



Scientific Societies Integrating Gender and Ethnoracial Diversity Efforts: A First Meeting Report from Amplifying the Alliance to Catalyze Change for Equity in STEM Success (ACCESS+)

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Professional STEM societies have been identified as an important lever to address STEM diversity, equity, and inclusion. In this *Perspectives* article, we chronicle the highlights of the first Amplifying the Alliance to Catalyze Change for Equity in STEM Success (ACCESS+) convening held in September 2021. Here, we introduce the three-part ACCESS+ approach using a model that entails (i) completion of a DEI self-assessment known as the equity environmental scanning tool, (ii) guided action plan development and iteration, and (iii) sustained participation in a community of practice.

KEYWORDS diversity, equity, inclusion, professional STEM societies, action planning, community of practice, equity environmental scanning tool self-assessment

PERSPECTIVE

STEM professional societies (ProSs) provide broad capacity to influence needed STEM systems reform. For example, in addition to publishing professional journals, developing inclusive professional excellence through recognition and awards, and setting standards (1), ProSs comprise an important potential lever in broadening participation in the STEM workforce through various

mechanisms, such as helping members network and gain access to resources useful in their career paths (2–11). Recently, there has been renewed interest in leveraging STEM ProSs for diversity, equity, and inclusion (DEI) change. For example, there has been a surge in peer-reviewed publications and editorials focusing on the DEI efforts of ProSs (2, 11–19, 20, 21). Also, federal funds have been mobilized to increase the impact of ProSs' efforts, both through longstanding funding mechanisms seeking to broaden participation in STEM, such as Organizational Change for Gender Equity in STEM Academic Professions (ADVANCE) of the National Science Foundation (NSF) and Innovative Programs to Enhance Research Training (IPERT) of the National Institutes of Health (NIH), and more targeted solicitations, such as the NIH's Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC) Institutionally Focused Research Education Award and the NSF's LEADING cultural change through Professional Societies (LEAPS) of Biology solicitation.

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In 2017, NSF funding from the Division of Molecular and Cellular Bioscience, Cellular Dynamics and Function Cluster (award number 1744098), brought together the diversity-focused committees of five STEM ProSs in the life sciences to create the Alliance to Catalyze Change for Equity in STEM Success (ACCESS). ACCESS serves as an interaction and collaboration hub for diversity-focused ProS committees working toward increased ethnoracial inclusivity in their scientific disciplines (8, 22). A more recent ADVANCE Partnership grant (award number 2017953), Amplifying the Alliance to Catalyze Change for Equity in STEM Success (ACCESS+), has allowed the further development of the ACCESS ProS network to not only include additional societies in engineering and the physical sciences but also add an intersectional gender equity lens to its ethnoracial diversity focus.

Efforts to broaden participation in STEM in scientific societies have historically addressed the underrepresentation of ethnoracial minority groups and women as separate issues (23). For example, these two types of diversity are often the focus of different committees advocating for their interests separately. This separation likely inhibits synergies across STEM ProS committees, potentially precluding intersectional interventions that could benefit multiply marginalized students and scholars (i.e., women of color). Through working with scientific societies, ACCESS+ aims to explore the integration of gender and ethnoracial diversity interests for the benefit of people with intersectional identities that have long been minoritized in STEM fields.

We chronicle the highlights of the first ACCESS+ convening, held in September 2021. During this 2-day convening, ACCESS member societies in the life sciences (ACCESS+ cohort I) reviewed Equity Environmental Scan pilot results, drafted DEI action plans informed by equity environmental scanning tool (EEST) results, and launched the ACCESS+ community of practice (CoP). The five ACCESS+ cohort I member societies are (i) the American Society for Biochemistry and Molecular Biology (ASBMB), (ii) the American Society for Cell Biology (ASCB), (iii) the American Society for Pharmacology and Experimental Therapeutics (ASPET), (iv) the Biophysical Society (BPS), and (v) the Endocrine Society (ES). The purpose of this *Perspectives* article is 2-fold: (i) to discuss the ACCESS+ approach, enabling interested societies to join our efforts, and (ii) to provide examples of the cohort-based ACCESS+ activities that will drive the integration of gender and ethnoracial diversity, to share ideas with other societies, and to inspire conversations that can help scientific communities become more inclusive.

ACCESS+ APPROACH TO SCIENTIFIC SOCIETY ENGAGEMENT

An overview

ACCESS+ uses a model that entails (i) completion of a DEI self-assessment known as the equity environmental scanning

tool (EEST), (ii) guided action plan development and iteration, and (iii) sustained participation in a CoP.

ACCESS+ views society representatives, including staff and committee or leadership volunteers, as “boundary spanners”—those who work within and across their societies to learn and share DEI strategies (24). ACCESS+ hopes to capitalize on boundary spanners’ ability to work collaboratively across entities to support DEI innovation and integration.

EEST

The equity environmental scanning tool is a DEI self-assessment tool that encompasses 11 different ProS functions or frames. These frames include the following: 1, governance; 2, membership; 3, programming; 4, professionalization; 5, student chapters; 6, awards; 7, communications; 8, outreach; 9, employment; 10, advocacy; and 11, publishing (Table 1). The EEST is structured so that information is captured using three different strategies: (i) closed-end survey items in which the STEM ProS reviewer(s) indicate the level of DEI ProS engagement along a 5-point Likert scale, (ii) numerical data on aggregated demographics, and an (iii) open-ended section for providing case studies and examples related to the ProS DEI efforts. The UK Science Council developed an equality and diversity audit instrument in 2008; which was then revised in 2015 to account for changes in UK legislation and used across STEM societies (25). The resulting instrument was further revised for use in 2020–2021 (25). Given the differences in functions across ProSs in the United States and UK, the ACCESS+ team adapted the content of the tool to a U.S.-based context (19). ACCESS+ also adapted the structure and form of the tool to enable it to be used for comparisons across frames, as well as for a benchmark to facilitate cross-group and over-time progress comparisons (19). As scientific societies are onboarded into ACCESS+, their first task is to complete the EEST over an 8-week period. The assessment data are then analyzed and a report generated, providing societies with a snapshot of where they are as an organization in their DEI efforts. The EEST results and analyses are the foundation of the second key element of the ACCESS+ program—action planning.

Action planning

Societies use their EEST results to identify frames (i.e., ProS functions) that need attention. Through the action planning that follows, societies make plans to address the areas of interest or concern. Action planning activities recommended by ACCESS+ are rooted in the organizational tool of a force field analysis (FFA). Lewin (26), as part of his overall field theory, proposed that organizational change encounters two opposing forces, those advancing change and those preventing change (Fig. 1). Despite its age, FFA offers an approachable and powerful lens to organizational action planning because it helps change agents see the larger systems in which the desired change will take place and, consequently, make strategic decisions about which change levers to apply and when to advance organizational goals

TABLE I
The 11 frames of the EEST

No.	Frame	Description
1	Governance and leadership	How the society is run and how major decisions are made about the goals and efforts of the society
2	Membership	Membership processes and the structures that shape membership
3	Programs: meetings, conferences and events	Who participates, and how people participate, in society activities; covers meetings, conferences, and events
4	Professionalization	Career growth, training, and mentoring availability and management
5	Student chapters	Extensions of the society located on university campuses that serve and support students in the field
6	Awards	Policies and procedures by which people are selected and recognized for awards and support
7	Communications and marketing	Society communication with its members and stakeholders; including the content that is communicated
8	Outreach and engagement	Society promotion and engagement with the public, including schools, universities, and other stakeholders
9	Employment	How employees are recruited, managed, and promoted in the society
10	Advocacy	The process and content of the society's official position statements on topical issues
11	Publishing	Publishing policies, processes, and products produced by the society

(27–29). Often, STEM reform initiatives begin with solutions in the absence of considering the larger dynamics at play. Instead, to intentionally ground their work moving forward, ACCESS+ societies conducted an FFA to map four key components, as follows: (i) define the desired future state—arguably the most important step, since it establishes the “destination” of reform; (ii) define the current state, including evidence of the current conditions of the problem being addressed; (iii) identify drivers that push toward and/or support the desired future state, including what evidence exists to support drivers; and (iv) identify barriers that push back and away from intended goals, including evidence of such barriers. Using the FFA results as a map, organizations can examine the four major components of the analysis to see where drivers can be strengthened or added and where barriers could be reduced or eliminated. Thus, the end goal is to have a stronger force pushing toward the desired future state rather than the force pushing against it being stronger. In addition, sharing the “maps” generated by

the FFA with colleagues from other societies promotes inter-organizational knowledge exchange (30), especially around shared experiences related to solution identification or how to navigate the academic landscape. Drawing upon peer feedback and the results of the FFA, societies prioritize future actions and make detailed plans framed by questions related to who, what, when, why, and how. The next element of ACCESS+ that is meant to work in concert with action planning is ongoing engagement in a CoP.

Engagement in a long-term CoP

Communities of practice are groups of people who have a shared interest or domain (e.g., DEI change), engage in joint activities around that domain (e.g., action planning, monthly meetings, workshops), and develop a shared pool of resources, including promising practices, articles, toolkits, tips, and more (31, 32). ACCESS+ cohort participation includes engagement in an ongoing year-long CoP. Through the CoP, STEM ProS boundary spanners receive peer and community support as they implement their action plans, connect through monthly meetings, and participate in virtual workshops, programs, and events.

In addition, ACCESS+ provides participating societies with a host of resources and engagement opportunities through the ADVANCE Resource and Coordination (ARC) Network, an NSF-funded initiative (awards number HRD-2121468 and HRD-1740860) that supports a community of researchers, practitioners, and change agents in their intersectional gender equity work in STEM academia. The ARC Network houses a resource library with over 2,000 searchable online DEI resources, hosts

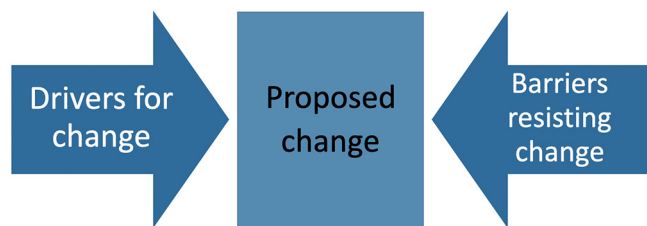


FIG 1. Force field analysis. Lewin's force field analysis (1951), as part of his overall field theory, proposed that organizational change encounters two opposing forces, those advancing change and those preventing change.

programs such as workshops, town halls, and webinars, and leads larger events such as community convenings. ACCESS+ societies receive curated resources from the library, are invited to contribute their own resources, and engage in ARC Network learning opportunities throughout their participation in the CoP.

Cohorts

ACCESS+ cohort 1 includes the five life sciences societies that comprised the original ACCESS effort. Cohort 1 attended the first ACCESS+ convening and serves as the pilot or proof-of-principle cohort in the ACCESS+ efforts. To grow its network and reach, ACCESS+ will host additional STEM ProS cohorts over the next 2 years. The members of these cohorts will include societies in additional (i.e., non-biological) STEM fields, such as physical sciences and engineering.

ACCESS+ ANNUAL CONVENING

Meeting goals

The ACCESS+ Annual Convening is an event that brings together all the society boundary spanners of a cohort. The first ACCESS+ convening to kick off cohort 1 took place virtually in September 2021 over 2 days. The goals of the convening were to onboard the cohort to ACCESS+ and provide a space for them to articulate their needs, explore areas of DEI strength and areas ready for development within the societies based upon the EEST results, help participants prepare action plans to guide their DEI change work moving forward, and set the stage to launch the CoP. We highlight how participants received information based on analyses of their EEST results and used this information to engage in action planning in identified DEI areas of interest. This information also helped set the stage and establish a common domain for participation in the CoP upon conclusion of the convening.

Areas of DEI strength and development identified through the EEST results

On the first day of the convening, we reviewed areas of DEI strength and room for growth resulting from the EEST with the participating societies' boundary spanners. Both EEST results and boundary spanners' feedback showed that there is a need to promote societies' abilities to collect and use intersectional demographic member data. Because efforts to address DEI in STEM have typically separated gender and race/ethnicity as isolated issues, we emphasized activities related to addressing the intersectionality of gender and race/ethnicity.

Given that the EEST is still in the pilot phase, participants were provided with strengths and weaknesses identified in the first two frames of the tool: 1, governance and leadership, and 2, membership. Frame 1 focuses on governance and leadership (see reference 19). Leaders are critical to the success of organizational DEI efforts because they help shape the vision, strategies, organizational infrastructure, and culture within a ProS.

Compared to other organizations, the blend of ProS members, staff, and elected officers can shape performance, particularly as elected leaders change, sometimes on an annual basis. Systematizing an approach and employing conscious consideration of DEI throughout a range of functions of the ProS can support positive governance and leadership to drive DEI change at the intersections of gender and race/ethnicity. Frame 2 focuses on society membership (see reference 19). ProSs spend considerable effort and money on recruiting, supporting, and retaining their membership. Membership dues also provide an important source of revenue for ProSs. As such, the efforts of ProSs to address the diversity of membership have not been the subject of much academic study until recently (for example, see reference 33).

In frame 1, the EEST findings showed that cohort 1's boundary spanners were committed to DEI, but specific practices in which they engaged to make DEI change were missing, especially in the evaluation and impact domain (i.e., data gathering and use processes regarding members and how they experience the society). Below are the frame 1 items with higher and lower levels of DEI engagement (based on the mean value self-assessed across the societies on the Likert scale), as presented during the convening. During the convening, cohort 1 participants also indicated that they would like more support in terms of gathering evidence to measure change, and they needed specific skills and knowledge to do so effectively.

Strengths, or items with a relatively high mean value of engagement:

- Senior-level personnel have accepted a case for change and DEI is integral to the ProS mission.
- There is an identifiable value statement that articulates the organization's commitment to DEI objectives, and it is regularly updated.
- Senior-level personnel discuss and plan how to address DEI at meetings.
- Data are gathered and reported about the makeup (i.e., race/ethnicity, gender) of leadership boards, committees, and groups.
- The ProS provides opportunities for younger/junior/underrepresented/early career professionals to interact with more senior colleagues and get involved in the governance of the society.

Room to grow, or items with a lower mean value of engagement:

- More complex data are used to understand intersecting statuses (e.g., women of color).
- Leaders are given routine support to expand their DEI knowledge and expertise.
- All new activities and projects undergo DEI assessment, with attention paid to the impact on multiple diversity groups. Activity impacts are reviewed for program changes.
- Surveys of members and how they experience the society and field are gathered and preexisting research is reviewed.

- Evidence is collected to establish sustained behavioral and cultural change on diversity, equity, and inclusion in governance and leadership.

For frame 2, EEST results indicated that areas of strength, or items with a higher mean value, related to buy-in, while there was again room to grow in enacting practices in support of DEI. Membership committee members have established the case for the need to implement DEI efforts. And yet, societies could benefit from a focus on measuring and analyzing ProS member data intersectionally. Below are the high- and low-engagement items for frame 2.

Strengths: items with a higher mean value of engagement

- There is collective responsibility across the society for increasing the diversity of the membership.
- There is an articulated process of adjudication and sanctions for members engaging in actions that have a negative impact on others, particularly minoritized members.
- The code of conduct for members makes explicit the standards of behavior expected from members in relation to diversity, equity, and inclusion.
- Data are gathered/tracked on the demographics of membership across multiple diversity groups (e.g., gender, race/ethnicity) and are shared internally and externally.

Room to grow: items with a lower mean value of engagement

- Membership grade assessors and other gatekeepers have been given information/awareness raising about unconscious bias in decision making.
- The collateral for new members (welcome e-mail, website, etc.) includes information about diversity, equity, and inclusion in the organization.
- The organization gathers information from current members on their views on creating a more diverse and inclusive membership.
- The organization has a clearly stated case and ambition to increase the diversity of ProS membership as part of its plan to recruit and retain members.

Action planning

Throughout the 2-day meeting, society boundary spanners came together in full-group, society-specific, and mixed-society breakout rooms to engage in a series of action planning activities. On the first day, boundary spanners were introduced to the force field analysis (FFA) tool and then met as representatives of individual societies to complete the tool by mapping (i) the target reform goal that they wanted to focus on for the next 6 to 12 months, (ii) the current state of that particular change goal within their society, (iii) drivers for change, and (iv) barriers preventing change from occurring. Supported by and in

accordance with research that supports the use of interactive whiteboards (34, 35), society-specific Google Jamboards were utilized so that participants could add, move, and modify sticky notes and other content in a preformed FFA template consisting of four columns to match the four areas of the FFA (e.g., Current state, Drivers, Barriers, and Future state).

On the second day, mixed-society breakout rooms were convened where each society boundary spanner had time to share their FFA and receive feedback from their peers. After a short presentation regarding how to identify key drivers to strengthen and barriers to reduce, participants again met in their society-specific breakout rooms to discuss potential changes to their FFA results due to engagement with their peers and to identify 5 potential action areas based on their FFA maps. The mixed-society groups then reconvened to discuss proposed potential action areas. Finally, after a short presentation on key questions in articulating strategic actions (i.e., who, what, when, why, and how), participants were reconvened into society-specific breakout rooms to prioritize action areas and flush out at least one action according to the who, what, . . . etc. questions.

There was a consistent DEI strategic planning theme across the five societies during the action planning activities detailed above. Four of the five societies noted a need for DEI strategic plans; society 1 desired to follow through with the recommendations from their current DEI strategic plan, society 2 proposed to revisit their strategic plan in spring 2022 (with the intention of having society leadership set the direction of DEI initiatives), society 3 sought to embed DEI focus into all aspects of their society, and society 4 decided the creation and implementation of a DEI strategic plan would be their ultimate goal.

Additionally, there were clear membership data needs expressed from all five societies, including creating more awareness and transparency in communicating DEI efforts to members, getting better data about their members, and educating members about the reason for collecting demographic data, building trust with underrepresented members within the society, having a clear plan for using demographic data, developing consistent categorization of different groups, and defining best practices for collecting demographic data.

Addressing cohort I's areas of focus through a CoP

Throughout the 2-day meeting, cohort I societies had the opportunity to share and discuss identified areas of DEI focus to address through their future CoP interactions. Boundary spanners from each society shared that they wanted to know who they were currently serving and who else they should be serving. Retention of members was another important issue, with one society noting that their younger members tended to be more diverse.

The ProS boundary spanners additionally felt that ACCESS+ open office hours, where they could (i) bring their executive directors in to exchange DEI activities, (ii) have access to a directory of ACCESS+ members, and (iii) be empowered to invite key DEI stakeholders into the CoP, would help support

boundary spanners and aid in cocreating the CoP. These support systems could facilitate the realization of common goals (e.g., publishing).

A summary list of the key areas of focus for the CoP established through the convening includes the following:

1. Collecting and using data (particularly intersectional data) to inform, assess, and make the value case for your DEI efforts.
2. Supporting leaders in expanding their DEI knowledge and expertise.
3. Mitigating bias in decision makers through education and creation of policies.
4. Integrating DEI throughout the societies' activities, policies, departments, and practices—making it “business as usual.”
5. Creating DEI strategic plans, including goals and metrics.
6. Disseminating DEI efforts to members and the general public.
7. Funding support for DEI efforts.
8. Engaging in a peer community to share ideas and practices and problem-solve challenges.
9. Creating, collecting, and sharing concrete tools, recommendations, and resources to support DEI change efforts.

CONCLUSIONS

ACCESS+ is currently piloting the first cohort of STEM ProS boundary spanners to support efforts to explore how to better serve the integration of gender and race/ethnicity DEI. Over the course of a year, cohort participants will undertake (i) guided DEI self-assessments, (ii) facilitated action planning, and (iii) transformative work within and between their organizations, aided by a CoP. Specific to DEI, ACCESS+ has established a framework to help STEM ProS develop key competencies, identify organizational strengths and opportunities, create strategic action plans for meaningful change, learn about resources, policies, and practices to support their efforts, collaborate with experts and peers to meet their goals, and exchange knowledge and resources.

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REFERENCES

1. National Academy of Sciences, National Academy of Engineering, Institute of Medicine. 2005. Facilitating interdisciplinary research. The National Academies Press, Washington, DC. <https://doi.org/10.17226/11153>.
2. Smith CA, Wao H, Kersaint G, Campbell-Montalvo R, Gray-Ray P, Puccia E, Martin JP, Lee R, Skvoretz J, MacDonald G. 2021. Social capital from professional engineering organizations and the persistence of women and underrepresented minority undergraduates. *Front Sociol* 6:671856. <https://doi.org/10.3389/fsoc.2021.671856>.
3. Haverkamp AE. 2021. Transgender and gender nonconforming undergraduate engineering students: perspectives, resiliency, and suggestions for improving engineering education. PhD thesis. Oregon State University, Corvallis, OR.
4. Voight M. 2020. Queer-spectrum student experiences and resources in undergraduate mathematics. PhD thesis. University of California San Diego, San Diego, CA.
5. Hartman H, Hartman M. 2005. Undergraduate women's participation in professional organizations. *J Women Minor Sci Eng* 11:117–138. <https://doi.org/10.1615/JWomenMinorSciEng.v11.i2.10>.
6. McGee EO, Martin DB. 2011. You would not believe what I have to go through to prove my intellectual value!” Stereotype management among academically successful Black mathematics and engineering students. *Am Educ Res J* 48:1347–1389. <https://doi.org/10.3102/0002831211423972>.
7. Etson CM, Block K, Burton MD, Edwards A, Flores SC, Fry C, Guillory AN, Ingram SL, McGee R, Neely-Fisher DL, Paxson S. 2021. Beyond ticking boxes: holistic assessment of travel award programs is essential for inclusivity. *OSF Preprints*. <https://doi.org/10.31219/osf.io/fsrpb>.
8. Segarra VA, Vega LR, Primus C, Etson C, Guillory AN, Edwards A, Flores SC, Fry C, Ingram SL, Lawson M, McGee R, Paxson S, Phelan L, Suggs K, Vuong E, Hammonds-Odie L, Leibowitz MJ, Zavala M, Lujan JL, Ramirez-Alvarado M. 2020. Scientific societies fostering inclusive scientific environments through travel awards: current practices and recommendations. *CBE Life Sci Educ* 19:es3. <https://doi.org/10.1187/cbe.19-11-0262>.
9. Segarra VA, Primus C, Unguez GA, Edwards A, Etson C, Flores SC, Fry C, Guillory AN, Ingram SL, Lawson M, McGee R, Paxson S, Phelan L, Suggs K, Vega LR, Vuong E, Havran JC, Leon A, Burton MD, Lujan JL, Ramirez-Alvarado M. 2020. Scientific societies fostering inclusivity through speaker diversity in annual meeting programming: a call to action. *Mol Biol Cell* 31:2495–2501. <https://doi.org/10.1091/mbc.E20-06-0381>.
10. Segarra VA, Blatch S, Boyce M, Carrero-Martinez F, Aguilera RJ, Leibowitz MJ, Zavala M, Hammonds-Odie L, Edwards A. 2020. Scientific societies advancing STEM workforce diversity: lessons and outcomes from the Minorities Affairs Committee of the American Society for Cell Biology. *J Microbiol Biol Educ* 21:15. <https://doi.org/10.1128/jmbe.v21i1.1941>.
11. Campbell-Montalvo R, Kersaint G, Smith CA, Puccia E, Sidorova O, Cooke H, Wao H, Martin JP, Skvoretz J, MacDonald G, Lee R. 2022. The influence of professional engineering organizations on women and underrepresented minority students' fit. *Front Educ* 6:755471. <https://doi.org/10.3389/educ.2021.755471>.
12. Segura-Totten M, Dewsbury B, Lo SM, Bailey EG, Beaster-Jones L, Bills RJ, Brownell SE, Caporale N, Dunk R, Eddy SL, García-Ojeda ME, Gardner SM, Green LE, Hartley L, Harrison C, Imad M, Janosik AM, Jeong S, Josek T, Kadandale P, Knight J, Ko ME, Kukday S, Lemons P, Litster M, Lom B, Ludwig P, McDonald KK, McIntosh ACS, Menezes S, Nadile EM, Newman SL, Ochoa SD,

- Olabisi O, Owens MT, Price RM, Reid JW, Ruggeri N, Sabatier C, Sabel JL, Sato BK, Smith-Keiling BL, Tatapudy SD, Theobald EJ, Tripp B, Pradhan M, Venkatesh MJ, Wilton M, Warfa AM, Wyatt BN, Raut SA. 2021. Chronicling the Journey of the Society for the Advancement in Biology Education Research (SABER) in its efforts to become antiracist: from acknowledgment to action. *Front Educ* 6:780401. <https://doi.org/10.3389/feduc.2021.780401>.
13. Ingram JC, Castagno AE, Camplain R, Blackhorse D. 2021. Role of professional societies on increasing indigenous peoples' participation and leadership in STEM. *Front Educ* 6:753488. <https://doi.org/10.3389/feduc.2021.753488>.
14. Hays KA, Havran JC, Heard MJ, Morris AB, Ovueraye L. 2021. From then to now: diversity, equity, and inclusion in the Association of Southeastern Biologists. *Front Educ* 6:755072. <https://doi.org/10.3389/feduc.2021.755072>.
15. Youngblood L, Kim C, Qiu K, Williams M. 2021. Student-led organizations advocating for inclusivity in healthcare and healthcare professions: highlights from the Joining Hands in Healthcare Club at High Point University. *Front Educ* 6:755176. <https://doi.org/10.3389/feduc.2021.755176>.
16. Huyck JJ, Anbuhl KL, Buran BN, Adler HJ, Atcherson SR, Cakmak O, Dwyer RT, Eddolls M, El May F, Fraenzer JT, Funkhouser R. 2021. Supporting equity and inclusion of deaf and hard-of-hearing individuals in professional organizations. *Front Educ* 6:755457. <https://doi.org/10.3389/feduc.2021.755457>.
17. Haddad MA, Jenkins T, Solivan B, Williams A. 2021. Enhancing diversity in STEM. *Front Educ* 6:755758. <https://doi.org/10.3389/feduc.2021.755758>.
18. Barnes L, Grajales J, Velasquez Baez J, Hidalgo D, Padilla-Benavides T. 2021. Impact of professional and scientific societies' student chapters on the development of underrepresented undergraduate students. *Front Educ* 6:763908. <https://doi.org/10.3389/feduc.2021.763908>.
19. Peters JW, Campbell-Montalvo RA, Leibnitz GM, Metcalf H, Sims EL, Lucy-Putwen A, Gillian-Daniel DL, Segarra VA. 2021. Refining an assessment tool to optimize gender equity in professional stem societies. WCER working paper no. 2021-7. Wisconsin Center for Education Research, University of Wisconsin–Madison, Madison, WI.
20. Leibnitz G, Gillian-Daniel DL, Greenler RM, Campbell-Montalvo R, Metcalf H, Segarra VA, Peters JW, Patton S, Lucy-Putwen A, Sims E. The inclusive professional framework for societies: changing mental models to promote diverse, equitable, and inclusive STEM systems change. *Front Sociol*, in press.
21. Campbell-Montalvo RA, Caporale N, McDowell GS, Idlebird C, Wiens KM, Jackson KM, Marcette JD, Moore ME. 2020. Insights from the Inclusive Environments and Metrics in Biology Education and Research Networks: our experience organizing inclusive biology education research events. *J Microbiol Biol Educ* 21:25. <https://doi.org/10.1128/jmbe.v21i1.2083>.
22. Ramirez-Alvarado M, Segarra V. 2020. Scientific societies join forces to amplify effectiveness of STEM workforce diversification programming. *Biophys J* 118:317a. <https://doi.org/10.1016/j.bpj.2019.11.1783>.
23. Metcalf H. 2016. Broadening the study of participation in the life sciences: how critical theoretical and mixed-methodological approaches can enhance efforts to broaden participation. *CBE Life Sci Educ* 15:rm3. <https://doi.org/10.1187/cbe.16-01-0064>.
24. Hill L. 2020. Understanding the impact of a multi-institutional STEM reform network through key boundary-spanning individuals. *J Higher Educ* 91:455–482. <https://doi.org/10.1080/00221546.2019.1650581>.
25. Royal Academy of Engineering. 2021. Diversity and Inclusion: Progression Framework Report 2021 for Professional Engineering Institutions. Royal Academy of Engineering, London, UK. <https://www.raeng.org.uk/publications/reports/diversity-and-inclusion-progression-framework-repo>.
26. Lewin K. 1951. *Field theory in social science*. Harper & Row, New York, NY.
27. Baulcomb JS. 2003. Management of change through force field analysis. *J Nurs Manag* 11:275–280. <https://doi.org/10.1046/j.1365-2834.2003.00401.x>.
28. Swanson DJ, Creed AS. 2014. Sharpening the focus of force field analysis. *J Change Manag* 14:28–47. <https://doi.org/10.1080/14697017.2013.788052>.
29. Thomas J. 1985. Force field analysis: a new way to evaluate your strategy. *Long Range Plan* 18:54–59. [https://doi.org/10.1016/0024-6301\(85\)90064-0](https://doi.org/10.1016/0024-6301(85)90064-0).
30. Powell WW, Koput KW, Smith-Doerr L. 1996. Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. *Adm Sci Q* 41:116. <https://doi.org/10.2307/2393988>.
31. Li LC, Grimshaw JM, Nielsen C, Judd M, Coyte PC, Graham ID. 2009. Evolution of Wenger's concept of community of practice. *Implement Sci* 4:11. <https://doi.org/10.1186/1748-5908-4-11>.
32. Wenger E. 1998. *Communities of practice: learning, meaning, and identity*. Cambridge University Press, Cambridge, UK.
33. Solebello N, Tschirhart M, Leiter J. 2016. The paradox of inclusion and exclusion in membership associations. *Hum Relat* 69:439–460. <https://doi.org/10.1177/0018726715590166>.
34. Mahoney J, Hall CA. 2020. Exploring online learning through synchronous and asynchronous instructional methods, p 52–76. In Sistek-Chandler CM (ed), *Exploring online learning through synchronous and asynchronous instructional methods*. IGI Global, Hershey, PA. <https://doi.org/10.4018/978-1-7998-1622-5.ch003>.
35. Sweeney EM, Beger AW, Reid L. 2021. Google Jamboard for virtual anatomy education. *Clin Teach* 18:341–347. <https://doi.org/10.1111/tct.13389>.