

# STEM DBER Alliance

## What is DBER?

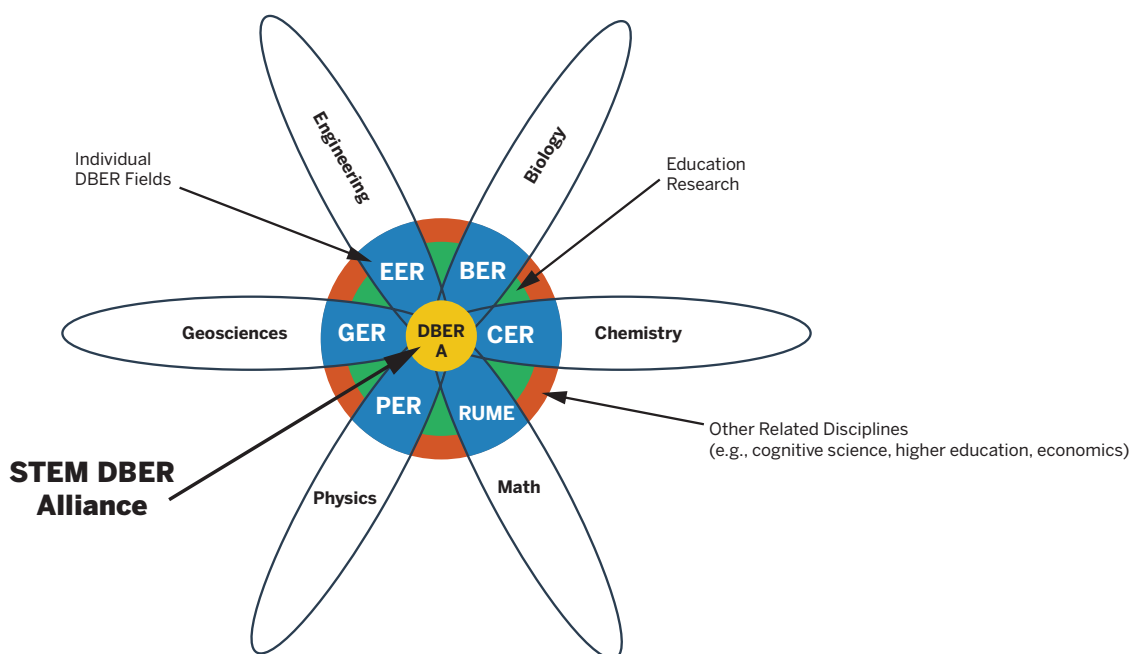
Discipline-Based Education Research (DBER) seeks to develop evidence-based knowledge and practices that improve teaching and learning in science, technology, engineering and mathematics (STEM). DBER represents a collection of fields that sit at the intersection of a STEM discipline and educational research. An important feature of DBER is the strong role that the disciplines play in setting research priorities, and ensuring research is relevant to and focused on improving what is most important in moving undergraduates toward expertise in the discipline.

## Need for a STEM DBER Alliance

Individual STEM DBER disciplines (e.g., physics education research, biology education research) developed independently and have largely operated separately, with separate conferences, journals and research interests. Additionally, relevant knowledge exists in related but currently disconnected disciplines such as cognitive science, higher education and economics.


Building on prior discussions across DBER communities<sup>1,2</sup>, on November 18-19, 2016, the American Association for the Advancement of Science (AAAS) and the Association of Public and Land-grant Universities (APLU) brought together a group of 26 thought leaders from the DBER communities to begin articulating the benefits of developing an intersectional DBER community, envisioning what structures might best support such a community, and developing plans for advancing this agenda.<sup>3</sup> It quickly became clear that tremendous advantage and synergy could be gained through the formation of an overarching DBER community that spans disparate disciplines. We have begun to refer to such a community as the STEM DBER Alliance (DBER-A).

**Figure 1.** The STEM DBER Alliance exists at the intersection of multiple DBER fields. (Image based on initial conceptualization by Mark Connolly.)



## What can a cross-discipline STEM DBER Alliance do?

We envision a cross-discipline STEM DBER community engaging in five basic activities. These occur on a spectrum, from independent work within an individual discipline to collaborative work between disciplines (for example, biology education researchers working with chemistry education researchers) and across multiple DBER disciplines. Figure 2 summarizes each type of work and provides a brief example. The existence of an overarching STEM DBER community (such as DBER-A) is increasingly important as the integration of ideas and development of shared frameworks increases from Activity A to Activity E.



Facilitated by DBER Alliance			Situated in DBER Alliance	
A: Develop Understanding of other Contexts	B: Transfer of Research Ideas/Methods	C: Collaborative Research	D: Cross-Cutting Research	E: Research Community Development
<ul style="list-style-type: none"> <li>• Discipline 2 requires understanding of Discipline 3 to improve work in Discipline 2.</li> <li>• <b>Example:</b> How to develop a physics course for biology majors</li> </ul>	<ul style="list-style-type: none"> <li>• Discipline 1 learns ideas and approaches from Discipline 2 to improve work within Discipline 1.</li> <li>• <b>Example:</b> How to study problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• Disciplines 3 and 4 collaborate on cross-disciplinary research that improves work in both Disciplines.</li> <li>• <b>Example:</b> How the teaching of “energy” be coordinated across multiple STEM disciplines</li> </ul>	<ul style="list-style-type: none"> <li>• Disciplines 4, 5, and 6 collaborate on research that spans and improves all STEM disciplines. Disciplines 1, 2, and 3 also benefit from this.</li> <li>• <b>Example:</b> Improving inclusion and diversity</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple disciplines interact to set norms (implicit or explicit) for DBER research. DBER (and all Disciplines) benefit.</li> <li>• <b>Example:</b> How student learning gets reported</li> </ul>

**Figure 2.** Five basic types of interaction between the individual DBER fields that are expected to take place within the STEM DBER Alliance.

## How to join the conversation

You can join the STEM DBER Alliance by completing this quick google form: [goo.gl/oEckXG](http://goo.gl/oEckXG).

We will be continuing this conversation with DBER scholars at the TRUSE 2017 Conference, July 5-9: <http://www.chem.purdue.edu/Towns/TRUSE/>. For questions, contact Kacy Redd at [kredd@apl.u.org](mailto:kredd@apl.u.org).

## Planning Committee

**Charles Henderson**, Western Michigan University; **Erin Dolan**, University of Georgia; **Noah Finkelstein**, University of Colorado Boulder; **Scott Franklin**, Rochester Institute of Technology; **Shirley Malcom**, American Association for the Advancement of Science; **Chris Rasmussen**, San Diego State University; **Kacy Redd**, Association of Public and Land-grant Universities; **Kristen St. John**, James Madison University

<sup>1</sup> For example, TRUSE (<http://www.chem.purdue.edu/Towns/TRUSE/index.html>)

<sup>2</sup> Talanquer, V. (2014). DBER and STEM education reform: Are we up to the challenge? *Journal of Research in Science Teaching*, 51(6), 809-819. <http://doi.org/10.1002/tea.21162>

<sup>3</sup> <http://www.aaas.org/news/experts-seek-boost-knowledge-and-allies-teaching-stem>