APPENDIX D

CONTRACTOR'S COMMITMENTS

Applicable to the Operation of
Fermi National Accelerator Laboratory

Appendix D: FermiForward Commitments

In this Appendix, FermiForward provides the list of resource commitments that support our plan to reinvest in the mission of the laboratory, at no additional cost to the Government. As shown in **Figure D-1**, each commitment is proposed separately, with a detailed description that includes the estimated total value, location, expected benefits to Fermilab, the date the commitment will be provided, and a summary of any required Governmental action. For each commitment we have identified not only tangible benefits to the Fermilab mission, but also significant areas of impact to science activities. We acknowledge that this list will be vetted for acceptance by the Government prior to incorporation as Section J, Appendix D, of an awarded contract. For commitments made by organizations other than FermiForward, we have also provided signed letters from individuals authorized to represent the institutions pledging resource commitments to the Fermilab management and operations contract.

		Area of Impact				Alignment w/ Science Vision								
ID No.	Organization / Commitment	A) Science Vision & Implementation	B) Mission Support	C) Workforce Development	D) User Community Enhancement	2.1 Understanding the Neutrino	2.2 Probing the Higgs and Energy Frontier	2.3 Using Muons to Explore New Physics	2.4 Discovering the Dark Universe	2.5 Transforming Accelerator S&T	3.1 Quantum Information S&T (QIST)	3.2 AI and Advanced Instrumentation (AI2)	3.3 Emerging Technologies and ME	4.1 Discovery on the Prairie (DoP)
1A	**University of Chicago** Joint Task Force Initiative	✓		✓		✓			✓	✓	✓	✓	✓	✓
1B	**University of Chicago** Joint Appointments	✓		✓		✓	✓		✓	✓	✓	✓		
1C	**University of Chicago** Fermilab-Dedicated Corporate Support	✓	✓			✓			✓		✓			
1D	**University of Chicago** College Tuition Scholarships	✓	✓	✓										
1E	**University of Chicago** Makers' Space Equipment Contributions	✓			✓						✓	✓	✓	✓
2A	**URA** Visiting Scholars Program	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2B	**URA** User Community Support				✓									
2C	**URA** Workforce Development Support			✓										
2D	**URA** Corporate Support	✓	✓		✓									
2E	**URA** Building Awareness of and Support for HEP Priorities	✓	✓			✓	✓	✓	✓	✓	✓	✓		
3A	**FermiForward** Director's Strategic Initiatives Fund	✓	✓	✓	✓									
3B	**FermiForward** Strategic Leadership Investment	✓	✓	✓										
3C	**FermiForward** Undergraduate Tuition Scholarships			✓										
3D	**FermiForward** Academic Sponsorship Fund	✓		✓	✓						✓	✓	✓	
4A	**Amentum** Mission Support		✓											
4B	**Amentum** Community Support	✓		✓										

		Area of Impact				Alignment w/ Science Vision								
ID No.	Organization / Commitment	A) Science Vision & Implementation	B) Mission Support	C) Workforce Development	D) User Community Enhancement	2.1 Understanding the Neutrino	2.2 Probing the Higgs and Energy Frontier	2.3 Using Muons to Explore New Physics	2.4 Discovering the Dark Universe	2.5 Transforming Accelerator S&T	3.1 Quantum Information S&T (QIST)	3.2 AI and Advanced Instrumentation (AI2)	3.3 Emerging Technologies and ME	4.1 Discovery on the Prairie (DoP)
5A	**Longenecker & Associates** Mission Support		✓											
6A	**State of Illinois** Capital Appropriation for New Housing/ Conference Facility				✓									✓
7A	**Museum of Science and Industry** Educational Outreach Events, Exhibits, and Consultation	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8A	**Centre National de la Recherche Scientifique** Joint Appointments, Postdoctoral/Graduate Students, Conferences/Workshops	✓				✓	✓		✓	✓		✓		
9A	**California Institute of Technology** Joint Appointments, Postdoctoral/Graduate Students, Facilities, Internships	✓		✓		✓		✓	✓		✓	✓	✓	
10A	**Chicago State University** Joint Appointments, STEM Workforce Development			✓										
11A	**City Colleges of Chicago** Student Internship Program	✓		✓									✓	
12A	**Columbia University** Joint Appointments, Postdoctoral/Graduate Students, Workforce Development	✓		✓							✓		✓	
13A	**Hampton University** STEM			✓										
14A	**Howard University** Joint Appointments, Postdoctoral/Graduate Students, STEM	✓		✓		✓	✓		✓	✓		✓		
15A	**Illinois Institute of Technology** Joint Appointments, Postdoctoral/Graduate Students, Workforce Development	✓		✓					✓	✓	✓	✓		
16A	**Northern Illinois University** Joint Appointments, Postdoctoral/ Graduate Students, Facilities	✓		✓						✓				

		Area of Impact				Alignment w/ Science Vision								
ID No.	Organization / Commitment	A) Science Vision & Implementation	B) Mission Support	C) Workforce Development	D) User Community Enhancement	2.1 Understanding the Neutrino	2.2 Probing the Higgs and Energy Frontier	2.3 Using Muons to Explore New Physics	2.4 Discovering the Dark Universe	2.5 Transforming Accelerator S&T	3.1 Quantum Information S&T (QIST)	3.2 AI and Advanced Instrumentation (AI2)	3.3 Emerging Technologies and ME	4.1 Discovery on the Prairie (DoP)
17A	**Northwestern University** Joint Appointments, Postdoctoral/ Graduate Students	✓							✓		✓	✓		
18A	**Purdue University** Joint Appointments, Postdoctoral/Graduate Students, Internships, Workforce Development, Facilities, Career Fair	✓	✓	✓			✓	✓			✓	✓	✓	
19A	**South Dakota School of Mines** Joint Appointments, Postdoctoral/ Graduate Students, Workshops	✓		✓		✓								
20A	**Spelman College** STEM			✓							✓			
21A	**University of Illinois Chicago** Joint Appointments, Postdoctoral/ Graduate Students, STEM	✓		✓			✓							
22A	**University of Illinois Urbana-Champaign** Joint Appointments, Postdoctoral/ Graduate Students, Internships, Workforce Development, Data Science	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	
23A	**University of Illinois System** Workforce Education and Training			✓										
24A	**University of Michigan** Joint Appointments, Postdoctoral/Graduate Students, Workforce Development	✓		✓		✓	✓		✓			✓		
25A	**University of Notre Dame** Joint Appointments, Postdoctoral/ Graduate Students, Facilities	✓		✓		✓	✓				✓	✓	✓	
26A	**University of Oxford** Joint Appointments, Postdoctoral/ Graduate Students, Educational Programs	✓		✓		✓	✓		✓		✓	✓	✓	

Figure D-1: Proposed Resource Commitments. Our list of proposed resource commitments demonstrates our plan to reinvest in Fermilab's scientific mission through contributions to the scientific community, mission support, facilities and equipment, and human resources.

1.0 List of Individual Commitments

Commitment 1A:
University of Chicago – Joint Task Force Initiative

Resource Commitment 1A: Joint Task Force Initiative	
Organization	**Area(s) of Impact**
University of Chicago (UChicago)	Science Vision & Implementation, Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and UChicago campus	$1M annually; $5M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Senior Associate VP for Strategic Initiatives, UChicago

Description

FermiForward will draw on an outstanding workforce to achieve the science vision outlined in this proposal. This workforce will require specialized training and resources to reach its full potential. To meet this challenge, UChicago will amplify resources from the Joint Task Force Initiative (JTFI), which was launched by UChicago in 2018 to provide support for programs at Fermilab and Argonne National Laboratory (Argonne). Described below are the available programs that, through the $5 million in total funding, will specifically benefit Fermilab in the initial five-year performance period.

Training Programs

Our proposed training programs will be available to develop the Fermilab workforce, with an estimated annual value of $400k to the Fermilab program.

- **Strategic Laboratory Leadership Program (SLLP):** will leverage the outstanding executive education program at the UChicago Booth School of Business to provide leadership training to a total of 25 Fermilab and Argonne participants each year, as well as individuals at other participating laboratories in the DOE network of National Laboratories.
- **Leadership Academy for Women in Science and Engineering (LAWISE):** will provide training to women in scientific and engineering leadership roles at Fermilab and Argonne and help honor and build a network of support for leaders in science, technology, engineering, and mathematics (STEM).
- **Data Science Institute (DSI) Clinic Program:** will support teams of UChicago graduate students mentored by DSI faculty to pursue data science projects at Fermilab in scientific and mission support areas using artificial intelligence (AI) and machine learning techniques.
- **Science, Partnerships, and Research Collaborations (SPARC):** will equip outstanding emerging leaders from Fermilab, Argonne, and UChicago to enhance their careers by equipping them with the skills required to forge effective partnerships with industry, government, other academic institutions, and non-profit organizations.
- **Strategic Program for Innovation at the National Laboratories (SPIN):** will promote entrepreneurial thinking at Fermilab and Argonne through classes taught by UChicago Booth School of Business faculty and external industry experts.
- **Laboratory Innovation Fellows (LIF) Program:** will support participating postdoctoral fellows from Fermilab and Argonne in exploring commercialization of technologies, using resources from the UChicago Polsky Center for Entrepreneurship and Innovation.

Strategic Science Initiatives

The following initiatives will provide annual program support of roughly $550k to the Fermilab S&T workforce.

Resource Commitment 1A: Joint Task Force Initiative

- **Fermilab International Workshops:** will leverage UChicago's centers in London, Paris, and Delhi to host Fermilab scientific workshops and symposia for international audiences.
- **International Partnerships:** will provide Fermilab direct access to the Centre National de la Recherche Scientifique (CNRS) International Research Laboratory, which hosts scientists, postdoctoral fellows, and PhD students working in particle physics and cosmology.
- **Graduate Research Cooperative:** will provide administrative support for UChicago Physics graduate students conducting thesis research at Fermilab under the mentorship of Fermilab scientists.
- **JTFI Postdoctoral Fellowship:** will be fully funded by JTFI and administered by Fermilab to support outstanding postdoctoral fellows from a background that is underrepresented in STEM. Fellows can choose to join one of the existing research groups at Fermilab or initiate a new research track aligned with Fermilab's mission, under the guidance and mentorship of a Fermilab scientist.
- **Technology Transfer:** will directly support participation of Fermilab startups in accelerator programs, and Fermilab startups will receive instruction, mentoring, and access to funding from staff members at the Booth School of Business. UChicago will also provide laboratory space to Fermilab start-ups in the new Hyde Park Labs building, due to open in the fourth quarter of 2024.
- **Outreach Efforts:** will provide new office space for Fermilab in the city of Chicago, adjacent to the space UChicago provides for Argonne on 53rd Street, from which to manage outreach programs to South Side communities and interactions with industrial partners in Chicago.
- **Pritzker Nanofabrication User Facility:** will provide Users of the Fermilab Superconducting Quantum Materials and Systems (SQMS) Center access to a 10,000-square-foot, ISO Class 5 cleanroom at UChicago that maintains less than 100 particles larger than 0.5 microns per cubic foot of air space. This access will be provided at a 60% discount in cost.
- **CMB-S4:** UChicago will jointly invest in the characterization and testing facility in the Fermilab IERC that will enable custom cryostats to accommodate the unique signal transmission and processing electronics required to fully qualify the CMB-S4 sensors in support of the CMB-S4 program.

JTFI Task Forces

The following proposed task forces will provide an estimated annual program support of $50k to benefit Fermilab.

- **Inclusive Innovation Task Force:** will incorporate and support a wide range of educational programs aimed at improving the lives of Chicago South Side students and communities.
- **Cybersecurity Task Force:** will reduce response time to incidents by leveraging the expertise of and fostering greater collaboration among cybersecurity teams at Fermilab, Argonne, and UChicago.
- **Technology Transfer Task Force:** will continue to provide a forum for showcasing technologies developed at the laboratories to interested industry partners through the Polsky Center for Entrepreneurship and Innovation.

Expected Benefits to Fermilab

JTFI support will assist Fermilab in developing and retaining a highly skilled workforce. Through the JTFI, UChicago promotes Fermilab's participation in research and education in scientific and technical fields of interest to DOE's programs and the laboratory's workforce needs. The JTFI represents a focused approach for maintaining, enhancing, and developing a cooperative and collaborative partnership with UChicago to enhance Fermilab's leadership in the national and international R&D arenas.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 1B:
University of Chicago – Joint Appointments

Resource Commitment 1B: Joint Appointments	
Organization	**Area(s) of Impact**
University of Chicago	Science Vision & Implementation, Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and the UChicago campus	$1.825M annually; $9.125M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Executive Vice President for National Laboratories, UChicago

Description

FermiForward's ambitious science vision features new initiatives that will enhance Fermilab's international standing in high energy physics (HEP). Achieving this vision will require the recruitment and retention of the world's finest scientific talent. To help Fermilab meet this challenge, UChicago commits the following joint appointments:

- **Faculty/Scientists:** UChicago commits to hiring ten new scientists jointly with Fermilab. The scientific areas will be determined by the Fermilab Director and Chief Research Officer in collaboration with the corresponding UChicago sponsoring department chairperson. The joint hires will be in areas of opportunity determined by Fermilab, where Fermilab has sufficient funding available in its DOE-approved budget not to require new or additional support from DOE. At present, we envision these areas to be physics, accelerator physics, dark universe, and the emerging areas of quantum information, microelectronics, and AI2 We estimate the annual value of this commitment to be $1M per year, for a total of $5M over the initial five-year budget period.
- **Postdoctoral Fellows:** UChicago will bear 50% of the cost for up to ten postdoctoral fellows per year working on projects of joint interest to Fermilab and UChicago scientists. We estimate the annual costs of these appointments to be $450K per year, for a total of $2.25M over five years.
- **Graduate Students:** UChicago will bear 50% of the cost for up to ten graduate students per year working on projects of joint interest to Fermilab and UChicago scientists. We estimate the annual cost of these appointments to be $375k per year, for a total of $1.875M over five years.

Expected Benefits to Fermilab

FermiForward's approach for implementing its Science Vision requires attracting, developing, and retaining a highly skilled workforce of existing and new scientific personnel with high stature in their disciplines and a plan for joint appointments. Appointed in partnership with UChicago, these 30 new scientists will help Fermilab achieve its mission goals to develop and educate the next generation of scientists and engineers.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 1C:
University of Chicago – Fermilab-Dedicated Corporate Support

Resource Commitment 1C: Fermilab-Dedicated Corporate Support	
Organization	**Area(s) of Impact**
University of Chicago	Science Vision & Implementation, Mission Support
Location(s)	**Estimated Total Value**
UChicago Hyde Park campus and UChicago international locations	$750K annually; $3.75M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Executive Vice President for National Laboratories, UChicago

Description

Fermilab will require significant corporate support to fulfill the ambitious science vision outlined in this proposal. To help Fermilab meet this challenge, UChicago commits to providing the corporate support outlined below, at no cost to the government:

- The administrative support necessary to lead and manage the JTFI program described in Commitment 1A for a program lead and staff support.
- Execute the Commitment Management Plan through the Commitments Manager and support staff, as described in Section 3.5.
- Make space available at no cost to Fermilab for hosting international symposia at UChicago's campus locations in London, Paris, and Delhi, which are managed by the UChicago Office of Global Engagement.
- Provide the administrative support necessary to manage joint appointments between Fermilab and UChicago through the Consortium for Advanced Science and Engineering (CASE) lead and support staff.
- Leverage the UChicago Office of Civic Engagement to provide support to Fermilab for the Inclusive Innovation Initiative and JTFI Task Force.
- Make resources available to Fermilab communications when needs arise through the UChicago Office of Communications.
- Lead and coordinate government relations staff to help ensure the successful provision of the $30M capital appropriation from the State of Illinois outlined in commitment 4A.

Expected Benefits to Fermilab

The corporate resources described above will benefit Fermilab by ensuring the following:

- Effective management of the JTFI program
- Timely execution of all commitments outlined in this proposal
- Support of international symposia to enhance Fermilab's international scientific leadership
- Effective management of joint Fermilab-UChicago scientific appointments
- Assistance with Fermilab communications initiatives
- Oversight of the $30M capital appropriation committed by the State of Illinois to FermiForward

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 1D:
University of Chicago – College Tuition Scholarships

Resource Commitment 1D: College Tuition Scholarships	
Organization	**Area(s) of Impact**
University of Chicago	Science Vision & Implementation Mission Support, Workforce Development
Location(s)	**Estimated Total Value**
UChicago campus	$100k annually; $500k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Associate Vice President for National Laboratories, UChicago

Description

Fermilab competes with top research universities in recruiting outstanding talent. Most, if not all, of these competitors have tuition benefits for faculty, which enhance recruitment and retention. To help Fermilab meet this challenge, UChicago will provide tuition scholarships to the dependent children of Fermilab employees who are admitted to The College of the University of Chicago, one of the nation's top-ranked colleges. These merit-based scholarships are of any amount, up to full-tuition, and are renewable for four years as long as the student is making satisfactory academic progress. This continuing commitment was made by UChicago after award of the current prime contract. Since the start of the current contract in 2007, UChicago has provided $2.2 million in tuition scholarship support to Fermilab employee dependent children accepted to the College of the University of Chicago.

Expected Benefits to Fermilab

This resource commitment provides an additional incentive in the recruitment and retention of top scientific and engineering talent, and is a comparable benefit provided by Tier 1 research universities to the dependent children of their faculty.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 1E:
University of Chicago – Makers' Space Equipment Contributions

Resource Commitment 1E: Makers' Space Equipment Contributions	
Organization	**Area(s) of Impact**
University of Chicago	Science Vision & Implementation, User Community Enhancement
Location(s)	**Estimated Total Value**
Fermilab	$1M in-kind contribution
Date the Commitment Will Be Provided	**Accountability and Oversight**
One-time, in-kind contribution when the Makers' Space facility is ready to accept the equipment	Executive Vice President for National Laboratories, UChicago

Description

This in-kind contribution of equipment will outfit a new ideation and prototyping space for Fermilab scientific staff, postdoctoral fellows, and students in the new Fermilab Makers' Space Facility. The equipment will be provided by the UChicago Polsky Center for Entrepreneurship and Innovation as a means of helping Fermilab build its capacity for innovation and technology transfer. UChicago will pay shipping and set-up costs to position the equipment and evaluate it. The equipment consists of:

3D Printers

- LulzBot Mini 2 3D Printer
- LulzBot TAZ 4 3D Printer
- LulzBot TAZ 5 3D Printer
- Stratasys Objet500 Connex3 3D Printer
- uPrint SE Plus 3D Printer

Computer Numerically Controlled (CNC) Routers

- Inventables X-Carve CNC Router
- ShopBot PRSalpha 96-48 CNC Router

Electronics Kits

- Arduino Experimentation (ARDX) Kit
- BeagleBone Black Starter kit
- Circuit Stickers
- Discover Electronics
- Particle Photon Internet Button
- Particle Photon Maker Kit
- Raspberry Pi 2 Model B Starter Kit

Electronics Workbench Test Equipment

- Extech 382260 80W 3-IN-1 Switching DC Power Supply
- Fluke 87V Industrial Multimeter
- Instek AFG-2125 Arbitrary Function Generator 25MHZ
- Instek GDS-1152A-U 150 MHZ Digital Storage Oscilloscope
- Saleae Logic Pro 16 Logic Analyzer

Resource Commitment 1E: Makers' Space Equipment Contributions

Other Digital Fabrication Tools

- Roland GX-24 Vinyl Cutter
- Universal VLS 4.60 Laser Cutter

Wood Shop Support Tools

- DeWalt DWS780 Chop/Miter Saw
- Grizzly G0513 Bandsaw
- Grizzly G7947 Drill Press
- RIDGID Oscillating Edge Belt/Spindle Sander
- SawStop Professional 3HP Table Saw

Expected Benefits to Fermilab
This resource commitment will enhance Fermilab's capacity to innovate, prototype and transfer innovative technologies to the marketplace.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 2A:
URA – Visiting Scholars Program

Resource Commitment 2A: Visiting Scholars Program	
Organization	**Area(s) of Impact**
Universities Research Association (URA)	Science Vision & Implementation, Workforce Development, User Community Enhancement
Location(s)	**Estimated Total Value**
All Fermilab locations	$500K annually; $2.5M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	URA President and CEO

Description

To further bolster research at Fermilab, enable the STEM workforce pipeline, and ensure an ongoing flow of researchers from across the nation and around the world, URA commits to continuing the Visiting Scholars program (VSP), which provides grants of up to $50K to graduate students and faculty of member universities to conduct research at Fermilab. The annual contribution of $500K, awarded through grants awarded twice per year, enables 30-50 researchers every year to contribute to critical Fermilab work. Chosen by a peer review committee from the community of Fermilab-focused faculty members from URA member universities, URA staff administer the applications, review committees, final report, and reimbursements. Fermilab staff serve as sponsors to the grantees.

Expected Benefits to Fermilab

Since the inception of VSP in 2007, Fermilab has benefited from the work of over 500 researchers from 85 universities across Fermilab's scientific portfolio. VSP recipients contribute across the spectrum of Fermilab's scientific work. VSP infuses new directions gained from academia by enabling networking between faculty members and Fermilab staff, facilitating collaborative research projects, and supporting professional development for young scholars at Fermilab. URA provides administrative support to the program, including applications review, final reports, and reimbursements. Under the new contract, VSP funded researchers will continue to work closely with Fermilab scientists to align their efforts with Fermilab scientific priorities to maximize contribution to Fermilab's scientific mission. The most recent survey of the VSP stakeholder community revealed that 100% of Fermilab VSP sponsors agreed that "...the awardees make a substantive contribution..." and that 100% of awardees recommended continuation of the program and would recommend the program to their colleagues.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 2B:
URA – User Community Support

Resource Commitment 2B: User Community Support	
Organization	**Area(s) of Impact**
Universities Research Association	User Community Enhancement
Location(s)	**Estimated Total Value**
Fermilab and Washington, DC	$110K annually; $550K in total over initial 5-year term
Date the Commitment Will Be Provided	Accountability and Oversight
Each spring and summer for the period of performance after contract award	URA President and CEO

Description

URA will:

- Host and provide planning and travel funding for the Fermilab Users, SLAC Users Organization (SLUO), and US LHC Users Association (USLUA) gathering in Washington, DC, each spring to meet with officials on Capitol Hill and in the Administration to communicate the enthusiasm they have for their science, to emphasize their consensus support for national priorities as expressed in P5, and to communicate the need for ongoing support.
- Host the post-meeting networking event and reception.
- Provide technical and programmatic support and travel funding for the annual Fermilab Users Meeting, held each summer at Fermilab. The summer meeting is a critical link in the chain of workforce development allowing early career scientists a chance to engage directly with laboratory leadership, contribute to Fermilab priorities, and better understand their various career opportunities.
- As part of the renewed effort to engage the User Community in creating workable solutions, fund and administer an impartial annual survey of all Users to discover how the lab and its Users can continually improve the User experience as well as the scientific work at Fermilab.
- Provide an executive secretary to enhance and coordinate the work of the newly reconstituted Users Executive Committee.

Expected Benefits to Fermilab

Fermilab's User community of over 2,100 scientists from around the world performs a substantial percentage of Fermilab's science mission. As stated in C.4 (b)(2) of the Statement of Work, the operation of User facilities at Fermilab includes developing and maintaining User communities for the facilities. An active, engaged, and empowered Fermilab User Community is critical to the ongoing success of Fermilab and the HEP vision set out in the P5 Report(s). URA contributions to organize and enable the User community will result in better communications between laboratory leadership and Users and will reduce obstacles to cooperation. The efforts to amplify the work of the Users will also enable collaborations and help stakeholders better understand the critical nature of the science at Fermilab. Fermilab will further benefit from a more engaged scientific User community that sees itself as a partner with Fermilab leadership.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 2C:
URA – Workforce Development Support

Resource Commitment 2C: Workforce Development Support	
Organization	**Area(s) of Impact**
Universities Research Association	Workforce Development
Location(s)	**Estimated Total Value**
Washington, DC and Fermilab	$340K annually; $1.7M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	URA President and CEO

Description

URA will sponsor and fund annually the following honorary awards, each with a $10K stipend:

- **Doctoral Thesis Award:** in recognition of outstanding doctoral thesis based on research conducted at Fermilab or in collaboration with Fermilab scientists.
- **Tollestrup Award for Postdoctoral Research:** for outstanding work conducted by a young scientist during their postdoctoral years.
- **Early Career Award:** for outstanding work conducted by a young researcher.
- **Engineering Excellence Award:** for exceptional contributions to the advancement engineering work at Fermilab.

URA will also fund the URA-Fermilab Undergrad Women in STEM Internship to enable a group of approximately five students each year to enter the STEM workforce pipeline at Fermilab. Initiated in 2023, interns will be recruited from Minority-Serving Institutions and HBCUs and selected and mentored by Fermilab scientists. They will work on real-world science and engineering projects and have opportunities for professional networking. The internship includes a science and technology policy module in Washington, DC, where interns are familiarized with the organizations, processes, and people responsible for creating and implementing policy and the critical role policy plays in their careers. Interns will present their work at the annual summer Users Meeting at Fermilab.

URA will establish and administer Science Policy & Advocacy for Research Competition (SPARC), a twice per year, virtual, eight-week course that provides for graduate students and postdoctorals working on Fermilab projects to raise awareness of the importance of science policy and to hone communications skills for presenting their work to nontechnical, policy-focused audiences. PhD-level URA staff and guest speakers will host the course, which can accommodate 20-40 STEM participants for each session. At end of series, SPARC participants deliver policy talks and an expert panel will choose three winners to visit Washington, DC, to deliver their presentations to congressional staff or other policy officials.

Expected Benefits to the Fermilab

All three commitments are focused on helping to ensure that DOE and Fermilab have a sustained STEM pipeline. The programs will create critical educa-tional opportunities in science, engineering, and technology as well as both professional and social net-working critical to employee retention and satisfaction. Targeted applicant pools will be from groups that represent under-served communities to encourage individuals from these groups to enter STEM careers and further diversify the STEM workforce.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 2D:
URA – Corporate Support

Resource Commitment 2D: Corporate Support	
Organization	**Area(s) of Impact**
Universities Research Association	Science Vision & Implementation, Mission Support, User Community Enhancement
Location(s)	**Estimated Total Value**
Washington, DC and Fermilab	$225K annually; $1.125M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	URA President and CEO

Description

Fermilab will require significant corporate support to fulfill the ambitious mission outlined in this proposal. To help Fermilab meet this challenge, URA will provide corporate support outlined below, at no cost to the government:

- Making space available for planning and hosting the annual Spring Users HEP Advocacy meeting in Washington, DC, and for the post-meeting networking event and reception.
- Administrative and programmatic support for all aspects of the VSP, including community outreach, applications processing, peer review panel, reimbursements processing, and communication of program results to stakeholders.
- Administrative support to plan and manage the annual Summer Users Meeting and the associated breakouts and poster sessions.
- Scientific and programmatic support to the Users Executive Committee to ensure a robust program engaged at the appropriate level and focused on Fermilab priorities.

Expected Benefits to Fermilab

Successful execution of critical programs requires dedicated, knowledgeable staff to ensure timely results. These programs add significant value by enhancing the professional experience of scientists at Fermilab, raising the visibility of Fermilab's scientific work, building a robust STEM workforce pipeline, and helping scientists and engineers at Fermilab be more effective in communicating the outcomes of their work.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 2E:
URA – Building Awareness of and Support for HEP Priorities

Resource Commitment 2E: – Building Awareness of and Support for HEP Priorities	
Organization	**Area(s) of Impact**
Universities Research Association	Science Vision & Implementation, Mission Support
Location(s)	**Estimated Total Value**
Washington, DC	100K annually; 500K in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	URA President and CEO

Description

URA organizes the annual convention of presidents and vice presidents for research from our 94 member universities for discussions that focus on Fermilab and high energy physics. Each year this gathering provides a valuable opportunity to showcase Fermilab successes and opportunities and to raise the profile of HEP for a substantial portion of the nation's research and development management officials. Fermilab's Laboratory Director is a featured speaker each year and offers a Q&A session to engage participants. The January 2024 event included an overview of the new P5 report. Other officials who have spoken and helped set the stage for HEP discussions include Secretaries of Energy, Presidential science advisors, members of Congress, and Office of Science Directors, among others. Discussions prepare university presidents and vice presidents for research to advocate effectively and knowledgably for HEP-related topics and raise their awareness of the continuing need for academic support for faculty and students working in HEP.

Expected Benefits to Fermilab

Fermilab benefits from building enduring relationships with leadership at the universities whose support is critical to Fermilab's overall scientific mission. Few venues provide a more sustained, concentrated, or high-level opportunity to engage with university leadership to help them understand how they can best engage with and support Fermilab's work. Understanding the details of the P5 report, its impact on the community will broaden community support from university leadership.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 3A:
FermiForward – Director's Strategic Initiatives Fund

Resource Commitment 3A: Director's Strategic Initiatives Fund	
Organization	**Area(s) of Impact**
Fermi Forward Discovery Group, LLC (FermiForward)	Science Vision & Implementation, Mission Support, Workforce Development, User Community Enhancement
Location(s)	**Estimated Total Value**
Fermilab	$500k annually; $2.5M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Financial Officer, FermiForward
Description	
FermiForward will create a Director's Strategic Initiatives Fund to provide the Laboratory Director with a flexible pool of discretionary resources to allocate to new programs and emerging opportunities in support of the Fermilab mission. These initiatives will include new conferences and meetings that benefit the DOE mission, but for which DOE funding is not available; enhancements to the User community experience at Fermilab; and new award programs to bolster employee morale.	
Expected Benefits to Fermilab	
The Fermilab Laboratory Director needs flexibility in allocating discretionary resources in addition to funding from DOE to amplify DOE support, stimulate new initiatives, and meet emerging needs and opportunities.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 3B:
FermiForward – Strategic Leadership Investment

Resource Commitment 3B: Strategic Leadership Investment	
Organization	**Area(s) of Impact**
Fermi Forward Discovery Group, LLC (FermiForward)	Science Vision & Implementation, Mission Support, Workforce Development
Location(s)	**Estimated Total Value**
Fermilab	$500k annually; $2.5M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Financial Officer, FermiForward
Description	
Achieving the ambitious science vision outlined in this proposal requires an experienced leadership team with world-class science expertise. Recruiting and retaining this level of leadership requires commensurate compensation and benefits. FermiForward will meet this challenge by compensating its leadership team at a competitive level with peers. FermiForward thereby commits to investing approximately $500k per year to fund appropriate unallowable/non-reimbursable compensation required to attract and retain suitable leadership talent.	
Expected Benefits to Fermilab	
This resource commitment provides laboratory management with funds to compete more aggressively and successfully for recruitment and retention of the best scientific and managerial talent, especially for those individuals in great demand in industry and in other parts of the research community.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 3C:
FermiForward – Undergraduate Tuition Scholarships

Resource Commitment 3C: Undergraduate Tuition Scholarships	
Organization	**Area(s) of Impact**
Fermi Forward Discovery Group, LLC (FermiForward)	Workforce Development
Location(s)	**Estimated Total Value**
Fermilab	$250k annually; $1.25M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
At contract start and in annual increments of approximately $250k	Financial Officer, FermiForward

Description

Fermilab competes with industry and academia in recruiting top scientific and engineering talent. Many, if not most, of these competing institutions offer tuition benefits to faculty as a critical aid in recruitment and retention. To help Fermilab meet this challenge, FermiForward commits to providing $250k per year to fund scholarships to full-time FNAL employees' children who are pursuing undergraduate college degrees at accredited US colleges. The scholarship award of $5k per year will be continued for a maximum of four years providing the student remains in a four-year program with satisfactory academic progress.

Expected Benefits to Fermilab

This resource commitment provides an additional incentive in recruitment and retention of top scientific, engineering, and managerial talent.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 3D:
FermiForward – Academic Sponsorship Fund

Resource Commitment 3D: Academic Sponsorship Fund	
Organization	**Area(s) of Impact**
Fermi Forward Discovery Group, LLC (FermiForward)	Science Vision & Implementation, Workforce Development, User Community Enhancement
Location(s)	**Estimated Total Value**
Fermilab	$200k annually, $1M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Financial Officer, FermiForward
Description	
FermiForward will create an Academic Sponsorship Fund that will cover 50% of salary support for joint appointment commitments made by our HBCU and other Minority-Serving Institution partners as outlined in their respective institutional letters of support. The goal is two-fold: to ensure our partners have adequate financial resources to ensure their engagement with Fermilab is as robust as possible and that these commitments are no cost to the government.	
Expected Benefits to Fermilab	
The FermiForward team features strong engagement with leading HBCUs and other Minority-Serving Institutions, and this commitment will help ensure that joint appointments will be fulfilled and thereby significantly help Fermilab deepen its relationships with these vital partners.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 4A:
Amentum – Mission Support

Resource Commitment 4A: Mission Support	
Organization	**Area(s) of Impact**
Amentum	Mission Support
Location(s)	**Estimated Total Value**
Fermilab	350 STP students at $2,500 per student – $0.875M 100 SafeUp students at $1,500 per student – $0.15M Corporate assistance to support VPP – $0.25M $1.275M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Senior Vice President for Technical Services, Amentum

Description

Amentum will make commitments in three primary areas, with the overall goal of bringing industry best practices to elevate supervisory skills and to transform Fermilab's safety culture.

Amentum Supervisory Training Program (STP) Quickstart: a full-day, in-person learning and networking opportunity that will be provided by Amentum instructors on site at Fermilab. Through guided discovery, learners will leave with an in-depth understanding of the following critical mission support functional areas:

- **Safety:** This session provides an overview of ES&H policies, principles, and procedures a manager must execute with their team to instill and maintain a culture of safety.
- **Ethics:** Managers are asked to represent integrity and a culture of ethics as leaders of their teams and are expected to lead change within their teams to replicate these behaviors.
- **Teambuilding:** Activities are woven within the STP session to promote multiple management functions, such as problem solving, communication, and leadership.
- **Policies & Procedures:** Focused on Human Resources needs, this material touches on performance management, employee incentives, talent acquisition, and labor relations.
- RESERVED
- **Communications:** This exercise focuses on all forms of communication and helps managers navigate the challenges of initiating and resolving difficult conversations.

Amentum will provide STP Quickstart training to supervisors and managers identified by Fermilab leadership. The commitment valuation encompasses the training of 250 personnel in the first two years, followed by annual or biannual training for up to 100 new-hires or promoted supervisory personnel.

Amentum SafeUp Safety Program: will be deployed by Amentum to Fermilab to systematically train Fermilab safety staff in the principles underpinning Amentum's commitment to ES&H excellence. The SafeUp program draws on a deep talent pool of safety professionals to customize and implement an outstanding safety program at Fermilab. Fermilab safety teams will be trained to achieve Certified Safety Professional credentials as well as Diamond Level Sponsor of Safety Trained Supervisor Certification. The Amentum-led Fermilab training regime will replicate the same rigorous training that has helped Amentum achieve industry-leading results, as recognized by membership in the National Safety Council's Campbell Institute. The commitment valuation covers the delivery of SafeUp training for an estimated 100 Fermilab safety personnel and professionals in the first year of the contract.

Corporate Assistance to Support DOE Voluntary Protection Program (VPP): will build upon SafeUp training and help FermiForward achieve VPP Star Status. Amentum commits to assisting Fermilab with attaining Star status within the first five years of the new contract. Amentum has considerable experience with attaining VPP Star Status at its sites and will share best practices and resources as necessary

Resource Commitment 4A: Mission Support	
to help FermiForward achieve this certification level. The commitment valuation reflects the corporate resources that Amentum will commit to this project.	
Expected Benefits to Fermilab	
Amentum's commitment to FermiForward will significantly enhance Fermilab supervisory and managerial safety skills sets and help make mission-critical employees more effective in their leadership roles. Coupled with Amentum's commitment to help FermiForward achieve DOE VPP Star Status, Amentum's SafeUp program at Fermilab will instill a comprehensive and integrated ES&H culture to gain transparency and reduce safety risks.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 4B:
Amentum – Community Support

Resource Commitment 4B: Community Support	
Organization	**Area(s) of Impact**
Amentum	Science Vision & Implementation, Workforce Development
Location(s)	**Estimated Total Value**
Fermilab	$250K annually, $1.25M in total value over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Senior Vice President for Technical Services, Amentum

Description

Amentum will make a $1.25M commitment to programs that support local community engagement and assist in the economic development of the towns and cities where Fermilab employees live and work. Examples include STEM programs with local area schools to encourage students to pursue careers in STEM-related fields as well United Way, Habitat for Humanity, local food banks, and other charitable organizations that serve the Fermilab's surrounding communities. These vital organizations bring people together to equip families and volunteers in building resilient, equitable communities. Amentum contributions also support scholarships for local area universities and colleges, the administration of intern programs, and curriculum development with local colleges and universities.

Expected Benefits to Fermilab

Amentum contributions aim to strengthen the relationship and community support for Fermilab, its employees, and its mission. Amentum contributions support the development, education, and training of the next generation of Fermilab scientists and researchers.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 5A:
L&A – Mission Support

Resource Commitment 5A: Mission Support	
Organization	**Area(s) of Impact**
Longenecker and Associates (L&A)	Mission Support
Location(s)	**Estimated Total Value**
Fermilab	$80.3k annually; $401.5k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	President, Longenecker & Associates, Inc.

Description

L&A will make the following commitments to the Fermilab proposal:

Mentor-Protégé Program: L&A commits executive-level sponsorship and participation in support of the mentor-protégé program for the duration of mentor-protégé agreements.

Leadership, Team, and Core Skill Development: L&A has highly experienced, certified facilitators in several learning programs and diagnostic tools focused on enhancing leadership and team effectiveness, developing core skills, and enhancing organization effectiveness. Learning programs include:

- **Franklin Covey:** Leading at the Speed of Trust, Trust in Team, Inclusive Leadership, Project Management for Non-Project Managers.
- **Kepner-Tregoe:** Problem Solving and Decision Making, System Troubleshooting.
- **Diagnostic Tools:** Myers Briggs Type Indicator, Kirton Adaption Innovation (KAI) Inventory
- **L&A-Developed Programs:** Team Effectiveness, Human Performance Improvement Concepts and Tools

Learning programs can be delivered virtually or in person. The program durations vary from one to three days (8-20+ hours of instruction time) and can be delivered using a variety of schedules and approaches. The cost of the learning programs depends on the duration, which impacts facilitator time and the cost of learner materials. The average facilitator cost per day is $1,800. Material costs range from $100 to $450 per participant. L&A commits to providing the facilitators at no cost and supporting Fermi in the material purchases. L&A commits to providing two training sessions per quarter. The estimated value of this commitment is $51k annually and $254k total over five years.

Process Optimization: The ability to develop and implement optimized processes is essential to maximizing efficient use of resources on mission support activities. L&A has Lean Six Sigma-trained facilitators to lead structured Rapid Improvement Events that result in executable process optimization plans and actions. These structured events are typically conducted in two- to three-day sessions. L&A will provide the trained facilitators, a contribution that represents a cost of $1,500-$1,800 per day. L&A commits to facilitating one Lean event per quarter. The estimated value of this commitment is $16.5k annually and $82.5k total over five years.

Assessment/Audit/Readiness Review Support: L&A has subject matter experts (SMEs) in several areas including quality, performance assurance, project management, radiological controls, ES&H, nuclear safety, and training program management. These SMEs routinely serve as leads and/or team members for independent oversight assessments, management assessments, quality audits, project reviews, safety reviews, and the development and implementation of comprehensive programs in their respective areas. The cost to engage the skills and knowledge of these SMEs depends on their experience level and certifications and ranges from $1,200-$2,000/day. L&A commits to supporting one event per quarter. The estimated value of this commitment is $12.8k annually and $64k total over five years.

Resource Commitment 5A: Mission Support	
Expected Benefits to Fermilab	
L&A's participation as a mentor in the DOE Mentor-Protégé Program (Clause H.29), provides Fermilab additional mentoring capability to assist small businesses (SBs), disadvantaged businesses, woman-owned SBs, HBCUs, veteran-owned SBs, and service-disabled veteran-owned SBs in enhancing their business capabilities. The ability to meet mission deliverables consistently and achieve overall mission success is dependent on several factors, including the effectiveness of leaders and the ability of members of the workforce to function as high-performing teams. The organization also relies on collective capabilities in core skill areas, such as understanding and applying human performance tools, using effective problem-solving and decision-making frameworks, and the ability to systematically prevent problems and promote opportunities. L&A's skills development training will help Fermilab improve its capability to meet mission deliverables and achieve overall mission success. The ability to develop and implement optimized processes is essential to maximize efficient use of resources on mission and mission support activities. L&A's process optimization training will help Fermilab trainees achieve these goals. L&A SMEs will provide assistance to key Fermilab mission support functions in maintaining a sustained level of readiness and performance.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 6A:
State of Illinois – Capital Appropriation for New Housing/Conference Facility

Resource Commitment 6A: Capital Appropriation for New Housing/Conference Facility	
Organization	**Area(s) of Impact**
State of Illinois	User Community Enhancement
Location(s)	**Estimated Total Value**
Fermilab	$30M in total
Date the Commitment Will Be Provided	**Accountability and Oversight**
As soon as possible following contract start and approval by DOE of the siting and construction plan	Executive Vice President for National Laboratories, UChicago

Description

FermiForward's Discovery on the Prairie initiative will modernize the Fermilab Village to better serve the needs of the growing community of Users and affiliates following the completion of LBNF/DUNE. The first major element of Village modernization will be the construction of a new housing facility for visiting scientists that will also include dedicated spaces for conferences, dining, and recreation. To cover the full cost of construction and furnishing the facility, UChicago secured a $30M capital appropriation from the State of Illinois. UChicago and its Illinois university partners will leverage their strong relationships with the State of Illinois to ensure the funds appropriated by the State are provisioned to FermiForward to fund the project. Upon notice of award to FermiForward, the Fermilab leadership team will develop a plan for siting and constructing the new facility, subject to DOE review and approval. Prior to and during this review, DOE will have the opportunity to augment funding from the State of Illinois to expand on this initiative and create a more ambitious facility design, if so desired. UChicago will also draw on its experience in successfully securing State capital funding in support of constructing the Guesthouse, Center for Nanoscale Materials, Advanced Protein Characterization Facility, and Energy Innovation Center at Argonne to oversee and manage allocation of these committed resources.

Expected Benefits to Fermilab

Over the next ten years, Fermilab's User and affiliate communities will grow significantly as LBNF/DUNE comes online and new initiatives are launched. To meet this demand, the Fermilab Village will evolve to accommodate the growing needs of the User community while providing an enhanced User and visitor experience at Fermilab. A major element of the evolution of the Fermilab Village will be the new housing/conferencing facility described above. The new facility will allow Fermilab to retire outdated accommodations by providing modern, energy-efficient housing space for the User community along with easy-to-access conferencing, dining, and recreation facilities.

Governmental Action Required/Related to the Commitment	Liability to the Government
Review and approval of the new housing and conference facility siting and construction plan	None anticipated

Commitment 7A:
Museum of Science and Industry – Educational Outreach Events, Exhibits, and Consultation

Resource Commitment 7A: Educational Outreach Events, Exhibits, and Consultation	
Organization	**Area(s) of Impact**
Museum of Science and Industry (MSI)	Science Vision and Implementation, User Community Enhancement
Location(s)	**Estimated Total Value**
Fermilab and MSI Chicago Campus	$34.4k annually; $174k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	President/CEO, Museum of Science & Industry Chicago

Description

MSI is pleased to make the following resource commitments at no cost to the government:

- Host lectures and educational outreach events by Fermilab staff at the MSI. It is estimated that in the initial five-year period of the new contract, the museum would host five such events, valued at $50k. MSI may also seek sponsorship for any event, lecture or demonstration which may include:
  - Behind-the-scenes donor engagement
  - Public lecture with VIP receptions
  - Private dinners and discussion
- Collaborate with Fermilab staff to consult on new exhibits highlighting high energy physics, the dark universe, and accelerator technologies. The museum commits to consulting on each exhibit, for a total of 60 hours, valued at a total of $18k. Additionally, MSI can provide space for prototyping at a cost of $50k including a week-long camp themed around the exhibit topics.
- Provide consultation and feedback from MSI exhibition experts to Fermilab staff developing Fermilab mission-themed exhibits and displays that will be showcased in the new Discovery on the Prairie complex on the Fermilab campus. MSI will contribute 150 hours of exhibit development staff time to this project in the initial performance period, valued at an estimated $45k.

MSI commits to test prototypes in the initial performance period, each of which will be vetted with museum audiences at various times throughout the year through student and community outreach for potential use in the new Discovery on the Prairie complex on the Fermilab campus. MSI will contribute 30 hours of creative design staff time to this project in the initial performance period, valued at an estimated $9k.

Expected Benefits to Fermilab

These unique contributions by MSI's creative professionals will provide Fermilab with direct access to MSI Chicago campus space and programming and enhance Fermilab's abilities to feature its science vision and its scientific and technological advances to a broad museum audience. The commitments will also directly help Fermilab showcase mission-themed exhibits in support of the Discovery on the Prairie complex initiative at Fermilab. As such, these commitments will assist Fermilab in maintaining its programs of cooperation with nonprofit institutions for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 8A:
Centre National de la Recherche Scientifique – Joint Appointments, Postdoctoral/Graduate Students, Conferences/Workshops

Resource Commitment 8A: Joint Appointments, Postdoctoral/Graduate Students, Conferences/Workshops	
Organization	**Area(s) of Impact**
Centre National de la Recherche Scientifique (CNRS)	Science Vision and Implementation; International Partnerships
Location(s)	**Estimated Total Value**
Fermilab and UChicago campus	Not specifically valued, as described below
Date the Resource Will Be Provided	**Accountability and Oversight**
At contract start and annually thereafter	Director of the European Research and International Cooperation Department, CNRS

Description

For the past fifty years, the CNRS has been a leading international actor in the fields of cosmology and particle physics, particularly as seen in the work of its National Institute of Nuclear and Particle Physics (IN2P3). IN2P3 researchers have been involved in a wide array of seminal discoveries, and they have made significant contributions to the fields of particle and hadronic physics, nuclear physics, astrophysics, and astroparticle physics and cosmology. International collaborations have been at the heart of the IN2P3's research strategy, and the proposed International Research Laboratory (IRL), which will be only the sixth of its kind in the world, will build on long-established relationships between with UChicago and its colleagues at Fermilab and Argonne. These established relationships include:

- Cooperative Research & Development Agreement signed between IN2P3 and Fermilab in November 2017 and valid for ten years, a renewable agreement that aims to strengthen student mobility in the context of the LBNF and the superconducting particle accelerator at Fermilab, part of the DUNE.
- International partnership for the major particle accelerator PIP-II (Proton Improvement Plan-II), in which IN2P3 and the CEA are key partners alongside India, Italy, and the United Kingdom, formalized in July 2018.
- Memorandum of Understanding for Collaboration in DUNE signed on November 17, 2023.
- Signed statements expressing interest to collaborate on high-tech international particle physics projects that are planned to be hosted at Fermilab, formalized in December 2018 by the U.S. Department of Energy (DOE), the French Alternative Energies and Atomic Energy Commission, Commissariat à L'Énergie Atomique (CEA), and the CNRS.
- Plan beyond agreement by the three agencies to work together on the development and production of technical components for PIP-II, the CNRS, and the CEA to collaborate on the construction of the Fermilab-hosted DUNE project.

The proposed IRL is part of a strategic formalization of the long-established relationships between the CNRS and UChicago. This formalization came to fruition in December 2022 with the creation of the CNRS-UChicago International Research Center for Fundamental Scientific Discovery (IRC Discovery), signed into agreement by Antoine Petit, Chairman and Chief Executive Officer of the CNRS, and Paul Alivisatos, President of UChicago, marking only the second relationship of its kind in the United States. The IRL will include the long-term placement of CNRS scientists in Chicago and will support joint PhD students, postdoctoral fellows, and researchers working across CNRS, UChicago, Fermilab, and Argonne, as well as the programming of scientific conferences and workshops.

Resource Commitment 8A: Joint Appointments, Postdoctoral/Graduate Students, Conferences/Workshops	
Expected Benefits to Fermilab	
The CNRS, through its partnership with UChicago in the framework of the IRC Discovery, will establish a new IRL focused on neutrino physics and cosmology. Through this partnership, CNRS will support tuition and mobility costs for an estimated 15 to 20 French PhD students supporting joint research, programming costs, and 2-3 staff scientists based in Chicago working in close collaboration with Fermilab staff. The estimated investment by CNRS in the initial five-year agreement is more than $3.5M, though this amount will fluctuate with currency exchange rates. This amount of investment will provide indirect support to Fermilab science staff who participate in this unique international program.	
Required Governmental Action	**Liability to the Government**
None anticipated	None anticipated

Commitment 9A:
California Institute of Technology – Joint Appointments, Postdoctoral/Graduate Students, Facilities, Internships

Resource Commitment 9A: Joint Appointments, Postdoctoral/Graduate Students, Facilities, Internships	
Organization	**Area(s) of Impact**
California Institute of Technology (Caltech)	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and Caltech campus	$925k annually; $4.625M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Provost, California Institute of Technology

Description

Visiting and Joint Appointments

Caltech commits resources to support faculty members who accept visiting Fermilab appointments in the fields of quantum information, microelectronics, artificial intelligence, and advanced instrumentation. Caltech will cover 100% of the salary and benefits associated with such appointments, for an annual contribution of up to $500k per year and a total of up to $2.5M over the initial five-year term of the contract. Caltech also commits resources to support up to four joint postdoctoral fellow appointments for five years in the fields of quantum information, microelectronics, artificial intelligence, and advanced instrumentation. Caltech will cover 50% of salary and benefits associated with such appointments, for an annual contribution of up to $325k per year and a total of up to $1.625M over the initial five-year term of the contract.

Training Programs and Workshops/Collaboration Meetings

Caltech commits to allowing Fermilab employees to participate in selected training programs at no cost, with an estimated value of up to $50k per year, or a total of up to $250k for the first five-year term of the contract. Caltech also commits to hosting workshops and collaboration meetings at no cost to Fermilab with an estimated value of up to $50k per year or a total of up to $250k for the first five-year term of the contract.

Expected Benefits to Fermilab

These commitments will assist Fermilab in maintaining its programs of cooperation with academic and educational communities for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. These visiting faculty and joint postdoctoral fellows, appointed in partnership with Caltech, will help Fermilab achieve its mission and help develop and educate the next generation of scientists and engineers. The opportunity to engage in selected training programs offered by Caltech as well as participation in workshops and collaboration meetings at Caltech will significantly contribute to Fermilab's efforts to attract, retain, and develop a high-performing workforce.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 10A:
Chicago State University – Joint Appointments, STEM, Workforce Development

Resource Commitment 10A: Joint Appointments, STEM, Workforce Development	
Organization	**Area(s) of Impact**
Chicago State University	Scientific Vision and Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and Chicago State University Campus	$140k annually; $700k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Associate Provost of Research and Grants Administration, Chicago State University

Description

Chicago State University is pleased to pledge the following commitments, at no cost to the government:

- Supporting up to two joint faculty appointment(s) in fields including Physics and Computer Science. Chicago State will aim to cover up to 50% of each joint appointment for an annual contribution of approximately $80kper year at the Assistant Professor level plus benefits (around 36% of base pay) for a total of $108.8k per year and a total of $544k over the initial five-year term of the contract.
- Establishing an undergraduate student research internship and exchange program for up to two Chicago State undergraduate students to participate in research opportunities at Fermilab each year. Chicago State University will institute a formal internship application system, selection criteria, and a pre-internship mentorship program. When needed, Chicago State commits the faculty resources to administer the pre-internship training component of the program. The undergraduate students will be supported as part of the established DOE Science Undergraduate Laboratory Internships (SULI) programs or the Visiting Faculty Program (VFP) at Fermilab.
- Funding for up to two staff members per year to participate in a new CSU-Fermilab Faculty/Staff Exchange Program. Fermilab laboratory staff can spend time at Chicago State University through sabbaticals or short-term appointments. During their time at the university, they can teach courses, engage in collaborative research, and offer their expertise in laboratory management. Chicago State aims to commit to funding the salaries at an Adjoint Professor level while involved in this exchange program, constituting a total contribution of up to $12k per year and up to $144k over the initial five-year contract.
- Hosting joint seminars, workshops, and day-long events at no cost to Fermilab to share knowledge and research findings and to facilitate networking and collaboration among scientists and students. These event commitments can include transportation costs, parking, and refreshments. They have a total estimated value of up to $3k per year or up to $15k for the first five-year term of the contract.

Expected Benefits to Fermilab

Chicago State University is the most affordable Chicago-area college that focuses on educational recruitment and achievement of African American students. These commitments will encourage individuals from underrepresented and underserved communities to enter careers in science and engineering and help to diversify the Fermilab workforce of tomorrow.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 11A:
City Colleges of Chicago – Student Internship Program

Resource Commitment 11A: Student Internship Program	
Organization	**Area(s) of Impact**
City Colleges of Chicago	Science Vision and Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab	$60k annually; $300k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Provost, City Colleges of Chicago

Description

City Colleges of Chicago commits to establishing an internship program for students to conduct research with scientists at Fermilab. This internship program will be modeled on the existing, successful program in place with Argonne National Laboratory. The internships provided by the program are 10-week paid opportunities during the summer (from May through August) or during an academic semester. City Colleges of Chicago commits to supporting up to ten internships as part of this new program, for an expected annual contribution in the form of staff or faculty time of approximately $60k per year and a total of $300k over the initial five-year term of the contract. City Colleges will also participate in the South Side Science Festival, one of the largest science festivals on the South Side of Chicago.

Expected Benefits to Fermilab

The internship program and South Side Science Festival are part of a broader Inclusive Innovation in the Sciences (IIS) initiative, co-led by Fermilab, UChicago, UIUC, and Argonne National Laboratory. IIS aims to ensure that South Side residents benefit from the economic opportunities withing emerging science and technology fields. Key activities include internships, training, and resource funding for community-led initiatives. Fermilab participation in these efforts will expand access to underrepresented groups in STEM education, expand Fermilab impact in these fields, and aid in recruitment and development of promising scientists and engineers from this population.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 12A:
Columbia University – Joint Appointments, Postdoctoral/ Graduate Students, Workforce Development

Resource Commitment 12A: Joint Appointments, Postdoctoral/ Graduate Students, Workforce Development	
Organization	**Area(s) of Impact**
Columbia University (Columbia)	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab	$195k annually; $975k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Executive Vice President for Research, Columbia

Description

Columbia is pleased to make the following commitments to FermiForward, at no cost to the government:

- Covering up to 50% of salary and benefits for up to two joint postdoctoral fellows in engineering fields of study, annually for five years for an annual contribution of approximately $90k per year and a total of $450k over the initial five-year term of the contract.
- Cover up to 50% of salary and benefits for up to two joint postdoctoral fellows in neutrino physics, annually for five years for an annual contribution of approximately $90k per year and a total of $450k over the initial five-year term of the contract.
- Offering joint BS/MS courses in Microelectronics for high energy physics, which will be jointly taught by Columbia Engineering Faculty and Fermilab scientists. Columbia and Fermilab will equally share a stipend of $6k and travel expenses per student, for up to five students, to spend ten weeks over the summer at Fermilab for the initial five-year term of the contract, for an estimated commitment value of $15k per year and $75k over five years.
- Exploring the possibility of joint PhD students in Computational Science and AI, and PhD courses offered jointly by Columbia faculty and Fermilab Scientists.
- Working with FermiForward and Fermilab to create new course offerings, to include on-site technical and pedagogical training at Fermilab. Columbia is launching its master's degree program in Quantum Science and Technology (MSQST) in Fall 2024. This three-semester program will train students through a set of core and elective courses, jointly taught by Columbia Engineering and the Columbia Physics Department.
- Exploring tuition waivers for Fermilab employees to participate in the program. Columbia faculty and researchers will lead the pedagogical components in conjunction with Fermilab staff and scientists who will lead the technical facilities and equipment training aspects.

Expected Benefits to Fermilab

These commitments will assist Fermilab in maintaining its programs of cooperation with academic and educational communities for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. The joint postdoctoral fellow appointments with Columbia in neutrino physics and microelectronics for high energy physics will enhance Fermilab's engagement with Columbia and engage these talented researchers at reduced cost to pursue critical scientific mission needs. The joint BS/MS student summer stipend program will bring talented Columbia students to Fermilab for extended engagements, familiarizing these students to Fermilab, its mission, and opportunities to pursue to pursue scientific positions at the laboratory.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 13A:
Hampton University – STEM

Resource Commitment 13A: STEM	
Organization	**Area(s) of Impact**
Hampton University	Workforce Development
Location(s)	**Estimated Total Value**
Fermilab	$146k annually; $730k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Vice President for Research, Hampton University

Description

Hampton University, one of the nation's premier HBCUs and a research-focused institution, is pleased to make the following commitments at no cost to the government:

- Establishing a research training program for at least five Hampton undergraduate students to participate in research opportunities at Fermilab each year as part of the FermiForward coalition of universities. Hampton University will institute a formal internship application system along with selection criteria and pre-internship mentorship structures. Hampton commits the faculty resources to administer the pre-internship training component of the program, with an estimated annual contribution of up to $10k per year, for a total of $50k over the initial five-year contract. The undergraduate students will be supported as part of the established DOE SULI programs at Fermilab.
- Funding up to two faculty per year to participate in a new Hampton-Fermilab Faculty Exchange Program for Faculty from the School of Engineering, Architecture and Aviation (SEAA) and the School of Science (SOS) who are interested in Fermilab research activities. Hampton commits to funding 50% of the faculty salaries while they are engaged in this exchange program at Fermilab, constituting a total contribution of up to $50k per year, for a total of $250k over the initial five-year contract. The remaining 50% of the faculty salaries, along with the potential to apply for travel and housing assistance associated with the exchange program, will be provided through the support of the FermiForward Academic Sponsorship Fund.
- Providing resources to support up to two joint faculty appointments in fields including Physics and Computer Science. Hampton will cover up to 50% of the salary and benefits of each joint appointment for an annual contribution of approximately $ 50k per year, for a total of $250k over the initial five-year term of the contract.
- Providing resources to support up to two joint PhD graduate student appointments per year conducting research at Fermilab in the fields of computer science, physics, and engineering. The value of the graduate student salary and benefits is approximately $ 36k per year, for a total of $180k over the initial five-year term of the contract.

Expected Benefits to Fermilab

These commitments will encourage participation by a diverse group of faculty and students from Hampton University in Fermilab programs to bring their talents to bear on important research problems and to contribute to the education of future scientists and engineers. These commitments will also encourage members of underrepresented societal groups to enter careers in science and engineering needed by Fermilab. By working with Hampton University, Fermilab will endeavor to facilitate the laboratory workforce of tomorrow.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 14A:
Howard University – Joint Appointments, Postdoctoral/Graduate Students, STEM

Resource Commitment 14A: Joint Appointments, Postdoctoral/Graduate Students, STEM	
Organization	**Area(s) of Impact**
Howard University	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and Howard University campus	$306k annually; $1.53M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Senior Vice President for Research, Howard University

Description

Howard University, a nationally ranked HBCU and top producer of on-campus African American PhDs, is pleased to make the following commitments at no cost to the government:

- Howard University postdoctoral research associates or fellows will work on joint collaborative projects with Fermilab scientists, which will include exchange visits during the academic year and summer sessions. We expect to engage up to thirty postdoctoral fellows through this partnership. The postdoctoral fellows will be based at Howard University and will travel to Fermilab for these exchanges for periods of up to one month. Postdoctoral fellows who are currently on staff at Howard University will be encouraged to engage in this collaborative research opportunity. Postdoctoral research associates or fellows will be available to existing postdocs who are currently on staff at Howard University. The average annual salary range for a postdoctoral research associate or fellow in Washington, DC, is $70k, constituting an annual in-kind contribution of up to approximately $140k per year for two postdoctoral fellows, for a total of approximately $700k over the initial five-year term of the contract.
- Howard University will commit to identifying undergraduate and graduate students to work on joint collaborative research projects with Fermilab scientists through summer internships at Fermilab. Howard University student participants will be identified from applicants to existing DOE internship programs, Howard University grant and institutional research programs, and other programs established to promote student research.
- To establish a Summer Faculty Research Fellowship Program for Howard University faculty at Fermilab, Howard University will serve as the employer of record. The Office of Research at Howard University currently hosts a Summer Research Faculty Fellowship Program at Howard University for tenure-track faculty. Awardees of the Summer Research Faculty Fellowship receive an award of $12k in salary per summer to conduct research in their respective disciplines. A maximum of five currently hired tenure track faculty awardees will be eligible to participate in the Summer Research Faculty Fellowship program and conduct their research at FNAL. The University is responsible for paying the summer salary and the benefits of the program. This agreement facilitates collaborative research projects and opens new avenues for seeking joint research funding and supporting the research and education goals of the consortium. Howard University commits resources to support up to three Summer Research Faculty Fellows for five years in fields to include Physics and Astronomy, Computer Science, Electrical Engineering, and Mechanical Engineering. The Summer Research Faculty Fellows will be available to existing faculty currently on staff at Howard University. Howard will cover 100% of the summer salary and benefits of each Faculty Fellow for an annual contribution of approximately $60k per year for five fellows, for a total of $300k over the initial five-year term of the contract.
- Howard University will host regional, national, and international professional meetings on jointly discussed research topics that align with the research expertise of Fermilab, Minority Serving Institutions, and additional universities that are part of the consortium. These meetings or symposia can occur during Research Month, which is held annually in April. The Office of Research at Howard University

hosts and organizes Research Month, which is the appropriate venue for a research symposium. Howard University commits to hosting these convenings at no cost to Fermilab, with an estimated value up to $5k per year for a total of up to $25k for the five-year term of the contract.

- Howard University will be deeply engaged in research training experiences for students at the undergraduate and graduate academic level at Fermilab. These joint PhD students would be focused in areas that are of strong mutual interest to both Howard University faculty and Fermilab, including for example, Neutrino Physics, Dark Matter Research, Particle Collider Physics, Astroparticle Physics, Accelerator Physics and Technology, Theoretical Physics, Data Analysis and Computational Physics. The overarching goal is for the students to receive significant research experience with research scientist mentors at FNAL, and thus be adequately prepared to pursue scientific careers. We aim to engage approximately thirty currently enrolled undergraduate, master's, and doctoral students per year to be trained in joint research projects. Approximately three currently enrolled and funded doctoral students will participate in the opportunity to have joint research experiences with FNAL. The total expected annual value of the Ph.D. student salary and benefits for three students actively engaged in joint research activities is approximately $75k per year ($25k per doctoral student) and a total of $375k over the initial five-year term of the contract.
- Howard University will provide opportunities for joint research undergraduate student exchange programs to provide academic year and summer session immersive training programs in QISE. The students selected to participate in this program will be expected to conduct select research projects, which utilize the User facilities at FNAL. The undergraduate students will be recruited from current STEM students at Howard University. Howard University commits to hosting these convenings at no cost to Fermilab with an estimated value of up to $1k per year or a total of up to $5k for the first five-year term of the contract.
- Howard University will collaborate with researchers at Fermi National Lab on joint research projects that involve training and use of Fermi National Lab User Facilities. Potential research project collaboration topics include Neutrino Physics, Dark Matter Research Particle Collider Physics, Astroparticle Physics, Accelerator Physics and Technology, Theoretical Physics, Data Analysis and Computational Physics.
- Howard University will collaborate with the operation of the U.S. Particle Accelerator School. The university will provide faculty and administrative experts to contribute to curriculum development, outreach, and instruction. We expect to engage up to ten faculty members and five administrators to engage in this collaboration. This support has an estimated value of $25k per year or a total of $125k for the first five-year term of the contract.
- Howard University educators in our Middle School of Math and Science Howard University faculty in relevant areas of research and STEM education will collaborate with researchers at FNAL to create specialized teacher workshops, field trips, enhanced science curriculum, and special speaker series designed to educate the students and inspire them to pursue college degrees in STEM.
- Howard University will work with FNAL researchers and administrators to develop experiential learning courses in areas of research priority for the symposium. For example, a certificate in Quantum Science and Technology.

Expected Benefits to Fermilab

These commitments will encourage participation by a group of faculty and students from Howard University in Fermilab programs to bring their talents to bear on important research problems and contribute to the education of future scientists and engineers. These commitments will also encourage members of underrepresented societal groups to enter careers in science and engineering needed by Fermilab. By working with Howard University, as a Historically Black College and University, Fermilab will seek to facilitate the laboratory workforce of tomorrow.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 15A:
Illinois Institute of Technology – Joint Appointments, Postdoctoral/Graduate Students, Workforce Development

Resource Commitment 15A: Joint Appointments, Postdoctoral/ Graduate Students, Workforce Development:	
Organization	**Area(s) of Impact**
Illinois Institute of Technology (Illinois Tech)	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and Illinois Tech Campus	$737k annually; $3.69M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Provost, Illinois Institute of Technology

Description

Illinois Tech commits the following:

- Resources to support up to ten joint scientist/faculty appointments for five years (up to two hires per year) in the fields of Quantum Information Science, Microelectronics Research and Technology, and Artificial Intelligence and Advanced Instrumentation. Illinois Tech will cover 50% of salary and benefits for an annual contribution of up to approximately $100k per year per hire and a total of up to $1.5M in salary and benefits over the initial five-year term of the contract.
- Resources to support up to two joint postdoctoral fellow appointments for two years in the fields of Quantum Information Science, Microelectronics Research and Technology, and Artificial Intelligence and Advanced Instrumentation. Illinois Tech will cover 50% of salary and benefits for an annual contribution of up to approximately $50k per year per postdoc and a total of up to$200k over the initial five-year term of the contract.
- Matching its half tuition waiver policy for on-campus research by providing at least ten half-tuition waivers for PhD students per year who are working on Fermilab programs at Fermilab. This support has an estimated value of at least $154k per year or a total of at least $770k for the first five-year term of the contract.
- Resources to grant up to two full undergraduate tuition scholarships to the dependent children of Fermilab employees per year. These scholarships will be provided on a competitive basis and will be renewed based on sufficient academic progress. This support is valued at an estimated $42k per student per year (i.e., $84k in Year 1, $168k in Year 2, $252k in Year 3, $336k in Year 4, and $336k in Year 5), for a total of $1.176M over the initial five-year term of the contract.
- Hosting two collaboration meetings on its Bronzeville campus on the south side of Chicago at no cost to Fermilab over the first five-year term of the contract. This has an estimated value of $20k per meeting for a total of $40k over the first five-year term of the contract.

Expected Benefits to Fermilab

These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs These commitments will help Fermilab develop a cooperative and collaborative partnership with a local academic partner, help train the next generation of scientists, expand research collaborations and enhance workforce development.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 16A:
Northern Illinois University – Joint Appointments, Postdoctoral/Graduate Students, Facilities

Resource Commitment 16A: Joint Appointments, Postdoctoral/Graduate Students, Facilities	
Organization	**Area(s) of Impact**
Northern Illinois University (NIU)	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and NIU campus	$350k annually; $1.75M total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	President, Northern Illinois University

Description

As the nearest Illinois public research university to Fermilab, NIU pledges the following commitments, at no cost to the contract, in support of FermiForward's proposal to manage and operate Fermilab.

- NIU commits resources to support up to three joint scientist/faculty appointments over five years in research areas that are of mutual interest and engagement for both Fermilab and NIU, including significant research efforts in Neutrino Physics, Beams and Accelerator Science and the emerging field of Quantum Information Science. NIU will cover up to 50% of salary and benefits of each joint appointment for a total of up to $400k over the initial five-year term of the contract.
- NIU commits resources to support up to six PhD graduate student appointments over five years in these field(s). The value of the graduate student salary and benefits is approximately $30k/year for a total of up to $500k over the initial five-year term of the contract.
- Through the Department of Energy supported traineeship programs in Computational High Energy Particles Physics and Beams and Accelerator Science, NIU commits to support Masters physics, engineering and computer science students working on Fermilab-related projects with joint Lab-NIU mentorship. These commitments to FermiForward constitute a contribution of up to $150k/year with an estimated total of up to $750k for the initial five- year contract.
- NIU is also pleased to provide the resources and personnel to continue support for the U.S. Particle Accelerator School, which provides significant and highly valued education, crucial to Fermilab's mission, in beam physics and accelerator technology at both the national and international levels.
- NIU is prepared to support the continuing educational needs of Fermilab staff and scientists through enrollment in degree programs at NIU in areas such as Physics and Engineering. NIU administrative support for these programs, combined with the tuition waivers for Fermilab staff, constitutes a total contribution of up to $20k/year, and a total of up to $100k over the initial five-year contract.

Expected Benefits to Fermilab

These commitments from NIU will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. NIU's designation as an Emerging Hispanic Serving Institution will also encourage members of underrepresented societal groups to enter careers in science and engineering needed by Fermilab. Overall, these commitments will encourage participation by a group of faculty and students in Fermilab programs to bring their talents to bear on important research problems and contribute to the education of future scientists and engineers.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 17A:
Northwestern University – Joint Appointments, Postdoctoral/Graduate Students

Resource Commitment 17A: Joint Appointments, Postdoctoral/Graduate Students	
Organization	**Area(s) of Impact**
Northwestern University (Northwestern)	Science Vision & Implementation
Location(s)	**Estimated Total Value**
Fermilab and Northwestern Campus	$1.325M annually; $6.625M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Vice President for Research, Northwestern

Description

As a member of the FermiForward coalition of universities and in support of the FermiForward proposal to manage and operate Fermilab, Northwestern is pleased to make the following commitments at no cost to the government:

- Northwestern commits to providing $50k per year over a five-year period for research equipment to support dark matter experiments and quantum research, for a total of $250k over the initial five-year term of the contract.
- Northwestern commits up to four joint faculty appointments between FNAL and Northwestern, using the strengths of both institutions to recruit top-tier scientists for five years. Positions will be sought in research areas that are of mutual interest to Fermilab and Northwestern. Northwestern commits to covering as much as an average of 50% of salary and benefits across all joint appointments, leading to an expected annual contribution of up to $380k/year and a total of up to $1.9M over the initial five-year term of the contract.
- Northwestern commits resources to support up to ten joint postdoctoral fellows for five years and will cover up to an average of 50% of salary and benefits across all joint appointments for an annual contribution of up to $375k/year and a total of up to $1.875M over the initial five-year term of the contract.
- Northwestern commits resources to support up to ten PhD graduate students for five years and will cover up to an average of 50% of salary and benefits across all student appointments. The expected value of the graduate student salary and benefits is up to approximately $500k/year for a total of up to $2.5M over the initial five-year term of the contract.
- Northwestern commits to provide summer internships for Northwestern undergraduates working at Fermilab through collaboration with our robust summer undergraduate research program. Northwestern will support up to ten undergraduate student trainees, providing up to an average of 50% of the stipend across all summer trainees. The value of the undergraduate traineeships is approximately $20k/year and a total of $100k over the initial five-year term of the contract.
- Northwestern commits to providing input to the operation and management of FNAL by serving on the Advisory Council and attending all related events.

Expected Benefits to Fermilab

These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. These faculty scientists, postdoctoral fellows, and graduate students, appointed in partnership with Northwestern, will help Fermilab achieve its mission goals and help develop and educate the next generation of scientists and engineers. The opportunity to host internships for Northwestern undergraduates will contribute to Fermilab's efforts to attract, retain, and develop a high-performing workforce.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 18A:
Purdue University – Joint Appointments, Postdoctoral/Graduate Students, Internships, Workforce Development, Facilities, Career Fair

Resource Commitment 18A: Joint Appointments, Postdoctoral/ Graduate Students, Internships, Workforce Development, Facilities, Career Fair	
Organization	**Area(s) of Impact**
Purdue University	Science Vision & Implementation; Mission Support, Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and Purdue Campus	$1.4M annually; $7M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Executive Vice President for Research, Purdue

Description

Purdue commits to the following:

- Resources to support eight joint graduate research assistantships each year for five years in the fields of microelectronics, quantum, instrumentation, high energy physics, and computing. Purdue will cover salary, fringe benefits, and fee remissions for an annual contribution of approximately $510k per year or a total of $2.55M over the initial five-year term of the contract.
- Resources to support three joint postdoctoral fellow appointments each year for five years in the fields of microelectronics, quantum, instrumentation, high energy physics, and computing. Purdue will cover salary and benefits for an annual contribution of approximately $375k per year for a total of $1.87M over the initial five-year term of the contract.
- Supporting the hiring of joint scientist/faculty appointments in the fields of microelectronics, quantum, instrumentation, high energy physics, and computing. Purdue anticipates that these hires could be made in partnership with the Purdue Computes and Dream Hires initiatives as qualified individuals are identified and recruited. We estimate the value of this commitment to be $400k per year for a total of $2M over the initial five-year term.
- Providing Fermilab employees a tiered discount program for Purdue University Online micro-credentials programs in microelectronics, quantum, and AI. The Table in Purdue University's supporting commitment letter reflects the discount at each tier. Assuming 300 enrollments by Fermilab employees per year, we estimate the value of the discount to be $21,250 per year for a total of $206,250 over the initial five-year term of the contract. The value of the discount and overall commitment can increase depending on enrollments as detailed in the letter.
- Supporting the university's world-leading experts across the fields of microelectronics, quantum, high energy physics, instrumentation, and computing to serve on Fermilab advisory boards and committees and participate in relevant workshops. Purdue will cover a portion of salary and benefits for individuals serving in these roles for an annual contribution of approximately $80k per year or a total of $400K over the initial five-year term of the contract.
- Facilitating the development of large interdisciplinary teams through allocating time of the Associate Vice President for Strategic Interdisciplinary Research to projects with Fermilab. This support has an estimated value of $20k per year or a total of $100k for the first five-year term of the contract.
- Facilitating the pursuit of joint research and partnering opportunities through allocating time of the Director of Partner Relations for Federal Laboratories and the deployment of Research Innovation and Strategic Initiatives personnel for Purdue- Fermilab research collaborations. This support has an estimated value of $15k per year or a total of $75k for the first five-year term of the contract.

Resource Commitment 18A: Joint Appointments, Postdoctoral/ Graduate Students, Internships, Workforce Development, Facilities, Career Fair	
Expected Benefits to Fermilab	
These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. These faculty scientists, postdoctoral fellows, and graduate students, appointed in partnership with Purdue, will help Fermilab achieve its mission goals and help develop and educate the next generation of scientists and engineers. The opportunity to engage in selected training and workforce development programs offered by Purdue as well as gaining access to the unique facilities outlined in Purdue's letter of support, will contribute to Fermilab's efforts to attract, retain, and develop a high-performing workforce.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 19A:
South Dakota School of Mines – Joint Appointments, Postdoctoral/ Graduate Students, Workshops

Resource Commitment 19A: Joint Appointments, Postdoctoral/Graduate Students, Workshops	
Organization	**Area(s) of Impact**
South Dakota School of Mines	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and South Dakota Mines campus	$455k annually; $2.275M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Vice President for Research, South Dakota Mines

Description

At South Dakota Mines, three physics faculty members are leading research initiatives closely tied to Fermilab. These involve a diverse range of projects, including DUNE far and near detector developments, DUNE Phase II proposals, MicroBooNE, and ANNIE. Furthermore, our undergraduate and graduate students have benefitted significantly from extended research visits to Fermilab.

South Dakota Mines is committed to supporting these ongoing and future projects. In the context of these important activities, South Dakota Mines commits resources to support these three faculty appointments for at least five years in the science of neutrinos. South Dakota Mines will cover 100% of salary and benefits for an annual contribution of approximately $350k per year and a total of $1.75M over the initial five-year term of the contract. South Dakota Mines will continue to offer in-kind assistance to graduate students involved in Fermilab endeavors, contingent upon the availability of funds.

Pending approval from the University Administration, the South Dakota Mines Physics Department is in the process of dedicating its next open faculty line to the realm of Quantum Information Technology. This step is intended to foster a close collaboration with Fermilab's Quantum Institute. Upon approval of the hiring process, we are committed to inviting a representative from Fermilab to participate as a member of the faculty hiring committee. For this potential faculty hire, South Dakota Mines will cover 100% of salary and benefits for an annual contribution of approximately $100k per year and a total of $300k over the initial five-year term of the contract.

South Dakota Mines provides Mine Safety and Health Administration (MSHA) training to the region and is pleased to provide the following support, as needed:

- **MSHA Underground New Miner Training (40 hours):** 50% reduced cost, at $80/person.
- **MSHA Underground Annual Refresher Training (8 Hours):** 50% reduced cost, at $40/person.

South Dakota Mines commits to providing these training resources, with an estimated value of $45k per year or a total of $225k for the first five-year term of the contract.

In addition, there is expertise in the Mining Engineering and Management Department to provide expertise and support on mine safety-related and mine ventilation projects, including heat, refrigeration, and pollutant transport (dust/gas/blast fumes).

Expected Benefits to Fermilab

These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. These commitments from South Dakota Mines will deepen Fermilab scientific engagement with a major South Dakota university closely located near the Sanford Underground Research Facility. South Dakota Mines also features

Resource Commitment 19A: Joint Appointments, Postdoctoral/Graduate Students, Workshops	
specially designed safety programs in Mine Safety and Health Administration that will assist Fermilab staff in acquiring the health and safety skill sets necessary to operate safely in underground locations.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 20A:
Spelman College – STEM

Resource Commitment 20A: STEM	
Organization	**Area(s) of Impact**
Spelman College	Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and Spelman campus	$4k annually; $20k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	President, Spelman College

Description

Spelman College commits to recruiting at least eight undergraduate students to participate in research opportunities at FermiForward over the next five years. We will arrange for sessions in which Fermilab leaders and/or researchers can share information about the assorted opportunities. We understand that the undergraduate students will be supported as part of the established DOE SULI programs at Fermilab, which we were informed provides funding for the students' travel, lodging, and stipends.

In addition, Spelman commits to informing faculty of the opportunity to participate in the Fermilab Faculty Exchange Program for Spelman faculty who are interested in Fermilab research activities. Spelman College will encourage up to three faculty members to participate in the new Spelman-Fermilab Faculty Exchange program over the next five years. For those faculty who elect to participate and are eligible for sabbatical, Spelman College will commit to paying 50% of their salary if approved for a one-year sabbatical leave (per the College's sabbatical leave policy) and the other 50% salary will be funded by the FermiForward Academic Sponsorship Fund. Since lodging costs may be prohibitive for faculty, we are grateful for the housing assistance (e.g., housing stipend and/or moving expenses) associated with the exchange program, which will be provided by the FermiForward Academic Sponsorship Fund. Because these joint faculties have not yet been identified, Spelman is unable to provide an estimate of its share of faculty salaries. These amounts will be provided in annual commitment reports to DOE.

Laboratory staff and scientists from Fermilab can spend time at Spelman College, either through sabbaticals or short-term appointments. During their time at the College, Spelman leaders may ask these individuals to support various departments in the Division of Natural Sciences & Mathematics, through the offering of lectures or engagement in collaborative research. Since Fermilab will be providing salary support for these Fermilab scientists, researchers, or staff, Spelman commits to providing housing support and funding of $10k for up to two laboratory scientists on short-term appointments at the college over the next five years.

Expected Benefits to Fermilab

These commitments will encourage participation by a group of faculty and students in Fermilab programs to bring their talents to bear on important research problems and contribute to the education of future scientists and engineers. By working with Spelman, a Historically Black College, Fermilab will seek to facilitate the laboratory workforce of tomorrow. These commitments will also encourage members of underrepresented societal groups to enter careers in science and engineering needed by Fermilab.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 21A:
University of Illinois Chicago – Joint Appointments, Postdoctoral/ Graduate Students, STEM

Resource Commitment 21A: Joint Appointments, Postdoctoral/Graduate Students, STEM	
Organization	**Area(s) of Impact**
University of Illinois Chicago (UIC)	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and the UIC Campus	$1.47M annually; $7.35M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Joanna Groden, Vice Chancellor for Research

Description

UIC commits to the following:

- Resources to support up to five joint scientist/faculty appointment(s) for the next five years in UIC fields of Quantum Information; Microelectronics Research and Technology; Artificial Intelligence and Advanced Instrumentation; High Energy Particle Physics; and in the Quantum Directorate and Neutrino Science at Fermilab. UIC will cover an average of 50% of salary and benefits for up to an annual contribution of approximately $125k per year per faculty member for a total of $635k a year and $3.125M over the initial five-year term of the contract.
- Resources to support up to six joint postdoctoral fellow appointment(s) for the next five years in the same fields. UIC will cover 100% of salary and benefits for up to an annual contribution of approximately $420k per year and $2.1M over the initial five-year term of the contract.
- Fifteen tuition waivers for PhD students per year who are working at Fermilab in joint Fermilab programs. This support has an estimated value of $25k per year per student, amounting to $375k in support per year and a total of $1.875M over the initial five-year term of the contract.
- Resources from the UIC Office of the Vice Chancellor for Research (OVCR) to host one annual meeting and up to three workshops annually at no cost to Fermilab with an estimated value of $50k per year or a total of $250k for the first five-year term of the contract.

Expected Benefits to Fermilab

These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. These commitments will help Fermilab develop a cooperative and collaborative partnership with a local academic partner, help train the next generation of scientists, expand research collaborations, and enhance workforce development.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 22A:
University of Illinois Urbana Champaign – Joint Appointments, Postdoctoral/ Graduate Students, Internships, Workforce Development, Data Science

Resource Commitment 22A: Joint Appointments, Postdoctoral/Graduate Students, Internships, Workforce Development, Data Science	
Organization	**Area(s) of Impact**
University of Illinois Urbana Champaign (UIUC)	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and the UIUC Campus	$1.8M annually; $9M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Vice Chancellor for Research & Innovation, UIUC

Description

UIUC pledges the following commitments to the FermiForward proposal:

- The UIUC Grainger College of Engineering (GCOE) will commit resources to jointly support with Fermilab, five joint scientist/faculty appointment(s) for five years in the field(s) of dark matter experiments, experimental collider physics, experimental astrophysics (all in the Department of Physics), microelectronics or quantum technologies (in the Department of Electrical and Computer Engineering), and AI or data science (in the Department of Computer Science). GCOE will cover 50% of salary and benefits for an annual contribution of approximately $440k/year and a total of $2.2M over the initial five-year term of the contract.
- GCOE will commit resources to jointly support with Fermilab, a total of nine joint postdoctoral researcher appointment(s) for five years in the field(s) of dark matter experiments, experimental collider physics, experimental astrophysics, microelectronics or quantum devices, and AI or data science. GCOE will cover 50% of salary and benefit for an annual contribution of approximately $414k/year and a total of $2.1M over the initial five-year term of the contract.
- The National Center for Supercomputing Applications (NCSA)-based Center for AstroPhysical Surveys (CAPS) at UIUC will commit up to two graduate student lines and one postdoctoral fellow line for joint NCSA-Fermilab efforts within the DOE Cosmic Frontiers portfolio for five years. These research lines are expected to work specifically and closely with collaborators at Fermilab. This is an annual contribution of $220k/year and a total of $1.1M over the initial five-year term of the contract.
- NCSA will commit to supporting joint students and trainees by providing up to 2,000 node-hours/year on Delta and DeltaAI and access to the CAPS cluster to facilitate collaborative work. This contribution has an estimated total value of $320k.
- NCSA will commit to providing office space for Fermilab visitors (both drop-in space for short term visitors and at least three offices for long-term visitors), as well as appropriate meeting space to accommodate collaborative work, workshops, seminars, and symposia. This contribution has a value of $20k/year and a total of $100k over the initial five-year term of the contract.
- NCSA is committed to continuing its partnership with Fermilab in Astrophysical Surveys and the Cosmic Frontiers projects. Additionally, we will work to expand this effort to include Artificial Intelligence.
- GCOE will commit to twelve tuition waivers for PhD students per year who are working at Fermilab or at UIUC on Fermilab programs. This support has an estimated value of $480k/year for a total of $2.4M for the first five-year term of the contract. It is anticipated that these students will be appointed to funded research projects.
- The Department of Astronomy in the College of Liberal Arts and Sciences (LAS) will commit to two tuition waivers for PhD students per year who are working at Fermilab or at UIUC on Fermilab programs. This support has an estimated value of $80k/year for a total of $400k for the first five-year term of the contract. It is anticipated that these students will be appointed to funded research projects.

Resource Commitment 22A: Joint Appointments, Postdoctoral/Graduate Students, Internships, Workforce Development, Data Science
• GCOE will commit to providing a 0.5 FTE in staff time in the Materials Research Laboratory (MRL) or the Illinois Quantum Information Science and Technology (IQUIST) center with the goal of strengthening the collaboration between UIUC and Fermilab in the areas of quantum materials and quantum communications. This support has an estimated value of $74k/year for a total of $370k for the first five-year term of the contract. • GCOE will commit to co-developing a cleanroom & microelectronics training program in the Holonyak Micro- and Nanotechnology Laboratory (HMNTL), open to Fermilab engineers, at no cost to the government. • GCOE will commit to creating 0% departmental affiliate appointments in the Department of Physics for visiting Fermilab scientists. We also look forward to establishing new relationships for staff at Fermilab who have affiliate appointments at UIUC to develop education programs that benefit the UIUC and Fermilab shared mission such as Particle Acceleration Physics Training Programs. • We will also commit to partnering with Fermilab (work that has already begun), in collaboration with Innovate Illinois to compete for a Department of Commerce funded National Heterogenous Integration Packaging facility located at Fermilab and participate in the governance of the packaging facility in service to the nation and to the Department of Energy.
Expected Benefits to Fermilab
These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. These commitments will help Fermilab develop a cooperative and collaborative partnership with a local academic partner, help train the next generation of scientists, expand research collaborations, and enhance workforce development.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 23A:
University of Illinois System – Workforce Education and Training

Resource Commitment 23A: Workforce Education and Training	
Organization	**Area(s) of Impact**
University of Illinois System	Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and UI Campuses	No financial value estimated
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Campus Vice Chancellors for Research

Description

The University of Illinois campuses at Chicago and Urbana-Champaign, both of which have long and accomplished histories of scientific involvement at Fermilab, have provided separate, campus-specific letters committing their enthusiastic support. These University of Illinois campuses bring excellence to Fermilab. The HEP program at UIUC is one of the largest in the country, and UIC, which is designated as a Minority Serving Institution and the University that was a driving force behind the formation of the Alliance of Hispanic Serving Research Universities, brings not only excellence in HEP research but also a strong history of educating minorities and underrepresented groups.

Of note in this regard is the Workforce Education Exchange (WEX), a platform for workforce education and training developed by the Illinois Innovation Network (IIN), which consists of the 12 public universities in Illinois as well as the U of I System's Discovery Partners Institute and links with Illinois's 48 community colleges and a growing number of K-12 schools. The Workforce Education Exchange connects education, workforce development, and industry resources to ensure a skilled and job-ready work-force for in-demand and emerging industries in Illinois. The University of Illinois is enthusiastic about po-tential collaborations with Fermilab to encourage more young people to pursue careers in science and technology. Developing tomorrow's science and technology leaders is essential if we are to compete in the global marketplace.

Expected Benefits to Fermilab

Advancing the economic well-being of Illinois, the Midwest, and the nation is an important responsibility of the University of Illinois System. We share DOE's mission to broaden and strengthen economic growth and development through investments in discovery research and the accelerated development, transfer, and commercialization of technologies for public benefit. The University of Illinois System therefore pledges its unwavering support to help design strategies and develop successful programs that enable Fermilab to foster rapid technology deployment to market, thus achieving local, regional, and national economic impact.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 24A:
University of Michigan – Joint Appointments, Postdoctoral/Graduate Students, Workforce Development

Resource Commitment 24A: Joint Appointments, Postdoctoral/Graduate Students, Workforce Development	
Organization	**Area(s) of Impact**
University of Michigan	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab	$80k annually; $400k in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Vice President for Research & Innovation, Michigan

Description

The University of Michigan commits resources to support one joint research scientist appointment(s) for five years in the field(s) of AI, Quantum, or Microelectronics. The University of Michigan will cover 50% of salary and benefits for an annual contribution of approximately $80k per year and a total of $400k over the initial five-year term of the contract.

Expected Benefits to Fermilab

These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. The joint appointment described above and in the supporting letter from the University of Michigan will provide an important programmatic link between the University of Michigan and Fermilab and thereby further the scientific mission of the laboratory.

Governmental Action Required/Related to the Commitment	Liability to the Government
None anticipated	None anticipated

Commitment 25A:
University of Notre Dame – Joint Appointments, Postdoctoral/ Graduate Students, Facilities

Resource Commitment 25A: Joint Appointments, Postdoctoral/Graduate Students, Facilities	
Organization	**Area(s) of Impact**
University of Notre Dame	Science Vision & Implementation; Workforce Development
Location(s)	**Estimated Total Value**
Fermilab and Notre Dame campus	$1.96M annually; $9.8M in total over initial 5-year term
Date the Commitment Will Be Provided	**Accountability and Oversight**
Annually following contract award	Vice President for Research, Notre Dame

Description

The University of Notre Dame commits resources to support up to five joint scientist/faculty appointments for five years in fields to include Physics, Computer Science, Applied and Computational Mathematics and Statistics, and Engineering. Notre Dame will cover up to 50% of salary and benefits of each joint appointment for an annual contribution of approximately $471K/year and a total of $2.4M over the initial five-year term of the contract.

The University commits resources to support up to five joint postdoctoral fellow appointments for five years in these fields and will cover up to 50% of salary and benefits of each joint appointment for an annual contribution of approximately $348K/year and a total of $1.7M over the initial five-year term of the contract.

The University commits resources to support up to ten PhD graduate student appointments for five years in these fields. The value of the graduate student salary and benefits is approximately $515K/year and a total of $2.6M over the initial five-year term of the contract. In addition, Notre Dame commits to provide tuition scholarships for up to ten PhD students per year who are enrolled at Notre Dame and working on Fermilab programs at Fermilab. This support has an estimated value of $625K/year or a total of $3.1M for the first five-year term of the contract.

Notre Dame is well positioned to play a leadership role in computational efforts and expects a number of joint appointments to be engaged with our Center for Research Computing in support of computational science.

Notre Dame is one of three founding member institutions of the Compact Accelerator System for Performing Astrophysical Research (CASPAR), a National Science Foundation (NSF) funded underground accelerator laboratory housed in the Sanford Underground Research Facility (SURF), located in the Black Hills of South Dakota. CASPAR resides 4850 ft underground and is dedicated to the study of nuclear reactions fueling stellar environments and elemental production. CASPAR is the only deep underground accelerator laboratory in the U.S. A strong focus of the laboratory is the education and training of the next generation of nuclear physicists through strong graduate and undergraduate student involvement.

The University is open to assisting Fermilab in the development and provision of training in the areas of Open Access Data, Human Resources and Organizational Effectiveness, and Safety. This training could be provided at no cost for the first initial program year with a goal of a long-term engagement in a fee-based training program.

Resource Commitment 25A: Joint Appointments, Postdoctoral/Graduate Students, Facilities	
Expected Benefits to Fermilab	
These commitments will assist Fermilab in maintaining its programs of cooperation with the academic and educational community for the purpose of promoting research and education in scientific and technical fields of interest to DOE's programs and Fermilab's workforce needs. These faculty scientists, postdoctoral fellows, and graduate students, appointed in partnership with Notre Dame, will help Fermilab achieve its mission goals and help develop and educate the next generation of scientists and engineers. The opportunity to engage in selected training and workforce development programs offered by Notre Dame will contribute to Fermilab's efforts to attract, retain, and develop a high-performing workforce.	
Governmental Action Required/Related to the Commitment	**Liability to the Government**
None anticipated	None anticipated

Commitment 26A:
University of Oxford – Joint Appointments, Postdoctoral/Graduate Students, Educational Programs

Resource Commitment 26A: Joint Appointments, Postdoctoral/Graduate Students, Educational Programs	
Organization	**Area(s) of Impact**
University of Oxford	Science Vision and Implementation Workforce Development International Partnerships
Location(s)	**Estimated Total Value**
Fermilab	TBD upon commitment fulfillment and reported to DOE on an annual basis
Date the Resource Will Be Provided	**Accountability and Oversight**
At contract start and annually thereafter	Head of Physics, University of Oxford

Description

Oxford will be a strong and unwavering partner to Fermilab in the scientific and technological initiatives spearheaded by FermiForward and is committed to engaging with and supporting the FermiForward proposal. Oxford is pleased to make the following commitments to Fermilab at no additional cost to the government. Please note that the U.S. dollar value of this commitment cannot be estimated with accuracy due to future fluctuations in currency valuations. Oxford commits to reporting resources provided to support the following commitments, converted to U.S. dollars at the time of commitment execution, on an annual basis.

On February 13, 2024, Oxford approved a new master's course in Quantum Engineering. Commencing in 2025 we intend this to be the world's premier course in this crucial subject. At the same time, their colleagues at UChicago are embarking on a similar course with similar goals. For the past 18 months Oxford has been exploring ways to make this a new joint UChicago-Oxford Master's Degree program and is making substantial progress towards this goal. The course will be made available to Fermilab staff. The silicon sensor testing and development facilities at Oxford will be made available to Fermilab scientists working in conjunction with Oxford on the new initiatives for future colliders. Oxford will also host Fermilab scientists and engineers on extended visits to its extensive facilities in the UK. In addition, we share interests in artificial intelligence and joint activity there is being explored.

Oxford University will commit the necessary resources to support the collaborative work of Oxford faculty and Fermilab staff in Physics with a particular emphasis on the areas of Particle Physics, Quantum Science, and Instrumentation. Those resources include the salary of Oxford faculty, staff, students, and postdocs. We currently anticipate that eight faculty members, eight PhD students, and six postdoctoral fellows will engage in the FermiForward partnership over the initial five-year term of the contract.

Expected Benefits to Fermilab

Oxford and Fermilab have a decades long scientific partnership. Oxford has a wealth of experience and ongoing scientific collaborations with Fermilab in multiple areas, currently including the experimental efforts in Neutrino Science with the DUNE and SBND projects, as well as in efforts to explore the Dark Universe through novel experimental approaches such as the MAGIS project. The success of LBNF-DUNE, SBND and MAGIS is of utmost importance to Oxford University. Through the commitments described above, Oxford intends to deepen and extend this profoundly important international collaboration.

Required Governmental Action	Liability to the Government
None anticipated	None anticipated