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## Technology Validation and Start-Up Fund

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### Round 9 Submittal Evaluations

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Submitted To:

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## 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 ten 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 for the state’s economic development goals. The Review Team evaluated each proposal based on the information submitted for review, and according to the criteria specified by OTF.

For Round 9, a total of 27 requests for funding were submitted to OTF’s Technology Validation and Start-Up Fund, 19 for Phase 1 and 8 for Phase 2. One Phase 2 proposal was withdrawn by the applicant. (Note: this proposal was not considered in the statistical results below) This represents a total quantity of requests for this round that was somewhat below average, with Phase 1s nearly average and Phase 2s lower than average quantities.

While proposal quality again varied from highly professional and complete to unfocused and incomplete, the overall quality of proposals was below average for that of the last several rounds. Of the 26 completed requests, 6 requests in Phase 1 (32%) and 2 in Phase 2 (29%) are recommended for funding to OTF by the expert Review Team. One of the seven Phase 2 applications was a prior Phase 1 awardee; it has been recommended for funding this round.

A total of 11 applications not previously recommended for funding were resubmitted in this round. Resubmissions, which are responsive to past feedback, generally have a much higher quality than other proposals. Two of eight Phase 1 reapplications (25%) are recommended, and two of three Phase 2 resubmissions (67%) are recommended. 64% of these resubmissions still do not meet the full criteria necessary for approval. 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. Further collaboration with the applicant’s Entrepreneurial Signature Program and Technology Transfer Office is highly recommended prior to resubmission.

Although sometimes too early in their life cycle for submission to the TVSF program, the technologies as proposed are generally sound. Most requests that are not recommended for funding lack fundamental elements of a business strategy. Phase 1 proposals were not recommended for funding due to concerns in Generation of Proof (9 of 19 had this fatal flaw); Path to Market (8 of 19); and Budget (4 of 19). Generation of Proof fell short for many applications this round by virtue of the technology being too nascent for commercialization. For other applications Proof insufficiency was a business matter; that is, even if technical goals are met for the project, those goals are inadequate to validate the technology. Deficiencies in the Budget category were a mix of appropriateness of use (either due to the stage of development, or suitability of the recipient within the RFP criteria), or

were the result of internal inconsistencies that extended beyond the appearance of mere typographical inaccuracies. Phase 2 proposals not recommended for funding were nearly all deficient, at least to an extent, in their business model (4 of 7 Red; 1 Yellow), which is a continuing theme from earlier rounds. The review team again saw a lack of robustness represented on the applicants' teams, which correlates with the business model deficiencies. The lack of external Company Backing remained a relevant theme (3 of 7 Red). Another area of deficiency is related to project financials. Budget/ Use of Funds or Likelihood of Additional funding was of concern (2 of 7 Red; 3 Yellow) and is a recurring theme.

Grant dollars recommended for funding is \$550,000, versus \$950,000 for round 1, \$900,000 for round 2, \$610,000 for Round 3, \$864,000 for round 4, \$1,462,000 for Round 5, \$998,000 for round 6, and \$1,100,000 for Round 7, and \$710,000 for Round 8. Dollar amounts are the lowest to date and percentage approvals are below average compared to past rounds.

<b>Round</b>	<b>Approval Rate</b>	<b>\$\$ Recommended</b>
<b>1</b>	<b>35%</b>	<b>\$950,000</b>
<b>2</b>	<b>52%</b>	<b>\$900,000</b>
<b>3</b>	<b>44%</b>	<b>\$610,000</b>
<b>4</b>	<b>30%</b>	<b>\$864,000</b>
<b>5</b>	<b>46%</b>	<b>\$1,462,000*</b>
<b>6</b>	<b>39%</b>	<b>\$998,000</b>
<b>7</b>	<b>57%</b>	<b>\$1,100,000</b>
<b>8</b>	<b>37%</b>	<b>\$710,000</b>
<b>9</b>	<b>31%</b>	<b>\$550,000</b>

*The Phase 1 Proposals that are recommended for funding*

Proposal #	Lead Applicant	Title	State Funds Requested	Total Budget	Recommend
15-775	Ohio State University	Vaporizing Foil Actuator Welding	\$50,000	\$100,000	\$50,000
15-779	Cleveland Clinic Foundation	Molecular Imaging of Prostate Cancer	\$50,000	\$100,000	\$50,000
15-781	Cleveland Clinic Foundation	The Urocapsule: A new clinical tool for home bladder monitoring and improved diagnosis of incontinence	\$50,000	\$100,000	\$50,000
15-782	Case Western Reserve University	Injectable Autologous Stem Cell-Based Therapy for the Treatment of Critical-Size Bone Defects	\$50,000	\$100,000	\$50,000
15-785	University of Akron	Artificial Tactile Skins using Hybrid 3D Printing Technologies	\$50,000	\$100,000	\$50,000
15-791	University of Toledo	Additively manufactured patient specific implants	\$50,000	\$100,000	\$50,000

*THE PHASE 2 PROPOSALS THAT ARE RECOMMENDED FOR FUNDING*

Proposal #	Licensing Institution	Lead Applicant	Proposal Title	State Funds Requested	Total Project Budget	Recommended	Capital Raised to Date	Time to Market	Additional Capital to Market
15-795	Ohio State University	Nikola Labs	Wireless Mobile Device RF Harvesting Products	\$100,000	\$100,000	\$100,000	\$80,000	0.5 Yrs	\$100,000
15-798	University of Toledo	Thermomorph LLC	QuickFlow PE	\$150,000	\$150,000	\$150,000	\$60,000	4 Yrs	\$5MM

## PROPOSAL RECOMMENDATIONS - PHASE 1 SUMMARY MATRIX

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-773	Northeast Ohio Medical University	Development of a New Commercial Kit for Screening Cell Specific Gene Therapy Vector	Green	Green	Red	Green	Yellow	Yellow	Green	Red
15-774	Ohio State University	Broadband-to-Monochrom X-Ray Converter	Red	Green	Yellow	Yellow	Yellow	Yellow	Green	Green
15-775	Ohio State University	Vaporizing Foil Actuator Welding	Green	Green	Green	Green	Green	Green	Green	Green
15-776	Cleveland Clinic Foundation	Clinical Intelligence Platform (CIP)	Red	Green	Green	Red	Green	Green	Red	Red
15-777	Cleveland Clinic Foundation	Prognostic Panel for Hematological Cancers	Red	Green	Yellow	Red	Green	Yellow	Red	Yellow
15-778	Cleveland Clinic Foundation	Application-Based Addiction Treatment Adherence Trial	Red	Green	Yellow	Red	Yellow	Green	Red	Yellow
15-779	Cleveland Clinic Foundation	Molecular Imaging of Prostate Cancer	Green	Green	Green	Yellow	Green	Green	Green	Yellow
15-780	Cleveland Clinic Foundation	Technology Platform for Analysis of Exhaled Breath	Red	Green	Yellow	Green	Yellow	Green	Green	Green
15-781	Cleveland Clinic Foundation	The Urocapsule: A new clinical tool for home bladder monitoring and improved diagnosis of incontinence	Green	Yellow	Yellow	Green	Green	Green	Green	Yellow
15-782	Case Western Reserve University	Injectable Autologous Stem Cell-Based Therapy for the Treatment of Critical-Size	Green	Green	Green	Yellow	Green	Yellow	Green	Green
15-783	Case Western Reserve University	NeuroRadVision: Decision Support Toolkit	Green	Green	Green	Red	Green	Green	Yellow	Red
15-784	University of Akron	A platform for remote virtual physical examination	Red	Yellow	Yellow	Red	Green	Green	Yellow	Red
15-785	University of Akron	Artificial Tactile Skins using Hybrid 3D Printing Technologies	Green	Yellow	Green	Yellow	Green	Green	Green	Yellow
15-786	University of Akron	Solution-Processed Ultrasensitive Infrared Polymer Photodetectors	Yellow	Yellow	Green	Yellow	Green	Green	Green	Red
15-787	University of Akron	A Smartphone-based Dual-modality Microendoscope for Cancer Diagnosis	Red	Yellow	Green	Red	Yellow	Green	Yellow	Yellow
15-788	University Hospitals Cleveland Medical Center	EndoSleeve- Accessory Medical Device Introduction Apparatus for Endoscopes	Red	Green	Red	Red	Green	Yellow	Red	Green
15-789	University of Toledo	Organic Substrates Having Improved Weatherability and Mar Resistance	Red	Red	Green	Red	Green	Green	Yellow	Yellow
15-790	University of Toledo	Validation of Earth-abundant and copper-free back contact for CdS/CdTe solar cel	Yellow	Green	Red	Green	Green	Red	Green	Red
15-791	University of Toledo	Additively manufactured patient specific implants	Green	Yellow	Green	Green	Green	Green	Green	Green

*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 3<sup>rd</sup> 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 -- description of how the entity proposes to use the funding if received

## DETAILS OF PHASE 1 RECOMMENDATIONS

<b>Proposal 15-773</b>	<b>Northeast Ohio Medical University</b>	<i>Development of a New Commercial Kit for Screening Cell Specific Gene Therapy Vector</i>
<b>Amount Requested:</b> <b>\$50,000</b>	<b>Recommended:</b> <b>\$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>15-193</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-773	Northeast Ohio Medical University	Development of a New Commercial Kit for Screening Cell Specific Gene Therapy Vector								

**Rationale:** This proposal is a resubmission of 15-193 which was not recommended for funding due to concerns regarding IP Protection. While the IP has been clarified and improved, additional concerns have further diluted the proposal's appeal.

Applicant proposes further development of a kit for screening cell-specific gene-therapy vectors.

A promising avenue for the treatment of cancer and other genetic and metabolic diseases is gene therapy, which is introducing to the diseased cells in the body a small amount of genetic material that will disrupt or otherwise alter the functions of the diseased cells, causing those cells to mutate in a manner that treats the disease. Vectors, whose function is to carry the genetic material into the defective cells, are key to the potential of treating cancer. A vector that invades only the defective cells, leaving normal cells alone is needed. Adeno-associated viruses (AAVs) have been found to lend themselves well to this function.

The applicants have developed a way to create millions of variants of capsid proteins, all carrying fluorescent tags. When this 'library' of multiple variants is mixed with targeted gene therapy cells, those cells allow themselves to be invaded by one or more of the AAV variants. The researchers can then extract from a particular type of cell the DNA that created the variants that made it possible for the virus to invade those cells, thus isolating the effective variant(s), which are now specific for that type of cell. These procedures can be repeated with the resultant products of the preceding procedure, thus producing an ever more-specific AAV for the target cells.

Proposed funding would be used to optimize the AAV target for cochlear cells (the sensory organ that governs balance) in mice. This choice applies to age-related hearing loss (ARHL) treatment, but the platform techniques have much broader applications.

The concept for advancing gene therapy disclosed in this proposal seems to be paradigm-shifting, as it will enable easy creation of highly specific vectors to remedy a wide range of poorly treated diseases and conditions.

The review team found significant concern regarding 3<sup>rd</sup> Party and Budget. One of the applicant’s team members is a principal of the proposed independent 3<sup>rd</sup> party reviewer, Gateway Bio. As such Gateway is not independent. The Budget exceeds the RFP criteria with more than half of funding being spent on personnel. An additional \$5,000 is going to the firm that has a team member as a principal, obfuscating funding suitability.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to IP and Start-Up. Only one of two IP applications was filed. Further there is a reasonable likelihood of the technology being licensed, reducing the impetus for an Ohio Start-Up.

**Recommendations for Improvement:** Should NEOMED choose to reapply for TVSF funding, the applicant should resolve any budgetary concerns, and engage with a fully independent 3<sup>rd</sup> Party prior to resubmission.

<b>Proposal 15-774</b>	<b>Ohio State University</b>	<i>Broadband-to-Monochrome X-Ray Converter</i>
<b>Amount Requested:</b> \$50,000	<b>Recommended:</b> \$0	
<b>Prior Phase 1 Application(s):</b>	<b>13-015</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-774	Ohio State University	Broadband-to-Monochrom X-Ray Converter								

**Rationale:** This proposal is a resubmission of 13-015 which was not recommended for funding due to concerns regarding Path to Market and Market Opportunity. This proposal does not fully address the previous concerns. In comparing the current grant submission to the previous one, there appears to be little progress since the prior application in 2012.

The applicant proposes further development of X-ray generation for diagnostics by placing a metal plate in the path of the emitted X-rays, causing the incident broad-band X-rays to be converted by a quantum process into narrow-band X-rays directed at the patient. The proposal cites five advantages of monochromatic X-rays over broad-band X-rays: reduced radiation dose,

accuracy in depth of penetration, specificity in selected radiation, low cost, and ease of adaptation.

Proposed funding would be used for construction of a proof of concept prototype.

The review team found significant concern regarding Proof. The technology remains too nascent for the TVSF program. In particular, no proof of concept has been done regarding efficacy within biological tissue or facsimiles ('phantoms'). Further, versus typical X-Rays, the resultant reduction in imaging penetration to less than three inches reduces the utility for most areas of the patient to be imaged (e.g. thoracic cavity).

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to 3<sup>rd</sup> Party, Path, IP and Start-Up. The proposed 3<sup>rd</sup> party is within the parent institution. The Path to market seems less likely since evidence was not provided to show progress of the technology since the prior application. IP is held jointly with another institution (TJU) with no explanation of the arrangement. Further, X-Ray conversion is well known, and as such may not be found to be novel and non-obvious to the US Patent Office. There is a reasonable likelihood of the technology being licensed, reducing the impetus for an Ohio Start-Up.

**Recommendations for Improvement:** Should Ohio State choose to reapply for TVSF funding, the proposal must have executed the clear proof of concept as to the viability of the technology for its intended use, and then identify the additional Proof needed for commercial licensure. An explanation of interim progress made, as well as delineation of the joint IP arrangement, should be included. Further inclusion of an IP novelty evaluation would be helpful. Finally, factors that weigh more heavily towards creation of an Ohio Start-Up versus licensure to an existing X-Ray manufacturer should be promulgated.

<b>Proposal 15-775</b>	<b>Ohio State University</b>	<i>Vaporizing Foil Actuator Welding</i>
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$50,000</b>	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-775	Ohio State University	Vaporizing Foil Actuator Welding								

**Rationale:** Applicant proposes further development of a novel welding technology that allows fusing dissimilar metals at lower cost and cycle time than current methodologies.

Impact Spot Welding (ISW) technology sometimes referred to as vaporizing foil actuator welding or VFAW can successfully produce welds between similar as well dissimilar material combinations, the most significant of which is high strength aluminum and steel.

Specifically, an aluminum foil is instantaneously vaporized by the passage of an electrical current in excess of 100 kiloAmperes. The rapidly expanding vapor propels one sheet of metal (flyer), placed above the foil, toward another metallic piece (target). The high-speed collision of the two metallic pieces leads to a strong, solid-state weld between them.

The process allows for 25% fewer welds than Resistive Spot Welding of similar metals and at a lower energy usage. It significantly reduces the costs associated with Self Piercing Welding for dissimilar metals. It is more suitable for production line manufacturing than adhesives, which take 20 minutes to cure. Automotive manufacturing is one noteworthy example of the large market opportunity for this technology.

Proposed funding would be used to build the next generation, portable prototype for field demonstrations.

The team finds the proposal is well thought-out and constitutes the next step in developing a marketable system for production welding.

The proposal addresses all of the criteria for Phase 1 TVSF and is recommended for funding.

<b>Proposal 15-776</b>	<b>Cleveland Clinic Foundation</b>	<i>Clinical Intelligence Platform (CIP)</i>
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>15-188</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-776	Cleveland Clinic Foundation	Clinical Intelligence Platform (CIP)								

**Rationale:** This proposal is a resubmission of 15-188 which was not recommended for funding due to concerns regarding Path to Market and Market Opportunity. This proposal does not fully address the previous concerns.

Applicant proposes further development and commercialization of software that supports real-time electronic clinical surveillance (RTECS), that is, continuous reviewing of data from multiple sources to detect conditions that merit immediate clinical review (for example, unnoticed drug interactions or lab results indicating a problem).

Applicant has developed software that permits collection of data from numerous sources throughout the Cleveland Clinic hospital system, including data from electronic medical records, administrative data, readings from various diagnostic and monitoring devices, and other sources. These data are then ordered and integrated in some manner for display, and to detect situations that require interventions by clinicians and others. They call this system a clinical intelligence platform (CIP). With this achievement the applicants feel well-positioned to adapt the system for the more specialized purpose of real-time electronic clinical surveillance (RTECS) and to modify it as a commercial product to be installed in other hospital networks. Difficult to quantify objectives include technology enhancement for commercial readiness, and continued multi-site validation for documentation, throughput, and event detection.

Proposed funding would be used for proof of concept activities, additional data source integration, feature expansion, migration to software as a service, commercial installation, and documentation of implementations.

The review team found significant concern related to Proof, Path, Market Opportunity, and Budget. The technology remains too nascent for the TVSF program. The proposal activities (milestone 2) include proof of concept for hard cost savings at a remote affiliated facility. This is considered basic research by the review team. Milestones 3, 4, and most, if not all, of number 1 are future undertakings that would be considered Phase 2 activities. The Path to Market remains unclear as system benefits and cost savings are not yet well defined and a conceptual business model is lacking. The market size remains undefined. Further, little additional information was provided on the competitive landscape and lack of adoption of other applications of RTECS. Most of the Budgeted objectives are for commercial feature enhancement or field installation, which should occur at a later stage in the life cycle of the technology.

Note: previous review team concerns, regarding making a home grown software system agnostic for external deployment, have been evaluated by a 3<sup>rd</sup> Party consultant. Those concerns have largely been allayed by the consultant, who has also made further recommendations to enhance the transition to external customers.

This proposal is not recommended for funding.

**Recommendations for Improvement:** Should CCF choose to reapply for TVSF funding, the proposal must have executed the clear proof of concept as to a value proposition to the proposed purchasers, and then identify the additional Proof needed for commercial licensure. The

addressable market size must be identified. Finally, the use of budgeted funds needs to concentrate on activities for that additional Proof.

<b>Proposal 15-777</b>	<b>Cleveland Clinic Foundation</b>	Prognostic Panel for Hematological Cancers
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-777	Cleveland Clinic Foundation	Prognostic Panel for Hematological Cancers								

**Rationale:** Applicant proposes further development of a prognostic panel for patient mutations in certain genes associated with myelodysplastic syndromes (MDS) and acute myeloid leukemia (AML).

Cancers can now be characterized by alterations in the DNA of the cells, a view that has revealed that cancers can be genetically differentiated and patients can benefit from personalized treatment. Applicant has discovered a number of gene mutations found in significant numbers of patients with MDS and AML. The concept is analogous to another tabulation used for these diseases called the International Prognostic Scoring System – Revised (IPSS-R), which assigns a score to a handful of test factors, which are combined to yield an overall score indicative of the severity of disease. In turn this can be used to guide therapy. The novelty in this proposal is to supplement the IPSS-R score with a panel of observed gene mutations known to be associated with these diseases.

Proposed funding would be used for some portion of postulated sample analyses for proof of concept to determine expected clinical relevance.

The review team found significant concern related to Proof, Path, and Market Opportunity. The technology remains too nascent for the TVSF program. Plan milestones 1 and 2 are considered basic research by the review team and more of a scientific undertaking to identify genetic mutations than a validation activity. Milestone 3 could be an appropriate future Phase 1 activity. The Path to Market was undefined. The Market Opportunity is relatively small, given the need for a \$5MM investment and 3yrs to bring to market.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to 3<sup>rd</sup> Party, Start-Up and Budget. The proposed 3<sup>rd</sup> party is within the parent institution. The need for a Start-Up is not explicitly called out. Finally, the Budget figures are not consistent within the proposal.

**Recommendations for Improvement:** Should CCF choose to reapply for TVSF funding, the proposal must have executed the clear proof of concept, and then identify the additional Proof needed for commercial licensure. The Path to, and the size of, the addressable Market need to be identified. A fully independent 3<sup>rd</sup> Party should be chosen and the budget rectified prior to resubmission.

<b>Proposal 15-778</b>	<b>Cleveland Clinic Foundation</b>	Application-Based Addiction Treatment Adherence Trial
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-778	Cleveland Clinic Foundation	Application-Based Addiction Treatment Adherence Trial								

**Rationale:** Applicant proposes further development of an ‘app’ (application program) to run on a smart-phone, which is expected to enhance the compliance rate for patients addicted to alcohol, opiates, or other addictive substances, who are enrolled in a twelve-step treatment program that requires them to attend regular meetings.

Community-based twelve-step programs that follow the pattern established by Alcoholics Anonymous have been found to improve addiction treatment outcomes by up to 20%. Such programs require patients to attend regular meetings, multiple times per week for open discussions. Regular attendance is a key to successful treatment. However, ensuring actual attendance is a challenge. Records are difficult to collect consistently and are subject to falsification.

The applicants propose that modern smart-phones provide a potential solution to this problem. Patients may already carry smart-phones. These smart-phones contain geographic positioning systems (GPS) that make it possible with a suitable app to record the position of the phone at any time, thus providing a record of the phone’s location and ostensibly a patient’s attendance at a meeting or encounter with a sponsor. Furthermore, the smart-phone can be used for treatment related communications to and from the patient and their physician.

Proposed funding would be used to develop such an app and then to evaluate its effect on patient compliance to the treatment regimen.

The review team found significant concern related to Proof, Path, and Market Opportunity. The technology remains too nascent for the TVSF program. Plan milestones are considered basic research by the review team. Further, the proposal lacks a tangible commercial milestone. A ‘manuscript’ is insufficient as a licensure Proof point. In addition, the app does not negate the potential for falsification. The Path to Market remains unclear as the applicant has not identified who the paying customer would be, or costs associated with acquisition and use of the technology. The Market Opportunity is also undefined. There is a large population but no discussion of addressable market.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to 3<sup>rd</sup> Party, IP, and Budget. Only one of three identified 3<sup>rd</sup> party reviewers is outside of the institution. Copyrights provide minimal IP protection. Finally, the Budget lacks a detailed linkage to the Plan.

**Recommendations for Improvement:** Should CCF choose to reapply for TVSF funding, the proposal must have executed the clear proof of concept, and then identify the additional Proof needed for commercial licensure. A suitable Path to market needs to be proposed. Addressable Market size will also need to be identified.

<b>Proposal 15-779</b>	<b>Cleveland Clinic Foundation</b>	Molecular Imaging of Prostate Cancer
<b>Amount Requested:</b> \$49,845	<b>Recommended:</b> \$49,845	
<b>Prior Phase 1 Application(s):</b>	N/A	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-779	Cleveland Clinic Foundation	Molecular Imaging of Prostate Cancer								

**Rationale:** Applicant proposes further development of a nuclear medicine tracer to detect prostate cancer.

Nuclear medicine is a standard method for detecting certain types of cancer. Required is a molecule known to have some affinity for the cancer in question, to which a radioactive atom can be attached. Such molecules are called tracers in this proposal. The distribution of the

molecules can be mapped using a special camera in a procedure called single-photon emission computed tomography (SPECT) or using positron emission tomography (PET) depending on the attached atom. Both types of camera produce images that represent slices through the tissue under study. Such images lend themselves to reconstruction of three-dimensional images showing the spatial distribution of the tracer and, of course, the cancer to which the tracer molecules have attached themselves.

The proposed tracer is known to have an affinity for prostate-specific membrane antigen (PSMA), which, according to the applicants, is expressed at low levels in the normal prostate but at high levels in cancerous prostate cells and in the vasculature that serves those cells and in the lymph nodes that drain the prostate. The proposed tracer can be modified for either camera technique.

The applicants note that there has been a tracer for prostate cancer called ProstaScint on the market since 1996, but that it is not widely used because it lacks sensitivity (ability to detect disease with a limited proportion of false positives) and specificity (ability to rule out disease with a limited proportion of false negatives). They believe that their tracer will have much higher sensitivity and specificity than ProstaScint.

Proposed funding would be used for validating the performance of the new tracer for localization of prostate cancer within the prostate and local pelvic lymph nodes.

The team finds the proposal is well thought-out and constitutes the next step in developing a marketable tracer.

The proposal addresses all of the criteria for Phase 1 TVSF and is recommended for funding.

Concerns which were not sufficient to preclude funding relate to Path and Budget. The Path to Market has the significant hurdle of an estimated minimum \$15MM future total investment and three years to get the product fully to market. The budget is limited on details and narrative.

<b>Proposal 15-780</b>	<b>Cleveland Clinic Foundation</b>	Technology Platform for Analysis of Exhaled Breath
<b>Amount Requested:</b> <b>\$50,000</b>	<b>Recommended:</b> <b>\$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-780	Cleveland Clinic Foundation	Technology Platform for Analysis of Exhaled Breath								

**Rationale:** Applicant proposes further development of a platform device that measures biomarkers found in exhaled breath. The proposal deals with markers relevant to patients with asthma or diabetes, but the applicants believe the technology can be the basis for a much wider range of pathologies.

Many medical conditions are known to be correlated with compounds found in exhaled breath, the most familiar being drunkenness measured by alcohol concentration in the breath. But there are numerous other examples. Applicant has developed methods for measuring concentrations of various compounds in the breath, a procedure that requires a device to capture exhaled breath, fractionate it, and, in some cases, to capture a condensate from it. The proposal mentions these steps but does not describe how they are accomplished.

This proposal is focused on validating breath analysis for two medical conditions, asthma and diabetes. The applicants say that they have measured concentration of nitric oxide in vitro and that they intend to do so with in the breath of asthmatic patients, as a known marker for the severity of asthmatic attacks. Additionally proposed is measurement of exhalation concentrations of acetone and beta hydroxybutyrate (BHB), for quantitative correlation with blood glucose levels. Alpha prototype components have been developed in conjunction with Case Western Reserve University and Parker-Hannifin.

Proposed funding would be used for proof of concept to capture and measure breath condensate for asthma patients and glucose tolerance test participants. Then the applicants would analyze the results to determine if there is a correlation between exhalation constituents and a commercial Nitric Oxide exhalation device or actual blood glucose levels respectively.

The review team found significant concern related to Proof. The technology remains too nascent for the TVSF program. For example, a correlation between blood glucose and acetone/BHB is yet to be established. Similarly, plan milestones are considered basic research by the review team. The Plan lacks details for hard proof points for statistically meaningful results.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to 3<sup>rd</sup> Party and IP. The 3<sup>rd</sup> Party is not fully independent. Further, given the extended time frame that these markers have been known, the team has concerns that the IP may be considered obvious and therefore not protectable.

**Recommendations for Improvement:** Should Cleveland Clinic choose to reapply for TVSF funding, the condensate device validation and combination glucose correlation needs completed and then identification of the additional Proof needed for commercial licensure prior to reapplication.

<b>Proposal 15-781</b>	<b>Cleveland Clinic Foundation</b>	The Urocapsule: A new clinical tool for home bladder monitoring and improved diagnosis of incontinence
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$50,000</b>	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-781	Cleveland Clinic Foundation	The Urocapsule: A new clinical tool for home bladder monitoring and improved diagnosis of incontinence								

**Rationale:** Applicant proposes further development of the Urocapsule, a wireless device that can be placed in the bladders of patients suffering from urinary incontinence to measure pressure over an extended observation period as a guide for diagnosis and subsequent therapy.

Bladder pressure is usually measured by inserting a catheter through the urethra and recording pressures as the bladder is filled from an external source. The measurements often fail to reproduce the patient’s symptoms because the catheter itself interferes with bladder emptying and because the exam is non-physiological in nature. Extended catheter use is undesirable because of discomfort and a tendency to cause urinary tract infections. Applicant asserts that approximately 15 million Americans suffer from urinary incontinence and that there are 600,000 urinary monitoring tests performed annually in the US.

Applicant has developed a small electronic unit with a pressure sensor, encased in a small compressible balloon that will allow the device to float upward, away from the urethral opening, after the device has been implanted in the bladder. Insertion and removal are both done with a catheter. The device can be recharged with an external charger. The wireless signals representing pressure measurements are received by a small externally-worn device resembling a Holter (electrocardiogram) monitor.

The applicants see the platform technology as extending to neuromodulation the sacral nerve for patients with hyperactive bladder problems and other organ systems such as cardiovascular, neurological and gastrointestinal systems. Urocapsule will be their initial product due to a simpler regulatory pathway. Laborie Medical Technologies and Parker-Hannifin will provide third-party reviews of the device.

Applicant estimates that it will take two years and an investment of \$2 million to bring the device to market.

Proposed funding would be used for design and fabrication of prototypes, regulatory analysis, and animal studies.

The team finds the proposal is well thought-out and constitutes the next step in developing a marketable device.

The proposal addresses all of the criteria for Phase 1 TVSF and is recommended for funding.

Concerns which were not sufficient to preclude funding relate to Team, 3<sup>rd</sup> Party, and Budget. The listed Team only includes the Inventor with a vague reference to a supporting ‘team’. The proposed 3<sup>rd</sup> party is within the parent institution. The Budget lacks funding for any needed 2nd round prototypes in purchased services. If necessary, these are likely to require additional time and/or money. Purchased Services Budget includes costs associated with the institutionally affiliated CCMDC. Applicant will need to work closely with Development to ensure compliance with budget constraints.

<b>Proposal 15-782</b>	<b>Case Western Reserve University</b>	Injectable Autologous Stem Cell-Based Therapy for the Treatment of Critical-Sized Bone Defects
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$50,000</b>	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-782	Case Western Reserve University	Injectable Autologous Stem Cell-Based Therapy for the Treatment of Critical-Size Bone Defects								

**Rationale:** Applicant proposes further development of an injectable compound, StemGraft, composed of stem cells taken from the patient’s own bone marrow and gelatinous microparticles that provide spacing and sustained release of recombinant human bone morphogenic protein-2 (rhBMP-2), an FDA approved bone-generating factor. The compound is expected to stimulate bone regeneration to fill in defects too large to heal without medical intervention, typically caused by trauma, surgical removal of cancerous bone, and other causes.

Smaller defects in bone normally heal quite readily, but large defects do not. The “gold standard” for treatment is to harvest bone from another part of the patient’s body to fill in parts of the defect, after which normal healing may take place. An important drawback of this procedure is that it requires two operations, one to harvest bone and one to implant it, doubling the surgical trauma to the patient. Alternatives include allografts (using bone from another person) and xenografts (using bone from another species), bone graft substitutes using synthetic bone fillers, and a collagen sponge loaded with rhBMP-2 (a product called INFUSE™

manufactured and marketed by Medtronic). All of these alternatives have their own limitations in that they lack or are deficient in one or more of the essential properties necessary for bone regeneration. StemGraft holds the promise of an ideal means to induce bone regeneration in cases with large defects.

Proposed funding would be used for implementation of a thorough study of the efficacy of StemGraft versus the three other therapy modes.

The team finds the proposal is well thought-out and constitutes the next step in developing a marketable therapy.

The proposal addresses all of the criteria for Phase 1 TVSF and is recommended for funding.

Concerns which were not sufficient to preclude funding relate to Path and Start-Up. The Path to Market has the significant hurdle of an estimated \$100MM future total investment to get the product fully to market. However, with a nearly \$1 Billion addressable market, the risk to reward is commensurate. There is a reasonable likelihood of the technology being licensed, reducing the impetus for an Ohio Start-Up.

<b>Proposal 15-783</b>	<b>Case Western Reserve University</b>	NeuroRadVision: Decision Support Toolkit
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>14-508, 15-184</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-783	Case Western Reserve University	NeuroRadVision: Decision Support Toolkit	Green	Green	Green	Red	Green	Green	Yellow	Red

**Rationale:** This proposal is a resubmission of 15-184 and 14-508 which were not recommended for funding due to concerns regarding Path to Market, IP Protection, and Budget. This proposal does not fully address the previous concerns of the reviewers.

Applicant proposes further development of specialized software for computer-aided diagnosis, designed for use by neuroradiologists and neurosurgeons in managing the treatment of brain tumors. This typically involves surgical excision of the tumor followed by therapeutic radiation. A major problem in this routine is distinguishing tumor regrowth from radiation necrosis (tissue damage caused by radiation) or other confounding factors. Tumor regrowth usually entails

additional surgery, while other factors do not. The standard method for detecting brain tumors and advising therapy is magnetic resonance imaging (MRI), which is manually evaluated by the practitioner to determine whether the tissue is new tumor or necrotic old tissue. The software under development makes measurements on MRI images using various techniques and integrates these into a score that distinguishes tumor regrowth from other confounding conditions, such as radiation necrosis, that mimic regrowth.

The applicants have developed the software in question and have evaluated it in a pilot study, demonstrating that it does improve the ability of neuroradiologists and neurosurgeons to distinguish tumor regrowth from radiation necrosis more reliably than they can without computer-aided diagnostic software (CAD). Based on in-progress work, the improvement, while significant, is not overwhelming – the applicants currently say that their CAD is 89% accurate (true positive plus true negatives divided by the total number of patients) compared to 50-60% for unaided readings.

The applicants outline a program taking three years at a now undisclosed cost to get fully to market.

Proposed funding would be used for development of a commercial ready version of the software.

The review team found significant concerns related to Path to Market and Budget. Path still lacks directional business assumptions such as competitive comparables, sales and distribution possibilities, etc. The suggested path in the narrative is not commercially robust. Changes in listed accuracy of this submission versus the prior submissions for both doctors (worse) and the tool (better) were not explained. Further, the lack of sources for radiological accuracy compounds the market obfuscation. Without that supporting evidence, and based on the historical performance of similar Computer Aided Diagnostic applications, the review team continues to believe that the incremental improvement in accuracy is not sufficient to drive practitioner behavior and payment activity to sustain the business model. The existence of other technologies that provides similar levels of improvement, which are not being widely adopted, continues to cast doubts on the potency of the economic benefit of the platform. The Budget was changed without explanation, versus the prior submissions, and contains inconsistencies within the proposal.

This proposal is not recommended for funding.

A concern which was not sufficient to preclude funding relates to Market Opportunity as it appears to be overstated, and is further complicated by numerous competitors in the market space.

**Recommendations for Improvement:** Should CWRU choose to reapply for TVSF funding, the applicants need to provide business-related hard data evidence that the technology will drive

behavior and investment by the medical community for the improvements gained. Further, assertions of efficacy need source references. Substantive changes to the application versus previous iterations need to be justified.

<b>Proposal 15-784</b>	<b>University Of Akron</b>	A platform for remote virtual physical examination
<b>Amount Requested:</b> \$50,000	<b>Recommended:</b> \$0	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-784	University of Akron	A platform for remote virtual physical examination								

**Rationale:** Applicant proposes further development of a Virtual Physical Examination application (VPE) for remote physical examinations of patients, based on a Bluetooth enabled stethoscope and a smartphone. The platform would enable caregivers other than physicians, or even patients themselves, to generate exam data for later review by physicians.

The VPE is composed of three components: an app that is installed on a mobile device, a cloud database to store the data generated by the mobile app, and an interface for the physicians or hospital staff to access the recorded exams and other data stored in a HIPAA compliant manner. The app is the pairing of a Bluetooth enabled stethoscope with a smartphone. The app utilizes a step-by-step guide for caregivers or patients themselves to perform physical examinations. To help a minimally trained person who is conducting the exam, the app is equipped with video recognition capability to utilize anatomical landmarks to optimize the exam. The exam provides video of oral mucosa, dentition, jugular venous distention, evaluation of thyromegaly, lower extremity edema, and dermatologic exam as well as the correct anatomic locations for auscultation of cardiac, pulmonary, and abdominal sites. The patient can also provide a detailed “Virtual History” utilizing voice recognition technology. Applicant claims the system can offer the average physician a reduction in patient encounter time up to 40%. The physician can then open real-time HIPAA compliant teleconferencing with the patient for further discussion of the treatment plan.

The review team found significant concerns regarding Proof, Path, and Budget. The Proof lacks identification of measurable goals such as % correlation to standard examination protocols that insurance reimbursements would require. The Path lacks any reimbursement strategy or compelling value proposition that would drive adoption by the practitioners. While an integrated

stethoscope offers more functionality than a simple videoconference with a healthcare professional, the proposed technology does not offer a variety of other hardware and diagnostics in higher-end solutions such as sphygmomanometers, otoscopes, or ultrasound. Given the increasingly crowded market space careful consideration of path and value proposition is needed. Budgetary use of funds is inappropriate in that services are purchased from TeleHealth Care Solutions, a company that is owned by one of the core team members in the proposal.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to 3<sup>rd</sup> Party, Market Opportunity and Team. I-Corps evaluation of the business model etc. does not constitute an independent third party reviewer to confirm the goals of the activities under the grant were met. Market Opportunity does not define the addressable market. Team percent commitment is unknown, and it is unclear who will be performing the actual plan activities.

**Recommendations for Improvement:** Should University of Akron choose to reapply for TVSF funding, the applicant should identify the measureable Proof needed for commercial licensure. An improved assessment of the competitive space and the value proposition of this device is needed. The budget cannot include payments to core team members via an LLC.

<b>Proposal 15-785</b>	<b>University Of Akron</b>	Artificial Tactile Skins using Hybrid 3D Printing Technologies
<b>Amount Requested:</b> <b>\$50,000</b>	<b>Recommended:</b> <b>\$50,000</b>	
<b>Prior Phase 1 Application(s):</b>	<b>15-200</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-785	University of Akron	Artificial Tactile Skins using Hybrid 3D Printing Technologies								

**Rationale:** This proposal is a resubmission of 15-200 which was not recommended for funding due to concerns regarding Path to Market. This proposal does adequately address the previous concerns of the reviewers, with specific improvements in market definition and structure, as well as an initial strategy for reimbursement in the high-end market.

Applicant proposes validation of the concept of producing artificial tactile skins with superior sensing capabilities using 3D printing technology.

The concept proposed is innovative and could be of great enabling benefit to the prosthetic and robotic communities requiring force and temperature feedback for control and grip functionality.

For the prosthesis market it provides a lower cost skin type covering of prosthetic hands to yield force and temperature sensing thus enabling feedback for prosthetics to manipulate and control objects. The tactile skin also shows potential by providing similar lower cost sensing capability in specialized automated electronic manufacturing lines and in wearable electronics. The skin is stretchable polymer composite which will be layered with a liquid ionic sensing material and electrodes in a grid fashion to create the sensing capability. The applicant has produced an alpha prototype.

Proposed funding would be used for additional development of the 3D printing system, sensor fabrication, validation, and integration into the prototype, prototype testing, and the development of a Demo Kit.

The team finds the proposal is well thought-out and constitutes the next step in developing a marketable product.

The proposal addresses all of the criteria for Phase 1 TVSF and is recommended for funding.

Concerns which were not sufficient to preclude funding relate to Plan, Path, and Budget. The Plan remains aggressive, but should be accomplishable. The Path should have included customer perspective from Advanced Arm Dynamics, an Ohio-based market leader in the targeted high-end segment. The Budget's source and size of matching funds is ambiguous. Note: the students listed on the team cannot be financially supported with budgeted funding. Applicant must coordinate with Development to ensure compliance with all RFP budgetary constraints.

<b>Proposal 15-786</b>	<b>University Of Akron</b>	Solution-Processed Ultrasensitive Infrared Polymer Photodetectors
<b>Amount Requested:</b> <b>\$50,000</b>	<b>Recommended:</b> <b>\$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>15-201</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-786	University of Akron	Solution-Processed Ultrasensitive Infrared Polymer Photodetectors	Yellow	Yellow	Green	Yellow	Green	Green	Green	Red

**Rationale:** This proposal is a resubmission of 15-201 which was not recommended for funding due to concerns regarding Project Plan. This proposal does address the previous concerns of the reviewers. However, the revision generated additional complications.

Applicant proposes further development of photodetectors in the ultraviolet thru infrared spectrum that can operate at room temperature, and are thus lower cost. They are further capable of use in flexible sensing applications.

This breakthrough technology would utilize a single room temperature full spectrum flexible detector to replace current technology that requires multiple sensors with narrow bandwidth and additionally need ultra-low temperature environments to function properly.

Proposed funding would be used for the scale up in size to 4"x4" on rigid glass, and fabrication of samples on flexible transparent substrates. The plan proposed is to accomplish these goals and then demonstrate their use on state of the art electronic devices. Roll to Roll fabrication was dropped from this version.

The review team found significant concern related to Budget. The revised proposal indicated a reduction in the number of Proof Points without a corresponding adjustment to the Budget. While the removal of the roll to roll fabrication improved the plan by making the work more achievable within a one-year time period, the remaining tasks in the plan are mostly the same while the requested budget was not reduced.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to Proof, Plan, and Path to Market. The roll to roll proof point was removed without an explanation as to the potential impact to the project endpoints, leaving the review team uncertain as to whether it was unnecessary to begin with, or whether its omission will create issues in subsequent spin-out of the technology. The Plan lacks details. It remains unclear how the proposal would translate into a marketing or business strategy.

**Recommendations for Improvement:** Should University of Akron choose to reapply for TVSF funding, the proposal modifications will need to be enumerated and the Budget adjusted and justified accordingly. Simply cutting parts of the proposal without explanation or modification to the remaining parts of the proposal is not sufficient.

<b>Proposal 15-787</b>	<b>University Of Akron</b>	A Smartphone-based Dual-modality Micro-endoscope for Cancer Diagnosis
<b>Amount Requested:</b> \$50,000	<b>Recommended:</b> \$0	
<b>Prior Phase 1 Application(s):</b>	N/A	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-787	University of Akron	A Smartphone-based Dual-modality Microendoscope for Cancer Diagnosis								

**Rationale:** Applicant proposes further development of a colposcope (an endoscope designed for visualizing internal parts of the vagina) attached to a smartphone. The device is envisioned as a way for healthcare workers in low-income countries to examine women for signs of cervical cancer while having the diagnostic services of trained physicians in a remote location.

The proposed device is intended to be utilized in telemedicine – medical care from a distance – which has been and is being tried with mixed success in many areas of the world. The applicants propose a demonstration project in a low-income, lightly regulated country. They expect to utilize CerviCusco in Peru for the independent third-party validation of their development.

Proposed funding would be used for development of miniaturized individual components, fabrication of an attachment mechanism, development of the smartphone application, and testing of the combined device on ten patients.

The review team found significant concern related to Proof and Path. Regarding Proof, the technology remains too nascent for the TVSF program. Neither the miniaturized components nor the combined device yet exist. Proof milestones are considered basic research by the review team. For example, proof of concept using smartphone cameras with laser diode light sources is yet to be established. Similarly, the attachment to contain the imaging optics has yet to be designed. The Path to Market is more analogous to a non-profit organization than to commercialization of the technology. The proposal lacks a business model to monetize the hardware and/ or service.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to Plan, IP, Market Opportunity, and Budget. The Plan is flawed in that development time for miniaturization of the components is unknown. IP has not been filed in the target markets. Market Opportunity has been severely limited by constriction to 3<sup>rd</sup> World markets. Applicant will need to justify Use of Funds to Development for a 3D printer purchase when the institution has significant existing 3D capabilities.

**Recommendations for Improvement:** Should University of Akron choose to reapply for TVSF funding, the proposal must have executed the clear proof of concept, and then identify the additional Proof needed for commercial licensure, with particular attention to monetizing the technology in the marketplace.

<b>Proposal 15-788</b>	<b>University Hospitals Cleveland Medical Center</b>	Endo-Sleeve- Accessory Medical Device Introduction Apparatus for Endoscopes
<b>Amount Requested: \$40,000</b>	<b>Recommended: \$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-788	University Hospitals Cleveland Medical Center	EndoSleeve- Accessory Medical Device Introduction Apparatus for Endoscopes								

**Rationale:** Applicant proposes further development of Endo-sleeve, an accessory for endoscopes that facilitates their placement and use.

This proposal is focused on one particular type of endoscope, the flexible cystoscope, referring to the bladder, though the applicants note that, having been developed for this application, the Endosleeve can be used for other kinds of endoscopes. The Endosleeve is to be a multichannel, expandable tube made of a not yet identified biocompatible material, which can be placed in the urethra to facilitate access to the bladder. The value proposition or competitive advantages of the device have not been defined.

The project described in the proposal simply presumes the attractiveness of Endosleeve for urologists and focuses on selecting a suitable material, followed by benchtop testing and animal testing to improve its characteristics in some unspecified ways, leading to a final design. The project will be carried out by an industrial design firm in Cleveland called Movement, which is presented as an independent third-party reviewer, even though the company would be the final recipient of the TVSF funding.

Proposed funding would be used for material selection, proof of concept prototype, prototype construction, and design iterations.

The review team found significant concern related to Proof, 3<sup>rd</sup> Party, Path, and Market Opportunity. Regarding Proof, the technology remains too nascent for the TVSF program, as the design appears to be largely conceptual with no proof-of-concept work performed. Therefore, proof milestones are considered basic research by the review team and the proof points are not compelling as material identification and safety testing should not present significant hurdles. The 3<sup>rd</sup> Party is not independent. The Path to Market is not defined in any detail. Market Opportunity is significantly hampered by copious existing competition, without a delineated differentiator. Flexible cystoscopes are regularly used with local anesthesia only, and lubricious sheaths exist

which are commonly used to simplify sterilization procedures and mitigate discomfort. With the information provided the review team is unable to determine the competitive advantages of the proposed technology.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to Start-Up. There is a reasonable likelihood of the technology being licensed, reducing the impetus for an Ohio Start-Up.

**Recommendations for Improvement:** Should University Hospitals choose to reapply for TVSF funding, the proposal must have executed the clear proof of concept, and then identify the additional Proof needed for commercial licensure. The value proposition and competitive differentiators must be defined. 3<sup>rd</sup> Party independence should be improved.

<b>Proposal 15-789</b>	<b>University of Toledo</b>	Organic Substrates Having Improved Weatherability and Mar Resistance
<b>Amount Requested:</b> \$50,000	<b>Recommended:</b> \$0	
<b>Prior Phase 1 Application(s):</b>	N/A	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-789	University of Toledo	Organic Substrates Having Improved Weatherability and Mar Resistance								

**Rationale:** Applicant proposes further development of scratch and UV resistant coatings for automobile plastics. Method optimization for technologies commonly used in electronic/semiconductor industries will be utilized. The goal is to replace the lacquering methods currently in practice.

UV protection is provided by infusing a UV absorbing molecule into the polymer substrate. The high density of the UV absorbing molecules at the surface prevents the UV light from denaturing the polymer substrate. The high density of infused molecules at the surface also acts as anchor points for a hard coat deposited through the vapor phase. The increased number of anchor points enhances adhesion of the hard coat to the surface, preventing scratching.

Proposed funding would be used for proof of concept and production methodology development.

The review team found significant concern related to Proof, Plan, and Path to Market. Regarding Proof, the technology remains too nascent for the TVSF program, and Proof milestones are

considered basic research by the review team. Most proof points appear open-ended explorations for deposition techniques, plasma gas composition, and procedure development, among others. The review team also considers the Plan too aggressive to accomplish in one year with the proposed resources, given the number of variables to be investigated and controlled. The Path to Market is not defined and appears to rely heavily on a small company with little information in the public domain to confirm competency and performance. This is further complicated by the need for a \$5MM investment to address \$50MM market.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to Market Opportunity and Budget. Market Opportunity is hampered by a low cost part offered in a relatively small initial market. The Budget lacks details to tie it back to the work plan and explain what will be purchased and why.

**Recommendations for Improvement:** Should University of Toledo choose to reapply for TVSF funding, the proposal must have executed the clear proof of concept, refine the proof points and then identify the additional Proof needed for commercial licensure. The Plan needs to be commensurate with the timeline and resources available to the project. Finally, the commercial Path to Market needs to be identified and the potential partner credentialed.

<b>Proposal 15-790</b>	<b>University of Toledo</b>	Validation of Earth-abundant and copper-free back contact for CdS/CdTe solar cell
<b>Amount Requested: \$50,000</b>	<b>Recommended: \$0</b>	
<b>Prior Phase 1 Application(s):</b>	<b>15-204</b>	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-790	University of Toledo	Validation of Earth-abundant and copper-free back contact for CdS/CdTe solar cel	Yellow	Green	Red	Green	Green	Red	Green	Red

**Rationale:** This proposal is a resubmission of 15-204 which was not recommended for funding due to concerns regarding Ohio Start-Up. This proposal does not fully address the previous concerns of the reviewers. The revision has generated additional impediments.

Applicant proposes to replace copper-based back contacts for solar cells with nano-crystalline iron sulfide (NC-FeS2).

The objective is to improve the long term stability of the CdTe and CdS based solar cells. The team has considerable experience in solar cell technology and the proposed research is innovative. If successful, it would lead to licensing agreement with existing CdTe based solar cell manufacturer(s).

Current technology utilizes Copper (Cu) in the back layer. This material degrades over time, leading to a 20% reduction in cell output. The proposed technology eliminates that degradation at a competitive manufacturing cost point. This improvement allows for a 12% reduction in the amortized cost of PV generated electricity.

Proposed funding would be used to synthesize smaller size NC-FeS<sub>2</sub> materials and develop processing technology for its deposition on CdTe back plane. The team finds the technology compelling and the proposed studies are well focused with clear endpoints defined.

The review team found significant concern related to 3<sup>rd</sup> Party, Start-Up and Budget. The 3<sup>rd</sup> Party is not independent as it is the intended Licensee. This proposal appears to have limited impact in Ohio, as the targeted licensee partner has a minimal presence in Ohio and only a passing reference to additional staff to be hired is made. As such, it does not appear to be a good return on investment for the State of Ohio. The revised proposal included large changes to the Budget without explanation, including significant increases in supplies and equipment. Since the two items combined are nearly 50% of the requested budget, a narrative is needed.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to Proof. The review team has concerns that for Proof step B to C, a 100X size fabrication increase may prove difficult to accomplish.

**Recommendations for Improvement:** Should University of Toledo choose to reapply for TVSF funding, an independent 3<sup>rd</sup> Party should be chosen to ensure objectivity in assessment of the results. The applicant must better help the review team understand the return on investment for the State of Ohio. Finally, the significant Budgetary changes must be enumerated.

<b>Proposal 15-791</b>	<b>University of Toledo</b>	Additively manufactured patient specific implants
<b>Amount Requested:</b> \$50,000	<b>Recommended:</b> \$50,000	
<b>Prior Phase 1 Application(s):</b>	15-205	

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof to be Licensed	Project Plan / Team	3rd Party Review	Reasonable Path to Mkt	IP Protection	Start-up in Ohio	Market Opportunity / Size	Budget Narrative / Use of Funds
15-791	University of Toledo	Additively manufactured patient specific implants								

**Rationale:** This proposal is a resubmission of 15-205 which was not recommended for funding due to concerns regarding Ohio Start-Up. This proposal does adequately address the previous concerns of the reviewers.

Applicant proposes development of a new type of bone fixation prosthesis made from nitinol instead of the conventional alloy of titanium with small admixtures of aluminum and vanadium. Nitinol, an alloy of approximately equal parts of nickel and titanium, has several properties that make it especially suitable for this application: it can be adapted for additive manufacturing (3D printing); and by creating porosity in its manufacture, its stiffness can be made comparable to that of bone.

Existing prostheses for bone fixation generate long term stresses due to the material stiffness differential, which can lead to hardware failure and the need for surgical removal. The applicants have developed patient specific prosthesis manufacturing. Utilizing CT data, which provides layer by layer outlines of the bone requiring fixation, the applicants have developed a method of 3D printing using nitinol powder, which is then sintered, following the contours provided by CT data. They configure prosthesis porosity to match bone stiffness, thus avoiding the problem of future hardware failure.

Proposed funding would be used for the manufacture and testing of a number of fixation devices, validating their performance, to serve as the basis for a submission to the FDA for a 510(k) approval. Their ultimate goal, assuming that the validation results are favorable, is to found an Ohio Start-Up to be called Morphologics, LLC.

The team finds the proposal is well thought-out and constitutes the next step in developing a marketable product.

The proposal addresses all of the criteria for Phase 1 TVSF and is recommended for funding.

A concern which was not sufficient to preclude funding relates to Team as it lacks a dedicated software expert.

## PROPOSAL RECOMMENDATIONS - PHASE 2 SUMMARY MATRIX

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-792	University of Toledo	Gen3Bio, Inc.	Low Cost Efficient Extraction of Microalgae by Enzymolysis	Red	Green	Green	Red	Red	Yellow	Yellow	Yellow	Yellow
15-793	Ohio State University	GTM Network, LLC	Educator Community Network	Withdrawn by Applicant								
15-794	Ohio State University	MatchTx, LLC	MatchTx: Cancer Treatment Matching Software for Clinical Trials and Research	Green	Green	Red	Red	Red	Green	Green	Green	Green
15-795	Ohio State University	Nikola Labs	Wireless Mobile Device RF Harvesting Products	Green	Green	Green	Yellow	Green	Green	Green	Green	Green
15-796	Cleveland Clinic Foundation	Infuseon Therapeutics Inc	Multiport Catheter	Green	Yellow	Red	Red	Green	Green	Green	Red	Green
15-797	Research Institute at Nationwide Children's Hospital	GenomeNext LLC	GenomeNext: Cloud Genomic Analysis Solution	Yellow	Red	Green	Green	Green	Green	Green	Yellow	Green
15-798	University of Toledo	Thermomorph LLC	QuickFlow PE	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green
15-799	Ohio State University	Creatively Aive, LLC	MassMatrix	Red	Red	Red	Red	Red	Yellow	Green	Green	Green

*DEFINITION OF COLUMNS<sup>1</sup>:*

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/ Likelihood to Raise Additional Funds – The proposed proof needed to raise additional funds for commercialization is meaningful to investors and is expected to materialize.

Project Plan / Budget Narrative (Use of Funds) – Proposed proof needed to move the technology forward can be generated during the one year project period with the proposed resources and description of how the entity proposes to use the funding if received

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/ License with Ohio Institution – Degree to which the intellectual property is protected relative to both the technology and the proposed business model and the applicant will execute a license with the Ohio institution within nine months of the date of the submission.

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

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

ESP Interaction - Degree to which the applicant has partnered with local ESP to ensure robustness of business model and obtained objective input on project activities.

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<sup>1</sup> Note: Some columns with related focus have been merged for clarity of the graphic. ESP Interaction has also been added to the RFP criteria.

*DETAILS OF PHASE 2 RECOMMENDATIONS*

<b>Proposal 15-792</b>	<b>Gen3Bio, Inc.</b>	Low Cost Efficient Extraction of Microalgae by Enzymolysis	
<b>Amount Requested:</b> <b>\$100,000</b>	<b>Recommended:</b> <b>\$0</b>		
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	<b>Prior Phase 2 Application(s):</b>	<b>N/A</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity /Mkt. Size	Start-up in Ohio	ESP Interaction
15-792	University of Toledo	Gen3Bio, Inc.	Low Cost Efficient Extraction of Microalgae by Enzymolysis									

**Rationale:** Applicant proposes further development of an enzymatic process for commercially viable products from algal biomass.

Scale-up and cost analysis of the digestion, extraction, separation and purification of algal biomass products utilizing a "one-pot" conversion and extraction method is proffered. The end products from the algal biomass include small proteins and amino acids from protein fractions; succinic acid from carbohydrate fractions; and methylated fatty acids and glycerin for biodiesel from the lipid fractions. The benefits of the proposed process would include elimination of additional solvents for extraction, reduced energy costs, reduction of unit operations and reduction of process volumes by processing high biomass concentrations.

Proposed funding would be used for pilot production and analysis of the above products to obtain commercial feasibility cost information.

The review team found significant concern regarding Proof, Business Model, and Company Backing. Proof lacks quantifiable outcomes that would inspire additional business investment. The Business Model lacks financial enumeration of basic business metrics like costs and pricing. This is even more poignant due to the fact that the previous licensee of this technology went bankrupt. Indeed the algal sector as a whole continues to have strong competition from low cost petroleum and the proposal lacks firm comparables. SEC filings show that Company Backing has been minimal, and from non-commercial sources.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to IP, Market Opportunity, Start-Up and ESP. The IP listed is the same referenced in 14-505/ 15-203 "Meso-scale validation of bio-sourced industrial nylon precursor production" from the University of Toledo. The review team has concerns that multiple applications with the same IP could mature to separate Start-Ups and create licensure issues. Market Opportunity is confounded by copious extant competition and the well-publicized economic challenges the algae industry has faced despite

high levels of investment. Start-Up stability within Ohio is uncertain given the lack of an algal ecosystem within the state. This is manifested by the fact that pilot-scale production would take place in Indiana, despite applicant efforts to identify a suitable pilot facility within Ohio. Bidirectional ESP interaction was minimal evidenced by the Business Model deficiencies and further evidenced by the statement that the applicant would “keep them informed” of progress.

**Recommendations for Improvement:** Should Gen3Bio choose to reapply for TVSF funding, the applicants need to provide business related measurable objectives that will drive investment in the technology. The applicants must also provide a fully developed Business Model that shows the viability of the technology to support an ongoing concern, notwithstanding competitive forces. Additional engagement of the ESP would be expected for this objective. External commercial or institutional support for the technology needs to be demonstrated. Finally, a robust narrative is needed for assurance of Ohio Start-Up durability.

<b>Proposal 15-793</b>	<b>GTM Network, LLC</b>	Educator Community Network	
<b>Amount Requested:</b> <b>\$100,000</b>	<b>Recommended:</b> <b>\$0</b>		
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	<b>Prior Phase 2 Application(s):</b>	<b>N/A</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-793	Ohio State University	GTM Network, LLC	Educator Community Network	Withdrawn by Applicant								

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

<b>Proposal 15-794</b>	<b>MatchTx, LLC</b>	MatchTx: Cancer Treatment Matching Software for Clinical Trials and Research	
<b>Amount Requested:</b> <b>\$125,000</b>	<b>Recommended:</b> <b>\$0</b>		
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	<b>Prior Phase 2 Application(s):</b>	<b>N/A</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-794	Ohio State University	MatchTx, LLC	MatchTx: Cancer Treatment Matching Software for Clinical Trials and Research									

**Rationale:** Applicant proposes further development of algorithms for analyzing the genetic profiles of clinical trial subjects, with the aim of identifying those subjects who are unlikely to show a positive response to the drug tested, and potentially, to select the best cancer drug for treating an individual cancer patient.

The specific mutations driving cancer vary depending on location in the body and can vary between patients with the same type of cancer. The technology combines genomic data and clinical outcome data in a single platform to match each individual patient to the best treatment using classification algorithms and a reference data set of genomic and outcome data. The service returns to the customer the best drug treatment match(es) inferred for each patient based on personalized genetic and clinical data as matched to the set of previous patients and their genetic and clinical profiles, treatments, and actual outcomes. Using genomic, clinicopathologic, and therapeutic data, including outcomes, the algorithm matches (classifies) new patients to previous patients that were treated effectively.

Proposed funding would be used for technology migration, software development and system validation.

The review team found significant concern regarding Team, Business Model, and Company Backing. The Team lacks a full time member with sufficient business acumen. Because the technology will be used for clinical trial patient selection, the review team finds that the Business Model has an unknown regulatory risk with respect to the need for an Investigational Device Exemption, as an external regulatory opinion has not been obtained. Company Backing beyond the university has not been identified.

This proposal is not recommended for funding.

**Recommendations for Improvement:** Should MatchTx choose to reapply for TVSF funding, the applicants need to provide sufficient business expertise for ongoing operational support. The applicants also need to obtain an independent qualified opinion of the regulatory requirements. Finally, external commercial or institutional support for the technology needs to be demonstrated. To that end, the applicant needs to demonstrate potential investors' perceptions of this technology, as well as what proof points from the proposal's objectives they would expect to see before committing funds.

<b>Proposal 15-795</b>	<b>Nikola Labs</b>	Wireless Mobile Device RF Harvesting Products	
<b>Amount Requested:</b> <b>\$100,000</b>	<b>Recommended:</b> <b>\$100,000</b>		
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	<b>Prior Phase 2 Application(s):</b>	<b>15-209</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-795	Ohio State University	Nikola Labs	Wireless Mobile Device RF Harvesting Products									

**Rationale:** This proposal is a resubmission of 15-209 which was not recommended for funding due to concerns regarding Plan, Business Model, and Budget. This proposal does adequately address the previous concerns of the reviewers.

Applicant proposes further development of a device that acts as both a protective mobile phone case and harvests energy from both radio frequency (RF) signals which originate from the cell phone and Wi-Fi signals from the environment.

Much of the transmitted electromagnetic energy remains unused for communications. For example the applicants state that 90% of the phone RF is “wasted” energy. This technology allows for closed-loop energy harvesting, extending the life of a smart phone battery by about 25% from RF alone. It would also allow continuous use in an environment that supplies sufficient ambient Wi-Fi signals.

Proposed funding would be used to accelerate the business development of the applicant to capitalize on significant recent momentum within the marketplace and allow additional product introduction for critical year-end market demand for consumer electronics accessories.

The review team found a refined proposal, company progress, and a rising momentum of market interest. The technology is compelling and Team qualified and enthusiastic. Further, the applicant has made significant efforts to pull the supply chain entirely into Ohio.

The proposal addresses all of the criteria for Phase 2 TVSF, and is recommended for funding. To capitalize on market momentum, the review team believes this is specifically the opportune time to promote the RFP Phase 2 stated objective to “accelerate the time to market of this technology.”

Concerns which were not sufficient to preclude funding relate to Business Model. The consumer electronics accessories market is fast paced with ever evolving hardware models. This creates tight timelines for accessory producers. In addition, to address this market, the applicant is taking a novel approach to direct sales and marketing through social media leveraging and crowdfunding campaigns. This may be the best path for high-tech early adopters of this technology, but it also presents a risk of lower than expected outcomes.

<b>Proposal 15-796</b>	<b>Infuseon Therapeutics Inc.</b>	Multiport Catheter
<b>Amount Requested:</b>	<b>Recommended:</b>	

<b>\$150,000</b>	<b>\$0</b>		
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	<b>Prior Phase 2 Application(s):</b>	<b>N/A</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-796	Cleveland Clinic Foundation	Infuseon Therapeutics Inc	Multiport Catheter	Green	Yellow	Red	Red	Green	Green	Green	Red	Green

**Rationale:** Applicant proposes development of a special catheter for convection-enhanced delivery (CED) of therapeutic drugs to brain tumors.

Although the circulatory system flows throughout the brain supplying oxygen to power neural activity, the blood itself is kept entirely separate from the neural structures by the blood-brain barrier. This anatomical fact creates a problem for delivering a therapeutic drug to a tumor in the brain because the barrier also stops the drug molecules.

Various methods have been tried, and most have been found wanting, but a special catheter, called the Cleveland multiport catheter (CMC), has been found effective for delivering therapeutic drugs to brain tumors. Details of the catheter design are Trade Secret until patent issuance. By itself the CMC is not a therapeutic device, but the CMC filled with a drug is. The company has a wide choice of pharmaceuticals to choose from, and for the sake of illustration chooses the generic drug Topotecan, which can be used to treat glioblastoma multiforme (GBM), one kind of brain tumor. Competitive products cost \$25,000 per treatment, suggesting that the combined device has significant commercial potential. The platform technology may be used for multiple drug combinations and for numerous cancer types beyond the brain.

Funding would be used for device refinement, 510K application, and business development.

The review team found significant concern regarding Team, Business Model, and Start-Up. The Team is comprised of the inventor and part-time resources contributed by Cleveland Clinic Innovations. The Business Model in the proposal is unconvincing and the Team was unable to articulate basic business factors such as projected revenue or costs in the interview. The fundamental purpose of the Start-Up is uncertain. It is not clear what the company is or will become, beyond a serial royalty generator, and the applicants apparently intend to create additional start-up companies to commercialize drug-device combination products. Reference to new device development was also made, but without a good understanding of the business model it is impossible to determine whether the resources will be available to create new platform technologies.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to Budget. Without a purposeful Business Model, use of funds for business development is premature.

**Recommendations for Improvement:** Should Infuseon choose to reapply for TVSF funding, The Team should be fully developed and described such that the entity can remain an ongoing viable concern. A robust Business Model must be developed and enumerated for evaluation by the review team. Finally organizational intent must emerge as an artifact of the Business Model.

<b>Proposal 15-797</b>	<b>GenomeNext LLC</b>	GenomeNext: Cloud Genomic Analysis Solution	
<b>Amount Requested:</b> <b>\$150,000</b>	<b>Recommended:</b> <b>\$0</b>		
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	<b>Prior Phase 2 Application(s):</b>	<b>14-435</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-797	Research Institute at Nationwide Children's Hospital	GenomeNext LLC	GenomeNext: Cloud Genomic Analysis Solution	Yellow	Red	Green	Green	Green	Green	Green	Yellow	Green

**Rationale:** This proposal is a resubmission of 14-435 which was not recommended for funding due to concerns regarding Proof, Plan, Additional Funds, Team, Business Model, Company Backing, Market Opportunity, and Budget. This proposal does not adequately address the previous concerns of the reviewers.

The applicants propose to take the Churchill genetic analysis software, developed at the Nationwide Children’s Hospital Research Institute in Columbus, and use it as the basis for a cloud software offering. The business would offer storage of genetic data as well as analysis. The applicants claim Churchill provides results that are identical in quality to the much slower (2 weeks vs. 2 hours) gold standard bioinformatics approach, achieving the clinical gold standard of 100% reproducibility.

Proposed funding would be used for genomics at NCH, and further software development.

The review team found significant concern with the application with respect to Budget. Per the applicant’s interview, 60-70% of the Budget would be spent for work by distinctive talent at Nationwide Children’s Hospital, including the inventor. NCH is the technology licensor, is a customer of the applicant, and would be the recipient of Sponsored Research in this proposal. In addition to the troubling circular nature of this financial arrangement, Sponsored Research is not permitted by the terms of the TVSF RFP.

This proposal is not recommended for funding.

Concerns which were not sufficient to preclude funding relate to Additional Funds and Start-Up. Although there has been significant funding to date, and a commitment by the founders to self-fund if necessary, there remains a significant \$1.2MM gap to close this year. Although strong relationships have been formed in Ohio, Start-Up concerns result from the fact that the three principals of the company are based in Maryland.

**Recommendations for Improvement:** Should GenomeNext choose to reapply for TVSF funding, the proposal must fund objectives that meet the RFP criteria.

<b>Proposal 15-798</b>	<b>Thermomorph LLC</b>	Quick Flow PE	
<b>Amount Requested:</b> <b>\$150,000</b>	<b>Recommended:</b> <b>\$150,000</b>		
<b>Prior Phase 1 Application(s):</b>	<b>13-002</b>	<b>Prior Phase 2 Application(s):</b>	<b>15-211</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-798	University of Toledo	Thermomorph LLC	QuickFlow PE									

**Rationale:** This proposal is a resubmission of 15-211 which was not recommended for funding due to concerns regarding Team and Company Backing. This proposal does adequately address the previous concerns of the reviewers. Further, this application is an extension of the concept developed earlier in an approved Phase 1 proposal (13-002) for a device utilized to extract a clot (thrombus) from an artery or vein.

Applicant proposes further development and testing of a device for extracting a clot (thrombus) from a blood vessel using a mechanical catheter-deployed nitinol basket device that arrays like opposing mesh umbrellas within the vasculature and encloses around the offending object for removal.

The device is less invasive than competitive devices and has shown superior results for: clot capture and removal, and the reduction in the escape or shearing of small debris from the clot into the bloodstream, thus preventing blockages and the resultant complications further downstream. It also does not require thrombolytic drugs or ICU care for indwelling catheters, thus reducing costs significantly.

Proposed funding would be used to manufacture 40 prototypes, perform two phases of animal studies, and prepare the 510K documentation.

The proposal addresses all of the criteria for Phase 2 TVSF, and is recommended for funding.

Concerns which were not sufficient to preclude funding relate to Additional Funds, and Team. \$5MM in Additional Funding is needed to bring the technology to market. Although discussions have occurred with potential sources, no firm commitments have been made for said capital. The current Team is not full time, however they have plans to hire a permanent CEO when funding permits.

<b>Proposal 15-799</b>	<b>Creatively Alive, LLC</b>	MassMatrix	
<b>Amount Requested:</b> <b>\$150,000</b>	<b>Recommended:</b> <b>\$0</b>		
<b>Prior Phase 1 Application(s):</b>	<b>N/A</b>	<b>Prior Phase 2 Application(s):</b>	<b>N/A</b>

PROPOSAL #	Licensing Institution	Lead Applicant	PROJECT TITLE	Proof/Addtl Funds	Project Plan/Budget	Team	Business Model	Company Backing	IP Protection/License	Opportunity / Mkt. Size	Start-up in Ohio	ESP Interaction
15-799	Ohio State University	Creatively Alive, LLC	MassMatrix									

**Rationale:** Applicant proposes development of a commercial version of MassMatrix (MM), their freeware program for analyzing data from mass spectrometry of protein samples.

Proteomics, following and building upon genomics, is the next step in our understanding of biological systems and the hot personalized medicine field focused on identifying biomarkers for specific diseases. The technology provides an innovative data analysis solution that leverages multiple algorithms to improve the identification of true positive protein matches so that users have 20%-30% fewer false positives than competitors. The improved scoring algorithms save users months or years of time not chasing false targets, resulting in thousands of dollars saved on labor and material needed to disqualify each erroneous result. In the therapeutics space, two large commercial users of the freeware have suggested joint development arrangements with the applicant. This opportunity would provide financial support for the commercial development, but could result in a feature set that does not have broader market appeal.

Proposed Funding would be used for development of two incremental versions of the software, product branding, sales, and marketing.

The review team found significant concern with the application with respect to Proof, Budget, Team, Business Model, and Company Backing. The technology remains too nascent for the TVSF program, since the feature set has yet to be determined from a forthcoming survey of potential customers. Without an understanding of the basic features to develop, Budgeted objectives are premature. The Team is too lean at 1 ½ people to actualize a \$1.5MM company which will require significant support resources for new clients. The applicants must more effectively

enumerate why the per-client CPU/license assumptions and client revenue projections are suitable for the Business Model. Company Backing beyond the university was not identified.

This proposal is not recommended for funding.

Concern which was not sufficient to preclude funding relates to IP Protection, as Copyrights provide minimal protection.

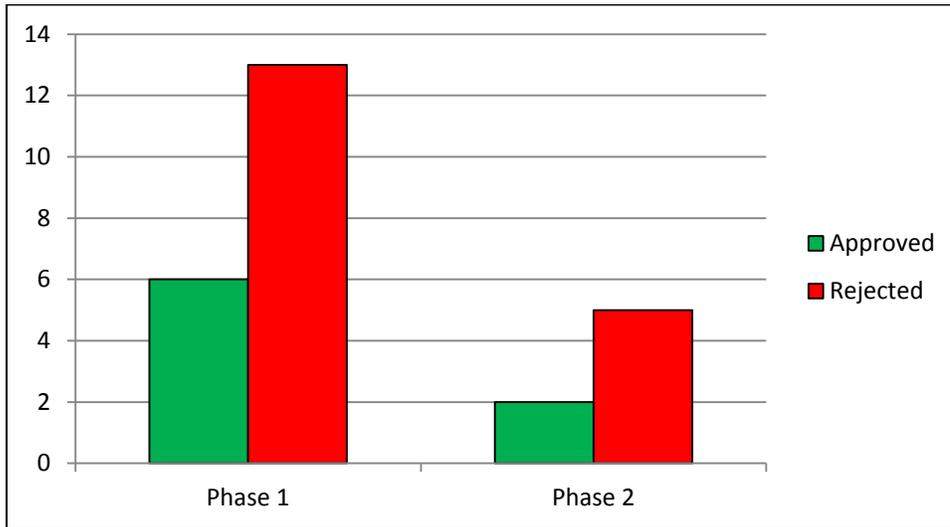
**Recommendations for Improvement:** Should Creatively Alive choose to reapply for TVSF funding, the feature set must be determined and the Proof objectives and subsequent budgeted activities derived therefrom. The Team should be fully developed and described such that the entity can remain an ongoing viable concern. A robust Business Model must be developed and enumerated for evaluation by the review team. Finally, external commercial or institutional support for the technology needs to be demonstrated.

## FINAL SUMMARY

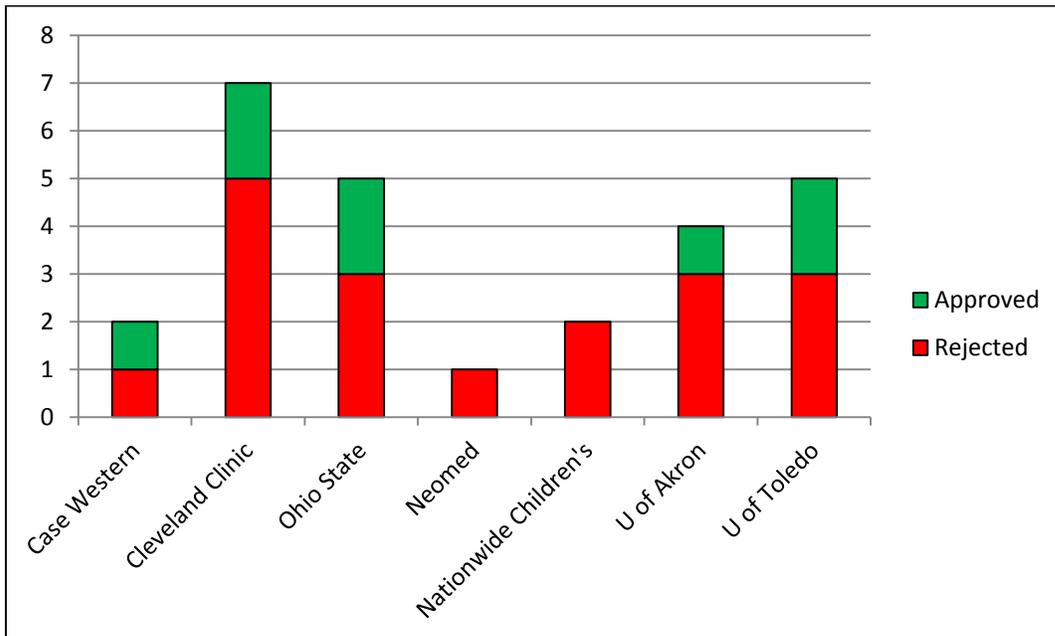
The Review Team is recommending 8 of the 26 finalized proposals (31%). The previous low was 30% in Round 4, and the high was 57% for Round 7. For this current round, 6 of the 19 Phase 1 proposals are recommended for funding (32%). For Phase 2, 2 of the 7 submitted proposals are recommended for funding (29%). With the Ohio Third Frontier accepting proposals on an approximate quarterly basis, the Review Team expects that many of the proposals will be revised to address the concerns of the review team.

For both Phase 1 and Phase 2, proposals 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 CHART*



*COMBINED APPROVED/REJECTED CHART BY INSTITUTION*



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 contractors 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

**Shankar Rananavare (Advanced Materials)**

**Summary:**

A physical chemist, having extensive experience consulting in a wide range of subjects, including development of nano-sensors, nano-materials for nano-electronics, development and optimization of chemical formulations for agricultural, chemical, semiconductor and oil industries. Has also consulted extensively in modern high tech areas involving photo-lithography, resolving IP disputes among government and private sectors. Published over 50 peer reviewed papers and presented over 50 conferences at national and international level.

**Core Competencies:**

Chemical formulations, lipids, surfactants etc.  
Drug delivery vehicles: Micro-emulsions, emulsions and vesicles.  
Formulations for selective wet etching for semiconductor industry.  
Photoresist and photo-lithography and nano-patterning.  
Liquid crystals and flat panel displays.  
Analysis and technology assessment.  
Synthesis and characterization of nano-materials such as nano-particles, nano-wires, nano-tubes.

**Education:**

Ph.D., Physical Chemistry, University of Missouri-St. Louis, MO  
B.S. Chemistry & Physics, Bombay 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 in the proposal's specific technical area.

**YourEncore Expert – Gregory L Workman II**

Greg has a Master of Business Administration (MBA), BS Chemistry (ACS), is a Six Sigma Master Black Belt, and Certified Quality Manager, he has 25 years of industrial experience in Food/Pharma, Chemical Manufacturing, Electronics, Logistics, and Construction Services. Included in this experience are extensive Project Management and Business Process Design. He currently leverages this experience as a YourEncore expert to Create Business Processes and Implement Process Improvements to existing methodologies for firms of all sizes (Startups to Fortune 500) in diverse industries (Food, Medical Devices, Packaging, Cosmetics, etc.)

He utilizes his Project Management skills to lead the TVSF review process; and Business Evaluation skills to review the individual proposals for merit.

***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:

	<b>Phase 1: Technology Validation</b>	<b>Phase 2: Startup Fund</b>
<b>Objective</b>	<i>Evaluate the commercial viability of protected technology developed by Ohio institutions of higher education</i>	<i>Determine whether a company has the resources, acumen, and market opportunity to successfully commercialize licensed IP</i>

Activities	<ol style="list-style-type: none"> <li>1. Assess protected technologies from higher education institutions</li> <li>2. Suggest technology development alterations to improve feasibility</li> <li>3. Provide funding recommendations</li> </ol>	<ol style="list-style-type: none"> <li>1. Assess companies' plan for commercializing licensed technologies</li> <li>2. Discuss improvement programs to unfunded Applicants</li> <li>3. Interview strong candidates</li> <li>4. Recommend funding candidates</li> </ol>
Assumptions	<ul style="list-style-type: none"> <li>▪ Submissions Per Year:                         <ul style="list-style-type: none"> <li>- 2012: 50-80</li> <li>- 2013: 100-160</li> </ul> </li> <li>▪ 6 Page Proposal Form</li> <li>▪ Proposal Size: \$50K</li> <li>▪ Available Funds: \$3M</li> </ul>	<ul style="list-style-type: none"> <li>▪ Submissions Per Year:                         <ul style="list-style-type: none"> <li>- 2012: 20-40</li> <li>- 2013: 40-80</li> </ul> </li> <li>▪ 6 Page Proposal Form</li> <li>▪ Proposal Size: \$100K</li> <li>▪ Available Funds: \$3M</li> </ul>

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

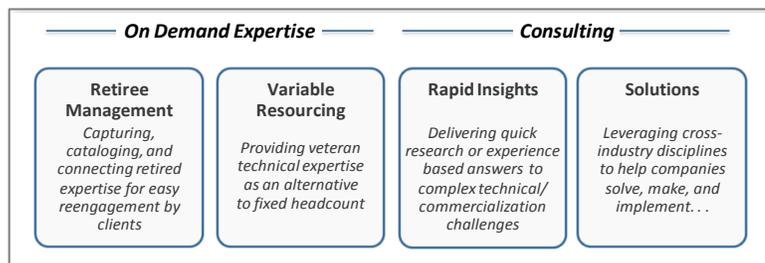
YourEncore understands the unique needs and challenges startups face since, 8 years ago, it was one. YourEncore was founded in 2003 by John Barnard of Barnard Associates. Barnard Associates is composed of a cross-functional team of highly experienced executive leaders, who advise start-ups on launching 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

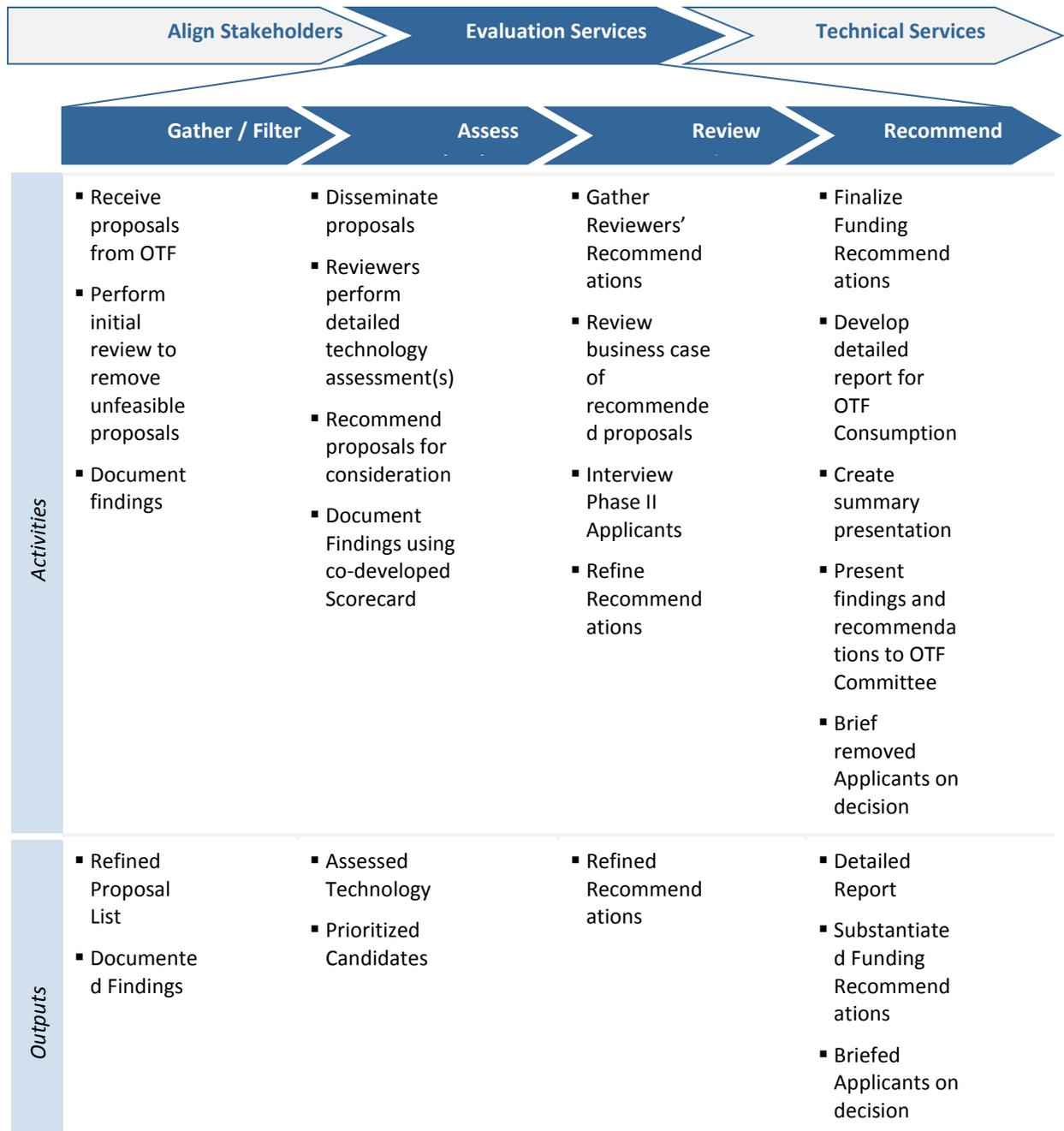
<b>1. Unparalleled Expertise</b>	<b>2. Recognized Leader</b>	<b>3. Flexible Resource Model</b>
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## APPENDIX D-EVALUATION PROCESS

### *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.



## Align Stakeholders

Shortly after selection, YourEncore held a half-day grounding session with YourEncore's stakeholders (i.e., Account Director, Project Manager, and 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:

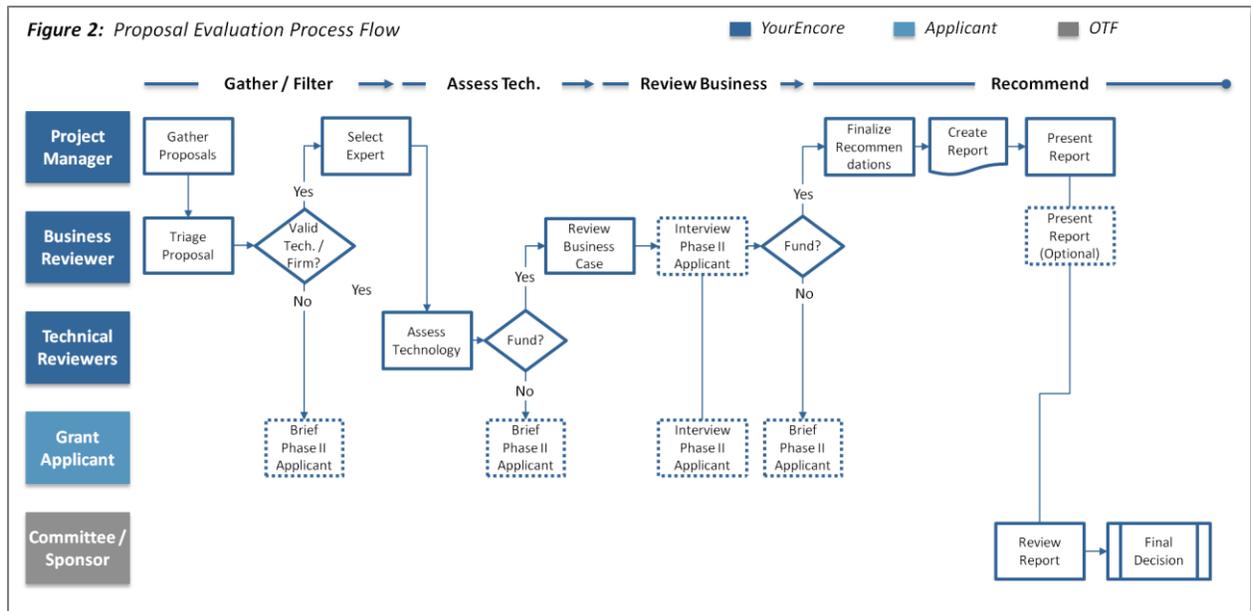
### **Key Evaluation Scorecard Components**

- *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 proposal 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.

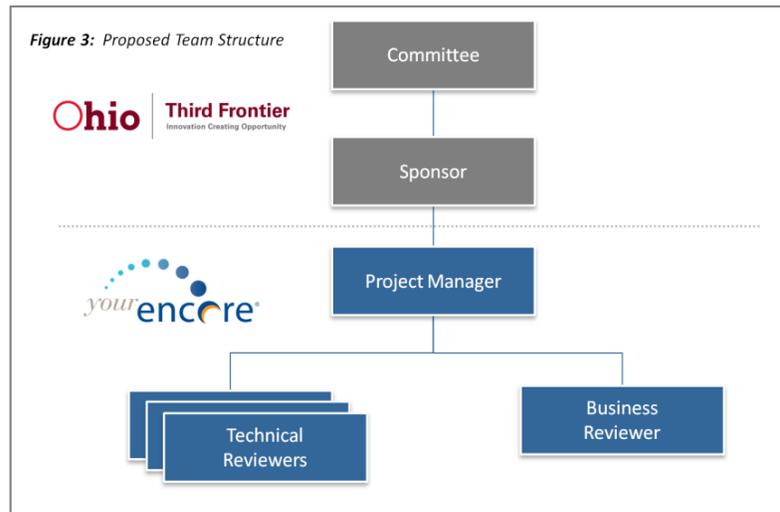
### BUSINESS REVIEWER

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.