

A.1. KEY CONTACTS, SUBMISSION DATE, AND FUNDING REQUEST

1. **Name of Eligible Entity (Planning Grant Applicant):** George Mason University
2. **Address of Eligible Entity (Planning Grant Applicant):** 4400 University Drive, MS 3F2, George Mason University, Fairfax, VA 22030
3. **Name of Authorized Official Representative:** Maggie Ewell
4. **Email Address for Authorized Official Representative:** ospaor@gmu.edu
5. **Telephone Number for Authorized Official Representative:** (703) 993-4806
6. **Name of Contact Person for Application:** Padmanabhan Seshaiyer
7. **Email Address for Contact Person for Application:** pseshaiy@gmu.edu
8. **Telephone Number for Contact Person for Application:** 806-239-8738
9. **Name of Partnering School Division (if applicable):** Shenandoah Valley Rural Regional Partnership led by Frederick County along with Fauquier County, Shenandoah County, Clarke County, Warren County, Page County, Winchester City and Mountain Vista Governor's School.
10. **Date of Submission:** Sept 22, 2023
11. **Amount of Funding Requested (\$200,000 maximum):** \$199,880

B. DEFINITIONS

1. **College Partnership Laboratory School:** In accordance with [Item 4-14](#) of the General Assembly's 2022-2024 Biennium budget, the Code of Virginia § [22.1-349.1](#) is amended and reenacted, and the types of IHE eligible entities to establish Lab Schools are defined as follows:
 - a. "College Partnership Laboratory School" means a public, nonsectarian, nonreligious school in the Commonwealth established by a public institution of higher education; public higher education center, institute, or authority; or an eligible institution, as defined in § [23.1-628](#). Notwithstanding the provisions of §

22.1-349.5, a public institution of higher education; a public higher education center, institute, or authority; or an eligible institution, as defined in § 23.1-628 may submit an application for formation of a college partnership laboratory school.”

- b. An “eligible institution” as provided above is an institution of higher education as defined in the Tuition Assistance Grant Program in accordance with § 23.1-628.
2. **At-risk student:** As provided in the Code of Virginia § 22.1-349.1, "at-risk student" means a student having a physical, emotional, intellectual, socioeconomic, or cultural risk factor, as defined in Board criteria, that research indicates may negatively influence educational success.

For the purpose of these guidelines and any Planning Grant awards, “at-risk students” include (a) students who have experienced learning loss as the result of the COVID-19 pandemic; (b) students served by low-performing schools that are designated as “accredited with conditions” or “accreditation denied” based on the Virginia Board of Education’s accreditation ratings; and (c) students attending schools identified under the Every Student Succeeds Act within three support categories: (i) Comprehensive Support and Improvement, (ii) Targeted Support and Improvement, or (iii) Additional Targeted Support Category.

3. **Regional diversity:** For the purpose of evaluation of this Application, regional diversity reflects representation from each of the Department’s eight Superintendent [regions](#).

C. ASSURANCES AND SIGNATURES

1. ASSURANCES

- a. By signing and submitting this Application, the Applicant assures that it will adhere to state and federal laws and regulations governing public schools, including the *Virginia Standards of Quality*, the *Virginia Standards of Learning*, and the Board’s *Regulations Establishing Standards for Accrediting Public Schools in Virginia*.
- b. The Applicant assures that all elements of the proposed school(s) will comport with all applicable state and federal laws and regulations.
- c. The Applicant certifies that to the best of his/her knowledge the information in this Application is correct, that all Application elements have been addressed as required in this Application, and that the Applicant understands and will comply with the assurances.
- d. The Applicant agrees to conduct a review of their planning phase, and submit milestones and deliverables as required, including, but not limited to, a

comprehensive report with details for the projected Lab School implementation, expenses, and other items as may be prescribed by the Department.

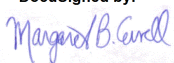
- e. Applicants receiving a Planning Grant are expected, by the end of the term of such grant, to submit a subsequent application for the launch of a Lab School to the Department, for review and approval by the Board.
- f. Applicant provides assurance to subscribe to the following reporting requirements timetable:

TIMELINE	BENCHMARK AND DELIVERABLES
On or before the end of the first quarter of the grant term	Awardee must present a proposed list of milestones, measures of success, and deliverables.
On or before the end of the second quarter of the grant term	Awardee must submit a progress report in order to be eligible for the second installment of the award.
On or before the end of the third quarter of the grant term	Awardee must present progress on milestones and deliverables, including submission to the Board of an application for approval to launch a Lab School.
On or before the end of the grant term	Awardee is expected to have attained approval by the Board to launch a Lab School.

2. SIGNATURES

Higher Education Authorization:

Signature of [AUTHORIZED REPRESENTATIVE of public institution of higher education; public higher education center, institute, or authority; or an eligible institution]:

DocuSigned by:

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Printed Name: Margaret Ewell
 Title: Director, Pre-award Administration
 Date: 9/18/2023

D. REGIONAL AND APPLICANT DIVERSITY

1. Planning Grants will be awarded in a manner that encourages ready access to Lab School options and the establishment of Lab Schools in each of the Department's [eight Superintendent regions](#).
2. Indicate Superintendent Region of Proposed of Lab School: Region IV
3. Indicate Proposed Name(s) of Lab School: Shenandoah Valley Rural Regional College Partnership Laboratory School for Data and Computing
4. Identify Proposed Physical Location(s) of Lab School: Shenandoah Valley Rural Regional College Partnership Laboratory School for Data and Computing will be within the rural Shenandoah Valley geographical region coordinated by George Mason University in conjunction with Frederick County Public Schools and Laurel Ridge Community College. Additionally, the intent of the proposal will be to include opportunities for students and teachers from Fauquier County, Frederick County, Winchester City, Clarke County, Warren County, Shenandoah County, Page County and Mountain Vista Governor's Schools, who are all partners through a Shenandoah Valley CS Regional Partnership.

E. PROGRAM DESCRIPTION, GOAL, AND TIMELINE

1. PROGRAM DESCRIPTION

- a. General description of the program (*2-3 paragraphs maximum*):

The Shenandoah Valley Rural Regional College Partnership Laboratory School for Data and Computing is a collaborative project between two higher education institutions including George Mason University (4-year) and Laurel Ridge Community College (2-year) and one major school district, namely, Frederick County Public Schools. The intent is to expand the offerings of this proposed lab school to six other school districts in the Shenandoah Valley Rural Regional Partnership along with one Governor's school. The latter includes rural and rural fringe school divisions including Clarke County, Fauquier County, Frederick County, Laurel Ridge Community College, Page County, Shenandoah County, Warren County and Winchester City.

Shenandoah Valley Rural Regional College Partnership Laboratory School will be a data-focused lab school with an emphasis on advancing Data Science, Computing and Applications (DSCA) through innovative research and education. The proposed lab school will help build on successful best practices these regional partners have already established through two Advancing Computer Science Education grants led by Co-PIs Dr. Padmanabhan Seshaiyer from George Mason University (GMU) and Dr. Deborah Crawford from Frederick County Public Schools (FCPS) and funded by the Virginia Department of Education (VDOE) that helped to enhance a regional partnership to create Shenandoah Valley Computer Science Regional Partnership which has impacted

about 400 teachers and over 700 students in four years. As a part of this program, they also helped to develop a micro-pilot lab school component within this project where over 30 high school students over two years had the opportunity to engage in capstone projects, earning college credits, in the areas of Data Science, Computing and Applications. A road map of what has been accomplished to build teacher capacity to teach CS High School courses and provide opportunities for student-led research is shown.

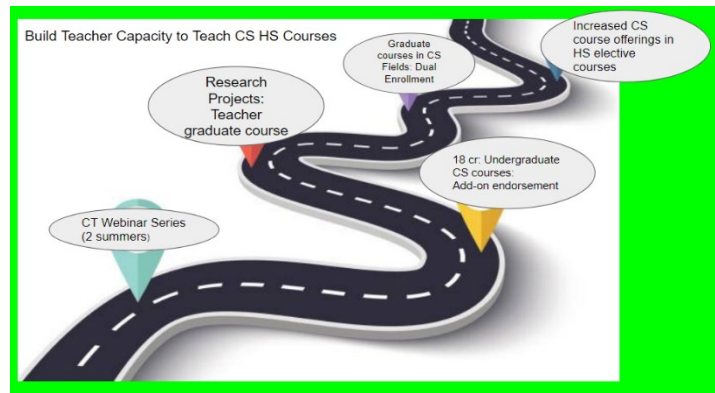


Table 1

COMMON EXPERIENCE	BRIEF DESCRIPTION
Interdisciplinary Coursework Experience	Students will be exposed to data-focussed coursework from various aspects of STEM that applies to the real-world workplaces. A minimum of 8 HS credits along with 24 college credits can be earned through dual enrollment or direct college credit.
Research and Creative Experience	Students will work on specific, student-led research projects, where he/she works closely with the faculty across the commonwealth and other researchers helping them earn college credit through George Mason University.
Design-thinking and Entrepreneurship Experience	Students will learn to solve problems using a human-centered approach to problem solving and, in this process, learn to build viable business models.
Work-based Learning Experience	Students will be mentored by Big Data business and industry partners through a choice of work-based experiences to equal a minimum of 1 HS credit per year.
Global and Multicultural Experience	Data collaborations around global challenges where every student will interact with students from US territories (Puerto Rico) and developing countries.

The proposed lab school will serve 50 students from grade 11 and 50 students from grade 12 selected from the partnering school districts who will have the opportunity to engage in DSCA through five common experiences (see Table 1). All students will also have the opportunity to earn directed online data analytics-focused certifications through companies such as Google and Amazon. Each year the students will take four core courses and a research innovations lab course in each grade 11th and 12th through a half-day program. The proposed planning grant will help us to align the courses, certifications and credits between the three partners in the lab school. Proposed ideas to align and organize will include the opportunity to earn an Associate’s Degree for the lab schools students from Laurel Ridge Community College, Dual Enrollment credit from George Mason University, and Industry Certifications from partnering organizations.

- b. Rationale for the program (*2-3 paragraphs maximum*): In the report titled “*The Missing Millions: Democratizing Computation and Data to Bridge Digital Divides and Increase Access to Science for Underrepresented Communities*” released by the National Science Foundation¹ in 2021, substantial barriers to access to limited infrastructure and opportunities in **rural** communities were identified. It was also noted that faster progress in improving K-12 student performance in STEM will require mechanisms to bring the best research-based STEM pedagogy and practices to the classroom in every school in the country². In December 2018, a report on “Chartering a course for success: America’s strategy for STEM Education” was presented by the Committee on STEM Education of the National Science and Technology Council which serves as the Executive Branch of the White House Office of Science and Technology Policy. Two of the four pathways that were identified as key elements for achieving the Federal Strategy of “all Americans will have lifelong access to high-quality STEM education and the United States will be the global leader in STEM literacy, innovation, and employment” include (A) **Engaging Students where Disciplines Converge** and this will help prepare the next generation STEM workforce with an interdisciplinary curriculum that teaches students to solve problems using multiple disciplines, for example, combining mathematics, statistics and computer science skills to solve societal challenges; that promotes innovation and entrepreneurship through transdisciplinary project activities such as project-based learning, science fairs, robotics, STEM clubs, invention challenges, game design and more. Specific objectives within this pathway included Advancing innovation and entrepreneurship education, Making mathematics a magnet and Encouraging transdisciplinary learning; (B) **Build Computational Literacy**: This pathway is meant to empower the next generation STEM workforce through digital literacy with information technology tools that can help find information, share ideas, answer questions in a responsible and safe manner. This pathway clearly indicates

¹ <https://www.rti.org/publication/missing-millions/fulltext.pdf>

² <https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf>

that Computational Thinking (CT), including Data Science (DS) and Computer Science (CS) is more than just being able to operate devices but being able to effectively employ devices to solve complex problems in the society through data driven decision making. Specific objectives included Promoting digital literacy and cyber safety, Making CT an integral element of all education, Expanding digital platforms for teaching and learning Integral to both pathways is the potential to decrease achievement gaps in educational settings that can help both create a STEM-literate population as well as upskilling Americans for the rapidly evolving workplace.

Why is this important for the Shenandoah Valley region? Ultimately, our Valley students need to become prepared for the workforce of the future, which will almost certainly require increased CT/DS/CS skills. While some schools have made strides through the regional partnership, there is a great need to increase the capacity overall to integrate DSCA into K-12 instruction in all schools in the Commonwealth. This needs assessment was measured by the VDOE Fall, 2021 CS Implementation survey and surveys within the Shenandoah Valley regional partnership. Currently, four of the seven partners are now able to offer a middle school CS elective or an introductory IT Fundamentals CTE high school elective through our VDOE funded Advancing Computer Science Education (ACSE) grant training. This grant also helped to establish a proof-of-concept for a micro-pilot college partnership laboratory school which helped to provide several high school students from the partnering districts to engage in research around Data Science for solving local and global societal challenges. This was one of the main impetus to build on these successful practices to apply for this lab school planning grant around data and computing. Also, with the introduction of the first-ever Data Science Standards and Curriculum that was approved by the VA Board of Education, students in the Commonwealth now have an additional pathway in Data Science that is well-aligned with the workforce needs. Both Dr. Seshaiyer and Dr. Crawford led this effort for the Commonwealth with the VDOE and this new DS course is now offered already in about 50 schools across the Commonwealth. We hope that this new data and computing focused lab school will also become a hub for continuous teacher professional learning across the state. Integrated with our approach will be a long-term, mutually beneficial collaboration that promotes the production and use of research through a new Shenandoah Valley-GMU Research-practice partnership (RPP).

- c. Nature of innovation proposed for the program, including how it will improve student academic proficiency, mastery, college and career readiness, and long-term outcome goal (2-3 paragraphs maximum):
 - *Improving Student Academic Proficiency*
The proposed lab school will equip our learners with a data literacy skill set sought by the workforce. Specifically,

- i. Enhanced DSCA curriculum will prepare learners for post-secondary opportunities around Data Science and Computing and give them the current high-demand data skills valued across every job sector through the following courses:
 - 1. Data Science I
 - 2. Data Science Applications (Health, Science, Finance/Business)
- ii. A course on “Innovations in Data Science and Computing Education”, a research course around computing and data science where students conduct research on a problem connected to the Engineering Grand Challenges, mentored by university faculty in the area of the topic. (11th Grade). This course has already been successfully piloted as a dual enrollment course COS120 through George Mason University through the VDOE Advancing Computer Science Education grants.
- iii. A new dual enrollment course on Multidisciplinary Problem Solving for the Grand Challenges. In this course, students will experience a hands-on and human centered approach to incorporating problem solving principles using a design thinking framework with data-driven approaches and consider implications for innovations in research, development, and entrepreneurship.

- ***Demonstrating Mastery of Topics***

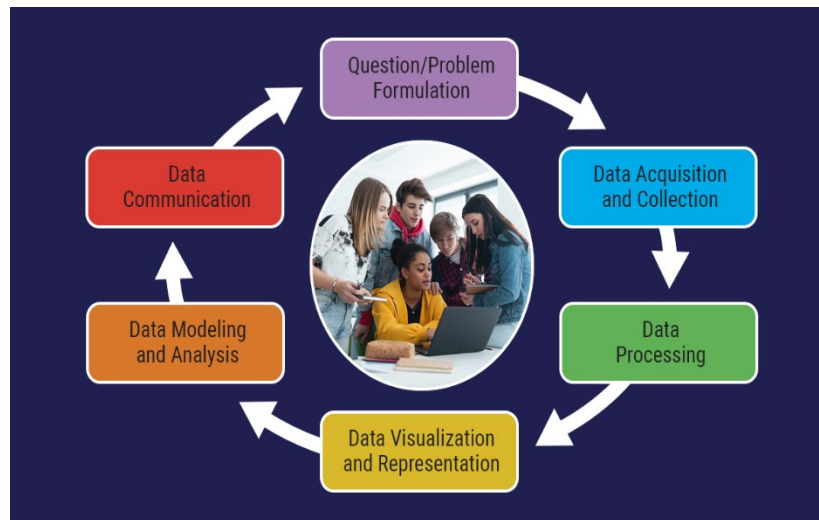
Students will also have the opportunity to demonstrate mastery of their learning through a research project around computing and data science where students deepen and expand their Phase 1 research on a problem connected to the Engineering Grand Challenges, mentored by university faculty in the area of the topic. Sample products would include competition entries, publications, and patents. (12th Grade). One of the exciting competitions these students will compete in teams is the Future City competition for High School students which builds from of the current competition structure for middle school students. Students will work in teams and one teacher coach will help to design a sustainable city of the future and present their ideas through three deliverables including an Essay, a City Model (built in AR or VR) and a City Presentation and Question & Answer session with a panel of STEM professionals. This effort has come out of the current VDOE ACSE grant implementation organically and we are very excited to grow this activity through the proposed lab school.

- ***Becoming College and Career Ready***

The proposed lab school will provide multiple capstone opportunities to either dive into research, apprenticeship or credentialing pathways in Grade 12. Research experiences will be mentored pathways led by faculty selected from across the commonwealth under the supervision of their classroom teacher. Apprenticeship pathways will be built through local companies in the Shenandoah Valley region as well as the broader Northern Virginia region to work with an industrial mentor with the guidance of their classroom teacher. They will also have an option to earn certifications offered by major organizations such as Google, Amazon and CISCO in data and computing

related fields that are sought out by the workforce. We also hope to work with Laurel Ridge in getting dual enrollment for these efforts leading to an Associate’s Degree. Integral to these experiences will be for every student to think like entrepreneurs. So they will each learn to create a business canvas for solving a societal challenge, engage in activities such as a Design-A-Thon (Design Thinking Hack-A-Thon) along with a Shark-Tank style final presentations where they will pitch new innovations to the general public.

- d. Expected student learning benefits (2-3 paragraphs maximum): The proposed lab school will develop data competencies including Mathematical Foundations, Computational Thinking, Statistical Thinking, Modeling and Communication. The students will learn and engage through a data cycle as shown below.



The proposed innovation lab school will involve various pedagogical frameworks to facilitate students to learn through inquiry-based learning, experiential learning, project-based learning and challenge-based learning which will be aligned with the approved standards of Data Science in Virginia:

- i. Identify specific examples of societal problems that can be effectively addressed using data science;
- ii. Formulate a top-down plan for data collection and analysis based on the context of a problem;
- iii. Recognize the importance of data literacy and develop an awareness of how the analysis of data can be used in problem solving to effect change and create innovative solutions;
- iv. Identify biases in the data collection process and understand the basic implications and privacy issues surrounding data collection;
- v. Present data storytelling as a strategy to effectively communicate with data;
- vi. Justify the design, use, and effectiveness of different forms of data visualizations;
- vii. Assess reliability of source data in preparation for mathematical modeling;
- viii. Acquire and prepare big data sets for modeling and analysis;

- ix. Select and analyze data models to make predictions, while assessing accuracy and sources of uncertainty;
 - x. Summarize and interpret data represented in both conventional and emerging visualizations;
 - xi. Select statistical models and use goodness of fit testing to extract actionable knowledge directly from data;
 - xii. Select and utilize appropriate technological tools and functions within those tools to process and prepare data for analysis and;
 - xiii. Select and utilize appropriate technological tools and functions within those tools to analyze and communicate data effectively.
- e. Expected teacher learning and professional development benefits: The proposed SVRRP Lab School for Data and Computing is designed to serve as a professional development hub for practicing high school mathematics and computer science teachers who plan to teach or integrate Data Science in their own classrooms. Teachers from partnering divisions as well as across the Commonwealth can learn from each other through virtual and in-person classroom visits, industry partnerships, student exemplar projects with rubrics, model lessons and lesson study, data sets, and curriculum resources developed by the Lab School. All curricular resources will be available to Commonwealth teachers through a #GoOpenVA Data Sci Lab School hub. Additionally, preservice student teachers and career switchers from business and industry in data-related fields can intern and complete student teaching in the lab school to complete the requirements to teach in VA. Teachers can intern in paid summer exchange programs with business and industry partners to learn how the data science skills they are teaching are used by practicing industry professionals.

Dr. Seshaiyer and Dr. Crawford serve on a variety statewide and national STEM education and workforce development committees and will be leading this opportunity to create new programs, pathways and partnerships through the proposed lab schools across the seven rural school districts as well as across the Commonwealth. They both served as leads on the first-ever VDOE Data Science Standards, Curriculum, and Coursework development team and helped to facilitate the Year 1 pilot cohort of 19 teachers and about 400 students. Both are currently facilitating the Year 2 pilot with about 46 Data Science teachers. Dr. Seshaiyer is the only higher education faculty who is an appointment member to two different boards under the Office of the Governor. Reporting to the VA Secretary of Education Aimee Guidera, he serves on the VA STEM Advisory Board and reporting to the VA Secretary of Labor Bryan Slater, he serves on the VA Workforce Development Board. Dr. Seshaiyer has also been actively in discussions with Superintendent Lisa Coons on pathways and programs aligned to her vision for the VDOE. Both Dr. Seshaiyer and Dr. Crawford also met with both the Chief of Staff Jeremy Raley and the Assistant Superintendent for Innovation Andy Armstrong and have discussed teacher learning and professional development benefits that will also come out of this lab school efforts especially serving students in the rural regions in Shenandoah Valley. Through the proposed

lab schools, we hope to build professional learning programs to engage **Teachers as Learners: Building capacity for secondary teachers to teach Data and computing across the Commonwealth and; Teachers as Designers: Integrating Data and Computing across all the STEM domains and curriculum working in conjunction with all the Office of STEM & Innovation at the VDOE with Tina Mazzacane (Mathematics), Keisha Tennessee (CS) and Anne Peterson (Science) and Susan Clair (Learning Infrastructure Coordinator).**

- f. Content areas addressed: Mathematics and Statistics, Computer Science, Data in Disciplines (ex. Data in Health, etc.) Proposed content areas would include over 11th and 12th grade years, the following: two Data Science (Math), two Computer Science (CS), two Data in Disciplines (ex. Data in Health Professions), and two courses to earn an industry credential or participate in an internship (ex. Google Data Analytics I and II).

GOAL

State the overall proposed goal for the Lab School:

The proposed innovation lab school will create an innovative opportunity to engage a diverse group of students from the Shenandoah Valley rural school districts in high-quality collaborative data-driven education and research in applications of data science and computing to societal challenges. The school will also become a STEM, Data and Computing hub for engaging teachers across the Commonwealth to continuously enhance their own pedagogical skills to integrate data science into their instructional practice.

2. TIMELINE

Provide a timeline of the planning process, including the proposed date/school year for launch of the proposed Lab School: (12 months)

The Shenandoah Valley Rural Regional College Partnership Laboratory Schools for Data and Computing Planning grant includes **five** phases over the 12 months with a proposed project start date on November 15, 2023. As a first step, a project team will be identified that will include GMU, Laurel Ridge and all the interested partners from the Shenandoah Valley. Once this team is identified, they will engage in the overall planning grant that will employ a Design Thinking human centered approach as follows:

- **Phase 1:** The first phase will include an **empathy** and needs assessment phase where we plan to engage a select group of stakeholders from VDOE, teachers and leaders from secondary level in K-12, members from Business, Industry and Government as well as from 2-year and 4-year higher education partners from the Commonwealth to engage in a state-wide Summit focused on data science. This summit will be held in January 2024 and will get feedback on the proposed common experiences. This summit will also help to create partnerships with the stakeholders to collaborate with the proposed innovation lab schools. The vision will also be aligned with the new VA Board of Education approved Data Science Standards, Curriculum and Course that Dr. Seshaiyer and Dr. Crawford have helped to lead with the VDOE. A report on the findings will be prepared and presented to VDOE in January, 2024.

- **Phase 2:** The next phase will include the selection of a diverse Advisory Board for the Shenandoah Valley Rural Regional College Partnership Laboratory Schools.

Representation will include partners from secondary level in K-12, members from Business, Industry and Government, educators from 2-year and 4-year higher education partners from the Commonwealth, as well as parents and students. The board will meet in February 2024 and help to guide and shape discussions around *defining* problem statements, challenges and opportunities including identifying an appropriate location for the proposed schools. A report on the results of the board discussions will be presented to VDOE in February, 2024.

- **Phase 3:** This third *ideation* phase will include a Data intensive curriculum alignment summit in March, 2024. This summit will help to align curriculum and coursework between K-12, Community College and 4-year institutions. During this summit we will also engage teachers from the first two cohorts of the High School Data Science to showcase exemplars of student research and the Data Science resource hub from resources being developed for the current implementation across the state. Following Summit 2, a cohort of 10 teachers will be selected from the partner districts to participate in a professional learning course in March, 2024 with GMU that will focus on big data, mathematical foundations, statistical thinking and computational thinking. A report on the results of ideations will be presented to VDOE in April 2024.

- **Phase 4:** The teachers in the course will each select 2-3 students from their respective classroom to engage in a micro-pilot student led research course as a *prototype* will be created through GMU building on a successful model that is already in place through the VDOE Advancing Computer Science Education grant but expanding it to become more data-intensive. This will be offered to a group of 20-30 students in May – June 2024. The problems that will be addressed will be presented by local business and industry through a hack-a-thon and the course will culminate in a shark tank format with the students presenting their innovative solutions. A report on the results of the micro-pilot will be presented to VDOE in July 2024.

- **Phase 5: Research and Apprenticeship Pathways**

This phase will include a *test* phase where the students will have an opportunity to present the outcomes of their research through a showcase to a variety of stakeholders in August 2024. The student presentations will be integrated into a proposed third summit on Data Science and Workforce Development where K-12, 2-year and 4-year higher education partners as well as business, industry and government partners. This phase will also help the students to have the opportunity to pursue one of three possible pathways through a semester half-credit course: research; apprenticeship; or certification in Fall 2024. During this time, students either continue their mentored research experience or work with stakeholders through a mentored apprenticeship or earn a guided certification through Google, AWS or Microsoft. Along with students engaging in various experiences, we will also create through the proposed lab school a “Teacher Residency in Industry” Program that will allow teachers to have regular visits and interactions with the industry mentors in the program. This will help them to understand how data and computing is used in the workforce and will help them to enhance their lesson plans to integrate what they learn and engage students in improved learning. A report on the results of Phase 5 activities will be presented to VDOE in Nov 2024. In parallel, in Fall 2024, the Shenandoah Valley Rural Regional Partnership will write and submit a full

VDOE Lab School Grant in Fall, 2024. The following table summarizes the planning grant activities starting on Nov 15, 2023.

Table 1

Phase/Semester	Activity
Nov 15, 2023 - Dec 31, 2023	<ul style="list-style-type: none"> ● Planning Grant Start Date ● Project Team Formation ● Creating MOUs in place with roles and responsibilities of each partner
Phase 1 Jan 1, 2024 - Jan 31, 2024	<ul style="list-style-type: none"> ● Data Science Stakeholder Summit 1 ● Summarize findings ● Report 1 to VDOE
Phase 2 Feb 1, 2024 - Feb 29, 2024	<ul style="list-style-type: none"> ● Selection of the Advisory Board ● Problem Statements and Feedback ● Report 2 to VDOE
Phase 3 Mar 1, 2024 - Apr 30, 2024	<ul style="list-style-type: none"> ● Data Science Curriculum Development Summit 2 ● Curriculum Development with Teacher Leads ● Create Laboratory School Application ● Report 3 to VDOE
Phase 4 May 1, 2024 - July 30, 2024	<ul style="list-style-type: none"> ● Micro-pilot Laboratory School ● Design-A-Thon and Shark Tank ● Report 4 to VDOE
Phase 5 Aug 1, 2024 - Aug 31, 2024	<ul style="list-style-type: none"> ● Data Science Workforce Development Summit 3 ● Creation of research; apprenticeship; or certification pathways ● Teacher Resident in the Industry ● Report 5 to VDOE
Fall 2024	<ul style="list-style-type: none"> ● Monitor and Evaluate students in pathways ● Provide Continuous Teacher Professional Learning on DS ● Submit Laboratory School Application
Spring 2025	<ul style="list-style-type: none"> ● Micro-Pilot student-led (mentored by faculty or industry) research projects around Data Science for solving Societal Challenges
Fall 2025	<ul style="list-style-type: none"> ● Shenandoah Valley Rural Regional Laboratory School for Data and Computing Official Opens

F. STUDENT POPULATION AND RELEVANT RESEARCH

1. TARGETED STUDENT POPULATION

- a. Describe the student population planned for the proposed Lab School, including the number of students, reporting group(s), and grade level(s) contemplated, and discuss why the specific student population is targeted to attend the Lab School.

PROPOSED GRADES TO BE SERVED FOR THE FULL TERM OF THE APPROVED LAB SCHOOL CONTRACT (PLEASE CHECK ALL THAT APPLY*)			
Pre-K		Sixth Grade	
Kindergarten		Seventh Grade	
First Grade		Eighth Grade	
Second Grade		Ninth Grade	
Third Grade		Tenth Grade	
Fourth Grade		Eleventh Grade	50
Fifth Grade		Twelfth Grade	50

*If the Applicant intends to add or change grade levels at some point during the Lab School's operation, please also provide this information in Section E. Program Description.

- b. Describe the community(ies) the school(s) serves:
- i. The proposed Lab School would serve a representative student body from the existing Shenandoah Valley Computer Science Regional Partnership school divisions. Students from underrepresented and underserved subgroups in the two Regional Governor's Schools for the area will be recruited from the existing SVCSR programing pathways in K-10.
 - ii. The proposed Lab School would serve students who show a career interest in Data Science from surveys, courses, and Computational Thinking/Data Science/Computer Science field experiences given in Grades 9 & 10 in the base schools.

- c. If the Lab School is going to have a specialized focus (e.g., Science, Technology, Engineering, Mathematics [STEM], at-risk students, special education, career and technical education, gifted education, classical education, etc.), please describe the focus: The focus of the proposed SVRRP Lab School will be Data Science and Computing Applications in a career cluster of interest for college and career preparation. The mission of the proposed lab school will be to help diverse students from the rural districts to learn about the importance of data and computing in all areas of STEM.

2. P/D) RELEVANT RESEARCH

Discuss any relevant research tied to the proposed student population and overall goal of the Lab School to demonstrate that it will improve student academic proficiency, mastery, college and career readiness, and long-term outcomes:

- i. While higher education institutions around the world have been steadily incorporating some version of data science into a wide range of undergraduate curricula (from business to healthcare and even the social sciences), K-12 education has been lagging behind in terms of both pedagogical changes and overall implementation. In most of the U.S., K-12 mathematical standards have not evolved significantly in the last 100 years, and school systems continue to run their mathematics courses as disparate blocks. In contrast, countries that have shown more success in science, technology, engineering, and mathematics education tend to teach three continuous years of integrated math wherein concepts of algebra, geometry, probability, statistics, and data analysis are presented in unison. This strategy helps students develop deeper conceptual knowledge and make stronger connections with the material. Dr. Seshaiyer and Dr. Crawford were able to help lead Virginia's efforts on creating the first ever **Data Science Standards**³. By virtue of design, the new data science curriculum and course in the Commonwealth combines elements of mathematics, statistics, and computer science to solve real-world problems. Therefore, introducing high school students to data science allows them to incorporate inter- and intradisciplinary approaches in the problem-solving processes. The curriculum also includes foundational competencies like statistical and computational thinking, mathematics, communication skills, and ethics. While mathematics, statistics, and computer science tend to share certain similarities with data science—they all aim to extract knowledge from data, for example—significant differences exist in the modeling processes, size of the data, type of problem, practitioners' backgrounds, and language in question. The proposed course focuses on **five units**: data and society, data and ethics, data and communication, data modeling, and data and computing. Students will utilize **open-source technology tools** to identify and explore problems that involve relational database concepts and data-intensive computing in order to ultimately find solutions. They will also engage in a **data science problem-solving structure** to interact with large data sets and formulate problems; collect, clean, and visualize data; create

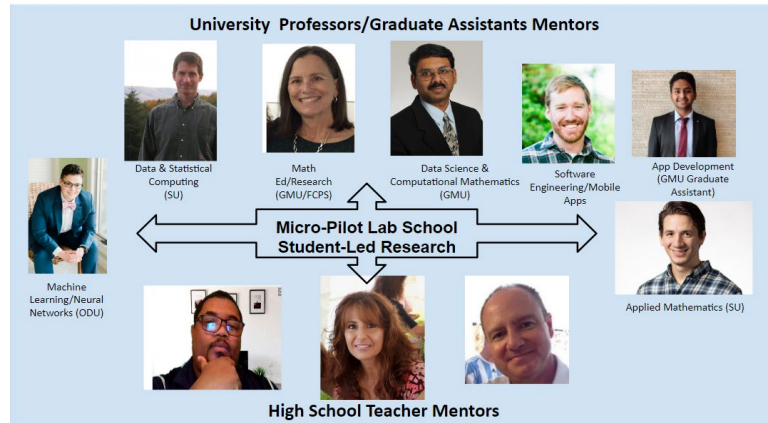
³ <https://www.doe.virginia.gov/teaching-learning-assessment/k-12-standards-instruction/mathematics/standards-of-learning/2023-mathematics-sol>

data-based models; and effectively communicate data-formulated solutions. We hope to bring all the best practices and lessons learned through this Data Science development into the proposed Shenandoah Valley Rural Regional College Partnership Laboratory School.

- ii. One of the novelties of the proposed lab school is to engage students in a two-year program designed to enhance their proficiencies in data by solving real-world problems. For this, students will take integrated STEM courses driven by data and develop lifelong learning competencies and durable skills that universities and employers' value. There are several unique aspects of this proposed school.
 - a. First, the school will incorporate grand challenges as identified by the US National Academy of Engineering⁴ which will be integrated into their curriculum using a data-intensive approach along with a human-centered approach such as **Design and Systems Thinking**. This helps to also build a STEM road map for students helping them prepare for their journey into college or the workforce [1, 2].
 - b. Next, the instructional strategy will be project-based and will incorporate models like the **5E model** (Engage, Explore, Explain, Elaborate and Evaluate) into the classrooms to help students build a strong foundation of knowledge through active participation. The teachers will have the opportunity to integrate different ways for students to make data-driven discoveries through inquiry-based learning [3], modeling [4], experiential learning, challenge-based learning and PBL [5]. The lab school will also have teachers from the Shenandoah Valley to collaborate and engage in research-based practices such as Lesson Study [6] as well as engaging in responsive and responsible learning through collaborative teaching [7].
 - c. Among the top 20 skills in demand in today's workforce, **data science, artificial intelligence (AI) and machine learning** are in high demand, ranking at #2. There is a growing need for data scientists and analysts globally to help navigate a disruptive marketplace, governed by big data. However, there is also a need to create a curriculum in K-12 and higher education that builds a data skill set for all students such as data visualization [8] that meets the needs of the workforce. The proposed lab school will help to bridge this gap through the proposed activities such as apprenticeships and just-in-time certifications as well as an innovative lab for teacher professional learning around data science and computing.
 - d. The proposed lab school provides a **multi-tiered mentoring and coaching** model, especially involving several rural districts. The lab school will help to create an ecosystem for mentoring and coaching for beginning and experienced teachers and teacher leaders in the areas of data-driven decision-making and instructional leadership.
 - i. **Tier 1** in our multi-tier mentorship models consists of the high school students who will be directly engaged in the data-driven project activities.

⁴ <https://www.engineeringchallenges.org/challenges.aspx>

- ii. **Tier 2** in our model involves the teacher leaders who will help to serve as their sponsors and classroom teachers to help guide them as students make their data-driven discoveries.
- iii. **Tier 3** includes a list of university and industry mentors who will help to coach the teacher leaders in helping identify relevant real-world challenges that the students are interested in pursuing.



This multi-tiered structure was used in our two back-to-back VDOE-funded Advancing Computer Science Education grants where we had a cohort of high schools in 2022 and 2023 take a dual enrollment course through George Mason University. The participants included faculty selected from across the commonwealth (Tier 3), and teachers from across the Shenandoah Valley (Tier 2) who worked with about 35 students.

References

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2. **Seshaiyer, P.** (2021). Novel frameworks for upskilling the mathematics education workforce. *Mathematics Education for Sustainable Economic Growth and Job Creation*, 90-107.
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4. **SESHAIYER, P.**, & SUH, J. (2019). Mathematical modeling in problem solving: a big idea across the curriculum. In *Big Ideas In Mathematics: Yearbook 2019*, Association Of Mathematics Educators (pp. 167-186).
5. Suh, J. M., & **Seshaiyer, P.** (2019). Promoting ambitious teaching and learning through implementing mathematical modeling in a PBL environment: A case study. *The Wiley Handbook of Problem-Based Learning*, 529-550.

6. Suh, J., & **Seshaiyer, P.** (2015). Examining teachers' understanding of the mathematical learning progression through vertical articulation during lesson study. *Journal of Mathematics Teacher Education*, 18, 207-229.
7. Mohamed, M., Rasid, N. S. M., Ibrahim, N., & **Seshaiyer, P.** (2023). Engaging Responsive and Responsible Learning Through Collaborative Teaching in the STEM Classroom. In *Cases on Responsive and Responsible Learning in Higher Education* (pp. 120-133). IGI Global.
8. Mazzacane, T., Wiersma, L. and **Seshaiyer, P.** (2023). Data Visualization - A Tool for Solving Unsolved Mysteries, *Virginia Mathematics Teacher*, Accepted and In press (2023)

G. COLLABORATION AND STAKEHOLDER INVOLVEMENT

1. Describe the involvement of local school divisions, community-based organizations, employers, teachers, and parents in the planning, development, and implementation of the proposed Lab School.

The SVRRP Lab School implementation will be planned by the lab school division partners along with stakeholders from higher education, parents, and business and industry partners. The timeline presented before summarizes the collaboration on the location and logistics, curriculum alignment with higher education, and workforce pathways.

- The proposed *stakeholder, curriculum development and workforce development summits* in the planning grant will help to bring feedback from members from local school divisions, community-based organizations, employers, teachers and parents.
- The proposed activities in the planning grant for teachers including continuous professional development in Data and Computing as well as new ideas like Teacher Residency in the Industry aligns well with the design of the lab schools to *provide teachers with an avenue for delivering innovative instruction and school scheduling, management and structure.*
- The planning grant will help to create an infrastructure that will involve higher education and employers for improved student learning through dual enrollment courses, research, apprenticeship and credential opportunities to build their *academic proficiency, mastery, college and career readiness.*

2. If the Lab School is going to be in partnership with a local school division(s), please briefly describe the partnership:

The Shenandoah Valley Regional Partnership project is coordinated by an existing advisory board that includes lead member(s) from each of the participating school divisions & programs (Clarke County, Fauquier County, Frederick County, Mountain Vista Regional Governor's School, Page County, Shenandoah County, Warren County, and Winchester City) along with the member institutions (George Mason University and Laurel Ridge Community College)

H. SUSTAINABILITY

1. The goal of the Lab School Planning Grant program is to support public institutions of higher education; public higher education centers, institutes, or authorities; or eligible institutions of higher education as defined in the Tuition Assistance Grant Program, as defined in § 23.1-628, as they develop and implement programs in order to create or improve capacity to operate and sustain a Lab School independently of long-term state funding, and in a manner that promotes quality, innovation, and program results.
2. Describe the Applicant's capacity to implement a Lab School:
 - Dr. Seshaiyer and Dr. Crawford have over two and half decades of experience in school management, higher education administration, teacher professional development, outreach and education programs and state-wide and national curriculum and standards revisions and development. They have helped to champion the creation of the first ever Data Science Standards for the Commonwealth working with the VDOE. They both have led the VDOE funded Advancing Computer Science Education grant for the last four years very successfully that led to the creation of the Shenandoah Regional Computer Science Partnership that includes eleven members with seven rural school districts, three higher-education members and one Governor's. The following quote from the CS Supervisor Keisha Tennessee from the VDOE Office of Innovations who visited our student showcase one year, summarizes our efforts to build successful student programs through these grants, "*Dr. Seshaiyer and Dr. Crawford, I cannot say how impressed I was with the depth of knowledge and ownership of learning that was evident throughout the entirety of the showcase. It is in these moments that highlight the impact computer science (learning in general) has on the lives of students and the tremendous role educators play in that journey. Thank you for extending the invitation. It is moments such as the student showcase that are the highlight of this role. Again, kudos to you all and the collective team.*" These outcomes from these grants have helped us to envision the development of the college partnership laboratory school as it will build on effective practices around building such collaborative partnerships.
 - Dr. Seshaiyer has served in multiple leadership positions including the Associate Dean for Academic Affairs at GMU, Program Director at the NSF, Director of the STEM Accelerator Program and the Director for the Center for Outreach in Mathematics Professional Learning and Educational Technologies at GMU as well. He is also currently the only appointed member serving both on the VA STEM Advisory Board and the VA Workforce Development Board. Dr. Crawford serves as the Supervisor of Mathematics & World Language in the Instructional Services Department at Frederick County Public Schools and also has extensive experience with coordinating regional partnerships. She also teaches at the College of Education and Human Development at GMU as an adjunct faculty member. Dr. Seshaiyer and Dr. Crawford bring complementary expertise that will help to design and develop the proposed next generation innovation lab school focusing on data and computing. Both have already shown success through the proof-of-concept micro-pilot lab school as well as establishment of the Shenandoah Valley CS Regional Partnership.

3. Identify potential affiliates, partners, and describe potential sustainable funding sources:
 - Working with this new high school data science curriculum and standards, Dr. Seshaiyer and Dr. Crawford have established very close relations with several partners that include the following organizations in Virginia
 - Amazon - Deidre Holmberg, Global Lead AWS Spark
 - Black Sky - Patrick O'Neil, Chief Innovation Officer, Blacksky
 - MITRE- Jay Crossler, Chief Engineer and Technical Fellow
 - Micron - Zuzana Steen, Academic and Community Relations Director
 - NASA- Elizabeth Joyner, Senior Outreach Coordinator
 - VSTE - Rod Carnill, Executive Director
 - Kathy Renzetti, DiscoverE, Executive Director
 - Ralph Wojtowicz, Faculty & Director, Applied Tech, Shenandoah Univ
 - Katie Smith, Faculty, VA Modeling, Analysis & Simulation Center, ODU
 - Marcella Torres, Faculty, Mathematics, University of Richmond
 - Ia Gomez, Dean of STEM, Laurel Ridge Community College
 - George Taratsas, Director, Workforce Dev, Office of Sec of Labor
 - New Horizons Regional Education Center – Casey Roberts, Exec Director
 - We will also be collaborating with members from outside the state who are doing a lot of work in the space of Data Science to get regular advice and feedback:
 - Zarek Drozda, Executive Director, Data Science 4 Everyone
 - Hollylynne Lee, Distinguished Professor of Mathematics and Statistics Education, NCSU and PI on Invigorating Statistics & Data Science Teaching through Professional Learning (InSTEP).
 - Lindsey Henderson, Secondary Mathematics Specialist, Utah State Board of Education
 - Gail Burrill, Mathematics Educator and former President of the National Council for Teachers in Mathematics
 - Aanand Vasudevan, Senior Director, The College Board
 - Ana Ferreras, Senior Program Officer, National Academy of Sciences
 - We will also actively pursue several funding opportunities to sustain the program activities including:
 - **NSF- Innovative Technology Experiences for Students and Teachers (ITEST):** One of expectations of this that aligns with our proposed lab school initiative is:
 - *Broadening Participation in the ITEST PI Community:* The ITEST Resource Center is expected to conduct outreach efforts to broaden participation in the ITEST community. Specifically, the Resource Center should seek individuals from organizations and communities underrepresented or not currently represented in the ITEST portfolio and facilitate increased participation in STEM workforce development through expansion of the ITEST portfolio to underrepresented geographic regions, community types (e.g., **rural**, suburban, or urban), and institutions (e.g., minority-serving

institutions, community colleges, school districts, or formal and informal learning centers).

- <https://www.nsf.gov/pubs/2022/nsf22585/nsf22585.htm>
- **NSF - Robert Noyce Teacher Scholarship Program:** This aligns well with the proposed lab school efforts of serving as a hub for continuous teacher professional development in Data and Computing.
 - This call invites innovative proposals that address the critical need for recruiting, preparing, and retaining highly effective elementary and secondary mathematics and science teachers and teacher leaders who persist as classroom teachers in high-need Local Education Agencies (LEA), (a.k.a. high-need school district and one of the eligibility criteria for applying to this funding is under the **Rural** School Program under 20 U.S.C. 7351(b)). To achieve this goal, Noyce supports talented science, technology, engineering, and mathematics (STEM) undergraduate majors and professionals to become effective K-12 STEM teachers. It also supports experienced, exemplary K-12 STEM teachers to become teacher leaders who continue as classroom teachers in high-need school districts.
 - <https://www.nsf.gov/pubs/2023/nsf23586/nsf23586.htm>
- **NSF – DRK-12: Discovery Research K-12** – The goal of this program is to catalyze research and development that enhances all preK-12 teachers' and students' opportunities to engage in high-quality learning experiences related to the sciences, technology, engineering, and mathematics (STEM). Some of the focal areas of interest relevant to our proposed lab school is on:
 - Research and development activities to advance innovative approaches to support and sustain high-quality STEM teaching in *rural preK-grade 12 schools*.
 - Research and development that seeks to identify barriers rural students face in accessing high-quality STEM education, and development of innovative approaches to improving the participation and advancement of rural preK-grade 12 students in STEM studies.
 - <https://www.nsf.gov/pubs/2023/nsf23596/nsf23596.htm>
- **NSF – IUSE: Improving Undergraduate STEM Education:** This program seeks to support projects that have high potential for broader societal impacts, including improved diversity of students and instructors participating in STEM education, professional development for instructors to ensure adoption of new and effective pedagogical techniques that meet the changing needs of students, and projects that promote institutional partnerships for collaborative research and development. One of the topics of interests that aligns with our proposed lab school is:

- Efforts to increase the diversity of the STEM workforce including K-12 teachers and/or the faculty and institutions engaged in work to improve undergraduate STEM education
 - <https://www.nsf.gov/pubs/2023/nsf23510/nsf23510.htm>
- The president’s budget codifies a proposal for a **Rural Partnership Program** (RPP) with a \$5 billion FY2022 request, with outlays over five years, placing the RPP within the Rural Development division of the U.S. Department of Agriculture (USDA-RD). Envisioned to “help rural regions, build on their unique assets and realize their vision for inclusive community and economic development,” the RPP seeks to match the diversity of rural places across the U.S. and invest in local leaders, organizations, and strategies, giving communities a fighting chance to build resilience and prosperity on their own terms. As the proposed lab school evolves, we hope to actively pursue opportunities under this program.
- The **CHIPS and Science Act** (H.R. 4346) bill authorizes NSF to
 - Support PreK–12 informal STEM opportunities, such as awards for “research on effective approaches to engaging students in PreK–12, including students from groups historically underrepresented in STEM and rural students” with a focus on “innovative before-school, after-school, out-of-school, and summer activities that are designed to encourage interest, engagement, and skills development in STEM.”
 - Increase efforts to advance rural STEM education including funds to support engaging rural educators, conducting research on effective STEM teaching in rural settings, leveraging community assets to support in-place learning in rural areas, and to support online STEM education for rural communities.

We will be actively be pursuing any related solicitations and funding opportunities that will come out of this new Act related to rural districts building on our strengths on Data and Computing. Dr. Seshaiyer has won several of these awards as an investigator from the National Science Foundation and also served as a former NSF program director and so will bring a lot of experience in these areas.

4. Identify potential barriers to the planning process and possible ways to address them: While they may not be actual barriers, we anticipate that we would need coordinated discussions during the proposed summits in the planning grant to
 - Identify ideal location for the proposed lab school
 - Align new developments and opportunities for students between K-12 and the 2-year and 4-year higher ed through dual enrollments and coordinated research opportunities.
 - Create new apprenticeship and internship pathways with our business and industry partners.
 - Build new credentialing pathways with the two higher education partners

I. BUDGET OF DIRECT COSTS (WITH \$200,000 MAXIMUM)

1. Complete the budget table below outlining the financial plan of how the Planning Grant will be used to establish the proposed Lab School. The Planning Grant Term and use of funds may not exceed 12 months from the date of award.
2. Only include direct operating costs. Indirect costs and capital outlay costs are not allowed. Include a description of expenses that explains the appropriateness of expenses based on the category descriptions shown below.
3. All expenses must be directly related to the proposed Planning Grant activities. Applicants are not guaranteed the requested award amount and any award may be proportionally adjusted according to the Application’s weighted Planning Grant Application Evaluation Rubric score and to reflect only those expenditures that are designated as permissible.
4. **Note: Any unspent Planning Grant funds remaining at the end of the Term must be returned by the recipient to the Department.**

CATEGORY	DESCRIPTION OF EXPENSES	FUNDING REQUESTED
1000 – Personal Services	<ul style="list-style-type: none"> ● PI - Padmanabhan Seshaiyer (GMU) 	\$20,000
	<ul style="list-style-type: none"> ● Co-PI To be identified (Shenandoah Rural Regional Partnership) 	\$20,000
	<ul style="list-style-type: none"> ● Senior Personnel (Laurel Ridge) 	\$10,000
	<ul style="list-style-type: none"> ● Graduate Assistant 	\$2,500
2000 – Employee Benefits	<ul style="list-style-type: none"> ● 7.3% (GMU - Faculty) 	\$1,460
	<ul style="list-style-type: none"> ● 6.8% (GMU - Student) 	\$170
3000 – Purchased/Contractual Services	<ul style="list-style-type: none"> ● College tuition for micro-pilot Dual Enrollment course for high school students <ul style="list-style-type: none"> ○ 30 students ○ \$325 per credit ○ 3 credits 	\$29,250
	<ul style="list-style-type: none"> ● Industry-approved certifications for teachers <ul style="list-style-type: none"> ○ \$3000 ○ 4 members 	\$12,000
	<ul style="list-style-type: none"> ● Registration for three planning summits <ul style="list-style-type: none"> ○ Summit 1 (Data Science Stakeholder Summit) 	\$10,000

CATEGORY	DESCRIPTION OF EXPENSES	FUNDING REQUESTED
	<ul style="list-style-type: none"> <ul style="list-style-type: none"> ■ Jan 2024 ■ 30 stakeholders ■ Rental Space ○ Summit 2 (Data Science Curriculum Development Summit) <ul style="list-style-type: none"> ■ March 2024 ■ 10 teachers ■ Rental Space ○ Summit 3 (DS and WFD) <ul style="list-style-type: none"> ■ August 2024 ■ 30 members ■ Rental Space ● Mentorship from Faculty <ul style="list-style-type: none"> ○ 4 Univ Faculty ○ \$2000 each ● Fee for Advisory Board (10 members) ● Industry-approved certification for students <ul style="list-style-type: none"> ○ 10 students ○ \$400 per student ● Apprenticeship Stipend (10) <ul style="list-style-type: none"> ○ 10 students ○ \$400 per student ● Research Scholarship (10) <ul style="list-style-type: none"> ○ 10 students ○ \$400 per student ● Teacher Residency in Industry (3) 	<p>\$10,000</p> <p>\$10,000</p> <p>\$8,000</p> <p>\$3,000</p> <p>\$4,000</p> <p>\$4,000</p> <p>\$4,000</p> <p>\$3,000</p>
4000 – Internal Services	<ul style="list-style-type: none"> ● Printing Supplies 	\$3,000
5000 – Other Services	<ul style="list-style-type: none"> ● Teacher Professional Learning (30) <ul style="list-style-type: none"> ○ Continuing Education Credits (\$15,000) ○ Stipend (\$200 each) ● Teacher Leaders 	<p>\$21,000</p> <p>\$5,000</p>

CATEGORY	DESCRIPTION OF EXPENSES	FUNDING REQUESTED
	<ul style="list-style-type: none"> ○ Ten Coaches (\$500 each) ● Administrative Assistant (1) ● Travel 	<p>\$2,500</p> <p>\$4,000</p>
6000 – Materials and Supplies	<ul style="list-style-type: none"> ● Marketing <ul style="list-style-type: none"> ○ Website ● Publishing ● Data Science Program Materials <ul style="list-style-type: none"> ○ \$500 per student team (10) 	<p>\$4,000</p> <p>\$4,000</p> <p>\$5,000</p>
Total		\$199,880

*** Total cannot exceed \$200,000 with additional funding considered at the discretion of the Department on a case-by-case basis and in accordance with available funds.**

Budget Narrative

Budget requests a total of **\$199,880** for the period of the proposed project Nov 15, 2023 and Nov 15, 2024.

Personal Services (1000)

A total of \$52,500 is requested for personal services. Salaries are requested for the lead GMU PI Dr. Seshaiyer for \$20,000 for the duration of the project, a Co-PI selected from the Shenandoah Rural Regional Partnership for \$20,000, and Laurel Ridge Senior Personnel Dr. Ia Gomez (Dean of STEM) or designee for \$10,000. One graduate assistant is requested for 125 hours at \$20 an hour over the period of the project to work closely with the PIs on the project.

Employee Benefits (2000)

\$1,460 is requested for job-related employee benefits for the PI and \$170 is requested for the graduate assistant.

Purchased/Contractual Services (3000)

A total of \$97,250 is requested towards purchased/contractual services:

- A total of \$29,250 tuition is requested to enroll 30 students for a 3-credit “Introduction to Innovations in Research” High School Dual Enrollment Course through GMU.
- A total of \$12,000 for four teachers to earn industry-approved certifications for \$3000 each.
- Budget for three summits including registration, food, travel, accommodation and honorarium:

- A total of \$10,000 for hosting the Data Science Stakeholder Summit for 30 participants at location to be determined (Jan 2024)
- A total of \$10,000 for hosting the Data Science Curriculum Development Summit with 10 participants at location to be determined (March 2024)
- A total of \$10,000 for hosting the Data Science Workforce Development Summit with 30 participants at location to be determined (August 2024)
- A total of \$8,000 for four faculty mentors for high school student projects selected from various universities across the commonwealth (\$2,000 each)
- A total of \$3,000 is requested as a fee for 10 advisory board members in the project (\$300 each) for their regular feedback and advice on the project.
- A total of \$15,000 for student scholarships in three categories
 - Industry-approved basic certification (10 students at \$400 each)
 - Apprenticeship Awards (10 students at \$400 each)
 - Research Scholarship (10 students at \$400 each)
 - Teacher Resident in Industry (3 Teachers at \$1000 each)

Internal Services (4000)

A total of \$3,000 is requested for internal services for the project supplies is being requested for all the print job activities we plan to do for all the various project activities.

Other Services (5000)

A total of \$32,500 is requested for travel other direct expenses as follows.

- A total of \$21,000 is requested for teacher professional learning through continuing education at GMU which includes \$15,000 for 30 teachers with \$200 stipend to each of the 30 teachers.
- A total of \$5,000 is requested in stipend for 10 teacher leaders (\$500 each) who will co-facilitate sessions with PIs and also help co-design lesson plans and serve as teacher coaches.
- One administrative assistant is requested for 100 hours at \$25 an hour over the period of the project to work closely with the PIs on the project
- Budget also requests a total of \$4,000 in travel for the project planning team to be able to travel across the Commonwealth to disseminate findings and learn from other lab schools.

Materials and Supplies (6000)

- A total of 4,000 is requested for marketing, website and publication from the project.
- A total of \$4,000 is requested for the data science educational materials designed for the lab schools. Specifically, computing supplies that will help engage students including plugged as well as unplugged materials; tools for computational thinking, data science and AI for student to explore various topics in STEM
- Budget also requests \$5,000 that will be awarded to 10 teams of high school students as seed grants (\$500 each) for the capstone project.

APPENDIX: PLANNING GRANT APPLICATION EVALUATION RUBRIC

For the Applicant’s information, the following will be used as the Planning Grant Application Evaluation Rubric for this Application. Applicant does not need to complete this section.

AREA OF CONSIDERATION	DESCRIPTION	POINTS AVAILABLE
Targeted Student Population(s) and Relevant Research	Application proposes intention to serve at-risk students and/or offer a new, innovative model of instruction grounded in evidence-based practices to improve student academic proficiency, mastery, college and career readiness, and long-term outcomes.	30
Clarity of Program Description Goal, and Timeline	The program description and goal are clear and attainable. Indication of programmatic, operational, and infrastructural capacity to advance an application to launch a Lab School program, as well as launch a Lab School no later than the 2024-2025 school year. Additional preference will be given to applicants with an earlier Lab School launch timeline.	20
Sustainability	Evidence of institutional commitment to the viability of a Lab School in a manner that promotes quality, innovation, program results, and sustainability.	20
Collaboration	Evidence of engagement and collaboration with stakeholders, including local school divisions, community-based organizations, employers, teachers, and parents.	15
Regional and Applicant Diversity	Evidence of diversity of location, with the goal of Lab Schools in each Superintendent region. For applicant diversity, preference will be given to new applicants in the event a concurrent applicant has previously received a Planning Grant during the current application period.	15