff is the best practical solution to administrative "silo-ing" (i.e., the "it's not my problem to solve" attitude) that can sometimes result from individuals carrying large case loads.

Both University of Idaho and Boise State University noted that they were working with Inteum Corporation's database to supports their operations. As Inteum has the largest market share in the global technology transfer community, these campuses will likely benefit from the advances Inteum makes with regard to interfacing with Client Relationship Management systems. It would be useful if all universities used the same system (or at least compatible systems) to facilitate centralize reporting or perhaps consolidation of financial accounting if/when such an action would create economies of scale.

The interviewees also discussed inter-institutional collaboration, and to a certain extent inter-institutional competition. While no formalized inter-institutional working group for technology transfer staff exists (which makes sense given the logistical complexities of intra-state travel) the leadership discussed the fact that they communicate when needed and cross-refer enquiries that would be more appropriately directed to another university. The national AUTM organization also has specific working groups for "small offices" so participation in those groups would help understand how like-sized offices manage to meet their institutional objectives. One possibility would be to create some internal communication channels such as a list-serve, wiki, or chat-rooms that allow practitioners to share experiences. However at this stage, because of the limited number of staff across the four institutions, the best solution is probably to pick up the phone or to e-mail directly. Using AUTM's broad network of e-groups could be more effective than an "Idaho-centric" solution.

The value of broader inter-institutional research collaborations was a subject also discussed by interviewees. The Center for Advanced Energy Studies ("CAES") was highlighted as an example of how universities could collaborate across institutional boundaries to create a state-wide program that established a center of excellence. Granted CAES benefited from strong Federal government support through Idaho National Laboratory, but it does demonstrate that strategic investments in technology in areas where multiple institutions have potentially synergistic resources can create real value and help breakdown historical barriers to collaboration between autonomous universities. CAES' success may have been helped by the fact that INL offered "neutral territory" as well as financial support for this collaborative effort.

In 2000, with the support of (then) California Governor Gray Davis, UC held a systemwide competition for four Institutes for Science and Innovation ("ISIs"); multi-

campus, multi-disciplinary structures focused on addressing research strategically important to California. The ISIs had to be "industry-facing" to ensure their research programs addressed the most important challenges faced by their particular industry sector. To be considered eligible for the program, the ISI had to demonstrate a 2:1 match of State funding. Each successful institute received $200 Million from the State and matched it with at least $400 Million from industry or philanthropic sources. In the subsequent 14 years, these institutes have developed state of the art facilities and innovative programs in their areas of focus. While the investment of such large sums is likely infeasible for Idaho, in certain areas where the State has identified strategic value and existing, but uncoordinated research programs, an analogous program that brings together researchers under a common umbrella and requires outreach to industry for matching funding could catalyze new research that creates inventions and businesses that create an Idaho-focused innovation-driven business ecosystem.

In searching for administrative efficiencies, the concept of "template" or "express" licenses are often raised as a way to streamline business processes. In general, most "templates" are customized almost immediately, and non-negotiable "express" licenses rarely survive unscathed. All institutions (as do companies) create contracts that comport to their particular legal standards with language determined by internal or external legal counsel, so attempts to streamline by mandating uniform language across institutions are rarely successful. In fact, some of the most challenging negotiations happen between universities and their own State bureaucracies because of the inability of the State to change "mandatory" language that does not apply to the specific contractual relationship with a public research university. What could be informative is to compare like contracts from all institutions to determine if any have significantly different legal interpretations of standard contractual requirements as a way to protect all universities from accusations that "I got these terms at …"

Creating a greater awareness in the local business community of the nature and potential contractual constraints of university sponsored research and license agreements is one way to manage expectations with collaborators and licensees unfamiliar with university practices. Boise State described a process of reviewing their basic license agreement with 30 individuals in three sessions to explain and obtain buy- in on the agreement. This type of outreach helps socialize the university's principles and values and protects against accusations of unreasonableness. Producing a generic "how to work with Idaho universities" document could be a first step in creating greater engagement with local business and signal to all external stakeholders the openness of the research university community to engage with business, while at the same time making a clear point about the underlying principles to which the universities adhere.

One other area that has the potential to impede efforts to enhance technology commercialization is the constraints imposed by public universities being "State" entities and being required to operate under the same rules as other State agencies. In general, governments everywhere are not flexible or nimble, characteristics of successful small and medium size enterprises that technology commercialization aspires

to create and that technology commercialization operations need to be able to match. In many States, universities have created separate Research Foundations that operate as 501(c)(3) organizations that give the university and its technology commercialization programs this flexibility to do things such as accept equity in startup companies that license university technology, or include contract terms that would not be permitted by a State agency. Technology commercialization is by its very nature a high risk endeavor, which puts it in conflict with the historically risk-averse cultures of universities and governments. Creating operational environments where managers can assume greater (but not egregious) risk can facilitate effective outcomes.

Especially in more isolated regions, research universities also have to have the freedom to seek out commercialization partners beyond their local or State borders, especially when trying to develop a stronger "brand". Looking externally does not necessarily result "exporting" ideas, but can actually "import" opportunities for local economic development. A thoughtful review of State policies and practices that impact technology commercialization could identify specific areas where changes could enhance the universities ability to meet the expectations of local and State government.

G. Opportunities to enhance technology commercialization

Based on the discussions with internal and external stakeholders of Idaho's university "research enterprise" described above, below are recommendations for HERC and the SBOE to consider as they seek to enhance technology commercialization with the goal of increasing the impact of research innovations on Idaho's economy. As noted in this report, the bulk of these recommendations are not "administrative efficiencies" created by centralization of technology commercialization activities. At the current scale of technology commercialization across the four universities, the cost of, and efficiencies generated by centralization of functions is outweighed by the loss of connectivity and immediacy to both university and industry stakeholders alike.

1. <u>Developing common messaging/materials relating to technology transfer</u>

To address the desire to create some unity across the various institutions, and demonstrate to external stakeholders that Idaho's universities are acting in concert to create public benefit for Idaho, HERC could charge the four institutions to develop some common documents that discuss the basic principles to which all institutions ascribe that underpin all interactions with external sponsors and licensors. Such a "principles" document would help set the fundamental ground rules by which universities and industry interact in a way that remains true to the tenets of academic research, such as open dissemination of knowledge and commitment to students and other academic researchers. UC has created a "Principles Policy" (attached as Exhibit A) for this purpose. HERC and SBOE recognition of these basic principles provides the necessary bulwark again any pressure from industry that could distort university behavior. A well

thought through set of principles can help create a better understanding by companies without a prior history of dealing with universities, of why the university takes the position it does on certain matters.

Likewise at the operational level, the universities could collaborate to develop licensing guidelines that would give staff charged with identifying and managing inventions some common understanding of how to manage frequently occurring situations in their day-to-day interactions with faculty and licensees. UC recently updated its "Licensing Guidelines" so that they would address current issues commonly faced by technology licensing professionals (attached as Exhibit B). At UC, documentation of system-wide principles and practices is one way to help ensure a common approach to technology licensing and generate basic consistency in dealing with industry.

An additional benefit of undertaking these tasks would creating greater interaction between the offices through the process of creating a set of common principles and practices which, in turn could enhance inter-institutional interactions when more challenging situations occur. Along the same line, HERC could sponsor some more formal gathering of technology licensing professionals on a regular or topic-specific basis. Idaho's particular geography and intra-state travel logistics does create challenges for in-person meetings so such gatherings could be held by video or audio conferencing, but telecommunications is no substitute for in-person meetings when the situation demands.

2. <u>Using modern technologies to increase visibility and outreach to showcase Idaho technologies</u>

External stakeholders express the need for greater visibility for the research carried out at Idaho's universities as a way to attract new collaborations and new businesses to the state. While all universities showcase their particular research through websites and other "portals", creating a coordinated approach across the four universities (and perhaps Idaho National Laboratory) could help foster new interactions with industry. As note in this report, North Carolina (with "ReachNC"), and other states are creating such portals for this exact purpose. Smaller states need to identify ways to create some form of "branding" that creates greater visibility to industry that may be more used to looking to higher profile universities when they consider engaging in collaborative research.

Such "researcher profiling" sites also help researchers and administrators identify common research themes, or potential areas for, or an individual with whom, to collaborate on larger proposals to funding agencies. The NIH has already recognized the value of researcher profiling as a way to accelerate collaborative translational research across their network of Clinical and Translational Science Award-funded institutes, and these institutes are developing common standards by which profiles can be created and shared. Profiling "solutions" are available from commercial vendors, or using open-

source software, so any decision to implement an "Idaho Researcher Profile" will require an in-depth analysis of the options and associated costs.

3. Increasing industry engagement and seeding new collaborations

Given Idaho's relative isolation from major business and investment centers, HERC should consider strategies to attract existing businesses to the state, as well as support new businesses that could emerge from Idaho-based research. Especially as new businesses struggle in the first year or two, modest incentives can make the difference between "taking the plunge" and maintaining the status quo.

To increase university-industry engagement, HERC could advocate for some form of "matching grant" program for companies that are willing to work with Idaho universities, and establish some research presence in Idaho. The IGEM program was praised, but a larger number of smaller awards could create greater momentum. The goal of the program should be to create and foster new collaborative relationships, especially with small- and medium-size businesses that will increase the network of connections between universities and industry. A parallel program could aim to strengthen existing relationships with large corporations, where deeper and richer interactions will help secure long-term interactions. Such deeper interactions are critical to establish in an era where major corporations are moving away from tactical bi-lateral research collaborations with many universities in favor of strategic, multi-faceted relationships with a few key partners, if for no other reason than to minimize transaction costs. Whatever the program, it has to strike the appropriate balance between use of public funds to support private industry and the desire to create new university-industry relationships that will enhance the economic health of the state.

Another theme in the interviews was to make university research more responsive to the particular challenges that Idaho faces. Charging university administration to in some way "direct" research is fraught with challenges, given that academics have generally self-defined their research interests. Any new direction has to fit with the broad parameters of their particular specialty so as to add to their professional qualifications. With this caveat, researchers generally look for ways in which to make their research useful, so if the state can define some "grand challenges" that align Idaho's needs with research competencies across the universities and which also have national or global implications, it could be possible to create programs that benefit all constituencies. The researcher profiling described above would help analyze where opportunities and researcher competencies align.

In several discussions, multi-institution collaborations were mentioned and the CAES program was highlighted as an excellent example of such a program. Clearly CAES's success can be attributed to significant external funding for facilities, but it does demonstrate that carefully structured strategic initiatives can drive collaborative synergies. In the context of the "grand challenge" model described in the previous paragraph, for one or more challenges, State support paired with matching extramural

funding (along the lines of California's Gray Davis Institutes for Science and Innovation) could lead establish additional programs akin to CAES focused on areas of key strategic and economic relevance to Idaho, such as agriculture or natural resource management.

4. Creating and supporting a more entrepreneurial culture

The explicit expectation that universities play an active role in creating economic value also challenges the traditional practices of both undergraduate and graduate education. For undergraduates, the goal was to use the basic degree to secure a job, or a place in graduate school. For graduate students (outside of professional degree programs) the implicit goal was to continue in higher education on the "faculty track". The emergence of the "Facebook generation" has undergraduates, especially in the engineering and computer science disciplines thinking more and more about creating businesses rather than being employed by one. For graduate students, the grim reality of the oversupply of PhDs relative to available faculty positions requires them to develop different skill sets to transition to careers outside of academia. If universities are going to exploit the best new ideas emerging from their research, especially in regions where entrepreneurship is lagging, they are going to have to devote resources to create these competencies in their student body.

Certain individuals are serial entrepreneurs by their very nature, but others with an entrepreneurial bent benefit from more formal training about the realities of the business world and how to make the transition to it. In a recent discussion, a colleague described a situation in most universities where EECS students are told that their degree with help them land a job at Google whereas students at MIT and Stanford are told their degree with help them create the next Google. This attitude helps them foster and maintain the entrepreneurial environment to which most other universities aspire. Supporting entrepreneurship does create real challenges for research universities. How much time should students spend honing their entrepreneurial skills relative to pursuing their research program? For faculty with research funding, such things can be distractions that compromise the larger research program in their laboratory, upon which they are ultimately judged by both their peers and the institution. For the student, the reputational cost to their future by "stepping away" to pursue their entrepreneurial passion may far outweigh the low financial opportunity cost.

Many universities are actively supporting and rewarding entrepreneurial activities by faculty and students. They are encouraging this behavior by creating formal and informal programs that expose all levels of researchers to business culture, and financial and strategic decision-making processes in investment and business development. At UCSF, graduate students at the completion of the bulk of their research program are offered the opportunity for "Internships in Career Exploration" where they can spend three months working in business environment other than university research laboratories (such as law firms, venture capital companies, and corporate research laboratories) to gain perspective on future career choices.

Caution should be taken when thinking about ways to reward entrepreneurial activities by faculty, especially equating disclosures and patenting with peer reviewed scholarly publications. To be awarded a patent does require the idea to meet the standards of novelty, non-obviousness and utility, but this does not rise to the same standard as traditional publication, is far more expensive and not covered by traditional research grant funding. Overly emphasizing entrepreneurship over scholarship also creates schisms in the academy as many important disciplines do not provide opportunities for entrepreneurial endeavors, thereby creating dissent and division within the institution.

Many schools have some form of competition where groups of students from different areas collaborate to identify technologies that have market opportunities and create financial and marketing plans to realize the vision. These plans are often judged by local investors and business leaders. While many are merely "course work requirements" some turn into real business opportunities. HERC could sponsor a state-wide business plan competition to showcase the "best of the best" to an Idaho-wide audience, including potential investors from around the region. A modest financial incentive for state-wide winners to take the next step to create the business they envisioned would also support the goal of creating new companies. Using local entrepreneurs and business leaders also increases engagement of this sector with the entire university community, not just the institution that happens to be nearby.

Another option for HERC to consider is sponsoring the creation of Idaho-centric networks of individuals with affinity to the state to advise new and emerging companies. While not having a deep reserve of entrepreneurial talent, Idaho can recruit university alumni, existing businesses entrepreneurs and even "recreational" visitors with investing and entrepreneurial connections to create a pool of talent to whom budding new business can turn to for advice. Such groups can also provide input into decisions on which projects to support through strategic investment of State funds.

5. <u>Enhancing new business creation through modest investment in individuals, technologies and companies</u>

Creating new businesses requires a combination of great new ideas, risk-tolerant investment and entrepreneurial management operating in a socio-political environment that supports both businesses and their employees. Idaho could enhance venture-creation by modest investments in individuals, technologies and companies seeking to create opportunities in the state.

Entrepreneurship education is becoming almost mandatory for 21st century research universities. Idaho could enhance the entrepreneurial culture by challenging it research universities to develop programs that give budding entrepreneurs the knowledge and experience they need to succeed. Without being proscriptive, Idaho could provide modest financial support, possibly as Entrepreneurial Fellowships that allow scientists and engineers to grow their entrepreneurial talents. Fellowships could include participation in existing formal programs, such as i-Corps, or by working with mentors to

create business opportunities around emerging technologies from the university community.

Technologies created by universities are rarely at the level of development that attracts early stage investment. Idaho could support new business creation by establishing a state-wide mechanism that funded commercial proof-of-concept research that demonstrated the commercial utility of promising new discoveries. Such a state-wide mechanism would ensure that no matter where the technology originated, resources were available to take it to the next stage in its evolution. Any such program has to develop guidelines and parameters for funding that ensure that it does not become a *de facto* extension of other basic research programs, but is focused on funding studies that address the critical go/no-go decisions that investors require before backing these new ideas with their capital. It is critical in such programs that the selection criteria and decision-making process balance both scientific reality and commercial viability. Decisions must be isolated from any implicit or explicit political pressures within individual institutions, while still being receptive to feedback from technology commercialization professionals on the campus with local knowledge of the invention and/or the proposed commercial development team.

Lastly, companies attempting to develop new technologies into viable businesses could benefit from an infusion of very early stage capital to help them achieve the business milestones needed to secure traditional follow-on funding. Many universities recognize this "gap" and are attempting to bridge it with funding for early stage companies. Any such program cannot be the "funds of last resort" but a prudent and thoughtful approach to funding could help new companies succeed. Funding could take the form of convertible debt that is either repaid or converted into traditional equity in a series A funding round. As state entities are generally prohibited from holding and managing equity, any equity obtained in such a program could be held by existing university foundations and the proceeds from liquidating that equity be dedicated to supporting the next generation of entrepreneurial businesses based on university technology. Another alternative that is employed by many other States (including Connecticut, Florida, Hawaii, Kansas, Kentucky, Michigan, Montana, Nebraska, Oklahoma, South Carolina and Virginia) is to create a funding program that "matches" Federal SBIR or STTR grant programs. Such matches can help fledgling companies build scientific and business infrastructures that help secure follow-on funding and rely on the existing SBIR/STTR review processes to identify businesses worth of additional public support.

Given the scale of Idaho's university-based research enterprise, the total funding require for the above three programs would be quite modest. UC, with a research expenditure base of roughly $5 Billion estimates the need for entrepreneurship, proof of concept and seed-stage funding at approximately $10-$20 Million annually.

H. Conclusion

This review of the technology commercialization infrastructure at Idaho's research universities reveals that, while small on the scale of the leading U.S. research universities, these programs are operating reasonably well given the size and the unique geographical and historical characteristics of Idaho's institutions. It does not appear that much real benefit can be gained by "centralizing" functions in an attempt to create either economies of scale or "standardized" processes. All technology commercialization operations have to recognize that success is largely dependent on creating and managing strong, trust-based relationships with all constituent stakeholders, and that this is best achieved by skilled individuals who operate at the interface between stakeholder groups by employing the appropriate tools and resources. In fact, evidence from many large systems, including UC, and most recently the National Institutes of Health, is that centralized management of technology commercialization tends to create dysfunction rather than efficiency. The most appropriate approach to optimizing outcomes that support economic development is to resource and empower local structures (with appropriate oversight) that understand the technology, the aspirations of the individuals who will champion it, and the needs of innovative companies that are essential to realizing this objective.

On the other hand, as described above, Idaho can take steps to enhance the broader technology commercialization capacity and competency of its institutions. Initiatives such as those outlined in this report are being pursued at both local and state levels around the U.S. and any decision by Idaho to pursue a particular option would benefit from an in-depth review of the best practices of analogous programs, which is necessarily beyond the scope of this review.

The funding environment in which U.S. research universities operate and the expectations of national, regional and local governments are evolving rapidly. Idaho needs to be able to embrace and adapt to these changes to ensure that its research universities continue to deliver a high quality education experience that is relevant to the future aspirations of its students and also create strong and durable links to industry that enhance their ability to create economic value for Idaho.

University of California Policy

Principles Regarding Future Research Results

I. POLICY SUMMARY

The Principles Regarding Rights to Future Research Results in University Agreements with External Parties establish the fundamental parameters for negotiating agreements with external parties to address rights and obligations associated with future University research results. This policy applies to any UC agreement with others that addresses future research results, whether that agreement is administratively managed as a contract or grant, a procurement, a sales and services contract, or is in another form.

Rights and obligations associated with future research results shall be based on the following principles:

1. Open Dissemination of Research Results and Information
2. Commitment to Students
3. Accessibility for Research Purposes
4. Public Benefit
5. Informed Participation
6. Legal Integrity and Consistency
7. Fair Consideration for University Research Results

8. Objective Decision-Making

II. DEFINITIONS

Not applicable

III. POLICY TEXT

Preamble

This policy defines the core principles to be addressed in University agreements with external parties as to rights to future research results including patents, copyrights, tangible property, and data generated by the University community or through the use of University resources.

The University increasingly is called upon to participate in a broad spectrum of research relationships with governmental agencies, nonprofit foundations, and industry. Such relationships encompass traditional extramural research funding arrangements, research collaborations, multi-party research consortia, visits by others to University laboratories, student and faculty visits to external laboratories, and use of University equipment and facilities by others. Other University relationships with external parties, such as purchasing or real estate transactions, may also have implications for future University research results. Properly cast, all such relationships can help both the University and the external party advance their respective and mutual research interests.

Each University agreement with an external party must recognize the importance of managing the results of research to enhance the teaching and research programs of University faculty, researchers, students, and postdoctoral scholars. To ensure the long- term success of such relationships, agreements should acknowledge the participants' respective contributions, understanding that parties may have divergent interests in the results of research. Regarding technologies and other results arising from research they support, industry partners may rely upon strong patent or proprietary positions to gain competitive positions in the marketplace. The University has a commitment to make the fruits of its research widely available through publication and open distribution of research products. The University also seeks to protect the viability of its research programs, to foster open inquiry beyond the interests of any one research partner, and to recognize its fiduciary responsibility as the beneficiary of a publicly -funded research infrastructure.

Principles

For University relationships with external parties to succeed, agreements must address the parties' interests in future research results through flexible application of fundamental principles to a broad range of specific circumstances. Rights and obligations associated with future research results shall be based on the following principles:

1. Open Dissemination of Research Results and Information

   Agreements with external parties shall not abridge the ability of University researchers to disseminate their research methods and results in a timely manner. The most fundamental tenet of the University is the freedom to interpret and publish or otherwise disseminate research results in order to support the transfer of knowledge to others and maintain an open academic environment that fosters intellectual creativity.

2. Commitment to Students
   Agreements for research relationships with external parties shall respect the
   University's primary commitment to the education of its students.

3. Accessibility for Research Purposes

   Agreements with external parties shall ensure the ability of University researchers to utilize the results of their research to perform future research.

4. Public Benefit

   Agreements with external parties shall support the ability of the University to make available for the public benefit in a diligent and timely manner any resulting innovations and works of authorship.

5. Informed Participation

   All individuals involved in research governed by a University agreement with an external party shall have the right and responsibility to understand the rights and obligations related to future research results embodied within the agreement.

6. Legal Integrity and Consistency

   Commitments concerning future research results made in agreements with external parties shall be consistent with all applicable laws and regulations and the University's contractual obligations to others.

7. Fair Consideration for University Research Results

   Agreements with external parties shall provide fair consideration to the University and the general public for granting commercial access to future University research results.

8. Objective Decision-Making

   When establishing or conducting University relationships with external parties, decisions made about rights to future research results shall be based upon legitimate institutional academic and business considerations and not upon matters related to the personal financial gain of any individual.

IV. COMPLIANCE / RESPONSIBILITIES

These principles shall apply to all University agreements with external parties that impact rights to University research results, whether such agreements are administratively managed as contracts and grants, as

procurements, as sales and services contracts, or as other forms of agreement.

Although this Policy is applicable to the three Department of Energy National Laboratories, allocation of rights under various agreements at the Laboratories may be subject to overriding obligations of The Regents under DOE operating contracts.

Responsibilities:
The Senior Vice President--Business and Finance shall develop appropriate delegations of authority, administrative guidelines, and accountability measures to support campus and Laboratory activity in this area.

V. PROCEDURES

University relationships with external parties are most efficiently established and managed by delegating appropriate authority to well-trained campus and Laboratory negotiators for development, negotiation, and execution of a broad range of tangible and intellectual property rights arrangements. Each such arrangement must be consistent with the provisions of this policy, but may be tailored specifically to particular circumstances. Since disposition of research results arising from such relationships is based on both University academic and business considerations, it is important that
authorized University contracting personnel and University academic personnel together participate in and take responsibility for decisions concerning such arrangements.

UNIVERSITY LICENSING GUIDELINES (revised *2/1/12)*

The purpose of licensing University intellectual property (IP) rights and materials is to encourage the practical application of the results of University research by industry for the broad public benefit; meet our obligations to sponsors of University research; build research relationships with industry partners to enhance the research and educational experience of researchers and students; stimulate commercial uptake and investment; stimulate economic development; and ensure an appropriate return of taxpayer investments in University research. Financial returns from technology licensing provide additional support for research and education, an incentive for faculty retention, and support of the University technology transfer program. Technology Managers (TM) within University authorized licensing offices (ALO) are charged to pursue these objectives in licensing University IP. In carrying out their duties, TMs are called upon to make complex licensing decisions based upon a multiplicity of facts and circumstances and by applying their professional experience, in consideration of the following guidelines.

These guidelines describe the many considerations that go into a licensing decision--and are not a statement of University policy. They may be used in specific cases as part of the complex licensing decision-making process, as the TM finds them applicable. They provide general guidance, and the relevance, irrelevance or weight that should be given to any particular guideline in any specific case is one of the several matters the TM must judge based on his/her professional experience. These guidelines are not intended to include all considerations for all licensing opportunities. For example, inventors' recommendations regarding the disposition of the IP rights associated with their inventions represent one factor among many to be considered. These guidelines are not intended to dictate a particular approach in any situation. Each licensing opportunity is
unique based on multiple factors including: the nature and stage of development of the technology; the breadth and complexity of the potential fields of use; the product development path and timeline; the extent of intellectual property protection; the

relevant markets and market niches; specific campus practices; unique needs of prospective licensees; ethical considerations for the use of future products; and emerging issues, among other elements. All factors require careful consideration in developing a relationship with a prospective licensee, and the TM needs tremendous flexibility to address each of these issues. Further, the result of any one licensing decision may or may not be appropriate to another similar situation, as changes in knowledge and individual factors should be taken into consideration for each case-specific circumstance.

On March 6, 2007, the University endorsed the "Nine Points to Consider" that articulates some key issues that the TM should take in consideration when evaluating a possible licensing arrangement. TMs should familiarize themselves with the Nine Points to Consider.
[http://www.autm.net/source/NinePoints/ninepoints_endorsement.cfm]

In its IP licensing practices, the University reserves the right, to the fullest extent permitted by law, to exercise decisions regarding its choice of licensee, the extent of rights licensed, and a refusal to license to any party. In part, the relevant law includes 35
U.S.C. 271(d) and the Constitution of the State of California, Article IX, Section 9 whereby the University manages its property as a public trust as a constitutional corporation of the State of California.

GUIDELINES

1. *The primary objective in developing a patenting and licensing strategy for an invention should be to support the education, research, and public benefit mission of the University.*

The University Patent Policy recognizes the need for and desirability of broad utilization of the results of University research, not only by scholars but also for the general public benefit, and acknowledges the importance of the patent system in providing incentives to create practical applications that achieve this latter goal.

In addition, with respect to federally-funded inventions (which comprise a large portion of the University's invention portfolio), the Bayh-Dole Act (35 U.S.C. 200-212) requires the University's use of the patent system

> "to promote the utilization of inventions arising from federally supported research or development; to encourage maximum participation of small business firms in federally supported research and development efforts; to promote collaboration between commercial concerns and nonprofit organizations, including universities; to ensure that inventions made by nonprofit organizations and small business
> firms are used in a manner to promote free competition and enterprise without unduly encumbering future research and discovery; to promote the commercialization and public availability of inventions made in the United States by United States industry and labor; to ensure that the Government obtains sufficient rights in federally supported inventions to meet the needs of the Government and protect the public against nonuse or unreasonable use of inventions; and to minimize the costs of administering policies in this area."

The TM is responsible for crafting a technology management strategy that supports the education, research, and public service mission of the University, which requires establishing a delicate balance of priorities between the timely transfer of technology to industry for commercialization while preserving open access to research results for use by the University and the research community.

One consideration is whether or not to seek patent protection of the invention and where such protection should be sought. Patent protection may provide the incentive for an industry partner when significant further private investment is necessary to commercialize the discovery, such as expensive regulatory hurdles or infrastructure requirements. Conversely, some industries employ an open access technology development strategy through non-exclusive licensing practices in order to stay competitive in the marketplace.

For diseases that disproportionately affect developing countries, one approach might be to seek protection only in developed countries to allow a company to obtain a return on its investment by excluding competition while allowing others in developing countries, including generics manufacturers, to provide the same product without having to enter into a license agreement with the University.

A primary licensing decision is whether to license exclusively or non-exclusively. The TM should consider licensing either non-exclusively, or exclusively within specific fields-of-use when an invention is broad in scope and can be used in multiple industries as well as for a platform technology that could form the basis of new industries. For example, if a technology will create the greatest public benefit if it becomes an industry standard, the TM should consider making it readily accessible to all interested parties unless significant investment or other factors require exclusivity to incentivize the realization of the commercial potential. Alternatively, the TM should (absent any third party obligations) consider foregoing the patent process and put the invention in the public domain by way of appropriate publications.

In general, TMs should consider granting exclusive licenses to inventions that require significant investment to reach the market or are so embryonic that exclusivity is necessary to induce the investment needed to develop and commercialize the invention. Frequently, new drugs or other technologies requiring time-intensive and capital-intensive development require exclusive licensing. Such technologies require a company willing to dedicate financial resources and the additional research to realize the commercial potential.

Alternatively, an exclusive "field-of-use" license is a way to create market incentives for one company while enabling the University to identify additional licensees to commercialize the invention in additional markets. In some cases, a limited-term exclusive license that converts to a non-exclusive license can be an effective strategy to meet the public benefit objective.

The licensing strategy should ensure prompt broad access to unique research resources developed by the University. For example, where an invention is useful

primarily as a research tool, the TM should carefully consider the choice of an exclusive or non- exclusive license because certain licensing practices could thwart rather than promote public access to the invention (See Technology-specific Considerations below.)

2. *University must meet existing third party obligations*

Research projects increasingly involve a multiplicity of third party agreements and relationships. For some inventions, the University will have existing licensing obligations to a company or other research partner based upon contractual commitments made under sponsored research, material transfer, database access, inter-institutional, or other third-party IP agreements. TMs shall seek to identify all licensing obligations to third parties so that such obligations can be met. While the primary method for identifying these obligations is the inventor(s)' entries on the Record of Invention (ROI) form, the TM is encouraged to verify the completeness or accuracy of the ROI listing. Among the resources that should be pursued to identify such obligations are the TT 100
Form (Inventor/Author Statement Concerning Involvement in Licensing Decisions) and documents filed with the inventor's department [Report of Category I and II Compensated Outside Professional Activities and Additional Teaching Activities (APM
25) and Form 700 Statement of Economic Interests (past and present)].
Direct discussions with the inventor(s) and/or review of systemwide and local contract and grant databases may help determine whether the appropriate agreements are identified (including through the Web-based Operational Tools resources provided through UCOP's Research Policy Analysis & Coordination website). Careful review of these agreements is critical to understanding the nuances of any third party obligations. Copies of any relevant agreements should be retained in the licensing file for future reference and to document the basis for decisions affecting the status of such third party obligations.

In addition, the TM should evaluate any other factors that may affect the University's right to license the invention. The TM should investigate whether an inventor's

disclosed invention entails a possible claim to prior ownership rights by a third party based upon the inventor's previous or current outside activities, for example, consulting arrangements, visiting scientist agreements, inventor start-up companies, and other contract obligations, particularly in light of court decisions (e.g. Stanford v. Roche, Fed Cir., 2009).

3. *The selected licensee should be capable of bringing the invention to the marketplace.*

Where no prior licensing obligations exist, or where additional licensing rights remain after prior obligations are met, the TM should seek licensees capable of bringing the invention to the marketplace in a timely manner. While often only one potential licensee comes forward for any given University invention, the TM should nevertheless assess the potential licensee's technical, managerial and financial capability to commercialize the technology. From a programmatic perspective, licensing preference should be given to small business concerns, when appropriate, pursuant to federal law and regulations, provided such small businesses appear capable of bringing the technology to the marketplace.

These guidelines provide the TM with a resource for selecting a licensee for individual inventions. TMs should use care when licensing multiple technologies, invention portfolios, or a single technology with multiple variant applications to a single commercial organization to ensure that the licensing strategy meets the University's desire to maximize public benefit.

For example, in selecting a licensee, the TM, should consider whether the potential licensee:

has a general business plan that delineates a clear strategy to commercialize the invention

has or can secure the technical, financial and personnel resources to develop and commercialize the invention in a timely manner

has experience relevant to developing and commercializing the invention

has appropriate marketing capabilities

possesses a strong desire and commitment to make the product/technology a success

is able to meet any regulatory requirements needed to commercialize the technology

has, or can develop sufficient capacity to satisfy the market demand for the technology

demonstrates commitment to the University's invention in light of other technologies competing for resources in the company

has goals that generally align with those of the University with respect to public benefit

The TM should obtain and retain documents that address the licensee's ability to bring the technology to the market. In the case of a start-up company, not all factors necessary to commercialize the technology may be present at the outset. The TM should consider whether the start-up has an appropriate level of resources and technical capabilities, given the development stage of the company and the nature of the invention, as well as whether the start-up has the potential to acquire the necessary resources to successfully develop and market the technology in a timely manner.

4. *The license agreement should include diligence terms that support the timely development, marketing, and deployment of the invention.*

The TM should include diligence provisions in a license agreement to ensure that the licensee develops and commercializes the invention in a timely manner, especially when an invention is exclusively licensed. The University's commitment to public benefit is not met by allowing an invention to languish due to a licensee's lack of commitment, "shelving" the technology to protect its competing product lines, or inadequate technical or financial resources. Appropriate diligence provisions are

invention-specific and will vary depending on the circumstances. Common diligence obligations that a TM should consider include:

- the amount of capital to be raised (for a start-up) or the amount of funding committed (for an existing business) by the company to support the technology's development.
- specific dates by which the licensee must achieve defined milestones, such as: secure levels of regulatory approval; make a working prototype; initiate beta testing of a licensed product; receive formal market/customer feedback; achieve specific prototype performance thresholds (such as efficiency or size); establish a production facility; first sell the commercial product; or achieve a certain level of sales

To ensure that the University continues to manage its technologies as assets for the public's benefit, clearly defined diligence provisions allow verification of the licensee's compliance with its diligence obligations. Therefore, the licensing agreement language should be sufficiently specific so that both parties can determine whether the diligence obligations have been met. Further, the license should provide a remedy for failure to meet diligence obligations, such as termination of the license or, in the case of an exclusive license, a reduction to a non-exclusive license.

5. *The University should receive fair consideration in exchange for the grant of commercial licensing rights.*

The TM should ensure that University receives fair consideration for commercial licenses of its inventions (as public assets created using public funds, supplies, equipment, facilities, and/or staff time) to private entities. Generally, the value of the consideration received by the University should be based on the licensee's sale or distribution of licensed products or licensed services by the licensee. Other factors that impact the negotiation of the University's consideration may include:

the type of technology and industry

the stage of development and market consideration

the perceived value to the licensee's business and competitive position ("must-have" vs. "nice-to-have")

the market potential, contribution of the technology to market penetration, and market sector dynamics (i.e. growing, static, declining?)

the projected cost and risk of product development and marketing

the competitive advantage over alternative products; is the invention a seminal "game-changing" one or an incremental improvement?

the likelihood of competing technologies

the net profit margin of the anticipated product

comparable prices for similar technologies or products

the scope and enforceability of the University's patent claims, extent of freedom-to- operate required, and years remaining on patent term

the projected decrease in the cost of production or R&D expenditures

the scope of license (exclusive/nonexclusive, narrow/broad fields of use, U.S./non- U.S.)

the opportunity for accelerated time to market based upon the necessity for meeting a

critical public need.

In general, the fair consideration to the University should be in cash, but other forms of consideration may be accepted in partial lieu of cash fee(s) such as equity in the company (discussed below). The form of such consideration negotiated by the TM may vary widely based on case-specific factors.

The TM should consider including some or all of the following elements as part of the consideration:

Reimbursement of University's patent costs:

The licensee pays for domestic and/or foreign patent applications either through an up-front fee that covers past and future costs and/or through a requirement to reimburse past, present and future costs upon invoicing by the University. Where the technology is licensed to multiple parties, reimbursement may be done on a
pro-rata basis. Full reimbursement by an exclusive licensee is standard University practice.

License Issue fee:

The licensee pays a fee to the University upon final execution of the license agreement either in a lump sum or on an agreed upon schedule. The amount of this fee should reflect the value of the invention at the time it is made available to the licensee. Such fees range widely, depending on the circumstance. Under some circumstances, the issue fee for small companies or start-ups may be partially postponed until sufficient investment capital is secured, or may be replaced in part by the University's acceptance of equity in the company (see *Equity* below).

Running royalties:

The licensee pays ongoing consideration to the University in the form of a running (or earned) royalty, typically calculated as a percentage of net sales or use of licensed products or services that incorporate the technology. Such royalties should not be "capped" at a pre-determined dollar level, as the University should share fully in the success of any commercial use of technology made available to the licensee. In some rare cases, a running royalty value may be difficult to assess due to the particular market and the type of products being developed. In such cases a fixed amount for each unit of licensed product sold or a one-time or annual fee may be contemplated, where the fee should reflect the value of the invention over the projected length of patent protection (both U.S. and foreign).

Annual maintenance fee/minimum annual royalty:

The licensee pays an annual license maintenance fee which serves as a form of diligence and represents the licensee's continuing interest in and a financial commitment to commercialize the invention. A minimum annual royalty begins in the first year of commercial sales and serves not only as a diligence obligation but also incentivizes the licensee to achieve sales generating royalties that meet or exceed the minimum annual royalty. Typically, annual maintenance fees cease after commercial sales begin when they are replaced by the minimum annual royalty. Minimum annual royalties, if paid in advance, are generally creditable against the running royalty due that year. The TM may use these fees singly, in combination, or not at all as judgment dictates, however, including such fees not only creates diligence obligations but also provides annual income to support the University's research and education mission.

Sublicensing fees:

Under an exclusive license where the licensee is permitted to transfer rights to third parties (a sublicense), the licensee pays the University consideration for sales or use of licensed products or services by its sublicensees. The University should receive a fair share of all consideration, including royalty and non-royalty income, received by the licensee from the sublicensee. It is University practice not to include sublicensing rights under its non-exclusive licenses as the granting of such rights could place the licensee in direct licensing competition with the University, except in those cases where the sublicensee's activities are necessary
for the sublicensor to commercialize the licensed technology (e.g. sublicensee is a contract research organization or contract manufacturer providing a vital component to the sublicensor necessary for the licensed technology, etc.).

Equity:

To encourage commercialization of University technology, the TM may accept equity in a company as partial consideration for invention licensing pursuant to

the University *Policy on Accepting Equity when Licensing University Technology*. This option may be particularly useful in working with small or startup companies where financial considerations limit the company's and its investors' willingness to pay cash to the university for licensing costs, such as license issue fees and annual maintenance fees. When accepting equity, TMs should consider the risk- adjusted value of equity and the potential loss of value associated with dilution of equity.

Other:

The TM may negotiate forms of consideration other than those described above, such as milestone payments upon the completion of certain licensed product development events or upon financing or investment triggers (e.g., investment rounds, merger or acquisition, or a public stock offering). Other unique exchanges of value occasionally may be appropriate forms of fair consideration. The TM should note, however, that such non-monetary forms of consideration (other than equity) fall outside the royalty-sharing provisions of the University Patent Policy. The TM should take care to not designate research funding as a form of consideration in a license as license income is subject to the royalty-
sharing provisions of the University Patent Policy whereas research funding is not consideration for a license but is fixed at a level to pay for the cost of conducting the research (Singer v. The Regents, 1996).

Finally, the TM should be aware that "overly-aggressive" negotiation of financial consideration may impede commercialization of an invention and may not be consistent with certain research sponsor guidelines (e.g., Federal, State, or non-profit extramural sponsorship policies). However, undervaluing a commercial license reduces the additional monetary support for research and education and compromises the principle of seeking a fair return on the public asset that is the University's technology. The TM should weigh all appropriate factors discussed above in crafting a commercial license to create an optimal structure and fair consideration.

6. *The license agreement should support the academic principles of the University.*

The TM should ensure that the provisions of the license agreement support the University's academic teaching and research mission, including the following concerns:

Open Dissemination of Research Results and Information:
License agreements with external parties shall not limit the ability of University researchers to disseminate their research methods and results in a timely manner. The most fundamental tenet of the University is the freedom to interpret and publish, or otherwise disseminate, research results to support knowledge transfer and maintain an open academic environment that fosters intellectual creativity.

Accessibility for Research Purposes:
The TM should ensure that the license agreement protects the ability of University researchers, including their student and research collaborators, to use their inventions in future research, thus protecting the viability of the University's research programs. The University has a commitment to make the results of its research widely available through publication and open distribution of research products for verification and ongoing research. The University also seeks to
foster open inquiry beyond the interests of any one research partner, particularly where the invention is a unique research tool (see Guideline 10). One way in which the University addresses this is through the retention in the license agreement of the University's right to use and distribute inventions to other non- profit research institutions for research and educational purposes.

A more detailed discussion of these concepts can be found under Principles Regarding Rights to Future Research Results in University Agreements with External Parties (http://www.ucop.edu/ott/genresources/principles.html).

7. *Licensing activities should be carried out within delegated authority.*

Licensing of University inventions may be carried out only by University personnel who are operating under a formal delegation of patenting and licensing authority. TMs shall conduct licensing activities within the parameters of that delegation.

In those cases where a licensee wishes to support future research at the University, where the diligence terms of the license agreement addresses such research funding by the licensee, and/or resulting inventions are otherwise addressed in a license agreement, the TM must obtain approval of the involved principal investigator(s) or affected inventors and, in the case of prospective research sponsored by the licensee, the appropriate University Contract and Grant Officer.

TMs shall not grant rights to inventions made by University employees at other campuses or national laboratories without appropriate coordination and authority.

8. *The license agreement should be approved as to legal integrity and consistency.*

In order to ensure that the University has the right to enter into licensing discussion, the TM should ensure that the inventors have signed both a University Patent Acknowledgement (updated 2011) and/or an actual Assignment Agreement that confirms the University's ownership in the invention and that includes a present assignment of invention rights.

In determining the rights that can be granted in a license agreement, the TM should ask the inventors about past and present sponsors of their research, material providers, and independent consulting and other agreements (e.g., visitor, confidentiality, etc.) they have signed that could be related to the invention to determine if conflicting obligations exist between such agreements and the proposed license.

The TM shall ensure that the provisions of the license agreement are reviewed and approved by the University Office of General Counsel or Laboratory Counsel, and comply with University policies with regard to legal integrity and consistency, including the following concerns:

Use of Name:

The TM shall ensure that the license agreement prohibits the use of the University's name, or the names of its employees, to promote the licensee or its products made under the license agreement, unless specifically approved by authorized University personnel. The license may provide limited use of the University's name where required by law, to give effective legal notice such as a copyright mark, or to make a statement of fact regarding the origin of plant material.

Indemnification:

The TM shall ensure that the license agreement contains an indemnification provision under which the licensee assumes all responsibility for any product or other liability arising from the exercise of the license covering the invention. The licensee should assume all responsibility as it has complete control over product development while the University only provides rights under the patents it holds.

Limitation of Liability:

The TM shall ensure that the license agreement contains a provision that limits the University's liability for any damages that may result from the licensee's acts under the license agreement (e.g., intellectual property infringement, lost profits, lost business, cost of securing substitute goods, etc.).

Insurance:

The TM shall ensure that the license agreement requires the licensee to carry sufficient insurance or have an appropriate program of self-insurance to meets its obligations to protect the University, and provide evidence of such.

Limited Warranty:

The TM shall ensure that the license agreement contains a limited warranty provision stating that nothing in the license shall be construed as (i) a warranty or representation regarding validity, enforceability, or scope of the licensed patent rights; (ii) a warranty or representation that any exploitation of the licensed patent rights will be free from infringement of patents, copyrights, or

other rights of third parties; (iii) an obligation for the University to bring or prosecute actions or suits against third parties for patent infringement except as provided in the
infringement provision of the license; (iv) conferring by implication, estoppel, or otherwise any license or rights under any patents or other rights of University other than the licensed patent rights, regardless of whether such patents are dominant or subordinate to the licensed patent rights; and (v) an obligation to furnish any new developments, know-how, technology, or technological information not provided in the licensed patent rights.

Patent Prosecution:

The TM shall ensure that the license agreement contains a patent prosecution provision that stipulates the University will diligently prosecute and maintain the patent rights using counsel of its choice who will take instructions solely from the University. The University will use reasonable efforts to amend any patent application to include claims requested by the Licensee. For an exclusive license, all such costs will be borne by the licensee. For non-exclusive licenses, a
common practice is for each licensee to pay a pro-rata share of such costs.

Patent Infringement:

The TM shall ensure that an exclusive license agreement contains a patent infringement provision that stipulates that neither the University nor the licensee will notify a third party (including the infringer) of infringement or put such third party on notice of the existence of any patent rights without first obtaining consent of the other party; with additional language that addresses infringement notification process, participation, control and prosecution of the suit, and payment of costs and sharing of awarded damages.

Third Party Obligations:

The TM must assess the impact of third party obligations on the licensing decision as discussed under the second guideline above.

9. *All decisions made about licensing University inventions should be based upon legitimate institutional academic and business considerations and not upon matters related to personal financial gain.*

It is important that the TM conduct the technology transfer process, including patenting, marketing, and licensing in a manner that supports the education, research, and public service missions of the University over individual financial gain.

Because TMs and inventors may have the opportunity to influence University business decisions in ways that could lead to personal gain or give advantage to associates or companies in which they have a financial interest, the TM and the inventor must comply with existing University policy and State law concerning such potential conflicts of interest. Under State conflict of interest law, any University employee or representative is prohibited from making, participating in making, or influencing a University decision (including selection of licensees and other decisions made in the course of commercializing University technology) in which they have a personal financial interest. Certain specific actions may be taken, however, consistent with University policy and State law, to allow participation in the licensing process by such inventors. An inventor's expectancy of receiving money or equity as inventor share under the University Patent Policy is not a disqualifying financial interest.

For TMs who have a personal financial interest in potential licensees, this situation can be readily managed by having the invention case assigned for management to another TM without a financial interest. For inventors who have a personal financial interest in potential licensees, another individual with appropriate scientific and technical background may be able to carry out the duties and responsibilities typically handled by the inventor. In both cases, personal disqualification requirements would need to be satisfied under University policy and State law.

University inventors, however, may not be able to reasonably remove themselves from involvement in the process under disqualification requirements as their expertise and input may be essential to successful technology transfer. It may be necessary for the

inventor to work closely with the TM and with potential licensees, or involve themselves in companies that are potential licensees, with the objective of commercializing University inventions, even when they have a personal financial interest. It is in this context, when the inventor is involved in the process, that the selection of a licensee and other commercialization decisions may have the potential to raise concerns about conflicts of interest. Some inventor contributions to the licensing process are primarily technical advice and do not constitute "participation in" or "attempting to influence" a licensing decision under State conflict of interest law. They are called "ministerial." An action is ministerial, even if it requires considerable expertise and professional skill, if there is no discretion with respect to the outcome. Thus an inventor can provide technical or scientific information about an invention where necessary without being considered to be participating in a licensing decision. This exception, however, does not apply to technical tasks such as most data gathering or analysis in which the inventor makes professional judgments which can affect the ultimate decision in question.

Therefore, the TM and inventor(s) should discuss: i) the disqualification option; ii) an approach to and level of inventor involvement in the technology transfer process; iii) compliance with University policy and State law concerning potential conflicts of interest; and (iv) where helpful, these University Licensing Guidelines.

In general, the role in the technology transfer process of any inventor who has a personal financial interest in a potential licensee should be kept to the minimum necessary to successfully achieve the University's objectives in patenting, marketing, and licensing. When an inventor has a personal financial interest in a potential licensee and does not fully disqualify him or herself from involvement in the process, an independent substantive review (Licensing Decision Review - LDR) and recommendation concerning the licensee selection and other licensing decisions is required. Thus, both the TM and the inventor should understand that the extent to which the inventor is involved in the technology transfer process may be a factor in the considerations and ultimate recommendations of the LDR body. The LDR body, composed of one or more qualified individuals with appropriate expertise, knowledge

and professional judgment, must independently check the original data and analysis upon which recommendations for the selection of licensees and for other licensing determinations were made by the TM and make its own independent recommendations concerning those decisions.

The TM must ensure that disclosure and management of potential inventor conflicts of interest are handled in accordance with OTT Guidance Memo No. 01-02, "Managing Potential Conflicts of Interest in Licensing under the California Political Reform Act." By doing so, the TM can help ensure that the inventor may continue to participate in the
technology development process while remaining in compliance with University policies and State law in this area. Future issues may arise, such as an inventor's desire to bring technology back to the University for further testing, development, and purchase for use in the lab as the licensee further develops the technology. If the TM becomes aware of such issues, the TM should ensure that other University officials impacted by such activities on the part of the inventor (e.g., procurement, C&G office, Conflict of Interest review board, etc.) are educated about the rationale and processes needed for a successful technology transfer program.

10. *Technology-specific Considerations*

The following guidance supports a general understanding of the objectives, practices and issues involved in the University licensing program with respect to specific technologies. The licensing strategies described herein are not intended to be applied in an absolute or mechanical manner. Each licensing decision is unique and a matter of professional judgment. The University's ALOs retain complete discretion in choosing the appropriate licensee and technology management strategy for its technologies.

Research Tools

In determining an appropriate licensing strategy for an invention that is used primarily as a research tool, the TM should analyze if further research, development and private investment are needed to realize this primary usefulness. If it is not, publication, deposition in an appropriate databank or repository, widespread non-exclusive

licensing, or electing not to file a patent application may be the appropriate strategy. Where private sector involvement is necessary to assist in maintaining (including reproducing), and/or distributing the research tool, where further research and development are needed to realize the invention's usefulness as a research tool, or where a licensee has the ability to enhance the usefulness, usability, or distribution of the research tool, licenses should be crafted with the goal of ensuring widespread distribution of the final research tool to the research community. Any such license should also contain a provision preserving the University's ability to continue to practice the licensed invention and allow other educational and non-profit institutions to do so for educational and research purposes. If carefully crafted, exclusive licensing of such an invention, such as to a distributor that will sell the tool or to a company that will invest in the development of a tool from the nascent invention, could support the University's objectives.

One particular concern is royalties assessed on sales of products that are developed using (directly or indirectly) a University invention that is a research tool ("reach-through" royalties), rather than assessed on products actually incorporating the University invention. The TM should note that reach-through royalties may impede the scientific process or create unreasonable restrictions on research and therefore generally should be avoided. Licensing of research tools should encourage prompt and broad access through a streamlined process. For NIH-funded inventions, see the NIH "Principles and Guidelines for Recipients of NIH Research Grants and Contracts on Obtaining and Disseminating Biomedical Research Resources." [http://www.ott.nih.gov/policy/rt_guide_final.html]

Global Health

While many of the licensing strategies discussed below are presented in the context of global health issues, such strategies are equally applicable to other current and future emerging technologies that can be used to support humanitarian efforts in underprivileged populations (e.g., clean water, sustainable sources of energy, food sources, etc.).

As innovative healthcare technologies are discovered and, after meeting extensive development and regulatory hurdles, introduced as publicly available therapeutic or diagnostic products, the ability of underprivileged populations to access and afford these technologies may be constrained by price or distribution. In particular, healthcare and agricultural products may not be readily accessible and affordable to the world's poorest people in developing countries and as a public institution striving to uphold its public benefit mission, the University should consider such public benefit and broad societal needs when developing licensing strategies for such technologies.

Developing "successful practices" is an evolving process, particularly for an issue as complex as balancing access by developing countries to biomedical products with ensuring timely and appropriate development and commercialization of the product. Such practices demand creative and flexible rather than rigid approaches. Entirely new business models coupled with nuanced intellectual property management strategies may be needed to produce the desired outcomes. Each situation is unique and must be addressed based on its own fact pattern to encourage licensees to make the substantial and risky investment necessary to develop biomedical products. Without appropriate and timely investments, the healthcare technology may never be developed into a product, thus eliminating access by all patients. A prescriptive approach may discourage licensees because of a perceived need to overcome too many obstacles in product development. TMs frequently need to balance conflicting objectives and must be able to make compromises in the interest of moving a technology forward.

As part of the University's public benefit mission, the TM should carefully consider patenting and licensing strategies that promote access to essential medical and agricultural innovations in developing countries. Although a multitude of downstream factors may affect the accessibility and affordability of essential technologies in developing countries, e.g. healthcare infrastructure, poverty, food security, international treaties and laws, sanitation, energy, and political stability, it remains possible for the

University to impart a profound life-changing impact in the developing countries through humanitarian patenting and licensing strategies.

One patenting strategy that the University and its licensee might pursue is to limit patent protection to those developed countries with a healthcare infrastructure that can afford the healthcare products and not seek patent protection in developing countries thereby allowing other manufacturers to freely practice the technology. Some examples of alternate licensing strategies to consider could be: (i) inclusion in a license agreement of mechanisms to allow third parties to create competition that affects or lowers prices in developing countries, create incentive mechanisms for widespread distribution of the licensed product, or reserve a right for the University to license third parties under specific humanitarian circumstances, (ii) inclusion of license terms requiring mandatory sublicensing to generic or alternative manufacturers in a developing country or a program that requires the distribution of the healthcare product at low or no cost to underprivileged populations with assurance that the licensee will continue to develop, manufacture and distribute the product to all such populations; and (iii) inclusion of uniquely crafted diligence provisions or other creative pricing tied to the patient's ability to afford the technology that are consistent with sponsor's march-in rights provision (if applicable).

Financial terms for products that address diseases that disproportionately affect developing countries should, where possible, facilitate product availability in the country of need. At a minimum, the financial terms should recognize the low profitability of such products. The University could also consider foregoing royalties on products distributed in such countries or requiring the licensee to sublicense other companies if the licensee is unwilling to invest in the development of a product distribution network within that country.

To be most effective in promoting global health, the TM needs to pursue creativity and consider a wide variety of patenting and licensing strategies, since the most impactful approach in one situation may fail in others. Prescriptive guidelines dictating limited strategies could be particularly detrimental to achieving the University's goals of public

benefit. Creative patenting and licensing strategies addressing global health should focus on effectiveness and should aim to achieve the greatest impact worldwide.

Software

Because of the cross-over of software and other digital media between the patent and copyright policies, licensing of these technologies are less straight-forward than simple patent or copyright licenses. In addition, under University Copyright Policy the campuses have the delegated authority to implement procedures and supplementary local policies regarding licensure, disposition of royalty income, and other rights related to copyrights. As such, copyright licensing practices will vary from campus to campus.

Diagnostics

Licensing clinical diagnostics technologies, regardless of type (genetic or otherwise), should balance the need of the licensee to achieve a fair return on investment with the public's need to have the test as broadly available as possible, including enabling patients to obtain a second opinion by accessing the test from an alternative provider. Licenses should also reserve the right for the academic community to use the diagnostic for research purposes, including studying and independently validating the test and employing it to advance medical research. The TM will need to take into account that licensees can elect to commercialize the technology (i) as an FDA-approved kit sold to end-users, (ii) as a testing service business using an in-house Laboratory Developed Test (LDT) subject to the Clinical Laboratory Improvement Amendments (CLIA) of 1988 administered by the Centers for Medicare and Medicaid Services, or (iii) a sequential combination of (i) and (ii) whereby the licensee initially enters the market to generate near-term revenue with an LDT-based testing service and subsequently obtains market approval via the costlier and lengthier FDA review process to market a kit for sale. Licensors that have academic medical centers need to structure their licenses to take into account the needs of their own clinical laboratories to insure affordable access to the licensee's FDA-approved kit or to have the right to provide an LDT in their CLIA labs (either as a carve-out or an affordable sublicense from the licensee).

For markets that can reasonably support two diagnostics developers (e.g. melanoma), the TM should consider co-exclusive licensing. However, for more limited markets, in order to assure maximum availability and multiple sources, the TM might consider such approaches as (i) a time- limited exclusive license that automatically converts to a non-exclusive license after several years, or (ii) a license grant for the exclusive right to sell and a non-exclusive right to make and use the patented technology. In this way the licensor can be the sole provider of an FDA-approved kit while clinical labs that cannot afford the kit can still serve patient needs with their own LDTs.

Lastly it is important to appreciate that whereas a single-source provider of an FDA-approved kit provides patients with a uniform, consistent product, LDTs developed by different clinical labs (commercial and academic) may vary in performance quality and have different degrees of false-positive and false-negative results. Thus a given patient's diagnostic outcome could vary depending on which CLIA lab performs the test. However, insuring test availability from more than one source can mitigate the variability from center-to-center.

Genetic Resources/Traditional Knowledge

Country laws or international treaties may influence licensing decisions where inventions are derived from genetic resources or traditional knowledge. The TM should investigate all project sponsored or collaborative research agreements, including material transfer agreements, to identify if any genetic resource or traditional knowledge was used in making the invention and if any specific requirements apply to the use of such resources. In some situations, the requirement may be attached to a collection permit or a visa document.

Even in the absence of such laws, treaties or contractual requirements, the TM should carefully consider biodiversity issues and negotiate individual agreements that recognize the origin or source of the material. Where possible, such agreements should consider benefit sharing arrangements with indigenous and custodial communities or governments in consideration for access to such biological material or traditional knowledge.

Emerging Technologies

Over time, whole new fields of technology and innovation will emerge that will raise new issues for consideration. As with any emerging technology area, the evolution of "successful practices" will require careful and conscientious decisions that may vary from previously released guidance. The TM should thoughtfully consider how best to address these emerging issues so as to optimally manage University-developed technologies for public benefit.

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