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BATTELLE PLATFORM RECOMMENDATIONS

Actions Requested: Receive the universities' reports on TCRO reviews of Battelle platform projects and consider recommending to the Board final approval of all platform projects, including the modifications identified below.

Executive Summary: At the August 2006 Board of Regents meeting, the three universities submitted proposals for the use of \$8.2 million in funding provided by the Legislature to advance research and commercialization in the biosciences, advanced manufacturing, and information technology as recommended by the Iowa Department of Economic Development's Battelle Report. The Board transmitted the proposals for further review to the Technology and Commercialization Resources Organization (TCRO) which was created in the same legislation which provided the funding. The TCRO's reviews of the projects were provided to the four Regent members of the TCRO and were provided to the universities which have provided additional information or have proposed modifications of several projects. A summary of the proposed modifications follows and the full responses from the universities are included in the Regent Exhibit Book. The universities request the Board consider final approval of the Battelle platform projects as modified by the universities.

University of Iowa

General Response

The University of Iowa reports that many of the review comments were valuable and it plans to implement many of them. The university notes that its call for proposals was intended to be highly strategic in building commercialization capacity in the core Battelle areas: bioscience, information technology, and advanced manufacturing. As such, the bulk of the proposals would be classified as being at a pre-company or pre-commercialization stage. This very early stage is largely the current state of the UI portfolio, which is why the GIVF and Battelle funding is crucial. The university reports that it will evolve the overall stage of opportunities to a more diverse portfolio ranging from very early to companies ready for financing, resulting in a "pipeline" of commercialization opportunities. Over the course of the funding period for the projects, the university will couple the principal investigators with experienced spinout company professionals to develop these models and plans.

Another theme of the TCRO comments centered on freedom to operate (FTO) issues. In the proposals in which patent protection is being sought, or a patent has been issued, the patenting process has included prior searches to elucidate the viability of patent protection and to guide the specific protection strategies. This is one component of a freedom to operate analysis. A full FTO analysis can be expensive-- \$50,000 and more which the university believes is not justified for the stage of these opportunities, except under special circumstances.

Specific SUI Projects

Commercialization of Santos (\$370,000)

TCRO reviews were very positive but noted an absence of a business plan for the project. SUI reports that a business plan is now under development.

Development of Ad5-Trail as a Cancer Therapeutic (\$400,000)

TCRO comments focused on concern about the legal strength of the patent on the technology. SUI reports that patent counsel has reviewed the patent and has advised the university that the legal position is strong. The university also reports the principal investigators (PIs) are considering a start up company and will receive assistance from the IOWA Centers for Enterprise.

Designing Transgenic Cells for Biomedical Applications (\$400,000)

TCRO comments were critical of the project's lack of business plan or a strong commercial partner and stated that the project was still at proof-of-concept stage. SUI reports that scientific proof-of-concept has been demonstrated in both published and unpublished work. The PI is working with the IOWA Centers for Enterprise regarding a commercialization path with the intention of developing a business model over the course of the funding timeline.

Development of Peptides for Diagnosis and Therapy of Cancer (\$400,000)

TCRO comments were supportive of the science involved in the project but were critical of the fact that commercialization was proposed to be through a subsidiary of a startup company in another state. SUI reports that the PIs have modified their business approach to create a stand-alone Iowa company for commercialization. Tentatively, the company would be called Radiopeptide DX&RX. With support from the IOWA Centers for Enterprise, the PIs have prepared a business plan that was submitted to the National Institutes of Health. The plan will be further revised with help from the IOWA Centers for Enterprise.

Build-out of Space in the Myriad Two Building (\$1,000,000)

TCRO comments focused on the lack of business information about the Dermacia/NGI firm which will temporarily utilize the built-out space. SUI reports that business information about the company has been submitted to the Iowa Department of Economic Development.

Iowa Neuro-Musculoskeletal Therapeutic Training System (\$130,000)

TCRO comments were very positive but expressed concern about the business development capacity of the partner company. SUI reports that the IOWA Centers for Enterprise will assist the PI in determining if the company is a viable partner and then in assisting in the development of a business plan. Both the university and the company are committed to obtaining such assistance.

Iowa Imaging-based Multicenter Trials Organization (\$400,000)

TCRO comments focused on the lack of a business plan or a go-to-market strategy and that the project is at the proof-of-concept stage. SUI reports the PIs have a business plan and that their go-to-market strategy involves working with major pharmaceutical companies in clinical trials to demonstrate the value of the product; these include a current relationship with the firm Astra-Zeneca and one being negotiated with the firm GSK. The PIs also now plan to hire an individual with FDA Good Laboratory Practices experience.

Design and Testing of Novel Toll-like Receptor-directed Immunomodulators (\$100,000)

TCRO comments were supportive of the science involved but were concerned that the patent has not been finalized, the actual commercialization might be many years in the future and might be subject to severe competition from large established firms. SUI reports the PIs have two patent applications pending and one in preparation. The PIs report that compounds already produced by them show promise in vitro of being much more potent and stable than those produced by a current company, Corixa, which was recently purchased for \$300 million by the firm GSK.

Porcine Models of Human Disease (\$400,000)

TCRO comments focused primarily on concerns that the proposal is a swine-related project but does not involve collaborative work with Iowa State University. SUI reports that the PI did approach ISU but the type of specialized expertise needed for the project only exists at another institution. The PI will continue to explore opportunities for collaboration with ISU. The IOWA Centers for Enterprise will assist the PI in preparing a business model as the project unfolds.

Iowa State University

Bioeconomy (Syngas, biomass gasification, bio-oils: \$910,000)

TCRO comments were uniformly positive and indicated the proposal could justify more Battelle platform funding than the \$710,000 originally requested. ISU has proposed increasing the platform funding for this proposal by \$200,000 to \$910,000. The funding would be diverted from ISU's Advanced Manufacturing Battelle proposal. The additional funding would extend the work being done by ISU faculty related to a U.S. Department of Energy grant for a syngas-to-ethanol proposal. The \$200,000 will be matched with an additional \$258,000 from the federal grant.

Biosecurity (Anti-microbials, prebiotics, livestock traceability: \$450,000)

TCRO comments were uniformly positive and indicated the project built upon previous state investments in the proposal from the Bioscience Alliance of Iowa. ISU has proposed no changes in this proposal.

Advanced Food and Feed (Starch research, flaxseed, soy carbohydrates: \$1,006,000)

TCRO comments identified good industry support for this proposal which funds projects at the ISU Nutrition and Wellness Research Center (NWRC) but raised two primary issues: 1) The long term future of the NWRC after the Battelle funding is expended and 2) Information about how businesses will be created from technology discoveries at the NWRC. ISU reports that the unique ability of the NWRC to bring together basic food and nutrition research with clinical testing will develop financial support from clinical testing services and from the research enterprise itself. ISU's long term goal is for the NWRC to become a National Institutes of Health clinical nutrition research center which will provide significant ongoing federal support. ISU also anticipates generating intellectual property at the Center which will lead to opportunities for additional industry development and expansion. The NWRC directors will meet regularly with the ISU Pappajohn Center for Entrepreneurial Development to assess opportunities for creation of new business ventures. The NWRC will utilize Keith Barnes, retired CEO of the Proliant Company as an advisor in development of a business plan for the Center and to help develop further industry connections.

Animal Systems (animal disease models, fat cell physiology: \$573,000)

TCRO comments were positive but several members asked if the project leaders could explore collaboration with the leaders of the University of Iowa's proposal on Porcine Models of Human Disease. ISU reports that the principal investigators and collaborators on the proposal already have continuing research contacts and projects with the University of Iowa, including Dr. Michael Anderson and Dr. Michael Welsh who are working on a cystic fibrosis model in pigs.

Information Technology (Information Science Technology Institute: \$650,000)

TCRO comments centered on the long-term sustainability of the Information Science Technology Institute (ISTI) after the Battelle funding is expended. ISU reports that the long-term funding of the ISTI will be through generation of federal and private research dollars. ISU states the ISTI will provide a unique environment where multi-disciplinary teams can address complex information technology needs of companies, generating commercial collaborations which will also enhance the researchers' abilities to compete for large federal grants. ISU also states that the ISTI will provide new mechanisms for the collaboration between the university and private companies that can lead to commercialization. New mechanisms may include leveraging ISU's commitment to flexibility on intellectual property issues to offer a variety of relationships ranging from the typical licensing model to those more akin to open source software.

Advanced Manufacturing (Supply chain management, product design/production: \$100,000)

TCRO comments focused on the need for additional information about how existing companies would benefit from the project and how the impact of the project could be measured. ISU reports that the advanced manufacturing platform at ISU is not as mature as those in the life and biosciences and proposes reducing the Battelle platform funding for this proposal from \$300,000 to \$100,000 with the difference being reallocated to the Bioeconomy platform proposal.

University of Northern Iowa

General Comments

The University of Northern Iowa reports that the TCRO comments have helped UNI researchers refine business approaches and strengthen relationships with commercial partners involved in the projects. UNI further reports that the university's Battelle grant portfolio includes projects at near-, mid- and long-term stages of commercialization and that the funding will enlarge the pipeline of projects making the transition from discovery to market.

Specific UNI Projects

Ethanol and Biodiesel Byproducts as Base Oils for Biobased Industrial Lubricants (\$120, 247)

TCRO comments were positive about the science involved but questioned the cost of laboratory work. UNI reports the estimated laboratory costs in the project were determined by a quick survey of comparable testing services available on the open market. The resulting cost estimate was reduced by 10 percent for the proposal. The university notes that the testing will be conducted by the National Ag-Based Lubricants facility at no profit.

Commercialization of Leading Edge Paint Removal Technologies (\$119,837)

TCRO comments were generally positive but included a request for information demonstrating industrial demand for the service. UNI reports that marketing surveys are currently underway to determine the size of the market. The Virtual Blast technology was developed as a result of requests from many private companies which are already interested in a previously developed Virtual Paint product developed by the PIs. The private company involved in the project already has an established reputation in the painting and blasting industry.

Commercial Computing Grids (\$64,933)

TCRO comments were generally positive but included questions about whether any commercial companies would actually use the service described in the project. UNI reports that the PI will partner with two cutting-edge, nationally-recognized Iowa companies, TEAM Technologies and PowerSurge. They will determine users' requirements, test options and establish a base of reference customers for ongoing marketing and sales work.

Robotics-Deployed Detection of Biological Agents (\$136,875)

TCRO comments included the lack of proof-of-concept, whether any "blocking" patents already exist in the marketplace and the lack of a clearly defined go-to-market strategy or business plan. UNI reports that proof-of-concept is imminent and is expected within three months. UNI further reports that a patent search was completed in 2004 and did not turn up any competing patents. UNI's Strategic Marketing Services conducted an exhaustive study of market potential in 2004 which indicated market opportunities in both civilian and military applications. At this time, the PIs' business approach is based upon licensing to Rockwell Collins, a company with both

manufacturing expertise and defense contract relationships. Initial communications with the company have been very positive.

Commercialization of Protein Structure Prediction Technology (\$58,767)

TCRO comments on the mathematics involved in the project were very positive but included concerns about the lack of a business plan, proof-of-concept and go-to-market strategy. UNI reports that proof-of-concept is expected within twelve months and indicated that a near-final version of the technology is currently being tested and benchmarked by a world-recognized assessment program. Preliminary ranking of the technology through this assessment has placed it in the top five percent in its technology category. The PIs further report that a market study will be conducted within the coming year and that they have developed relationships with two Iowa-based companies, Bio::Neos and Pharmacom, Inc., both of which have expressed interest in licensing the technology.

Development and Commercialization of a Foundry Binder System from Biobased Feedstock (\$71,512)

TCRO comments focused on the industrial partners identified in the project and the concern that Iowa-based companies be more involved. The university reports that Bender Foundry Service in Sigourney, Iowa is the lead foundry partner in developing and testing the new technology and that John Deere, which has several factories in Iowa, is also providing technical advice and equipment. It is anticipated that Bender Foundry Service will be the first commercialization partner and that John Deere will be the first customer. The PIs will explore a startup company in tandem with the licensing opportunities.

Identifying Drought Tolerance Genes in the Reproductive Structure of Barley (\$169,997)

TCRO comments were critical of the proposal stating that private companies had already explored this area of research several years ago. The PIs agree that private firms have already studied drought tolerance in plant leaves but not in the gene expression of the plant's reproductive structures. The UNI Office of Intellectual Property conducted independent reviews of more than 1,000 related plant patents and found no patents that addressed gene expression in the reproductive structures. After the genes are identified and patents filed, the PIs will seek to collaborate with the ISU Plant Science Institute to speed up similar discoveries in corn and soybeans.