



# 2017 APLU INCLUDES Summit Report



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The Association of Public and Land-grant Universities (APLU) is a research, policy, and advocacy organization dedicated to strengthening and advancing the work of public universities in the U.S., Canada, and Mexico. With a membership of 237 public research universities, land-grant institutions, state university systems, and affiliated organizations, APLU's agenda is built on the three pillars of increasing degree completion and academic success, advancing scientific research, and expanding engagement. Annually, member campuses enroll 4.9 million undergraduates and 1.3 million graduate students, award 1.2 million degrees, employ 1.2 million faculty and staff, and conduct \$43.9 billion in university-based research.

## About the INCLUDES Project

Significant attention has been paid to the barriers that underrepresented populations face in entering and participating in STEM pathways and workforce.<sup>1</sup> And yet, large-scale systematic efforts to diversify STEM fields have resulted in little change and progress has been far too slow.

Broadening participation within STEM faculty is widely seen as critical to increasing student participation in STEM fields and cultivating a STEM workforce capable of tackling 21st century problems. Research shows that the diversification of STEM faculty will contribute to broadening participation in the STEM workforce by directly increasing the number of underserved individuals in STEM faculty careers.<sup>2</sup> A more diverse faculty would stimulate a larger secondary effect by facilitating the increased interest and success of STEM students from underrepresented groups through experiences with a more nationally representative faculty.<sup>3</sup>

### INCLUDES Mission

APLU INCLUDES seeks to diversify the STEM professoriate at public research universities—a critical lever to broadening participation throughout the global STEM community. Through a collaborative, evidence-based approach, this project will provide tools for APLU’s national network of member universities to effectively recruit, hire, and retain faculty from underrepresented groups and foster career pathways toward the professoriate by broadening student participation in STEM programs.

### Three Objectives

APLU INCLUDES Project focuses on a set of activities aimed at the diversification of STEM faculty across our member institutions. The project has three primary objectives:

Objective 1	Develop and test an initial set of diagnostic tools and practices to more effectively recruit, hire, retain, and support faculty from traditionally underrepresented populations within STEM.
Objective 2	Identify an initial suite of transformative institutional activities to increase participation along the STEM pathways toward the professoriate and engage a network of institution clusters committed to collectively implementing one or more of the activities.
Objective 3	Assemble a set of expert partners and APLU members to evaluate the adequacy and coverage of current data sources and metrics available to track the progress and success of STEM students from entry into postsecondary education through the professoriate.

<sup>1</sup> Antonio, A. L. (2000). Faculty of color and scholarship transformed: New arguments for diversifying faculty. *Diverse Digest*, 3(2), 6–7.

<sup>2</sup> Hurtado, S. (2001). Linking diversity and educational purpose: How diversity affects the classroom environment and student development. In G. Orfield (Ed.), *Diversity challenged: Evidence on the impact of affirmative action* (pp. 187–203). Cambridge, MA: Harvard Education Publishing Group and The Civil Rights Project at Harvard University.

<sup>3</sup> Turner, C. S. V., González, C. J., Wood, J. L. (2008). Faculty of color in academe: What 20 years of literature tells us. *Journal of Diversity in Higher Education*, 1(3), 139–168. <http://dx.doi.org/10.1037/a0012837>.

## What makes APLU INCLUDES different?

The magnitude of our network and our intense focus on institutional transformation to support the recruitment, hiring, and retention of underrepresented STEM faculty uniquely positions us for making a significant impact on faculty diversity. Our members and national partners intend to uncover and undertake innovative and evidence-based initiatives aimed at increasing the pool of underrepresented STEM graduates and effectively recruiting, hiring, and retaining those graduates into faculty positions. APLU's INCLUDES Project will aid in the adoption of these activities by synthesizing, curating, and disseminating promising practices. APLU provides tools and opportunities for members to work and learn together via network improvement communities, supporting institutional change.

## Funding

This project is funded by a \$300,000 pilot grant (Grant #1649214) from the National Science Foundation's (NSF) Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) program. APLU was one of 37 original recipients of [NSF INCLUDES Design and Development Launch Pilots](#), which are funded through two-year grants with the potential to deliver prototypes for bold, new models that build on extensive earlier work to broaden participation in STEM. APLU's INCLUDES Summit is also supported by an NSF Conference Grant (#1741276) to assess the effectiveness of a designed thinking approach. A principal aim of this summit was to deploy design thinking strategies to create and solicit feedback from APLU institutional representatives in an effort to address APLU's broader INCLUDES project—broadening participation of STEM Faculty and the STEM pathway.

## INCLUDES Summit Overview

The INCLUDES Summit, hosted in Alexandria, Virginia on April 25-26, 2017, brought together institutional leaders, along with content and context experts, for an interactive summit on broadening the participation of women and underrepresented minorities within STEM faculty and students. Participants included researchers, administrators, and policymakers. In sum, **90 participants from 60 institutions and 9 partner organizations were represented at the Summit**. The Summit was facilitated by The Value Web, a global network of facilitators that aim to create spaces for leaders to see, think, and act differently.

The event began with a welcome and introduction to the Summit, led by APLU's Howard Gobstein, Executive VP and Principal Investigator, and Travis York, Director, Student Success, Research, & Policy. Their presentation was followed by an exploration of STEM faculty diversity and strategies for improving it by Dr. Kenneth Gibbs, Jr., Program Director, Division of Training, Workforce Development & Diversity at the National Institute of General Medical Sciences/ National Institutes of Health.

## Why STEM Diversity?

Dr. Gibbs, provided important context for the purpose and goals of the Summit. His presentation STEM Faculty Diversity: What, Why, Where, and How? summarized the important benefits of a diverse professoriate, along with the steps institutions can take to bridge the gap between doctoral completion and entry into faculty roles for URM scholars.

Dr. Gibbs first discussed key findings from research on the academic pipeline in the biomedical sciences. Through qualitative and quantitative analyses, Gibbs and colleagues have found that Ph.D. degree attainment has increased among underrepresented minority (URM) scholars – but the proportion of URM assistant professors has not increased at similar rates (See presentation slide below, where trends in biomedical PhD graduates is compared to biomedical assistant professors for URM and well-represented groups). Gibbs research has also shown that women and URM biomedical scholars are less likely to see faculty roles as congruent with their professional and personal goals.

## Temporal Trends in Representation

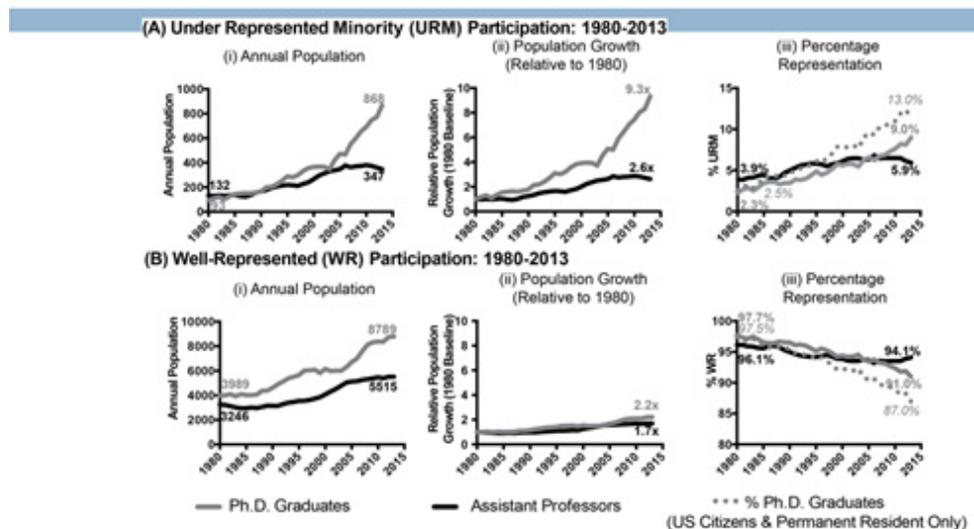


Figure 1. Temporal Trends in Representation in the Biomedical Fields<sup>4</sup>

What can institutions do to recruit more URM scholars into faculty roles? Dr. Gibbs presented a four-prong approach. First, institutions must connect the PhD talent pool to academic hiring by ensuring academic work environments align with scientists' values and personal responsibilities. Second, institutions must listen to students and faculty and act on their recommendations and concerns. Third, institutions must identify the talent pool that already exists – specifically through federal training programs and by looking to the PhD students at our own institutions. Finally, institutions must recognize and adopt best practices for improving search and selection processes.

<sup>4</sup> Gibbs, K. (2017, April 25). Does Diversity Matter in STEM? [PowerPoint slides].

## Faculty Hiring—How?

- **Connect the Ph.D. talent pool with academic hiring**
  - Ensure academic work environments align with scientists' values and other life responsibilities
- **Listen to your students/faculty and act**
- **Identify talent pool**
  - Cultivate relationships and actively encourage applications
- **Evaluate (fairly), hire and retain**
  - Search process interventions can increase faculty diversity (Molly Carnes et al, *Academic Medicine* (2015); Jessi L. Smith et al, *Bioscience* (2015))

Figure 2. Strategies for Improving Faculty Diversity through Hiring<sup>5</sup>

### Mapping the Terrain: The STEM Pathway

Over the course of the Summit, participants “mapped the terrain” by identifying the major barriers to broadening participation along the STEM Pathway. Participants recognized specific challenges at the critical junctures of educational attainment and professional advancement: K-12, undergraduate, graduate, postdoctoral, faculty, and administrative and system level.

#### Across the Pathway, several themes emerged:

*Lack of role models, mentors, and quality advising undermines advancement and retention.* At all levels of the STEM Pathway, participants said that role models and mentors are crucial for encouraging and supporting the next generation of STEM professionals.

*Transition points matter.* Participants frequently identified barriers specifically related to transitions, such as between undergraduate degree completion and into graduate school and from graduate school and into faculty or postdoctoral roles. Students must be prepared and encouraged to pursue the next stage of the academic ladder, and supported during these important transition time periods.

*Implicit bias continues to undermine diversity efforts.* From admissions and hiring to conceptions of merit for promotion and tenure, implicit bias limits the advancement of women, URM, and disabled individuals from proceeding through the STEM pathway.

On day two, the Summit turned to action and implementation. During the open plenary session, participants discussed the key questions that they hoped to answer by the end of the day. Then, participants broke into Deep Dive sessions, where they revisited the three INCLUDES objectives to discuss implementation tools, strategies, and communication techniques. During the closing plenary session, participants developed action plans and determined how they could implement these strategies at their home institutions.

<sup>5</sup> Gibbs, K. (2017, April 25). Does Diversity Matter in STEM? [PowerPoint slides].

## Task Force & Advisory Committee Streams

Based on the three primary objectives of the INCLUDES project, Summit participants joined the Faculty Diversity Task Force, the STEM Pathway Taskforce, or the Technical Advisory Committee for Round Robin Sessions on Day 1, and Deep Dive Sessions on Day 2.

Round Robin sessions organized around the three INCLUDES objectives: tools and practices to recruit, retain, and support faculty from underrepresented groups; identify institutional transformation to increase participation in the STEM professoriate; and evaluate the data sources needed to track progress. On Day 1 participants were placed into randomly assigned groups which then rotated through one-hour sessions focused on each of the three objectives. These Round Robin sessions allowed participants to gain an understanding of the primary goal and deliverables associated with each objective. On Day 2 participants had the option to choose which of the three objective's Deep Dive sessions they wanted to participate in.

### **Objective 1: Faculty Diversity Task Force**

**Charge of the Committee:** Develop and test an initial set of diagnostic tools and practices to more effectively recruit, hire, retain, and support faculty from traditionally underrepresented populations within STEM.

#### *Members*

- **M. Roy Wilson** (Co-chair), President, Wayne State University
- **Ruth Watkins** (Co-Chair), Provost, University of Utah
- **Kimberly Griffin** (Senior Researcher), Associate Professor of Education, University of Maryland, College Park
- **Junius Gonzales**, Senior Vice President for Academic Affairs, University of North Carolina System
- **Lawrence Morehouse**, President, Florida Education Fund
- **Mark Smith**, Dean, Purdue University Graduate School
- **Kiernan Mathews**, Executive Director & Principal Investigator, The Collaborative on Academic Careers in Higher Education (COACHE); Harvard Graduate School of Education
- **Susan Carlson**, Vice Provost for Academic Personnel and Programs, The University of California, Office of the President
- **Ann E. Austin**, Associate Dean for Research, College of Education & Assistant Provost for Faculty Development-Academic Career Paths, Michigan State University
- **Alan Mabe**, Vice President of Academic Affairs, APLU (Project Liaison)

Objective 1 has two major deliverables: A tool that campuses can use to do a self-study/self-assessment of their diversity practices in hiring and retaining faculty, and the preparation of a set of best practices that can guide campuses as they work to improve faculty diversity. The Faculty Diversity Taskforce initially focused on the tool, entitled “**Rethinking Increasing Faculty Diversity as a Multidimensional Process: A Proposed Model**,” (see below) and the kinds of data institutions need to collect to better understand diversity on campus and identify factors that influence diversity goals. Immediately prior to the beginning of the Summit, the Taskforce convened to review the model. Members discussed the questions that would be used to shape the self-study, and considered the process that could be used to test the proposed self-study with selected campuses. The Taskforce also discussed and reviewed the data collection component at length, and proposed strategies

to organize data collection in ways that would not derail the self-study process overall. Plans were made for a conference call with the Taskforce to review both the discussed changes and the result of the discussions of the diversity model and campus self-study tool at the Summit.

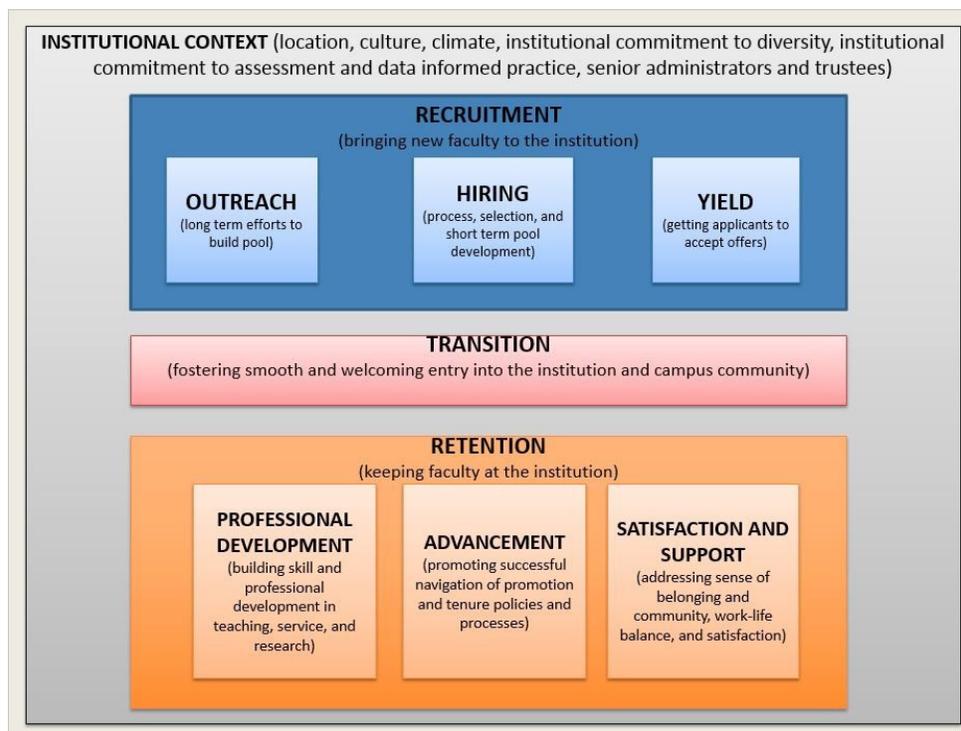


Figure 3. Rethinking Increasing Faculty Diversity as a Multidimensional Process: A Proposed Process

### *Faculty Diversity Taskforce Round Robin*

During Day 1 of the Summit, participants attended a Round Robin session led by the Faculty Diversity Task Force’s Co-PI’s: Kimberly Griffin and Alan Mabe. Participants considered two major questions: 1) What are the most critical barriers to remove to broaden participation in STEM faculty and 2) What data do we need to increase diversity? Participants considered these questions from the vantage of institutions, colleges, and departments, and arranged their findings around barriers for recruitment, retention, and transition.

#### *Recruitment*

Participants discussed multiple barriers to recruiting a diverse faculty, including implicit bias, institutional climate and culture, and the attitudes of current faculty. Participants also mentioned several strategies that institutions can use to improve faculty recruiting, such as identifying the diversity needs of colleges and sticking with those objectives; dual-career hiring partnerships with industry and nearby institutions; cluster hiring; providing search committees with professional development and training; identifying new hiring streams; and developing relationships with internal and external organizations. Additionally, participants discussed the needs to increase incentives and accountability for diversity in hiring, creating new policies for work-life balance, and how to embed diversity considerations into institutional culture.

## *Transition*

Objective 1 Round Robin participants also considered the challenges faculty face during transition to new institutions. Challenges included a lack of systemic and intentional processes to transition, including resources, professional development, and resources; failure to communicate across colleges; and current approaches to faculty orientation that are ineffective. Participants identified many interventions that can improve faculty transition, such as having a family advocate meet with each applicant, who can coach them on what and how to ask for what they need during negotiation. Other possible interventions include connecting candidates with information about the campus; creating an “Office of Work Life” which can provide potential and current faculty a place to get answers to questions about sensitive issues and core questions; providing a variety of formal institutional mentors; and building relationships between diverse students and faculty.

## *Retention*

Finally, participants in the Objective 1 Round Robin explored barriers to faculty diversity related to retention. One of the major themes that emerged during this discussion included the criteria for promotion and tenure, which are frequently outdated, narrowly-defined, and not clearly communicated. Participants also discussed the lack of culture of support for continuous professional development, rewards, and recognition, and that institutions need leaders and formal mentorship programs in order to enhance faculty recruitment. Summit participants identified, that a diverse student body can be influential in attracting and retaining a diverse faculty, and that peer networks/communities (such as faculty writing groups) can be effective for positively impacting retention. They also suggested that institutions ought to be concerned about retention because it is cheaper to retain current faculty than it is to recruit new faculty, particularly in STEM fields with large start-up costs.

Overall, participants pinpointed multiple data needs in order to increase faculty diversity through recruitment, transition and retention. First, they agreed that institutions often lack data about the counts and proportions by subgroups of faculty at each rank and time-in-rank (including years to promotion) by department (for accountability). They identified that exit interviews with faculty who depart institutions, as well as interviews with faculty who stay over long periods of time, are necessary for gathering information about what institutional factors influence retention.

Summit participants also discussed general direction of the model and self-study tool, and participant feedback was collected. Many indicated they were supportive and looked forward to participating in the project at their campuses as it develops. Conference facilitators provided many opportunities for participants to provide written feedback including through post-its and poster board comments.

## *Faculty Diversity Taskforce Deep Dive Session*

The Objective 1 Deep Dive took place on Day 2. This session provided an opportunity for participants to delve into greater detail regarding both the model for addressing campus diversity and the more than 60 questions that have been proposed to constitute the 8 sections of the self-study tool. Participants were divided into 8 groups and each team reviewed and offered revisions to an assigned batch of questions. Facilitators from The Value Webb were instrumental in facilitating this process, then collecting and organizing the results for effective use.



Two major results came out of this process.

- 1) The participants collectively affirmed that the model and the proposed tool for campus self-study were well on track and could prove very helpful to campuses.
- 2) They also provided valuable feedback on the set of questions, including some suggested rewriting for greater clarity, and proposed addition of others.

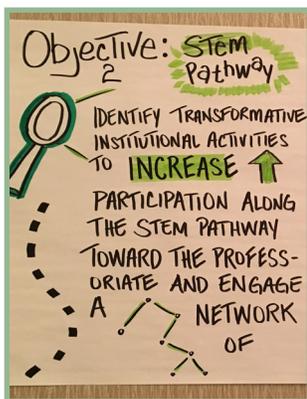
### *Next Steps for the Faculty Diversity Task Force*

The Summit provided an opportunity for the Faculty Diversity Taskforce to spend time in face-to-face interaction to further develop and improve plans previously developed. In addition, the Summit provided an opportunity for the Faculty Diversity Taskforce to interact with the Objective 2 Taskforce and with the Technical Advisory Committee. Overall, the meeting was an ideal platform to gain feedback from a wide range of participants and launch the work plan for improving and further developing the diagnostic tool.

After the Summit, co-PIs, Kimberly Griffin and Alan Mabe met for an extended work session on the results of the April convening and discussed how to incorporate those recommendations into the Taskforce's ongoing work. After reviewing the results from the Deep Dive and Round Robin sessions, they agreed on a set of modifications to the model and tool. Once these modifications have been reviewed by all members of the Taskforce, the model and tool will be ready for review by a few APLU member institutions.

In addition to continued work on the model, the Faculty Diversity Task Force will consider the following questions and the results of the initial review by selected institutions:

1. How will an approach be made to campuses? (Likely to President, Provost, and if a liaison has been named they will be included)
2. Who would compose the recommended campus team to implement the self-study? (Likely, Provost would need to lead, but involvement of Council of Deans, Faculty Senate, Diversity office, and selected department chairs, maybe some senior STEM faculty)
3. Once campuses use the self-study, what are the next steps they would take? What steps would APLU will take? Expectations will likely be different in the testing stage in comparison to the implementation stage, demonstration stage, and potential alliance stage.
4. Develop a set of questions about the instrument for campuses to address, which would be used to review the model/tool once again with Taskforce.
5. Request a few campuses do or evaluate the self-study.
6. Make further revisions based on feedback and prepare for wider testing in the second year of the grant.
7. Develop a timeline for the remainder of the year.

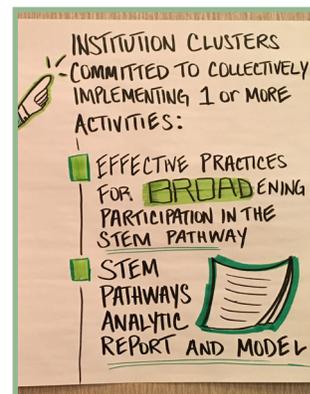


### **Objective 2: STEM Pathway Task Force**

**Charge of the Committee:** Identify an initial suite of transformative institutional activities to increase participation along the STEM pathways toward the professoriate and engage a network of institution clusters committed to collectively implementing one or more of the activities.

### Members:

- **Mildred Garcia** (Co-Chair), President, California State University, Fullerton
- **Shirley Malcom** (Co-Chair), Head of Education and Human Resources Programs, American Association for the Advancement of Science (AAAS)
- **Lisa Lattuca** (Senior Researcher), Professor of Higher Education, University of Michigan
- **Elizabeth Halimah**, Associate Vice Provost, University of California, Office of the President
- **Kevin Eagan**, Assistant Professor & Director of CIRP, University of California, Los Angeles
- **Robert Mathieu**, Professor of Astronomy at the University of Wisconsin, CIRTL Leadership Team, The Center for the Integration of Research, Teaching, and Learning (CIRTL)
- **Suzanne Ortega**, President, The Council of Graduate Schools (CGS)
- **Jaffus Hardrick**, Vice President of Human Resources & Vice Provost for Student Access and Success, Florida International University
- **David Ferguson**, Distinguished Service Professor and Chair, Technology and Society; Associate Provost for Diversity and Inclusion, Stony Brook University
- **Travis York**, Director of Student Success, Research, & Policy, APLU (Project Liaison)



### STEM Pathway Round Robin

On Day 1 of the Summit, participants in the STEM Pathway Round Robin session discussed strategies, policies, and programs that have been used to address barriers to broadening participation along the STEM pathway. Participants framed strategies using three lenses: communities of support, institutional structures, and vocational anticipatory socialization (VAS).

#### Communities of Support

- Participants agreed that fostering person-to-person connections are an important element for creating communities of support, and that building these connections can transform institutions. Peer-to-peer support programs, mentoring, cohort models, and involving families can enhance the sense of community for STEM student scholars. Participants also discussed the need for quality, pro-active advising across all levels of the STEM pathway.
- Collaboration of all kinds can increase communities of support. Participants discussed the importance of engaging with business and industry as well as inter-institutional partnerships as examples of collaborative efforts that have worked in the past. They also identified that non-tenure track faculty should be considered as a source of tenure track faculty.
- They also recommended identifying programs that work (McNair, Ford, McKnight, SREB) and modelling them. Additionally, Objective 2 participants expressed the strong desire for models that focus on STEM identity development and self-efficacy, rather than deficit models.

#### Institutional Structures

- Summit participants recommended that institutions take responsibility for student success and focus on the experiences that students are having in the community. Experiential learning, funded undergraduate summer research

opportunities, team and cohort-based models, and learning communities were discussed as high impact practices that institutions can use to improve the student experience.

- They also recommended professional development and training for a variety of institutional constituents, including teachers, admissions and instructional committees, mentors, etc. Professional development and training on culturally-sensitive strategies for teaching, advising, and mentoring were specifically discussed.

*Vocational Anticipatory Socialization (VAS)* is a process whereby individuals learn and adopt norms, conventions, and beliefs regarding a particular vocation. Participants discussed how VAS can be used to orient students towards an academic career. They recommended that:

- STEM needs to be re-framed to emphasize the community value of research careers and the benefits of the profession, including collaboration, engagement, problem-solving, and interdisciplinary perspectives; in sum, students need to see the positive aspects of being a faculty member, not just the negatives.
- Students need to be exposed to research opportunities as early as possible.
- The process of applying for graduate school and entering the professoriate must be de-mystified and clarified; students must be encouraged and supported to apply for graduate school and consider faculty roles.
- To increase student-faculty mentoring, faculty must be given training on how to be good mentors and recognized for the time they spend on mentoring. Additionally, faculty must be aware of how bias can influence selection.

### *STEM Pathway Deep Dive Session*

During the Deep Dive session, the STEM Pathway Task Force discussed the **STEM-OP: Survey to Expand and Maximize Opportunities to the Professoriate**. The STEM-OP will collect comprehensive information regarding the evidence-based and promising programs/practices used by APLU member institutions to broaden participation within the STEM pathway towards academic and research careers. Summit participants reviewed and provided feedback on a survey that would be distributed to member institutions, which will be incorporated into the final survey distributed to institutions.

After reviewing the survey, Summit participants made a series of recommendations for how to market the STEM-OP to APLU member institutions. Participants recommended:

- Outreach should begin at the top by reaching out to the president or provost level; Identify STEM champions on campus and involve them in the process.
- Develop a cover letter or email template that clearly outlines the process; Identify who will complete the STEM-OP and how it will be coordinated on a large campus with multiple initiatives.
- Identify a live, contact person to answer questions as they arise; create an FAQ.



- Clearly state the rationale and benefit of participating in the STEM-OP, such as gaining access to a repository of information, joining a network/alliance of institutions committed to broadening STEM diversity and partnership, collaborative partnerships, and, faculty/student recruitment.
- Identify corporate sponsors or incentives for completing the instrument.

### *Next Steps for the STEM Pathway Task Force*

Participants' involvement in Objective 2's Round Robin and Deep Dive sessions provided valuable information to the Pathways Taskforce; especially in terms of considering what types of information would be most helpful to institutional leaders seeking to increase the diversity of students in their STEM programs.

Over the next year the Pathways Task Force will continue to meet monthly to collaborate on the activities needed to achieve Objective 2's deliverables. These activities will naturally require the engagement of APLU member institutions. As such, at the closing of Objective 2's Deep Dive session, participants engaged with Pathways Task Force members regarding the next steps of the project:

1. **Develop Release Plan for STEM-OP** utilizing the suggestions from the deep dive session regarding which institutional leaders to target and marketing strategies to increase participation.
2. **Refine and Release the STEM-OP Instrument** to collect information about evidence-based and promising strategies to increase the diversity of STEM students advancing towards an academic STEM career.
3. **Collect and Curate Strategies from APLU Member Institutions** for inclusion into Objective 2's *Effective Practices for Broadening Participation in the STEM Pathway* deliverable.
4. **Analyze Strategies & Work with Obj. 3 to Create STEM Pathway Model** for Objective 2's *STEM Pathways Analytic Report and Model* deliverable. This analysis will need to be vetted at the 2018 APLU INCLUDES Summit with special attention regarding how practices can be vertically aligned within an institution as well as opportunities for partnerships across institutions to facilitate student movement along the pathway.

### **Objective 3: Technical Advisory Committee (TAC)**

**Charge of the Committee:** Assemble a set of expert partners and APLU members to evaluate the adequacy and coverage of current data sources and metrics available to track the progress and success of STEM students from entry into postsecondary education through the professoriate. The Technical Advisory Committee (TAC) focused on (1) data needs and (2) general scope and scale of environmental scan as the two deliverables from the Summit.

#### **Members:**

- **Kelvin Droegemeier** (Co-chair), Vice President of Research, University of Oklahoma
- **Marco Molinaro** (Co-chair), Assistant Vice Provost for Educational Effectiveness, University of California Davis
- **Ansley Abraham**, Director, SREB-State Doctoral Scholars Program

- **Daniel Denecke**, Vice President, Best Practices and Strategic Initiatives, Council of Graduate School
- **Chris Fastnow**, Director, Office of Planning and Analysis, Montana State University
- **Jillian Kinzie**, Associate Director, Center for Postsecondary Research & NSSE Institute
- **David Knight**, Assistant Professor in the Department of Engineering Education at Virginia Tech
- **Emily Miller**, Associate Vice President for Policy, Association of American Universities
- **Kacy Redd**, Assistant Vice President, Science & Mathematics Education Policy, APLU (Project Liaison)

The TAC convened prior to the Summit to discuss the data needs and the general scope of the environmental scan. During this meeting, members identified gaps in the data for undergraduates, graduates in STEM fields, including the limitations of IPEDS, student perceptions of STEM fields, evaluating graduate student experience and performance, and interventions that have been deemed most effective. They also identified data elements that would be critical to collect:

*Demographics of Interest:* Race and Ethnicity; Gender; Disabilities; Veterans; Discipline; Professor Rank; Tenure/tenure track plus instructors/lecturers

*Institutional characteristics of Interest:* Carnegie classification, IPEDS: Special Mission Institutions (Title 3 and 5; HBCUs and HSI); Region; Private/Public; USU-density; Undergraduate international student body profile.

#### *Technical Advisory Committee Round Robin*

On Day 1 of the Summit, the Round Robin Session with the Technical Advisory Committee discussed the successes and failures around data collection and using data to make change on their campuses. Each table was asked to provide guidance to the TAC about how best to collect data to broaden participation along the STEM pathway. In summary, participants provided the following feedback around four data-related questions:

*What is the Purpose of Data?* The TAC must have a clear purpose to collect meaningful data. Collecting data without a clear purpose or appropriate reporting leads to a warehouse with useless data. Making meaning of the data collected in a timely manner is a crucial component and is sometimes the more important piece of the research process. Summit participants also raised the issue of how best to engender a culture of informed decision-making to share results with the campus community.

*What is Needed for Good Data Collection?* The TAC must clarify the purpose of data collection – will it be used for accountability purposes, or for research? The TAC must also create common definitions and common collection strategies, clarify who will own the results of data collection and who will fund data collection efforts.

*What Data are Needed?* There are numerous data needs at the undergraduate, graduate, and faculty levels. Members need data beyond inputs and outcomes: instead, we need to understand the challenges that students and faculty are facing as they proceed along the STEM Pathway and encounter critical junctures that inhibit procession. Qualitative data are also needed to make sense of quantitative data, to give context about the problems institutions face and to evaluate if

strategies are truly working. Participants identified the following as some of the most important data elements:

- Undergraduate and graduate student retention/graduation rates, by demographics and income level
- Career outcomes, through surveys of students and their mentors
- Post-doctoral hiring practices
- Hiring, retention, promotion, and tenure rates for faculty
- Faculty employment packages, including salaries/fringe and startup packages

*What is Needed to Impact the System?* Education and training – for campus administrators, department heads, and faculty - is a critical need for ensuring that data are used accurately and productively. Additionally, participants discussed the need to inventory faculty search committee practices, collect stories about successful STEM graduates, and create benchmarking processes or systems to monitor and evaluate faculty time spent on service, research, and teaching at all stages.

#### *Technical Advisory Committee Deep Dive Session*

On Day 2 of the Summit, the TAC re-convened for a Deep Dive Session to revisit the purpose and rough dimensions of the Environmental Scan. In addition to the TAC members, Kyle Frantz, Milton Faison, and Zakiya Wilson Kennedy contributed to this discussion. Based on the discussion, the Environmental Scan Model was updated.

Summit participants and the TAC also identified some questions that are important to address about the STEM pathway that we cannot currently address with national data sets.

- Culture is the big challenge for broadening STEM participation; how do we measure it?
- What experiences lead to faculty careers and who has access to these experiences? In addition to a STEM degree, undergraduate leadership and research experiences, graduate program admissions policies, and other educational or out-of-classroom experience may lead individuals to pursue faculty careers. Underrepresented groups may have less access to these high impact practices.
- What role do international students play in the system? What is the representation of international students among post-doctoral researchers? Do international graduates stay on as faculty or do they go back to their home countries? The narrative is that institutions of higher education are losing these researchers to their home countries, but the reality may be different.
- Increasingly, institutions are hiring associate deans, center directors, and others who are not faculty. How are these positions siphoning off underrepresented faculty? What are the start-up salaries, incentive packages, and disincentives being offered to faculty and are their differences for faculty from underrepresented groups? We could look to EEO offices about pools of applicants to see how many people are turned down.

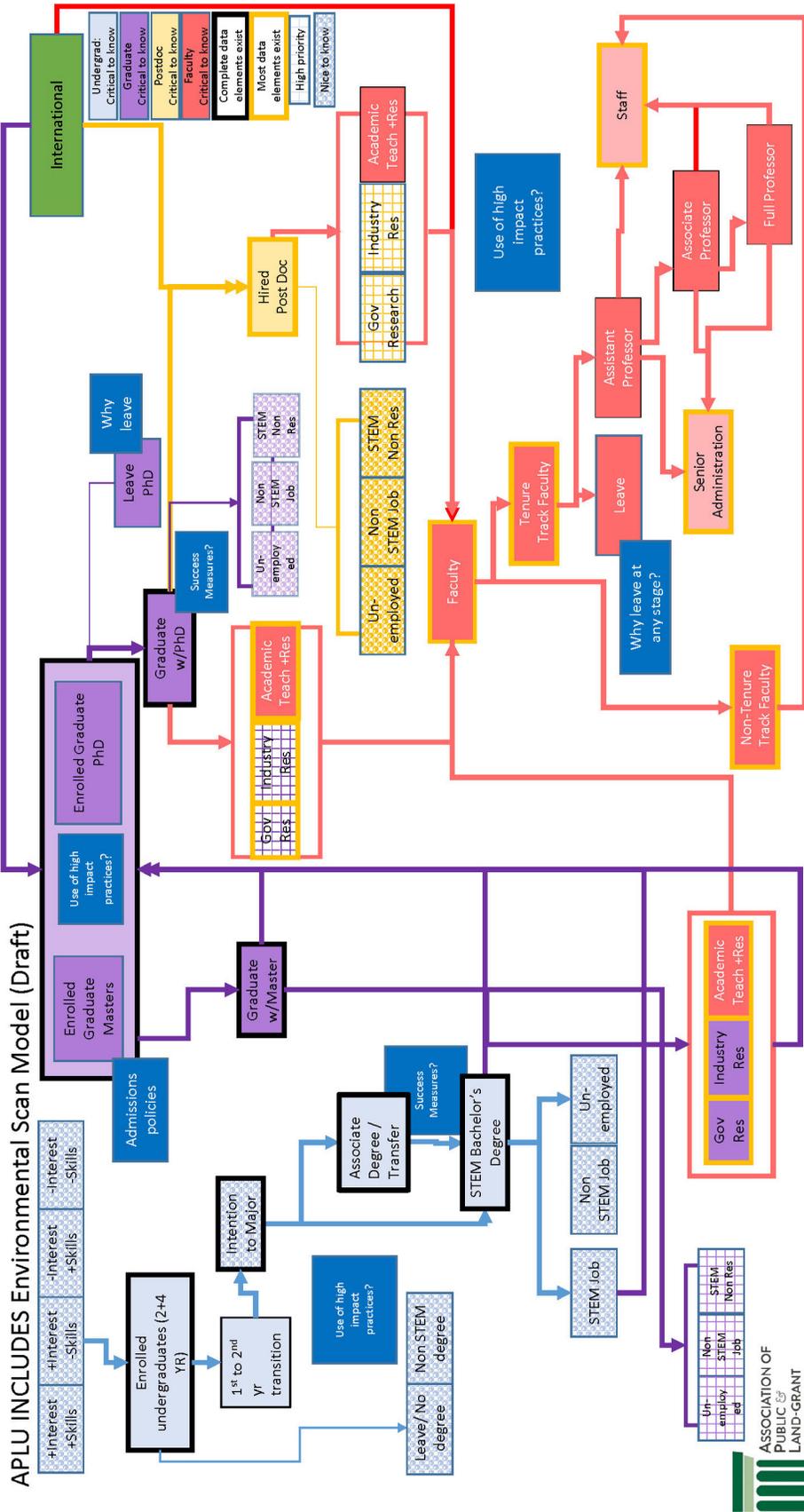


Figure 4. Environmental Scan Model of STEM Pathways

- What happens to students in the STEM pathway longitudinally? Though many national data sets provide a series of snapshots, there is little long-term information available how students enter, exit, and re-enter the STEM pathway. One suggestion was to focus on state systems that are doing true longitudinal tracking to help connect the dots.
- Do departments that have a critical mass of underrepresented faculty tend to graduate more people from underrepresented groups?

#### *Next Steps for the Technical Advisory Committee (TAC)*

1. Update the Environmental Scan Model
2. Get input from Objectives 1 and 2 on their data needs
3. Set up a resource page to collect and share data sets, identify gaps, identify journal articles, etc.
4. Identify potential linkages between data sources
5. Identify questions of interest to drive data collection

#### ***Stitching It All Together: Action Items & Next Steps***

In small groups, Summit participants then discussed their vision for the APLU INCLUDES Project and created tiles where they wrote or drew their vision for success. When asked to describe what project success would look like summit participants reported:

- Institutions welcome students to STEM at various points in the pipeline: URG succeeding in STEM fields at undergraduate levels, leading to a change in the Ph.D. enrollments, which ultimately increases the number of URG and women faculty at institutions. Near-term goals at the university level can lead to climate and culture change.
- There is institutional change in both climate and culture that values and appreciates diversity. Institutions use diversity to improve learning, discovery, and engagement to change the world.
- Increase the use of high impact practices, which will influence institutional strategic goals.
- Increased diversity in the professoriate, administration, and leadership that reflects the diversity of the institution's student bodies. Institutions will develop metrics to address the diversity of STEM faculty, with timelines.

#### *Summary of One-Year Table Goals from Participants*

- In one year, we will have conducted an environmental scan of practices and policies (STEM-OP) that institutions currently use to increase faculty diversity. From these, we will have created and shared best practices with all APLU institutions.
- Through the STEM-OP self-study and/or other self-evaluation, institutions will have identified where they stand in regards to faculty diversity and identified what practices they currently have in place.
- We will develop common faculty diversity metrics that can be used to benchmark progress and hold institutions accountable for increasing faculty diversity.

- We will engage with campus leaders to communicate the value of diversity; Garner support for the allocation of resources for increasing faculty diversity.

Overall, INCLUDES participants agreed that:

- In one year, institutions will adopt high impact practices that are shown to lead to parity. High impact practices will be used to set and meet institutional goals.
- In 10 years, faculty diversity should mirror the undergraduate student population and should be sustainable over time. At institutions that are exceptionally lacking in student body diversity, diversity of faculty and administration will greatly exceed diversity of the student body.

#### *Summary of Five-Year Table Goals from Participants*

- In five years, institutions will implement the policies and practices identified from the STEM-OP of best practices. These policies and practices will be integrated into university mission statements and other strategic planning documents.
- In five years, we will use the data we have collected to chart improvements in faculty diversity. Through data collection, we will evaluate what programs and policies are the most effective and which are the least effective. Based on this evaluation, we will offer a refined vision of what works for increasing faculty diversity and what does not.

## Post-Summit Survey Results

After the Summit, several participants indicated via an online survey that they hoped to meet with senior administrative leaders (President, Provost, Chief Diversity Officer, etc.) to report on the activities/action steps discussed at the Summit to encourage further participation in INCLUDES in the future. Other participants indicated specific strategies they would deploy on their campus, such as focus on new faculty transitions, make adaptations to faculty search committee manuals, or design a formal mentoring programs. A few respondents also indicated that they would build on connections made at the Summit by developing partnerships and other collaborations.

Table 1. Post-Summit Responses Regarding Impact

As a result of attending the APLU INCLUDES Summit:
76.7% of participants strongly agreed or agreed that they were better able to identify the challenges their institution was facing.
78.1% of participants strongly agreed or agreed that they were better equipped to create or sustain change at their institution.
75.1% of participants strongly agreed or agreed that they were more committed to diversifying the STEM pathway.
96.8% of participants strongly agreed or agreed that they had made new connections, or strengthened existing ones, at the Summit.
100% of participants were very likely or moderately likely to extend the discussions undertaken at the Summit with colleagues at their home institution.
100% of participants were very likely or moderately likely to review the draft tools developed at the Summit.

**Collective Action.** Several respondents indicated that APLU is well-positioned to tackle these issues on a national level, whereas respondents have only been engaged in thinking about STEM participation on a single institutional scale prior to this gathering. For example, one respondent said “APLU leading a nationwide approach is quite new, as we more often think of ourselves in competition for scarce talent.” Others had more lukewarm responses, indicating though the Summit was useful, they had not learned new approaches or wished there had been more time to discuss this topic.

## How Institutions Can Get Involved

Broadening participation within STEM programs and in the STEM workforce is a critical and complex initiative that requires collaboration across a multitude of sectors, organizations, and key stakeholders. As such, APLU is seeking involvement from its vast network of institutional members and from national partners committed to broadening participation. There are many ways that institutional member and partners might consider collaborating with this pilot project, including:

- Designating an institutional contact for the APLU INCLUDES Project.
- Providing innovative and evidence-based strategies to diversify STEM faculty recruitment, hiring, and retention via a digital collection platform.
- Providing innovative and evidence-based practices to broaden participation in STEM Pathways for students via a digital collection platform.
- Piloting a dynamic institutional self-diagnostic tool for inclusive faculty recruitment, hiring, and retention practices. (Institutional Members)
- Participating in network improvement clusters to adopt and scale evidenced-based practices throughout the APLU member network. (Institutional Members)

To get more details about how to participate the APLU INCLUDES Project, please email Dr. Travis York, APLU’s Director of Student Success, Research, & Policy and APLU INCLUDES Project Lead at [includes@aplu.org](mailto:includes@aplu.org).

## Partners & Participants

***The American Association for the Advancement of Science (AAAS)*** is the largest general science organization in the world. AAAS Education and Human Resources staff run programs for science students and professionals to nurture talent, build careers, and build the STEM workforce.

***The Center for the Integration of Research, Teaching, and Learning***. The Center for the Integration of Research, Teaching, and Learning (CIRTL) is a preeminent organization preparing the future STEM faculty. The current CIRTL Network comprises 46 diverse research universities, representing one-third of the Ph.D. production of the United States.

***Collaborative on Academic Careers in Higher Education***. The Collaborative on Academic Careers in Higher Education (COACHE), based at the Harvard Graduate School of Education, is a research-practice partnership working with universities to address issues of faculty hiring, support and satisfaction. COACHE uses this research to bring faculty and administration together to make evidence-based improvements to faculty support and satisfaction.

***Big Ten Academic Alliance (formerly CIC)***. The Big 10 Academic Alliance is a leading higher education consortium and includes the 14 members of the Big Ten Athletic Conference and the University of Chicago. The BTAA Professional Advancement Program (PAI) and The National Research Mentoring Network-CIC Academic Network (CAN) are two initiatives the BTAA participates in that emphasize the recruitment and progression of underrepresented minority candidates to faculty positions.

***The Council of Graduate Schools***. The Council of Graduate Schools (CGS) is a national organization dedicated to the advancement of graduate education and research. It serves over 500 North American university members and its members are the principal source for preparation of faculty in this country.

***The Florida Education Fund's McKnight Doctoral Fellowship Program*** was founded in Florida to provide greater educational advancement for underrepresented groups.

***Southern Regional Education Board State Doctoral Scholars Program***. The Southern Regional Education Board (SREB) is an organization of sixteen southern states dedicated to improving education levels through policy and practice. The SREB State Doctoral Scholars Program was initiated to address barriers in graduate education, to overcome them, and to diversify the faculty.

***University of California Office of the President***. University of California, Office of the President (UCOP) has launched many projects across its 10 campuses, including UC Recruit, a web-based recruitment system that significantly that streamlines the faculty recruitment and application process by automating procedures that had previously been very labor-intensive.

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