Draft SEAD Network 5-Year Snapshot Update to *Steps to an Ecology of Networked Knowledge and Innovation*

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After the publication of *[Steps to an Ecology of Networked Knowledge and Innovation: Enabling New Forms of Collaboration among Sciences, Engineering, Arts, and Design](#)* (MIT Press, 2015), collaborators in the SEAD network took note of significant changes since the document's inception and publication, both in and beyond its community of practice. In August 2015, we sought to capture the changes by announcing an international [call](#) for brief updates that identified topics, trends, gaps, and issues of growing importance. The collection of ideas was intended to inform the present 5-Year Snapshot Update to the report. The background of this endeavor is discussed in the document *[SEAD 5-year Snapshot Update Community Inputs](#),*[1] along with the compilation of the nearly 60 updates from the SEAD network that comprise it. In addition, we compiled relevant supporting [material](#), including third-party reports, references, a webiography, and a website directory, to reflect the collective thinking during the period of the 5-Year Snapshot Update.

To further examine current conditions, in fall 2015 we formed a SEAD network Working Group that included more than 35 thought leaders from the U.S. and abroad who convened on February 2, 2016, at the National Academy of Sciences in Washington, DC. Individuals from the National Endowment for the Arts, National Endowment for the Humanities, National Institutes of Health, National Science Foundation, and the Small Business Administration attended the meeting to observe it (see [attendees' biographies](#)). The organizers of the present 5-Year SEAD Snapshot Update noted emerging initiatives, maturing organizations, relevant [projects and convenings](#) beginning in 2015, and solicitations of evidence corroborating the value of transdisciplinary education and practices. The strongest reminder of the need for such evidence came from the Director of the Board on Higher Education and Workforce at the National Academies of Science, Engineering and Medicine, Tom Rudin, who sought persuasive support for a [study](#) that would examine the topic in the context of integrating the arts and humanities into science, technology, engineering, and mathematics (STEM) curricula. Robert Root-Bernstein addressed such evidence, in part, through the [presentation](#) of a 3-part draft report ([part 1](#), [part 2](#), [part 3](#)) on a study of relevant educational projects.

Attendees at the SEAD network Working Group meeting discussed the value of compiling inclusive exemplars of transdisciplinary practices for referencing in a variety of contexts, including advocacy, exhibition, and funding. The group noted the importance, when selecting exemplars, of taking into account factors that include both innovative utility and emotional impact. The collection of exemplars is already underway through [XSEAD](#), a community platform for those working across disciplines, and the [Alliance for the Arts in Research Universities](#), which is focusing on transdisciplinary research efforts and peer review of such work. The SEAD network Working Group discussion suggested a need to hone collections of exemplars according to specific intentions that can be identified among the creators of selected works. In addition, there was recognition of a need for development of exemplar "how-to" resources, to demonstrate from multiple perspectives how successful transdisciplinary collaborations have worked, in order to facilitate assessment according to different frameworks as well as use or adaptation for different purposes.

The Working Group discussion also stressed the imperative of identifying and supporting inclusive transdisciplinary practices, and the need to form ways of measuring outcomes of inclusive practices in order to properly account for a range of intentions. Projects may be motivated by a desire to support personal meaning-making, to promote cultural constructions and interpretations among local communities, to realize collective delight, to enact utilitarian social good, and so on. The Working Group exchanged ideas about the need for funding and suggested creating early-stage ideation funding, pooled from different disciplinary sources and patterned on the Small Business Innovation Research and the Small Business Technology Transfer later-stage funding models, when disciplines necessarily come together. There was a suggestion regarding building on existing project-based and time-and-space residency structures, to specifically seek collaborative inclusion of multiple disciplines. Another idea was to formulate a more intentional, deliberate way of developing disciplinary configurations that are demonstrably optimal for supporting transdisciplinary practices and achieving beneficial outcomes. Throughout the meeting there was an emphasis on continuing to create and foster strategic, complementary relationships and partnerships domestically and internationally.

The advocacy priorities of the SEAD network remained a prominent topic throughout the snapshot-update processes. The varied, overlapping ideas presented here corroborate the SEAD network's effort to capture a moment in time through the 5-Year Snapshot Update. We hope this addendum to *Steps to an Ecology of Networked Knowledge and Innovation,* along with the new supporting material, will be useful to those seeking guidance, resources, and policy that support inclusive transdisciplinary practices.

Notes
1. A draft document titled *SEAD Snapshot 5 Year Update*, which is formatted as a report in progress, contains unedited submitted snapshot updates.

Emerging Actors and Stakeholders and Their Initiatives and Convenings Germane to the SEAD network, Fall 2015 through February 2016

• The NAKFI Futures Conference convened communities from the U.S. National Academy of Science, the National Academy of Engineering, and the National Academy of Medicine, Including artists for the first time. The Conference took place in Irvine, CA, November 12–14, 2015.

• The European Commission issued its ICT-Arts CONNECT report (2015), launching the STARTS program for funding work in Science, Technology, and the Arts as part of the Europe 2020 program.

• The Alliance for the Arts in Research Universities (a2ru) held the conference "GroundWorks: Improving and Supporting Practice in the Third Space" to address the next generation of opportunities and challenges facing arts transdisciplinary practice, peer review, infrastructures, and partnerships in research universities at Virginia Tech in Blacksburg, VA, November 8–11, 2015.

• A committee of the National Academies of Sciences, Engineering, and Medicine's Board on Higher Education and Workforce convened a workshop exploring the topic of Integrating Education in the Arts and Humanities with Education in STEM at the Carnegie Endowment for Peace in Washington, DC, on December 2, 2015.

• The organizers of the SEAD network Working Group held a planning meeting hosted by the National Academy of Sciences on December 3, 2015.

• The Innovation Collaborative has been arranging collaborations between professional educator organizations, including the National Science Teachers Association, the National Art Education Association, and the Association of Science and Technology Centers. They held a board meeting at the Association of Science and Technology Centers on February 1, 2016.

• The SEAD network Working Group meeting of thought leaders convened to review and share emerging trends and issues since the NSF/NEA/NEH/Smithsonian hosted workshops that led to the Sciences, Engineering, Arts, and Design (SEAD) report, published as "Steps to an Ecology of Networked Knowledge and Innovation" (MIT Press, 2015). The meeting was held at the National Academy of Sciences in Washington, DC, on February 2, 2016.

• The Association of Independent Colleges of Art and Design Chief Academic Officers Meeting was held at the Council of Independent Colleges in Washington, DC, on February 2, 2016. It was supplemented with arranged meetings with Congressional representatives on Capitol Hill.

• The opening of the exhibition *Making in the Arts,* organized by Congressman Mark Takano and hosted by the Congressional Maker Caucus in collaboration with the National Endowment for the Arts, Public Knowledge, Fractured Atlas, the Congressional STEAM Caucus, the Congressional Arts Caucus, and Shapeways, was held in the Foyer of the Rayburn House Office Building, Washington, DC, on February 2, 2016.

• A panel discussion coordinated by the SEAD network entitled *Cultivating an Ecology of Networked Knowledge and Innovation through Collaborations among Sciences, Engineering, Arts, and Design* took place as a session at the 2016 College Art Association Annual Conference on February 3, 2016.

• The DC Art Science Evening Rendezvous (DASER) was held at the National Academy of Sciences, Washington, DC, on February 4, 2016.