Technology Validation and Start-Up Fund

Round 1 Submittal Evaluations

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Submitted To:

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Director, Ohio Department of Development

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1. Executive Summary

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

There were a total of 37 requests for funding submitted to OTF's Technology Validation and Start-Up Fund, 19 for Phase 1 and 18 for Phase 2. Of these, seven requests in Phase 1 and six in Phase 2 were recommended for funding to OTF by the expert review team. The review team was composed of subject matter experts in each field of technology, a business reviewer, and YourEncore senior managers. The review team evaluated each proposal based on the information submitted for review, and according to the criteria specified by OTF.

The proposals which received positive recommendations presented strong cases for the scientific merit of the technology as well as the business opportunity. While all proposals offered assessment of the business opportunity, the best proposals substantiated that assessment with objective market insights, meaningful input and guidance from existing or potential partners, and well-defined differentiation of the product under development relative to the competition. The better proposals also included reasonable and achievable development milestones which were nonetheless impactful and relevant to potential commercial partners.

Proposals that did not receive a positive recommendation had at least one 'fatal flaw' or one or more elements of the proposal that were sufficiently lacking to outweigh the positive merits of the proposal. The most common failing for both phases was articulation of the business opportunity. A number of proposals did not demonstrate a good understanding of unmet needs in their chosen market, provided poorly thought-out pricing/cost models (or none at all), or greatly underestimated the hurdles they would encounter as they move toward commercialization. The review team believes that the majority of the grant applicants could benefit from business mentoring prior to submitting their proposal. On the technical side, proposals generally did not fail because the technology itself was poorly conceived. Technical failings were generally related to overly ambitious project plans – development teams trying to accomplish more than is reasonable within the budget and timeline – or milestones that the review team felt would not generate sufficient proof to advance the technology.

The review team believes many of the proposals that did not receive positive recommendations can be easily improved, and to that end has provided individual recommendations for improvement for each of those proposals. The general themes addressed above and the specific feedback on each submission provided in this report should prove helpful for development teams looking to improve a future submission.

<u>The Phase 1 Proposals that are recommended for funding are:</u>

12-402: Development of Novel Tools for Health IT-GEINA (Case Western School of Medicine)

12-403: Controlled Cracking of ITO on Plastic Substrates (Kent State University)

12-404: iLidRX - Interoperating Medication Container for Mhealth Management of Chronic Illnesses (Kent State University)

12-410: Trajectory Tracking Flight Controller by Trajectory Linearization (Ohio University)

12-411: Polyisobutylene (PIB) Based Elastomeric Coating for wound healing and closure(University of Akron)

12-412: Shape Memory Alloy Thermal Energy Harvesting (University of Akron)

12-417: Plasmonic Based BioMarker Sensing Technology (University of Toledo)

The Phase 2 Proposals that are recommended for are:

12-421: Commercial Development of an OsteoporosisDiagnostic Device (University of Cincinnati / OsteoDynamics, Inc.)

12-426: Autoregulatory molecular therapy of obesity (Ohio State University / Obgenex, Inc.)

12-428: Commercialization of Enhanced Cathodes for Electrochemical Applications (Ohio State University / pH Matter, LLC)

12-433: Advanced Battery Management Algorithm Implementation for a Unified Energy Management System (University of Akron / Design Flux Technologies, LLC.)

12-435: SuperGraphSQL: A Unified SQL and Graph Analytic Engine for Massive Graph Analysis (Kent State University / GraphSQL LLC.)

12-437: Demonstration of Advanced Polymer Membranes for Algal Growth Enhancement (Ohio University / ECO2Capture of Ohio Inc.)

2. Overview Technology Validation and Start up Fund

Development's Purpose for Fund

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

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

OFT has divided the Fund into 2 distinct Phases:

	Phase 1: Technology Validation	**Phase 2: Startup Fund**
Objective	*Evaluate the commercial viability of protected technology developed by Ohio institutions of higher education*	*Determine whether a company has the resources, acumen, and market opportunity to successfully commercialize licensed IP*
Activities	1. Assess protected technologies from higher education institutions 2. Suggest technology development alterations to improve feasibility 3. Provide funding recommendations	1. Assess companies' plan for commercializing licensed technologies 2. Discuss improvement programs to unfunded Applicants 3. Interview strong candidates 4. Recommend funding candidates
Assumptions	▪ Submissions Per Year: - *2012: 50-80* - *2013: 100-160* ▪ 6 Page Grant Form ▪ Grant Size: $50K ▪ Available Funds: $3M	▪ Submissions Per Year: - *2012: 20-40* - *2013: 40-80* ▪ 6 Page Grant Form ▪ Grant Size: $100K ▪ Available Funds: $3M

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

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

3. 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.

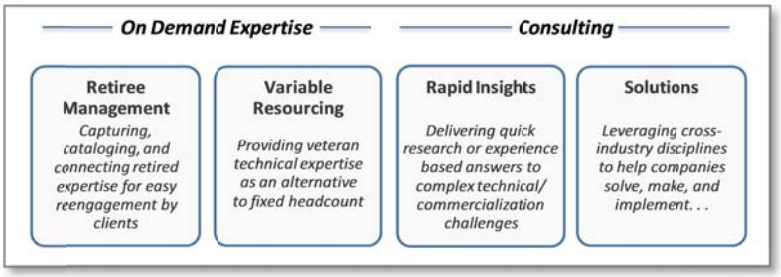
YourEncore understands the unique needs and challenges startups face since, 8 years ago, it was one. YourEncore was founded in 2003 by John Barnard of Barnard Associates. Barnard Associates is composed of a cross-functional team of highly experienced executive leaders, who advise start-ups on launching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

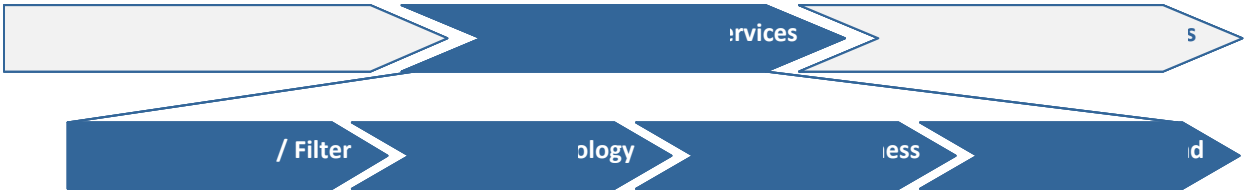
1. Unparalleled Expertise | **2. Recognized Leader** | **3. Flexible Resource Model**

4. 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.



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

Align Stakeholders

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

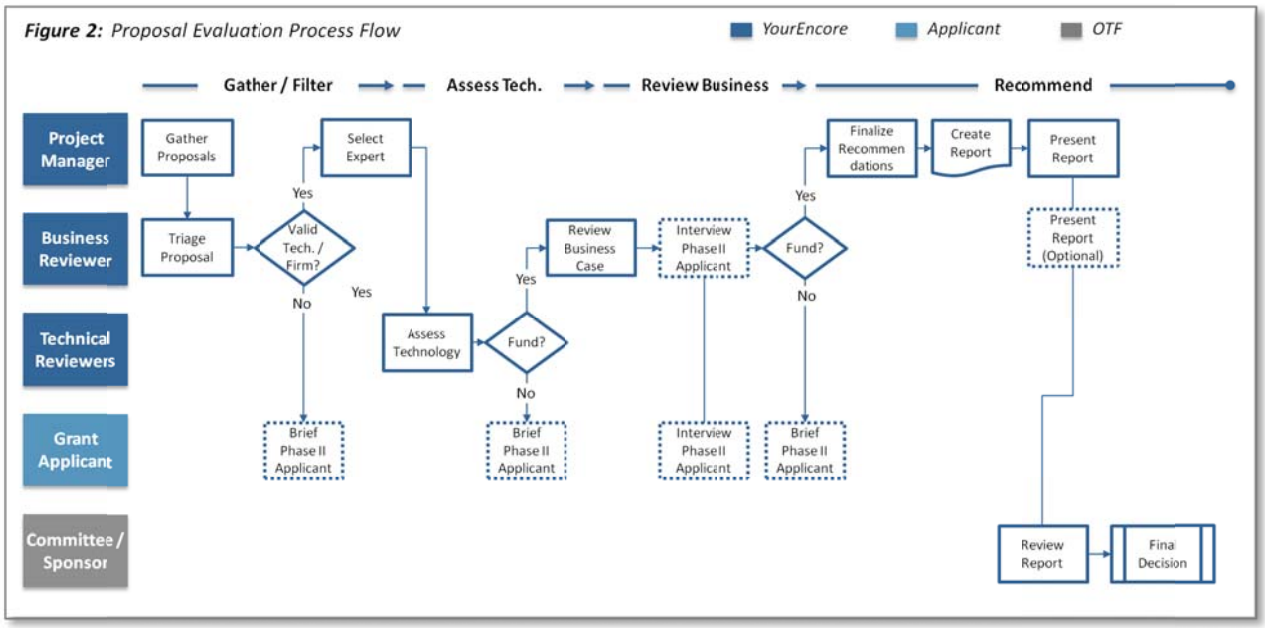
Key Evaluation Scorecard Components

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

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

Evaluation Services

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



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

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

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

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

Team Structure and Qualifications

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

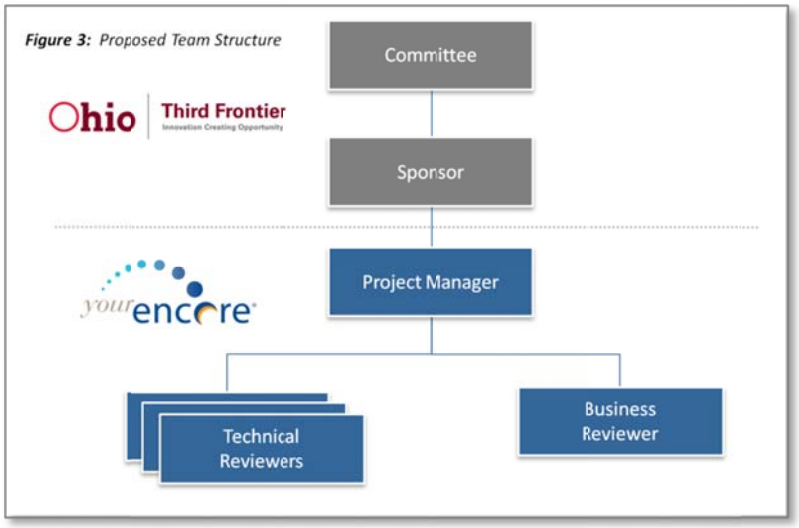


Figure 3: Proposed Team Structure

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 (See Appendix For Details)

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 (See Appendix For Details)

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.

5. Proposal Recommendations - Phase 1

Summary of Recommendations

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof	Path to Mkt	Project Plan	3rd Party Review	IP Protection	Start-up in Ohio	Commerical Opportunity
12-401	Bowling Green State University	Inverted top-emitted organic light emittingdiodes on flexible substrates							
12-402	Case Western School of Medicine	Development of Novel Tools for Health IT-GEINA							
12-403	Kent State University	Controlled Cracking of ITO on Plastic Substrates							
12-404	Kent State University	iLidRX - Interoperating Medication Container for Mhealth Management of Chronic Illnesses							
12-405	Miami University	Device to Dimish Gag Reflex Response							
12-406	Ohio State University	Altricial Fish Hatchery Utilizing Marine Live First FeedsTechnology							
12-407	Ohio State University	Allostatix							
12-408	Ohio State University	Gene Expression Validation uding GFP- Automated collection amd Image Analysis							
12-409	Ohio University	Advanced Catalytic Materialand Super Critical Reactor for Cost Effective of Flowback /produced Waters from Unconventional Shale Gas Wells							
12-410	Ohio University	Trajectory Tracking Flight Controller by Trajectory Linearization							
12-411	University of Akron	Polyisobutylene (PIB) Based Elastomeric Coating for wound healing and closure							
12-412	University of Akron	Shape Memory Alloy Thermal Energy Harvesting							
12-413	University of Akron	Non Biological Inhibition-Based sensors to detect Halogenated Organic Compounds in Aqueous Solutions							
12-414	University of Cincinnati	Controlled Life Medical Devices							
12-415	University of Cincinnati	The SENSE Device: A major advance in the critical care of the brain							
12-416	University of Cincinnati	High Impact Resistance and High Tg Hybrid Sylanized Epoxy Estercoatings and Membrance							
12-417	University of Toledo	Plasmonic Based BioMarker Sensing Technology							
12-418	University of Toledo	Facet Fixation Screw							
12-419	University of Toledo	Injectable Bone Cement							

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 – 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

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

Project Plan – 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

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

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

Commercial Opportunity – Is this technology a viable commercial opportunity

Details of Recommendations

Proposal 12-401, Bowling Green State University, Inverted top-emitted organic light emitting diodes on flexible substrates, $50,000 requested. **Amount recommended: $0**

Rationale: *The proposal is based on making OLEDs using cheaper, flexible substrates such as stainless steel. The technology works on a small scale but requires proof of scale-up. OLED work is intense world-wide and there is growing demand for such devices especially to make them larger and cheaper. Technically, this is a well-presented proposal and the concept is pragmatic aiming to scale-up using a common, inexpensive substrate. Well above average and very pragmatic which is unusual and a positive sign.*

However, the track-record of the team is unproven, the longevity of the devices is not mentioned and there are not strong ties to commercial prospects at this stage. The lack of focus on a pathway to commercialization is the key driver behind this recommendation.

Recommendations for Improvement: *While the review team sees merit in the technology behind the proposal, it is not at all clear that their intended partner, Xunlight, is committed to partnering to develop the technology. Specifically, the proposal uses the following language referring to Xunlight "We will try to convince", and "Appears to be open to expansion of their portfolio to OLEDs". Additionally, Xunlight has independently submitted a Phase 2 grant request to OTF specifically detailing a separate technology they would like to pursue, which was developed by the same BGSU team on this request. This calls into question the true value of the technology. The proposal would be improved by gaining a firm commitment from Xunlight to explore the potential. The perception of an uncommitted partner is only reinforced by the unproven track record of the team, which makes it all the more critical that an objective third-party demonstrates its interest and belief in the commercial potential of the technology.*

In addition, while the review team agrees that there are advantages to the technology from a production perspective, additional insights on the longevity and quality of devices (relative to existing technologies) produced using this process would be extremely helpful.

Proposal 12-402, Case Western School of Medicine, Development of Novel Tools for Health IT-GEINA, $50,000 requested, **Amount recommended: $50,000**

Rationale: *This proposal provides for the commercialization of a unique systems biology software application that will allow a Pharma end user to better develop and manufacture drugs that will be more likely to affect the disease that is targeted and also provide a potentially faster FDA approval process thus providing a better outcome and a "faster to market" path.*

The review team believes this will fill a significant unmet need in the drug discovery and development process. And, since the selected partner, NeoProteomics, has extensive experience in related technologies, the pathway to successful commercialization with an Ohio start-up company is clear and compelling. As the software behind the system leverages an existing platform, the timeline and milestones would appear reasonable and achievable.

Proposal 12-403, Kent State University, Controlled Cracking of ITO on Plastic Substrates, $48,109 requested, **Amount recommended: $48,109**

Rationale: *This proposal addresses controlled cracking of ITO on plastic substrates, enabling low-cost production of electrical connections for the flexible electronics industry. The technology turns a weakness of ITO into a strength. By forming well-controlled parallel cracks it is possible to make conductive traces in*

one or two dimensions. The project seeks to optimize this and in particular to maximize the differential conductivity in the crack direction and perpendicular to it. Two main methods are proposed for this, selective etching and stretching to increase the gap between conductive tracks. This is clearly written by a team which is not only inventive but one which also understands commercial aspects and has a track record of commercialization. They have a very appealing process which, in its simplest form, can be run free of chemicals (green). They have strong industrial support and feedback in the scope of the project.

A potential area of concern is lack of definition of the competitive marketplace. It isn't clear, specifically, what they are competing against, what advantages beyond the production method they may offer, and the end quality of their product relative to competitive benchmarks.

Proposal 12-404, Kent State University, iLidRX - Interoperating Medication Container for mHealth Management of Chronic Illnesses, $50,000 requested, **Amount recommended: $50,000**

Rationale: *This proposal addresses a portable device to monitor compliance with a drug regimen for patients with chronic conditions and participants in drug safety and efficacy studies. Clinical trials of drugs and medical devices often depend upon actions that must be taken by patients in their homes. In these circumstances it can be difficult to know with certainty that the patients have actually complied with the conditions of the trial, that is, actually taken the medicine as prescribed or carried out some other action. Thus, there appears to be a real need for the device proposed. In addition, it may be useful outside of clinical trials for monitoring patients who are mildly cognitively impaired and may forget to follow medical recommendations. The technology leverages pre-existing software and interface, making a path to market clear, and timelines are credible.*

The review team does have several concerns that did not outweigh a positive recommendation for funding. Generally, the applicants' assertions regarding market size and potential are accepted, though some of the specific numbers cited may not be accurate. There are additional concerns about assertions for broad-based adoption, as a $200 per unit cost would translate to a sale price that would likely limit broad adoption. Despite this, it is clear this device would have a place in clinical trial settings and the review team believes this merits a positive recommendation.

Proposal 12-405, Miami University, Device to Diminish Gag Reflex Response, $41,750 requested, **Amount recommended: $0**

Rationale: *This proposal from Miami University addresses further development of a device to diminish the gag reflex, which can be easily provoked during dental procedures. Acupuncture (and the related field of acupressure) is poorly understood, but many physicians and other researchers attest to its efficacy. The original findings, published by the American Dental Association, were obtained at Miami University. They present reasonably convincing data that the method works, though there is no convincing explanation for why it works. But it evidently does work and meets a genuine need. While there is no data to quantify claims made in the proposal for avoidance of dental procedures or procedures not completed due to gagging, the review team accepts these are issues. Most important to a general dentistry practice is time – a gagging patient can be sedated with gas (nitrous oxide) or pills (halcyon), though these are sometimes inefficacious and cumbersome. Additional personnel may be required to assist with a gagging patient, and these procedures can take much longer than normal.*

The remaining tasks to produce a working prototype for a practical device that could be manufactured and marketed do not present significant challenges and should not be difficult to complete in a year. After that, there is a reasonable path to market with the company PharynMed.

The primary concern of the review team is a lack of any economic or pricing model. This type of device does not generate income for a dental practice, and as there are alternatives already in place, as noted above, dental offices already cope with gagging patients. Specialty dental offices use reimbursable sedation techniques and would not likely purchase the device. General dental offices would likely purchase one or two devices at most, as the most severe gagging patients are relatively rare. One could make some rough assumptions on potential volume of sales using the information in the proposal, but without even an approximate cost to produce and an approximate selling price it is not possible to fully evaluate the commercial potential. The review team recommends not to fund this project as a result.

Recommendations for Improvement: *The proposal mentions involvement in the project from the former President of the Dental Group of the largest dental product distribution company in the world. This individual should be able to add considerably to this proposal. The review team would like to see approximate cost, selling price, and justification of selling price in the proposal. Justification would include a small market research study of general dental practices to establish / justify a price point and/or price justification by comparison of analogous devices currently sold to general dental practices. Acceptable analogues would be devices not associated with reimbursement from insurance and that are optional in that work can be conducted without them (despite added convenience or time savings). The review team would be more likely to provide a favorable recommendation if the commercial opportunity was substantiated in some way.*

Proposal 12-406, Ohio State University, Altricial Fish Hatchery Utilizing Marine Live First Feeds Technology, $50,000 requested, **Amount recommended: $0**

Rationale: *The system proposed as a start up opportunity is a prototype of an automated water recirculation technology that would provide substantial increase in fish production in the aquaculture industry. The "Fish-Live-Feed" system provides a closed water flow system that eliminates need for fish to ever be taken out of an indoor facility, thus reducing mortality and improving production. The proposal describes the considerable work that has been done to date and proposes 4 project objectives to bring the technology to market-ready state. The university resources, laboratories and facilities involved and required are identified. A series of development tasks are presented along with an allocation of funds between personnel, services and equipment.*

This proposal did not provide a plan to show that the technology is ready to be licensed to an Ohio startup. In fact, the proposal specifically states there are no suitable third-party partners due to the novel nature of the technology. Without involvement from an objective third-party it will be difficult, if not impossible, for OTF to measure success upon completion of this work.

The review team also questions the size of the market opportunity. The development team would appear to be targeting the state of Ohio for their product, as they mention this technology is "the only technology that effectively addresses the aquaculture needs specified by the Ohio Department of Agriculture." But the proposal also states that annual aquaculture sales in the state are $6.6 million annually, which provides limited opportunity for this technology. The proposal notes that despite this small revenue total, Ohio is first in the nation in production of yellow perch and blue gills, which are two species targeted under this proposal – the implication of a limited nationwide market is clear.

Recommendations for Improvement: *The technology as proposed would appear to be sound. What is not clear is whether it would meet with commercial success. The development team should place some focus on the economic model before continuing technical development work, including cost estimations and production estimates in operational environment, target markets and revenue potential, and some assumptions around survivability / yield improvements. If a suitable third-party should be identified and targeted for licensing to bring credibility to the business assumptions, this third-party can also assist in building the business case.*

Proposal 12-407, Ohio State University, Allostatix, $50,000 requested, **Amount recommended: $0**

Rationale: *This proposal will develop diagnostic software as the initial sleep apnea test for purposes of screening patients prior to a physician-ordered sleep study. The proposal has some merit as it relates to the problem being solved, and the applicants have demonstrated an unmet need in the market. However, there are too many concerns around the poorly-defined value proposition to receive a positive funding recommendation. Specifically, it would appear that physicians are targeted as the user/customer, but no information is provided on product costs, potential revenue, or even a clear reason why physicians would be motivated to use the technology. Insurance companies would appear to be the primary beneficiaries in a financial sense, whereas physicians may in fact be losing revenue by conducting fewer sleep tests. The proposal cites recent 'modest growth' in dramatically less-expensive home tests, which only reinforces the perception that simpler or cheaper may not be enough to have a commercial impact, given the sometimes divergent interest of health care providers and payers.*

In addition, the review team is concerned that a "small, prospective study" at a cost of $15,000 may not produce a relevant and statistically robust outcome. Given the work already done using existing data, it would appear doubtful this study would add any additional clarity to the viability of the technology.

Finally, the bulk of the requested funds will be directed to software development, but the proposal is lacking in specifics of how much work needs to be done, whether a tangible milestone can be achieved, and how they will measure success at the end of the 1-year term.

Recommendations for Improvement: *The review team would like to see the business model in detail, with a logical description of who the true customer is, what will drive purchase, and some sense of costs/revenue projected. More detail should be provided on the intended milestone and how, specifically, success will be measured. An improved budget narrative would also greatly improve the application.*

Proposal 12-408, Ohio State University, Gene Expression Validation using GFP- Automated Collection and Image Analysis, $50,000 requested, **Amount recommended: $0**

Rationale: *This proposal requests funds for further development of an automated system that uses an optical microscope to view tissue samples, typically samples growing in a Petri dish. This proposal is addressed not to development of a new device but to making certain improvements to an existing device, which has not yet been commercialized. The needed improvements, though not spelled out in much detail, appear to be quite feasible to realize within a year and within the proposed budget. When plans for the improved product are available at the end of this period an Ohio company, Finer Robotics Imaging, stands ready to implement a marketing and sales program.*

The review team agrees that there are several strengths to the proposal, including the experience of the development team, equipment available to them at the University, and a realistic timeline based on an existing device. However, lack of IP for the device itself and unspecified plans to patent or copyright improvements are cause for concern – the OTF specifically requires some form of IP protection. The

proposal does cite IP protection for the Petri dish lid design, but the requested funding is for an entirely different development purpose.

The proposal repeatedly mentions unspecified 'third-party' reviewers, developers and customers. Since the proposal specifically mentions Bayer and Syngenta as long-time supporters of the initial device development, it is puzzling that the 'third-parties' remain nameless. The review team is concerned that the development team in various forms (Dr. Finer's lab, Finer Robotics Imaging) may lack the objectivity required by OTF, and without clarity as to the identity of the third-parties, a positive recommendation cannot be made.

Recommendations for Improvement: *This proposal would benefit from a clearer description of IP protection planned or intended. Third-party partners and customers must be specified. Additional detail as to the types of improvements to the device would be helpful to better place that in context with the requested funds and timeline.*

Proposal 12-409, Ohio University, Advanced Catalytic Material and Super Critical Reactor for Cost Effective of Flowback/Produced Waters from Unconventional Shale Gas Wells, $50,000 requested, **Amount recommended: $0**

Rationale: *This proposal is for the remediation of shale gas well water using a combination of supercritical water and catalyst. The review team agrees with the business opportunity, in that economical treatment of F/P water is a rapidly growing need. The development team would appear to have the appropriate experience and credentials to develop the technology.*

What is not clear, however, is how the multiple milestones outlined in the proposal can be achieved within a 12-month period. According to the project timeline, all three tasks will be run in parallel. The review team does not believe, for example, that techno-economic evaluation can be conducted in parallel with prototype validation and characterization of catalytic materials. The proposal precisely identifies numerous critical failure points which will need to be assessed and analyzed – this would have to occur prior to precise refinements of the technology to optimize the cost model.

Other concerns of the review team include the existence of other non-fouling super critical water reactors, some of which have already been commercialized. The development team does not address these technologies or their competitive position relative to them. Finally, while the development team speculates that an Ohio start-up company would be formed to commercialize the technology, the funding requirements are substantial and no commercial partners identified. The funding sources mentioned are speculative, at best.

Recommendations for Improvement: *The proposal would benefit from a more realistic set of objectives and timelines, though that in turn may demonstrate the challenge of completing these tasks in a 12-month period. A better assessment of the commercial opportunity, including potential competitors and future partners or funding sources would also be desirable.*

Proposal 12-410, Ohio University, Trajectory Tracking Flight Controller by Trajectory Linearization, $50,000 requested, **Amount recommended: $50,000**

Rationale: *This proposed technology potentially offers an advanced and robust UAV flight controller with considerable cost, flexibility and safety improvements. The conceptual technology has already received*

funding from university and government sources to support development to date. The proposal for phase 1 recognizes that demonstration of the concept with a prototype in a flight environment is essential to continue development efforts. The plan utilizes Ohio based DoD organizations, facilities and labs and also Ohio University labs and facilities, and the strength of these partnerships is significant and compelling. The independent review and support of NASA/ARC and others will provide a very compelling case to move the project forward upon completion of this project phase.

The primary concern of the review team is the timeline. With operational demonstration not occurring until month 11 of the 1-year plan, it is unlikely sufficient data can be gathered in such a short period of time to constitute proof of concept. The review team does not believe this is a reason for a negative recommendation, but would like the development team to make efforts to move the demonstration period forward in the timeline if at all possible. The proof required from these tests is substantial, but if it can be achieved, the opportunity is considerable.

Proposal 12-411, University of Akron, Polyisobutylene (PIB) Based Elastomeric Coating for Wound Healing and Closure, $50,000 requested, **Amount recommended: $50,000**

Rationale: *The proposal identifies and quantifies a market opportunity as yet unaddressed in flexible wound healing adhesives. The chemistry proposed is reasonable, though questions remain around biocompatibility and performance. The timeline appears to be achievable, and the development team has done a nice job in partnering locally to ensure market needs are met and the test results are verified objectively. Obviously the key hurdle is in FDA approval, which is unpredictable both in terms of outcome and timing. If the adhesive performs and is FDA approved, commercial success is very likely due to the dynamic nature of the medical market and the margins involved.*

Proposal 12-412, University of Akron, Shape Memory Alloy Thermal Energy Harvesting, $50,000 requested, **Amount recommended: $50,000**

Rationale: *The proposal describes a device that will harvest waste/ambient heat energy by converting it to mechanical motion via a shape memory alloy and storing the resulting generated electricity in a battery. The idea of an SMA heat engine device has been around since the 1970s and has been the subject of increased interest in the last several years. The description of the device is consistent with other SMA heat engines proposed in scientific literature, and there are other universities and companies in the process of developing similar devices. If this device is as economical as claimed in the proposal, it should prove to be commercially viable. A small-scale prototype is already functioning and producing proof-of-concept data and development team proposes a one-year timeline to produce a larger scale prototype and achieve independent validation of the technology. The technology is protected by a provisional patent application. The project resources are clearly listed, with legitimate claims to sufficient material and manpower resources, and a proposed budget of $100,000 for the first year.*

Though the expected cost of the resulting electrical energy is not shared, the team claims that this is an "extremely economic method". Assuming this is the case and the device is independently validated, the device should have a reasonable path to commercialization

Proposal 12-413, University of Akron, Non-Biological Inhibition-Based Sensors to Detect Halogenated Organic Compounds in Aqueous Solutions, $50,000 requested, **Amount recommended: $0**

Rationale: *This proposal is for grant funding to build and test a portable sensing system for detection, identification and quantification of trihalomethanes in drinking water. The review team believes the work plan is very ambitious, and with the limited information provided cannot support a positive funding recommendation. There is a lot to be done in the eight months allotted to this work before independent validation, including optimization of a selective membrane, development of the actual sensor, development of data analysis software and demonstration that the newly developed sensor does not suffer from too many cross-sensitivities and can actually detect at the concentration level required (after pre-concentration.) A search of the open literature did not reveal the sensor material that will be used for this sensor. The technical reviewer of the proposal has significant experience with developing sensors for other analytes and believes the technique is solid, but it can be very difficult to find sensing materials which are as selective as this proposal indicates is necessary.*

The review team agrees there is potential for commercial applications such as spot checking in water treatment plants, but finds it unlikely there is a market for consumer testing of trihalomethanes in water. While this diminishes the commercial potential, the review team still agrees there is sufficient overall opportunity, and this concern did not impact the funding recommendation.

Recommendations for Improvement: *Much more detail and focus should be provided on the project timeline so the review team can better understand how the development team will overcome the considerable technical hurdles in only 8 months. To that end, any information that can be provided on the sensor material would greatly improve the review team's ability to assess the plan's feasibility. The review team would need to see at least a solid hypothesis, given the selected sensor material, as to why and how the required level of sensitivity would be achieved.*

Proposal 12-414, University of Cincinnati, Controlled Life Medical Devices, $50,000 requested, **Amount recommended: $0**

Rationale: *This proposal addresses development of a new kind of implantable orthopedic support that would eventually, after healing has taken place, be resorbed into the body. The proposal addresses only the initial investigation necessary to realize this hope, namely, using two candidate alloys of magnesium, to determine the parameters of treatment using two separate processes that produce a material with the corrosion properties needed to make them suitable for orthopedic implants.*

The proposal lists eleven activities to be carried out in the course of this one-year project. All of these steps are necessary to proceed with this development, but the difficulty is that at the end of this process, the applicants will still not be in a position to attract a licensee. At best they will know that one of these alloys subjected to hardening by one of the methods outlined seems to retain its strength and fatigue-resistance adequately to be considered as a material for orthopedic implants. Lying ahead will be issues about which implants to design, animal and later human testing to see if there are undesirable effects from dissolving so much material in the body, tests to be sure that each design reliably retains its strength for the duration of healing before it begins to erode appreciably, and tests to see that the new material is compatible with tissue and with other components of the implants.

Though a provisional patent application has been filed, it would appear additional patent filings will be required based on the outcome of this early-phase research.

Recommendations for Improvement: *It is simply too early in the development cycle for the review team to offer a favorable recommendation. The application would be much stronger if some of the early phase research was conducted in the university setting, IP secured around process and materials, and a more focused proposal resubmitted with a more meaningful endpoint. At present, the process may fall one of two ways (LSP or UNSM), one of two alloys may be selected, there are multiple process parameters to be assessed via DOE, and the end-application in terms of implant type is undecided, all of which indicate it is too soon to commit OTF funding.*

Proposal 12-415, University of Cincinnati, The SENSE Device: A major advance in the critical care of the brain, $50,000 requested, **Amount recommended: $0**

Rationale*: This proposal is for further development of a device called SENSE for use in intensive care units that will noninvasively monitor patients' brains for signs of bleeding, blood-clotting, and/or edema. The concept appears to meet a real need, and the program of development is cogent, practical, and well thought-out / well-presented in the proposal. Recognizing deleterious developments like intracerebral hemorrhage or increasing cerebral edema in patients with head trauma is important. Currently available methods do not lend themselves to monitoring in the ICU. The device is likely to be found quite safe, since it is non-invasive and uses power levels hardly different from cell phones.*

However, the main hurdle to overcome is proof of efficacy. While efficacy is conceptually possible given the work performed to date, the review team does not believe the concept will be sufficiently developed at the end of one year to move it from a university setting into commercial development.

The proposal states the system will be placed in a Faraday cage to shield it from extraneous RF signals, but does not address how this shielding would be accomplished at later stages, assuming Faraday cages will not be a part of the system in practice. With or without the cage, there is likely to be other 'noise' in the system, including variability across patients caused by unknown factors, overlapping spectra from varying causes, and the potential for smaller bleeds or less pronounced edema to be missed due to the necessary noise reduction. Early in-vitro studies also show a high degree of variability across specimens, to the extent there is significant overlap between data points which could lead to false negatives.

The third party reviewer is a Professor of the same university as the development team, which would not meet OTF's stated criterion of an independent third-party review.

Recommendations for Improvement: *Due to the ambitious nature of the milestones and significant technical hurdles to be overcome, this request may not be able to meet the criteria of OTF's phase one program. Additional research would have to be conducted and milestones redefined to receive a recommendation for funding. A truly independent third party review would also be needed.*

Proposal 12-416, University of Cincinnati, High Impact Resistance and High Tg Hybrid Silanized Epoxy Ester Coatings and Membranes, $50,000 requested, **Amount recommended: $0**

Rationale: *The proposal is to make coatings which have excellent corrosion resistance, impact resistance and high glass transition temperature (Tg) enabling them to be used at high temperatures.*

This proposal suffers from a complete lack of focus, which may be due to the inexperience of the development team in commercializing technologies. The technology under development may in fact be

applied to numerous industries, but the proposal does not offer a pathway to commercialization in any of them. It is not clear that completion of this phase of the project will bring the technology any closer to commercialization.

Recommendations for Improvement: *If in fact this novel coating can perform at such high level, the development team should focus their efforts on one specific, high-potential application for development, and work with potential partners to better determine unmet needs for that application. Focused testing and development should then be conducted to demonstrate proof of concept for that application. Without a better-defined plan for testing and proof of concept, it is highly unlikely a favorable recommendation would be given.*

Proposal 12-417, University of Toledo, Plasmonic Based Biomarker Sensing Technology, $50,000 requested, **Amount recommended: $50,000**

Rationale: *This is a well thought-out proposal that exploits work already done at the university in connection with creating and optimizing aptamers for detection of specific molecules in blood serum and other mixtures and with measuring their concentration by surface plasmon resonance. It deliberately focuses on a particular application – measurement of glycated hemoglobin from diabetic patients – in the belief that a new device will offer readily appreciated improvements over existing methods, which are already in widespread use. Thus, the initial product will be sold into an existing market rather than having to create a new market.*

This project also has the potential to lead in many commercial directions, dependent only upon choosing different aptamers for different targets, which reinforces the case for a new Ohio-based start-up company.

Proposal 12-418, University of Toledo, Facet Fixation Screw, $45,500 requested, **Amount recommended: $0**

Rationale: *This proposal concerns development of a facet fixation screw, which would be used in surgery of the spine to stabilize vertebrae made unstable by disk degeneration, injury, or other causes. The proposal is incomplete in that it merely asserts superiority of a new design for facet screws, while omitting critical details as to how and why it is superior. The review team agrees the University of Toledo has the tools and experience to make such a determination, which is a source of confusion as to why it was omitted. The lack of detail in the proposal gives the review team the impression this potentially innovative screw exists in concept only. There simply is not enough information available to form an opinion about the technical merit of the technology.*

The proposal appears to be hastily assembled, as a glance at the first page indicates quite rapid market uptake in year one (which apparently is 2011), without any justification for an immediate 2% market share.

Recommendations for Improvement: *More complete technical information on design, performance and competitiveness of the proposed technology is essential. More thought should also be given, with this additional information in mind, to realistic market uptake. A detailed revenue forecast is not expected or required, but even rough revenue assumptions should be realistic in nature so as not to detract from the scientific and commercial merits of the proposal.*

Proposal 12-419, University of Toledo, Injectable Bone Cement, $50,000 requested, **Amount recommended: $0**

Rationale: *This proposal concerns a new calcium phosphate-based injectable cement for use in orthopedic applications, in particular to secure implants such as screws and other devices inserted into bones of the spine and to fill spaces left by prior therapy. The applicants appear to be well qualified to have conceived this new product and to carry out the program that they have outlined to advance its development. The difficulty is that the program is incomplete. Because this product will be entering an established marketplace, judging its merits must be done in the context of existing products, and this is not done. Instead the proposal cites certain drawbacks of some existing products and asserts that the new product does not share them, but the work plan makes no attempt to compare the new product with existing ones. Unless it is at least as strong and at least as osseoinductive, these improvements will not be decisive. It may be that at the end of the year, the proposed product will be found to be inferior to existing products.*

An additional concern of the review team is the IP position. The applicants state that the University has submitted a patent application. However, the literature indicates that many other researchers are investigating the same compounds, including the addition of chitosan, for the same application.

Recommendations for Improvement: *If the program was expanded to include tests of existing products as well as the various test mixtures that the applicants propose, then at the end of the test period there would be sufficient information for a potential licensee to make an informed decision. Without that comparison, the review team cannot assert that sufficient proof has been demonstrated to move the product to a licensing or commercialization phase. Further clarity on the strength of the IP positions would also be desirable.*

6. Proposal Recommendations - Phase 2

Summary of Recommendations

PROPOSAL #	Licensing Institution	PROJECT TITLE	Generation of Proof	Additional Funds	Project Plan	Team	Business Model	Company Backing	IP Protection	Opportunity	Start-up in Ohio	License
12-420	University of Cincinnati	Pre-Clinical development of an Electrical Stimulation Device for Cardioprotection										
12-421	University of Cincinnati	Commercial Development of an OsteoporosisDiagnostic Device										
12-422	Ohio State University	Exercise Stress Cardiac Magnetic Resonance Imaging										
12-423	Ohio State University	Launching Perfect Practice: A New Era in Physical Training										
12-424	Ohio State University	Quantum Tunneling Electronics for Ultra-Low Power Scaled CMOS										
12-425	Ohio State University	Anthocyanin isolation scale-up, sample distribution, and market research										
12-426	Ohio State University	Autoregulatory molecular therapy of obesity										
12-427	Ohio State University	Advanced Language Performance Portfolio System (ALPPS)										
12-428	Ohio State University	Commercialization of Enhanced Cathodes for Electrochemical Applications										
12-429	Ohio State University	3d Tracking and Locating										
12-430	Ohio State University	Marine Jet Propulsion System										
12-431	Ohio State University	Commercialization of an Advanced Serum Biomarker Test for Adenocarcinoma Cancers										
12-432	University of Akron	New Low Cost, Small Diameter NGJ Carbon Fibers from NGJ, LLC										
12-433	University of Akron	Advanced Battery Management Algorithm Implementation for a Unified Energy Management System										
12-434	University of Toledo	Acetylene Gas Sensor										
12-435	Kent State University	SuperGraphSQL: A Unified SQL and Graph Analytic Engine for Massive Graph Analysis										
12-436	Bowling Green State	OLED Lighting Devices based on Wide-Web, Metal Substrate Roll-to-Roll Manufacturing										
12-437	Ohio University	Demonstration of Advanced Polymer Membranes for Algal Growth Enhancement										

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 – The proposed proof needed to raise additional funds for commercialization

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

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

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

Business Model – Realism and achievability of the proposed business model

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

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

Opportunity – Potential opportunity for the start-up

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

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

Details of Recommendations

Proposal 12-420, CardioCeption with University of Cincinnati, Pre-Clinical Development of an Electrical Stimulation Device for Cardioprotection, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal from CardioCeption, LLC, Cincinnati, OH, is concerned with development of a device for inducing production of chemicals protective of the heart muscle by applying electrical stimulation to peripheral nerves in the abdomen. The development team has experimental proof that the size of myocardial infarcts is reduced when electrical stimulation has been applied prior to induction of a coronary artery occlusion. This work has been published in a respected journal, and the proposal indicates others have replicated these results.*

The review team generally agrees there is both scientific and commercial opportunity here, but has some concerns with both. On the scientific front, while there is some concern on the overall method and selection of the site for electrical stimulation, which seems counterintuitive, of much greater concern is the ambitious timeline for testing, which the proposal states will be complete within one year. The proposal does not specify how many canine subjects will be targeted (the proposal's stated goal is to 'prove efficacy using a canine model of MI', which implies statistical relevance), nor does it allow for unexpected findings, such as lower-than-expected levels of cardioprotection in test animals or variability within the test group. The proposal mentions a $432,000 grant for previously conducted animal studies (mice), with "two times the funding" from UC, implying approximately $1.3 million to bring the research to this point. The results cited in the proposal pertain to mice only, using surgical incision as the stimulus for preconditioning. Similarly, while the proposal cites recent research in canines to confirm this, that research was also conducted using incision, not electrical stimulation. Overall, it seems overly optimistic to expect the $100,000 OTF grant to sufficiently fund this research, and the review team does not believe the end point will be achievable with these resources within one year.

If the technology works the business model has some merit – certainly there is significant unmet need. However, given the substantial additional sums required (between $32 million and $45 million), an annual revenue figure of $700 million is offered without a compelling narrative as to how that would be achieved and by when.

Recommendations for Improvement: *The main shortcoming the review team would like to see addressed is how, given the considerable sum spent on development to date using incision rather than abdominal electrical stimulation, the development team believes a one-year, $100,000 grant will allow them to achieve the proof which will certainly be required by investors. More detail should be provided on the study size (number of canines), a cost narrative for the study should be provided that would support this number of subjects, and a better narrative should be provided to help the review team understand how results will be generated, interpreted, approach modified, and a positive outcome obtained on such short timeline and limited budget.*

Proposal 12-421, OsteoDynamics, Inc, with University of Cincinnati, Commercial Development of an Osteoporosis Diagnostic Device, $100,000 requested, **Amount recommended: $100,000**

Rationale: *This proposal from OsteoDynamics, Inc. addresses further development of device to measure osteoporosis using bone shock absorbance. The proposed development activities can certainly be*

completed within one year, the leadership of the company has excellent credentials, and there is significant promise in the business model overall.

Initially, based on the written proposal, the review team was unclear as to why funds were needed for what appeared to be minor prototype improvements. During the face-to-face interview, the development team successfully articulated their rationale as to why funds to improve the prototype are required, and it is on the strength of this case a positive recommendation for funding is being made. However, during the interview, the review team voiced significant concerns about new developments based on a recent clinical trial. The written proposal stated the technology would be a low-cost replacement for more expensive, existing technologies. A recent statistical analysis of trial results now indicates the technology is better positioned as an adjunct to these technologies, which completely alters the path to market.

Because analyses of complex clinical trial data can often take months to prepare, the review team does not fault the applicants for this late development which occurred between submission and the interview. A positive recommendation for funding is being made with the understanding the development team will place significant focus and effort on understanding the payor reimbursement model. The Ohio Department of Development office will expect regular updates from the development team in this regard.

Proposal 12-422, EXCMR with Ohio State University, Exercise Stress Cardiac Magnetic Resonance Imaging, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal from a company called EXCMR (derived from Exercise for Cardiac Magnetic Resonance) addresses development of a special treadmill used in a diagnostic procedure to exercise a patient's heart in the same room as an MRI machine.*

It is hard to conclude that a project so long in gestation possesses a strong likelihood of being able to raise additional funds. Part of the problem must lie in the fact – alluded to in the proposal – that it is still necessary to demonstrate that cardiac MR actually produces images diagnostically superior to those from ultrasound or nuclear medicine, especially when the higher cost of MR is taken into account. In addition, one can question whether it is worthwhile, given the expense and space limitations, to have a treadmill right in the same room as the MR machine. In most situations it seems that it would work almost as well to have the treadmill nearby but outside the MR suite.

The review team is concerned that four years have elapsed since the founding of the company, during which $2.3 million have been expended. As the development team estimates product launch is still a year away, one has to question whether the principals have devoted sufficient time and energy to bringing this product to market. The engineering required, while not trivial, does not seem excessively challenging, and the fact that the device will be classified by the FDA as Class I, not requiring premarket approval, reinforces this view.

Recommendations for Improvement: *The review team would like to see a more candid narrative on the timeline for development to date, so as to better understand the lengthy (and expensive) path to reach this point. OTF has already provided over $1.4 million to this project, and the review team is hesitant to recommend yet more funding without a better sense of commitment and focus of the development team. Finally, it would be helpful to have some basic customer research to understand specifically why it would be preferable to have the treadmill in the MR suite instead of just outside.*

Proposal 12-423, Perfect Practice with Ohio State University, Launching Perfect Practice: A New Era in Physical Training, $100,000 requested, **Amount recommended: $0**

Rationale: *This project will provide a hard device and companion software to help individuals who require additional strength in their core muscle. There has been a prototype developed and used. However, the review team has concerns around use of requested funds. The proposal states funding for the complete package is estimated at $225,000, against the requested budget of $100,000. This is a significant funding gap to complete the work with no concrete direction given on how this gap will be bridged. The proposal does state they have cash on hand to complete initial construction of the web platform, and to fund initial customer research and outreach efforts. Despite this assertion, $50,000 of the requested funds will be directed to the "website and analytics platform", meaning this money may be double-counted, thus reducing the funding gap but making it likely OTF funds will go towards the projected Beta II inventory build-up. If these funds are not double-counted and the grant money will fund additional platform development, the funding gap question remains.*

The review team is also concerned that the overall effort required to commercialize this offering into a very crowded market has been significantly underestimated. Marketing collateral (Videos, Website) would be developed with the use of OTF funds without fully understanding all the market needs, price points, and target customers. While the commercial opportunity may be substantial, without a focused and well-targeted approach based on deep target consumer understanding, commercial success will likely not be realized.

Recommendations for Improvement: *The review team recommends a shift in marketing collateral funds to more robust market research activities, like a conjoint analysis, so as to better understand the opportunity. In addition, a well constructed budget narrative that clearly delineates funding sources and uses is needed. However, there is concern that despite these improvements funding may still not be recommended. This technology is well-developed in its current state and outside (private) funding could be obtained - it is not clear that additional OTF funds will help the development team attract that funding, but an improved proposal may change that perception.*

Proposal 12-424, QuTel Inc with Ohio State University, Quantum Tunneling Electronics for Ultra-Low Power Scaled CMOS, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal describes some interesting development work to improve the performance of computer-type chips while reducing their overall power consumption. However, the success of marketing the technology to large chip manufactures via license agreements and royalty payments seems remote at best. Even if QuTel's proposed project to significantly reduce the physical size of their Si-based compact tunneling system to sub micron levels is successful, which will be a significant technical challenge, it is questionable as to whether it would be truly meaningful to the large chip manufacturers who already all have major in-house R&D efforts ongoing to develop chips with reduced power consumption, increased performance attributes and reduced material and processing costs. It would be very difficult to insert any new technology improvements from the outside into existing in-house R&D programs in any type of timely fashion.*

Since no manufacturing site, no physical products and no real production scale equipment or employees will be involved, this proposal does not seem to fit the basic objectives of the Ohio Third Frontier validation and start-up funding program. Finally, there is no written commitment or work plan timeline contained in the proposal that would indicate that the proposed proof would be completed within one year. The

proposal does state a technical sales person will be hired to integrate with potential customers, but no information on timeline or funding of that position was given.

Recommendations for Improvement: *The most meaningful improvement would be a better description of a market / licensing pathway, and demonstration of interest and commitment from potential customers in this technology and approach. Prof. Berger is clearly well-qualified from a technical perspective and his credentials are well-established in that regard. The review team would like to see the addition of a business person with deep experience in the chip industry to the development team, which may bring clarity to the proposed pathway to commercialization.*

Proposal 12-425, Antho-Scyantific, LLC with Ohio State University, Anthocyanin Isolation Scale-up, Sample Distribution, and Market Research, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal from Antho-Scyantific, LLC, in Dublin, OH, concerns a plan to market highly purified anthocyanins to the agencies – government labs, universities, and companies – undertaking research on the properties of these compounds. The reason for undertaking research is that these chemicals are known to be antioxidants, and there is some evidence that they may play a protective role against cancer and numerous other diseases and disorders. There is probably a real business opportunity here, but it isn't clear the development team is aware of the specifics behind it.*

What is lacking at this stage is any evidence beyond a few anecdotes that researchers will be interested in buying purified anthocyanins at the still-not-cheap price of $2,000 per gram. Thus it takes a leap of faith that scaling up the extraction process, establishing supply chains, and (though this is not mentioned) building a plant to turn out large quantities of purified anthocyanins will turn out to be a good investment. Selecting six kinds of berries, each of which presumably will yield multiple anthocyanins, will likely lead to a large inventory of substances without any information about the need for such substances in research.

Simply put, the review team believes the current business plan will facilitate creation of a large inventory of products that no one is willing to buy. If that is so, then there is little likelihood that the company will be able to raise additional funds at the end of the project presented in this proposal.

Recommendations for Improvement: *It may well be the development team has appropriate and substantiated market research to address the review team's concerns, above. But, given a lack of specific targeted customers, anything more than anecdotal evidence that $2,000 per gram is a meaningful price point, and no data on which of the over 700 different anthocyanin chemical structures are the most relevant (highest volume potential), the business case is lacking. An improved proposal would dedicate significant narrative to these items. It would also be helpful to have clarification on which 'third-party chemical engineering firm' has been working with the development team, as this would help the review team understand the likelihood of the business remaining in Ohio.*

Proposal 12-426, Obgenex, Inc with Ohio State University, Autoregulatory Molecular Therapy of Obesity, $100,000 requested, **Amount recommended: $100,000**

Rationale: *This proposal from Obgenex, Inc., Columbus, OH, contemplates development of a biologic substance (Obgentin) that can be implanted in an obese patient's brain where it will compensate for a genetic defect, resulting in reversion to normal weight. The results of limited animal trials have been*

reported in several peer-reviewed journals. The technology has received and apparently will receive significant outside financial support from both public and private sources.

Prior to the interview, the review team had several concerns regarding the written proposal. First among these concerns was the licensing model proposed by the development team. However, during the interview the developer presented a very compelling and well-thought-out business case in that regard, leading the review team to provide a positive recommendation for funding. The review team firmly believes this proposal, if approved, will do more than just deliver a royalty stream, and will in fact lead to a very positive return on the state's investment.

The review team also questioned a number of other elements of the written proposal, but the developer of the technology adeptly addressed these concerns and gave the review team a great deal of confidence in the technology and the path to development.

In sum, the development team has clearly demonstrated capabilities and thorough understanding of the scientific, regulatory and commercialization challenges ahead, as well as a clear plan to address each.

Proposal 12-427, ALPPS Ltd with Ohio State University, Advanced Language Performance Portfolio System (ALPPS), $100,000 requested, **Amount recommended: $0**

Rationale: *This project is a second stage offering that will provide, initially for the academic sector, software and a process to evaluate student applicants who seek to gain entry into a higher learning institution. The result of the use of such a system should be a better-matched student and institution, as well as a faster and more cost effective selection process.*

The review team agrees there is real promise in this proposal, both in the concept and in the business model. However, the biggest shortcoming in the proposal is lack of a clear path to market. While the development team does a good job of providing anecdotal insights into both the unmet need (clear, consistent and trustworthy linguistic and cultural assessment) and the commercial opportunity (universities and corporations), it provides detailed and substantiated insights on neither. During the face-to-face interview, the development team acknowledged it has not spoken with other universities or with potential corporate partners to ensure their development process is aligned with their needs. Anecdotal evidence was presented regarding the impact falsified credentials have on a university, but no data was provided to demonstrate the scope of the problem, even for Ohio State. Similarly, the development team is not aware of current best practices or processes used by academia or industry, and therefore could not articulate how their technology would compare.

Recommendations for Improvement: *The review team would like to see substantiated market insights to support the technology and the opportunity. Documented feedback from large corporate partners and other large institutions would greatly improve the proposal. Also, while the review team fully agrees that falsified credentials are a problem for universities, but data to support the broad-based scope of the fraud would be helpful. Engagement of a business mentor who has commercialization experience could be an asset for this team.*

Proposal 12-428, pH Matter, LLC with Ohio State University, Commercialization of Enhanced Cathodes for Electrochemical Applications, $100,000 requested, **Amount recommended: $100,000**

Rationale: *The proposal describes a carbon nanomaterial-based catalyst powder which has significant performance and cost advantages over existing precious metal-based catalysts. It was very difficult to evaluate the technical merits of the solution due to lack of detail in the written proposal. However, if the*

catalyst performs and costs as claimed, and is successfully validated by the manufacturers, the material has the potential to be a solid replacement for existing (and more costly) catalysts.

The founders are committed to the success of the technology. They claim relationships with existing manufacturers and though no names were mentioned in the written proposal, the development team shared details in this regard in the face-to-face interview. These potential customers were identified in early-stage market research, which is a distinct positive for the project. The founders stated in the interview they will produce pilot-scale materials quickly, resulting in the required proof at the end of the one-year period.

Based on the strength of that interview and several positive elements of the proposal, the team is making a positive funding recommendation. The most glaring weakness in the development plan at this point is an experienced business advisor to help the technically adept founders better plan their use of limited resources and chart a pathway to profitability.

Proposal 12-429, FireSenseID with Ohio State University, 3d Tracking and Locating, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal concerns a novel technology to improve command and control as well as situational awareness for firefighting Incident Commanders. The review team cannot provide a positive recommendation for numerous reasons. Among them:*

- *The project plan as described in the request requires $458,503 to complete, which coincidentally is the precise sum already requested by FireSenseID from the Department of Homeland Security. If that award is granted, it would appear OTF funds are not required for proof of concept. If it is not granted, OTF funds will not be sufficient to complete the work and demonstrate proof, as required under OTF guidelines.*
- *Subsequent to the proof of concept phase, an additional $660,000 is needed to perform system refinements, which presumably is the intended use for the OTF funds, which again falls outside guidelines.*
- *While the review team cannot fault FireSenseID for being opportunistic with the grant request, the proposal cannot be considered on its technical merits without a more focused proposal to OTF.*

Recommendations for Improvement: *As with any early stage project, there are many objectives which must be met for the technology to move forward to commercialization. However, OTF has very specific guidelines which must be adhered to, which ensures appropriate use of taxpayer funds and demonstrable results achieved with those funds. It simply isn't clear what the development team will do with OTF funding, other than to have it contribute to the larger effort. An improved proposal would include tight, focused goals and deliverables along a reasonable timeline, which would give the review team confidence that additional outside funds would be attracted to the technology at completion of the tasks conducted under the grant.*

Proposal 12-430, CGC Ultramarin LTD with Ohio State University, Marine Jet Propulsion System, $100,000 requested, **Amount recommended: $0**

Rationale: *The review team agrees there is no question relative to the viability of reactive thrust devices for marine application. However, the proposal is severely lacking in specificity and data regarding the performance of the technology. For example, the grant application provides a number of assertions relative to improved performance: lower life cycle costs, lower emissions, better fuel economy, etc., but*

does not substantiate these claims. Further, the new thermodynamic cycle is undefined and minimal design information is provided. While there is a schedule of needed subscale and full scale testing it appears to be very aggressive and optimistic. It would appear from the photos in the proposal that many of the test articles were constructed with stereolithography techniques and materials. The proposal is not clear on the materials being used in the demonstrator full scale model, but it is assumed, given the partners mentioned in the proposal (Laser Reproduction and LaserFlex), these materials are similarly derived. Not included in the test plan is conversion of these materials to metal, full scale component tests, and full-scale test of a pre-prototype.

Even if it is assumed the proposal accurately portrays the performance and cost advantages of the device, the review team is concerned at the conditional and non-specific pathways to commercialization. Statements such as 'do it, no matter the cost' do not in any way support a commercialization plan – using this logic, additional OTF funding should not be required at this point, as commercial partners are ready to license or invest.

Recommendations for Improvement: *The review team would like several elements to be defined in a future submission:*

- *Detail and clarity around the new thermodynamic cycle*
- *A more realistic development schedule*
- *More specific design information*
- *Test data to support performance and cost assertions*

Proposal 12-431, Enlyton, Ltd with Ohio State University, Commercialization of an Advanced Serum Biomarker Test for Adenocarcinoma Cancers, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal from Enlyton, Ltd,, Columbus, OH, addresses development of a serum test for cancer using a monoclonal antibody called 3E8 that has a high affinity for anti-TAG-72. It would replace a test in widespread use today, namely, testing for carcinoembryonic antigen (CEA). If the representations about the sensitivity of the monoclonal antibody 3E8 are true, and the expectations that it can be made more sensitive and specific through the use of dPEG prove true, there should be a ready market for the reagent and, if that is so, then there is a high likelihood of being able to raise additional funds.*

Unfortunately, the written proposal was not clear on the IP position of this technology. The licensed patent from Ohio State was issued in 2001, and covers use of the antigen as a diagnostic and imaging tool in a variety of cancers. The grant request pertains to refinement of the 3E8 antibody, which the development team failed to point out in their request was recently licensed from a Korean company. The review team believes this does not meet the criterion of OTF that the technology under development be licensed from an Ohio institution of higher learning. It appears the team's intent is not to develop and commercialize the OSU patent; rather, all grant money would be directed toward the development of the Korean-licensed antibody.

Even if the above did not preclude a positive funding recommendation, the long and curious history of the OSU patent likely would. The CEO of Enlyton explained, when questioned in a face-to-face interview that he previously licensed this patent from OSU for a different company he ran, BioCrystal, which then gifted the patent back to OSU, allowing it to be re-licensed to his new company, Enlyton. While this may meet the written requirements of the OTF program, it clearly does not meet the intent.

Recommendations for Improvement: *At this stage it is entirely unclear how this technology could be resubmitted successfully to OTF for funding. The review team must follow the rules of the OTF program, and this technology does not meet them. That notwithstanding, the review team still believes there is considerable merit in the technology, and believes it has a reasonable chance of achieving commercial success. The fact that funding was not approved via this program should not prevent Enlyton from moving forward using other funding channels that are not constrained by similar rules.*

Proposal 12-432, NGJ LLC with University of Akron, New Low Cost, Small Diameter NGJ Carbon Fibers from NGJ, LLC, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal provides a path forward for manufacturing scale-up and generation of sufficiently large samples of lower cost, pitch-based, extremely small diameter carbon fibers via a melt extrusion and blow-spun (gas jet) technology. The path forward strategy proposed by NGJ appears solid and well thought out. It is based on a building block approach, i.e., 1) increase scale of fiber production to better serve target end-users with sufficient quantities of representative product samples, 2) monitor customer evaluations to confirm favorable product performance 3) assist in applications development and qualifications, and 4) refine the process and use lower cost feed stocks to help ensure end user (final composite) products achieve competitive market pricing.*

The review team believes this is an important, worthwhile project that addresses a very real need in the global advanced materials community. However, during the in-person interview session with the development team a number of issues were identified that, as they stand, preclude a positive recommendation for funding. Specifically, the written proposal was definitive in regards to the relationship between NGJ and NanoSperse, stating, "NanoSperse will do the required heat treatment…" A planned joint venture between NGJ and NanoSperse was not formalized after OTF declined a $1 million grant request in 2011, and no formal agreement between the companies currently exists. It also is not clear, based on the review team's discussion with NGJ, what level of commitment NanoSperse has to the technology, or why $20,000 of the requested grant is needed to incentivize NanoSperse to perform the development work. As this partner is the channel partner to the aerospace industry, the review team would like to better understand the strength and the nature of the relationship between these two organizations before making a positive recommendation for funding.

Recommendations for Improvement: *The review team would like to see some level of commitment from potential commercial partners, including, but not limited to, NanoSperse. Since the 'proof' required to move the product forward to commercialization must be generated (in this case) by a channel partner, an improved grant request would detail project plans, resource commitments, or some other tangible demonstration that proof of commercial success would be generated at the end of one year. Without this, the review team is left with the impression the scaled-up fiber process would create inventory but no proof.*

Proposal 12-433, Design Flux Technologies, LLC with the University of Akron, Advanced Battery Management Algorithm Implementation for a Unified Energy Management System, $100,000 requested, **Amount recommended: $100,000**

Rationale: *The proposal describes a system that will dynamically manage the charge and discharge operations of individual cells within a battery stack. The technology, if successfully validated, has the clear potential to have a significant impact on the growing battery market, with applications in electric & hybrid*

vehicles, renewable energy, satellites, and others. The energy storage industry has undergone significant growth in recent years and is projected to grow more through at least the next decade. With battery costs still very high, any solution that can help prolong their life will be high-value and a demanded addition to many battery systems.

The team is clearly committed to the success of this technology and has demonstrated strong support systems and relationships to achieve the stated goals. Further, the team has established relationships with local entities and has identified a local manufacturer to produce the device when going to market, which means that the success of this company will expand Ohio's technological strengths and lead to economic growth in Ohio.

While the review team is making a positive funding recommendation for the grant request, some concerns still exist. Strong commercial leadership and industry connections/guidance is sorely needed at this point. The complex, rapidly changing market for this technology will prove difficult to penetrate without that guidance. But the review team believes the well-vetted technology and capable technical team at Design Flux can succeed if they embrace that outside counsel and guidance.

Proposal 12-434, Acense LLC with the University of Toledo, Acetylene Gas Sensor, $100,000 requested, **Amount recommended: $0**

Rationale: *The proposal was submitted by Acense LLC, which was formed to develop an acetylene gas sensor on patent pending technology from University of Toledo. The sensor is a low-cost alternative, using different technology than the current, more expensive options that are sold today to monitor health & performance of oil-filled electric utility equipment. This proposal was well-written with solid planning and strategy for all areas requested. The market has been identified and is sizable and this sensor gives entry to a broader part of the electric utility industry that needs this type of fault monitoring. There has been much work already completed in developing the initial prototype.*

Despite a compelling written proposal, the review team is not able to make a positive funding recommendation based on the face-to-face interview. The majority of the interview was spent trying to understand the relationship between Acense, its sole employee and founder, and a separate company, FirstPower, which is majority-owned by the same founder. The founder specifically stated in the interview that Acense, which has been funded to date with a personal investment, would never have employees. Rather, FirstPower would contract resources to Acense, FirstPower may (or may not) license the Acense technology, FirstPower would receive benefits from, but not invest in or capitalize Acense, etc. While the review team believes the applicant has good personal reasons for conducting business in this way, the interwoven layers of the two companies and the founder's personal finances committed to the project are far too obtuse to assess them against the criteria for this OTF grant program. It is apparent that FirstPower should be the lead company on this project, and while the principal may not wish to do that, the review team cannot make an objective assessment of the viability of the business model without a clearer financial picture.

Recommendations for Improvement*: It appears this proposal cannot be fixed unless the principal is willing to dramatically change the way his companies' finances are managed. If that were to occur, there are additional questions around the business model to be addressed, but it is certainly possible an improved application could be created.*

Proposal 12-435, GraphSQL LLC with Kent State University, SuperGraphSQL: A Unified SQL and Graph Analytic Engine for Massive Graph Analysis, $100,000 requested, **Amount recommended: $100,000**

Rationale: *This offering is both a potential product and cloud service that allows the user to "mine" graph data created from data in a number of formats. This will allow the user access to information created from graph data in a relational query. This has significant potential in all market segments, provided the IP is protected and there is minimal competition.*

To that end, the review team recommends:

1. *Careful consideration should be given to the applications and the use of the data while the development work on the Beta is underway. An advisory board should be selected during this phase that is user-focused, not technology-focused, which, though this is not noted in the proposal would appear to be the team's intent based on the face-to-face interview.*
2. *Consideration should be given to filing process patents as applications are identified. Again, though this was not noted in the proposal, the team indicates they have plans to do this.*
3. *A competitive landscape analysis should be documented.*
4. *Effort should be given to both application development and market research in order to focus on a specific and deliberate launch during the startup phase. The potential for widespread distribution for the technology also has potential for distraction and lack of focus. In addition, the review team believes the technology may have a much greater value as a consultative / analytical tool. The development team should at least explore selling not the technology itself, but an analytical consulting service using the proprietary technology.*

On balance, the review team is confident in the knowledge and dedication of the team, and recommends this project for funding.

Proposal 12-436, Xunlight OLED, LLC with Bowling Green State University, OLED Lighting Devices Based on Wide-Web, Metal Substrate Roll-to-Roll Manufacturing, $100,000 requested, **Amount recommended: $0**

Rationale: *This proposal addresses utilization of the thin sheet flexible SS process technology of Xunlight to produce lower cost, high volume, wide sheet OLED materials on a production scale basis. Larger scale OLED lighting products are already available in the commercial world-wide market place and are being produced by very large, well known electrical and electronics firms. Therefore, it would seem impractical for the State of Ohio to support / fund a start-up company that appears to be at least a couple of years behind the commercialization curve compared to the competition that is already supplying these types of products. The proposal notes that GE, Philips and Konica, among others, are far ahead of them in the commercialization process.*

The stated competitive advantage of the technology is based on an unsubstantiated claim that Xunlight's capital and production costs are the lowest in the world for RTR solar technology production. However, the proposal neither addresses nor helps the review team understand how that will necessarily translate into the OLED market. If Xunlight is able to make a world-class cost assertion for solar, they should be able to make a similar assertion for OLED, which of course should be substantiated in some way.

It should also be noted the review team is concerned that both BGSU and Xunlight have submitted Phase 1 and 2 applications, respectively, for very similar technologies, which calls into question the validity of both. BGSU offers a differing technology for top-emitting LED while implying Xunlight may be a potential partner for that technology, while Xunlight is using a BGSU-developed technology as the foundation for its RTR production process. Either BGSU or Xunlight (or possibly both) is overstating the value of their differing approaches and it's very unclear, given their close working relationship, why they are diverging in this regard.

Recommendations for Improvement: *DOE targets are only useful as industry benchmarks if no other competing technologies exist. Since there are numerous competing technologies, that must be the benchmark against which to assess the commercial potential of this technology. Without a compelling narrative and analysis to help the review team see a clear pathway to successful commercialization against much larger and better-resourced competitors, the review team cannot make a favorable recommendation.*

Proposal 12-437, ECO2Capture of Ohio Inc. with Ohio University, Demonstration of Advanced Polymer Membranes for Algal Growth Enhancement, $100,000 requested, **Amount recommended: $100,000**

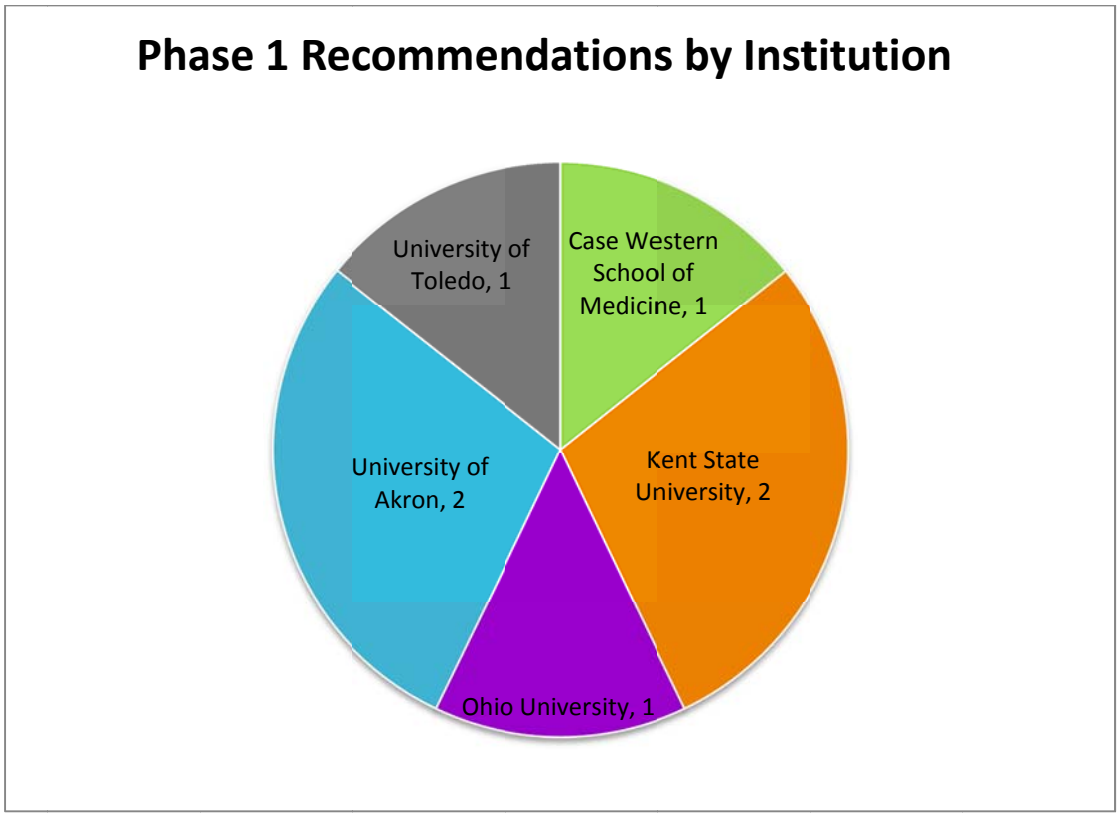
Rationale: *This proposal addresses a technology for advanced polymeric membranes that efficiently transfer low partial pressure soluble gases, such as CO_2, into aqueous solutions to enhance and facilitate algal production. This highly motivated ECO_2 Capture Team has proposed a very sound second stage project which is market-focused and structured to accomplish commercialization via a viable start-up company and to achieve substantial revenue growth over the next few years. ECO_2 Inc. already has in place the necessary technical and management resources necessary to successfully prove their technology and to generate the necessary data to warrant further business development/funding generation. A reasonable and detailed Work Plan Schedule is presented which shows that the key objectives of this project should be achievable during a one-year project period.*

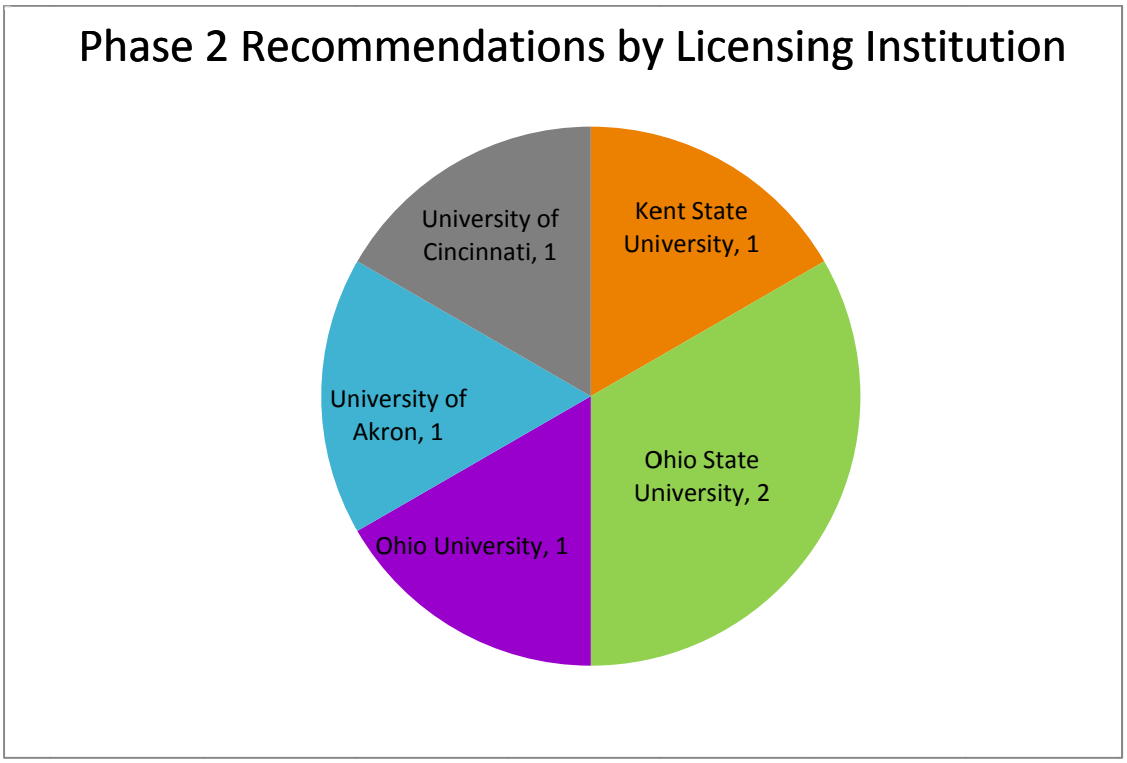
The written proposal offered very little insights on the proprietary technology under development, and the review team had several questions regarding the technology itself, the market opportunity and the IP position. During the face-to-face interview, the development team ably addressed all these concerns, and augmented an already strong case as laid out in the written proposal. The review team sees this as being a more efficient, lower cost, highly desirable means for CO_2 mass transfer into aqueous-based algae streams, likely to achieve significant commercial success in a rapidly growing market. This proposal proved to be one of the strongest seen by the review team, and as a result received a positive recommendation for funding.

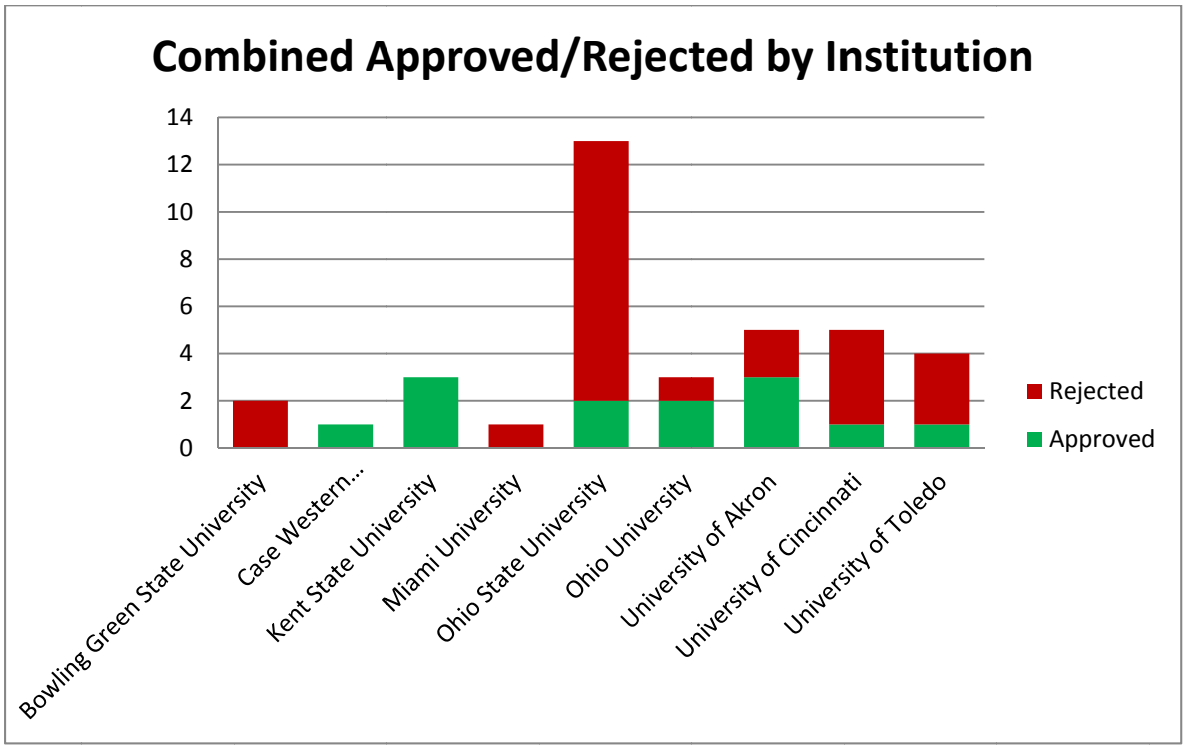
7. SUMMARY

The Review Team is recommending 13 of the 37 submitted grants for review (35.1%). For Phase 1, seven of the nineteen proposals are recommended for funding (36.8%). For Phase 2, six of the eighteen submitted grants are recommended for funding (33.3%). With the Ohio Third Frontier, accepting grants on a quarterly basis, the Review Team expects that many of the grants will be revised to address the concerns of the review team.

Generally, for both Phase 1 and Phase 2 grants which were recommended for funding did not have a "fatal flaw" in the proposal. The "fatal flaw" is described in the reviewers' comments in the previous sections and readily identified as red in the charts at the beginning of the each of the phase reviews. In the case of 12-419, there were too many concerns, none of which were "fatal", but in sum made the grant not worthy of funding until they were addressed.


Phase 1 Recommendations by Institution
University of Toledo, 1
Case Western School of Medicine, 1
University of Akron, 2
Kent State University, 2
Ohio University, 1

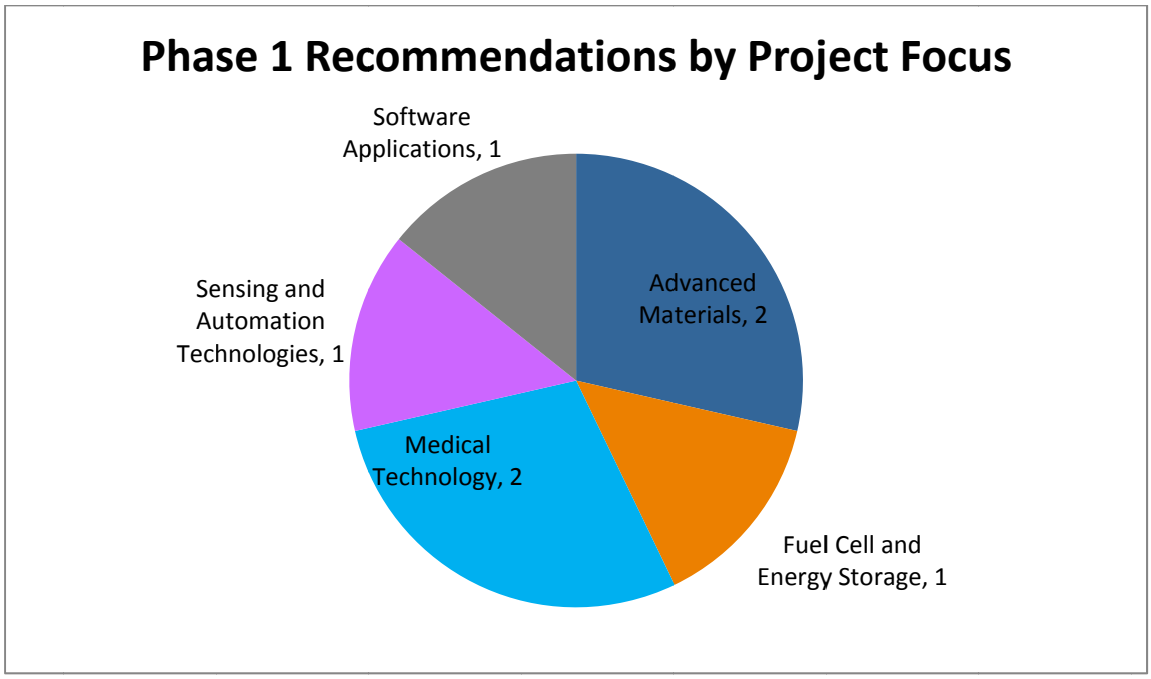

Phase 2 Recommendations by Licensing Institution
University of Cincinnati, 1
Kent State University, 1
University of Akron, 1
Ohio State University, 2
Ohio University, 1

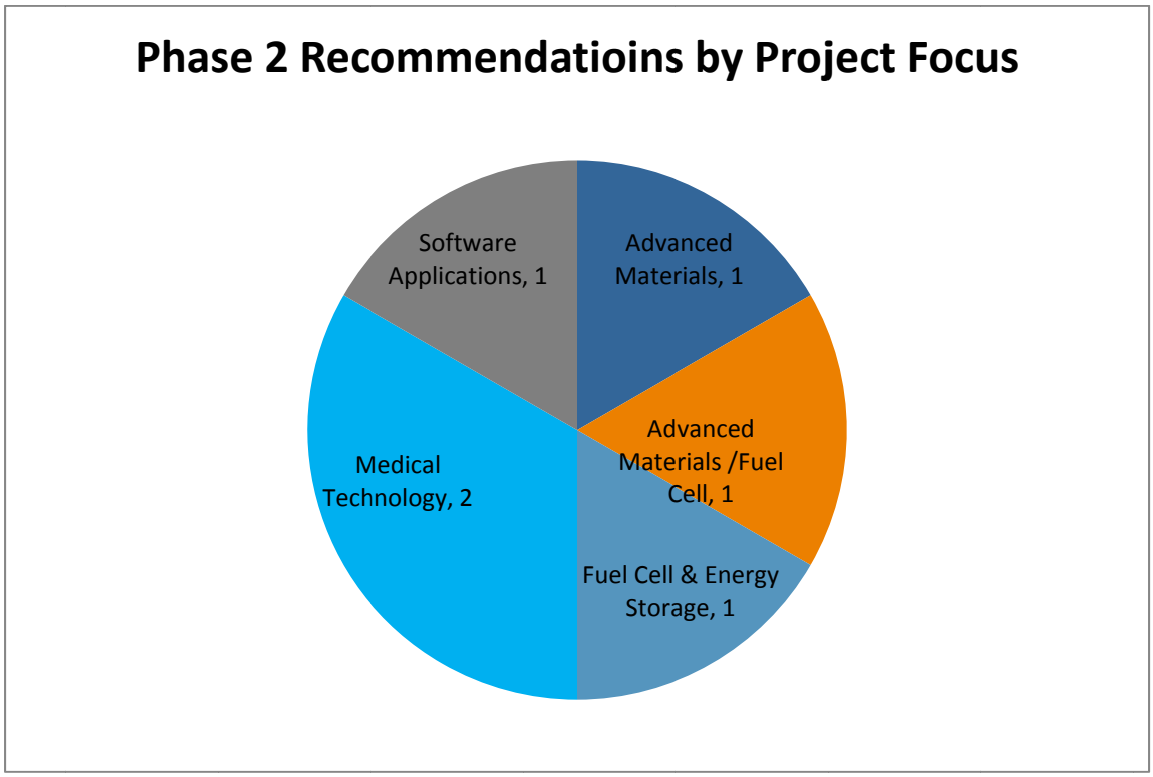


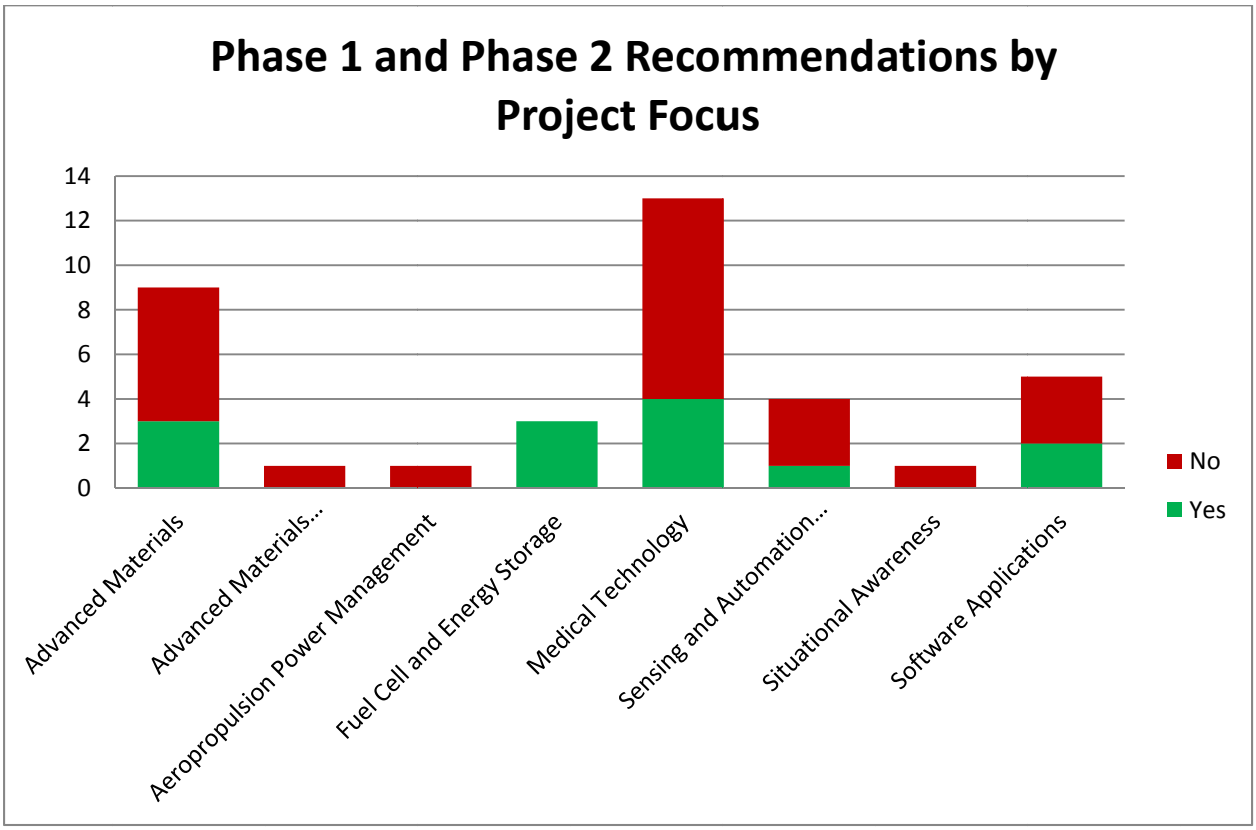
It was noted by the reviewers that Ohio State University submitted the same letter for each of the grants. Thematically, grant applications from Ohio State University tended to be weak in the commercial aspects namely, Path to Market, Commercialization/Business Plans, and the Commercial Opportunity. Bowling Green University's applications also tended to be weak in the Path to Market/Business model. For the University of Cincinnati, all of three of their Phase 1 and the Phase 2 which were not approved failed in the generation of the proof. For the one University of Cincinnati grant which was approved, the reviewers had concerns in this area. Many of the above mentioned commercial concerns can be readily addressed, and the application re-submitted in a future round.

Kudos to Kent State University who had all 3 grant applications approved, with only 2 "yellows" for all three applications. Case Western University had one application, which was done very well and had green across the board. The University of Akron also did relatively well, with 60% of the applications approved. Of the 3 approved, 2 of them were green in every category.

The review team believes that many of the shortcomings of the grants can be easily rectified and when done so in a future submission, the review team believes they will be approved. In addition, the review team in conjunction with the State of Ohio is willing to have a review with any institution or start-up company who would like further clarification of the criteria.


Phase 1 Recommendations by Project Focus
Software Applications, 1
Sensing and Automation Technologies, 1
Advanced Materials, 2
Medical Technology, 2
Fuel Cell and Energy Storage, 1


Phase 2 Recommendatioins by Project Focus
Software Applications, 1
Advanced Materials, 1
Advanced Materials /Fuel Cell, 1
Medical Technology, 2
Fuel Cell & Energy Storage, 1



By technical area, Medical Technology had one third of the applications, followed by Advanced Materials and then Software applications. The review team analyzed the data to assure consistency in the process. With the limited data of 37 submissions, the team verified there was not approval-rejection rate appeared to not be dependent upon the project focus. In addition, the team assured the two themes for rejection, namely weak business case or project plan were uniformly judged irrelevant of the project focus.

APPENDIX A (TEAM MEMBERS)

TECHNICAL REVIEWERS' CREDENTIALS

Chris DeArmitt (Advanced Materials)
Summary: Began his career at the Institute for Surface Chemistry, progressing to roles Electrolux, the world's largest manufacturer of household appliances and later at BASF, the world's largest chemical company.

Experience:
Hybrid Plastics Inc., USA
BASF Plastics Research, Germany - Laboratory Manager
BASF Specialty Polymers, Germany - Innovation Manager
Electrolux CTI, Sweden then Italy - Senior Project Manager
Institute for Surface Chemistry, Sweden - Manager - Polymeric Materials Group
Polymer Technology, KTH, Sweden - Post - Doctoral Work
Cookson Technology Centre, UK - Polymer & Surface Scientist

Core Competencies/Field of Expertise:
Plastics
Polymers
Surface Chemistry
R&D
Marketing
Management
Consulting

Education:
University of Sussex, Brighton, UK - 1990-1993
Field: Novel Colloidal and Soluble Forms of Polyaniline and Polypyrrole
Degree: Ph.D.

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 (Software Application and 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

Thomas Jones (Sensing and Automation Technologies)
Summary:

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

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

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

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

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

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

Education:
PhD in Physical Chemistry from the University of Massachusetts

Walter Gist (Situational Awareness and Surveillance Systems)
Summary:
Successfully created and operates a consulting firm specializing in military aircraft avionics, advanced situational awareness, and weaponization. Several years of experience assisting foreign companies successfully market airborne equipment to the US military market. Organized and participated in proposal development, review and vetting. Has 41 years experience in marketing to the large US military OEMs like Boeing, Lockheed-Martin, Northrop Grumman, and BAE Systems. Understands the process by which foreign companies obtain access to

International Trade in Arms Regulations (ITAR) controlled information and the rules and guidelines for doing so. He has also assisted in the merger and acquisition process.

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

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

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

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

Core Competencies:
Natural gas conditioning, dew-point control, dehydration, heavy-ends composition, (CGTs)
Natural gas corrosion inhibitors (US patent # 6,920,802, July 26, 2005)
Cross-functional team industrial applied research project management
Analytical materials identification and root-cause failure determination
Technical reporting and presentations preparation and delivery
Organic, inorganic and organometallic synthesis and characterization
Semiconductor (Group IVA) nanomaterials manufacturing process development

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

YourEncore Senior Manager-Robert Worden

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

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

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

YourEncore Project Manager-Kevin Broida

Kevin Broida is a certified Project Manager (PMP) 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. He earned his MBA from Miami University.

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

Number of YourEncore Experts per Technology Area

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