# Project Narrative

## Executive Summary

**Project Title**: *"Workforce Readiness in Agritech & Aquatech Program"*

**Type of Eligible Applicant:** Nonprofit Organization

**Summary**: There is a critical need to advance awareness among middle and high school students about the availability of STEM-based jobs in agriculture and aquaculture. The false stereotypes about the farming and seafood industries are plentiful; that they are dirty, involve long hours, and do not pay well.

The *Workforce Readiness in Agritech & Aquatech Program* seeks to dispel the myths about this sector and to alert students to the good-paying and rewarding career opportunities that are available in the 21st century version of agriculture and aquaculture. Whether it's precision agriculture, automated equipment, drones, sensor-driven lighting or irrigation in urban agriculture, artificial intelligence driven decision-making, improved soil health, better crop protection, increased efficiencies in energy, or software management programs, there are expanding technology-driven jobs in the agriculture and aquaculture sectors.

Using an online educational curriculum, instructional materials, and certification testing, the proposed program plans to complement existing career and technical education (CTE) already in schools. The online content will be correlated to state & national standards via a learning management system. It will also provide industry certification testing and career-readiness for the students through skills validation.

esec Eastern Shore Entrepreneurship Center
Serving Innovative, High-Growth, and Scalable Startups and Entrepreneurs throughout Maryland's Eastern Shore

Eastern Shore Entrepreneurship Center (ESEC) is a private, nonprofit, regional economic development organization for Maryland's Eastern Shore and is a 2019 EDA RIS i6 Challenge awardee for its $F^3$ Tech Program, an accelerator for early-stage companies commercializing innovations and technologies in agriculture and aquaculture. The proposed program will develop a future workforce in support of these technology-based companies.

## Location and Region

Maryland has a rich history in the traditional industries of agriculture and seafood. The state has an abundance of unique geographical features that include not only rich, productive agricultural land but the bounty of the Chesapeake Bay and Atlantic Ocean. This makes for an ideal testbed and development region, conducive for researching how problems in agriculture and the demand for increased food production can be further solved through new innovations and technologies within the 21st Century version of the agriculture and aquaculture industries.

It is based upon the above scenario that the Eastern Shore Entrepreneurship Center (ESEC) was awarded in 2019 with an EDA RIS i6 grant in support of its F³ (Farm·Fish·Food) Tech Accelerator Program that works with agriculture and aquaculture industry partners in assessing and prioritizing problems and then assisting early-stage companies in commercializing innovative and technology-based solutions. The F³ Tech program is currently working with its third annual cohort.

The *Workforce Readiness in Agritech & Aquatech Program*, which will be explained below in greater detail, is targeting its initial efforts on the State of Maryland. This includes twenty-three (23) counties and the City of Baltimore.

In Maryland, four (4) counties meet EDA's distress criteria:

| | 24 Month Unemp | Threshold Calculation | BEA PCPI | Threshold Calculation | Census PCMI (2000) | Threshold Calculation | ACS 5-Year PCMI | Threshold Calculation |
|---|---|---|---|---|---|---|---|---|
| Allegany County, MD | 6.10 | 0.79 | $40,517 | 74.4 | $16,780 | 77.7 | $23,280 | 71.4 |
| Somerset County, MD | 6.82 | 1.51 | $31,562 | 58 | $15,965 | 74 | $18,924 | 58 |
| Wicomico County, MD | 5.68 | 0.37 | $42,054 | 77.2 | $19,171 | 88.8 | $27,622 | 84.7 |
| Worcester County, MD | 9.06 | 3.75 | $60,007 | 110.2 | $22,505 | 104.3 | $35,666 | 109.3 |

Sources: U.S. Bureaus of Census, Labor Statistics, and Economic Analysis; Calculations generated by StatsAmerica

At the end of the funding period for this grant, marketing efforts for the *Workforce Readiness Program* will be expanded to include all of the United States in order to meet the needs of the agriculture and aquaculture sectors at-large.

With the proposed project being a related activity to the F³ Tech Accelerator initiative, it is in line with the priorities of two regional Comprehensive Economic Development Strategies (CEDS) created by EDA approved Economic Development Districts (Mid Shore Regional Council and Tri County Council for the Lower Eastern Shore).

## Needs and Opportunities

Specifically, the Agritech and Aquatech sectors require an ambitious skills development strategy in order to inspire not only the industries as they develop during the 21st Century but middle and high school students who will be the future workforce for these tech sectors. Workforce development is a key part of repositioning the traditional industries of agriculture and seafood within a changing world. 21st Century employers in agriculture and aquaculture are looking for a new brand of talent and demanding a much different set of skills.

Under current population growth and demographic trends, and with food demand projected to increase by 60%–70% by 2050 – a quantum leap in food production and disruptive change in

agricultural and aquaculture is needed in the U.S. Agricultural workforces need 'Industry 4.0' skills. Agriculture is a fundamentally interdisciplinary endeavor and agriculture professionals rely on a range of specialties, necessitating a broad education rich in STEM. In January 2016, the White House Office of Science and Technology Policy made an initial call for action for targeted approaches to expand and diversify the communities and STEM disciplines from which the agricultural sector draws its workforce.

An excerpt from a 2019 report issued by the Agricultural & Applied Economics Association concludes;
*"Recent studies provide evidence that the farm labor supply in the United States is becoming less elastic. Charlton and Taylor (2016) find that rural Mexico, the primary source of U.S. farm workers, is transitioning out of farm work, just as the United States did in the mid-twentieth century and as economies around the globe typically do as they develop. Fan et al. (2015) show that the U.S. agricultural workforce became less migratory in the 1990s, limiting farmers' ability to adjust to short-term shocks by drawing workers from other regions. Richards (2018) finds evidence of persistent labor shortages for harvest workers in California, given a marginal value product of labor insufficient to support higher wages that might attract additional workers. Hertz and Zahniser (2013) document that local farm labor shortages were pervasive throughout the United States in 2011. As the labor supply to U.S. farms continues to contract, farmers will have to invest in labor-saving technologies if they wish to remain competitive in a global economy."*

So as the demand rises for agriculture to become more automated, mechanized, and technology-driven in response to reduced labor availability, future jobs in the industry will require a more elevated level of skill, emphasizing once again the importance of STEM education for our students.

Related to our F³ Tech Accelerator program, we recognize that once our tech-based cohort companies successfully commercialize an innovation or technology and begin to scale, they too will find themselves in need of this new breed of STEM-educated and tech-oriented workforce. It is for this reason that ESEC seeks to begin developing and provide access to a pipeline of online curriculum for middle and high school students that will both create awareness of the opportunities available in Agritech and Aquatech and motivate interest in preparing for the good paying careers that these sectors have to offer.

**Description and Justification of this Project**

It is our proposal to develop, market, and implement an online educational curriculum platform aimed at creating greater visibility among middle and high school students to the technology-based employment and career opportunities in agriculture and aquaculture. The platform will include video presentations, instructional materials, and certification testing. A learning management system (LMS) will be established having a single sign-on integration. Initial content will utilize existing curriculum to which ESEC already has access. Project plans include building upon and elevating the level of this existing curriculum to include additional category topics and the use of X Reality or mixed reality environment technology (XR) to create a heightened user experience. Networking events with industry will also allow students to begin building relationships and encourage their participation in the ecosystem.

The purpose of this project is to:

- Engage middle and high school students through a free online Learning Management System (LMS);

- Introduce students to today's agriculture and aquaculture industries and combat previous stereotypes about what it means to work in farming and seafood;
- Increase awareness among students about the exciting and rewarding jobs and careers available in agriculture and aquaculture;
- Help students develop the knowledge and skills necessary for the kind of jobs that will be available in agriculture and aquaculture in the future;
- Encourage students to maximize their current STEM education in school;
- Assign Micro Badge certification for each curriculum topic/module completed so students can build a portfolio of knowledge & qualifications they can promote, and
- Connect students to companies and industry partners so they begin to be part of an ecosystem network and build relationships that will serve them in their future employment efforts.

This is a private sector, industry-driven workforce development project. It is not affiliated with any college or university nor are we seeking their collaboration in this project other than with Maryland Agriculture Extension, a statewide, non-formal education system within the University of Maryland College of Agriculture and Natural Resources and the University of Maryland Eastern Shore.

Though this project's primary objective is the early workforce development of middle and high school students in our targeted industry sector, it will also have the additional impact of nurturing future entrepreneurs and innovators who may find themselves participating in the F³ Tech Accelerator and commercializing some of the industry's yet to come innovations and technologies.

The key personnel to be involved in this project include:

- Mike Thielke – ESEC Executive Director – Thielke will perform general oversight of and accountability for the project, providing 10% of his full-time hours. He has been ESEC executive director since 2009 and is responsible for the 1,000% growth of the organization's assets and a corresponding expansion of its programs and impact over the past eleven years. ESEC provides general technical assistance to entrepreneurs and startups throughout Maryland's nine Eastern Shore counties, administers a portfolio of regional revolving loan funds (to include relending funds from USDA and SBA), administers a network of six coworking spaces (hotDesks), and initiated the F³ Tech Accelerator program in 2018 that works with early-stage companies commercializing innovations and technologies within the agriculture and aquaculture industry cluster. Thielke has a bachelor's degree in Russian Area Studies and International Economics from Knox College.

- Chris Hlubb – F³ Tech Program Director – Hlubb is an operating executive with twenty years of management expertise. He has aided numerous international high-growth consumer food product manufacturers and distributors through turn-around and expansion efforts by developing and enacting next-level growth strategies. He most recently led the Marky's Group in Miami through an eight-year turn-around and expansion as the President and COO, which included international acquisitions, the construction of an aquafarm & processing facility, the development of a cheese processing plant, and a $20 million international capital raise. He has also procured over $35 million through non-traditional funding sources and was recently the sole sell-side advisor for a $30 million seafood industry divestiture. He is also pursuing one of the most significant aquaculture projects in North America—to develop the first truly sustainable land-based recirculating aquafarm. He is leading the team which includes private investors, global executives, Global 500 engineers and conservationists to

raise $20 million for initial construction. Hlubb has a bachelor's degree in Biology from Randolph-Macon College.

- TBD – Workforce Readiness Project Director – Based upon being awarded this funding opportunity, ESEC will hire a yet-to-be determined director to oversee the day-to-day activities and progress of this project, develop the proposed curriculum content, manage essential partners/vendors, ensure that the project meets the timeline objectives, operate within budget, and achieve the project outcomes and measurements. The candidate to be sought will have previous work experience in education as well as a familiarity with agriculture and project management.

The project's essential partners include:

- CEV Multimedia – CEV Multimedia seeks to create innovative solutions and engaging online curriculum aimed at providing students with the focus and preparation needed for successful transition from K-12 to postsecondary studies to career success, along with providing necessary training for the life-long learner both internationally and within industry. Throughout the company's history, CEV has always teamed with recognized specialists, educators and publishers nationwide to create quality, accurate and appropriate content in efforts to retain student interest and facilitate learning.

- Mixed/Augmented/Virtual Reality Innovation Center (MAVRIC) at the University of Maryland – a 2018 EDA RIS i6 Challenge awardee, MAVRIC develops technologies in multiple areas: scene understanding; object tracking and registration; multimodal rendering; machine intelligence; and interfaces and usability. MAVRIC will aid the project in developing an XR experience for the online curriculum, heightening the student's user experience and providing a more in depth understanding about the agriculture and aquaculture industry in a post-Covid learning environment.

- Credly – Credly is an end-to-end solution for creating, issuing and managing digital credentials that recognize achievement. Using Micro Badges, it empowers the recognition of educational achievement with the most popular platform for verifying, sharing and managing digital badges and credentials. Credly is at the forefront of the digital credentialing movement, and they partner with leading technology companies, service providers, and industry organizations who are similarly focused on the value of verified skills and achievements in unleashing the potential of the workforce.

Other partners involved and which support this project include Maryland Agriculture Extension, Maryland Farm Bureau, and MidAtlantic Farm Credit,

Our outreach and engagement plan includes the following components:

- The target market is middle and high school students throughout Maryland.

- This target market will be approached via a multitude of channels, to include public and private school systems, Future Farmers of American chapters, 4-H programs, state and county Farm Bureaus and their Young Farmers and Ranchers Committees, and Maryland Agriculture Extension offices. Additional channels will be determined as the project proceeds.

- Both print marketing collateral and online digital marketing will be utilized in messaging the value and benefit of the online curriculum. Messaging will also introduce students to the importance of building a portfolio of Micro Badge credentials that certifies the knowledge,

skills, and accomplishments a student has achieved, and which can be used on digital resumes, LinkedIn pages, and/or social media when in pursuit of future employment or advanced education. All printed and digital marketing will acknowledge EDA's financial support for the program.

- Additionally, video conferencing will be used to interact directly with school system decision makers who are responsible for CTE curriculum and other prospective organizations interested in promoting the curriculum to students.
- Monthly press releases will be issued about the program and its progressing accomplishments and impacts. The releases will acknowledge EDA's financial support for the program.
- Students who take advantage of the free online curriculum will be added to the F³ Tech database, receive F³ Tech's weekly e-newsletter as well as other communications and announcements about events, programs, and activities. It is important that students be encouraged to become and remain an active part of the Agritech and Aquatech ecosystem.

**Scope of Work**

The work to be accomplished during this project includes:

- Only a 3-month planning phase followed by a 15-month implementation phase;
- Creating a web landing page for the delivery of a learning management system (LMS) to include analytics of system utilization and corresponding metrics;
- Immediate availability of eighteen (18) existing curriculum topics/modules in agriculture technologies and science on the LMS;
- Immediate marketing and promotion of the curriculum to targeted student markets and audiences;
- Development of ten (10) curriculum new topics/modules in aquaculture technologies and science as well as entrepreneurship and innovation readiness to be added to the LMS;
- Creating Micro Badges to be awarded upon completion of each curriculum topic/module so students can build portfolios of accomplishments and skill development for future self-promotion of workforce skills and abilities; and
- Engaging industry partners to support the LMS as well as participate in networking activities with students that will engage the students into the industry ecosystem.

**EXISTING WORKFORCE READINESS CURRICULUM**

Agricultural Equipment Design & Fabrication
Agricultural Exploration
Agricultural Mechanics & Metal Technologies
Agriculture Power Systems
Agricultural Structure Systems
Animal Science
Energy & Natural Resources Technology
Food Technology & Safety
Forestry & Woodland Ecosystems
Horticultural Science
Introduction to Agribusiness
Introduction to Agriscience
Introduction to Aquaculture Science
Landscape Design, Construction & Maintenance
Plant & Soil Science
Professional Standards in Agribusiness
Veterinary Medical Applications
Wildlife, Fisheries & Ecology Management

| ***Workforce Readiness in Agritech & Aquatech*** **Timeline – 18 months** | **2021** | | | | | | | | | | | **2022** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Q1** | | **Q2** | | | **Q3** | | | **Q4** | | | **Q1** | | | **Q2** | | | **Q3** |
| **TASK** (Planning Phase / Implementation Phase) | **FEB** | **MAR** | **APR** | **MAY** | **JUN** | **JUL** | **AUG** | **SEP** | **OCT** | **NOV** | **DEC** | **JAN** | **FEB** | **MAR** | **APR** | **MAY** | **JUN** | **JUL** |
| Update & Refine Scope of Work and Action Steps | | | | | | | | | | | | | | | | | | |
| Assign Project Manager | | | | | | | | | | | | | | | | | | |
| Establish & Launch Online Learning Management System (LMS) with Existing Curriculum Content | | | | | | | | | | | | | | | | | | |
| Establish & Launch Micro Badge Protocols | | | | | | | | | | | | | | | | | | |
| Create and Promote Digital & Print Marketing | | | | | | | | | | | | | | | | | | |
| Aggressively Market Curriculum to School Systems, FFA, Farm Bureaus, 4H & Other Constituencies | | | | | | | | | | | | | | | | | | |
| Develop New Curriculum Content | | | | | | | | | | | | | | | | | | |
| Monitor Use of LMS, Make Adjustments | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
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**NEW WORKFORCE READINESS CURRICULUM TO BE CREATED**

| Commercialization of Technology & Innovation Readiness | Entrepreneurship |
|---|---|
| X | |
| X | |
| X | |
| X | |
| X | |
| X | |
| X | |
| X | |

## Anticipated Impacts

Below are exemplary output and outcome measurement goals planned for the *Workforce Readiness in Agritech & Aquatech Program*:

| **Exemplary Output Measures** | |
|---|---|
| **Description** | **Measurement Goal** |
| Sign up School Systems to promote curriculum | 24 School Systems |
| Sign up State and County Farm Bureaus including Young Farmer & Rancher Committees to promote curriculum | 23 County Bureaus<br>1 State Bureau |
| Sign up 4-H Chapters to promote curriculum | 24 Chapters |
| Sign up Future Farmers of American Chapters to promote curriculum | 40 Chapters |
| Sign up Maryland Agriculture Extension Offices to promote curriculum | 28 Offices |
| Activate Existing Curriculum Modules | 18 topics/modules |
| Create New Curriculum Modules | 10 topics/modules |
| Create Micro Badges | 28 badges |
| **Exemplary Outcome Measures** | |
| **Description** | **Measurement Goal** |
| Number of students creating profiles on Learning Management System | 500 |
| Number of modules started by students | 4,000 |

| | |
|---|---|
| Number of modules completed by students | 3,000 |
| Number of Micro Badges awarded | 3,000 |
| Number of social media engagements by students utilizing LMS | |
| Number of social media engagements by students utilizing Micro Badges | |
| Number of interactions between students and industry partners | |

**Tracking Mechanism**

Two components of the *Workforce Readiness in Agritech & Aquatech Program* already have analytics embedded into their platforms, enabling complete assessment of user interface and engagement.

CEV's curriculum platform allows us to track student progress by course or lesson, monitoring student proficiency and topic areas that may require special attention.

We will capture the data from the CEV platform and insert it into our $F^3$ Tech Customer Relations Management (CRM) program to include enrolling students into the expanding industry ecosystem in which $F^3$ Tech participates. This will continue and increase future engagement with students so that their participation is not just a one-time event. It would be a missed opportunity not to maintain an ongoing connection between the student and the industry.

Credly's micro badge platform offers a reporting and analytics tool that provides us with real-time data such as badge sharing, badge clicks and overall student usage. We can leverage these reports to analyze the effectiveness of each course/module and to optimize the marketing of the *Workforce Readiness in Agritech & Aquatech Program*. It will also inform us of whether employers are referring to the student's credentials and their value to the program.

Once a student is captured into the $F^3$ Tech CRM system via the LMS, we plan to follow up with all students at least once per year for a period of at least five (5)years to ascertain what has transpired relative to their continuing education and/or employment. This information will allow for regular assessment of the curriculum program and its outcomes.

**Sustainability Plan**

With the assistance of this funding opportunity, the initial expense of developing and implementing the *Workforce Readiness in Agritech & Aquatech Program* represents the primary investment in the project. The program's sustainability going forward will be modest in comparison, largely made up of site hosting and maintenance, annual subscriptions for curriculum content and micro badges, and marketing of the program.

To maintain the free access of the online curriculum, it is planned that these ongoing expenses will be covered through banner ads on the site, paid for by industry partners and tech-based companies in agriculture and aquaculture that wish to achieve brand identity among potential future employees in the industry.

After the grant funding period, it is intended that the *Workforce Readiness in Agritech & Aquatech Program* becomes part of the overall $F^3$ Tech brand. ESEC as the parent organization of the $F^3$ Tech initiative will take responsibility for the continuation of the online curriculum in its annual operating budget, making it a part of the $F^3$ Tech brand and a value-added benefit of its anchor Accelerator program.

The long-term objective is to position "*$F^3$ Tech Workforce*" curriculum and the associated micro

badges as an industry standard within the Agritech and Aquatech sectors. Toward this aim, the curriculum will be marketed nationwide and become a full-time part of the $F^3$ Tech portfolio of programming.

**Summary**

It is through this grant funding opportunity that we seek EDA's leadership and help in contributing $300,000 to the development and introductory implementation of a needed workforce development program in agriculture and aquaculture. This program will support the workforce and employment needs of emerging tech-based companies which are commercializing innovations and technologies in response to the growing need for automation and efficiency that lead to increased yield production. This comprehensive effort of commercialization and workforce development contributes to the larger need of feeding a growing and more affluent global population.