

TRIUMPH GULF COAST, INC. PRE-APPLICATION FORM

Triumph Gulf Coast, Inc. (“Triumph Gulf Coast”) has created a pre-application process to provide initial consideration of eligibility for potential ideas of projects or programs that may seek an award of funding. Applicants are required to participate in the pre-application process. Notwithstanding the response from Triumph Gulf Coast on the pre-application form, an Applicant may still elect to submit an Application.

APPLICANT INFORMATION

Name of Individual/Entity/Organization: NERD Lab LLC

Proposal Title: Materials Science & Engineering Experiences for Okaloosa High School Students

Amount of Triumph Funds Requested: \$500,000

Total Estimated Project Cost: The total cost to establish this program is ~\$2,000,000.

Brief Description of Individual/Entity/Organization: NERD (Niceville Engineering & Research Developmental) Lab is a newly incorporated small teaching lab with a vision to increase the number of students with STEM (Science, Technology, Engineering & Math) identities by lowering the barrier to entry through high value, easily accessible real-world experiences. Our mission is to expand the talent pool by exposing, inspiring, and training students in the field of materials and science engineering (MSEG) through work-based learning opportunities.

NERD Lab is in Okaloosa County, located in the heart of Niceville, FL and is moving into a ~2000 sq ft. facility within walking distance to Niceville High School and Ruckel Middle School and less than 30 minutes from Eglin Air Force Base, Duke Field, Hurlburt Field, University of Northwest Florida, and the University of Florida Research and Engineering Education Facility. Okaloosa County is home to over 30,000 students, including more than 7,300 high school students.

Contact Information

Primary Contact: Nydeia Bolden-Frazier

Title: Director

Mailing Address: 119 N Partin Dr

City: Niceville

State: FL

Zip Code: 32578

Telephone Number: 850.902.0150

Email Address: nydeia.bolden-frazier@nerd-lab.com

Website: nerd-lab.com (under construction)

Names of co-applicants, partners or other entities, organizations that will have a role in the proposed project or program: NERD Lab is the sole applicant, but anticipate partnering with organizations across industry, academia, and government. This includes, but is not limited to the Okaloosa County School System, organizations across Eglin AFB, Hurlburt Field & Duke Field, Univ of Northwest Florida, Univ of Florida REEF, National Science Foundation, Department of the Navy, Department of the Army, Florida State University/Florida A&M University

REQUIRED EXECUTIVE SUMMARY

The Florida Department of Economic Growth has identified Professional and Technical Services (i.e., testing lab services and engineering services) as the top industry in Okaloosa and Walton counties with the highest projected employment growth rate. Nationally, there is also a push to significantly increase the number of STEM (Science, Technology, Engineering and Math) and skilled technical workers. The following organizations, which include the White House, National Science Foundation, and the Department of Defense have laid out the STEM needs for the nation and their related vision and/or goals for achieving it.

- The White House STEM Strategy, “Charting a Course for Success: America’s Strategy for STEM Education”, states that “A diverse talent pool of Americans with strong STEM knowledge and skills prepared for the jobs of the future is essential to maintaining the national innovation base that supports key sectors of the economy”.
- The National Science Foundation has a vision to be “A nation that leads the world in science and engineering research and innovation”.
- The Federal STEM Education Strategic Plan’s goals include preparing the STEM workforce of the future.
- The Department of Defense STEM Strategic Plan addresses critical STEM challenges through talent inspiration and cultivation.

NERD Lab is uniquely positioned to support these local, regional, and national initiatives through its strong focus on practical, work-based technical skills development, engineering education research and traditional STEM outreach activities. Its proximity to the local middle and high school, along with its small size will allow students to receive individualized attention, one-on-one training, access to research grade equipment, and more opportunities to obtain high value real-world experiences. NERD Lab intends to build a direct pipeline into the STEM field by becoming a local and national feeder program for organizations across industry, academia, and government. We are working toward establishing long-term partnerships that include, but not limited to local industry partners, Okaloosa County School System, the Department of Defense, the National Science Foundation, the University of Northwest Florida, and the University of Florida.

NERD Lab is primarily organized as a student-led materials characterization lab and designed to work in partnership with scientists and engineers (S&Es) across the community to help students understand the value of structures and materials as enabling technologies and the role materials characterization play in generating data needed for material development, including the related modeling and simulation tools such as material models. Materials makes up everything around us and serves as an enabler to many technical challenges across a wide range of industries, like military, aerospace, automotive, health and medicine, energy, computing, robotics, sports, etc. Material scientist and engineers work to understand the structure and properties of materials and use design processes to manipulate them to meet the needs of modern technology. Examples of their work include¹:

- Developing materials to enhance munition system performance
- Developing structures to make aircraft and automobiles stronger, cheaper and more fuel efficient

¹ <https://mse.washington.edu/about/what-is-materials-science-engineering>

- Developing devices to detect cancer in its early stages
- Creating-plant based materials
- Creating novel energy storage nanostructures to improve fuel cells, batteries, super-capacitors, and power grids
- Understanding and exploiting 3D printing to meet growing manufacturing needs
- Developing computational tools to predict and control complex materials synthesis and structures

Through the NERD Lab, participants will receive access and training in the field of MSEG by performing R&D (research and development) quality characterization of materials like polymer matrix composites, structural metals, aerospace structures/materials and additive manufactured materials. Students will perform material testing, basic analysis and prepare simple technical reports to be presented to collaborators whenever possible. Additional opportunities to meet scientist and engineers, co-author journal articles/conference proceedings and participate in local science/engineering fairs will be sought out. Students will have the opportunity to gain ~400hours/year of hands-on experience and the potential to earn technician-level skills that will position them to start their career as a technical worker or begin their post-secondary education in one of the STEM fields.

The funding requested will be used to expand the testing capabilities of the lab to include morphological, thermal, and chemical analysis and to develop a supporting industry certification program. The intent is to grow student experiences across a broad range of technologies and provide a method to demonstrate their competencies to support feeder programs. NERD Lab's initial capability is primarily mechanical testing, which includes static and dynamic test capabilities. This funding will be used to purchase a Scanning Electron Microscope (SEM), thermogravimetric analysis (TGA) machine and a differential scanning calorimeter (DSC). The ultimate goal is to provide the widest range possible of hands-on experiences, giving the students the ability to work on a broader range of materials across more industries to meet our local and national economic demand.

Amount of funds being sought: NERD Lab is requesting \$500K over 3 years at the following rate: \$350 K in Year 1 for equipment, installation, training and supporting salaries, \$75K in Years 2 and 3 for equipment maintenance, curriculum development and salaries.

Amount and identity of other sources: NERD Lab will contribute an estimated \$350K for facilities, salaries, and insurance and \$150K for initial equipment purchases; \$600K is being pursued through Department of the Navy's FY23 STEM BAA and \$400K through the National Science Foundation's Research Initiation in Engineering Formation (PFE: RIEF) program

Location of the project or program: NERD Lab will be located at 119N Partin Drive Niceville, FL

Summary Description: Details discussed above.

Summary timeline: The funding requested will be used to expand the technical capabilities of NERD Lab, create an industry certification program, and will support the initial salaries, training, equipment, and supplies. The program is expected to approach a self-sustaining status by Year 3. Year 1 will focus on equipment acquisition, training and identifying potential partnerships. Year 2 will focus on establishing long-term collaborations and building the industry certification program. It is anticipated that Year 3 will demonstrate the ability to develop industry and academic ready STEM students and will focus on creating feeder programs into specific organizations across industry, academia, and government.

IMPORTANT NOTICE

This pre-application process will **not** result in an award of funding by Triumph Gulf Coast. Rather, this process is designed to facilitate submission of ideas for potential projects or programs before the Applicant expends time and/or resources to complete a full Application. All Applicants for funding are required to complete an Application, which will be reviewed and then considered for award at the discretion of Triumph Gulf Coast Board.

Please Select the Proposal's Eligibility Category(s)

Pursuant to Section 288.8017, Triumph Gulf Coast, Inc. was created to make awards from available funds to projects or programs that meet the priorities for economic recovery, diversification, and enhancement of the disproportionately affected counties. The disproportionately affected counties are: Bay County, Escambia County, Franklin County, Gulf County, Okaloosa County, Santa Rosa County, Walton County, or Wakulla County. *See*, Section 288.08012.

1. From the choices below, please check the box that describes the purpose of the proposed project or program (check all that apply):

- Ad valorem tax rate reduction within disproportionately affected counties; Local match requirements of s. 288.0655 for projects in the disproportionately affected counties;
- Public infrastructure projects for construction, expansion, or maintenance which are shown to enhance economic recovery, diversification, and enhancement of the disproportionately affected counties;
- Grants to local governments in the disproportionately affected counties to establish and maintain equipment and trained personnel for local action plans of response to respond to disasters, such as plans created for the Coastal Impacts Assistance Program;
- Grants to support programs that prepare students for future occupations and careers at K-20 institutions that have campuses in the disproportionately affected counties. Eligible programs include those that increase students' technology skills and knowledge; encourage industry certifications; provide rigorous, alternative pathways for students to meet high school graduation requirements; strengthen career readiness initiatives; fund high-demand programs of emphasis at the bachelor's and master's level designated by the Board of Governors; and, similar to or the same as talent retention programs created by the Chancellor of the State University System and the Commission of Education, encourage students with interest or aptitude for science, technology, engineering, mathematics, and medical disciplines to pursue postsecondary education at a state university or a Florida College System institution within the disproportionately affected counties;
- Grants to support programs that provide participants in the disproportionately affected counties with transferable, sustainable workforce skills that are not confined to a single employer; and
- Grants to the tourism entity created under s. 288.1226 for the purpose of advertising and promoting tourism and Fresh From Florida, and grants to promote workforce and infrastructure, on behalf of all of the disproportionately affected counties.

Please Select the Priorities this Proposal's Outcomes will Achieve

1. Please check the box if the proposed project or program will meet any of the following priorities (check all that apply):

- Generate maximum estimated economic benefits, based on tools and models not generally employed by economic input-output analyses, including cost-benefit, return-on-investment, or dynamic scoring techniques to determine how the longterm economic growth potential of the disproportionately affected counties may be enhanced by the investment.
- Increase household income in the disproportionately affected counties above national average household income.
- Leverage or further enhance key regional assets, including educational institutions, research facilities, and military bases.
- Partner with local governments to provide funds, infrastructure, land, or other assistance for the project.
- Benefit the environment, in addition to the economy.
- Provide outcome measures.
- Partner with K-20 educational institutions or school districts located within the disproportionately affected counties as of January 1, 2017.
- Are recommended by the board of county commissioners of the county in which the project or program will be located.
- Partner with convention and visitor bureaus, tourist development councils, or chambers of commerce located within the disproportionately affected counties.