

THE NASA SMD COMMUNITY OF PRACTICE FOR EDUCATION (SCoPE): A NEW SCIENCE ACTIVATION PROGRAM INTEGRATION PROJECT TO CONNECT SMEs WITH NASA SCIACT. M. Wadhwa¹, D. A. Williams¹, J. L. Swann¹, A. D. Anbar¹, C. J. Mead¹, A. J. Tamer¹, J. F. Bell III¹, G. P. Asner¹, K. Bossert¹, and E. L. Shkolnik¹, ¹School of Earth and Space Exploration, Arizona State University, PO Box 876004, Tempe, AZ 85287-6004

Introduction: In 2019, a National Academies of Sciences, Engineering and Medicine (NAEM) review of the vision and top-level metrics of the NASA Science Mission Directorate (SMD) Science Activation Program (SciAct) portfolio identified major gaps that limit its ability to meet these objectives [1]. A critical identified gap is the absence of: *A process by which Subject Matter Experts (SME), especially NASA and NASA-funded SMEs, can engage with learners, content producers and audience-focused disseminators within the Science Activation Program portfolio.* Our funded work will directly address this gap by creating a community of practice that will increase awareness between SciAct teams and SMEs (especially early career scientists), affording them the opportunity to engage in educational projects together and establishing best practices for public engagement.

Solving the Problem: To solve this problem, we are establishing a community of practice (CoP) around SME engagement: the SMD Community of Practice for Education (SCoPE). Below we briefly describe the CoP model in general and the SCoPE in particular. A CoP is defined as a community with a common practice working within a shared domain [2]. The CoP model offers particular advantages when working with professional learners, because the domain and practice are readily apparent and what is needed is organization, focus, and facilitation.

The CoP model is an excellent fit for the needs of this project. Several loosely connected communities of educators working with SMEs already exist within the SciAct teams, each one building knowledge of how to effectively work with SMEs. Our project aims to bring together this existing knowledge, and, more significantly, to facilitate the growth of a CoP that is inclusive of the SMEs themselves. We believe that encouraging SMEs to see themselves as participants in this community will increase motivation, sense of purpose, and re-engagement in future activities. We also want to encourage SciAct team members to learn from SMEs.

How will SCoPE work: The core of the SCoPE will be SciAct team members, a select group of highly experienced and motivated SME leaders, and our project team (Figure 1). These participants will be consistently active in sharing and improving the practice of SME–Educator collaboration. However, a CoP can also provide value to participants at lower levels of

engagement. This is useful for our purposes, because surrounding the core SCoPE participants will be SMEs at various levels of interest and experience in collaborating with educators (Fig. 1).

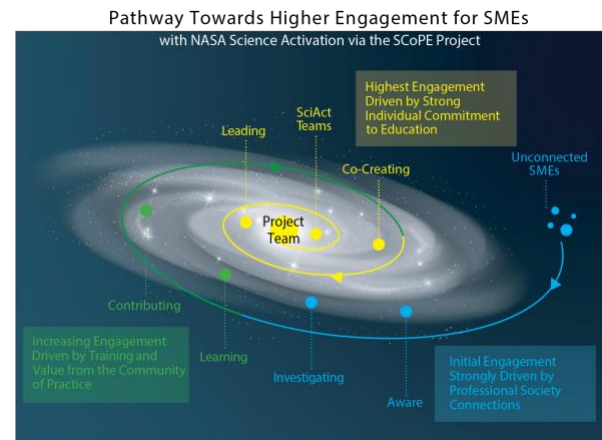


Figure 1. Schematic diagram illustrating the pathway towards higher engagement for SMEs with projects in the NASA SciAct portfolio via SCoPE.

The most critical criteria by which a CoP can be judged is whether or not it enables learning and improvements to practice. Wenger et al. [3] described what is known as the value creation framework, which is one way to characterize the value that a CoP creates for its members. We will use this framework to both manage and to evaluate the SCoPE. Value creation will be different for those in the SciAct teams and for SMEs and will also be different among the SMEs. For example, SciAct team members may find the most value in learning about how other SciAct teams work with SMEs, perhaps incorporating specific strategies into their own practice. Experienced SMEs may find the most value in learning about the kind of student impacts that come from learning directly from materials that use SMEs effectively. SMEs who are new to the process may find the most value in hearing from the more experienced SMEs, something that helps them to see themselves as a future contributor to educational resource development.

The SCoPE will also be proactive in self-examination in this regard. Working with our evaluators, we will regularly collect data from SCoPE members to learn where value is being created and what activities or structures are not providing value.

Facilitating the Community of Practice:

In-Person Programming at Conferences: In an effort to acknowledge existing assets and bandwidth issues of SMEs, we will leverage the annual professional conferences that SMEs and SciAct teams already attend. This avoids additional cost and time burdens on SMEs for separate in-person workshops.

The culminating event each year is a “meeting within a meeting” at both the AGU and the AAS annual meetings. Two categories of activities are planned for these sessions: (1) entry level activities that develop awareness and interest, and (2) activities that support specific SME–SciAct collaborations planned for the coming year. Interactive presentations and workshops will focus on the exchange of best practices, project presentations, SciAct/SME demos, and social mixers.

Virtual Workshops: To support and grow the CoP, virtual workshops will be hosted online throughout the year. These workshops will focus on skills and engagement strategies and leverage efforts already provided by AGU, such as the *Sharing Mentorship Program* and the *Share and Advocate for Science Program*. All training will be designed to support not only the SMEs, but also the SciAct. All virtual workshops will be recorded and archived to allow for flexibility in attendance and scheduling. This approach will help us to offer personalized training sequences as we build an archive of recordings.

Supported Projects: SCoPE projects are intended to be partnerships between SciAct projects and SMEs working as Project Teams. We have observed that such partnerships are often enhanced by modest supplemental funding. Such funding makes a large difference by making it easier for SMEs to engage in educational activities which may fall outside of their normal job duties. We believe this is particularly true for early career scientists, including graduate students and postdoctoral scholars. Therefore, the SCoPE will fund up to 12 projects per year of \$5000–\$20,000 each. This funding may be used for travel to the AGU or AAS meetings, supplemental personnel time, or other similar expenses that directly support SME engagement with SciAct teams.

We also expect that many Project Teams will need no additional funding. For example, something as simple as completing a public talk likely would not justify funding. There is no expectation by the SME to receive funding for the talk. We expect that the SCoPE project and its activities will spur these smaller, unfunded projects in addition to funded ones and both types of projects will benefit from the staff and CoP support provided through this project.

Expected Outcomes and Impact: The project’s primary impact will be in establishing an effective and

sustainable process by which SMEs can engage with content producers and audience-focused disseminators within the SciAct portfolio. As a consequence of this primary impact, the project will also support and improve many SciAct projects through enhanced SME engagement.

To achieve this primary goal, we will take steps to make the SciAct and its projects more visible to SMEs, to reach out specifically to early career and underrepresented SMEs, to make it easier for those SMEs to find ways to work with the SciAct, and to provide training to help those SMEs to be more effective in their educational engagement. This will lead to the following outcomes by the end of the funding period: 1. At least 1000 Earth and Space Science and Engineering (ESSE) SMEs who are aware of SciAct program and projects. 2. At least 50 ESSE SMEs who are trained and ready to contribute to a SciAct project. 3. Increased diversity of ESSE SMEs who are trained and ready to contribute to a SciAct project, including representation by early career SMEs. 4. Increased diversity of ESSE SMEs who participate in collaborations with a SciAct project, including representation by early career SMEs. 5. SciAct teams will report having improved access to potential SME collaborators. 6. SciAct teams will report positive outcomes from collaborating with SMEs trained through this project.

Another important dimension to the SCoPE’s anticipated impact is in identifying, defining, and disseminating best practices for SME engagement by the SciAct and other educators. This impact will flow from the activities of this project’s CoP and the work of the internal and external evaluators. Outcomes will include the following: 1. Publication of a peer-reviewed article describing the best practices for SME engagement based on the results of this project. 2. SciAct teams will report that this project’s CoP was a source of value to their project. To ensure the long-term sustainability of our project’s impact, we will work closely with professional scientific societies. We anticipate that the outcome of this work will be an institutionalized presence at annual meetings.

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References: [1] National Academies of Sciences, Engineering, and Medicine (2019) *NASA’s Science Activation Program: Achievements and Opportunities*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25569>. [2] Wenger-Trayner, E. & Wenger-Trayner, B. (2015) <https://wenger-trayner.com/introduction-to-communities-of-practice/>. [3] Wenger, E. et al. (2011) Netherlands: Ruud de Moor Centrum.