Community-Driven Civic Science: Relationship Building to Prioritize Public Needs

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Executive Summary: At a time of unprecedented emphasis and investment in civic science, policymakers must grapple with whether existing civic science practices deliver on intended public benefits. Civic science, if poorly managed, can exploit communities due to inherent power imbalances between researchers and the public. For community stakeholders to guide or lead civic science—an approach we call *community-driven civic science*—we must invest in the *relational infrastructure* and *relational capacity* for scientists to build authentic relationships with communities. Relational infrastructure investments should include modifications to criteria for academic advancement—like tenure, expansion of funding sources, and grant reporting structures redesigned to focus on ongoing evaluation of community stakeholders' value gained. Relational capacity building should include financial stipends for community members, training resources, and staff professional development. These investments will cultivate a new generation of civic scientists and scientifically engaged communities to collaborate towards using science for public benefit.

I. Background

Civic science has received unprecedented attention and investment in the past few years, catalyzed in part by Executive Order 13985 issued by the Biden-Harris Administration: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (Biden 2021). Research and development (R&D) agencies are seeking ways to embed equity in their processes and bolster support for civic science activities (Biden 2021). These activities include increased events in underserved communities, new grant programs focused on key community concerns, direct funding opportunities for community-based organizations, and support of community-driven planning for technical infrastructure investments (NSF 2021; NASA 2022; Baker 2021).

Further, the August 2023 R&D budget memorandum from the Office of Management and Budget and the

Office of Science and Technology Policy outlining policy priorities for fiscal year (FY) 2025 called on federal agencies to further address long-standing inequities by "broadening public participation in R&D" (Prabhakar and Young 2023). Later that same month, the President's Council of Advisors on Science and Technology released recommendations to (1) expand participatory public engagement in agencies and (2) create a White House office to support agencies in these participatory efforts (President's Council of Advisors on Science and Technology 2023).

To these ends, in what we term expert-led civic science ("technocratic approach"), researchers hold the power to shape the research agenda, analyze findings, share results, and translate these results into action. In choosing research questions for the public, researchers exert control over experimental design and what are acceptable findings (Bonney et

al. 2009). While the public has limited control over the research, the end goal of the research is articulated as a public good, i.e., advancing knowledge for making evidence-based decisions in policymaking.

In community-driven civic science ("participatory approach"), the research process is guided or led entirely by community stakeholders. Community members' lived experiences shape the study design, data collection efforts, and research translation. Scientists' role in this process is not to generate new knowledge; rather, it is to enrich community narratives, create influential tools for organizing change, and facilitate action on key social problems affecting communities (Dosemagen 2019).

Community-driven civic science has the potential to counteract decades of mistrust between communities and researchers that has resulted from extractive research processes, as well as generating evidence that is well-grounded in community truth (Chicago Beyond 2019). To capitalize on the public promise of community-driven civic science, we need to build authentic and reciprocal relationships with the community.

i. Challenges facing relationship building for community-driven civic science

Relationship building is culturally contextual
Relationships provide value in ways distinct from traditional forms of knowledge, particularly westernized notions of scientific knowledge as objective and replicable. Civic science positioned by strong relationships requires acknowledgement of cultural, historical, ethical, and political contexts surrounding relationship building practices (Weber 1949; Sjoberg 1967; Haraway 1988). For example, indigenous modes of knowledge emphasize the agency of non-human actors in the world, while de-emphasizing human actors from a privileged status that divests us of responsibility, humility, and reciprocity in relationship with non-human actors (Bang and Marin 2015; Kawagley 1993; Kawagley 2006; Cajete 2006). This has translated to problematic and harmful research-community member relationships (Bang et al. 2016). Specifically, indigenous scholars working on ecological issues have identified how historical colonialism and Western practices harmfully erase Indigenous peoples' presence, their relationship with the lands

they inhabit, and their construction of nature-culture relations (Bang et al. 2016). Consequently, situated awareness of *what* relationships are built, *with whom*, and *within which contexts* creates nuanced questions for civic scientists to navigate throughout the course of relationship building.

Unclear determination of stakeholders and types of relationships
Stakeholder identification is a common first step in community-engaged research and practice (Allen and Reiter-Palmon 2019). Yet the task of identifying *which* stakeholders to engage and for what reason is not straightforward. Building relationships with a variety of stakeholders requires intentionality. The complexity of relationships is intimately tied to the problem at hand, as most social problems involving multiple, diverse stakeholders present no clear or well-defined solution (Rittel and Webber 1973). For example, consider the wide range of changing stakeholders that city administrators need to account for in implementing a new climate resilience plan; they need to gather input from as many residents as possible, correspond directly with residents who may be disproportionately affected by climate impacts, and align with neighboring cities, state, or federal agencies to potentially seek additional funding. Each of these stakeholders would need to be engaged differently, and those engagement methods would shift as the project does.

Relationships are difficult to measure
Unlike many empirical measures of progress, relationships cannot be evaluated from one side alone. Individual actors need to *reciprocate*—or mutually invest in and value partnerships—to cultivate the relationship over time. Thus, the nature of the relationship is always in flux and requires commitment from all involved. Movement organizations have articulated the limitations of dominant engagement metrics for making the work visible and the value of relationship development in building their member base (Cushman and McKenna 2023). For example, researchers might approach the measurement of relationships through a goal- or project-oriented lens trained towards evaluation of transactional outcomes (e.g., how many community members participated in providing data, or how did community members feel about the pilot program).

Metrics for capturing the emergent value of reciprocal relationships are much less clear.

Relationships are not time-bound
There is no standard timeline for relationship building and no easy way of aligning this work with typical academic project deadlines. Project goals may evolve over time, particularly as new stakeholders are involved or relationships develop and change. Researchers should develop the capacity to adjust expectations and be flexible towards these changes. Attrition issues in academic work, including staff and student turnover in projects, present particular challenges to relationship building, as existing relationships may be negatively disrupted when individuals choose to leave, sometimes resulting in having to restart the entire relationship building process. Repeated instances of these disruptions can result in distrust for community members at both the interpersonal and institutional level, negatively impacting future opportunities.

II. Recommendations
To combat these common yet persistent relationship building challenges, we argue for additional resources dedicated to two foundational components of building and sustaining relationships between research institutions and community partners: relational infrastructure and relational capacity building. Relational infrastructure recommendations were developed through analysis of existing federal funding sources, grant requirements (for proposals and reporting), and policies/processes for assessing success. Further research was conducted into potential models for effective, accountable relationship building practices, programs, and policies. Relational capacity building recommendations were developed through analysis of existing capacity building programs for communities and researchers, such as California's Partners Advancing Climate Equity, as well as professional experience leading community-engaged research (Lu et al. 2023; Wickerson 2023).

i. Relational infrastructure
To combat extractive patterns of institutional relationships with community partners, policy makers, funding agencies, and institutional decision makers need to dedicate resources towards building and maintaining infrastructures for relationship-building practices.

Reform Academic infrastructure
Reform criteria for academic tenure, broadening the set of products that count for academic advancement. The academic environment is not designed to be conducive to community-driven civic science. Criteria for faculty advancement, including receiving tenure, frequently include the number and impact of publications. In some cases, a minimum number of publications may even be required to be considered for tenure (University of North Texas 2018). However, community-driven civic science can move more slowly than traditional scientific research, as time must be taken to invest in building those relationships and to come to consensus on research objectives. In addition, the results may not be viewed as highly impactful within the scientific community, as there are often tradeoffs between theoretical novelty and practical impact when the research prioritizes long-term impact on local communities. In addition, few academic journals have historically been interested in publishing community-focused research. Nevertheless, the rewards and incentives provided to faculty through career advancement and recognition may leave many early career faculty members unable to invest the time, energy, and resources into civic science.

Instead, the criteria for academic advancement, including tenure, could include community-engaged research, which should be considered with the same level of importance and impact as traditional research. By specifically mentioning community-driven research in advancement criteria and tenure policies, universities can demonstrate the value placed on this type of research by the institution and create more community engagement incentives (Janke et al. 2023; Weerts and Sandman 2010).

Create more funding sources that would invest in relational infrastructure
Most scientific funding sources do not include funds for relationship building. Consequently, the number of community-driven civic science projects will be limited to include those who have existing relationships with community groups or have the resources and capacity to establish these relationships. This significantly limits the number of scientists able to participate in this process and thereby the number of community collaborations that can be built. The National Science Foundation's

Civic Innovation Challenge (CIVIC) and the National Institute of Health's Community Partnerships to Advance Science for Society (COMPASS) are examples of how funders can allocate resources towards relationship building. In CIVIC Stage 1 Planning Grants, funding is allocated to support relationship building between researchers and community partners and the co-development of research questions and plans (National Science Foundation 2022). Researchers and community partners can then apply for additional funding through CIVIC Stage 2 Pilot Grants to conduct the research proposal they co-developed in Stage 1. COMPASS also institutes a phased approach where in Phase I community organizations and research partners further develop partnerships and in Phase II community and research partners implement these interventions and document the impact. (NIH 2022). Throughout the grant phases, resources and training on research capacity and partnership building are available to grantees (NIH 2022). Similarly structured funding programs could provide more resources to support relationship building between researchers and communities.

Embed responsible partnership requirements and guidelines within federal R&D grant proposals and grant reporting structures to build relational infrastructure.
Researchers often propose partnerships for their research and broader impact activities without ever having to ask, "What is the community getting out of this partnership and how do we know?" A shift to community-driven civic science must include checkpoints where the strength of partnership is rigorously assessed. These stages where federal R&D grant makers can influence the quality of community relationships are throughout the proposal stage, ongoing reporting, and upon grant conclusion.

At the proposal stage, grantees seeking partnerships should include some documentation of community governance and oversight of the proposed activities. Non-profits organizations, like the Little Village Environmental Justice Organization (LVEJO) in Chicago, have started to mandate these oversight activities themselves for academics interested in partnership. For example, LVEJO requires memorandums of agreement (MOAs) that "set partnership ground rules, alignment principles, accountability mechanisms, and compensation

rates" (LVEJO 2023). A standardized MOA could be included as a part of grant applications from federal funding agencies and allow for a more standardized look into effective and responsible partnerships.

Ongoing assessments of grants provide important touchpoints for federal grantmakers to assess not only scientific process, but also public benefit. This requires designing a new evaluation paradigm at the grant and program level. For individual proposers, some potential questions that researchers could be asking in their grant reporting to assess the quality of relational infrastructure include:

- In developing the research process, how were the concerns of race-class subjugated communities sourced, engaged with, and acted upon?
- Does the design of the research process explicitly consider the perspectives and concerns of marginalized communities? How are they involved in shaping the direction of the partnership?
- How are the proposers building sustained relationships with communities as a part of the research process? What can we use to assess relational quality (i.e., letters of endorsement)?

The time-bound nature of grants makes it challenging to sustain ongoing partnership with communities. Federal funding agencies could consider creating funding incentives for sustaining well-established and successful partnerships for activities like research translation after the conclusion of the project. They can also provide aid to communities to build their own sustained organizational capacity. Important questions for assessing sustainability of partnerships include:

- Do the community member(s) involved feel they can keep maintaining the benefits / program after researchers leave?
- How do community members perceive the relationship with researchers?
- Do community members feel there was benefit from the research, and how?
- Are there demonstrable benefits researchers can point to in the community as a result of their partnership?

Conduct ongoing assessments of the quality of relational infrastructure

Federal funding agencies recognizing successful partnerships could aid in creating a new metric by which researchers benefit the public. More intentional monitoring of partnership effectiveness will aid federal funding agencies as they build programs for broad engagement with the public.

Revisiting the NSF's broader impacts (BI) criteria, for example, could provide a way to adapt an existing metric for evaluating researchers' projects and their impact on society. NSF currently defines broader impacts as "the potential to benefit society and contribute to the achievement of specific, desired societal outcomes" (Renoe et al. 2023). Yet, while a part of every grant, BI is rarely reviewed in aggregate to identify best practices, such as whether grants have partnership plans or post-BI activity evaluations (e.g., reporting accomplishments, impacts, publications). Strengthening assessment requirements for BI activities will aid in keeping a pulse on the status of relational infrastructure building and pain points that further policy innovation can address.

ii. Relational capacity building

Building authentic and reciprocal relationships between research institutions and community partners is an ongoing capacity. This requires investment at the level of individuals, institutions, and communities through deep and intentional training and resource development programs, both of which suggest important policy implications for research institutions. Below, we highlight concrete recommendations for potential policies to build relational capacity between communities and research institutions in civic science.

Build community capacities to work with researchers through financial stipends, training and educational resources.

Historic consequences of extractive scientific research, particularly in communities of color and otherwise vulnerable populations, remains a major challenge to trust building between communities and research institutions (e.g., the infamous Tuskegee Syphilis Experiment). While the kind of repair for these historic ills requires ongoing investigation and examination for appropriate means of community-determined restitution (e.g., Tammaro and Shakesprere 2020), researchers and institutions need to mitigate future extractive consequences through a commitment to investing resources in the communities with which they are building relationships—before, during, and after formal completion of research. Before research or research design begins, researchers need to account for the time and financial costs of community participation, including the use and distribution of financial stipends for participation in *any* aspect of the research process, from serving on advisory roles in research design, participating in data collection, and furthermore in conducting outreach or dissemination efforts during implementation of practical outcomes and policies. Researchers should also invest educational resources in building community capacity for engagement, as exemplified by programs like curriculums developed by Partners Advancing Climate Equity for capacity building with frontline community leaders (Partners Advancing Climate Equity n.d.), and community-engaged research initiatives like the East Baltimore Research Project (Peiffer 2022).

Build researcher capacities to create authentic and reciprocal relationships with communities through training and investment in staff dedicated to managing partnerships.

Researchers also need new (and renewed) capacities for authentically engaging with communities in non-extractive ways. This includes a re-examination of interpersonal capacities integral in any authentic relationship, such as those for having and holding challenging conversations (Scott 2004). Importantly, these relationship building capacities require ongoing investment and practice and should not be considered "masterable" capacities, particularly as these skills constantly require attunement to different cultural contexts. Even within the same community contexts, researchers should be trained to exercise these capacities in ways that are sensitive to the changing dynamics of relationships in the course of collaboration.

For example, researchers should be trained to reflect upon *awareness of researcher positionality and power dynamics periodically and throughout a community collaboration*. In addition to the deep injuries of extractive research traditions, community relationships can be damaged by technocratic assumptions underlying the scientific process, including those that take lived experience for granted or minimize community sites of expertise in

favor of institutional ones (Peiffer 2022; Tammaro and Shakesprere 2020). To mitigate and correct these power imbalances, researchers should participate in trainings that educate and provide them with practical guidelines for positionality practices. These trainings should always include practice scenarios and interactions with the support of coaches and preferably in heterogeneous learning cohorts that include community members, rather than being limited to reading and discussion-based activities, as the former require and are meant to impact interactional outcomes (rather than solely cognitive ones). Moreover, more emphasis should be placed on formal trainings in community-based methodological traditions like those pioneered in the field of public health that focus on integrating the expertise of community practitioners with those of academic researchers to address challenges that cannot be studied in laboratory settings (Ammerman, Woods Smith, and Calancie 2014; Swisher 2010).

Finally, capacities for navigating and managing expectations between institutional researchers and community members requires dedicated researcher capacity towards these goals. One recommendation for investing resources in building these capacities is to normalize the role of a "partnership or relationship director" within traditional research organizations. Besides procuring and managing partnerships, an expanded emphasis of this role most relevant to our thesis for capacity building is in the training and coaching support this individual would be tasked in providing other members of the organization, specifically in engaging with and repeatedly reflecting on and practicing the capacities of authentic relationship building. Such a director could be responsible, for example, for leading workshops and coaching sessions, in addition to providing readings, facilitation guides, and other seminar-like activities for reflection and practical guidance throughout the course of a community-based relationship. A partnership director could also provide regular feedback to members of their organization on the nature and quality of interactions with community members, specific areas for growth, and lead facilitated workshops with mock conversations and interactional activities to support researchers in developing and practicing these skills.

iii. Addressing critiques of relational infrastructure expansion for community-driven civic science

Strategies to expand power to communities drive forward meaningful scientific research and challenge existing research paradigms and hierarchies. Critics may argue that community-driven civic science removes too much control from scientists, thus reducing the objectivity of scientific research and introducing politics into science. Yet members of the public are paying for science with their tax dollars; research and development funding garnered $195 billion in last years' federal appropriations, nearly 3.5% of the total federal budget. Giving communities the power to shape, participate in, and evaluate the research invested in by their tax dollars builds public support and confidence for science, as well as reasoning to retain funding.

Further, community-driven civic science might be seen as "not generalizable" as it might focus scientists' attention on hyper-local challenges. However, increasing the amount of high quality, high validity, hyper-local scientific data is critical in helping decision makers design evidence-based policy. Small sample studies/region-focused studies can work to make science useful to specific populations, increasing overall return on investment. For example, in medical research, significant data is often lacking from underrepresented populations (women; Black, indigenous, and other people of color; sexual and gender minorities), especially those holding multiple underrepresented identities. Without an understanding of the effects of treatments in these populations, it can be nearly impossible to overcome historical mistrust.

Finally, it can be hard to imagine large, slow-moving bureaucracies, like academia and the federal government, shifting their practices after hundreds of years of exclusive control of scientific research. But even here, the tides are changing. Monica Bertagnolli, the newly appointed NIH Director, has signaled a desire to broaden public participation in research (Stolberg 2023). As leadership realizes a need to change practices, policy windows are opening for new and transformative practices.

III. Conclusion

Billions of federal tax dollars are dedicated towards funding scientific research each year. The theory behind this allocation of public funding is that this research will help to improve the health, well-being,

and economic interests of society. But if members of the public are not driving the priorities of this research and evaluating its impact relative to their lived experiences within their communities, how can this lofty mission ever truly be achieved? By supporting the development of authentic and reciprocal relationships between communities and scientists, civic science can be *driven* by the community, allowing members of the public to truly determine the needs and priorities of the research

that seeks to benefit them. Investment in relational infrastructure and relational capacity building, as described in this paper, is needed to foster these relationships and remove the barriers to community-driven civic science. These investments will cultivate a new generation of civic scientists and scientifically engaged communities, achieving vital progress towards the ambitious goal of community-driven science for the public good.

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