

Activating Networks to Support Libraries as Community Hubs for Citizen Science

PROJECT JUSTIFICATION: Arizona State University (ASU), along with SciStarter, the Network of the National Library of Medicine (NNLM), the Association for Rural and Small Libraries (ARSL), the National Girls Collaborative Project (NGCP) and additional library partners, proposes *Activating Networks to Support Libraries as Community Hubs for Citizen Science*, a National Leadership project in support of Goal 1: Champion Lifelong Learning and Objective 1.1: Advance shared knowledge and learning opportunities for all. The two-year, \$249,500 implementation project will amplify, sustain and activate nationwide engagement, building on the momentum of *Libraries as Community Hubs for Citizen Science (LCHCS)* through national networks reaching thousands of libraries each month and SciStarter, reaching millions of citizen scientists. The project team leverages the complementary expertise of libraries experienced in lending physical STEM activity resource kits; university faculty who are recognized leaders in the field of citizen science and for creating lifelong STEM learning and engagement experiences; a national organization experienced in catalyzing and measuring collective impact to citizen science programs and resources; two national library associations reaching thousands of libraries in underserved urban and rural settings; and SciStarter, a centralized online resource for public participation in science reaching millions of citizen scientists and potential volunteers for libraries.

The project will 1) greatly expand the reach of the *LCHCS* National Citizen and Community Science Library Network and thus libraries' awareness of and access to field-tested, customizable and replicable resources through partnerships with the Association of Rural and Small Libraries and the Network of the National Library of Medicine; and 2) develop a Volunteer Activation Program to train, mobilize and connect enthusiastic SciStarter users and library volunteers to libraries seeking support for on-site programs and kit demonstrations. The project supports efforts to transform how libraries serve their communities as champions of lifelong learning by advancing shared knowledge and learning opportunities for all with an emphasis on underserved urban and rural communities. This project builds on the momentum of our current project addressing the libraries' request for continued access to essential resources including turnkey, customizable, DIY citizen science kits; libraries' concerns regarding lack of staff to promote kits and citizen science; the citizen scientists' need for short-term access to instruments and their growing desire to engage more deeply through libraries; and scientists' need to recruit citizen scientists.

Libraries function as anchors that provide resources and guidance necessary to an evolving workforce and lifelong learners (IMLS Convening on STEM Learning in Libraries, 2014). Libraries want low-cost, turnkey programming that aligns with their capacities to introduce patrons to STEM engagement and learning (STEM Education Movement in Public Libraries, 2013). Citizen science engages the public in scientific inquiry through data collection and analysis, provides authentic lifelong learning opportunities for diverse publics, is widely recognized for supporting learning in science (Jordan et al. 2011) and is a resource for libraries to develop "responsive models and tools that engage communities and provide learning experiences for patrons across the lifespan." (IMLS Leadership Grants 2017).

Currently, through *LCHCS*, an estimated 117 libraries circulate the kits with 1,287 kits checked out per month, yielding 63,000+ data contributions to six kit projects advancing important research in health, ecology, environment, space and air-quality fields. More than 12,000 people have completed our online trainings (Foundations of Citizen Science and Libraries as Community Hubs for Citizen Science) on SciStarter. 93% of patrons who checked out a kit plan to check out another one. Patrons reported increased interest and confidence in participating in a research project (93.3%) and changes in the way they think about their libraries and the types of resources and learning opportunities it provides (73%). Evaluation demonstrates positive impacts on librarians, too, with 100% of those surveyed reporting feeling more confident in building and circulating citizen science kits, facilitating a citizen science event, and directing interested patrons to citizen science resources after joining the Network and implementing customizable resources. Needs assessments uncovered near-universal support to continue offering turnkey kit resources and trainings. Citing staffing issues, 75% of librarians responding to an informal survey said access to trained volunteers a few hours per month to introduce citizen science and the kits to patrons would make them "more likely or extremely likely" to become or remain

a hub for citizen science. Fortunately, more than 300 SciStarter members have already expressed interest in becoming trained to volunteer at their local library to introduce citizen science to patrons. The project builds on related projects by the project team that focus on citizen science and/or library partnerships for lifelong learning in STEM, including NSF-funded program Leap into Science: Cultivating a National Network for Informal Science and Literacy #1712878.

PROJECT WORK PLAN: The two-year project beginning on November 1, 2023 has three primary phases:

Phase I (Nov '23-Apr '24): a) Coordinated communications outreach efforts will be made through strategic partnerships with library networks (NNLM, ASRL, Library Network) to continue growing the National Citizen and Community Science Library Network, offering libraries a suite of on-demand resources including kits, webinars, trainings, and funding opportunities; b) Ten partner libraries currently among the 350-member Library Network will be identified based on a diversity of geography, capacities, and audiences to participate as pilot libraries for the CitSci Volunteer Activation program. Corresponding local volunteers (including 12,000 SciStarter who have already completed the Foundations of Citizen Science Training on SciStarter, along with existing adult and teen library volunteers) will also be identified, recruited and trained via existing citizen science webinars, tutorials, and other resources to be able to introduce citizen science and demonstrate kits to other patrons at their libraries.

Phase II (Apr '24-Jan '25): The 10 pilot libraries will engage in the Volunteer Activation Program and provide feedback on the effectiveness and readiness of SciStarter trained volunteers. Ongoing formative evaluation will be used to provide feedback on the program model, which will be iterated during Phase III.

Phase III (Feb '25-Oct '25): Instructional designers use the feedback from Phase II testing to build a new training module and associated badge to scale the Volunteer Activation Program nationally through SciStarter. SciStarter develops a new searchable database of volunteers who have completed the training so that they will be discoverable by any library in the Network. Training is promoted to 150,000 SciStarter members and millions of site visitors, with a focus on rural and urban locations. Outreach strategy continues with dissemination partners (NNLM and ASRL) to amplify existing CitSci Library resources, expand the National Community and Citizen Science Library Network, and promote the searchable database of trained volunteers to libraries. Summative evaluation will assess the overall effectiveness of the National Network, Library Network partners, and new Volunteer Activation Program. The team will disseminate findings among the library and citizen science fields.

PROJECT RESULTS: This project will develop an understanding of how libraries and complementary network support structures broaden and deepen public engagement as community hubs for citizen science. If successful, the project will enroll more than 1000 libraries resulting in 11,000 kits checked out per month, 300,000 data contributions to real research projects, 3,000 trained citizen scientist library volunteers deployed and active in rural and urban libraries, and measured increases in libraries' and public's confidence in participating and sharing information about citizen science through libraries, as well as sustain citizen science in the community for the long-term.

BUDGET: The total project is estimated at \$249,500 including salaries (\$37,320), fringe (\$10,536), travel (\$5,200), materials (\$2,475), Consultant services (\$137,500, including Instructional design \$6K, Network management/webinars \$72K, Evaluation \$10K, Front/back-end development \$26K, Library partners \$5K, Library advisors \$16K, Badgr design \$2.5K), other \$5,000, and indirect costs of \$51,469).

REFERENCES CITED: Jordan RC, Gray SA, Howe DV, Brooks WR, Ehrenfeld JG. Knowledge gain and behavioral change in citizen-science programs. *Conserv Biol.* 2011 Dec;25(6):1148-1154. Arizona State University Office of Evaluation and Educational Effectiveness. Scaling, Supporting, and Sustaining Libraries as Community Hubs for Citizen Science (SSSL) Evaluation Report September 2020 - August 2022, in preparation.