

Nuclear Challenges Capstone Evaluation and Learning Synthesis: Executive Summary

November 2024

Despite significant reductions in the number of nuclear weapons since the height of the Cold War, nearly 13,500 remain today. Rising geopolitical tensions and the non-state actor threat raise the risk of accidental or intentional use. Just one detonation could change the contours of society. Civil society has a critical role to play in identifying and mitigating nuclear risks through policy research, analysis, publication, and engagement in public and private settings.

The John D. and Catherine T. MacArthur Foundation (MacArthur) has invested in civil society to reduce nuclear risks for over three decades, providing roughly \$100 million in grants to the nuclear field from 2015-2020 alone. In 2021, with the end of MacArthur's time-limited Nuclear Challenges Big Bet strategy, the Foundation's focus shifted to implementing a three-year, roughly \$30 million investment in a Nuclear Challenges Capstone strategy, with nearly \$26 million in grants focused on four pillars.¹ In 2024, the Nuclear Challenges program came to an end. The Capstone strategy sought to strengthen the nuclear field through four complementary areas of work as shown in Table ES-1.

TABLE ES-1: The Nuclear Challenges Capstone Strategy

THE NUCLEAR CHALLENGES CAPSTONE			
CULTIVATE PILLAR	INNOVATE PILLAR	LEAD PILLAR	PRESERVE PILLAR
Inject new voices, organizations, and people into the field.	Challenge prevailing theory and make a meaningful contribution to future scholarly and policy debates.	Identify pathways to mitigate the safety and security consequences of nuclear power's expansion as a climate solution.	Maintain and offer flexible support for anchor organizations that form the basis of the nuclear field's infrastructure.
Grant Amt: \$5.5M	Grant Amt: \$4.3M	Grant Amt: \$3.1M	Grant Amt: \$12.8M
Grantees: 13	Grantees: 5	Grantees: 5	Grantees: 10

¹ Approximately \$4 million in grantmaking was made outside of the pillars, and five organizations received grants at a later point in time. As such, they were not included in the Capstone evaluation.



Insights in this evaluation are primarily informed by 68 individuals who participated in 62 interviews over a 20-month period (12/2022 – 7/2024): 32 with grantees and 30 were with external informants like nuclear experts and funders. The evaluation team also reviewed documents like grant reports and publications, engaged MacArthur staff in reflective dialogue, obtained secondary data, and built several quantitative inventories with knowledge products and events to understand the prevalence of key thematic areas like diversity, equity, and inclusion,² nuclear as a climate solution, and alternatives to deterrence theory.

The evaluation intended to answer two overarching strategic review questions:

1. What significant results and/or meaningful contributions were achieved? What among these results and/or contributions will endure?
2. What did we learn that is transferable beyond this strategy?

This executive summary will address these questions in two sections.³ The first section details pillar-level findings and assesses progress toward the distinct goals of each pillar. The second section provides an overview of Capstone-level findings about diversity, equity, and inclusion in the nuclear field, the state of the nuclear field, and the end of MacArthur's Nuclear Challenges program, which includes lessons learned and future opportunities.

We found that grantees achieved some notable successes, even though the Foundation ended the Nuclear Challenges program at a sensitive moment. Key findings include:

- Many organizations strengthened their commitments and practices related to diversity, equity and inclusion.
- More diverse organizations and scholars are working on scholarly and policy issues related to how the field thinks about deterrence and nuclear issues.
- People working at the nexus of climate solutions and nuclear security have made inroads in understanding key stakeholders' concerns and perspectives in ways that should help mitigate safety and security concerns associated with expansion of nuclear power to address energy needs.

² The foundation defines diversity, equity and inclusion in its values: Diversity includes all the ways that people differ, encompassing the characteristics that make people distinct from one another. Equity is the fair treatment, access, opportunity, and advancement for all people while identifying and eliminating barriers that have prevented the full participation of some individuals. Inclusion is the act of creating authentic environments in which all individuals feel welcomed, respected, valued, and feel a sense of belonging.

³ If you have any questions about the evaluation, please contact Angela Schlater.

- Many core infrastructure organizations made progress on funding and addressing financial instability concerns.
- The Foundation ended the program at a sensitive moment. Global risks are heightened, views around nuclear issues are increasingly polarized, and the nuclear field is not immune to the pushback and rollbacks to gains made around diversity and equity after the racial reckonings of 2020.

Pillar-Level Findings: Zooming In

This section describes the progress that was made within distinct Capstone pillars. The evaluation team used a four-point scale to evaluate progress toward pillar goals as originally defined by the MacArthur Nuclear Challenges team, and determined that there was mixed progress in the Cultivate pillar, some progress in the Innovate and Lead pillars, and good progress in the Preserve pillar (as shown in Table ES-2).

TABLE ES-2: Overall Assessment of Progress Towards Pillar Goals

	NO PROGRESS	SOME PROGRESS	MIXED PROGRESS	GOOD PROGRESS
CULTIVATE: Inject new voices, organizations, and people into the field.			✓	
INNOVATE: Challenge prevailing theory and contribute to future scholarly and policy debates.		✓		
LEAD: Identify pathways to mitigate the safety and security consequences of nuclear power's expansion as a climate solution.		✓		
PRESERVE: Offer flexible support for anchor organizations that form the basis of the nuclear field's infrastructure.				✓

The Cultivate pillar made mixed progress towards its goals to inject new voices, organizations, and people into the field, with the goal of broadening the types of people, perspectives and thinking for the field going forward. Expanded perspectives included disciplinary, age, gender, and geographic diversity. Grantee organizations are committed to advancing diversity, equity, and inclusion in the nuclear field and have solidified their commitment through a range of policies and practices to improve internal operations and externally facing programming. Early signs of progress indicate that diverse talent gained some recognition and influenced the nuclear field through speaking engagements, publications, and new job positions. A summary is shown in Table ES-3.

TABLE ES-3: Summary of Projected Outcomes and Evaluation Findings for the Cultivate Pillar

	Projected Outcomes	Evaluation Findings
1	Increased attention, recognition and influence of a broader range of voices and backgrounds.	Through various programs, many grantees created opportunities for young people, people of color, and those from varied backgrounds and geographies to explore the nuclear field, obtain a career, and continue to promote diversity, equity, and inclusion in the field. Several grantees shared anecdotal success stories about some program alumni who gained recognition by speaking at events or publishing news articles. Other alumni obtained employment in staff positions across the nuclear field. From within these positions, diverse talent reported efforts to influence the field by working towards goals like equitable security outcomes or calling out diversity, equity, and inclusion issues in the workplace.
2	New and strengthened diversity, equity, and inclusion policies and practices across sector organizations.	Cultivate grantees designed and implemented 63 distinct diversity, equity, and inclusion policies and practices (33 of which were initiated during the Capstone) to establish inclusive and equitable workplaces, increase diversity of staff and program participants, and ensure diversity, equity, and inclusion is integrated in organizational structures and operations.

Challenges for the Cultivate pillar: Although MacArthur's support enabled grantees to scale organizational capacity, leverage partnerships, and increase opportunities to amplify diverse voices and influence the field, a few grantees observed that women and people of color who recently entered the nuclear field were the first ones to leave due to limited funding and undesirable working conditions.

The Innovate pillar made some progress towards its goals to challenge prevailing theory and make a meaningful contribution to future scholarly and policy debate. Two years is limited time for grantees and sub-grantees to produce a substantial volume of rigorous research. Early insights and conversations by and among grantees, experts, scholars, and policymakers about various dimensions of deterrence have nevertheless influenced the way this close-knit community thinks about the evolution of nuclear deterrence. A summary is shown in Table ES-4.

TABLE ES-4: Summary of Projected Outcomes and Evaluation Findings for the Innovate Pillar

	Projected Outcomes	Evaluation Findings
1	A body of research that seeds a next chapter of deterrence theory and resulting field conversations.	Although grantees are still working on new scholarship, they built a network with more diverse perspectives to strengthen research that can challenge deterrence theory. Some people in government, non-governmental organization (NGOs), and the public seem to be more interested and engaged in conversations about deterrence and related contextual factors, in part due to an increasingly challenging geopolitical climate.
2	New seminal thinking in the field seeds new projects and approaches along with a deeper conversation and exploration of the next chapter of deterrence theory.	According to grantees and experts, deterrence theory has not fundamentally changed, but contextual factors like the emergence of new technology and the three-way arms race have influenced how deterrence is viewed. Grantees emphasized the need to manage and reduce risks posed by nuclear weapons and think about the actual use of nuclear weapons in moral and legal terms. To challenge prevailing deterrence theory, grantees engaged a broad range of different perspectives in terms of demographics, scholarly focus, and profession to produce new scholarship, initiate new projects, and even start a new organization.

Challenges for the Innovate pillar: Although some stakeholders are open to exploring alternatives to deterrence, beliefs about deterrence are more polarized than ever before. In fact, the current nuclear posture in the U.S. is moving away from arms control and toward nuclear buildup.

The Lead pillar made some progress towards its goals to identify pathways to mitigate the safety and security consequences of nuclear power's expansion as a climate solution. Grantees engaged various stakeholders on both the climate and nuclear side in conversations about the nexus with varying degrees of success. Advancing the nuclear-climate nexus agenda is challenging because while nuclear energy communities believe that the benefits of nuclear energy outweigh proliferation concerns, nuclear security communities are cautious about new reactor technology because of heightened proliferation risk. The U.S. has shown leadership by investing in new nuclear reactors, but regulations need to change before the U.S. can export new technology and set global safety standards. A summary is shown in Table ES-5.

TABLE ES-5: Summary of Projected Outcomes and Evaluation Findings for the Lead Pillar

	Projected Outcomes	Evaluation Findings
1	Increased and more productive dialogue around the nexus of climate change, nuclear power, and global security.	Lead pillar grantees improved their understanding of the interests, needs, and perspectives across stakeholder groups, which further enabled the engagement of key constituent groups (like various NGOs, governmental bodies, and foreign countries) around the nuclear-climate nexus agenda. Grantees and experts alike noted a growing acceptance that nuclear power is a necessary component to obtain clean and secure energy, especially after Russia's invasion of Ukraine. Despite this, it remains hard to bridge the divide between nuclear energy communities and nuclear security communities because there is a general sense of distrust, their objectives are different, and they have opposing views on how nuclear should be used.

	Projected Outcomes	Evaluation Findings
2	Surfacing specific ways for the United States to show diplomatic and commercial leadership in the context of nuclear power's expansion.	Although there is policy salience on the nuclear energy front, the U.S. is still far removed from becoming a global leader in the development and export of nuclear energy technology so that it can set safety and security standards rather than Russia and China to minimize the chance of proliferation.
3	Understanding among funders how critical it is to consider nuclear non-proliferation as part of conversations on nuclear power and climate change.	Although more progressive constituencies like young people and some environmental groups are beginning to advocate for nuclear power, and the U.S. government as well as the private sector continue to invest billions of dollars in nuclear technology, many institutional environmental organizations and funders still hold an anti-nuclear stance.

Challenges for the Lead pillar: Although the U.S. has shown leadership by investing in nuclear technology development and mandating changes in licensing to achieve climate goals, the U.S. still faces several challenges before it can compete globally and export nuclear reactors. In addition, support from philanthropic institutions and donors for funding nuclear energy or the nexus agenda remains limited.

The Preserve pillar made good progress towards its goals to offer flexible support for anchor organizations that form the basis of the nuclear field's infrastructure. All Preserve grantees have taken steps to raise funds and nearly half of them secured some replacement funding during the Capstone. MacArthur was the largest foundation left in the field, and because of the end of the Nuclear Challenges grantmaking, most grantees are worried about their ability to sustain current ways of working in the future. However, nearly all grantees expressed gratitude for MacArthur's flexible support during the Capstone and for their long-term commitment that has shaped the nuclear field and its organizations. A summary is shown in Table ES-6.

TABLE ES-6: Summary of Projected Outcomes and Evaluation Findings for the Preserve Pillar

	Projected Outcomes	Evaluation Findings
1	Organizations leverage MacArthur funding to increase financial sustainability and find replacement funding for MacArthur grants over the long-term.	Nearly half of the Preserve grantees secured some form or amount of replacement funding, while the others mostly used general operating support to engage in different kinds of activities toward replacement funding. Whether or not grantees secured replacement funding during the Capstone, most worry about their ability to sustain “business as usual” now that MacArthur’s Nuclear Challenges program and capstone are finished. When they thought about the future, a couple of grantees felt that their organization or the nuclear field is in a crisis, most felt anxious but hopeful, and a couple felt confident about the future.
2	Positive relationships with these grantees over the wind-down period.	Grantees noted that MacArthur has been fundamental to the very existence of many grantee organizations and success in the nuclear field, and they found multiyear, general operating, and flexible support during the Capstone to be invaluable.

Challenges for the Preserve pillar: MacArthur was the largest funder left in the nuclear field, and now that MacArthur’s Nuclear Challenges Big Bet and capstone have ended, there have been fewer resources available in the field. This structural change will affect the livelihood of Preserve pillar grantees as well as all other organizations left in the nuclear field.

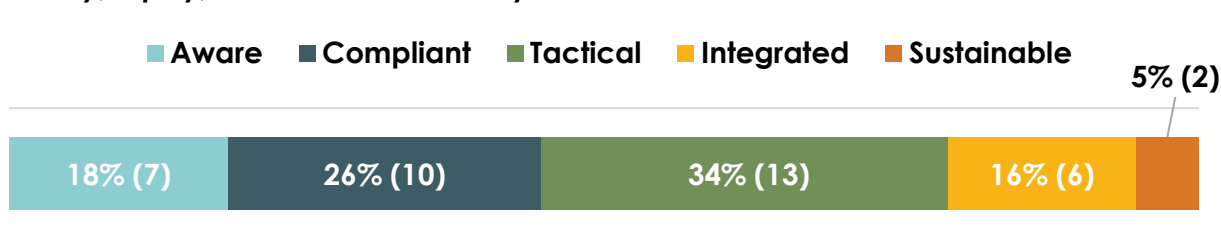
Capstone-Level Findings: Zooming Out

This section is informed by all interviewees and looks across pillars. The topics discussed in this section include diversity, equity, and inclusion in the nuclear field, the state of the nuclear field as it is in transition, and the end of MacArthur's Nuclear Challenges program – which includes lessons learned and future opportunities.

Diversity, Equity, and Inclusion in the Nuclear Field became a greater focus for MacArthur through its Just Imperative, a strategy grounded in values of diversity, equity, and inclusion. This strategy drove MacArthur's interest to learn more about the advancement of diversity, equity, and inclusion in the nuclear field across all pillars and grantees. In addition, the racial justice uprising of 2020 was one of the key drivers that launched diversity, equity, and inclusion into the nuclear field.

Interviewees representing grantees across all pillars were asked: When you think about diversity, equity, and inclusion in the nuclear field, how would you place different organizations or groups in the nuclear field within each of the categories below (aware, compliant, tactical, integrated, sustainable)? Overall, more than half of interviewees agreed that the organizations in the nuclear field connect diversity, equity, and inclusion to field-wide initiatives (tactical) and lean toward a focus on compliance, as shown in Figure ES-1. Interviewees noted that underrepresented populations have been systematically excluded from the nuclear field.

Figure ES-1: Interviewees' Placement of the Nuclear Field within the Five Stages of Diversity, Equity, and Inclusion Maturity



Although contextual factors like social justice movements or the decades-long exclusion of underrepresented communities have either propelled or hindered the advancement of diversity, equity, and inclusion, today, most organizations in the nuclear field believe that diversity, equity, and inclusion is important and participate in field-wide initiatives to further advance such goals. However, the nuclear field is still far removed from fully integrating diversity, equity, and inclusion.

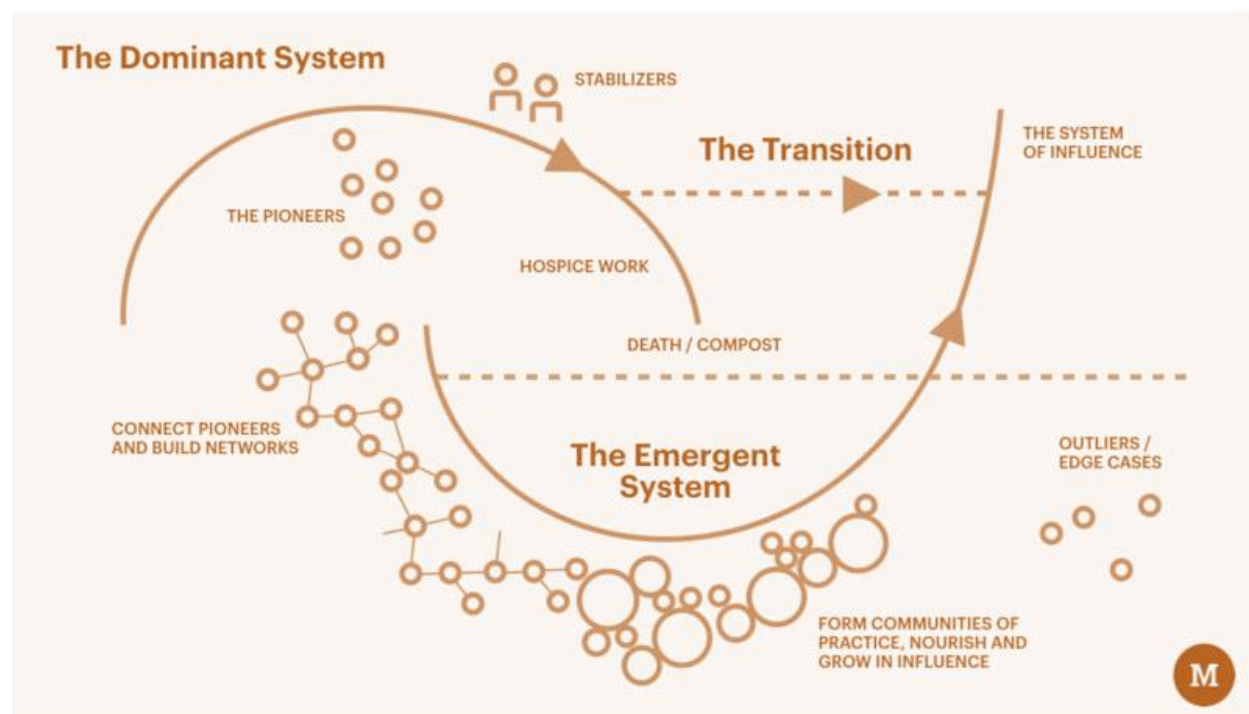
The State of the Nuclear Field was evaluated using two frameworks: the Strong Field Framework and the Berkana Institute's Two Loops model. The Strong Field Framework is designed to help assess the major elements of a field, thereby revealing in the process areas of strength and weakness. The five elements assessed by the framework are shared identity, standards of practice, knowledge base, leadership and grassroots support, and funding and supporting policy. The field's strengths and weaknesses in these elements are summarized in Table ES-7.

Table ES-7: Strengths and Weaknesses of the Nuclear Field

STRENGTHS OF THE NUCLEAR FIELD	WEAKNESSES OF THE NUCLEAR FIELD
The main strength and practice in the nuclear field seems to be the production of various written products from peer-reviewed publications to news articles, and sharing related insights at events to spur discussion, which has contributed to the development of a vast <u>knowledge base</u>.	The field lacks a <u>shared identity</u> because most anchor organizations operate on an individualistic basis and tend to focus on arms control and disarmament, whereas small communities of newer organizations mainly focus on combating climate change and advancing diversity, equity, and inclusion. There is opportunity to bolster field <u>leadership and grassroots support</u>. The same people have led the field for decades, and it has been difficult for newcomers to find footing. The current field has not engaged the public in building political power behind their <u>policy</u> objectives. Now that MacArthur has finished its Nuclear Challenges capstone, there will be far fewer <u>financial resources</u> available.

The Berkana Institute's Two Loops model, visualized in Figure ES-2, was used to help make sense of how systems change, or paradigm shifts, influence the current and future state of the nuclear field as the Capstone strategy sought to seed newer ideas or bolster the original foundations of the field's infrastructure. The assessment of the field suggests that some of the foundational elements of the system are in transition or even in decline while new parts of the system have not yet been fully launched.

Figure ES-2: The Berkana Institute's Two Loops Model



The End of the Nuclear Challenges Program has affected organizations in the nuclear field as well as staff at the MacArthur Foundation.⁴ All interviewees reflected on this transition, shared lessons learned and offered opportunities for those continuing to support the field moving forward.

Unsurprisingly, grantees, funders, and experts wished MacArthur would continue in the nuclear field and while most are worried about continuity in the field post MacArthur, others see opportunities to, for example, increase alignment and collaboration.

Staff members believed that the Capstone was a strong pivot from the Big Bet and revealed three lessons about shifting strategies while commencing the end of the Nuclear Challenges program: 1) Create a concrete plan for the end from the start and avoid ambiguity in communications, 2) More deeply engage people on the ground to

⁴ MacArthur ended the Nuclear Challenges program earlier than originally planned following a review of the program strategy in late 2020.



inform grantmaking strategies, and 3) Keep coordinating between foundations that remain in the field and streamline efforts toward common objectives.

Grantees, experts, staff, and funders also surfaced opportunities for those who continue to support and build the nuclear field:

- Change narratives, especially around the social meaning ascribed to nuclear weapons.
- Enable more collaboration among funders and grantees to pursue long-term strategies.
- Continue to work on integrating diversity, equity, and inclusion.
- Keep building on the momentum and support for nuclear energy as a climate solution.
- For those who remain in the field, keep building the field and attract new funders.

Conclusion

MacArthur's Nuclear Challenges Capstone sought to bolster the nuclear security field ahead of a planned end to its program. As we near the end of this period and the wind-down of these grants and activities, we find that grantees achieved some notable successes:

- Many organizations did strengthen their commitments and practices related to diversity, equity and inclusion.
- More diverse organizations and scholars are working on scholarly and policy issues related to how the field thinks about deterrence and nuclear issues.
- People working at the nexus of climate solutions and nuclear security have made inroads in understanding key stakeholders' concerns and perspectives in ways that should help mitigate safety and security concerns associated with nuclear power's expansion to address energy needs.
- Many core infrastructure organizations made progress on funding and addressing financial instability concerns.

At the same time, the end of the Foundation's Nuclear Challenges program happened at a sensitive moment. Global risks are heightened, views around nuclear issues are increasingly polarized, and the nuclear field is not immune to the pushback and rollbacks to gains made around diversity and equity after the racial reckonings of 2020. There have been promising starts to progress in things like a new chapter in nuclear



deterrence theory and the nuclear-climate nexus, but the runway has been short for more outcomes and impact to solidify and occur. Among the soon-to-be-former grantees, there is a mix of hopefulness that a shaking up could be just what the field needs, with others fearing that fewer funds will mean a degradation to the field, with less innovation, fewer players, and less meaningful impact.

It is never easy to end a program. We hope this report's accounting of what grantees, experts, and others shared about their accomplishments, lessons, and hopes for the future can help the MacArthur Foundation and others think about other strategies and potentially support efforts that others may continue in the nuclear field space.