Technology Validation and Start-Up Fund

Round 4 Submittal Evaluations

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Submitted To:

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TABLE OF CONTENTS

1. Executive Summary

YourEncore was selected as the contractor to perform the review process based upon having over 7,000 subject matter experts with a collective average of over 25 years of experience. For each of the eight areas of "project focus" a technical expert was selected to review the proposals. Once the technical review was complete, a business reviewer and senior YourEncore managers reviewed each proposal. These experts have diverse backgrounds and a plethora of experience that make them ideally suited to review the proposals and recommend where the state of Ohio should invest to achieve maximum benefit to the state's economic development goals.

For Round 4, a total of 40 requests for funding were submitted to OTF's Technology Validation and Start-Up Fund, 23 for Phase 1 and 17 for Phase 2. This is the highest number of requests received to date, though likely driven by a relatively large gap between rounds as compared to prior rounds. Of these 40 requests, 6 requests in Phase 1 (26%) and 6 in Phase 2 (35%) were recommended for funding to OTF by the expert Review Team. As with the first three rounds, the Review Team was composed of subject matter experts in each field of technology, a business reviewer, and YourEncore senior managers. The Review Team evaluated each proposal based on the information submitted for review, and according to the criteria specified by OTF.

The quality of Phase 1 proposals was noticeably lower than in Round 3. While it is difficult to assign clear causality, it would appear the proposals were less carefully screened and edited than in the prior round. Some were not well constructed and confusing, while others made ambitious but unsubstantiated claims, giving the impression that involvement from university TTOs may have been less rigorous than in prior rounds.

A total of five applications not previously recommended for funding were resubmitted in this round. The sole resubmission for Phase 1 was not recommended, and one of four Phase 2 resubmissions was recommended, though one of those withdrew prior to a decision. In two instances very little was done to address prior concerns expressed by the review team and in the other the strategy was altered but raised new concerns. Therefore, teams that plan on resubmission are encouraged to take advantage of the opportunity to debrief with the review team to discuss potential improvements, as this may help clarify and focus the comments offered in this report.

Generally, the technologies as proposed are sound, and most requests that were not recommended for funding were lacking in fundamental elements of business strategy. Phase 1 proposals not recommended for funding (with one exception) were either deficient in Generation of Proof (9 of 23 had this fatal flaw) and/or Market Opportunity / Size (8 of 23). While Generation of Proof can be a technical issue, for most applications it was a business issue; that is, even if technical goals are met for the project, those goals are insufficient to validate the technology. Deficiencies in the latter category were most often linked to a poorly articulated or greatly overestimated market potential, though in some instances it was apparent that a viable market simply does not exist. Phase 2 proposals not recommended for funding were nearly all deficient, at least to an extent, in their business model, which is a continuing theme from earlier rounds. The review team saw a lack of adequate preparation and understanding of market dynamics, pricing, or the basic business model itself, meaning, the product, license or royalty structure, partner model, etc. were poorly defined.

Total grant dollars recommended for funding is $863,636 for this round, versus approximately $950,000 for round 1, $900,000 for round 2, and $610,375 for Round 3. While the total number of requests was high, the

quality for the Phase 1 proposals especially was low, and there were several grants recommended that did not submit their request for the maximum allowable amount.

The Phase 1 Proposals that are recommended for funding are:

1. 13-402: Kent State University, Easily Configurable, High Resolution, Patterned Liquid Crystal Alignment Layers via Ink-jet Printing of Metal Nanoparticles and Semiconductor Quantum Dots, $46,527
2. 13-407: The University of Toledo, Nano-biosensor for Infection in Tissue, $25,000
3. 13-410: The University of Toledo, Non-toxic Antibacterial Surfactant/Microgel Formulations, $44,493
4. 13-413: Case Western Reserve University, Image-based Risk Score for Predicting Response to Therapy for ER+ Breast Cancer Patients, $50,000
5. 13-416: Austen BioInnovation Institute in Akron, Ultra Low Volume Syringe/Pipette, $49,250
6. 13-420: Kent State University, Fast Electrooptic Switches Based on Liquid Crystals, $50,000

The Phase 2 Proposals that are recommended for funding are:

1. 13-427: Nanofiber Solutions, Development of a Tissue Engineered Small Intestine, $100,000
2. 13-429: Folio Photonics, LLC, Prototype Development of a Coextruded Multilayer Polymer Film for Optical Data Storage, $100,000
3. 13-433: Lucintech Inc., Transparent PV Window Prototypes, $100,000
4. 13-434: Apto Orthopaedics, A Non-invasively Adjustable Implant for Treatment of Early Onset Scoliosis, $100,000
5. 13-436: LARAD, Inc., Virus-Like-Particle (VLP) Vaccines, $100,000
6. 13-437: Analytic Diabetic Systems, LLC, Beta Prototype Development of a Comprehensive Web-based Clinical Decision Support System (GlyCU) Supporting Optimization of Glycemic Control in the Hospital/Critical Care Setting, $98,366

2. Proposal Recommendations - Phase 1

Summary of Recommendations

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	Independent 3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
13-0401	Ohio University	*A Matlab Toolkit for 3D Visualization of Real and Synthetic Flight Data*								
13-0402	Kent State	*Easily Reconfigurable, High Resolution, Patterned Liquid Crystal Alignment Layers via Ink Jet printing*								
13-0403	Kent State	*Smart Energy Saving Liquid Crystal Window*								
13-0404	Ohio State	*VisonLight*								
13-0405	Ohio State	*Inorganic Membranes for Freshwater Recovery*								
13-0406	Ohio State	*Personalized Spine Assessment*								
13-0407	University of Toledo	*Nano-biosensor for Infection in Tissue*								
13-0408	University of Toledo	*Bio-polyamides precursors for production of Nylon 11*								
13-0409	University of Toledo	*Nanoelectronic Memristor Device*								
13-0410	University of Toledo	*Non-toxic Antibacterial Surfactant/ Microgel Formulations*								
13-0411	University of Toledo	*Injectgraft*								
13-0412	Ohio State	*Total Animal*								
13-0413	Case Western	*Image-Based Risk Score for Predicting Response to Therapy for ER & Breast Cancer Patients*								
13-0414	Cleveland Clinic	*Reinforced Extracellular Matrix Device for Ventral Hernia Repair*								

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	Independent 3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
13-0415	University of Akron	*Low-Cost Integrated Wireless Sensor Network for Agriculture Hydroponic Systems*								
13-0416	Austen BioInnovation Institute	*Ultra Low Volume Syringe/Pipette*								
13-0417	Austen BioInnovation Institute	*Self-Retaining Radiolucent Femoral Retractor*								
13-0418	Austen BioInnovation Institute	*Intubation Mouth Guard*								
13-0419	Austen BioInnovation Institute	*Digital Wound Assessment*								
13-0420	Kent State	*Fast Electrooptic Switches Based on Liquid Crystals*								
13-0421	Kent State	*Novel Non-Photobleaching Fluorescent Magnetic Nanoparticles as Advanced Bioimaging Agents*								
13-0422	Kent State	*High Speed Plasmonic Spatial Light Modulators with Low Driving Voltages*								
13-0423	Kent State	*Smart Responsive Scaffolds for 3D/4D Cell Culture and Regenerative Medicine Applications*								

Definition of Columns:

Proposal # – A unique OTF number for each proposal

Licensing Institution – The Ohio Institution of higher learning that is requesting funds

Project Title – The Project Title for the Request for Proposals Application Page

Generation of Proof to be Licensed – The proposed proof needed to move the technology to a point where it is ready to be licensed to a start-up or young company is deemed meaningful and likely impactful to that end

Project Plan/Team – Proposed proof that the technology can be generated during a one year project period with the proposed resources to move the technology to a point where it is ready to be licensed by a start-up or young company

Independent 3rd Party Review – Will the validation/proof process be conducted or overseen by an independent party

Reasonable Path to Market – The technology has a commercially reasonable path to market entry of first product

IP Protection – Degree to which the intellectual property is protected

Start-up in Ohio – Degree to which the proposed project will likely lead to a start-up company if the technology validation is successful and needed proof is generated

Market Opportunity/Size – Is this technology a viable commercial opportunity in regards to the potential market size and competition

Budget Narrative/Use of Funds-newly added for Round 2, description of how the entity proposes to use the funding if received

Details of Recommendations

Proposal 13-401, Ohio University, A Matlab Toolkit for 3D Visualization of Real and Synthetic Flight Data, $50,000 requested. **Amount recommended: $0**

Rationale: This proposal concerns development of a software interface to sensors and synthetic data to render a 3D visualization tool for situational awareness. It's an ambitious proposal supported by an impressive body of work, and there would appear to be the potential for commercial relevance. The proposed work would be conducted in conjunction with a third party to ensure alignment with commercial needs and user requirements at launch. While the development team robustly describes their technology, the review team found the description of the market opportunity lacking and cannot support a positive recommendation for funding at this point.

The proposal cites impressive numbers for spend in situational awareness space, generally, and estimates a $1,000 per seat license for their tool, but does not provide any estimates for the potential size of the market for this application nor how much of that market they believe they could reasonably capture. There were other concerns as well. First, the question of latency was not addressed, and any delay in the transmission and processing of the data would be a critical flaw. The need for compliance with DO-178B (or C, depending) was not addressed, but it is assumed this compliance would be required and should be addressed in the plan. Finally, there was concern as to the rationale of needing to compensate a potential customer to help define user requirements. If in fact this is a breakthrough technology, it is reasonable to expect customers to willingly provide input on user requirements to align development with their need.

Recommendations for Improvement: The review team believes this proposal could be greatly improved if the potential market were better described, along with a rationale for the license fee and some objective estimate of the projected revenue stream. The team should be clear whether latency is a concern (if not, provide the rationale), and if so what specific targets they have and how those targets will be achieved. Attention should be given to the software airworthiness certification process. Finally, specific feedback as to why their potential customer is not voluntarily participating in the project would be helpful.

Proposal 13-402, Kent State University, Easily Configurable, High Resolution, Patterned Liquid Crystal Alignment Layers via Ink-jet Printing of Metal Nanoparticles and Semiconductor Quantum Dots, $46,527 requested. **Amount recommended: $46,527**

Rationale: This proposal requests funding to make use of a simple approach for creating printed electronics and sensors, using ink jet printing technology combined with nano-structured inks. There are obvious commercial benefits if such an approach is successful, including reduced costs and use of a wider range of substrates (including flexible materials). The first nine months of the project plan are dedicated to formulation and optimization of the nano-inks, then optimization of the printing process. While the proposal lacked clear and specific goals, the narrative of the project plan provided sufficient direction. In addition, potential commercial partners are included in the final months of the project, giving reason to believe proof can be demonstrated. This approach will also ensure timely market input and increase chances for commercial success. A strong IP portfolio to protect the work and clear capabilities of the development team make this a compelling proposal, and a recommendation for funding is made.

Proposal 13-403, Kent State University, Smart Energy-Saving Liquid Crystal Window, $50,000 requested. **Amount recommended: $0**

Rationale: This proposal describes a path for development and validation of a novel energy-saving, reversible photochromic liquid crystal (LC) glass/window technology. If successful, the resulting product could provide energy savings, privacy, and compete in a rapidly growing market. While there appears to be promise in the underlying technology, the proposed milestones lack clarity and specificity, making it difficult to assess whether the end results of the work would be sufficient to render the technology ready for license and subsequent commercialization by an Ohio start-up. The development team states they will design and optimize photochromatic chiral materials, but does not provide specific goals or performance targets. There is no mention of a third-party to oversee and validate the work, nor is there a business plan to move the technology to market. As a result, a favorable recommendation for funding cannot be made.

Recommendations for Improvement: An improved application would provide greater detail in the project plan, including specific project goals and/or performance targets. In addition, an objective third party should be identified to validate the work. Without more tangible and verifiable outcomes, it is unlikely the review team would be able to recommend funding for a resubmitted proposal. Other areas that would help would be an improved budget narrative – how the State's money would be used against the detailed project plan. This would include more information on who, other than the principal investigator, would be involved, as the bulk of the requested money is for personnel. Some attempt at an initial business plan should be made. It should also be noted that a similar technology from Kent State was recommended for funding in a previous review – clear differentiation of this work from other work streams already underway would be helpful.

Proposal 13-404, The Ohio State University, VisionLight, $25,000 requested. **Amount recommended: $0**

Rationale: This proposal requests funding support for a single instrument, using the i-Pad as a platform, to measure properties of the eyes and vision. The underlying rationale and business case is logical and compelling, and there would seem to be a real market opportunity. The product as proposed would be considerably cheaper and easier to use than current equipment and methods. Unfortunately, there are numerous deficiencies in the proposal as submitted. First and foremost, all technologies submitted to the Third Frontier for TVSF funding must have protected intellectual property. None currently exists for this product and it is unclear, according to the proposal, whether any could be obtained going forward. This particular hurdle may be insurmountable, but if it can be overcome, there are other areas of concern. The applicants make no mention of a regulatory strategy in their project plan, but presumably this product would require FDA approval, likely as a Class II device. The third party mentioned may or may not be objective, but the existing relationship under the same university umbrella creates concern. Finally, the proposal does not explain how this product will achieve a defensible market position, even if successfully launched. Since most of the elements of the proposal are concepts only at this point, presumably competitors could closely follow with a similarly small budget and short timeline.

Recommendations for Improvement: The IP situation must be addressed before resubmission of this grant request. If that can be accomplished, the applicants should explain their regulatory strategy and how it impacts timelines and budget, or, if they believe no approval is required provide rationale for that approach. Either way, the regulatory strategy should be clearly linked to the business model – screening devices have a different revenue model than diagnostic devices. The review team would like to better understand the

business model as a whole, including what, specifically will be sold and earn revenue (e.g., i-Pad, light, software, analytical algorithms, etc.)? And finally, effort should be made to explain how this business will guard against competitive entry and create a sustainable advantage.

Proposal 13-405, The Ohio State University, Inorganic Membranes for Freshwater Recovery, $50,000 requested. **Amount recommended: $0**

Rationale: This proposal requests funding to develop ceramic membranes, and specifically intends to validate these membranes for water recovery from hydraulic fracturing operations. The development team nicely describes the project plan and presents a clear path forward, both within the scope of this project term and beyond. The proposal correctly cites many advantages of ceramic membranes as compared to traditional polymeric membranes. It also correctly points out the growth potential for ceramic membranes as costs are driven down through more efficient production methods. Similarly, it's clear the development team has impressive qualifications in this area, and there would appear to be an impressive body of patent art to support this work.

However, it is quite unclear how this technology, specifically, compares to numerous ceramic membranes which are already on the market. Nor is it apparent how, once work on this project phase is completed, this product or approach will create that differentiation. Given a lengthy (four years) and expensive (multiple millions) path to market, there must be a clear and obvious differentiator. Presumably companies already in this space (with products on the market) will continue their work to make their products perform better while reducing productions costs, leaving the review team unable to discern what competitive position this product will possess. A positive funding recommendation cannot be given.

Recommendations for Improvement: The inclusion of an objective and frank assessment of the competitive market for ceramic membranes would be helpful. This assessment should also address the specific advantage the proposed technology would offer over other products, whether performance, cost, reduced maintenance, or some other parameter. Similarly, the end point for the project work should align with the anticipated advantage, as simply demonstrating functionality is not sufficient for a late entrant to a market. It would appear the development team has relationships with potential partners and customers, who should be able to assist them in that regard, if needed.

Proposal 13-406, The Ohio State University, Personalized Spine Assessment, $50,000 requested. **Amount recommended: $0**

Rationale: The proposed project is to further develop a method for assessing and managing lower back disorders, through quantification of the impairment and mathematical modeling to predict the effects of various interventions. The review team was unable to conduct an informed technical appraisal with the information presented. First, though a patent exists for the lumbar motion monitor, a new patent will apparently be required after a non-specified redesign of the monitor. Most of the requested funding will go towards this redesign, which, as a non-protected technology is not eligible for TVSF funding. Further, the applicants reference a personalized biomechanical model which they will keep as a trade secret, and as such provide no detail on the database. The proposal mentions 30 years' research behind these technologies, bringing into question the value of 10 additional patient assessments (as proposed in the project plan), especially in light of generalized and unsupported assertions. Overall, these vague references left too many

unanswered questions for the review team to make an informed assessment. It is also noted that while third parties were identified as collaborators, there is no mention of an objective party to validate the work.

Recommendations for Improvement: The development team should have a clear design for the new monitor, and file the appropriate invention disclosures, working closely with the University to put an IP strategy in place. Further, detail should be provided on the trade secret elements of the database, which is allowable under the grant request process by marking the proposal as containing trade secret information. If this is not possible, non-trade secret information should still be provided to help the review team understand how the algorithm works, even at a high level. With greater detail on the monitor and the underlying data to make assessments and predictions, the application will be improved, though an objective party to review the work should be included in the plan. Further, assertions for specificity and sensitivity of their measurements should be supported, along with a good description of the criteria used as a standard for making these assessments. Finally, it would be helpful to understand how the numerous data inputs referenced (electromyography, magnetic resonance imaging, computed topography imaging, optical tracking, motion signature/tracking, etc.) are combined and weighted in the assessment and prediction process.

Proposal 13-407, The University of Toledo, Nano-biosensor for Infection in Tissue, $25,000 requested. **Amount recommended: $25,000**

Rationale: This proposal is for a biosensor to detect infection, initially targeting bone infections as the primary application. When the device, a microprocessing chip, is in the presence of microbes that bind to the particular antibodies on the chip, the conductivity changes, the chip senses the change, the signal is amplified and a quantified output (light or sound) is produced. Given the tremendous unmet need in the area of infection control and management, the perceived strength of the IP position and the ingenious nature of the device, a recommendation for funding is made.

The review team does have some concerns, however. First, the timeline appears quite aggressive and leaves very little room for error. Second, while the products under development can eventually be applied to any type of pathogen (virus or bacteria) and the potential, if the product meets the development targets, is considerable, the development team appears focused on a licensing strategy which may greatly diminish the potential return to the State of Ohio. A great deal of focus and care should be placed on a commercialization plan, including creation of a start-up company, or, at a minimum, a careful strategy to protect as much of the intellectual property (and future value) as possible to realize long-term benefits to the University, the State and the inventors.

Proposal 13-408, The University of Toledo, Bio-polyamides precursors for production of Nylon 11, $40,152 requested. **Amount recommended: $0**

Rationale: This proposal describes a bench-scale R&D path for further development of a novel, patent-pending pyrolytic fractionation technology that enables solvent-free recovery of free fatty acids (FFAs) or fatty acid methyl esters (FAMEs) from algae. This approach offers numerous potential advantages against petroleum-based products, and other more complex methods of extraction from algae. The presented grant request is logical and sound, and the review team has every reason to believe the development team can complete the proposed work. Similarly, if successful, there is a ready market for their proposed approach, as evidenced by the active participation of an industrial partner, Cereplast.

Unfortunately, the review team is unable to justify a funding recommendation at this point. The only potential concern is return on investment for the State of Ohio, as Cereplast is not an Ohio-based company nor do they have significant operations in the state, and it does not appear the development team intends to start a company of their own to carry the product to market. Since Cereplast is investing in development in this project phase (testing of physical properties of the polymers) it is extremely likely they will license the technology if successful. That scenario makes it unlikely the technology would, at least in the short-term, also be licensed to an Ohio-based company, which goes against the intent of the TVSF.

Recommendations for Improvement: An improved grant request would make a more compelling case for state investment. If the development team believes a license to Cereplast would still leave sufficient room for a start-up company to operate in non-competitive applications, detail and rationale should be provided for such a scenario. This would include non-competitive applications and market landscape relative to Cereplast, an assessment of the state of the technology relative to those applications (how well developed, what proof, how close to market), and rationale for a new start-up or additional licenses to existing, but nascent, Ohio-based companies.

Proposal 13-409, The University of Toledo, Nanoelectronic Memristor Device, $50,000 requested. **Amount recommended: $0**

Rationale: This grant request is for development of nonvolatile nanoarrays that, if successful, will have superior performance in device applications that now use flash NAND memory. The applicants certainly have the right credentials for the project, and while there are certain to be challenges, they are well-positioned to overcome them. They also appear to have done a lot of preparation for commercialization, having engaged with potential customers and partners, and completed the NSF I-Corps Teams training. The proposal is logical and generally compelling.

The review team did have some significant concerns. Despite several mentions of ‘unique materials and processes’ the proposal was lacking detail as to what, specifically, those are. In addition, numerous references were made to current state of the art, but this is a field in which numerous universities and companies are actively playing. For example, Hewlett-Packard announced plans for their own memristor arrays in 2010. A team at the University of Michigan published an article on memristor arrays in 2011. There was no discussion of potential competition in memristors, rather than flash NAND, which gives reason to believe there may be challenges in commercialization of the proposed technology, if not in function, then in timing, as it would appear others have a sizeable head start. This, combined with lack of detail on the ‘unique materials and processes’ combined to create sufficient concern that a favorable recommendation for funding cannot be made at this point. One other note – the review team was confused with the conflicting statement of ‘$100k in funding will be sufficient to bring the first product to market by the end of 2015’, yet the project timeline clearly shows the team will be seeking additional funding prior to 2015. This inconsistency can be addressed and is not a fatal flaw, but it is confusing.

Recommendations for Improvement: As referenced above, there are two major areas for improvement. First, the applicants should be specific and clear about what makes their approach unique, and second, tie this information to a more objective competitive assessment, as it’s quite likely the development team is well aware of the work that is being done by others in this field. The rapid pace of development and change in this market requires a forward looking competitive evaluation, especially in light of the first movers already

mentioned. The flash NAND comparison would have been valid if this technology was likely to be first to market. Therefore, the development team should dedicate their competitive focus to similar products and approaches that are more likely to be their competition at launch.

Proposal 13-410, The University of Toledo, Non-toxic Antibacterial Surfactant/Microgel Formulations, $44,493 requested. **Amount recommended: $44,493**

Rationale: This proposal concerns development of a new cleaning and disinfecting agent. It is a mixture of an antibacterial microgel derived from a naturally-occurring and abundant material, chitosan, and a nontoxic, nonionic surfactant that cleans. The applicants state they have completed a preliminary proof-of-concept study, demonstrating that microgels maintain their antibacterial properties in surfactant mixtures against a highly resistant strain of bacteria, maintain colloidal stability, and solubilize hydrophobic compounds. The technical merits of the proposal are apparent, and detailed descriptions of the process to establish the properties of the mixture (physicochemical, biological, and environmental) are provided.

There were several relatively minor concerns noted by the review team. First, it is unlikely that a start-up company will emerge to carry this technology to market (EPA registrations, crowded market requiring substantial marketing, capital investments), making it likely, if not inevitable, that this technology will be licensed before it reaches the market. That said, there is no reason why the eventual manufacturer cannot be an Ohio company. Second, the project budget has very little money for purchased services, yet two companies are mentioned who will do considerable testing and regulatory advisory work. It's unclear as to how that work will be funded. Despite these concerns it is likely a technically superior product with unique and desirable properties will emerge, and a favorable recommendation for funding is made.

Proposal 13-411, The University of Toledo, Injectgraft, $50,000 requested. **Amount recommended: $0**

Rationale: This proposal concerns an artificial bone graft material which possesses numerous desirable properties. If the project achieves its expected results, this material should have a ready place in a crowded market. The review team was appreciative of the competitive focus in the proposal, especially the planned comparative testing against commercially available products, and the testing plan was quite well done. Despite this, a recommendation for funding cannot be made due to sizable gaps in the plan as presented.

It simply isn't clear that there is a product at this point, and this appears to be more of a fundamental research project than development of an existing technology. There is no description of the material itself – only the assertions of its properties. The proposal even states that past feedback was provided from a potential partner/customer who notes the potential of the approach, but was concerned that 'as yet there is no product'. The review team would have expected a detailed description of the technology under development in light of this feedback, but there is none, giving reason to believe the product itself is still yet to be developed. There is simply no way to know whether proof will be achieved at the end of the project, and the crowded nature of the bone graft market requires a more compelling proposal.

Recommendations for Improvement: An improved application would have a detailed description of the material under development – its composition, properties, and work done to date that would support the assertions in the grant request. If this can be accomplished, the team should also include their regulatory strategy and how that fits into the broader development work.

Proposal 13-412, The Ohio State University, Total Animal, $50,000 requested. **Amount recommended: $0**

Rationale: This proposal requests funding to take existing modules in the hard copy-based animal husbandry system called Learning Lab, and make them available as a series of smart phone applications called Total Animal. There does appear to be a viable business opportunity here, as the existing hard-copy materials are prohibitively expensive, so a virtual approach will greatly increase the available customer pool. Despite the high cost, the current materials are widely distributed through clubs and organizations, and would presumably have a good revenue stream associated with them, though that was not specified in the proposal.

Since the TVSF exists to drive economic and job growth in the State of Ohio, the review team cannot provide a positive recommendation for this proposal. The team does not understand the pathway for the formation of a startup company in Ohio since it would appear that Ohio 4-H and Ohio State will continue to provide the distribution of the new product. In fact, if a start-up were formed, considerable brand recognition would be sacrificed. In addition, presumably this approach will cannibalize, or perhaps even eliminate, the existing revenue stream, though that was not addressed in the proposal. The proposal specifically mentions the well-established marketing tools, customer base, and distribution channels enjoyed by Ohio 4-H and Ohio State, which holds the copyrights to the materials. And, while the review team recognizes that 4-H is a non-profit organization which utilizes these materials to educate young people, a non-profit can utilize cash for items such as program development. It would seem, therefore, that grant money would not be necessary to fund development of an app, as there should be sufficient existing cash flow from already developed materials such that Ohio 4-H could develop this on their own. If, for some reason, Ohio 4-H doesn't wish to lead the development, there should be ready and anxious licensees given the relatively modest investment needed to own a virtual version of a well-established franchise. Simply put, it is unclear why grant money would be needed to move this project forward, and nothing in the proposal helped the review team to understand the rationale.

Recommendations for Improvement: As best as the review team could discern, the proposal would be for offsetting one revenue stream with another. An improved application would clearly describe the economic benefit to the state if this project is funded. The best way to achieve that would be a clear explanation of 1) why Ohio 4-H is unable or unwilling to fund development on their own, especially if the University is willing to match funds (which they appear to be), and 2) if licensing to a private concern is the end goal, a clear explanation of why the apparently minimal risk and investment is not something a potential licensee would welcome for a presumably sizeable return.

Proposal 13-413, Case Western Reserve University, Image-based Risk Score for Predicting Response to Therapy for ER+ Breast Cancer Patients, $50,000 requested. **Amount recommended: $50,000**

Rationale: This proposal concerns a method for predicting the effect of two alternate therapeutic approaches to treating estrogen-receptor-positive breast cancer. While a reliable method already exists and is commercially available, it is relatively slow and expensive, as it involves assay of patients' DNA. The proposed approach uses an image of a standard stained slide that, at least initially, appears to compare favorably to the current standard, but would not require complex assays or shipment of tissue samples.

Image-based classifiers in pathology have a distinctly mixed history, and the variability inherent in slide preparation may introduce unforeseen variability in the outcome. Nonetheless, the proposed program is

sensible and achievable, and will provide scientific evidence of its utility in practice. There is good evidence of third-party evaluation, and the existence of an accepted standard as a comparator will provide a valid measurement as an outcome. If this new method is at least as accurate as the existing standard, there is every reason to believe it will meet with commercial success, and a recommendation for funding is made.

Proposal 13-414, Cleveland Clinic, Reinforced Extracellular Matrix Device for Ventral Hernia Repair, $50,000 requested. **Amount recommended: $0**

Rationale: This proposal requests funding to continue development of a reinforced matrix to repair abdominal hernias. This matrix, constructed of biological materials and reinforced with synthetic fibers, is intended to provide more strength and stability than traditional biologic grafts, while reducing the potential for complications (inflammation, stiffness and fibrosis, infections) of synthetic meshes. The project would be dedicated to material selection and scale up for testing.

The review team agrees with the limitations of both biologic and synthetic meshes, but is unclear as to how the combination of the two will necessarily overcome their individual limitations. The inclusion of synthetic materials to reinforce the design would seemingly also create increased opportunities for complications compared to biologic mesh alone. This paradox is not addressed in the proposal. In addition, while it certainly appears this approach is patentable, it also would appear to be very difficult to protect the art. There may be some subtlety in the manner of sewing in the reinforcing threads, but a different manner of sewing may allow for circumvention. Similarly, as the proposal points out, there are various materials that could in theory serve well in this product, another potential gap in the IP. Finally, the project plan seems to have fairly modest goals, with the three main tasks overlapping in most elements with the exception of scale. It seems quite likely that at the end of one year a reinforced mesh will be shown to be stronger than biological meshes alone. While that work is of course needed to select and scale materials, more diverse work could be done to prepare the product for launch into a highly competitive market. The product will either need to be more functional, more cost effective, or both, so insights on cost or expected patient outcomes will be invaluable if the product is to move forward toward commercialization and attract future investment.

Recommendations for Improvement: If the applicants decide to resubmit their request, they should clearly outline their hypothesis as to why inclusion of a smaller amount of synthetic material will greatly improve outcomes. It would also be very helpful to understand how the intellectual property will be protected and offer them a sustainable place in the market. Finally, more ambitious end points should be considered for the work, as presumably future investors will want to see more than the ability to scale the mesh, and demonstration of strength alone may not be a sufficiently meaningful endpoint.

Proposal 13-415, The University of Akron, Low-cost Integrated Wireless Sensor Network for Agriculture Hydroponic Systems, $50,000 requested. **Amount recommended: $0**

Rationale: This proposal offers a low cost wireless sensor network for hydroponic systems by using existing commercial circuitry hardware, combined with novel monitoring and decision algorithms. The initial market entry would be data monitoring only, followed by automated control products – a logical step-wise approach. The primary concern of the review team is lack of clarity on the market opportunity. Total sales to the hydroponic market were $544M in 2011, according to the proposal, though no detailed breakdown offered, so the potential market size for this product is completely unknown. The applicants do offer high-priced

comparators against whom they believe they can effectively compete. There is no information presented on lower-cost alternatives, however. While there are indeed very expensive pH monitors on the market, litmus paper strips are practically free, temperature measured manually, etc. As there is no information provided on customer segments, usage patterns, sales revenues, etc., it is unclear whether there is a viable market for their product or not. Perhaps low-tech solutions suffice, perhaps not. On balance, the review team believes this team can build the products as they describe, but has sizeable doubts as to whether they understand the market well enough to compete and provide a strong return on the investment by the State of Ohio. Finally, there is a presumption that this product, yet to be developed, will offer a similar user experience to customers as the more expensive models they cite. Without input from an objective third-party on as their work progresses, they may find they have missed critical functions or lack ease-of-use. In sum, the business elements of the proposal are lacking, and a positive recommendation for funding cannot be made.

Recommendations for Improvement: Since the applicants have industry connections in their proposed partners, they should be able to more clearly state their value proposition and do so in an objective, compelling way. For example, how many hydroponic customers are there? What percentage are commercial or have operations big enough to warrant automated sensors? What sales estimates are available for like products? As it would appear the applicants are planning to sell products at the end of this project, there should be inclusion of a third-party who is not affiliated with the UARF to provide feedback on the product.

Proposal 13-416, Austen BioInnovation Institute in Akron, Ultra Low Volume Syringe/Pipette, $49,250 requested. **Amount recommended: $49,250**

Rationale: This proposal seeks funding to continue development of a new design for syringes or pipettes. Low-volume syringes help in various circumstances – for example, when drug doses are proportionate to a patient's weight and the patient is a small child. The ability to precisely measure low quantities of a liquid (drug) without dilution or outside of a pharmacy would reduce drug administration errors, for example. The ingenious design of the product is worthy of support, and a recommendation for funding is given.

The review team believes the market for these products is sufficient to support further development towards commercialization, and there is a clear unmet need here. The project plan is reasonable and achievable, and the right resources are in place. There was no mention of an independent third party to validate the results, but the developers will partner with an Ohio-based company on the project, as they have expressed interest in manufacturing the products once ready for market. This, combined with their intent to invite local clinicians and scientists to provide feedback on the products, should suffice, although if Phase II funding is sought detailed feedback and insights from these parties will be expected. While the market for low volume syringes is not huge, the unmet need is significant and the review team believes this product alone can sustain an Ohio-based startup.

Proposal 13-417, Austen BioInnovation Institute in Akron, Self-retaining Radiolucent Femoral Retractor, $38,730 requested. **Amount recommended: $0**

Rationale: This proposal seeks funding for development of a femoral retractor with two distinguishing features: 1) it is made of a reinforced plastic material which will be radiolucent, allowing x-rays to be taken without removal of the device, and 2) the device has an adjustable spreader, keeping soft tissue out of the way on both sides of the bone without needing to be held – it is self-retaining. The device would appear to

have some novelty, although the functionality is difficult to assess – the retaining device may interfere with the surgeon, though the applicants offer anecdotal insights to the contrary.

The main concern of the review team is the size of the potential market. The applicants cite a total market of $1.1B for retractors and elevators, which is well-established and highly competitive. They make a 'conservative' estimate of a 10% market share (presumably for this particular type of retractor) but provide no basis for that. At their projected selling price of $400 per unit, it is difficult to conceive of a successful start-up based on this one innovation, and the most likely scenario would be a quick exit through license to an established company with a sales and marketing infrastructure already in place. The modular design may lend itself as a platform technology, but here too there are concerns. There are other radiolucent retractors on the market today, and these too are sterilizable and reusable, two unique advantages claimed by the applicants. On balance, there is merit to the proposal, but the review team believes the benefits relative to other options and market opportunity need to be further clarified, and as a result does not recommend funding.

Recommendations for Improvement: Objectivity in a grant request is important, and claims for breakthroughs and uniqueness should be substantiated in a careful assessment and presentation of the competitive space. An improved request would provide a more detailed assessment and rationale for the market opportunity, as well as address competing and emerging technologies that are well-known to exist. Care should also be taken to identify the role of an objective third-party to assess the work and the resulting proof. While the applicants offer their video system as capable of allowing this assessment, a commitment from an objective party is needed. Finally, the applicants state 'the initial offering…will allow us to create a platform for a general surgical device company making specialized retractors'. Rationale for this approach must be provided, as a low selling price per unit would presumably require a substantial investment in a sales and marketing organization.

Proposal 13-418, Austen BioInnovation Institute in Akron, Intubation Mouth Guard, $46,700 requested.
Amount recommended: $0

Rationale: This application requests funding for a mouth guard for intubation, that is, passing a tube down the throat to administer anesthetic gasses, to assist breathing to conduct endoscopy, etc. It is not uncommon for medical professionals to unintentionally inflict injury to the patient's teeth, lips, or oral cavity during such procedures and this product is intended to improve those outcomes. The product would both keep the mouth open and offer the aforementioned protection.

There is very little information provided on the market potential for such a product, if successfully developed. While the applicants note that there are 25 million intubations performed each year in the US and twice that number worldwide, they do not mention the frequency with which those procedures are performed using mouth guards. They do not offer an expected selling price or a means to compare that with products already on the market. They do not state why anesthesiologists today often do not use mouth guards and why they would change their behavior with this device. This leads the review team to question whether there is sufficient opportunity to start a new company based on this technology, and the applicants contradict themselves in that regard. They note 'the device is sufficiently unique to be positioned as a non-bundled stand-alone device,' then, 'we intend to bundle several similar devices into a spinoff' (though the 'similar devices' were not specified), and finally, 'it is the intention of the team to pursue [co-development with Covidien] after generating some preliminary data.' Since there are a variety of mouth guards already in this space (even if lesser in capability) it is difficult to imagine the spin-off approach given the considerable sales

and marketing effort needed. A quick licensing exit to a partner creates the question of return on investment to the State of Ohio. At this point funding is not recommended. One final concern is the applicants state a provisional patent for this technology was filed in 2001, which may be a typo. The patent status was not a deciding factor in this recommendation, but this should certainly be clarified and explained if the application is to be resubmitted.

Recommendations for Improvement: More thought should be given to the business plan. Options are certainly acceptable for a Phase I application, but they should not be contradictory. A better competitive assessment is needed as well, including pricing of both the device under development and comparators. Volume estimates, even if rudimentary, should be provided and should be credible. Some thought should be given to obtaining comparative data in future work, given the crowded nature of the market, though it is not expected that work would take place within a Phase I project.

Proposal 13-419, Austen BioInnovation Institute in Akron, Digital Wound Assessment, $49,050 requested. **Amount recommended: $0**

Rationale: This request concerns development of a computer-automated system to assess chronic wounds based on their appearance as recorded by a standard digital camera and certain other measurements like near-infrared spectroscopy. The system would 'learn' via a large number of measurements of wounds characterized by a panel of experts. This approach has been applied in other areas, notably radiology and serology. The approach is technically feasible, though there are numerous challenges. The applicants are correct that radiology has benefitted in many ways from analogous tools, but the assessment is incomplete. Radiology is plagued with false positives and in the areas of greatest need (breast, lung, colon) the gold standard for diagnosis is still biopsy. This is not to say their proposed approach won't work, but it does raise the question whether the applicants' confidence is justified.

The applicants did not mention how this technology would compare to or compete with at least one other established competitor, WoundRounds. This is a critical gap, as the two systems would appear to offer many similar features and benefits. Further, while the applicants state no other products in the market can automate and quantify a clinically relevant wound score, they do not offer insight into how the wound scores are used, and whether slight differences in scores drive alternate treatment approaches or outcomes. Finally, this is an extremely ambitious program to accomplish in one year, considering four separate institutions are involved – there is no room for delays or unexpected outcomes, nor is there an objective third party in place to ensure the findings of the project are meaningful and relevant.

Recommendations for Improvement: This proposed product may or may not compete with WoundRounds, but at a minimum the developers should explain whether that is the case, and clearly differentiate their product. More careful explanation should be given to the significance of standardizing wound scores, as precision only matters if different decisions are routinely made as a result. Input from clinicians to describe circumstances for altering therapy would be quite helpful in that regard, as well as to provide objective third-party review of the outputs.

Proposal 13-420, Kent State University, Fast Electrooptic Switches Based on Liquid Crystals, $50,000 requested. **Amount recommended: $50,000**

Rationale: This grant application pertains to development of an Electrically Modified Order Parameter (EMOP), a breakthrough which represents a vast improvement over state of the art (SOTA) technologies. In microelectrical mechanical systems (MEMS) processing speed, especially the speed of optical switching capabilities, reigns supreme. Existing liquid crystal optical modulators typically operate in the millisecond (10^{-3}) range, while the EMOP optical switching times are in the order of tens of nanoseconds (10^{-9}). If this technology is proven during this Phase I project, it would have potential to capture a major portion of the overall liquid crystal optical switch market, estimated to exceed $1B by 2017.

While the proposal could be strengthened in several aspects and there is considerable work to be done, the review team believes enough evidence was presented to give confidence in the approach. It is clear that the technology will either be proven or disproven during the project period. There are third-party, Ohio-based partners committed to assess critical failure points for the prototype and to validate the technology. And while some of the development work is speculative, the radical improvements in performance shown in proof-of-concept work merit support of the work. The milestones are logical, available resources appropriate, the backgrounds and experiences of the developers sufficient and there is a good focus on commercialization. A recommendation for funding is made.

Proposal 13-421, Kent State University, Novel Non-photobleaching Fluorescent Magnetic Nanoparticles as Advanced Bioimaging Agents, $50,000 requested. **Amount recommended: $0**

Rationale: The applicants for this grant request propose further development of nanoparticles composed of a paramagnetic core coated with a fluorescent polymer. When a targeting functional group (TFG) is attached, the over expression of receptors for the TFG in cancer cells would cause an accumulation of these nanoparticles at the site of the cancer, thereby permitting detection, or, with the addition of a therapeutic agent to the particle, treatment. There would certainly appear to be potential in this application, and the lead applicant is clearly a highly capable scientist.

The primary concern of the review team is the proposed work appears to be basic research rather than validation of an existing technology. The applicants note there are at least 35 FDA-approved imaging agents of this kind on the market, all of which suffer from shortcomings – toxicity, immune response, rapid excretion, etc. While it is possible the applicants will prove their product does not have any of these limitations, the early stage of the research makes it more likely they are yet to be discovered, and as a result a positive funding recommendation cannot be made. Given the crowded field, the lack of commercial focus and absence of a high-level business plan in the proposal is a concern as well, but this may be driven by the speculative nature of the potential benefits of the product at this early stage. A third-party was mentioned as a source of validation for the work, though no budget dedicated to that. It is unclear what services this third party will provide and on what basis.

Recommendations for Improvement: The main area to be addressed is the basic nature of the research. While promising, there simply isn't enough evidence at this point to give confidence in the approach. It may be that additional work is required before resubmission – something to show that the proposed approach in fact has some of the benefits that are hoped to exist. A better-articulated business plan and path to market should be provided, and this should be easier to create if the first gap can be addressed. Finally, while the existence of a third-party to validate is a positive, the nature of that work and how it will be funded should be provided.

Proposal 13-422, Kent State University, High Speed Plasmonic Spatial Light Modulators with Low Driving Voltages, $46,070 requested. **Amount recommended: $0**

Rationale: This proposal is a resubmission of an earlier grant request that was not recommended for funding. The technology under development is high-speed plasmonic light modulators, and the proposed approach would potentially offer increased speed, greater flexibility and reduced power consumption. The earlier proposal was not recommended for several reasons, including a lack of specific and quantifiable goals for the work, which of course should be linked to a commercial need. This new submission is not improved in that regard. While there is more information in this new request, it is related to how the work will be performed, and does not address the review team's prior concerns. Without more specific and meaningful endpoints, there is no way to know whether the improvements the development team may achieve will constitute the 'proof' required for a favorable recommendation for funding. An improved result may or may not have commercial relevance – there is simply no way to know. This concern is only highlighted by the long timeline to market, estimated at five years in the request.

Recommendations for Improvement: As the submitted grant did not address the review team's earlier concerns and recommendations for improvement, they are presented again here. An improved proposal would include specific and quantifiable goals and performance targets. These should be based on some commercial need, whether potential customer requirements or existing technologies. At the end of the program, it should be clear whether or not the improvements realized will translate into a viable business, and the review team cannot support open-ended improvement as achievement of proof. The IP situation should be clarified – at a minimum there should be evidence that the University of Michigan will not have rights to the IP developed in their facilities, and to meet the requirements of the TVSF program some IP should be filed to protect the state's investment.

Proposal 13-423, Kent State University, Smart Responsive Scaffolds for 3D/4D Cell Culture and Regenerative Medicine Applications, $28,595 requested. **Amount recommended: $0**

Rationale: This proposal is concerned with the development of elastomers conjugated with liquid crystals, to be used as a scaffold for cell culture. This structure promotes orderly differentiation of stem cells, leading to tissue-like structures, which are the basis of tissue engineering. This proposal was not well organized or presented, making it difficult to follow the claims scattered throughout. Even if the broad potential utility of the product is valid, far too much effort was expended describing all the possibilities. Similarly, while the project tasks were listed in great detail, the specific outcomes to prove success were unclear, and no reference to a third-party to assess the work mentioned. The applicants refer to the technology as 'easily marketable', but the market information presented was sparse, at best, and little attention paid to a commercial pathway. It is quite unclear what, specifically, will be ready for license at the end of the project plan.

Recommendations for Improvement: The review team recommends, should the applicants decide to reapply, that they seek assistance from Kent State in drafting and editing the proposal. If all the claims made for elastomers conjugated with liquid crystals are true, this is an exciting program that deserves support. But as presented, the review team has significant doubts it will be ready for license to a start-up in the next year.

3. Proposal Recommendations - Phase 2

Summary of Recommendations

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof to Raise Additional Funds	Project Plan (one year)	Likelihood of Additional Funds at project end	Team	Business Model	Company Backing	IP Protection	Opportunity / Mkt. Size	Budget / Use of Funds	Start-up in Ohio	License with Ohio Institution
13-0424	University of Dayton	ZaggerTag, LLC	*ZaggerTag*											
13-0425	University of Akron	Akron Software, LLC	*Parallel Computation of the Fast Fourier Transform (WITHDRAWN BY APPLICANT)*											
13-0426	Ohio State	Sensetronics, LLC	*Commercialization of ImmunoFET Sensors*											
13-0427	Nationwide Children's Hospital	Nanofiber Solutions	*Development of a Tissue Engineered Small Intestine*											
13-0428	The Austen BioInnovation Institute in	GorMonjee Inc	*GorMonjee The Decision Making Engine for Healthier Food Choices*											
13-0429	Case Western Reserve	Folio Photonics LLC	*Prototype Development of a Coextruded Multilayer Polymer Film for Optical Data Storage*											
13-0430	Nationwide Children's Hospital	Abeona Therapeutics	*Development of therapies for children with Sanfilippo disease*											
13-0431	Ohio State	COPE2Thrive LLC	*COPE Online*											
13-0432	Ohio State	Simple-Fill LLC	*Simple-Fill Natural Gas Compression*											
13-0433	University of Toledo	Lucintech Inc	*Transparent PV Window Prototypes*											
13-0434	The Austen BioInnovation Institute in	Apto Orthopaedics	*A Non-Invasively Adjustable Implant for Treatment of Early Onset Scoliosis*											
13-0435	Ohio State	AEPCON	*Electronic Bandages*											
13-0436	Ohio State	LARAD	*Virus-Like-Particle (VLP) Vaccines*											
13-0437	University of Toledo	Analytic Diabetic Systems	*Beta Prototype Development of a Comprehensive Web-Based Clinical Decision Support System*											
13-0438	Ohio State	Dowell Vargas Solutions	*MedReviews*											
13-0439	Ohio State	Readiness Analytics	*The Readiness Test*											
13-0440	University of Toledo	IRISense LLC	*IRISense LLC*											

Definition of Columns:

Proposal # – A unique OTF number for each proposal

Lead Applicant – The Ohio start-up company that is requesting funds

Project Title – The Project Title for the Request for Proposals Application Page

Proof to Raise Additional Funds – The proposed proof needed to raise additional funds for commercialization

Project Plan – Proposed proof needed to move the technology can be generated during the one year project period with the proposed resources

Likelihood of Additional Funds at Project End – Likelihood of being able to raise additional funds for commercialization at the end of the project

Team – Experience and commitment of the team members in the commercializing new technology

Business Model – Realism and achievability of the proposed business model

Company Backing – Stability and backing of company, must have demonstrated backing and support independent of the university

IP Protection – Degree to which the intellectual property is protected relative to both the technology and the proposed business model

Opportunity/Market Size – Potential opportunity for the start-up in regards to the potential market size and competition

Budget /Use of Funds-newly added for Round 2, description of how the entity proposes to use the funding if received

Start-up in Ohio – Company plans to stay in Ohio

License with Ohio Institution – Company will execute a license with the Ohio institute of higher education within nine months of the date of the application

DETAILS OF RECOMMENDATIONS

Proposal 13-424, ZaggerTag, LLC, ZaggerTag, $100,000 requested. **Amount recommended: $0**

Rationale: The applicants for this grant propose to add a mobile payments function to the ZaggerTag app, which currently provides the user the means to locate a place or event of interest, see the details of the offerings at that place or event, and comment on his or her experience. The addition of a payment system would both generate a meaningful revenue stream and add value to the app to help distinguish it from other services. Given the experience of the principal in the company the review team is confident the mobile payment functions can be developed and tested during the project period.

There are several areas for concern. There are a number of similar apps already in existence, and the applicants seem to heavily rely on the existing ZaggerTag platform as the key differentiator. That critical assumption will likely not hold given the extremely crowded and ever-changing market for this type of service. The applicants state their pricing model, one in which the costs of the system are borne by consumers and not business, is an advantage. No research or insight was presented as to why that would be the case. They may indeed have retailers interested in the payment system, but it's unclear why users would choose to absorb the convenience fee rather than use other methods of payment. The presence of Amazon as a potential partner is certainly encouraging, but given the sparse detail provided on the nature of that relationship the review team can only assume that even if a deal were consummated (it has not been, as of the writing of the proposal) that ZaggerTag would not be a featured or exclusive partner with Amazon. Since the applicants state they have no intention of seeking additional outside funding it is entirely unclear how they will quickly gain the critical mass necessary to make this product work. And, while the need to operate a lean company is recognized, the distributor model has not been well thought-out. Pushing all training, marketing, and support to distributors will keep costs low to ZaggerTag, but greatly compromise the long-term business roll-out if not well executed. This approach seems to be the path of least resistance rather than a strategic choice. This is an ambitious project, and certainly a creative idea. But based on the information provided, there is little reason to believe this offering will gain rapid adoption and achieve the massive scale needed to effectively compete over the long-run. Funding is not recommended.

Recommendations for Improvement: Clarity on the current and intended relationship with Amazon should be provided. A better rationale is needed to help the review team understand why users would embrace a convenience fee rather than use more common forms of payment whose costs are borne by the retailer. Finally, more attention and thought should be given to the distributor model. While this request lists pricing benchmarks, input is needed from distributors before any pricing assumptions can be made as they will bear most of the risks and costs to roll the product out. Otherwise, the applicants will need to re-think their independent approach and articulate a strategy to attract funding to help them gain critical mass.

Proposal 13-425, Akron Software, LLC, Parallel Computation of the Fast Fourier Transform, $100,000 requested. **Amount recommended: $0**

Rationale: This proposal passed the first level technical review step and the development team was invited to interview, but the proposal was withdrawn prior to the interview date at the request of the applicants.

Proposal 13-426, Sensetronics, LLC, Commercialization of ImmunoFET Sensors for Food Safety, Environmental and Diagnostic Applications, $100,000 requested. **Amount recommended: $0**

Rationale: This proposal refers to the commercialization of an electronic biosensor technology to detect and measure protein levels that is faster, easier to use and potentially cheaper than current approaches which use laboratory techniques. These biosensors can detect pathogens or contaminants in clinical settings, environmental settings, or in food safety settings. The development team has an impressive track record of fundraising, and the review team has every reason to believe they will successfully raise funds to support this venture, especially given the potential of the technology. The focus on fundraising, however, appears to have distracted the team from development of their core product and preparation for commercialization. It is unclear what the first product will be (meaning, what proteins or pathogens will be targeted), and similarly unclear what customers, or even industries, will be the primary focus. The initial application which would be validated during the project period utilizes a protein expressed in renal transplant patients at risk of rejection, but that is more by default than intent, as the team has a long history with that particular protein. The development team has not engaged any potential customers to discuss what applications would be most meaningful, what performance levels they would expect, what unmet needs should be addressed, etc., something that would be expected for a Phase 2 application. While the project plan does request $15k to conduct part of this research, the review team is concerned about the quality and validity of the potential findings, given the relatively small budget to address numerous potential applications and customers. A company at this stage of development should have a firm sense of where their product will compete, and ensure they develop a targeted application (or several related applications) they know will meet a real unmet need. In this case, the applicants made it clear during the in-person interview that product development or customer insights is of secondary interest, and much of that work will be conducted once investors have committed funds. Most of the requested grant funding is to support tasks that other Phase 2 applicants take on themselves, or which they could relatively easily obtain using university or incubator resources. The exit plan for the company is another concern, as the development team made it clear during the interview that profitability and a sustainable presence in Ohio was less important than sales growth to enable an exit. To be clear, this approach to starting a company has its merits, and the review team believes they can succeed. But it is inconsistent with the intent of the TVSF, and funding is not recommended.

Recommendations for Improvement: An improved application would focus on speed to market, product/application development, and a compelling launch strategy based on customer and market insights. Fundraising is, of course, a necessary and important task, but it must be reasonably balanced with other critical tasks as well, and completion of those tasks should in turn facilitate fundraising. The applicants should also give more consideration to creating long-term value for the state. For example, rather than target a complete exit from the business, explore options to create a self-sustaining organization or a targeted licensing approach, using the resulting revenues to fund new applications and innovations in the overall platform.

Proposal 13-427, Nanofiber Solutions, Development of a Tissue Engineered Small Intestine, $100,000 requested. **Amount recommended: $100,000**

Rationale: This proposal concerns development of a tissue-engineered small intestine, which can be used to augment the small bowel of patients with short bowel syndrome (SBS). The initial target indication of necrotizing enterocolitis (one of the causes of SBS) was selected due to extremely high mortality rates in affected infants and lack of other treatment options. This approach may also speed the path to clinical trials and commercialization. The project plan and use of funds is logical and achievable, and the work will prove invaluable if successfully completed. Meaningful past work on the trachea gives reason to believe in the technology, and the development team has a well thought-out approach to scaling their production processes. The review team has only one slight concern – this company, like many in the life sciences space, will likely pursue a licensing approach to quickly and efficiently reach the market and achieve scale. However, the underlying technology can be leveraged to other organ systems, and the team is actively filing IP to protect new areas for exploration, making it likely that this start-up will continue to be a source of investment and innovation well into the future. Funding is recommended.

Proposal 13-428, GorMonjee, Inc., GorMonjee the Decision Making Engine for Healthier Food Choices, $100,000 requested. **Amount recommended: $0**

Rationale: The applicants for this grant propose to develop an app, with supporting infrastructure, to guide users in making decisions about nutrition and food. The app would use a proprietary algorithm developed by the applicants. There are no major technical hurdles facing this project, and the team assembled would certainly appear to be qualified to execute the work. The major challenge is the need to win market share in a competitive landscape already crowded with other apps with similar purposes. Each app claims a unique advantage, and some include exercise data as well. The applicants mention three comparators as supporting evidence for likely commercial acceptance and adoption. First, My Fitness Pal, is mentioned as having more than 14 million downloads. The applicants do not mention those downloads are free. Second, they mention Weight Watchers and the associated high price point, but do not explain how they would overcome the obvious brand recognition imbalance, or meet the portfolio of products and services Weight Watchers offers. Finally, they mention Shazam, a music service provider which uses an algorithm to drive purchase of songs. While Shazam is successful in many regards, including large revenues and sizeable investment commitments, it lost several million dollars in the fiscal year ending June 2012. Obviously the proposed business model is not doomed to failure, but a number of large and well-established players are still trying to figure out how to achieve (and then sustain) profitability.

The applicants also mention four different revenue models they are considering – each offering potential, but none offering a certain path to profitability. And, in fact, it is likely that some of those paths may erode the credibility that is core to the app, and the ability to select amount options is not a substitute for a single, well-articulated and credible revenue model. In sum, this is a well-conceived idea, and if it could demonstrate the ability to change user behavior it may have a chance to compete. But in an incredibly crowded market even a good product stands little chance of success without a very clear value proposition to the consumer and significant time, money and effort to promote it and keep it relevant. Further, it is unrealistic to expect that current shortcomings of competing products, even if objectively assessed, will not be a core focus of development by that competition in the coming months and years. There are simply too many hurdles to long-term viability and a positive funding recommendation cannot be given.

Recommendations for Improvement: It will admittedly be challenging to improve this application as the hurdles identified are not technical in nature and to some extent fall outside the control of the development team. The business plan must be improved, and a clear, logical and objective path to continued revenue growth and profitability must be presented. Simply presenting various options to the business model is not sufficient, especially for a Phase 2 application. The applicants should also strive to present a more objective assessment of their competitive set, as they either underestimate or chose to downplay the real competitive challenge presented by first movers, free services, large brands, and a rapid pace of innovation.

Proposal 13-429, Folio Photonics, LLC, Prototype Development of a Coextruded Multilayer Polymer Film for Optical Data Storage, $100,000 requested. **Amount recommended: $100,000**

Rationale: This proposal seeks funding for continued development of an extrusion process to manufacture high capacity optical discs for offline storage of computer data. These extrusion processes have existing applications for manufacturing food packaging, for example, but this application to data storage is novel. Initial work has shown that data storage costs can be reduced by several orders of magnitude if this approach can be proven and scaled. Though the existing team lacks business experience, they have prepared themselves well for this challenge and recognize the need for an experienced CEO, which they plan to hire during the project period. The team has actively engaged potential partners and customers, and have built their project plan and prototype development plan based on that feedback. The review team is confident the development team has the technical acumen and resources in place to execute the project. Once work has been completed at the end of the project period they should have a compelling value proposition and significant interest from large corporate partners. A recommendation for funding is made.

Proposal 13-430, Abeona Therapeutics, Development of Therapies for Children with Sanfilippo Disease, $100,000 requested. **Amount recommended: $0**

Rationale: This proposal seeks funding to further develop a treatment for a lysosomal storage disorder, known as Sanfilippo disease. Though incredibly rare, it is devastating, and can cause cognitive decline, motor dysfunction and inevitably leads to premature death. Early data shows the treatment under development has significant promise, and sizeable funding has been obtained from foundations dedicated to support of research in this area. Despite the promising nature of the research and the obvious need, the review team has too many concerns to recommend funding. The applicants estimate a 15% market share for their product if successfully launched, which is difficult to understand as there are no treatments currently available for this disease. When pressed on this point in the in-person interview, the development team acknowledged this may be a conservative estimate while simultaneously insisting there are no other therapies under development that have shown any proof of survivability in animal models. If that is true, the only product to effectively treat a debilitating and ultimately fatal disease in children should be able to capture the entire market, at least where the drug is reimbursed. The only conclusion that can be drawn is that there are other potential therapies on the horizon which can make use of the same shortened orphan drug pathway, and a quick search of the literature confirms that to be the case, though the relative effectiveness of these therapies cannot be assessed at this stage.

The sizeable investment needed to bring this treatment to market requires a licensing strategy, and the foundations that have provided equity funding are located outside the US, greatly diminishing the benefit to

the state if the milestones are achieved. In addition, a critical element to the plan is licensing of gene vectors from ReGenX, based in Washington, DC. While research can proceed without the license for the gene vectors, the eventual product cannot be sold without that license. If license is obtained, another significant portion of company equity would go to ReGenX, again diminishing future return to the state. Though the foundations are passionate and well-intended supporters, the review team sees too much risk in the plan to recommend state funding, which, relative to existing commitments, is relatively insignificant.

Recommendations for Improvement: If this application is resubmitted in the future, the business plan will need additional focus. This would include a better competitive picture, citing potential competitors and time to market. A written commitment or executed license from ReGenX may help, depending on terms and conditions. More careful consideration of the need for state funding would be helpful – why the relatively small $100k in funding is critical relative to resource and commitments on hand, along with a clear value proposition for a return on the state's investment.

Proposal 13-431, COPE2Thrive, LLC, COPE Online, $100,000 requested. **Amount recommended: $0**

Rationale: This proposal requests funding to accelerate the development and launch of online versions of the COPE mental health programs for various age groups. A program specific to teenagers is already under development, and will be completed shortly. Funding is needed to support other modules directed at other age groups. There is little doubt the principal investigator is qualified in her field, and the review team accepts the validity and efficacy of the program. There are however, numerous concerns with the proposal in its current form, which prevents a favorable recommendation for funding.

First, it would appear the first module, directed at teens, is near launch-ready. However, very little information was provided in the application on progress made on the program to this point, and detail on software development was lacking. It could be presumed that if launch is indeed imminent, this would suffice as proof to raise additional funds. An unspecified investor was mentioned in the proposal, who is 'eager to see' the online version of COPE for teens. The request does not mention what hurdle needs to be cleared to gain a commitment from the investor, nor why the investor would not provide the funding requested in this proposal if that hurdle is cleared. So the requested funding is dedicated to the unspecified 'talented graphic team' leading the current development program, and is presumably sufficient to develop the remaining programs, though that is not clear.

While the principle investigator is well-credentialed in her field, she does not appear to have business leadership or start-up experience. She does mention intent to hire a CEO, but that has not taken place as of yet. Other critical gaps would include marketing and software development professionals. Critical financial details are missing from the proposal, as well. The proposal states that COPE programs are currently offered as an in-person service, but no mention of cost, volume, or profitability is made. Similarly, a price estimate for the online version of $175 per person is given, but no other details given on cost structures, or profitability estimates. Finally, it does not appear there is any IP in place to protect this technology, and the applicant notes that this technology existed 'in concept' before her arrival at Ohio State. That leaves open concerns not only about whether this can be protected going forward, but also whether another institution may have a claim on the IP when it is developed.

Recommendations for Improvement: An improved application would provide a better description of the work underway, including a project plan, timeline, and detail on the developers of this technology, for whom all the funding is intended. More detail should be provided on the current, in-person COPE business model, including pricing, volume and profitability. The addition of one or more business resources to build out a business plan is needed, and a better description of the software development, marketing plan, and P&L projections should be provided. At a minimum, the IP position should be clarified, and clear steps should be taken to protect the IP as a first-launch is imminent. Finally, the review team would like to understand why state funds are needed, if in fact an eager investor is in place, and this first module can be completed without state funds. If the investor is not prepared to invest after having reviewed the completed first module, that rationale should be provided.

Proposal 13-432, Simple-Fill, Inc., Simple-Fill Natural Gas Compression, $100,000 requested. **Amount recommended: $0**

Rationale: This funding request is a resubmission of a previous request which was not recommended for funding. The underlying technology is a logical solution for compressed natural gas (CNG) fuel-at-home systems for personal and commercial vehicles. The system is simple to install, affordable, and would appear to be easy to maintain as well, and on balance it's a compelling concept. The previous proposal appeared to have overstated the commitment level from a potential partner, Chesapeake Energy, who recently partnered with General Electric to offer CNG filling at retail gas stations. While the potential role of Chesapeake as an investor was diminished in this written proposal, the in-person interview highlighted a different natural gas company as a potential investor and partner. While the written proposal made only passing mention of this company, the development team stated in the interview they are close to securing a sizeable equity investment and distribution agreement with them. While of course change is expected, rapid opportunistic changes to the strategy have not served the development team well. The written proposal states 'Simple-Fill will have a regionally based sales force…responsible for selling units to automotive supply stores and standard big box outlets.' During the face-to-face interview the business model had changed entirely, with their potential partner providing the sales force and targeting small businesses. The proposed pricing remained the same, however, and the team confirmed they could achieve that price point in a wholesale market.

If the deal with the potential partner is completed, it would appear the state's money is not needed, as the team mentioned they would in that instance have a $350,000 'cushion' to complete their work over the coming year. And of course their primary investor also becomes their primary distribution channel, making it unlikely the company can obtain the pricing they propose. If the deal is not completed, that would signal a serious flaw in this revised business plan and the state's investment may well be wasted. At its core the 'chicken and egg' challenge for natural gas vehicles is not an easy one to solve, and the proposed approach seems unlikely to provide that solution. Funding, therefore, is not recommended.

Recommendations for Improvement: While there are many economic and market factors that make this idea compelling, it may be difficult to improve this proposal. The biggest gap is the business model itself. The team is of course free to pursue whatever approach it wishes, but it must be objective in its assessment of that approach. Retail offers flexibility, good margins and control of the model, but a sizeable investment in sales, marketing and distribution. Wholesale offers scalability and rapid growth, but at the cost of margins and control. An improved submission would also provide a thoughtful rationale as to the need for state funding.

Proposal 13-433, Lucintech Inc., Transparent PV Window Prototypes, $100,000 requested. **Amount recommended: $100,000**

Rationale: This grant request seeks funding for efficiency improvements and scale up of transparent photovoltaic glass, targeting the automobile sunroof and building-integrated photovoltaic markets. The scale up is both needed and achievable within the project period. Both targeted markets would require proof of scale, and the product under development would appear to have a meaningful value proposition in both. The team is well-qualified and has appropriate experience in the industry. While the solar industry generally has struggled in recent years, this particular approach has merit and relevance in auto sunroofs, and if successful the company will remain in Ohio to manufacture the units.

The review team had some concerns which were not significant enough to prevent this positive recommendation for funding. The team has done a nice job of integrating with their distribution partners, but should also seek direct feedback from the automobile OEMs on pricing, both for their units and for the end customer, to ensure there is alignment. Second, much of the initial business model is based on these sunroofs, which is a negligible market at the moment. There is strong reason to believe this technology will change that, but it cannot be taken as a given, so appropriate focus and contingency planning is needed.

Proposal 13-434, Apto Orthopaedics, A Non-invasively Adjustable Implant for Treatment of Early Onset Scoliosis, $100,000 requested. **Amount recommended (conditionally): $100,000**

Rationale: This proposal seeks funding for development and testing of a novel approach to treatment of scoliosis – an implantable rod whose length can be adjusted without open surgery. The advantages of non-surgical adjustments to the rods as patients grow are significant, as patients today are subjected to twice yearly surgeries for adjustments. If successful, there is every reason to believe this technology will find a ready place in the market, as patients and parents would embrace fewer surgeries and the associated complications, and payors will see this as a significant opportunity to reduce costs.

While the review team was impressed with the technology, there are some real concerns about the company itself. At this point, it appears to exist on paper only, as all the equity is held by ABIA and Akron Children's, there are no employees and no cash in a company account. Since some of the requested state funding would be used to purchase services from the equity holders, the review team makes a conditional recommendation for funding. The technology has great potential and is worthy of support, but funding will not be provided until a full-time CEO has been brought into the company. Full-time would mean the CEO cannot be an employee of the equity holders, as the intent of this condition is to both ensure delivery of the needed proof to advance the product and also to ensure funds are used appropriately.

Proposal 13-435, AEPCON, Inc., Electronic Bandages, $100,000 requested. **Amount recommended: $0**

Rationale: The applicants for this grant plan to develop products based on electric stimulation of wound healing, which has been reported to speed healing and provide an antibacterial effect. This approach has been explored by others, but this development team believes they have a novel approach which will allow for greater efficacy. Significant funding to support the development of the conductive polymers was obtained

from the US Navy, which is certainly encouraging. There is a fairly significant gap in the research plan, however, and as a result a positive funding recommendation cannot be made at this point.

The review team is concerned that the proof to be generated during the project plan is in vitro only. Presumably this would include cell proliferation and migration, but the proposal does not specify the targets to be achieved nor does it mention whether these targets are commercially relevant. Since J&J has expressed interest in the technology and discussions have been held, it is confusing as to why specific performance targets are not provided. Any potential licensee would certainly expect to see a performance threshold met before investing. In vitro testing seems more appropriate for a Phase 1 application, but if it is appropriate for a Phase 2 in this case, the rationale is missing. This concern is only heightened by the lengthy time to market (4-5 years), leaving the review team to believe that significant work will remain at the end of the project period before commercial sources of funding can be obtained.

Recommendations for Improvement: An improved application would detail how success in vitro translates to a commercially relevant endpoint, and would provide specific targets for the development work, linking those to commercial requirements. If J&J or another company is prepared to invest based on this data, a clear and compelling explanation should be provided as to why, referencing specific performance targets. And, given the timeline to first sales, a detailed path for development and funding support should be provided so that it's clear this company can sustain itself over the long-run. This would include financial support from partners, additional R&D resources needed, FDA/regulatory support, a rough business plan to show costs, revenues and path to profitability, etc.

Proposal 13-436, LARAD, Inc., Virus-Like-Particle (VLP) Vaccines, $100,000 requested. **Amount recommended: $100,000**

Rationale: This proposal seeks funding to further develop and then market virus-like particles (VLPs) that can be used as vaccines or as diagnostic reagents. Genetic engineering allows proteins from infectious agents (like viruses) to self-assemble into VLPs, which provoke an immune response in the recipient. The advantage of this approach as compare to traditional methods is that VLPs can be constructed from multiple strains of an infectious agent, creating, in essence, a universal vaccine. This approach is being pursued in one specific area, but there are dozens more as potential targets.

The potential market for his technology is relatively small, but the development team sees this as an advantage, as the large pharmaceutical companies who play in this space are not committed to innovation given relatively low margins and small revenue potential. The review team probed around this in the in-person interview, and agrees it is a sound approach. Given that the amount of capital needed to begin the business is incredibly modest, this is a solid opportunity despite the relatively small market. If the company is successful in its first offering, they will be able to expand the addressable market with this platform technology. A recommendation for funding is made.

Proposal 13-437, Analytic Diabetic Systems, LLC, Beta Prototype Development of a Comprehensive Web-based Clinical Decision Support System (GlyCU) Supporting Optimization of Glycemic Control in the Hospital/Critical Care Setting, $98,366 requested. **Amount recommended (conditionally): $98,366**

Rationale: This proposal is a resubmission of a previous grant request which was not recommended for funding, primarily due to lack of focus. The applicants responded to the feedback provided by the review team, and the current request is much more focused in nature, adequately addressing the concerns previously expressed. The technology itself is worthy of endorsement. Glycemic control in ICU patients presents significant challenges to physicians and staff, and an analytic or predictive tool to help them manage glucose levels is needed. Poor glycemic control can lead to extended stays in the ICU, increasing costs that may not be reimbursed if the stay is excessive. The work done to date has not only attracted the interest of physicians, one of whom was present to describe the utility of the tool, but hospital administration at OSU, as evidenced by financial support, commitment to partner in the study to be performed, and an expressed intent to purchase the tool when ready for first sale.

There are some real concerns, however. First, the team does not yet know what their regulatory strategy will be, and while they can make initial sales of the product as a business analytics tool rather than a diagnostic one, the regulatory path needs to be clarified as soon as possible. Second, the principals on the team are employed by another company and are part-time on this initiative, though they have committed to splitting this company from its parent shortly, and will join full-time in early 2014. An experienced CEO is also needed as soon as possible.

A conditional recommendation for funding is made. Before the grant can be awarded the team must come back with a defined regulatory pathway / strategy, which has been validated by an objective external source. The review team believes this pathway can be defined quickly using resources within the university setting. As long as that proposed approach is confirmed by a separate and objective party, this condition will have been met.

Proposal 13-438, Dowell Vargas Solutions, LLC, MedReviews, $99,860 requested. **Amount recommended: $0**

Rationale: The applicants for this request propose to create a web-based system that will allow physicians (and other members of a health care team) and patients to review and grade medical products and devices. The proposed benefits of such a system are numerous, including better inventory management and cost control, creation of online communities to share best practices, creation of business intelligence services based on the data captured, a targeted advertising platform for marketers, etc. While the concept makes sense, too many elements are missing from the plan and a recommendation for funding cannot be made at this point.

There is an assumption that healthcare providers will embrace this product and provide their input in a meaningful, objective and comprehensive way, such that it is useful to other providers. The applicants do not provide a basis for that assumption, other than to cite other models/companies (specifically Amazon and Angie's List) that they believe have done this successfully. Amazon, of course, not only provides reviews but also sells the products it lists – a very different business model, with revenue derived from sales, not reviews. Angie's List, while successful by many measures, still has yet to make a profit despite a long track record of top-line revenue growth. It should also be pointed out that Angie's List has an ingenious strategy for populating their database in new markets – without a populated database it's unrealistic to think anyone would pay to join or advertise.

Even if the database can be successfully populated, there are too many additional concerns that were not addressed in the proposal. Reviewers may or may not be objective, and no evidence was provided to show that hospitals or physicians would change their practices based on online reviews. Advertising and marketing would appear to be anticipated revenue streams, but again, no commentary offered as to how advertising would impact the site's credibility, nor how health care practitioners would react to receiving marketing materials based on their participation in the site. For example, the proposal states, "Additionally businesses may advertise with MedReviews for preferred search result placement and extra listing features". This appears to be counter to the purpose of the website to provide unbiased reviews.

Three prior projects led by the applicants are cited as evidence that this venture will succeed, but no mention is made of how those products make money, how many they have sold, and whether those prior ventures are profitable. At its core, it's entirely unclear how this service will make money, how critical mass will be achieved, how objectivity will be balanced with the need to grow the database, and what incentives are in place for users, other than altruistic designs.

Recommendations for Improvement: The applicants have a considerable amount of work to do should they decide to resubmit this request. A well thought-out plan to create critical mass in the database should be presented – critical mass defined as sufficient to sell advertising, subscriptions or whatever other means of revenue generation the team proposes. As this is a Phase 2 application, a clear business case needs to be created and substantiated in some way. Broad statements around potential revenue streams (some of which conflict with one another) are insufficient, and pricing strategies and revenue estimates (again, substantiated) are needed. The applicants will likely find that advertising revenue, while potentially lucrative, will erode the service's credibility. Similarly, a truly objective database will have difficulty making money and gaining critical mass. Not to say this can't be done, but some attempt must be made to paint a clear picture of the intent if the application is to be reconsidered for funding.

Proposal 13-439, Readiness Analytics, The Readiness Test, $97,350 requested. **Amount recommended: $0**

Rationale: This proposal seeks funding to develop a virtual package (web- and app-based) to assess the adequacy of disaster preparedness for organizations and families. While there is reason to believe the underlying decision algorithms are correct and robust, there is very little in the application to help the review team understand, what, specifically, this program does – how it works, how it benefits end-users and how it is better than existing services, ranging from checklists on the low-end to consultative services on the high-end. In addition, while there is some initial pricing proposed, there are no volume estimates or any attempt at a P&L statement to show at what point the new company would become profitable. It would appear the management team expects adoption of this platform by organizations such as FEMA and the Red Cross, but again, no rationale as to why they would want this system, against whom they are competing, and whether they can make money over the long-run. While technically feasible, the business case is greatly lacking, and a recommendation for funding cannot be made.

Recommendations for Improvement: This application would be improved if the tool itself and the outputs are explained, especially highlighting advantages over other methodologies. While the underlying algorithms may be protectable as a trade secret, some attempt should be made to help the review team understand why those algorithms are sufficiently complex and relevant to withstand competitive products. Similarly, while the pricing estimates are useful on some level, the value to an end user of, for example, a monthly subscription is

entirely unclear. The review team would also like to see a compelling rationale for adoption made on both ends of the spectrum. Most homeowners would be unlikely to invest much time or money in such a service, but if the development team has reason to believe otherwise, they should provide that rationale. Similarly, large organizations have extensive risk management and disaster preparation planning in place. While these plans may not be adequate, again, rationale should be provided as to how and why this service will position itself as an effective adjunct and/or replacement to what already exists.

Proposal 13-440, IRISense, LLC, IRISense, LLC, $100,000 requested. **Amount recommended: $0**

Rationale: This proposal, a resubmission of a previous grant request not recommended for funding, concerns development of a completely novel method for noninvasive measurement of blood glucose concentrations. It relies on the discovery that glucose levels in the aqueous humor (the clear fluid in the eye that lies between the lens and the retina) contains glucose in concentrations that track with blood levels, and that variations of those glucose levels alters the appearance of the iris. Therefore, analysis of a photograph of the iris can be used to infer glucose concentrations in the blood, potentially offering a non-invasive (no finger prick) means of measuring blood glucose levels in diabetics. This is quite ingenious and certainly seems to hold a great deal of promise.

Unfortunately, the review team believes the development team returned for funding too quickly, as the business plan behind this model is undeveloped. In fairness to the team, they are taking this approach by intent, trying to make sure they follow a certain process for development and focusing on the product first. But a plan without a clear path to profitability is not one that can be recommended for funding, and balance between fundraising, product development and business strategy needs to be achieved. It would appear the team will position this as a reimbursable subscription service, with the value to the payor being reduced volume of expensive glucose strips. That pricing has not yet been determined or substantiated. The regulatory pathway to market the device as such is uncertain at this point.

Part of the challenge here is the equity in the company is 100% held by the university at this point, which calls into question the focus and dedication of the team. At this stage of development the inventors and CEO would typically have enough at stake to fully dedicate themselves to the company. The interim CEO stated he was involved in two ‘projects’, this and one other, which is not how a full-time CEO would describe his company. Also, the team stated that for the near-term their intent is to maintain this structure, which is counter to the purpose of the TVSF - to encourage technology to leave the university setting and form companies for commercialization. The team is of course free to pursue the step-wise approach they have chosen, but a complete commitment from a development team may help to accelerate things on multiple fronts.

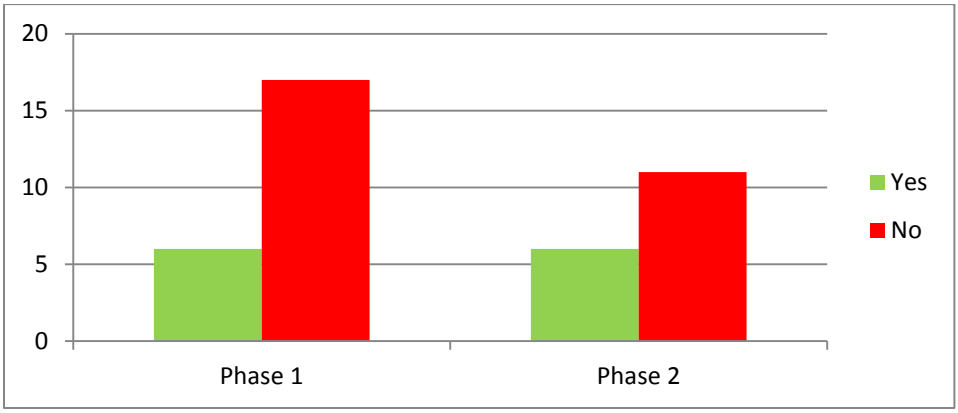
Recommendations for Improvement: As stated above, this application was re-submitted too quickly. The business model must be better defined and vetted before a positive recommendation can be made. Much of the feedback provided for the last request pertained to the business model, and very little progress was made in that regard. While the technology has merit, the review team needs to ensure there is a viable business going forward and that is unclear at this stage. It would also be helpful for the university to put appropriate incentives in place for this team or others who would then be able to dedicate more time and attention to the work.

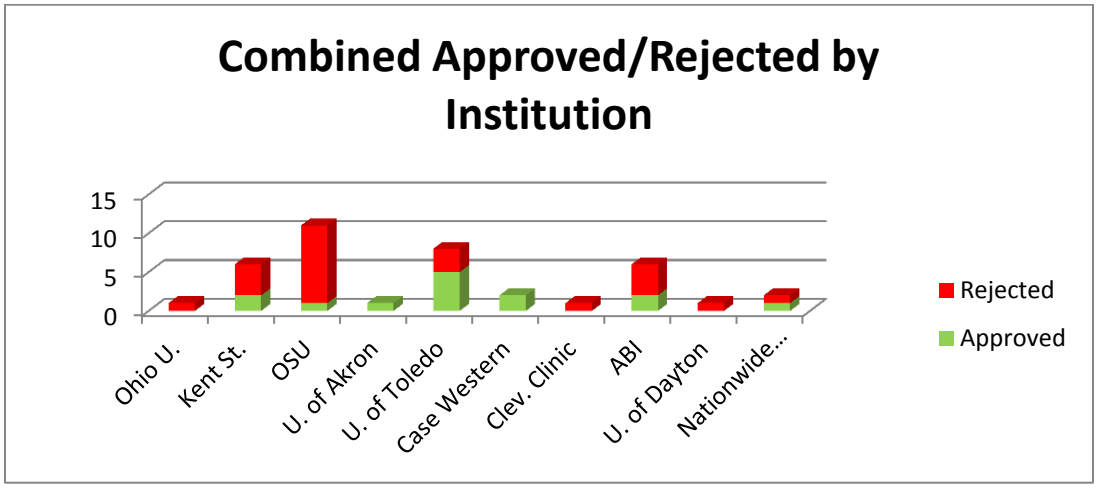
4. SUMMARY

The Review Team is recommending 12 of the 40 submitted grants for review (30%) which is the lowest percentage for positive recommendations of the four rounds of reviews. The previous low was 35% in Round 1, and the high was 52% for Round 2. For this current round, 6 of the 23 Phase 1 proposals are recommended for funding (26%). For Phase 2, 6 of the 17 submitted grants are recommended for funding (35%). With the Ohio Third Frontier accepting grants on an approximate quarterly basis, the Review Team expects that many of the grants will be revised to address the concerns of the review team.

For both Phase 1 and Phase 2, grants which were recommended for funding did not have a "fatal flaw" in the proposal. The "fatal flaw" is described in the reviewers' comments in the previous sections and readily identified as red in the charts at the beginning of the each of the phase reviews.

Phase 1 and 2 Recommendations





If any applicant desires feedback or further clarification on the above recommendations a review session can be arranged through the Ohio Development Services Agency.

APPENDIX A-TEAM MEMBERS

TECHNICAL REVIEWERS' CREDENTIALS

John Banisaukas (Advanced Materials)
Summary:
An independent consultant specializing in Government Contracts Program Management and Administration, as well as a technical consultant to the carbon fibers advanced composites industry. Has a broad background and over forty years experience in advanced composite materials.

Core Competencies/Field of Expertise:
Carbon Fiber
Advanced Composites
UCC's Parma, OH Research Center
Carbon Fiber Research and Development Engineer
UCC / BPA Carbon Fiber & Advanced Composites facility, Greenville, SC 21 years
Chairman of the Suppliers of Advanced Composite Materials Association (SACMA) Technical Affairs Steering Committee

Marshall Heard (Aero Propulsion and Power Management)
Summary:
Expert joined the Florida Aerospace Alliance in 1999 after a 34-year career with the Boeing Company. He served as both Vice Chairman of the Alliance and Executive Director prior to becoming Chairman. While with Boeing, he divided his efforts between engineering, marketing/business development, and project management. As a Vice President he directed the Tandem Rotors Programs (CH-46 and CH-47), the Comanche Program (RAH-66), and served as the Deputy Program manager of the V-22 Joint Program Office. He was also Vice President of marketing/business development for Boeing's passenger, cargo, and tanker military aircraft programs and was Boeing Aerospace's senior executive in their Washington, D.C. office.

Expert has served on numerous Cabinet-level panels and commissions (including the Defense Science Board and the Commercial Space Transportation Advisory Committee). He has been a frequent witness before both the U.S. Congress and foreign legislative bodies on the subjects of strategic deterrence, battlefield mobility, and the role of technology in national defense policy. In addition to his role with the Florida Aviation Aerospace Alliance he also serves on the boards of Enterprise Florida, Inc., the National Aerospace Technical Advisory Committee and several other organizations. He has a keen interest in promoting science, technology, engineering and math (STEM) and serves on the Florida Coalition for the Improvement of Math and Science (CIMS), the Florida Center for Advanced Aero-Propulsion and is an Executive Committee member of the Aerospace Resources Center (ARC), the state's first BANNER center. Expert has an active aerospace related consulting practice specializing in business development and the integration of large scale systems.

Education:
A graduate of the U.S. Naval Academy, he also holds advanced degrees in engineering and business management from the University of Illinois and the Massachusetts Institute of Technology

James Mellentine (Fuel Cell and Energy Storage)
Summary:
A Project Management Professional (PMP) and LEED Green Associate, combining years of fast-paced business consulting experience with renewable energy & energy storage technology, economics, and policy research. Directed the analysis, design, quality assurance, deployment, and training activities for complex system implementations and business transformations. Recommended logistics process transformations and performance management solutions based on industry best practices customized for client needs. Conducted broad energy systems and policy research.

Core Competencies:
Project Management
Business Consulting
Renewable Energy
Energy Storage
Flow Batteries
Energy Systems Analysis
Project Financial Analysis
Energy Project Feasibility
Life Cycle Assessment
Sustainable Building

Education & Certifications:
University of Iceland/University of Akureyri, Master of Science, Renewable Energy Systems & Policy
University of Michigan, Bachelor of Engineering, Mechanical Engineering
University of Michigan, Bachelor of Engineering, Aerospace Engineering
Project Management Professional (PMP), Project Management Institute
LEED Green Associate, Green Building Certification Council

Phil Drew (Medical Technology)
Summary:
Expert provides data and analysis to users and manufacturers of medical imaging equipment. For hospitals and radiologists, the Expert provides strategic planning services, program and space planning studies, studies of financial and organizational feasibility, and related assistance. For manufacturers and others interested in the commercial aspects of medical imaging he provides technological and market forecasts based on analysis of technical, clinical, operational and competition-related factors, as well as assistance in strategic planning, product planning and acquisition studies.

Experience:
Mallinckrodt Institute of Radiology
Department of Radiology for the State University of New York at Stony Brook
Cardiovascular Division of the Washington University School of Medicine
Arthur D. Little, Inc.

Core Competencies/Field of Expertise:
Electrical engineering
Mechanical engineering
Health care
Medical imaging
Hospital operations

Education:
Harvard University, Degree: Ph.D. Electrical engineering
Harvard University, Degree: M.S. Applied Mathematics
Carnegie-Mellon University, Degree: B.S. Mechanical Engineering

John McClure (Business Reviewer)
Summary:
Over 20 years of management experience. Expert builds shareholder and customer value through the development and implementation of creative business strategies and new product/service offerings for existing and new markets. Demonstrates the ability to successfully start up technology business ventures, including hardware, software, Internet, e-Commerce, and telecommunications solutions.

Experience
Sicuro-China LLC. - President & Chief Executive Officer
Comm South Companies, Inc. - President & Chief Executive Officer
ADVAL Communications, Inc. – 2001 - Chief Operating Officer & General Manager
Wintegrity, Inc. – President & Chief Executive Officer
Electronic Data Systems Corporation (EDS) – Business Unit Vice President, Strategic Global Opportunities

Core Competencies/Field of Expertise:
Bankruptcy
Mergers and acquisitions including due diligence
Operations management
Financial support including public and private fund raising
Support of the development and presentation of client business plans

Education:
University of Iowa & Roosevelt University, Accounting

Joel Studebaker (Software Applications)
Summary:
Over 30 years of experience in project management and in all phases of the software development life cycle for pharmaceuticals, biotechnology, blood banking, and other industries. Experience in drug discovery, high-throughput genotyping, and analysis of medical and pharmacy claims.

Experience
Integrated eCare Solutions – Director of Data Analysis
CareAdvantage – Senior Data Manager
Orchid BioSciences – AD of Informatics
IBM – Advisory Engineer, Senior Industry Specialist

Core Competencies/Field of Expertise:
Project Management
Oracle 10g
Informatica 8.1
Erwin Data Modeling
SQL
Clinical Risk Grouper
SAS

Toad

Education:
Harvard University, Degree: Ph.D. Chemical Physics
Stanford University, Degree: B.S. Chemistry

Thomas Jones (Sensing and Automation Technologies)
Summary:
Over 25 years technical management and engineering analysis experience with the system engineering and integration of Electro Optical and Spectral remote sensing collection systems. Excellent communicator who provides briefings to all levels of corporate and government organizations, as well as technical and program management. Functional oversight and administrative management of group of lead senior remote sensing technologists.

Experience:
System Engineering Consultant
Lockheed Martin:
Management lead and technical oversight for multiple year remote sensing modeling corporate research & development effort. Resulting models used in proposals, studies and contracts and instrumental in acquiring new business.
Technical management coordinator of system integration support to government sensor technology research and technology customers. Provided technical oversight consultation of government contactors including technical roadmap development. Technology manager of senior remote sensor system analysts and technologist group.

Core Competencies:
System engineering for electro optical remote sensing collection systems including spectral analysis and requirements development/ system operations support/ sensor system modeling and simulations/ mission analysis / operations concepts/ technology roadmaps/ functional management/ project management/ research & development technical oversight and management / proposal and new business development

Education & Certifications:
BEE Villanova university 1964
MSEE Drexel University 1969
Multi-year System Engineering Course General Electric Co. 1970-72
Numerous Sensor engineering courses Lockheed Martin Co.
Numerous Proposal/Marketing courses Lockheed martin Co.

Margaret Ryan (Sensing and Automation Technologies)
Summary:
Chemistry Expert with broad range of Research, Consulting and Academic experience

Core Competencies/Field of Expertise:
Chemical sensors
Jet Propulsion Laboratory
Principal Member of the Engineering Staff, Power and SENSOR Systems Section,
Chemical sensors
Alternative SENSORs include an all silicon carbide sensor for identification of hydrocarbons and hydrocarbon mixtures for automotive applications, colorimetric oxidation sensors, and electronically conducting molecularly imprinted polymer sensors for identification of organic compounds in water.

Education:
PhD in Physical Chemistry from the University of Massachusetts

Walter Gist (Situational Awareness and Surveillance Systems)
Summary:
Successfully created and operates a consulting firm specializing in military aircraft avionics, advanced situational awareness, and weaponization. Several years of experience assisting foreign companies successfully market airborne equipment to the US military market. Organized and participated in proposal development, review and vetting. Has 41 years experience in marketing to the large US military OEMs like Boeing, Lockheed-Martin, Northrop Grumman, and BAE Systems. Understands the process by which foreign companies obtain access to International Trade in Arms Regulations (ITAR) controlled information and the rules and guidelines for doing so. He has also assisted in the merger and acquisition process.

Experience:
BAE SYSTEMS - Director, Business Development
GEC-Marconi/Plessey, Plc - Marketing and Sales Manager
Simmonds Precision - Aerospace Regional Manager

Core Competencies/Field of Expertise:
Mechanical Engineer by trade
New Business Development
Customer Relations
Marketing and Sales
Business Development Process

Education:
Business Administration, Pepperdine University Graziadio School of Business, Los Angeles CA

Timothy Newbound (Solar Photovoltaics)
Summary:
Organometallic synthesis of highly air- and moisture-sensitive compounds. Analytical evaluations using multi-nuclear NMR, FTIR, UV-vis, ESR, GC, x-ray structures and other methods to describe novel compounds described in peer-reviewed publications. Oil and Gas industry root-cause materials failure analysis for gas-oil separation plants (GOSPs), Water Injection Pump Stations (WIPS), pipeline systems (sour gas collection and Sales gas), Gas Plants (Amine sweetening and sulfur removal), natural gas and NGL fuel conditioning, dew-point control and light hydrocarbon separations. Research project management, project proposals, economic and technical feasibility studies and corporate strategic research assessments from industry-wide due diligence. Semiconductor materials development (Group IVA) and process scale-up for manufacturing of hydrocarbon functionalized nanocrystalline silicon free of surface oxides. Developed novel architectures using these materials in solar PV and Li-ion secondary batteries. Patent processing and intellectual property evaluation. Multiple international publications including ASME/IGTI O&G Division Best Paper Award, 2004.

Core Competencies:
Natural gas conditioning, dew-point control, dehydration, heavy-ends composition, (CGTs)
Natural gas corrosion inhibitors (US patent # 6,920,802, July 26, 2005)
Cross-functional team industrial applied research project management
Analytical materials identification and root-cause failure determination

Technical reporting and presentations preparation and delivery
Organic, inorganic and organometallic synthesis and characterization
Semiconductor (Group IVA) nanomaterials manufacturing process development

Education & Certifications:
Ph.D., Inorganic Chemistry, University of Utah
Thesis: "Substitution Effects and Reaction Chemistry of Metal-Pentadienyl Complexes"
B.S., Chemistry, Eastern Michigan University

YourEncore Senior Manager-Robert Worden

Robert has held a variety of sales, marketing and business development roles over a 20-year career, both as an individual contributor and as a manager. He has extensive work experience across the globe, with a concentration in Latin America. His core competencies include sales, marketing, business development, general management, and Six Sigma (certified Black Belt). He earned his MBA from the University of Virginia.

YourEncore Senior Manager-Camille Rechel, Director, Consumer Practice.

In addition to being a degreed chemist, Camille has over 25 years of Business Management experience. She holds several pioneering patents for polymeric coatings for optical fibers. She brings experience from the chemical industry and industrial electronics industry. Her core competencies include customer service and business development.

YourEncore Project Manager-David Young

David Young is a Project Manager with YourEncore and has led projects in numerous industries. He also assists with business development, rule harvesting and analysis, and Engagement Management. His core competencies include Project Management, Program Management, business rule definition and analysis, and process definition.

If a proposal fell outside the technical experts' core capabilities, the Project Manager engaged an Expert from YourEncore's network with deep expertise proposal's specific technical area.

Number of YourEncore Experts per Technology Area

- *Advanced Materials: 63*
- *Aero Propulsion and Power Management: 19*
- *Fuel Cells and Energy Storage: 80*
- *Medical Technology: 86*
- *Software Applications: 109*
- *Sensing and Automation Technologies: 28*
- *Situational Awareness and Surveillance Systems: 31*
- *Solar Photovoltaic and Photovoltaic: 31*

APPENDIX B-OVERVIEW TECHNOLOGY VALIDATION AND START UP FUND

DEVELOPMENT'S PURPOSE FOR FUND

Ohio's Third Frontier (OTF) created the Technology Validation and Startup Fund (TVSF) to accelerate economic growth in Ohio through helping Ohio-based entrepreneurial companies commercialize technologies developed by Ohio institutions of higher education. The TVSF will accomplish this through:

1. **Validating Technologies**: Enhancing the commercial viability of protected technologies developed by Ohio institutions of higher education by supporting validation activities such as developing prototypes, demonstrations, and/or assessments. These validation activities will help generate the proof needed to either license the technology to an Ohio entrepreneurial firm or deem the technology unfeasible. The purpose of Phase 1 is to verify a milestone for licensing, not funding for basic research.
2. **Funding Startups**: Providing Ohio-based entrepreneurial firms the funding needed to accelerate the commercialization of licensed technologies from Ohio institutions of higher education. The goal is to enable these companies to 1) generate the proof needed to acquire additional outside funding to support commercialization or 2) support the commercialization of these licensed technologies. The purpose of Phase 2 is to establish start-up companies, independent of the university.

OFT has divided the Fund into 2 distinct Phases:

	Phase 1: Technology Validation	**Phase 2: Startup Fund**
Objective	*Evaluate the commercial viability of protected technology developed by Ohio institutions of higher education*	*Determine whether a company has the resources, acumen, and market opportunity to successfully commercialize licensed IP*
Activities	1. Assess protected technologies from higher education institutions 2. Suggest technology development alterations to improve feasibility 3. Provide funding recommendations	1. Assess companies' plan for commercializing licensed technologies 2. Discuss improvement programs to unfunded Applicants 3. Interview strong candidates 4. Recommend funding candidates

Assumptions	▪ Submissions Per Year: - *2012: 50-80* - *2013: 100-160* ▪ 6 Page Grant Form ▪ Grant Size: $50K ▪ Available Funds: $3M	▪ Submissions Per Year: - *2012: 20-40* - *2013: 40-80* ▪ 6 Page Grant Form ▪ Grant Size: $100K ▪ Available Funds: $3M

Due to the technical nature of the Phase I / Phase II Proposals, OTF required the selected reviewing contractor to have subject matter expertise in the following technical areas:

- *Advanced Materials*
- *Aero Propulsion and Power Management*
- *Fuel Cells and Energy Storage*
- *Medical Technology*
- *Software Applications*
- *Sensing and Automation Technologies*
- *Situational Awareness and Surveillance Systems*
- *Solar Photovoltaic and Photovoltaic*

APPENDIX C-EVALUATION CONTRACTOR-YOURENCORE, INC.

CORPORATE BACKGROUND

YourEncore is a company of veteran scientific, engineering and technical Experts that provides clients with solutions based on a lifetime of proven expertise. YourEncore deploys its expertise against capability, capacity, and technical challenges in a confidential environment to help clients develop products essential to healthier, safer and richer lives. Given its diversity of expertise and flexible resourcing deployment model, YourEncore offers unique flexibility to swap in and out the right expertise or team size to meet the needs of client demands.

YourEncore Expert Network Profile:

- 7,000+ Experts
- Avg. 25+ years Experience
- 67% have advanced degrees
- Representing 1000+ different companies

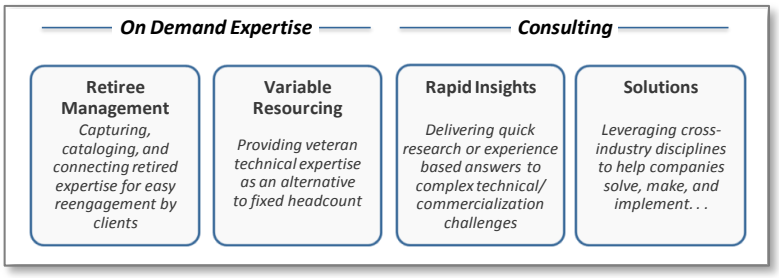
YourEncore understands the unique needs and challenges startups face since, 8 years ago, it was one. YourEncore was founded in 2003 by John Barnard of Barnard Associates. Barnard Associates is composed of a cross-functional team of highly experienced executive leaders, who advise start-ups on launching and growing businesses. Tim Tichenor, formerly the Director of the Business Development Center for Indiana University and Director of Business Advisory Services for Barnard Associates, is YourEncore's CFO.

Today, YourEncore has over 75 employees and is a recognized leader in Expert advisory services. YourEncore has over 7,000 Experts in its network, and serves over 70 companies, including 9 of the top 12 pharmaceutical companies and 5 of the top 9 global consumer companies. YourEncore was awarded a top 100 "Most Brilliant Company" by Entrepreneur Magazine in 2011 and P&G's "External Enabler of the Year" Award in 2009.

SERVICES & EXPERIENCE

YourEncore deploys its Expertise in two ways: On-Demand Expertise, contracting of specialized Expertise to address short-term resource gaps, and Consulting. Within Consulting, technology assessment and due diligence are core offerings. YourEncore performs assessments for over 50% of its 70+ clients, the majority of which are global leaders in their industries.

Figure 1: *YourEncore's Services*



SUMMARY OF QUALIFICATIONS

APPENDIX D-EVALUATION PROCESS

APPROACH AND MANAGEMENT PLAN

YourEncore engaged an Expert team comprised of a Project Manager, Business Reviewer, and eight Technical (i.e., Subject Matter) Reviewers along with 2 of its senior managers to most efficiently and accurately assess all Phase I / Phase II proposals. Prior to implementing a robust Phase I and Phase II RFP evaluation process, YourEncore conducted a grounding session to align stakeholders around common objectives and finalize the expertise requirements.

After the stakeholders were aligned, YourEncore deployed a comprehensive Proposal Evaluation process that initially gathered and filtered all submissions, engaged subject matter experts to assess technologies/firms, and provided substantiated funding recommendations. Finally, to ensure a robust review, YourEncore senior managers reviewed for consistency and quality.

	Gather / Filter	Assess	Review	Recommend
Activities	▪ Receive proposals from OTF ▪ Perform initial review to remove unfeasible proposals ▪ Document findings	▪ Disseminate proposals ▪ Reviewers perform detailed technology assessment(s) ▪ Recommend proposals for consideration ▪ Document Findings using co-developed Scorecard	▪ Gather Reviewers' Recommendations ▪ Review business case of recommended proposals ▪ Interview Phase II Applicants ▪ Refine Recommendations	▪ Finalize Funding Recommendations ▪ Develop detailed report for OTF Consumption ▪ Create summary presentation ▪ Present findings and recommendations to OTF Committee ▪ Brief removed Applicants on decision
Outputs	▪ Refined Proposal List ▪ Documented Findings	▪ Assessed Technology ▪ Prioritized Candidates	▪ Refined Recommendations	▪ Detailed Report ▪ Substantiated Funding Recommendations ▪ Briefed Applicants on decision

Align Stakeholders

Shortly after selection, YourEncore held a half-day grounding session with YourEncore's stakeholders (i.e., Account Director, Project Manager, Senior Managers) and OTF's desired stakeholders. This session assured alignment around common success criteria (i.e., funding goals, success metrics, and timelines), scoped the program's expertise requirements to ensure the right subject matter experts were engaged, and reviewed the evaluation scorecard. This scorecard included the following information:

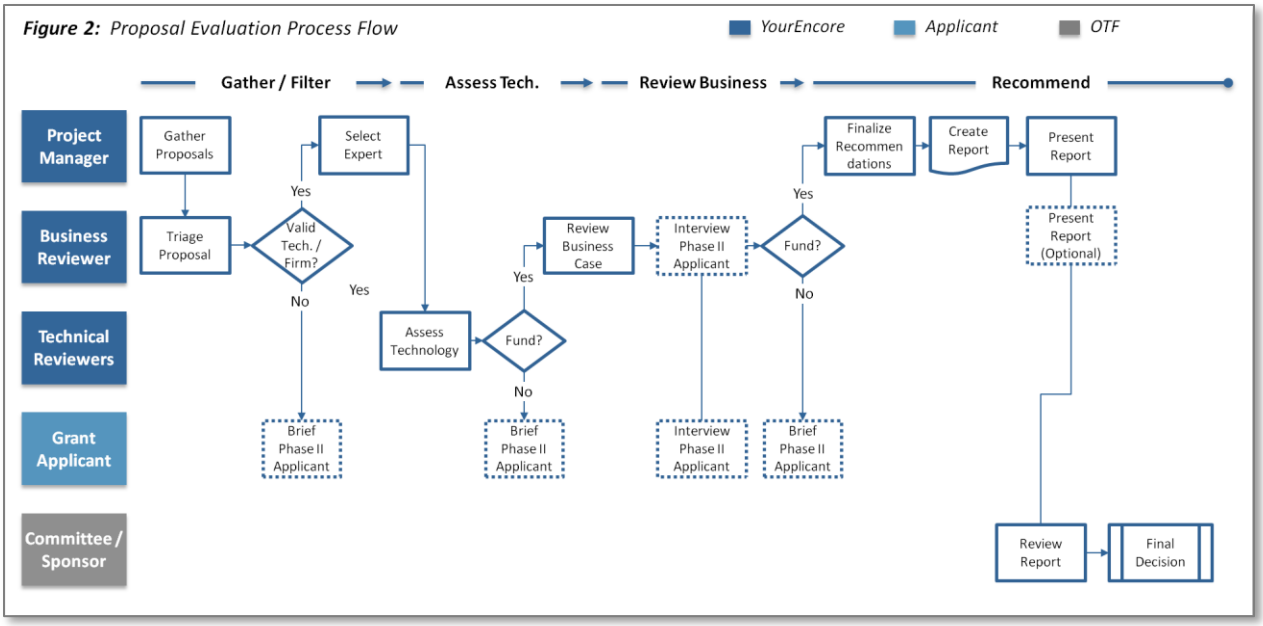
Key Evaluation Scorecard Components

- *Alignment and quality of response to the TSVF's RFP requirements*
- *Demonstrated proof to move technology / business to a next major milestone*
- *Evidence that milestone can be obtained during the one-year period and with the proposed resources*
- *Validation / proof process will be overseen by independent 3rd party*
- *Achievability of the proposed technical application and/or business model*
- *Demonstrated support/ stable backing that is independent from the university. (Phase II only)*
- *Strength of Intellectual Property (IP) protection*
- *Likelihood project will lead to the creation and/or success of a Ohio-based entrepreneurial company*

In addition, YourEncore conducted a grounding session with all technical reviewers to assure they were aligned on the criteria and they judged each grant submission in a uniform manner.

Evaluation Services

To assure a robust decision for each Phase I and Phase II Proposal YourEncore instituted a four part approach that encompassed gathering / filtering submissions, assessing the technical feasibility, reviewing the business case, and recommending funding prospects.



Gather and Filter Submissions: After gathering the Proposals from OTF the Project Manager collaborated with the Senior YourEncore Managers to remove all submissions deemed unfeasible, document findings, and brief Phase II applicants as required. For those submissions deemed feasible, the Project Manager then identified an Expert with the necessary technical background to perform an in-depth assessment.

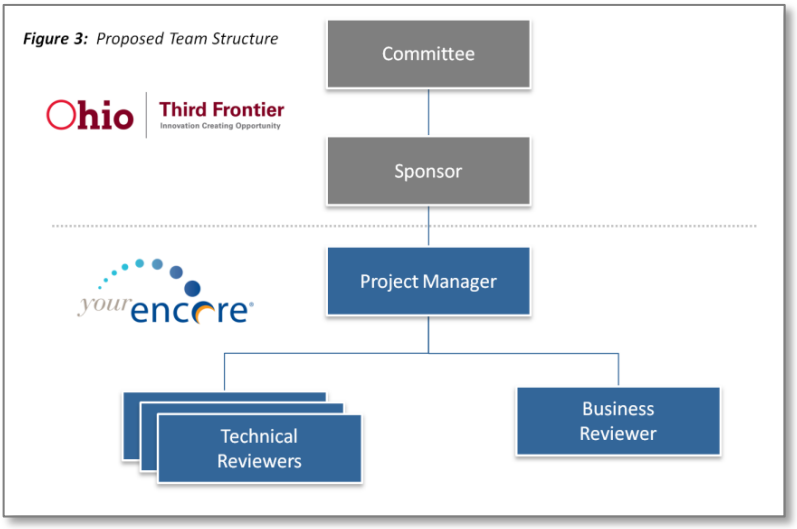
Assess Technology: Upon receiving the proposal, the YourEncore Technical Reviewers' leveraged the co-developed evaluation scorecard to perform assessments for the Phase I / Phase II submissions they were provided. Upon completion of the assessment the Technical Reviewers documented their recommendations.

Review Business Case: The Project Manager compiled the technical assessments and disseminated recommended Proposals to the Business Plan Reviewer. The Business Reviewer then reviewed the business case and analyzed the market potential of each recommended proposal. For all recommended Phase II applicants, the Business Reviewer, the Project Manager and YourEncore Senior Managers conducted a short on-site interview to further determine the company's feasibility.

Recommend Funding Decision: After determining the final recommendations, the Project Manager and Senior YourEncore Managers developed this detailed report and summary presentation to share the assessments' findings and the final funding recommendations, including dollar amount, with the OTF Committee. The OTF Committee will then use the final recommendations to distribute the funding as they deem appropriate.

Team Structure and Qualifications

To successfully execute YourEncore's proposal a clear team structure (See Figure 3) with defined roles and responsibilities was required.



Development Committee

OTF has an established Committee to provide overall program sponsorship, guidance, and support to ensure the program's success.

Development Sponsor

YourEncore worked with Dr. Andrew Hansen from Development to help set the direction for the team, review progress on a monthly basis, and work with YourEncore's Project Manager to resolve any issues. Furthermore, Dr. Hansen previewed the final outputs prior to Development Committee presentation and support implementation of improvement initiatives.

Project Manager

The YourEncore Project Manager managed the day-to-day operations of the program including ensuring all assessments are completed on-time. This individual established and managed the program's processes, assured process / scorecard compliance, and engaged / managed Technical Reviewers to ensure on-time completion of assessments. Furthermore, this individual leveraged YourEncore's internal Project Management system to track each proposal's submission, expert assignment, timelines, budget, and documented outputs.

Business Reviewer

To validate the Experts' recommendations YourEncore engaged a strategic business development, entrepreneurial expert to perform review of all Proposals. Furthermore, this individual participated in all Phase II onsite interviews.

Technical Reviewers

YourEncore identified and selected a team of nine subject matter experts to perform detailed technical assessments on Phase I and Phase II proposals, complete co-developed scorecard and document recommendations. Reviewers had expertise in each of the following areas.

- *Advanced Materials*
- *Aero Propulsion and Power Management*
- *Fuel Cells and Energy Storage*
- *Medical Technology*
- *Software Applications*

- *Sensing and Automation Technologies*
- *Situational Awareness and Surveillance Systems*
- *Solar Photovoltaic and Photovoltaic*

System Infrastructure and Utilization

YourEncore leveraged its internal Project Management System, DelTek Vision, as the central system of record for the program. This system houses all information for thousands of YourEncore projects and has the capacity to handle all of OTF's Phase I / Phase II proposal information.

YourEncore believes this is the best solution due to the program's robust document repository, project management tools (i.e., timelines, budgets, experts engaged), reporting, and activity audit trail capabilities. By leveraging this system all Reviewers will utilize one system to house and track all the activities, scheduling, and documents associated with this program. Furthermore, this system will enable YourEncore to create reports on a regular basis to report on progress, budget utilization, and identify / reconcile issues.