Preview of Award **2349967**- annual Project Report

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Cover

Federal Agency and Organization Element to Which Report is Submitted:

4900

Federal Award or Other Identifying Number Assigned by Agency:

2349967

Project Title:

Forging a Blockchain-ready Workforce: Preparing Technicians for Success

PD/PI Name:

Angel M Fonseca, Principal Investigator
Dianne M Hill, Co-Principal Investigator

Recipient Organization:

Jackson Community College

Project/Grant Period:

08/01/2024 - 07/31/2027

Reporting Period:

08/01/2024 - 07/31/2025

Submitting Official (if other than PD\PI):

N/A

Submission Date:

N/A

Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)

N/A

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Accomplishments

* What are the major goals of the project?

The faculty leading this initiative will create new curricula in stackable micro-credentials that will be laddered into the Software Engineering Associate of Applied Science degree. PIs will leverage JC's position as an innovative educator to work with stakeholders (internal and external) to recruit students. Further, PIs are devoted to continued substantive professional development to remain current in emerging standards related to Blockchain technology:

- Goal 1: Develop an innovative and comprehensive **curriculum** for blockchain education that aligns with industry standards and emerging trends
- Goal 2: Design and implement strategies to attract, **recruit**, and engage a diverse student population in blockchain technology education
- Goal 3: Engage in, create, and deliver **professional development** activities for faculty and the community to enhance their expertise in blockchain concepts and technologies

* What was accomplished under these goals and objectives (you must provide information for at least one of the 4 categories below)?

Major Activities:
Goal 1 Activities:
1.1.1 Prioritize curriculum focus, create CIS modules
1.1.2 Deliver embedded modules in CIS201 and CIS220
1.1.3 Design new Blockchain technology courses that align with evolving standards
1.1.4 Vet courses with Advisory Committee

Goal 2 Activities:
2.1.1 Develop marketing and recruitment materials
2.1.2 Coordinate and host outreach activities

Goal 3 Activities:

3.1.1 Research PD, education, and training opportunities for PIs
3.1.2 Enroll in and complete PD

Upon receiving notice of the NSF award, the project team immediately began work on Goal 2, focusing on building awareness and excitement within the community about Jackson College's leadership role in pioneering blockchain technology education in the region. In collaboration with the College's Marketing Department, the PIs developed a range of promotional materials to support outreach efforts. A press release announcing the initiative was published, and the PIs appeared on JTV's Bart Hawley Show—a local TV program spotlighting impactful community initiatives. A dedicated webpage was launched to provide foundational information about blockchain technology and to serve as a living archive for the project's progress and outcomes. To support networking and outreach, the PI and Co-PI created project-specific business cards and developed posters and flyers tailored for various events.

Blockchain promotional materials were shared at key community and college-hosted events, including Starry Night (a Jackson College Foundation fundraiser), the Blockchain Breakfast (a recruitment and awareness-building event), and the Jackson County ISD Advisory Committee, where both PIs are active members. Progress updates were also delivered during annual meetings with partners such as the Workforce Intelligence Network (WIN) and various advisory boards. These outreach efforts led to greater community engagement, increased dialogue around blockchain's relevance, invitations to workforce-focused events, and new appointments to the Jackson College Blockchain Advisory Committee (JCBAC) from both industry and education partners.

Under Goal 1, the PIs conducted a benchmarking study of blockchain curricula across the U.S. and internationally to identify promising models and determine the most relevant focus areas for Jackson College's offerings. Four initial topic areas were identified for course development, forming the foundation for a stackable mini-credential (certificate) and an associate degree pathway. Curriculum development was prioritized within the Computer Information Systems (CIS) program, leading to the creation and delivery of embedded blockchain modules in CIS201 and CIS220, which introduced students to the core concepts of blockchain technology.

A significant milestone this year is the drafting of a complete blockchain curriculum, which includes four newly developed courses and a credentialing pathway that ladders into the college's Software Engineering Associate Degree. These courses are being designed to meet current industry standards and will be reviewed by the Blockchain Advisory Committee for feedback and approval in the upcoming months.

These are the four new courses under development:

- BLC101 Introduction to Blockchain Technology
- BLC105 Cryptography and Security
- BLC110 Blockchain Application and Industry Standards
- BLC115 Blockchain Development: dApps and Smart Contracts

The micro-credentials (certificates) being drafted are shown below. This may evolve based on feedback from the advisory *Italic courses are new courses.*

Blockchain Fundamentals Certificate	
3	*BLC101 Introduction to Blockchain Technology*
3	*BLC105 Cryptography and Security*
3	CIS201 Advanced Information Technologies
3	ENG 131 Writing Experience 1
4	MAT 130 Quantitative Reasoning
16	Total Credits

Applied Blockchain Technology Certificate	
3	*BLC101 Introduction to Blockchain Technology*
3	*BLC105 Cryptography and Security*
3	*BLC110 Blockchain Application Industry Standards*
4	*BLC115 Blockchain Development: dApps & Smart Contracts*
3	CIS158 Programming Logic
16	Total Credits

PI Angel Fonseca is an active member of the Competency Based Education Network and has utilized coaching hours to help shape the new curriculum, ensuring it emphasizes project-based learning, offers maximum flexibility, and aligns assessments directly with workforce-relevant skills.

Under Goal 3, the PIs identified and engaged in multiple professional development opportunities to deepen their expertise and instructional capacity in blockchain and emerging technologies. While the PIs specifically sought accredited training programs, they found none that fully met their needs. Previously, they completed professional development through eCornell during the grant application process. Over the past year, the PIs completed a variety of free training programs offered by the Blockchain Training Alliance, including courses such as Blockchain for Business, Blockchain Basics, Building a Hereda Course, Developing a Polkadot with Substrate, and Understanding and Developing Zcash. Additional trainings completed include IBM EdX's IBMBC2022 course and Code.org's Blockchain Technology courses. These programs not only enhanced their technical knowledge but also provided valuable insight into the current industry landscape—what blockchain technologies are being adopted, what skills are valued, and how blockchain is applied across different sectors.

A significant outcome is that the PIs are now enrolled in The Blockchain Academy's comprehensive course series, which is in the process of seeking ANSI and ISO certification, further supporting their ongoing professional development.

Significant results are that the Principal Investigators are enrolled in The Blockchain Academy's (currently seeking ANSI and ISO certification) series of courses covering these topics.

- Web3 Foundations
- Blockchain Foundations
- Data Protection Regulation
- AI Essentials
- Blockchain & Bitcoin Intensive
- Blockchain Development Decision
- Blockchain for Supply Chain
- Information Security and Cyber Risk Awareness
- Blockchain Enterprise Strategy
- Enterprise Strategy Workshop
- Key Management

- Introduction to Blockchain Scrum Master
- Scrum Methods for Blockchain
- Scrum Master Architecting Solutions by Combining Agile Methodologies
- Scaling Agile Solution for Blockchain to a team-of-teams
- Understanding L1 and L2 Blockchains
- Introduction to DevOps
- Blockchain Architecture 101

PIs will complete industry certifications as part of the customized training:

- W3CB Web3+ Certification
- W3CB Blockchain+ Certification
- W3CB Blockchain Supply Chain Professional
- W3CB Blockchain Project Manager
- Blockchain Security Professional
- Blockchain Smart Contract Developer

Three other potential trainings are currently being investigated to be pursued in year 2 of the grant:

- University of Michigan: Blockchain and Cryptocurrency FinTech Specialization
- Princeton University: Bitcoin and Cryptocurrency Technologies
- Massachusetts Institute of Technology Professional Programs: Blockchain – a Disruptive Technology

The outcomes related to these activities are that the PIs are more competent in blockchain technology and continue to be informed while they develop relevant and current curriculum.

* What opportunities for training and professional development has the project provided?

For immediate sharing and dissemination, the principal investigators have developed a standard presentation to deliver to audiences on-demand. Each time blockchain information is shared there is a micro-training involved to ensure that the audiences have a beginning conceptual understanding of how blockchain technology works across industries, what the adoption rate is regionally, nationally and globally, and how local industries are impacted by this emerging and disruptive technology.

For example, in the Starry Night event, audience members were given an introduction about the principles of blockchain and then during a campus tour attendees were given pieces of Legos to put together and build a block. At the end of the event, the Lego block was used to illustrate decentralization, immutability, transparency, and security. Business case uses are used to exemplify the impact industries are using blockchain in innovative ways to be more streamlined and competitive.

Outcomes for these activities have resulted in increased engagement with community members and willingness to provide input while PIs develop curriculum. More than half of the attendees of the most recent event (Blockchain Breakfast) expressed interest in serving on the JCBAC.

* Have the results been disseminated to communities of interest? If so, please provide details.

In the first year, since the full blockchain curriculum is still under development, dissemination efforts have primarily focused on strategic marketing campaigns and targeted outreach activities. Jackson College is actively positioning itself as a leader in blockchain technology education by pursuing fully accredited, credit-bearing curriculum. To achieve this, the college is prioritizing community engagement and stakeholder input, which are central to Goals 1 and 2 of the grant project. Ongoing progress is shared through the Jackson College Marketing Department, direct communication from the PIs, and updates during various outreach. Looking ahead to year two, once the curriculum receives formal approval, these same channels will be used to promote and deliver the new courses. The offerings will be available in the course catalog for academic credit and through modularized trainings accessible via Jackson College's Corporate and Continuing Education, the Workforce Intelligence Network (WIN), and the Center for Occupational Research and Development (CORD).

* What do you plan to do during the next reporting period to accomplish the goals?

In year two, the PIs will continue integrating blockchain modules into CIS201 and CIS220 while formalizing the development of the full blockchain curriculum. They will prepare and submit all required documentation to seek approvals from the Jackson College Blockchain Advisory Committee (JCBAC), Deans, Pathway Committee, Assessment Committee, and Curriculum Committee. The new courses and programs will also be submitted for accreditation consideration by the Higher Learning Commission. Concurrently, course shells will be built in the college's learning management system to ensure readiness for delivery.

A comprehensive marketing campaign will launch to promote the new Blockchain Technology courses, stackable micro-credentials, and associate degree programs. Dissemination of modular curriculum components will begin with education partners, including Jackson College's Corporate and Continuing Education division, and potentially CORD, and the WIN network, to extend the program's reach.

The PIs will continue their professional development by enrolling in advanced training opportunities such as MIT's "Blockchain – a Disruptive Technology," the University of Michigan's "Blockchain and Cryptocurrency FinTech Specialization," and Princeton University's "Bitcoin and Cryptocurrency Technologies."

The PIs also plan to attend key conferences and events, including Automation Alley's Integr8 Roundtable on Global Manufacturing Trends and Supply Chain in August, the ATE PI Conference in October, and a Futurist Blockchain Conference in Florida in November.
A detailed list of year-two activities, as projected in the grant application timeline, is provided below.

1.1.2 Deliver embedded modules in CIS201 and CIS220
1.1.3 Design new Blockchain technology courses that align with evolving standards
1.1.4 Vet courses with Advisory Committee
1.1.5 Submit course approval paperwork to Dean, Guided Pathways and Curriculum Committee for approval
1.2.1 Create Blockchain Fundamentals Certificate
1.2.2 Create Applied Blockchain Technology Certificate
1.2.3 Secure Higher Learning Commission approval
1.3.1 Create program map sequencing courses for Software Engineering AAS Degree
1.3.2 Process program paperwork for Guided Pathways, Assessment and Curriculum Committees
1.4.1 Prepare learning management system (LMS) with resources and learning content for four new courses
2.1.1 Develop marketing and recruitment materials
2.1.2 Coordinate and host outreach activities
2.1.3 Share curriculum with consortiums and partners
3.1.1 Research PD, education, and training opportunities for PIs
3.1.2 Enroll in and complete PD

A full list of activities for all three years is listed in the chart.

	Year 1			Year 2			Year 3		
Activities	fal	spr	sum	fal	spr	sum	fal	spr	sum
Goal 1: Develop an innovative and comprehensive curriculum for blockchain education that aligns with industry standards and emerging trends									
Objective 1.1: Create four new Blockchain technology education courses									
1.1.1 Prioritize curriculum focus, create CIS modules	X	X	X	X					
1.1.2 Deliver embedded modules in CIS201 and CIS220			X	X	X	X	X	X	X
1.1.3 Design new Blockchain technology courses that align with evolving standards		X	X	X					
1.1.4 Vet courses with Advisory Committee			X	X			X		
1.1.5 Submit course approval paperwork to Dean, Guided Pathways and Curriculum Committee for approval				X					
Objective 1.2: Create two new stackable blockchain certificates									
1.2.1 Create Blockchain Fundamentals Certificate				X					
1.2.2 Create Applied Blockchain Technology Certificate				X					
1.2.3 Secure Higher Learning Commission approval				X	X				
Objective 1.3: Integrate blockchain courses/certificates into an existing STEM program									
1.3.1 Create program map sequencing courses for Software Engineering AAS Degree					X				

1.3.2 Process program paperwork for Guided Pathways, Assessment and Curriculum Committees					X				
Objective 1.4: Deliver new courses									
1.4.1 Prepare learning management system (LMS) with resources and learning content for four new courses						X	X	X	
1.4.2 Deliver and teach new Blockchain courses							X	X	X
Goal 2: Design and implement strategies to attract and engage a diverse student population in blockchain technology education									
Objective 2.1: Develop recruitment and outreach initiatives to increase awareness of the benefits and opportunities in blockchain education among student groups.									
2.1.1 Develop marketing and recruitment materials		X	X			X			
2.1.2 Coordinate and host outreach activities		X	X			X	X	X	
2.1.3 Share curriculum with consortiums and partners									X
Goal 3: Engage in, create, and deliver professional development activities for faculty to enhance their expertise in teaching blockchain concepts and technologies									
Objective 3.1: Ensure PIs' continued blockchain proficiency in evolving and emerging standards									
3.1.1 Research PD, education, and training opportunities for PIs	X			X			X		
3.1.2 Enroll in and complete PD		X	X		X	X		X	X
Objective 3.2: Improve cross-discipline knowledge of blockchain application in industry									
3.2.1 Create peer blockchain education module							X		
3.2.2 Present module to colleagues during faculty learning days (FLD)								X	X
3.2.3 Host professional development activities for education partners									X

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Products

Books

Book Chapters

Inventions

Journals or Juried Conference Papers

View all journal publications currently available in the NSF Public Access Repository for this award.

The results in the NSF Public Access Repository will include a comprehensive listing of all journal publications recorded to date that are associated with this award.

Licenses

Other Conference Presentations / Papers

Other Products

Other Publications

Patent Applications

Technologies or Techniques

Thesis/Dissertations

Websites or Other Internet Sites

Jackson College: https://www.jccmi.edu/blockchain/
ATE Central: https://atecentral.net/r46116

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Participants/Organizations

What individuals have worked on the project?

Fonseca, Angel	PI	

Hill, Dianne	Co PI	

Full details of individuals who have worked on the project:

Angel Fonseca
Email: fonsecaangelm@jccmi.edu
Most Senior Project Role: PI
Nearest Person Month Worked: 3.08

Contribution to the Project: Lead PI

In the first year of the project, the PI focused on building a strong foundation for Jackson College's blockchain initiative. This included conducting extensive research on blockchain applications, participating in professional development opportunities, and engaging in outreach to establish relationships with industry partners, educators, and workforce agencies. The PI actively collaborated with faculty across multiple disciplines to explore cross-curricular integration of blockchain concepts. Traditionally, work began on drafting new curriculum content aligned with current industry trends. Outreach activities were completed to solicit interest for the Blockchain Advisory Committee, who will review the curriculum and provide feedback. Coaching sessions between the PI and the Competency Based Network coaches helps define industry-aligned objectives and authentic assessments. These efforts laid the groundwork for the development of new courses and expanded awareness of blockchain's relevance across both technical and non-technical fields.

Funding Support: 25,700 + fringe + stipend 2500

Change in active other support: No

International Collaboration: No

International Travel: No

Dianne Hill
Email: Hilldiannem@jccmi.edu
Most Senior Project Role: Co PI
Nearest Person Month Worked: 3.08

Contribution to the Project: In the first year of the project, the Co-PI played a vital role in supporting the foundation of Jackson College's blockchain initiative. She collaborated closely with the PI to research the evolving impact of blockchain technology across industries and education. The Co-PI actively explored professional development opportunities and monitored changes in regulations and standards to ensure the curriculum remains current and compliant. She also participated in faculty professional development activities to deepen her expertise and support interdisciplinary integration of blockchain concepts. Her contributions helped shape the direction of the curriculum and ensured that the program is informed by both academic innovation and industry relevance.

Funding Support: 25,700

Change in active other support: No

International Collaboration: No

International Travel: No

What other organizations have been involved as partners?

There have been no formal partners on this work in year 1.

Full details of organizations that have been involved as partners:

Were other collaborators or contacts involved? If so, please provide details.

Yes, numerous collaborators and contacts were involved throughout the first year of the project. The PIs actively reached out—cold calling, leveraging leads, and conducting extensive research—to connect with individuals and organizations working in the blockchain technology space. This effort was driven by the need to better understand the adoption of this emerging technology, identify which industries are leading its implementation, and explore how educational institutions can support and

align with these evolving industry needs. In addition to connecting with global blockchain professionals, the team also engaged with local and regional community leaders, employers, workforce development agencies, fellow educators, and research and development offices. These collaborative efforts provided valuable insights and helped shape the direction of the initiative. A comprehensive list of contacts made during year one is provided below.

Ann-Claire	Anderson	Council of Research and Development
Amy	Anderson	Business Office, Jackson College
Shauna	Bard	Danfoss
Katie	Bertke	Michigan Works! Southeast
Ron	Betzig	Entrepreneurship, Jackson College
Geoff	Bontrager	Northwest Schools
Mindy	Bradish-Orta	Executive, CMS Energy
Geremy	Burns	12th District Court
Cari	Bushinski	Northwest Schools
Carrie	Bushinski	Northwest Community Schools - Curriculum
Larry	Choate	Cybersecurity
Sally	Clark	Hillsdale EDP
Mary	Cline	Technique
Amber	Collins	Corporate and Continuing Education, Jackson College
Justin	Cook	MMTC
Mark	Costa	Brembo North America, Inc.
Jim	Coutu	Michigan Economic Development Corporation
Callie	Curtis	Consumers Energy
Cheryl	DeGroote	Grants Coordinator, Jackson College
Sean	Dennis	Lenawee Chamber
Dan	Draper	Jackson Area Career Center
Dan	Draper	Jackson County Intermediate Schools
Aaron	Ensley	Economics, Jackson College
Karen	Farr	Eaton Aeroquip
Amber	Fogarty	Consumers Energy
Justin	Gifford	Visit Lenawee
Keith	Gillenwater	Enterprise Group
Ron	Griffith	Lenawee Now
Ellen	Hause	Mentor Connect
Bart	Hawley	JTV
Austin	Hyatt	Adrian Steel Company
Brian	Jurasek	Willis & Jurasek P.C.
Lauren	Kroa	Grants Coordinator, Jackson College
George	Levy	The Blockchain Institute
Kyle	Liechty	Jackson College: Sport Management

Kurt	Linberg	CBEN Curriculum Coach
Suzanne	Long	Accounting, Jackson College
Becky	Lorian	LOMAR Machining
Alex	Masten	Lean Rocket Lab
Barb	Meyers	Lomar Machine & Tool
Clevester	Moten	Business and Public Administration, Jackson College
Bryant	Nielson	Web3 Certification
Chad	Noble	Retired Executive
Gary	Pageau	InfoCircle LLC
Connie	Poisson	Junior Achievement
Matt	Reinker	Jackson County Farm Bureau
Bridget	Robinson	Jackson College Foundation
Alex	Roy	CEI Materials
Jenifer	Scanlon	The Brokerage House
Jerry	Shaughnessy	Director of Purchasing, TRW Automotive
Christine	Shook	Consumers Energy
Pam	Silvers	Mentor Connect
Lindsey	Skocelas	CEI Materials
David	Smith	Sport Management, Jackson College
Joe	Sorenson	Advanced Turning
Joe	Sorenson	Advance Turning
Ryan	Specht-Boardman-	Competency Based Education Network
Nitish	Srivasta	The Blockchain Council
Dan	Stewart	Automation Alley
Cierra	Sylvester	Workforce Planning Coordinator, Henry Ford Health
Craig	Tapley	Commonwealth Associates, Inc
Ryan	Tarrant	Jackson Chamber of Commerce
Ryan	Tarrant	Jackson Chamber of Commerce
Steve	Tuckey	Math Professor, Jackson College
Michele	Ureste	WIN
Michele	Ureste	Workforce Intelligence Network
Valerie	Williams	Willis Information Technologies Inc

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Impacts

What is the impact on the development of the principal discipline(s) of the project?

As a result of the research, collaborations, and professional development the PIs have engaged in, a new blockchain-focused curriculum is currently being drafted for review by the Jackson College Blockchain Advisory Committee. This work directly contributes to the advancement of the discipline by bridging academic content with real-world industry needs. It ensures that the curriculum reflects current trends, tools, and use cases in blockchain technology, strengthening the academic foundation of this emerging field. By involving industry partners in the review process, the project fosters a responsive and forward-thinking approach to curriculum development, ultimately shaping a more relevant and impactful educational experience within the discipline.

What is the impact on other disciplines?

There has been a growing and ongoing dialogue with faculty across a range of disciplines—including Business, Accounting, Economics, Public Administration, Sport Management, Entrepreneurship, Cybersecurity, and Software Engineering. These conversations have highlighted the broad relevance of blockchain technology beyond its technical origins. In response, the PIs are developing a universal module designed to introduce blockchain fundamentals, with tailored examples that demonstrate its application within each of these fields. This cross-disciplinary approach is expanding awareness, fostering collaboration, and supporting the integration of emerging technologies across academic areas, ultimately enriching the college educational experience.

What is the impact on the development of human resources?

This is the first NSF grant that Jackson College has received and new policies were approved to be able to administer it. Accordingly, several employees on campus have taken on responsibilities to ensure processes are in place that are aligned with the new policies. This has required a significant amount of upskilling. In addition, a new Grants Coordinator position was filled to administer this and other grants that the College has received.

What was the impact on teaching and educational experiences?

The project has had a significant impact on teaching and educational experiences by introducing a cutting-edge topic—blockchain technology—into the community college environment in an accessible and relevant way. Faculty participating in the project have gained exposure to industry-informed insights, hands-on training, and interdisciplinary collaboration, all of which have influenced their instructional approaches. The development of blockchain curriculum, including modular content adaptable across various disciplines, has created new opportunities for active learning, problem-solving, and real-world application in the classroom. Coaching sessions with Competency Based Education coaches are assisting the PIs to create active learning objectives aligned with industry standards and evaluated with authentic assessments. Overall, the project is reshaping how faculty build curriculum and teach students.

What is the impact on physical resources that form infrastructure?

There have been no changes yet, as year one didn’t plan for any.

What is the impact on institutional resources that form infrastructure?

There have been no changes yet, as year one didn’t plan for any.

What is the impact on information resources that form infrastructure?

There have been no changes yet, as year one didn’t plan for any.

What is the impact on technology transfer?

There have been no changes yet, as year one didn’t plan for any.

What is the impact on society beyond science and technology?

The impact on society is far-reaching. By raising awareness of blockchain’s role in industries like finance, logistics, and operations, the college is driving momentum for broader economic and workforce transformation. Its efforts are positioning the institution as a forward-thinking leader, committed to preparing students—including dual-enrolled learners and incumbent workers—with practical, future-ready skills. The pursuit of curriculum accreditation ensures equitable access to high-demand education, helping to close opportunity gaps and support social mobility. This initiative ultimately strengthens community resilience, economic inclusion, and institutional innovation.

What percentage of the award's budget was spent in a foreign country?

0%

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Changes/Problems

Changes in approach and reason for change

There have been no changes in approach or change in the overlying goals

Actual or Anticipated problems or delays and actions or plans to resolve them

After a minor delay during the US administration changeover, the *Forging a Blockchain-Ready Workforce* grant is progressing as scheduled.

Changes that have a significant impact on expenditures

There have been no changes.

Significant changes in use or care of human subjects

There have been no changes.

Significant changes in use or care of vertebrate animals

There have been no changes.

Significant changes in use or care of biohazards

There have been no changes.

Change in primary performance site location

There have been no changes.

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Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.

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