

Edison Advanced Manufacturing Program (AMP) Proposal Evaluation

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Executive Summary

This report summarizes the funding recommendations for the Edison Advanced Manufacturing Program (AMP).

The Edison AMP is a competitive grant program to encourage new advanced manufacturing project and service activity in Ohio's established base of manufacturing companies, with an emphasis on small and medium sized manufacturers.

Up to \$3.7M may be awarded in increments of \$250,000 to \$500,000 to teams that are led by an Edison Center or other Ohio non-profit. Up to \$2M is reserved for the top ranking Edison Center proposals with the remaining \$1.7M available to the best remaining proposals from all applicants.

A comprehensive evaluation process, based on an extended version of the RFP criteria, was conducted by Redwood Innovation Partners (www.redwdinnov.com). This included ranking by a primary technical and economic development reviewer, further review by other Redwood Innovation staff and a final calibration review attended by all evaluators.

Fourteen proposals, totaling \$5.645M were forwarded to Redwood Innovation for evaluation. Nine of the proposals, totaling \$3.453M, were from Edison Centers.

Five Edison Center proposals, totaling \$2.120M, are recommended for funding. Three other proposals, totaling \$1.297M, are also recommended for funding.



Edison Advanced Manufacturing RFP Objectives and Selection Criteria

Program Objectives

The Edison Advanced Manufacturing Program (AMP) is a competitive grant program to encourage new advanced manufacturing project and service activity in Ohio's established base of manufacturing companies with a particular emphasis on small and medium manufacturers (SMMs). The funding is intended to support both existing Edison Technology Centers and other qualified Ohio nonprofits.

Up to \$3.7 M will be awarded to Ohio based applicants in the amounts of \$250,000 – 500,000. \$2M is offered only to Edison Technology Centers and the remaining funds are available to Edison Centers and other qualified non-profits.

As stated in the AMP RFP:

“The fundable activities under the AMP can include:

- 1) Implementation of a new (but market tested) service activity with the purpose of providing access to or deploying an advanced manufacturing technology capability to a defined client base made up of multiple for-profit Ohio manufacturing companies. Such an activity would have the goal of becoming a sustainable business function of the organization beyond the project period.
- 2) Discrete projects involving two or more manufacturers that will lead to new product manufacturing or improvements in manufacturing operations. Ideally, some aspect of the project would have transferability to companies beyond those initially involved in the project.

In general, AMP projects must:

- 1) Be an advanced manufacturing technology-based competitive advantage for for-profit, Ohio manufacturers and their Ohio operations;
- 2) Lead to lower cost or product differentiation out of the Ohio operations of the for-profit Ohio manufacturers;
- 3) Have an impact on multiple firms, as opposed to a one-off company specific, impact in Ohio; and
- 4) Have those resources and capabilities to be a self-sustaining function after grant funding and cost share has been expended.



Activities not eligible under this Program include:

- 1) Basic or applied research and development activities;
- 2) Development of new, heretofore unproven advanced manufacturing technology; planning, development or pilot service activities; and
- 3) The acquisition of real-estate, basic renovations or construction of a basic facility shell.
- 4) The support of established core business functions or expansion of existing projects ...”

Proposals Evaluated

Fourteen proposals were evaluated. Table 1 summarizes the distribution of applications. The total funding requested was \$5,645,000, with Edison Centers proposing \$3,453,000 in funding.

Table 1 – AMP Proposal Summary

Applicant	Number of Proposals	Total Funding Requested
Edison Centers	9	\$3.453 M
BioOhio	1	\$0.361 M
Center for Innovative Food Technology	1	\$0.270 M
Edison Welding Institute	2	\$0.813 M
Manufacturing Advocacy and Growth Network	1	\$0.500 M
PolymerOhio	3	\$1.010 M
TechSolve	1	\$0.500
Other Ohio non-profits	5	\$2.192 M
National Composites Center	1	\$0.500 M
Ohio Energy and Advanced Manufacturing Center, Inc	1	\$0.395 M
Ohio Fuel Cell Coalition	1	\$0.297 M
University of Akron	1	\$0.500 M
Youngstown Business Incubator	1	\$0.500 M
Grand Totals	14	\$5.645M

The individual proposals are summarized in Table 2. Proposals with Edison Center lead applicants are marked with an asterisk (*).



Table 2 – Individual Proposals Submitted to AMP

LOI #	Lead Applicant	Project Title	Thomas Edison Funds Requested
AMP-14-02	Ohio Fuel Cell Coalition	Ohio Technical Exchange Center	\$297,056
AMP-14-03	TechSolve*	MiniViz: Small Manufacturer, Low Cost Equipment Monitoring	\$500,000
AMP-14-05	MAGNET*	Implementation of Positive Thermal Coefficient Ink Advanced Manufacturing to Accelerate the Printed Flexible Heater Industry in Ohio	\$499,841
AMP-14-06	PolymerOhio*	Simulation Software for Ohio Manufacturers	\$446,653
AMP-14-08	PolymerOhio*	Development and Implementation of Co-injection Molding for High Performance Parts	\$263,000
AMP-14-09	PolymerOhio*	Tailoring Physical Properties through Innovative Surface Texture Application	\$300,000
AMP-14-12	University of Akron	Advanced Roll to Roll Manufacturing of Functional Nanofibers and dECM Hybrids	\$500,000
AMP-14-13	BioOhio*	Ohio Bioscience Entry-Level Talent Assessment	\$360,576
AMP-14-14	Edison Welding Institute*	Structural Connection Performance Simulation and Testing	\$408,829
AMP-14-15	Edison Welding Institute*	Implementation of Advanced Formability Testing Services for Lightweight Vehicle Structures	\$404,112
AMP-14-16	Youngstown Business Incubator	Ohio Precision Printed Parts Initiative	\$500,000
AMP-14-18	National Composites Center	Materials Manufacturing Technology Hub	\$500,000
AMP-14-19	Center for Innovative Food Technology (CIFT)*	Ohio Advanced Food Processing and Packaging Technology Consortium	\$270,000



LOI #	Lead Applicant	Project Title	Thomas Edison Funds Requested
AMP-14-20	Ohio Energy and Advanced Manufacturing Center, Inc.	Development of a Consortium to Study and Advance the Commercialization of High Strain Rate Metal Forming Technologies	\$395,000

Evaluation Process and Criteria

Evaluation Process

A multistep review process featuring individual and collective assessments was used to achieve highly qualified and insightful reviews. Below is the outline of the evaluation process:

1. The program manager scanned the application to confirm it was generally consistent with the RFP requirements. If so, then a prospective lead reviewer was identified. If not, the proposal was not reviewed and the Development Department was notified.
2. The lead reviewer and economic development specialist confirmed in writing that no conflict of interest existed.
3. If a conflict existed, then an eligible and qualified lead reviewer was identified by the program manager.
4. For non-administrative criteria, a common set of assessment factors and a 1 to 5 rating scale were established and shared with all prospective reviewers. The criteria mirrored the full list of Evaluation Criteria on page 14 of the AMP RFP. Sub criteria were identified that allowed a ‘build’ to score each criterion. Weightings were assigned to each criterion. (The ratings scale and the associated definitions are shown in Table 3. The Criteria, Assessment elements, and weightings are shown below in Table 4.)
5. To ensure a consistent evaluation approach, an orientation meeting was held for all reviewers to explain the rating criteria and overall process.
6. One of the Redwood team reviewed all proposals for conformance to the administrative requirements (indicated in Table 4 *by italics*) and noted any discrepancies.
7. The lead reviewer and economic development specialist conducted each review by completing the rating table, commenting in each review category and posting the results to the appropriate Drop box folder. Each of the five review categories was assigned a score by multiplying the 1-5 rating by the category weighting, giving a possible score range of 100 to 500.
8. The Program manager or another Redwood partner and the economic development specialist completed a secondary review for thoroughness and quality.



9. A “calibration review” was held with all evaluators (technical and economic development) to ensure a consistent approach was used from one proposal to the next. Where appropriate, proposal evaluations were adjusted. After rank ordering the proposals, the assembled reviewers were also asked, for each proposal, “If this were my program / my money, would I fund this proposal?”
10. After the calibration review, the Edison Center proposals were considered as a single group and funding recommendations were made up to a total of \$2M. Then the remaining Edison Center proposals were grouped with the proposals from other nonprofits. The strongest proposals from the second group were recommended for funding of up to an additional \$1.7M.

Brief profiles of the nine evaluators are provided in Appendix 1.

Table 3 – Rating Scale (after NSF)

5	Excellent: An outstanding proposal in all respects; deserves highest priority for support.
4	Very Good: High quality proposal in nearly all respects; should be supported if at all possible.
3	Good: A quality proposal, worthy of support.
2	Fair: Proposal lacking in one of more critical aspects; key issues need to be addressed.
1	Poor: Proposal has serious deficiencies.

Table 4 – Edison Advanced Manufacturing Criteria and Assessment Elements



Evaluation Criterion (from EAMP RFP page 14)	Weighting	Key Assessment Elements (<i>RFP administrative requirements in italics</i>)
Degree to which the proposed project will have an impact on multiple manufacturers as opposed to company-specific impacts	25	<ul style="list-style-type: none"> • Provides a significant productivity or quality improvement and the potential for compelling economic returns. • Clearly identifies project beneficiaries and other stakeholders. • Clearly defines size and location i.e., (Ohio, non Ohio) of the group that will benefit. • Clearly defines how the results of the project will be transferred to manufacturers and other project beneficiaries. • Clearly identifies the nature and magnitude of the impacts (both positive and negative). • Demonstrates a history of new technology adoption by this industry. • <i>Has the resources and capabilities to be self sustaining after grant funding and cost share have been expended.</i>
Degree to which the proposed project represents a competitive advantage for Ohio companies	20	<ul style="list-style-type: none"> • <i>Is the proposed project an advanced manufacturing technology-based competitive advantage for for-profit, Ohio manufacturers and their Ohio operations?</i> • <i>Will the proposed project lead to lower cost or product differentiation out of the Ohio operations of the for-profit Ohio manufacturers?</i> • Clear basis of competitive advantage, e.g., secrecy, first mover, IP, complementary assets. • Commitment of the applicant to transfer the technology. • Clear description of ability to maintain competitive advantage over time. • <i>Are two or more for-profit Ohio manufacturers participating in this project and do they meet proposal requirements?</i>
Degree to which the experience and organization of the project team reflect the ability to achieve project success	20	<ul style="list-style-type: none"> • <i>Is the lead entity one of the six Edison Technology Centers or an Ohio non-profit?</i> • <i>Degree to which the Lead Applicant is capable of managing the grant funds, as well as providing the supporting environment to carry out the project.</i> • <i>Can the project be completed within 24 months?</i> • Track record of project team members. • Experience of project team members in collaborating and functioning as a team. • Clearly identified leader with proven success in leading a project of this nature and magnitude. • Prior history of new technology adoption in this industry.



Evaluation Criterion (from EAMP RFP page 14)	Weighting	Key Assessment Elements (<i>RFP administrative requirements in italics</i>)
Degree to which applicant demonstrates the soundness, relevance and maturity of the technology or methodology supported by the proposed project to drive near-term product manufacturing or improved manufacturing operations	20	<ul style="list-style-type: none"> • State of commercial maturity on a scale spanning: idea to repeated successful demonstration at an industrial scale. • Ease of scaling the approach to higher production volumes. • <i>This project is not a basic or applied research project; it is not based on development of new, heretofore unproven advanced manufacturing technology; it does not involve planning, development or pilot service activities; it does not include the acquisition of real estate, basic renovations or construction of a basic facility shell; it is not designed to support established core business functions; and it is not for the expansion of existing projects.</i>
Degree to which the applicant defines realistic and justified metrics for jobs and sales growth to be generated by the project and, in the case of service activities, projections of future clients and revenues	15	<ul style="list-style-type: none"> • Reasonableness of approach to defining metrics. • Reasonableness of proposed approach to collect data for development of job, sales growth and revenue metrics. • Prior experience of applicant in collecting this information. • Reasonableness of applicant's approach to distinguishing impacts due to the project and overall company growth. • Consistency with prior experience for this technology/industry/region.

Evaluation Results and Funding Recommendations

After completing steps one through eight in the evaluation process described above, a set of initial numerical ranking resulted. Those rankings are summarized in Table 5. The proposals fell into 3 overall bands – those there were quite attractive, those requiring further analysis / discussion and those that were least attractive. Shading in Table 5 is used to show the three bands of proposal attractiveness.



Table 5 – Initial Proposal Evaluation Results

LOI #	Lead Applicant	Project Title	Initial Review Score (scale: 100 - 500)
AMP-14-18	National Composites Center	Materials Manufacturing Technology Hub	445
AMP-14-06	PolymerOhio	Simulation Software for Ohio Manufacturers	435
AMP-14-16	Youngstown Business Incubator	Ohio Precision Printed Parts Initiative	428
AMP-14-02	Ohio Fuel Cell Coalition	Ohio Technical Exchange Center	410
AMP-14-03	TechSolve	MiniViz: Small Manufacturer, Low Cost Equipment Monitoring	405
AMP-14-19	Center for Innovative Food Technology (CIFT)	Ohio Advanced Food Processing and Packaging Technology Consortium	405
AMP-14-05	MAGNET	Implementation of Positive Thermal Coefficient Ink Advanced Manufacturing to Accelerate the Printed Flexible Heater Industry in Ohio	365
AMP-14-08	PolymerOhio	Development and Implementation of Co-injection Molding for High Performance Parts	340
AMP-14-12	University of Akron	Advanced Roll to Roll Manufacturing of Functional Nanofibers and dECM Hybrids	340
AMP-14-15	Edison Welding Institute	Implementation of Advanced Formability Testing Services for Lightweight Vehicle Structures	340
AMP-14-13	BioOhio	Ohio Bioscience Entry-Level Talent Assessment	295
AMP-14-14	Edison Welding Institute	Structural Connection Performance Simulation and Testing	283
AMP-14-09	PolymerOhio	Tailoring Physical Properties through Innovative Surface Texture Application	265
AMP-14-20	Ohio Energy and Advanced Manufacturing Center, Inc.	Development of a Consortium to Study and Advance the Commercialization of High Strain Rate Metal Forming Technologies	225



In the calibration review, the group reviewed the top and bottom bands of the ranking and confirmed that each proposal was appropriately grouped. The review team agreed to recommend all top band proposals for funding and to not recommend all bottom band proposals for funding. Recommended funding contingencies were also identified as appropriate for the top band of proposals. Note that more detail on each of the proposals and its' evaluation is provided in the next section of this report.

It is important to mention that the evaluators believe that proposal 14-13 "Ohio Bioscience Entry-Level Talent Assessment", which is not recommended for funding, is a well conceived, potentially high impact proposal. It is, however, outside the scope of this RFP. Perhaps this proposal can be funded from another more appropriate source.

A significant portion of the calibration review was spent comparing and contrasting the middle band of proposals. After substantial discussion, the group identified AMP 14-15 and then AMP 14-05 as proposals that would be recommended for funding with contingencies.

As a confirmatory step, for each proposal in the top two bands, the group was then asked the hypothetical question of "If this were my program / my money, would I fund this proposal?" The question was answered with a unanimous yes for all proposals that are recommended .

Tables 6 and 7 show the respective Edison Center and 'Combined Non-Profit' proposals that are recommended for funding. Based on analysis of the proposal relative to the goals of the RFP, contingencies have been suggested for several of the recommended awards.



Table 6 Edison Center Proposals Recommended for Funding

LOI #	Lead Applicant	Project Title	Requested Funding	Suggested Award Contingencies
AMP-14-06	PolymerOhio	Simulation Software for Ohio Manufacturers	\$446,653	<ul style="list-style-type: none"> • None
AMP-14-03	TechSolve	MiniViz: Small Manufacturer, Low Cost Equipment Monitoring	\$500,000	<ul style="list-style-type: none"> • Confirm there is a viable plan for educating SMM users.
AMP-14-19	Center for Innovative Food Technology (CIFT)	Ohio Advanced Food Processing and Packaging Technology Consortium	\$270,000	<ul style="list-style-type: none"> • None
AMP-14-05	MAGNET	Implementation of Positive Thermal Coefficient Ink Advanced Manufacturing to Accelerate the Printed Flexible Heater Industry in Ohio	\$499,841	<ul style="list-style-type: none"> • Ensure there is some proprietary advantage to Ohio companies • Make the technical development portion of the program explicit, especially any proof of concept / demo done for efficacy, scalability, etc. of DuPont ink.
AMP-14-15	Edison Welding Institute	Implementation of Advanced Formability Testing Services for Lightweight Vehicle Structures	\$404,112	<ul style="list-style-type: none"> • Make project outcomes available to all companies upon project completion. • Strengthen outreach to Ohio SMMs and Economic Development metrics.
		Total Recommended Funding	\$2.120M	



Table 7 – ‘Combined Non-Profit’ Proposals Recommended for Funding

LOI #	Lead Applicant	Project Title	Requested Funding	Suggested Award Contingencies
AMP-14-18	National Composites Center	Materials Manufacturing Technology Hub	\$500,000	• None
AMP-14-16	Youngstown Business Incubator	Ohio Precision Printed Parts Initiative	\$500,000	<ul style="list-style-type: none"> • Ensure on time YSU curriculum introduction. • Achieve \geq 50% for-profit cost share
AMP-14-02	Ohio Fuel Cell Coalition	Ohio Technical Exchange Center	\$297,056	<ul style="list-style-type: none"> • Reduce overhead to 20% or below. • Explicitly identify economic development metrics.
		Total Recommended Funding	\$1.297M	

Individual Proposal Summaries

Individual summaries of each proposal are attached below in numerical order. The “Evaluation” category in the first table of each summary refers to the proposal’s placement (top / middle / bottom) in the rating bands.



<p>Proposal # / Name: 14-02/ Ohio Technical Exchange Center Lead Organization: Ohio Fuel Cell Coalition</p>	<p>Evaluation: Top band Funding request: \$297, 056 Cost share: \$335,154 Cost share committed: \$335,154</p>
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Funding Recommendation: Fund with contingencies. Recommended contingencies are: 1) Reduce overhead to 20% or below and 2) Explicitly identify economic development metrics.

Administrative Issue: Total state funded indirect cost is 23.4% of total state funded direct operational cost

Summary:

- **Project Description/Summary:**

The project goal is to promote and increase the sales of Ohio manufactured fuel cell Balance of Plant (BOP) components to fuel cell OEMs through the exchange of technical and manufacturing data / information to lower the cost of fuel cells for wider acceptance in the market place.

- **Evaluation Summary:**

This is a solid proposal team with a long history and presence in the fuel cell field. The approach proposed is well thought out and the work plan and deliverables are well suited to deliver the project outcomes in 2 years. Well documented and articulated analysis and review of state of fuel cell industry, markets, players, leading role played by Ohio companies and the outcomes of the proposed work to be shared by all stake holders. One question is how much of a direct influence the output of the project will have on lowering the cost of BOP components to drive the overall market attractiveness of fuel cells. Other issues include the impact on established BOP suppliers and securing a competitive advantage for Ohio companies.



Analysis:

Rating Category	Major comments
Multi-company impact	Good set of sub component suppliers along the supply chain for BOP
Competitive advantage for Ohio companies	Should provide a competitive advantage to Ohio companies but perhaps not exclusively
Project team	Strong with proven track record
Soundness /relevance to drive near term outcomes	Well laid out plan to focus on two segments of fuel cell market that shows growth
Realistic and justified metrics	Proposal did not provide quantitative metrics for project success. Main challenge is the continued resistance for wide scale fuel cell adoption

Strengths

- Strong team
- Impact across several stake holders

Weaknesses

- May not be able to directly influence acceptance of fuel cells in target markets with an information center/ advocacy focus
- Need to have a more proactive role to influence growth through cost reduction in BOP sub components
- May not provide exclusive competitive advantage to Ohio companies
- Existence of Technical Exchange may not be beneficial to well established BOP manufacturers

Missing elements

- Direct role to influence lower cost product/ manufacturing of sub component suppliers
- Proposal did not identify quantitative metrics to measure project success.

Other Recommendations:

- The team should develop, measure and report success metrics to demonstrate the impact of the technical exchange.



<p>Proposal # / Name: 14-03 / MiniViz: Small Manufacturer, Low Cost Equipment Monitoring Lead Organization: TechSolve</p>	<p>Rank: Top band Funding request: \$500,000 Cost share: \$898,095 Cost share committed: \$898,095</p>
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Funding recommendation: Fund with a contingency. The recommended contingency is to confirm there is a viable plan for educating SMM users.

Administrative Issue: No indirect costs in budget for lead applicant – see analysis below, Missing Elements.

- **Project Description/Summary**

Machine shops are not adopting machine tool monitoring because the total cost of adoption is high and shop managers are unsure how to use the newly available information to better manage their operations. TechSolve’s proposed solution to this problem is MiniViz™ – a low cost, easy to use, locally installed machine tool monitoring solution specifically designed to meet the needs of small manufacturers.

MiniViz is a departure from typical automated monitoring systems in its simplicity and low cost. MiniViz design requirements are able to overcome the above barriers by providing a low cost, low pain method to begin a basic monitoring and data collection platform. TechSolve believes strongly that even basic monitoring can help Ohio manufacturers make better decisions to increase profitability and competitiveness.

Evaluation Summary

Good team put together, experienced in the technical and market areas already. Committed collaborators and already identified potential next generation users. While initial work focuses on Ohio-based companies, the only Ohio competitive advantage that will be gained is as a first adopter as they will make technology broadly available. Potential for the product success is high based on trends in manufacturing and the anticipated climbing costs of energy.



Analysis:

Rating Category	Major comments
Multi-company impact	Potential to impact companies across multiple market areas involved in any sort of materials or parts manufacturing. Likely to be a major value in energy and machine efficiency studies and implementation appears to be seamless.
Competitive advantage for Ohio companies	For early adopters, many will be from Ohio but TechSolve network is national in scope with many from the Tri-State area around Cincinnati. The only entity that is likely to create a sustained competitive advantage is TechSolve.
Project team	Strong project team with experience in machine monitoring and feedback based on earlier development. The collaborators have all had experience working with lead applicant and have extensive network themselves of vendors and customers that could benefit. TechSolve also has a strong network.
Soundness / relevance to drive near term outcomes	Being more efficient and lowering energy costs in manufacturing are significant drivers for an industry trying to maintain or increase profitability. The relevance of the technology for near term outcomes is significant.
Realistic and justified metrics	Initial (Year 1 and 2) metrics are reasonable and consistent. As the extrapolation continues to out years, though, the numbers begin to get less believable and justification is less rigorous.

Strengths

- Technically very strong proposal, can point to product already available in the market that has developed traction with bigger players who have the financial wherewithal to invest across entire job shop or facility. Reducing the complexity and making more flexible will expand the marketability. Other fed agencies see this type of migration as being extremely important currently and are funding significant efforts (DOE SBIR programs on Cloud Based computing to support SMEs)
- Team put together is highly creditable and already aware of technical and market barriers.



Weaknesses

- The increase from 17 to 530 users over 5 years is hard to believe. Would be interested in seeing how many ShopViz users are out there and how long it took to get to that level.
- Also, the number of sales suggests that MiniViz would be operating upwards of 20-30,000 machines at that time. Market for new tools is around \$90 billion per year and with each CNC on average around \$150K or so, be about 600K sold. However, US is around 7th leading market, so US is around 8-10% of total market, which suggests purchases of 60K a year. Using an assumed fifteen year cycle for tool life, be on the order of 1,000K so MiniViz would have penetrated 3% of market in five years – this seems a little steep.
- Would also have liked to see a Schedule proposed of beginning / end of each step in the proposal over the 18 month time period - assuming they really meant 18 months.

Missing elements

- No overhead being bid by Lead Applicant. This needs to be understood.
- Another concern is how many of NAICS companies listed in page 8 are represented in multiple NAICS codes, so could be double counting both on Table 1 and possibly on Tables 2 and 3.

Other recommendations:

Consider training modules that can be web-based/self-directed so are not dependent on physical availability of TechSolve tech team. Think about international sales if you really plan to market over web.



<p>Proposal #/Name: AMP-14-05 / Implementation of Positive Thermal Ink Advanced Manufacturing to Accelerate the Printed Flexible Heater Industry in Ohio Lead Organization: MAGNET</p>	<p>Rank: Middle band Funding request: \$ 499,841 Cost share: \$503,058 Cost share committed: \$503,058</p>
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Funding recommendation: Fund with contingencies. The recommended contingencies are: 1) Ensure there is some proprietary advantage to Ohio companies, and 2) Make the technical development portion of the program explicit, especially any proof of concept / demo done for efficacy, scalability, etc. of DuPont’s ink.

• **Project Description/Summary:**

The project is aimed at developing novel, safe and cost effective printable positive thermal coefficient inks to create significantly better flexible heating modules than the current graphite foil based ones, for use in diverse high value markets.

• **Evaluation Summary:**

Proposal clearly states and articulates the "problem statement", benefits and how it would benefit multiple stakeholders and companies along the supply chain in Ohio.

The project beneficiaries are clearly identified and include three initial targets as well as the opportunity for later participation by other Ohio manufacturers.

The industry is well adept at deploying novel technologies to address emerging needs, in this case cost effective flexible heating modules/ strips that are reliable and safe.

The Team has companies that are in the various segments of the value chain and should be able to readily implement the project outcomes, and their proximity should help in encouraging strong interaction to resolve issues.

The outreach efforts are strong and well-articulated, and include two chains of dissemination of the technology.

The project seems to have the resources and capabilities to be self-sustaining after completion of project funds. The strong histories of these firms should help assure the project's sustainability.

Metrics are well covered. The experience and past performance of the Team members adds credence to their projections of job creation, sustainability and market opportunity.



The problem that is being addressed is an industry wide one looking for a cost effective solution. If solved, the market and growth opportunities projected are quite achievable. The team has specified expected sales impacts, as well as both short term and long term "dynamic" metrics to aid in evaluating the success of the initiative.

Analysis:

Rating Category	Major comments
Multi-company impact	Broad set of companies that could benefit
Competitive advantage for Ohio companies	Reasonable competitiveness - need to articulate sustainable Ohio based advantages, as the key material from Du Pont is available for others
Project team	Good solid team with proven track record
Soundness / relevance to drive near term outcomes	Need to be more focused on product outcome from the start and not capability development
Realistic and justified metrics	Metrics are well articulated

Strengths

- Attractive market with potential for profitable growth for several companies in OH
- Solid team

Weaknesses

- Focus is on application research/development as written. Need to change to product development focus.

Missing elements

- Product/ manufacturing focus within 2 year project period

Other recommendations

- Worthwhile area to support with revisions to focus on product based outcomes and less on capability development



<p>Proposal #/Name: 14-06 / Simulation Software for Ohio Manufacturers Lead Organization: PolymerOhio</p>	<p>Rank: Top band Funding request: \$446,653 Cost share: \$679,050 Cost share committed: \$679,050</p>
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Funding recommendation: Fund.

Administrative Issues: Lead applicant budget did not include \$89,999 of collaborator cost share (Compuplast, EMCC, Moldex, SCC, SCM) in the consolidated budget form. This additional cost share is included in this summary.

• **Project Description/Summary:**

The PolymerOhio Team proposes to extend its’ polymer processing portal to six simulation packages and conduct initial training and demonstrations with 11 industrial partners. This approach has promise for making advanced technology readily available to small and medium manufacturers (SMMs). A substantial (> 300) number of other prospective SMMs will also be contacted.

• **Evaluation Summary:**

This is a very strong proposal that directly addresses most the AMP RFP criteria. The Ohio Polymer industry is among the nations largest and has many SMMs who could benefit from this program. It could be further strengthened by better quantification of the economic outcomes associated with this estimate – at the product, firm and state levels.

Analysis:

Rating Category	Major comments
Multi-company impact	This proposal has the potential for positively impacting the many Ohio SMMs who are part of the polymer industry. Tech transfer process is well described.
Competitive advantage for Ohio companies	The proposed approach will lead to a technology based competitive advantage for all who use it. Should there be a premium charged for access by non-Ohio companies?
Project team	The project team has had success with a similar project and has a good blend of polymer processing, project management and simulation experience.



Rating Category	Major comments
Soundness / relevance to drive near term outcomes	Simulation technology is proven as is a portal / cloud delivery approach, so potential for near term outcomes is high. Need to validate pay as you go business model.
Realistic and justified metrics	The economic development metrics are modest and vaguely defined. These need to be strengthened, especially at the overall SMM and Ohio levels.

Strengths

- Ready access to simulation tools is a clear need / opportunity. The portal approach and state based training seems like an efficient, realistic approach.
- Very encouraged to see the level (11) of industrial collaboration/commitment. This is a near term opportunity with (hopefully) significant upside. It is also great to see the commitment to engaging the SMMs!

Weaknesses

- Poor quantification of the economic upside for simulation - at the product, adopting firm and state levels.
- Unclear, assumption filled model for economic sustainability of the portal.

Other recommendations:

- Consider leveraging the experiences global engineering / technology companies have had with using cloud based portals.



<p>Proposal # / Name: 14-08 Development and Implementation of Co-Injection Molding for High Performance Parts Lead Organization: PolymerOhio</p>	<p>Rank: Middle band Funding request: \$263K Cost share: \$263K Cost share committed: \$263K</p>
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Funding recommendation: Do not fund.

Summary:

- Project Description/Summary:**
 The team proposes to develop and then prototype polymer parts that take advantage of co-injection technology capabilities. A molder, two customers and a polymer supplier are part of the well configured team.
- Evaluation Summary:**
 Co-extrusion technology is complex, expensive and has been slow to catch on. The team does not appear well positioned to capture major growth opportunities and has not provided a plan for engaging and enabling other SMMs.

Analysis:

Rating Category	Major comments
Multi-company impact	Concerned that the project team includes only one SMM polymer processor and has a weak technology transfer plan.
Competitive advantage for Ohio companies	The relative complexity and expense (> \$100K) of co-extrusion suggest that there will be a competitive advantage for the companies that adopt it.
Project team	This is a strong team that appears to have all the ingredients for success. It would be nice to see another polymer SMM on the team.
Soundness / relevance to drive near term outcomes	The relative complexity, expense and slow acceptance of the technology suggest that widespread adoption will be gradual, not near term.



Rating Category	Major comments
Realistic and justified metrics	The economic impact estimate for Venture Plastics is well done. Would like to also see an estimate for PolyOne and Ohio polymer processors.

Strengths

- Good path to a differentiated product for one supplier. Nice job engaging the relevant supply chain players.
- Given the technical complexity and specialty applications, significant technical barriers will be created.
- Economic development outcomes, though modest, are clearly stated and reasonable.

Weaknesses

- Capital intensive co-extrusion equipment and more complex process also create barriers to adoption for Ohio companies.
- Given its' slow acceptance, co-extrusion seems to be a technology looking for a problem to solve.

Missing elements

- Commitments to assist other SMMs from UDRI, assuming PolymerOhio and PolyOne are fully on board.
- Specific plan for engaging other molders beyond Venture Plastics and helping to finance their co-extrusion equipment.



<p>Proposal # / Name: AMP 14-09 / Tailoring Physical Properties through Innovative Surface Texture Application Lead Organization: Polymer Ohio</p>	<p>Rank: Bottom band Funding request: \$410,000 Cost share: \$439,000 Cost share committed: \$439,000</p>
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Funding recommendation: Do not fund.

Administrative Issue: Lead applicant budget did not reconcile and was \$110,000 lower in state funding than reported on the collaborator budget sheets. This additional state funding is included in this summary. Proposal funding still meets all funding criteria.

Summary:

- **Project Description/Summary:**

The team proposes to develop structure property relationships of polymeric materials for engineered surfaces of interest in several industrial film / coating applications. The proposal is primarily focused on developing capabilities related to structure property studies, modeling and transferring the information to partner companies for implementation.

- **Evaluation Summary:**

It appears that the Team has a clear understanding of the need for developing structured polymeric surface technology of value in myriad applications. The team has focused on developing research and development tools that would address structure-property relationships that would be useful in such applications.

The scope of work is primarily applied research and developmental and transferring the "information/ data" for implementation at the three companies. Other factors that need to be in place for effective implementation, leading to commercial products in a timely manner, are not explicitly covered. Factors such as durability of such surfaces in use, low cost manufacturing of such surfaces and technology transfer of capability to companies for implementation are not addressed.

The markets appear to be mature and slow to adopt new products. This is a very conservative industry (e.g. coatings, floorings, etc.) and takes a long time to get new technologies qualified, validated and fully accepted. Further, competition is strong.

Stronger outcome metrics are suggested to allow valid evaluation of the success of this program.



Analysis:

Rating Category	Major comments
Multi-company impact	A bit weak
Competitive advantage for Ohio companies	Competitive advantages not well articulated and supported.
Project team	Good
Soundness / relevance to drive near term outcomes	The scope of work is primarily capability development, it does not include all the required modeling / structure property information for commercializable products. It is not clear how the technology would be transferred to manufactured products in 2 years.
Realistic and justified metrics	Metrics are not complete and not well supported

Strengths

- Need for structured surfaces identification
- Good Team

Weaknesses

- Largely capability development in scope.
- Metrics, monitoring of projects tasks/ deliverables and transfer to products not well covered.

Missing elements

- Realistic plan to implement information/ capability developed at Univ. of Akron to manufacture products
- Market justification is not compelling

Other recommendations:

- Start with specific products needs from the 3 companies that can deploy "structured polymeric surface" features to grow through new product introductions. After setting the product specs/ attributes, conduct relevant structure-property- modeling tasks to identify optimum set of materials, design, process, scale up/ manufacturing and testing (for durability, etc) features.
- Transfer the information to companies to start making prototypes and launching products for sale. In short, reverse the chart shown on Fig 2, page 9 of the proposal to have market/ product focus and developing needed tools and capabilities to meet the goals.



<p>Proposal # / Name: AMP-14-12; Advanced Roll to Roll Manufacturing of Functional Nanofibers and dECM Hybrids Lead Organization: University of Akron</p>	<p>Rank: Middle band Funding request: \$ 500,000 Cost share: \$514,680 Cost share committed: \$514,680</p>
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Funding recommendation: Do not fund.

Administrative Issues: The lead applicant’s budget did not reconcile with collaborator budgets because it did not include \$325,000 collaborator cost share. This additional collaborator cost share is included in this summary. Proposal funding still meets all funding criteria.

Summary:

- **Project Description/Summary:**

The proposal is focused on overcoming product enhancement and manufacturing barriers of functional polymer nano fibers and nanofiber functionalized Xenograft materials by working with partner companies and IP from University of Akron and roll to roll manufacturing capabilities at the Akron Innovation Labs.

- **Evaluation Summary:**

The project scope, objective and deliverables, if successfully met, have the potential to have a significant positive impact on the use of functionalized fibers in diverse medical, separation and other high value markets/ applications.

The expected outcome of the project is compelling, with an estimated 25 to 35 new permanent Ohio jobs and greater than \$15 million in annual sales at the end of the project period. The project addresses an important, unmet need in the field related to cost effective continuous production of new functionalized materials.

SNS fibers and Viscus Biologics project Team members are well positioned to exploit the outcomes of effort. The parties are in relatively close proximity, which will aid collaboration throughout the project and after completion. Roll to roll manufacturing capability is well suited to the project scope.

Besides these two OH based companies, the new manufacturing technology developed in the project would have value in the rest of US and globally, and will be accessible to Ohio and non-Ohio companies via licensing.



The proposal team has estimated impacts and potential markets. The medical and diagnostic industry is adept in taking new technologies to market. The Team has the needed capabilities and resources to be self-sustaining after grant funding ends.

This is a very IP rich area with a strong team to develop high value products in a growing market that is well suited for new product adaption.

Market segmentation and potential impact, defensibility and providing competitive advantages to Ohio manufacturers are good.

The scope, as written, is primarily focused on capability building. Scope needs to be recast to a product focus with a few target products identified by the partner companies that have the best fit with the proposed chemical/manufacturing advances. FDA and other regulatory related issues must be considered upfront in selecting “target products for roll to roll manufacture”.

Metrics, including GANTT chart type monitoring, deliverables, etc. need to be strengthened to have measureable outcomes in 2 years.

Analysis:

Rating Category	Major comments
Multi-company impact	Very high probability
Competitive advantage for Ohio companies	High and attractive
Project team	Strong
Soundness / relevance to drive near term outcomes	Need to focus on product outcome based scope and not primarily on capability development
Realistic and justified metrics	Need to strengthen with product focus based plan.

Strengths

- Market/ IP/ competitive advantage
- Strong team



Weaknesses

- Focus on capability development and not specific on product outcomes
- Need to strengthen metrics to meet deliverables in 2 years

Missing elements

- Implementable work plan with milestones

Other recommendations:

- This proposal needs major modification/revision. The proposal would be better focused to deliver the outcomes with the following approach.
 - Select 1-2 most attractive opportunities (product or product platform) that can benefit the most from the use of University of Akron's technology related to DIBO functionalization, azide attachment of actives (pick protein, carbohydrate, etc).
 - Assess upfront for any potential FDA/ regulatory issues in the intended use(s). Pick the selected 2 systems for optimization, process study and proceed to roll to roll advanced manufacture.
 - Provide prototype samples for in house testing and limited field testing. This scope of work could be completed in a 2 year project.

<p>Proposal #/Name: AMT 14-13/Ohio Bioscience Entry-Level Talent Assessment Lead Organization: BioOhio</p>	<p>Rank: Bottom band Funding request: \$360,576 Cost share: \$360,760 Cost share committed: \$360,760</p>
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Funding recommendation: Do not fund.

Administrative Items: The budget section of the proposal reads as follows: *"This is a significant and necessary portion of the budget. These include payments to testing services for on-line access, Taylor Strategy Partners will play a key role in forming both the appropriate questions, analysis of data and finally a web based market facing tool, the Ohio Bioscience Entry-Level Talent Assessment. We anticipate Wright State University will have out of pocket expenses that we have budgeted for."* Yet, the budget does not reflect either organization receiving state funds through this procurement.

Summary:

- **Project Description/Summary:**

As proposed, this project will result in the development and commercialization of the Ohio Bioscience Entry-Level Talent Assessment. This assessment tool, once developed, will enable manufacturing employers to screen candidates, benchmark them against top performers in their company and peer organizations, and target training interventions for their current employers.

- **Evaluation Summary:**

This project involves planning and development of a new service activity, it is not specific to enhancing economic growth in Ohio based on advanced manufacturing technology and is, hence, inconsistent with the goals for this procurement. In spite of this, the proposal is well conceived and could be important to Ohio’s BioScience Industry. Alternate funding sources should be pursued.



Analysis:

Rating Category	Major comments
Multi-company impact	This project has the potential to impact several bioscience companies across Ohio. A commitment has been made to work with more than 20 collaborating companies in year 1; in year 2 more than 1,200 Ohio bioscience companies will have access to the tool proposed for development.
Competitive advantage for Ohio companies	The advantage to Ohio companies would come through improved ease and efficiency of assessing, recruiting, and retaining entry-level talent.
Project team	The project team includes BioOhio, Taylor Strategy Partners, Wright State University plus nine Ohio manufacturing companies: NAMSA, SNS Nano Fiber Technology, Aptalis Pharmatech, PharmaForce, Cleveland HeartLab, Mound Laser and Photonics Center, Sparton Medical, E-Beam Services, and DG Medical.
Soundness / relevance to drive near term outcomes	The approach is clearly presented and has the potential to achieve the outcomes as proposed.
Realistic and justified metrics	BioOhio reports more than 1,200 unfilled positions in the industry; 65 percent of these are purported to be entry-level – the target for this assessment tool. BioOhio projects more than 275 jobs filled during year two, but does not distinguish between those filled by the tool and those filled by other means. Several other metrics are suggested which involve tracking and counting, but they do not uniformly include goals that indicate success or lack thereof.



Strengths

- The industry, through surveys and interviews, has stated the need for improved efficiency in assessing, recruiting and retaining talent. This proposal addresses that need.
- The approach is thoughtful, clearly enumerated, and shows the potential to achieve the proposed outcome.

Weaknesses

- This program involves planning and development of a new service activity. It does not provide access to or deploy an advanced manufacturing technology. As such it is inconsistent with the goals for this AMP procurement.
- The program does not generate job growth, but instead has the potential to increase the efficiency with which the jobs are filled. It may be difficult to assess the number of jobs that are filled solely as a result of the use of the tool.

Missing elements

- Job growth attributable to the investment in this program.
- Method for distinguishing project impacts from those naturally occurring in hiring practices.

Other recommendations:

- Reconfigure the proposal to be a pilot with one or more SMMs that identifies the most efficient human resource strategy to implement/scale up a specific Advanced Manufacturing technology. Or...
- Assist BioOhio in identifying an appropriate funding source for this activity.



<p>Proposal # / Name: 14-14 / Structural Connection Performance Simulation and Testing Lead Organization: EWI</p>	<p>Rank: Bottom band Funding request: \$408,828 Cost share: \$ 409,600 Cost share committed: \$409,600</p>
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Funding recommendation: Do not fund.

Administrative Issue: Letter of support from Alcoa but no cost share. Can a for-profit company be one of the two required participants without providing cost share?

- Project Description/Summary**
EWI propose to lead the development of a simulation and modeling portal for welded automotive parts. The program includes development of a user interface / portal, computational tools and experimental validation.
- Evaluation Summary**
This is a world-class team that is developing a service / product with high potential for an industry which is vital to Ohio’s economic health. While Ohio based SMMs could certainly benefit from the proposed tool and capabilities, the proposal does not include any SMMs or provide a plan for engaging them. Finally, it is not clear if the project outcome will allow SMMs to conduct their own simulations or create a proprietary EWI service offering.

Analysis:

Rating Category	Major comments
Multi-company impact	It appears that all prospective customers are constrained to work through EWI for technical assistance vs being able to 'do it yourself' with the portal – is this so? There is no plan for introducing this service to SMMs or supporting their adoption. There is also limited justification of how important the simulation is to component suppliers vs automotive companies. AweSim, now under development by OSC, must be functional to implement this service. There appears to be only one meaningful industrial collaborator, who is not a SMM.



Rating Category	Major comments
Competitive advantage for Ohio companies	"National Center for Manufacturing Science reports that access to effective predictive simulation technologies can reduce product design cycles by as much as 66 percent." Having ready access to this sophisticated capability could be a real differentiator for Ohio SMMs. This is sophisticated technology, so there will be a learning curve, and hence a competitive advantage for companies who adopt this approach. The plan is to offer this nationally (page 17), so not sure of the Ohio competitive advantage - should this be limited to Ohio based companies? Could also charge a premium to non-Ohio companies.
Project team	The lead applicant is an Edison Center. There is a prior history of successful collaboration between EWI and OSC (Ohio Supercomputer Center). With the addition of Honda and Alcoa (need to confirm) this is a world class team. However, the team does not include the target adopter - a SMM
Soundness / relevance to drive near term outcomes	How mature is the simulation & modeling approach? AweSim is currently under development - not yet demonstrated?? Claimed to be similar to successful Weld Predictor which has shown good adoption. Also say in the proposal that technical uncertainty may lead to re-negotiating scope and budget for auto components (Task 7). Offsetting this uncertainty are the credentials and track record of Honda and EWI. As this is fairly complex technology, the benefits for SMMs will likely occur in the mid-term, not near term.
Realistic and justified metrics	There is no substantive discussion of jobs and sales growth that this proposal will enable beyond the positive impacts for EWI and OSC.

Strengths

- This is a world-class team developing a service / product with enormous potential for an industry that is very important to Ohio's economic health.



Weaknesses

- Lack of a SMM team member and a plan to engage SMMs post development is a serious weakness.
- There may also be some significant technical risk relative to the 'ready to commercially implement' spirit of the RFP.
- It is not clear to the reviewer if the logical outcome of this project is a broadly available advanced portal based capability or enhanced proprietary business prospects for EWI and Honda.

Missing elements

- Meaningful recruiting / engagement of Ohio SMMs.
- How will any intellectual property that is developed be managed so as to best enable efficient, low cost access by all Ohio companies?

<p>Proposal # / Name: 14-15 Implementation of Advanced Formability Testing Services for Lightweight Vehicle Structures</p> <p>Lead Organization: EWI</p>	<p>Rank: Middle band</p> <p>Funding request: \$404,112</p> <p>Cost share: \$404,995</p> <p>Cost share committed: \$404,995</p>
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Funding recommendation: Fund with contingencies. The recommended contingencies are: 1) The resulting forming tools / service be immediately available to Ohio SMMs, 2) The economic development metrics should be strengthened and 3) Provide a more explicit and comprehensive plan for engaging other Ohio SMMs.

- Project Description/Summary:**
 The EWI led team proposes to provide the advanced tools needed to efficiently design and form high strength materials that comprise an ever increasing portion of the automobile body. This capability could be very helpful in assisting Ohio SMMs to stay competitive in this \$4 billion, rapidly growing market.
- Evaluation Summary:**
 The team, technical proposal and associated Ohio business prospects are top notch. The plan for engaging SMMs beyond the team and quantifiable economic development estimates is vague or missing. Finally, the plan to initially restrict access to this capability for an unspecified time period is unacceptable.

Analysis:

Rating Category	Major comments
Multi-company impact	The potential for achieving a substantial multi-company impact is clear. The plan to do so is not. Initial, open-ended restrictions on availability are unacceptable.
Competitive advantage for Ohio companies	This capability is critical to at least allow Ohio SMMs to keep pace with others. Hopefully it will lead to company specific trade secrets. How will this offering be different from that currently offered by Forming Technologies, Inc?
Project team	This is a world class team that includes well qualified SMMs.



Rating Category	Major comments
Soundness / relevance to drive near term outcomes	Though the scientific / engineering principles are established, at least some development remains. Given required development and initial use restrictions, achieving near term impact may be a challenge.
Realistic and justified metrics	The discussion of project specific success metrics is good. Need to add specific economic development metrics for EWI, partner companies and Ohio metal forming industry.

Strengths

- This proposal targets an important technical gap in a manufacturing sector that is critical to Ohio.
- The team is world class in every way, including SMMs.
- The proposed technical program is appropriate, realistic and well conceived.

Weaknesses

- At least some, potentially significant, development remains.
- The plan to share with manufacturers outside the team is vague and has an unspecified time lag.

Missing elements

- Economic development impact in \$ and / or jobs is essentially absent.



<p>Proposal # / Name: 14-16 Ohio Precision Printed Parts Initiative</p> <p>Lead Organization: Youngstown Business Incubator</p>	<p>Rank: Top band</p> <p>Funding request: \$500,000</p> <p>Cost share:\$574,734</p> <p>Cost share committed: \$574,734</p>
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Funding recommendation: Fund with the contingencies. The recommended contingencies are: 1) Ensuring that the Youngstown State curriculum is introduced on time and 2) Provide at least 50% of the cost share from for profit entities.

Administrative Issue: Consolidated budget does not reconcile with individual collaborator budgets with \$25,000 more state funding in the consolidated budget. The consolidated budget was used for this summary. Proposal funding did not meet criteria because the for-profit cost share is less than 50 percent.

- **Project Description/Summary**

The proposed effort seeks to widen the application of additive manufacturing (AM) technologies by transforming rapid prototyping into rapid manufacturing by developing post-processing capabilities. Development and demonstration of this post-processing effort will enable adoption of metal-AM processes in lieu of conventional manufacturing, as applicable.

- This program focuses on companies that would benefit from printed metallic parts along with the AM suppliers and post processor companies. This includes 3D printing or AM providers, post processing providers (e.g. CNC machiners), manufacturing integrators, and OEM's that can adopt 3D printing parts embracing a wide range of Ohio SMMs. The program also has an impressive training program to educate Ohio companies that fall within the above categories to learn and embrace this disruptive technology.

- **Evaluation Summary**

This proposal can leverage the AmericaMakes federally funded advanced manufacturing center established in 2012 in Youngstown. There are a good core group of companies to start (10) with and list of active participants to increase core over the period of performance. The partnership with an academic institution to develop what appears to be undergraduate courses will not have the impact that training courses for skilled operators or those working in the field already would have. The ability to manufacture parts through this initiative should help lower costs for new product implementation.



Analysis:

Rating Category	Major comments
Multi-company impact	Project launch with 10 partners already identified and many committed collaborators. Plan to extend to more than 50 by end of the five year launch time. Focus is initially on NE Ohio firms, plans to expand to other areas of Ohio and nationally appear to be gestational.
Competitive advantage for Ohio companies	Ohio companies and Ohio divisions of larger national and international companies will be involved initially, so have the first to enter advantage. However the educational aspects will allow training of students that then can take technical know-how with them where ever the best jobs are available.
Project team	Business wise there is a strong contingent which has earned accolades for incubation of technologies and companies. Technically the P3N and the availability of equipment for SMMs to access without purchase is an important emphasis. YBI has the needed resources and track record of success in software development.
Soundness / relevance to drive near term outcomes	Near term outcomes look like they will be relatively easy to achieve assuming project can pull from those firms already involved in the AmericaWorks federal initiative.

Rating Category	Major comments
Realistic and justified metrics	The economic justification metrics and indicators seemed murky for industry as a whole. The proposers state that the concentration of industry of interest in NE Ohio is greater than the norms for US so they feel they have a large, centrally located market. That needs to turn into members, though, which will be driven by success of installing equipment and creating relevant training course work that will help the industry. The metrics for YBI growth were more specifically spelled out but not really of prime importance in this project. Did indicate that 3D printing market is projected to grow 11-17% per annum over next decade but not clear what technologies will win out.

Strengths

- Large initial cadre of companies willing to sign on as collaborators.
- Ability to develop actual parts, not models, using the methods being proposed
- Concentration of both companies and skilled manufacturing talent available locally that would benefit from the opportunity for training in new technologies and access to equipment to try before buying.
- Should be able to leverage learning and collaborative development from the 2012 NNMI AmericaMakes federally funded initiative centered in Youngstown.

Weaknesses

- Unclear if some of what is being proposed is to the market entry point of the product life cycle or is it still in the demonstrating (R&D) stage.
- The economic impacts described are somewhat muddy/murky in details.
- It is commonly believed that a resulting AM product is necessarily 'porous' compared to other methods (forging, etc.). Porosity, of course, reduces strength and especially toughness. They likewise say AM has great potential. Thus, need to confirm that the part mechanical properties are appropriate for the intended applications. If parts are not 'structures' critical, why use metals?
- Companies are entirely focused in North East Ohio. They would have to ensure that all of Ohio benefits. It is believed that this initiative would leverage constituents from the AmericaMakes federal pilot initiative in additive manufacturing also based in Youngstown so that while its initial focus is Ohio companies, the portfolio being assembled would extend nationwide eventually.



<p>Proposal # / Name: 14-18 Materials Manufacturing Technology Hub Lead Organization: National Composites Center</p>	<p>Rank: Top band Funding request: \$500,000 Cost share: \$500,000 Cost share committed: \$500,000</p>
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Funding recommendation: Fund.

- **Project Description/Summary**

Having a significant stake in the aerospace industry as the number one commercial aviation supplier state to both Airbus and Boeing, Ohio must leverage its manufacturing legacy to escalate the competitiveness of its supply chain to meet market demand. The Materials Manufacturing Technology Hub (MMaTH) for aerospace will enhance the Ohio and U.S.-based CNC machining aerospace supply chain through an unconventional approach to technology, supply chain and workforce development. MMaTH stimulates economic growth in Ohio by addressing issues that have been widely identified as barriers currently facing the industry: Engineering Technology, Training, Supply Chain Development and Business Analytics. By producing new manufacturing practices for actual aircraft components and providing advanced instruction and on-the-job training, the MMaTH program will augment the aerospace supply chain and competitively position Ohio companies for the commercial aviation global market expansion opportunity.

- **Evaluation Summary**

The proposed project offers a significant potential for a competitive edge to for-profit Ohio Companies by having well trained, certified workers throughout the supply chain that employ advanced CNC methods and methodologies for manufacture of commercial aerospace parts. With the MMaTH, advanced aerospace parts will be delivered on time, with precision which translates to lower parts cost with less scrap.

Analysis:

Rating Category	Major comments
Multi-company impact	The formation of the Materials Manufacturing Technology Hub (MMaTH) offers all interested lower tier suppliers a new, affordable avenue to access training, certification, and innovative technology in CNC based manufacturing in the aerospace industry.



Rating Category	Major comments
Competitive advantage for Ohio companies	The proposed project offers significant potential for a competitive edge for for-profit Ohio Companies by having well trained, certified workers throughout the supply chain that employ advanced CNC methods and methodologies for manufacture of commercial aerospace parts. With the MMAaTH, advanced aerospace parts will be delivered on time, with precision which translates to lower parts cost with less scrap.
Project team	Lead Applicant and collaborators have the necessary experience and resources to succeed in this project. NCC previously led projects that employ a similar strategy. Using experienced partners with innovative manufacturing parts capabilities, NCC was able to successfully achieve “out-of-the-box” designs that were cheaper to build, with less time to completion, and demonstrated quality performance.
Soundness / relevance to drive near term outcomes	The Hub provides a near term solution to a potentially unending spiral of SMM non-competitiveness through its’ access to comprehensive resources and training capabilities which present (and future) workers can affordably access that have not been reachable by SMMs previously.
Realistic and justified metrics	Both Boeing and Airbus have a significant presence in Ohio and their commercial markets have robust growth prospects. The estimations for jobs and revenue generated per employee seem somewhat high and the basis for projections are extracted from a referenced Industry 2012 report. Comparisons were made with other applications of trained workers (via improved processes) in general manufacturing of steel structures and the levels of jobs and revenue generated were projected to be an order of magnitude less than the levels given here.



Strengths

- The proposed project offers a significant potential for competitive edge for for-profit Ohio Companies by having well trained, certified workers throughout the supply chain that employ advanced CNC methods and methodologies for manufacture of commercial aerospace parts.
- With the MMaTH, advanced aerospace parts will be delivered on time, with precision which translates to lower parts' cost with less scrap.

Weaknesses

- While the solution proposed addresses these requirements, the lead will have to be very diligent in ensuring that SMMs are fully cognizant of necessary commitments.
- The economic impact predicted appears to be somewhat optimistic in market penetration and success.

<p>Proposal # / Name: AMP- 14-19; Ohio Advanced Food Processing and Packaging Technology Consortium Lead Organization: Center for Innovative Food Technology</p>	<p>Rank: Top band Funding request: \$ 270,000 Cost share: \$270,000 Cost share committed: \$270,000</p>
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Funding recommendation: Fund.

- **Project Description/Summary**

This project focuses on helping Ohio food processing companies to expand the use of several advanced processing and packaging systems, including high pressure processing (HPP), flexible retort packaging, etc. The major deliverable is an outreach / educational / network based infrastructure that would accelerate the use of the advanced packaging technologies amongst the majors and over 1,100 small companies in the state.

- **Evaluation Summary:**

The proposal clearly identifies project beneficiaries with compelling economic returns and sustainability after grant funding and cost share have been expended. The project includes three major Ohio food processors in the Team and access to over 1,100 smaller processors in the state. The food processing / packaging industry has a strong track record of implementing new technologies to improve quality, safety, freshness, and natural / organic content.

This is a solid proposal having a broad impact for the food processing companies in the state and thus helps grow their business and stay competitive in this very important segment of the state economy.

Proposed approaches and estimates for market growth, penetration in different segments of the food markets, defining metrics, etc. seem reasonable. Prior experience for the SPP technology in food packaging in Ohio supports the projected economic outcomes.



Analysis:

Rating Category	Major comments
Multi-company impact	Very strong
Competitive advantage for Ohio companies	Being an advocacy/consortium oriented focus and outreach/educational in scope, great attention needs to be paid to implementation.
Project team	Strong and well versed in the field with accomplishments
Soundness / relevance to drive near term outcomes	Well articulated market segmentation, growth and implementation
Realistic and justified metrics	Realistic metrics to achieve projected outcomes in two years

Strengths

- Addresses a growing need/ opportunity in the industry that would benefit myriad companies in Ohio
- Strong team with achievable goals

Weaknesses

- Specific work plan with milestones lacking
- Too many objectives—select 2-3 major objectives

Missing elements

- No GANTT chart

Other recommendations:

- This is a service type proposal and not manufacturing oriented. This proposal should be presented as a service / outreach type in scope to aid in wider use of SPP packaging in Ohio for the food packaging industry.



<p>Proposal # / Name: 14-20 / Development of a Consortium to Study and Advance the Commercialization of High Strain Rate Metal Forming Technologies Lead Organization: Ohio Energy & Advanced Manufacturing Center, Inc. (OEAMC)</p>	<p>Rank: Bottom band Funding request: \$395,000 Cost share: \$390,000 Cost share committed: \$395,000</p>
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Funding recommendation: Do not fund.

- **Project Description/Summary:**

OEAMC proposes to form a consortium for High Strain Rate Metal Forming (HSRMF) technology which will be a public-private-government-industry-academic partnership to stimulate investment and promote advanced manufacturing in small and medium sized companies.

- **Evaluation Summary:**

The project aims to create a consortium that is led by OEAMC and American Trim to support the growth of HSRFM technology in manufacturing. The role of the other for-profit manufacturing companies identified in the proposal is not clear. The metrics for jobs created and sales growth do not appear to be realistic.

Analysis:

Rating Category	Major comments
Multi-company impact	Very minimal as stated in the proposal initially. The proposal focuses on creating a consortium which would include multiple manufacturers but the mission and vision of the consortium appears diluted at this time.
Competitive advantage for Ohio companies	The mere creation of a consortium to discuss technical areas of common interest does not, in and of itself, guarantee that companies will be sharing the latest and greatest technology in the specific area. The equipment discussed in the proposal would provide SME's with access to costly capital that they might not otherwise have but does not create a competitive advantage.



Rating Category	Major comments
Project team	The lead and PM are adequate for the effort described. The national labs are nice to have as key team players but understanding their specific role is a challenge.
Soundness / relevance to drive near term outcomes	Do not see near term economic or job growth outcomes based on creation of a consortium.
Realistic and justified metrics	Economic impact is not realistic

Strengths:

- HSRFM is a mature technology and is commercially used by AmeriTrim that has significant expertise in this area.

Weaknesses

- Not focused on developing a service or product that will create competitive advantage for Ohio industry. The focus is on developing a network of companies that would support the OEAMC
- Sales impact and job growth numbers are ill defined if at all.

Missing elements

- Sales Impact
- Job Growth



Appendix 1 – Evaluator Profiles

There were nine evaluators who worked on this project. They are listed by company affiliation and then alphabetically.

Redwood Innovation Partners, LLC / Individual Consultants

Robert Carnes, M.D. Rob was trained as a critical care physician and has served as a DARPA program manager and the Director of self funded (internal) research for Battelle's largest business. Rob has designed technical proposal evaluation processes for DARPA and Battelle and has evaluated over 300 proposals in those organizations. Rob's investments at Battelle generated over \$100M in new sales.

Mary L. Duchi, MBA. Mary has an MBA with a concentration in Finance. She has over twenty five years of experience completing technology and economic development assessments for commercial and public entities. Mary has evaluated hundreds of proposals and programs. Mary is working with Redwood as a independent consultant.

John McArdle, MS, MBA. John was trained as a Chemical Engineer and has an MBA with a concentration in Finance. John has over thirty years of experience in business and commercial development in oil, gas and wastewater treatment. John has evaluated over 200 technical proposals for the EPA and Battelle.

James Sonnett, Ph.D. Jim has a PhD in Chemical Engineering and over thirty years of experience in new product / process / business development in commercial and non-profit environments. He has led technology and commercialization teams and organizations that have delivered over \$300 million in new product / service sales. Jim has evaluated over 300 technical proposals while at DuPont, W.L. Gore and Battelle and has over fifteen years of program management experience.

Bhima Vijayendran, Ph.D., MBA. Bhima has a PhD in chemistry and an MBA. He has over forty years experience with Fortune 500 companies and non-profits. Bhima has lead technology and commercialization organizations that have generated over \$1 billion in new sales. He has evaluated over 200 technical proposals and is named as an inventor on over 100 patents. Bhima has served as an evaluator for technical proposals for Battelle and DOE.



Engineering Mechanics Corporation of Columbus (Subcontractor to Redwood Innovation Partners)

F.W. (Bud) Brust, Ph.D. Bud has a Ph.D. in Computational Mechanics and has extensive experience managing and evaluating large engineering development programs in the Mechanical, Civil, Nuclear, and Aerospace Engineering disciplines. Bud currently serves as Associate Editor of the ASME Journal of Pressure Vessel and Piping (JPVP) and sits on several editorial and technical advisory boards. In his various roles, Bud has evaluated hundreds of papers and proposals for clients, societies such as ASME and governmental entities such as NSF/NAE over the last 30+ years.

Gary Hattery, SM, MBA. Gary was trained as a Chemical Engineer and has an MBA with a concentration in Finance. Gary has over 35 years of experience in business and commercial development across a wide variety of markets encompassing materials for oil/gas, medical, aeronautical and aerospace, automotive, building and construction among others. Gary has evaluated over 300 proposals and programs for such widely diverse entities as OSU's Technology Commercialization Office, Battelle, ACS, ASME, and others.

James Kennedy, Ph.D. Jim has a Ph.D. in Engineering Mechanics. For more than 50 years, Jim has been involved in applications of engineering mechanics principles (dynamics, response of structural systems to a variety of loading conditions, materials behavior, etc.) to support client needs. In his role as lead on many standard and rule setting programs for groups such as the Department of Defense, the U.S. Department of Transportation, the National Academy of Sciences state and local DOTs and industrial/commercial clients, Jim has evaluated hundreds of technologies, proposals and reports for clients.

Prabhat Krishnaswamy PhD. Prabhat has a PhD in Mechanical Engineering and over 25 years of experience in new product/process/business development in commercial and non-profit environments. He has led technology, commercialization and manufacturing teams that have resulted in the creation of new companies and significant new investment in Ohio. Prabhat led the worldwide standards activities in the area of thermoplastic composite lumber. This new industry is now estimated to be ~\$1BN and growing at more than 20 percent annually. Prabhat has served as a reviewer for US NRC on multiple levels and has evaluated hundreds of papers and proposals for clients and governmental entities such as NSF/NAE over the last 25+ years.

