

# Task Force on Expanding International Engagement

*Report, Recommendations, and Implementation*



A Report by the Task Force on Expanding International Engagement

November 2018



## About the Task Force on Expanding International Engagement

The Task Force benefited from an internationally diverse set of members with the background and experiences to balance visionary, long-term planning with pragmatic, achievable goals. Having served in APS leadership roles, the members were familiar with multiple aspects of APS operations, governance, and activities, and represented a broad cross-section of the Society's interests.

## Members

**Jonathan Bagger**, Chair  
TRIUMF

**William Colglazier**, Vice-Chair  
Center for Science Diplomacy, AAAS

**Dirk Jan Bukman**  
APS Editorial Office

**Luisa Cifarelli**  
University of Bologna

**Carlos Henrique de Brito Cruz**  
São Paulo Research Foundation and Universidade Estadual de Campinas

**Laura H. Greene**  
National High Magnetic Field Laboratory, Florida State University

**Alan J. Hurd**  
Los Alamos National Laboratory

**Young-Kee Kim**  
University of Chicago

**Patricia McBride**  
Fermi National Accelerator Laboratory

**Eliezer Rabinovici**  
Hebrew University, Jerusalem

**Johanna Stachel**  
University of Heidelberg

**Nai-Chang Yeh**  
California Institute of Technology

## APS Staff

**Amy K. Flatten**  
Director of International Affairs

**Michele E. Irwin**  
International Programs Manager

## Acknowledgements

We express our appreciation to APS Chief Executive Officer Kate Kirby for establishing the Task Force on Expanding International Engagement and for seeking its recommendations. Likewise, we thank the APS Presidential Line, Board of Directors, Council of Representatives, Senior Management Team, Unit Leaders, Editors, and Senior Staff for sharing their perspectives on the Society's international goals and priorities. Lastly, we thank the leaders from national, regional, and international physics organizations, as well as APS members worldwide, who provided invaluable insight and advice that guided our efforts.

## About the American Physical Society

The American Physical Society (APS) is a nonprofit membership organization working to advance and diffuse the knowledge of physics through its outstanding research journals, scientific meetings, and education, outreach, advocacy, and international activities. APS represents over 55,000 members, including physicists in academia, national laboratories, and industry in the United States and throughout the world.

## Authorship

The APS Task Force on Expanding International Engagement, convened by the American Physical Society, has sole responsibility for the contents of this report, and the recommendations within.

## Publication Date: November 2018

 American Physical Society

This report is available under the terms of a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. For more information, please visit the Creative Commons website.

## FROM THE CHAIR

Physics is a worldwide effort. Today, close to one quarter of APS members live outside the United States. Two-thirds of papers published in APS journals have corresponding authors with international affiliations. And so much of science is done by collaborations that cross national borders.

What is the role of the American Physical Society in this global endeavor? International Affairs has long been part of APS, advancing physics, furthering cross-cultural communication, and speaking out for the oppressed. Today, the APS Committee on International Scientific Affairs and the APS Office of International Affairs have built a portfolio of programs that serve APS members and physicists worldwide.

But there is clearly more to do. The APS Strategic Plan 2013-2017 identified expanding international engagement as a key goal of the Society, and in March 2017, APS Chief Executive Officer Kate Kirby launched the APS Task Force on Expanding International Engagement.

The Task Force was composed of 12 APS members living or working across the globe with a broad range of research interests and leadership experiences. The Task Force worked for nearly 18 months to understand the priorities of all APS stakeholders and to identify goals and recommendations for the Society's leadership. I am deeply grateful for the time and talent they devoted to the task, as well as for input and guidance we received from the APS Board and Council, APS editors and staff, and APS members worldwide.

With this document, I am proud to present the result of our work. Our committee's report identifies guiding principles, shared values, overarching goals, and a set of supporting recommendations. It also contains an implementation plan.

Our primary recommendation is that APS deepen its international engagement across the full range of Society activities. This is a transformational recommendation, one that affects the entire APS, not just the programs under the direct purview of the APS Office of International Affairs. We believe that our report can serve as useful guides towards expanding the Society's service, not just to APS members, but to the entire international physics community.

I cannot think of a better time for this report to appear. Physics relies on the free circulation of people and ideas. I need only look at my laboratory, TRIUMF, to see this demonstrated every day. Our users and visitors travel to Canada from some 39 countries, spanning every continent except Antarctica. Our students and staff hold passports from 30 countries.

Today, with isolationism on the rise, these fundamental principles are under threat. By increasing its international engagement, following the goals and recommendations presented here, the American Physical Society can stand in support of the global physics community and of the values we share worldwide.



**Jonathan A. Bagger**

Director, TRIUMF

Chair, APS Task Force on Expanding International Engagement

# EXECUTIVE SUMMARY

The APS Strategic Plan 2013-2017 recognized that expanded international engagement is key to the Society's service to the physics community. Consequently, APS created new international programs to serve its members, increased its offerings to physicists in the developing world, established ongoing physicist exchanges with new international partners, and united with other national physics societies to carry out a suite of joint activities.

With the development of a new APS Strategic Plan: 2019, APS leadership decided it was time to take the Society's international efforts to the next level, and in March 2017, APS Chief Executive Officer (CEO) Kate Kirby launched the APS Task Force on Expanding International Engagement. The Task Force worked for nearly 18 months to understand the interests, concerns and priorities of all APS stakeholders and to identify goals and recommendations for APS leadership.

## Two Guiding Principles shaped its work:

### **International partnerships strengthen the American Physical Society.**

Expanded and strengthened partnerships with other national, regional, or international physics organizations will enable APS to better serve the global physics community.

### **International collaboration strengthens physics in the United States.**

The U.S. physics enterprise benefits from international engagement with physicists worldwide.

## The Task Force identified four major goals, with the full report below giving recommendations to accomplish each:

**Goal 1:** Offer new/expanded ways to participate in the APS community.

**Goal 2:** Integrate international affairs across all APS activities.

**Goal 3:** Expand international opportunities for young physicists; better prepare young physicists for international careers.

**Goal 4:** Advance government policies that promote international scientific collaboration.

The Task Force also created an Implementation Plan to provide pragmatic “next steps” for each recommendation (Appendix A).

Perhaps most importantly, the Task Force suggested that APS should serve as a global hub—a place where the world’s physics community comes together. To become such a hub, the Society must proactively welcome international members and better integrate them into all leadership levels and all APS activities. The Society must also provide more international opportunities for its members, and better serve physicists worldwide, especially those without established physics societies in their own country or region.

The Task Force recommendations range from groundbreaking new initiatives to more moderate adjustments of the current directions or activities. Our hope is that APS members, leaders, and staff will embrace the Task Force’s overarching recommendation: that APS fully incorporate international engagement into all of the Society’s activities.

The Task Force believes that APS must develop and commit to a long-range international strategy, aligned with the goals presented in this report. It must make expanding international engagement a priority and commit resources accordingly. Doing so will not only benefit APS members, but will also strengthen the Society’s leadership in serving all physicists across the globe.

# INTRODUCTION

Physics is a global endeavor, with some of the greatest breakthroughs and achievements realized through international collaboration. The American Physical Society's membership reflects the international nature of physics, with nearly one quarter of its members living outside of the United States. (See Figure 1 for membership distribution.) Physicists cross continents to attend the Society's annual meetings, with nearly one third of all March Meeting participants coming from outside of the United States, making it one of the largest and most internationally diverse gatherings of physicists worldwide. Moreover, international issues cut across essentially all interests of the American Physical Society, and their importance is increasing:

**RESEARCH:** International research collaborations are on the rise; more countries are partnering to build large-scale collaborations and facilities.

**INDUSTRY:** Companies are increasingly multinational; more U.S. corporations are expanding offshore research and development facilities.

**JOURNALS:** Two-thirds of corresponding authors publishing in APS journals are now from outside of the United States.

**EDUCATION:** The United States competes to attract and retain first-rate students and scientists, yet international applications to U.S. physics Ph.D. programs are declining.

**OUTREACH:** APS engages physicists at all levels worldwide, offering K-12 students hands-on physics activities and bringing the excitement of physics to the United States and, increasingly, to international audiences.

**POLICY:** Open exchange is the lifeblood of scientific progress; recent government policy shifts regarding scientific mobility are affecting U.S. participation in international collaborations, as well as international participation in U.S.-based collaborations.

**MEMBERSHIP:** Nearly one-quarter of the APS membership lives outside of the United States; APS surveys indicate that many members would welcome a more international outlook from the Society.



The APS Strategic Plan 2013-2017 identified international engagement as key to the Society's service to the physics community. In recent years, the Society had developed a broad portfolio of international programs through entrepreneurial and opportunistic initiatives. Nonetheless, the Society's future international activities must be guided by a longer-term strategy, with a clear mission and unambiguous goals. Consequently, the APS Chief Executive Officer, Kate Kirby, launched the APS Task Force on Expanding International Engagement in March 2017.

The Task Force was asked to: 1) identify and refine strategic objectives of expanding international activities and recommend ways that current APS initiatives can serve the Society's international goals, 2) prioritize the countries or physics communities that could/should be served by APS international programs, and 3) recommend new international programs, partnerships, or services to fulfill the Society's international objectives. Likewise, as international issues span all aspects of APS, the Task Force was also tasked with identifying the critical, cross-cutting issues that APS should particularly address in partnership with international colleagues—and to suggest a process for doing so.

The Task Force launched an extensive mission to understand the interests, concerns and priorities of all APS stakeholders—members, units, leadership, staff, editors, national physics societies, and international organizations. Its process, findings, and recommendations are presented below, in hopes that its efforts will serve not only APS, but will empower the Society to better serve the physics community worldwide.

## GUIDING PRINCIPLES

Based on discussions and feedback from APS members, leaders and partners, the Task Force adopted two Guiding Principles:

### **International partnerships strengthen the American Physical Society.**

Expanded and strengthened partnerships with other national, regional or international physics organizations will enable APS to better serve the global physics community. While increased international partnerships and activities may attract new APS members, the Society is not aiming to grow its membership through expanded international engagement. APS does not aim to be the world's physics society.

### **International collaboration strengthens physics in the United States.**

The U.S. physics enterprise benefits from international engagement with physicists worldwide. APS meetings and publications strengthen that engagement. As physicists often belong to their own national or regional physics society—and also to APS—the Society has the opportunity to serve as a global hub for physicists.

These Principles serve as the foundations upon which this report is built.

# METHODOLOGY

## Understanding Stakeholder Interests

The Task Force held its kickoff meeting in March 2017, in Washington, D.C. At this initial meeting, Task Force members agreed to undertake an extensive research effort to better understand the perspectives and priorities of essentially all APS stakeholders. Here, the Task Force established four subcommittees:

**OUTREACH:** Better understand the perspectives of international partners on how APS international engagement could/should serve the international physics community.

**IN-REACH:** Better understand how internal components of APS (i.e., APS Unit Leaders, Presidential Line, Board, Council, Lead and Remote Editors, and Senior Staff) regard expanding international engagement. Identify their preferred mechanisms for doing so.

**MEMBERSHIP:** Better understand the needs and priorities of APS members. Examine membership surveys. Identify barriers to APS membership and hear from APS advisory committees (e.g., Committee on Membership, Committee on International Scientific Affairs) about international membership interests and concerns.

**CROSS-CUTTING POLICY ISSUES:** Identify critical cross-cutting issues that APS should address in partnership with international colleagues.

Most notably, the Task Force collaborated with the Statistical Resource Center of the American Institute of Physics (AIP) to conduct a survey of APS members on international priorities. A sample of nearly 9,400 U.S. and non-U.S. members yielded a 33% response rate, as shown below.

	Population*	Sample**	Responses	Overall %
<b>U.S. members</b>	39,281	6,424	1,762	27
<b>Non-U.S. members</b>	11,619	2,950	1,357	46
<b>Total number</b>	50,900	9,374	3,119	33

\* APS member population available to receive this survey.

\*\* Stratified random sample; stratified by membership category and U.S. / non-U.S. Sample includes Regular, Early-career, Life, Retired, and Graduate Student members. Sample excludes Undergraduate members and members with undeliverable email addresses.

The membership survey yielded a strong overall response rate, with an especially strong response from non-U.S. members. This suggests that APS members, especially those outside of the United States, are invested in the Society's efforts to expand its international engagement. Selected results from the survey are presented as Findings on pages 8 and 9.

In addition to the survey, the Task Force subcommittees sought advice from the following external and internal stakeholders:

## APS Units and Physics Organizations

- Executive Committees of all APS Units
- Industrial Physics Advisory Board
- National physics society leaders
- International and regional physics organizations
- International Union of Pure & Applied Physics (IUPAP) Presidential Line
- U.S. Liaison Committee to IUPAP

## APS Leaders and Staff

- Presidential Line
- Board of Directors
- Council of Representatives
- Senior Management Team
- APS Senior Staff (College Park, MD; Washington, D.C.; Ridge, NY offices)
- Lead and Remote Editors

Feedback from the consultations is incorporated into the Findings, Goals, and Recommendations sections on pages 8 through 11.

## Timeline

The Task Force conducted extensive outreach to solicit the interests, concerns, and priorities of APS stakeholders shown above. It shared its initial findings with the APS Council of Representatives in April 2018, and discussed its preliminary recommendations with the Board of Directors in June 2018. Its major milestones are listed below:

**SPRING 2017:** Held initial “Kickoff” Task Force meeting, as well as multiple video conferences to define subcommittee tasks.

**SUMMER/FALL 2017:** Subcommittees developed surveys, letters, and communications to APS Units; undertook extensive outreach to all components of APS.

**WINTER 2018:** Shared survey results and outreach findings with Task Force for analysis.

**SPRING 2018:** Presented preliminary findings and sought feedback from APS Council of Representatives.

**MAY 2018:** Held second in-person Task Force meeting in Washington, D.C.; developed preliminary recommendations to feed into larger “APS Strategic Plan: 2019.”

**SUMMER 2018:** Presented preliminary recommendations to APS Board of Directors; held discussions with APS Strategic Planning Committees to ensure Task Force recommendations were incorporated into “APS Strategic Plan: 2019.”

**FALL 2018:** Refined Task Force goals and recommendations; developed final report.

**NOVEMBER 2018:** Presented Task Force Final Report to APS Council of Representatives.

# FINDINGS

## Shared Values

The aforementioned information gathering exercise was critical to developing the Task Force goals and recommendations. A few common values emerged from this feedback:

**CONNECTIVITY AND COMMUNITY:** All APS members, regardless of nationality, rated “being part of a larger physics community” as the primary reason for APS membership. As mentioned above, the Task Force noted that the world’s physicists may belong to their own national society—and also to APS. Consequently, APS should serve as a “global hub,” a place where the world’s physics community comes together to advance its shared interests.

**INCLUSIVENESS:** APS must strive to serve all its members—worldwide. It must provide more ways for non-U.S. members to participate in all aspects of the Society. It should move from mere “passive allowance” towards “proactive inclusion” of international members across all of its activities.

**REPRESENTATIVE LEADERSHIP:** Non-U.S. members comprise 24% of total membership, but international members are not proportionally represented across the Society’s leadership (i.e., APS Unit Leaders, Program Committees, Advisory Committees, etc.). APS must work to ensure that international voices are included in all aspects of the Society’s leadership and advisory roles.

The Task Force strongly endorses all three of these shared values.

## Survey Results

The “Member Survey” and “Internal Surveys” each included two common questions below:

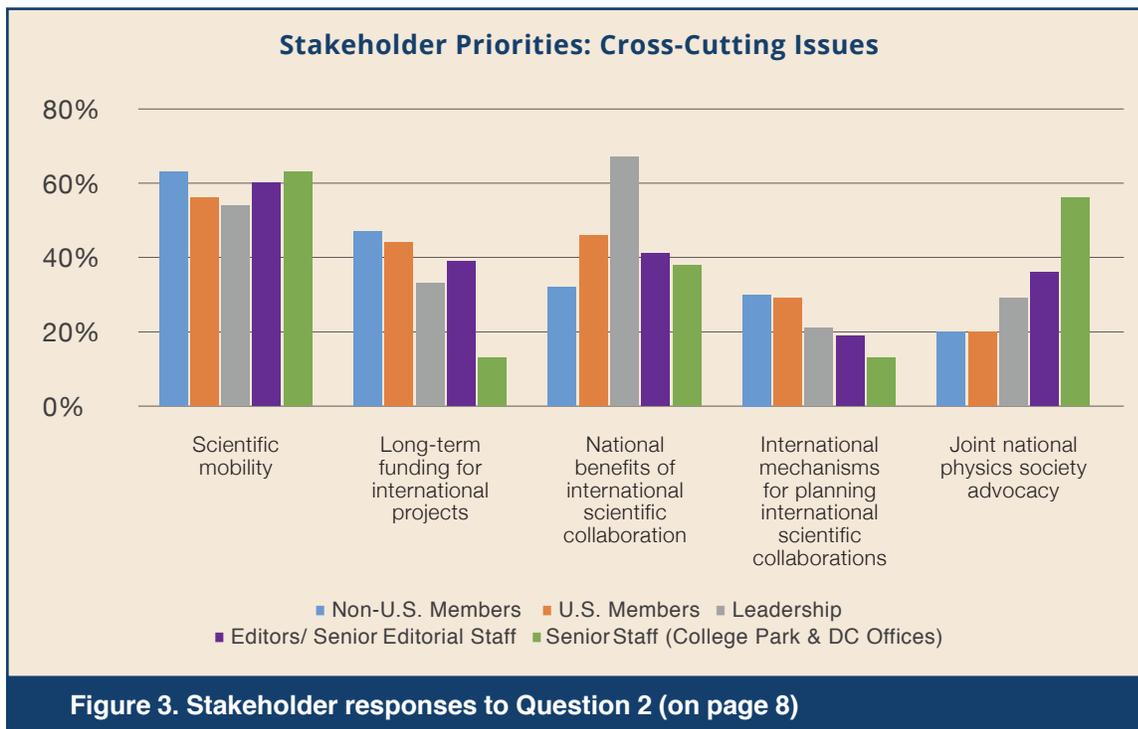
**QUESTION 1:** The list below describes some broad, overarching goals for APS international programs. *Which of these do you believe APS should make top priority?* [Select up to 2.]

- Increase international member participation in APS leadership
- Expand international reach of existing APS programs
- Serve developing country physicists, without encouraging “brain-drain”
- Prepare young physicists (Ph.D. students, postdocs, early-career) for international partnerships and collaboration in industry, academia, or other careers
- Promote “Science Diplomacy”
- Create incentives for physicists outside of the United States to belong to *both* APS and the national physics society in their current country of residence

**QUESTION 2:** The list below describes some broad, cross-cutting issues that involve actions that APS might take. *Which of these do you believe APS should consider making a top priority?* [Select up to 2.]

- Scientific mobility
- Long-term funding for international projects
- National benefits of international scientific collaboration
- International mechanisms for planning international scientific collaborations
- Joint national physics society advocacy

Comparisons of responses across the various stakeholder groups are presented in Figures 2 and 3.



# GOALS & RECOMMENDATIONS

The Task Force identified four goals that encompass the breadth of interests conveyed by all stakeholders in APS international activities. The goals are consistent with the shared values endorsed by the Task Force.

Each goal is presented below, accompanied by a set of recommendations aimed towards achieving the goals. The Task Force also developed an Implementation Plan with specific actions for each recommendation. (See Appendix A.) The Implementation Plan describes the rationale for each recommendation, and suggests pragmatic “next steps” for APS leaders, members, and staff.

## ❖ = Strategic Priority

### Goal 1: Offer new/expanded ways to participate in the APS community.

#### Recommendations:

- ❖ 1. Enable geographic APS Sections outside of the United States.
- 2. Create incentives for physicists outside of the United States to belong to both APS and the national physics society in their country of residence.
- 3. Develop new and/or strengthen existing electronic communications vehicles for physics communities outside of the United States, especially for those without established physics societies.

### Goal 2: Integrate international affairs across all APS activities.

#### Recommendations:

- ❖ 1. **LEADERSHIP:** Hold regular summits of physics society presidents and leaders of international physics organizations; partner with national physics societies toward joint advocacy on issues of common concern. Include more international members in APS leadership at all levels (APS Units, Advisory Committees, Prize and Award Committees, Nominating Committees, etc.).
- ❖ 2. **UNITS:** Empower APS Units to expand joint activities; establish an International Officer on every Unit Executive Committee with a clear mandate to strengthen linkages and activities with international partners.
- 3. **SENIOR STAFF & PROGRAMS:** Expand international reach of APS programs; ensure senior staff include international communities in program plans.
- 4. **EDITORS:** Increase and facilitate the APS profile and editorial presence at international meetings; increase, as appropriate, the number of associate editors, editorial board members, and reviewers from international locations.

### **Goal 3: Expand international opportunities for young physicists; better prepare young physicists for international careers.**

#### **Recommendations:**

- ❖ 1. Increase connections to the international private sector/industry to improve career development opportunities outside academia.
- 2. Establish additional summer research opportunities for U.S. and non-U.S. undergraduate students at premiere research facilities outside the country of their home institution.
- 3. Significantly increase international student and early-career participation in APS annual meetings and APS Unit meetings. Expand existing APS programs and meetings that focus on young international physicists.

### **Goal 4: Advance government policies that promote international scientific collaboration.**

#### **Recommendations:**

- ❖ 1. Advocate for international research activities and for stable funding for large-scale international projects.
- ❖ 2. Promote and advocate for scientific mobility (e.g. visas and immigration policies, removing barriers to engagement), including a proper balance between open scientific exchange and intellectual property and security concerns.
- 3. Establish an APS State Department Fellowship Program and/or expand APS sponsorship of existing AIP State Department Fellowships to further engage APS members in policy formation.

# IMPLEMENTATION

Along with its goals and recommendations, the Task Force developed an Implementation Plan with specific actions designed to implement each recommendation. The Plan is provided in Appendix A; it describes a series of pragmatic next steps for initiating the new programs and opportunities. (Additional considerations that arose during Task Force deliberations are collected in Appendix B.)

The Task Force endeavored to set strategic directions, rather than to evaluate specific programs. Given this long-range view, while some Task Force recommendations are readily implemented, others will take years to realize. Therefore, international goals must be embraced by the APS leadership and consistently incorporated into the Society's ongoing strategic planning.

The Task Force also recognizes the need for APS to consider: 1) evaluation and assessment of current international programs; 2) measures of success (metrics) for existing and future international programs; and, 3) impact on resources and sustainability of key initiatives.

## Evaluation and Assessment

Along with developing new programs based on the Task Force recommendations, APS should evaluate existing international programs to assess whether any should be continued, expanded, or concluded. This will require a clear framework, including unambiguous objectives and metrics.

Evaluating the current suite of international programs was not the role of this Task Force. As the framework and metrics are likely unique for each program, the Task Force recommends that the APS Committee on International Scientific Affairs (CISA) undertake this evaluation in partnership with the APS Office of International Affairs (INTAF) and other relevant committees. CISA should report its findings and recommendations to the CEO for consideration in future program plans.

## Defining Metrics—Measuring Impact

The American Physical Society committed considerable resources to developing recommendations for expanding the Society's international engagement. This report presents a series of recommendations that range from ground-breaking new initiatives (i.e., international sections) to more moderate adjustments of the current directions or activities. Each international initiative will require its own metrics, which the relevant APS Departments and Advisory Committees can develop according to the unique interests of the programs.

The Task Force's primary recommendation is that APS deepen its international engagement across the full range of Society activities. This is a transformational recommendation, one that affects far more than programs under the direct purview of INTAF. Therefore, while the Task Force can suggest recommendations that serve various stakeholder interests, only APS leadership can prioritize them and integrate them into the Society's long-term plans.

The "APS Strategic Plan: 2019" is the perfect vehicle to ensure that international engagement is properly incorporated into the Society's activities. Once the Strategic Plan is released, the Task Force recommends that APS leadership, in partnership with relevant advisory committees (e.g., CISA) develop a five-year roadmap of near-, mid- and long-term goals for international engagement. Some of the Task Force recommendations are immediately implementable, while

others will be part of a larger strategy that encompasses the overall vision for the Society. Consequently, the roadmap should contain clear targets and milestones, properly calibrated to a program's priority and resource allocation. The Task Force also strongly recommends that the APS CEO should, as appropriate: 1) give a regular update to the Council of Representatives on progress towards implementing the roadmap, and 2) discuss the progress and challenges of expanded international engagement with APS Unit leaders during the annual Leadership Convocation.

All three of these components—the Task Force recommendations, unique metrics for individual initiatives, and a comprehensive five-year roadmap with clear targets—are required to measure success as the Society expands its international engagement.

## Resources

If the Society is indeed committed to expanding its international engagement, APS must make transformative change a priority and commit resources accordingly. To implement the long-term plan presented here, including near-, mid- and long-term goals, the Task Force believes that APS must allocate sufficient resources (staff, financial, and leadership attention) to develop and implement the five-year roadmap discussed above. Likewise, some international activities may be especially attractive to potential donors or foundations, and APS may launch fundraising campaigns for certain new initiatives.

The Task Force's overarching recommendation is that all APS components adopt an international perspective. However, as international activities often include diplomatic and political concerns, it is critical that APS maintain a centralized awareness of the international landscape. Consequently, along with additional resources, the Task Force recommends transitioning INTAF from a purely programmatic office (i.e., responsible for developing almost all international offerings) to assuming a hybrid role, encompassing three main functions:

- 1. COORDINATION AND FACILITATION:** INTAF should work together with the other program offices to help expand their offerings to serve international physicists. In doing so, it can facilitate connections to international science organizations, national physics societies, and other potential partners. It can also serve as a central node for keeping abreast of the diverse international activities across the Society. As APS expands its international programs, the Society can expect to engage more volunteer members in new programs and initiatives, and perhaps even establish new Advisory Committees to address certain international interests (e.g., developing countries, international sections). These volunteer activities will also benefit from INTAF coordination and facilitation.
- 2. AMBASSADORIAL:** INTAF should build and strengthen international contacts with colleagues in other national physics organizations. The Director of International Affairs should continue to represent APS in international fora as appropriate (e.g., IUPAP, SESAME, international meetings). In doing so, special attention should be paid to building direct connections between international colleagues and other APS components such as the program offices and Units.
- 3. PROGRAMMATIC:** While many international activities will be carried out by other elements of APS, certain programs are still best developed and managed by INTAF (e.g., Young Physicist Forums, travel and exchange programs). Likewise, INTAF should continue to collaborate with other APS Departments, APS Units, and Advisory Committees, to address cross-cutting issues of interest to the members and international physicists (i.e., scientific mobility, visas, etc.).

As a first step in this transformation, APS must evaluate INTAF staffing as compared to its new and expanded mission. Currently, with only two full-time staff, INTAF is one of the smallest departments in APS. The Task Force believes that APS cannot realistically expect to expand its international activities, its service to international members, its coordination and facilitation of international activities with APS Departments, APS Units, Advisory Committees, and volunteers, unless it commits appropriate staff to these efforts.

## CONCLUSIONS

By establishing the Task Force on Expanding International Engagement, APS has launched an extraordinary effort to better serve the interests of all its stakeholders—members, national physics society partners, and physicists worldwide. These stakeholders welcomed APS aspirations for expanded international engagement, contributed to the recommendations, and look forward to new opportunities for international partnerships and programs. The Task Force believes that the goals, recommendations, and Implementation Plan contained in this report can guide the Society as it works to elevate its international endeavors.

Nonetheless, even the most carefully developed reports have little impact without follow-on commitment to progress. Consequently, the Task Force stresses that this report represents merely the first step of a more challenging, yet critical journey, dedicating time, staff, and resources to expanding the American Physical Society's service to the international physics community.

## APPENDIX A

# Implementation Plan

### *Suggested Actions to Implement Recommendations*

**Goal 1: Offer new/expanded ways to participate in the APS community.**

**Goal 2: Integrate international affairs across all APS activities.**

**Goal 3: Expand international opportunities for young physicists; better prepare young physicists for international careers.**

**Goal 4: Advance government policies that promote international scientific collaboration.**

## Goal 1: Offer new/expanded ways to participate in the APS community.

### RECOMMENDATIONS:

#### Enable geographic APS Sections outside of the United States.

**BACKGROUND:** Such sections will offer non-U.S. members the same opportunities for geographic sections that are provided to U.S. members. APS Sections are launched by a petition of local physicists (i.e., from the “grass-roots,” not “top-down”). Consequently, Sections exist only in locations where there is strong interest. Sections are more beneficial to APS than Student Chapters, as they include members at all career levels and keep students engaged as they progress through their careers. These Sections would especially serve young non-U.S. members in that they allow participation in APS meetings without international travel. Likewise, APS can require that the Sections and/or its members be linked to the national physics society, thus, underscoring the principle of “engagement” rather than “encroachment.” Such sections can provide strengthened connections to the national physics societies as well as a natural mechanism for joint society meetings or activities.

**SUGGESTED ACTION:** As a first step, APS leaders may ask the Committee on Membership (COMEM), in partnership with the Committee on International Scientific Affairs (CISA), to draft a set of guidelines regarding the establishment of APS Sections outside of the United States. This could include draft procedures for establishing the Sections, and the impact on existing APS staff and other required resources to implement.

#### Create incentives for physicists outside of the United States to belong to both APS and the national physics society in their country of residence.

**BACKGROUND:** According to the 2017 survey, non-U.S. APS members ranked “*wanted to be part of a larger physics community*” as the main factor in joining APS.<sup>1</sup> APS, however, has historically been very careful to not appear to be “poaching” members from other national physics societies. A potential solution would be for APS to provide a “convening node” for international physicists, whereas a physicist may belong to their national or regional physics society, and also to APS. APS can increase the opportunity for more international physicists to connect by expanding its membership offerings.

#### SUGGESTED ACTIONS:

1. Explore existing membership models from sister organizations like OSA. (We note that international chapters in OSA are effective.)
2. Examine joint membership for students and early-career physicists: Examples include the European Physical Society’s (EPS) Young Minds Program, and the Materials Advantage Program, which provides a single low-cost membership for participation in several pre-eminent societies in the United States and Canada.

<sup>1</sup> R. Chu, S. White; “2017 Survey of APS International Programs,” Table 3, American Institute of Physics, December 2017

**Develop new and/or strengthen existing electronic communication vehicles for physics communities outside of the United States, especially for those without established physics societies.**

**BACKGROUND:** The AIP survey indicated that most non-U.S. members joined APS because they “wanted to be part of a larger physics community.”(While this was true across all regions, it was especially true in Africa.) In spite of this, APS provides limited opportunities for most physicists outside of the United States to engage with the larger APS community. While some programs serve a handful of physicists (e.g., travel support to attend meetings), a region-specific communications vehicle, such as an electronic newsletter, would strengthen non-U.S. members’ connections to APS.

APS already has electronic newsletters (*APS News*, *Physics*) that provide updates on APS or highlights of physics research. By adding an additional section with region-specific news or information, APS will highlight its commitment to its international members, and help underserved communities connect with APS and with colleagues in their region to stay abreast of physics related events, news, and meetings in their community.

Such communications would be particularly valuable for physicists without established national and/or regional physics societies and may also help facilitate the establishment of International Sections. APS can also consider translating certain articles in *Physics* into other key languages.

**SUGGESTED ACTIONS:**

1. Translate articles in existing publications, such as *Physics* or *APS News*, into other key languages.
2. Translate certain outreach and education materials and/or announcements on the APS website into other languages.
3. Provide highlights of physics research and include region-specific updates on physics news, meetings, etc.
4. Create a mechanism for regular communication with APS members located outside of the United States, especially regarding joint activities with physics organizations in their home region/country.
5. Allow for anyone in developing countries to sign-up to receive APS emailed publications (i.e., do not require APS membership).
6. When requested, help physics communities in developing regions create their own communication vehicles, electronic newsletters, etc., to enhance connections to local, national, and regional colleagues.

## Goal 2: Integrate international affairs across all APS activities.

### RECOMMENDATIONS:

**LEADERSHIP:** Hold regular summits of physics society presidents and leaders of international physics organizations; partner with national physics societies toward joint advocacy on issues of common concern.

**BACKGROUND:** APS already has existing bilateral and multilateral partnerships and/or activities involving a few societies (SESAME, as well as bilateral activities with Brazil, China, and India). National physics societies may also wish to partner with APS to advocate for policies affecting international scientific collaboration or to advance other areas of common interest (basic research funding, partnerships with industry, science advice for public policy, promoting international mechanisms for planning future large-scale facilities, etc.). Examples might include physics education from K-12 to undergraduate/graduate, and communicating the value of fundamental research to policymakers. Further topics for coordination could include the environment, climate change, health, energy, water, gender and inclusion, usage of bibliometric indexes, research grant evaluation, and scholarly publication (open access and its consequences on access, costs, burden on researchers).

#### SUGGESTED ACTIONS:

1. Establish a mechanism for regular meetings and communication among national physics society leaders through smaller meetings (e.g. regionally focused, “G-7,” etc.) that will allow for focused agendas resulting in concrete actions.
2. Form joint advisory committees, topical task forces, or joint working groups with one or more societies to identify areas of common interest, producing reports with clear action items (e.g., more coordinated efforts to influence governments on the importance of investing in international scientific collaboration and shared international scientific facilities).
3. Identify areas of possible joint advocacy interest during small summits of physics society presidents. Develop joint statements or joint presidential letters to use in advocacy efforts with national policymakers—allowing international physics community to “speak more loudly with a common voice.”
4. Work with other society leaders towards next steps for promoting mechanisms for planning international facilities.
5. Promote exchange of international speakers for APS and other national society meetings.

**LEADERSHIP:** Include more international members in APS leadership at all levels (APS Units, Advisory Committees, Prize and Award Committees, Nominating Committees, etc.).

**BACKGROUND:** To proactively include APS international members in all the Society's activities, non-U.S. members should be better represented in leadership positions within APS, including APS Units, Board, Council, Program Committees, Nominating Committee, the Panel on Public Affairs (POPA), and the Physics Policy Committee (PPC).

**SUGGESTED ACTIONS:**

1. Solicit recommendations for international representatives to serve on APS advisory committees.
2. Increase the international representation on the Board of Directors and Council of Representatives to better reflect the increases in: 1) non-U.S. APS members, and 2) corresponding authors from outside of the United States that are published in APS journals.

**UNITS:** Empower APS Units to expand joint activities; establish an International Officer on every Unit Executive Committee with a clear mandate to strengthen linkages and activities with international partners.

**BACKGROUND:** Many APS Divisions already host meetings with other national physics societies. Likewise, IUPAP organizes international conferences in many of the major disciplines of physics. On the other hand, many emerging or cross-cutting physics fields addressed by APS Topical Groups could benefit from joint meetings with international partners. Likewise, many national physics societies have similar groups such as APS Forums to address cross-cutting issues. (For example, both APS and EPS have a "Forum on Physics and Society.")

Many Units' Executive Committees (ExComms) already may include physicists from outside of the United States, but these members are not given a specific mandate to build connections with other national physics communities. Likewise, some APS Units are reluctant to include non-U.S. ExComm members, due to increased travel expenses to attend ExComm meetings.

By helping to offset certain additional expenses, APS can encourage Units to establish an International Officer who would specifically be charged with connecting to other physics communities.

**SUGGESTED ACTIONS:**

1. Establish an International Officer position on APS Unit ExComms, with a clear mandate to strengthen linkages to physics communities outside of the United States and foster such opportunities as: 1) organizing joint sessions at other national physics society meetings; 2) organizing joint workshops or other meetings; and 3) identifying other ways to build APS connections to international physics communities. The APS Office of International Affairs can help facilitate these connections.
2. Provide additional travel funds to units that need to bring an International Officer or ExComm members from outside of the United States to attend the Unit ExComm meetings.

3. Establish a call for proposals for “catalyst funds” to help APS Units (especially Topical Groups and Forums) organize workshops or other meetings with international partners on emerging physics, cross-disciplinary topics, or cross-cutting policy issues and other shared interests. Unit budgets may not be able to fully support a joint international workshop or meeting. While APS “catalyst funds” may not be able to fully fund a joint workshop, a partial contribution to organizing expenses could underscore APS commitment to working with international partners and motivate units to organize joint workshops or meetings.

**Senior Staff & Programs: Expand international reach of APS programs; ensure senior staff include international communities in all program plans.**

**BACKGROUND:** When surveyed on the most important objectives for international engagement, APS Senior Staff and Editors ranked “*expand international reach of existing APS programs*” as the highest priority. APS leadership must ensure that international engagement should be included when developing program plans and priorities.

In survey comments, Senior Staff also suggested that a closer partnership between the Office of International Affairs and other APS Departments, involving regular dialog to exchange information and explore ideas for adapting and expanding APS programs to international contexts, would help coordinate and facilitate diverse activities.

**SUGGESTED ACTIONS:**

1. Ask programmatic leaders to prepare a White Paper with ideas to expand their U.S.-focused programs to serve international audiences.
2. Convey that resource requests for implementation will be appreciated and considered in upcoming budget conferences, and/or included in fundraising campaigns.
3. The APS Office of International Affairs should work together with the APS program offices to help expand their offerings to serve international members. In doing so, it can facilitate connections to international science organizations, national physics societies, and other potential partners. It can also serve as a central node for keeping abreast of the diverse international activities across the Society and explore with programmatic leaders the best mechanisms for doing so.

**Editors: Increase and facilitate the APS profile and editorial presence at international meetings; increase, as appropriate, the number of associate editors, editorial board members, and reviewers from international locations.**

**BACKGROUND:** APS could take better advantage of the international expertise of the editorial staff. This is a valuable but potentially underused resource. Currently, editors attend international meetings on an ad hoc basis with little coordination. A standard process and budget should be established to support editors' attendance and expanded participation in international meetings. There should be an understanding that this is part of normal APS editorial practices. This expands APS' reach to international colleagues and to authors who attend international meetings, without the need for APS to organize meetings outside of the United States.

Also, APS editors can serve as APS ambassadors beyond the journals. By providing them with basic, standard information about APS programs and activities, they can inform international audiences about APS. This would take advantage of existing editorial travel and therefore would be relatively cost effective. APS journals would gain even more visibility abroad by using more associate editors, editorial board members, and reviewers from international locations.

#### **SUGGESTED ACTIONS:**

1. Sponsor prizes and awards at international conferences to improve the visibility of APS journals and activities, with editors participating in the selection and awarding process. This could be focused on early-career scientists and could include a certificate and/or publicity. The cost would be a relatively small.
2. Sponsor special sessions with talks, editorial receptions, editorial panels, and/or journal booths at more international meetings. Meetings could be sponsored with just a monetary contribution in return for having the APS name and logo displayed, or by sponsoring a specific item such as a coffee break. All this would increase the journals' international visibility and leverage the Physical Review brand to raise APS' profile and recognition.
3. Establish an advisory group in the Editorial Office to develop guidelines, procedures, and budgets for APS awards that would be presented at international meetings. This could include award guidelines (i.e., which types of meetings, what types of sponsorships, ability for editors to make the decisions), the budget available, and metrics (qualitative or quantitative) to assess the value to APS and its target audience.
4. Create materials that provide basic information about APS that Editors can use when they travel to meetings and site visits (e.g. a set of standard slides that can be tailored to fit into individual talks).
5. Encourage editors to partner with the APS Office of International Affairs regarding contacts with other physics societies' leadership, as well their interests and suggested discussion items concerning outreach on editorial issues.

## Goal 3: Expand international opportunities for young physicists; better prepare young physicists for international careers.

### RECOMMENDATIONS:

**Increase connections to the international private sector/industry to improve career development opportunities outside academia.**

**BACKGROUND:** As most Ph.D. students do not obtain jobs in academia, it is important to prepare them for jobs in the private sector. While APS has programs to prepare U.S. students to work in U.S. private-sector jobs, existing programs can be expanded to help U.S. students to access and prepare for international jobs. New programs can be created to better serve students and early-career physicists outside of the United States.

#### **SUGGESTED ACTIONS:**

1. Study member survey commonalities among key constituents (which are not usually linked), such as young, international, developing country, and industrial sector respondents, to seek correlated signals.
2. Hold joint workshops with partner societies for both U.S. and non-U.S. students to prepare for industrial, private-sector, or other non-academic careers.
3. Offer webinars on international career development needs and opportunities. Permit international students who are not APS members to access these resources through their national/regional physics society.
4. Convene an inter-society task force with other national physics societies to study different models for the interaction of academia and industry (given the varied industry-academic partnerships in different countries). This could result in recommendations to share with government and other stakeholders.

**Establish additional summer research opportunities for U.S. and non-U.S. undergraduate students at premiere research facilities outside the country of their home institution.**

**BACKGROUND:** The program will provide undergraduate students with first-hand experience with other countries' science, culture, and people. This will foster a global perspective in undergraduates, which is very much required to be part of the 21st century workforce and to prepare young physics students for future careers involving international cooperation, whether in industry, academia, or government. Many universities offer study abroad programs that enable travel or coursework. Most, however, do not offer research opportunities at premiere facilities. Unlike some semester research programs, summer programs will not interfere with academic coursework. An international undergraduate program will round out the APS international programs that serve physicists at all other career levels (i.e., graduate students, postdocs, and established physicists).

### **SUGGESTED ACTIONS:**

1. Identify international research facilities that may have an interest in building an undergraduate summer program with APS, particularly in countries such as India, Brazil, and China. (The Committee on International Scientific Affairs may undertake this.)
2. Ensure these opportunities are available to students who do not traditionally have access to international research programs, including students from non-Ph.D. granting universities, first-generation college students, women, and minorities.

**Significantly increase international student and early-career participation in APS annual meetings and APS Unit meetings.**

**BACKGROUND:** Many APS Units already have programs to support students' attendance at March, April, or unit meetings. These opportunities, however, are modest and are often awarded only to a small number of the most outstanding students. Naturally, these could be expanded through fundraising.

Likewise, by strategically establishing "named" travel programs in partnership with other physics societies or organizations, APS strengthens linkages to physics communities where it has few members (e.g., named after physicists with shared history, heritage or other connections to both communities). Partnering toward named student travel awards would enhance communication at the leadership level, through collaborating to develop the program, and also encourage greater commitment of international students to APS. These students could potentially continue as long-term APS members.

### **SUGGESTED ACTIONS:**

1. Establish "named" travel award programs with national physics societies, or other national organizations, for students and/or early-career physicists to present at an APS March or April Meeting (e.g., named after physicists with shared history, heritage or other connections to both communities). Particularly focus upon students in countries where APS has few connections or members.
2. Expand existing APS Unit programs that bring students from developing countries to APS March or April meetings.
3. Support U.S. students to speak at other international physics meetings.

**Expand existing APS programs and meetings that focus upon young international physicists.**

**BACKGROUND:** Because students are the lifeblood of future membership, attractive APS programs during the early years of careers is of prime importance to foster lifetime engagement. At that stage, physicists are making major decisions about career objectives, research directions, and personal choices.

**SUGGESTED ACTIONS:**

1. Expand APS Young Physicist Forums for international mixing of student and early-career scholars. Programs for China, Mexico, Canada, and India already exist, and additional YPFs with certain other countries could also support science for diplomacy.
2. Provide an attractive tool set to communicate among the international networks of young scholars. Original APS apps and social networking tools (Facebook, LinkedIn, WeChat) are more attractive and useful to young generations than networking through correspondence and meetings. Though not just for international physicists, such a tool set is acutely needed in developing countries.

## **Goal 4: Advance government policies that promote international scientific collaboration.**

### **RECOMMENDATIONS:**

**Advocate for international research activities and stable funding for large-scale international projects.**

**BACKGROUND:** Some policymakers may be unaware of national economic benefits of international scientific collaboration. Evidence of such benefits may influence their support for favorable policies. Likewise, U.S. budget cycles may affect long-term funding for international science projects and perceptions of the United States as a reliable partner. Additionally, there are important points to be considered regarding the proper balance between open scientific exchange and intellectual property and security interests.

**SUGGESTED ACTIONS:**

1. Ask POPA to identify potential studies that can be carried out by POPA or another relevant scientific organization (e.g., National Academies of Sciences, Engineering, and Medicine) regarding such issues as national benefits of international scientific collaboration, the importance of long-term funding for large-scale international projects, and the proper balance between open scientific exchange and intellectual property and security interests.
2. Partner with other U.S. scientific organizations toward the above studies, to broaden the scope and strengthen the impact of key messages to policymakers.
3. Ask PPC to develop advocacy strategies based on the aforementioned reports.

**Promote and advocate for scientific mobility (e.g. visas and immigration policies, removing barriers to engagement), including a proper balance between open scientific exchange and intellectual property and security concerns.**

**BACKGROUND:** Many international members of APS (together with other citizens of their countries) face complex and time-consuming processes when they wish to obtain the visas they need to participate in APS meetings and other physics activities in the United States. While they realize that APS cannot have a large influence on such matters, they do expect APS to help them in whatever way it can. They want to know what APS is doing to influence U.S. visa and other policies that affect them.

**SUGGESTED ACTIONS:**

1. Develop a “best practice experience” by preparing an instruction package for conference and workshop organizers. Describe difficulties that some speakers and participants may face and inform them how to best advise their participants regarding visa procedures.
2. Hold APS scientific activities outside of the United States to enable international members’ easier access to some APS events.
3. Continue to advocate for U.S. policies that enable scientific mobility with both Congressional offices and Executive agencies. Partner with other U.S. science and higher education organizations toward joint actions when appropriate. This includes reforms to the H-1B visa program to ensure that those visas are available to international applicants who join U.S. corporations and contribute to physics research and technology development.

**Establish an APS State Department Fellowship Program and/or expand APS sponsorship of existing AIP State Department Fellowships to further engage APS members in policy formation.**

**BACKGROUND:** APS members can contribute their science and technology expertise to the policymaking process by working directly at the Department of State. Here, APS representatives in these positions can help shape policies affecting the physics community and inform APS on issues at the interface of science and foreign affairs, or opportunities for partnerships toward international programs.

**SUGGESTED ACTION:** As a first step, APS leaders may task CISA to explore status and current opportunities for expanding these programs within the State Department (i.e., in STAS and OES). If the State Department is open to Fellowships, ask CISA to develop a proposal for expanding participation in existing programs or launching a new one. This also may include suggestions of potential foundations, etc., that may be approached in a fundraising campaign to support these Fellowships.

## **APPENDIX B**

# **Additional Considerations**

**Increase international partnerships.**

**Prepare young physicists for global opportunities.**

**Expand international diversity of APS communities.**

**Empower APS internal operations to better serve international physicists.**

## Increase international partnerships.

### CONSIDERATIONS:

**Expand physics education, training and outreach in partnership with other physics societies and international organizations, including those in developing countries.**

**BACKGROUND:** A shortage of STEM middle and high school teachers is a shared issue in many countries. Likewise, there are not always sufficient resources for education and training in developing countries. Also, in some countries there is a decline of interest in pursuing careers in physics.

#### **SUGGESTED ACTIONS:**

1. Form joint topical focus groups, or joint committees with other societies to identify areas of common interest, share best practices, and leverage combined resources for joint activities. The Task Force does not presume to identify specific projects, but underscores physics education, training and outreach as a shared global interest.
2. Develop an online platform to share teaching, learning, and outreach resources. Provide some of these resources in other languages besides English.

**When appropriate, partner with other national physics societies on issues and individual cases relating to human rights for physicists and other scientists.**

**BACKGROUND:** Over the years, the Committee on International Freedom of Scientists (CIFS) has often reached out to professional associations in physics and other disciplines, as well as other scientific and technical institutions, sometimes seeking cooperative action, sometimes seeking only information. In many instances such outreach has proven to be extremely helpful to the work of CIFS. In some cases, however, success has depended upon there being an appropriate degree of discretion and confidentiality in the approach to a partner institution. Every situation is different, and case-specific judgment is required about the optimal mode of outreach.

CIFS has been wary of pursuing a blanket approach of establishing more formalized relationships with physics societies and other such institutions. This is mainly because “human rights” is interpreted differently in different parts of the world. One can easily imagine cases in which an open, formal request for collaboration on human rights issues could be awkward and perhaps even seen as threatening.

#### **SUGGESTED ACTIONS:**

1. Encourage CIFS to continue to engage with other national physics societies and similar institutions in cases where cooperation is seen to be appropriate and in a manner that respects sensitive issues that might be involved. CIFS should consult with and advise APS leadership regarding such outreach as individual situations demand.
2. Task CIFS with developing appropriate guidelines for partnering with other national physics societies on human rights issues.

## Prepare young physicists for global opportunities.

### CONSIDERATION:

**Increase participation of non-U.S. Graduate Student and Early-Career members in APS leadership and APS Unit activities.**

**BACKGROUND:** Many graduate students and early-career physicists wish to become active in APS activities, beyond attending meetings, but do not know how to “get involved” in APS meeting programming, unit activities, or other leadership. This is especially true for non-U.S. young physicists who may not have mentors or professors who are APS members.

#### **SUGGESTED ACTIONS:**

1. Identify and strengthen the “charter” or “bylaws” for nominating committees within APS Units to encourage international representation by young international physicists.
2. Create a webinar “how-to” series to educate Graduate Student and Early-Career members, especially those outside of the United States, on how to become engaged with APS meeting planning, Unit activities and leadership, and other aspects of APS.

## Expand international diversity of APS communities.

### CONSIDERATIONS:

**Increase diversity of physicists attending U.S. and international meetings; promote collaboration among developed and developing country physicists.**

**BACKGROUND:** Many groups struggle to understand how to access certain career-enhancing international opportunities. These include groups in the U.S. such as students and physicists at non-Ph.D. granting institutions and first-generation physicists from immigrant parents, women, and minority groups. Likewise, physicists from developing countries have difficulty accessing APS activities.

#### **SUGGESTED ACTIONS:**

1. Provide financial support for women, underrepresented minorities, students from non-Ph.D. granting universities, etc., to present their scientific research at international meetings.

2. Provide financial support for physicists from developing countries to present their scientific research at APS meetings. Ensure a diversity of developing country physicists from various regions (i.e., Middle East, Africa, Latin America, Southeast Asia, etc.).
3. Expand and ensure sustainability of existing (and proven successful) APS Unit programs that enable physicists from developing countries to collaborate and conduct research with physicists from developed countries.

**Provide support to developing country physicists for open access fees and journal subscriptions.**

**BACKGROUND:** APS offers free, online access to its journals for institutions in some countries in Sub-Saharan Africa, as well as Bangladesh and Cuba. This offer is made available through the International Network for the Availability of Scientific Publications (INASP). APS may wish to further explore questions, such as: Is this well enough known and easy enough to use? Is the set of countries appropriate? How often is this used? APS may already be doing enough, but it is worth making sure, and perhaps the policy could be given more prominence.

**SUGGESTED ACTIONS:**

1. Advertise better the free journal offerings (both to the people who might make use of them and more widely to generate goodwill). Determine whether current practices are sufficient. Make improvements, if and where necessary.
2. Explore whether other developing countries should receive free online journals, besides those countries currently covered by the current APS agreement with INASP.
3. If there is a non-negligible cost to the suggestions above, consider fundraising.

**Create an APS “Committee on Serving Developing Country Physicists,” similar to those created by other national physics societies.**

**BACKGROUND:** As IUPAP, EPS, and IOP have already done, APS can form a committee charged with promoting physics in developing countries. These countries are often without established physics societies, leaving physicists without access to larger physics communities and services. The committee could be charged with fostering APS relationships with these developing country physicists and finding ways to bring APS programs, journals, and other services to their communities. It could also work with APS Units to help facilitate or coordinate the diverse Unit programs serving developing countries.

**SUGGESTED ACTION:** Task CISA to develop a proposal, describing the charge and functions of a Committee on Serving Developing Country Physicists to be shared with APS leadership.

## Empower APS internal operations to better serve international physicists.

### CONSIDERATIONS:

#### Use information technology to enable participation in APS meetings and scientific seminars.

**BACKGROUND:** When APS members were surveyed on ways to make meetings and seminars more accessible using information technology, respondents overwhelmingly ranked “provide video archives of March & April Meeting invited sessions” as their highest priority. (71% of non-U.S. respondents and 68% of U.S. respondents ranked this as their highest priority, over other options such as livestreaming, etc.<sup>2</sup>)

The next highest priority was “offer webinars of scientific lectures on significant physics research.” (56% of non-U.S. and 54% of U.S. respondents ranked this as a priority.<sup>3</sup>)

#### SUGGESTED ACTIONS:

1. Provide video archives of March & April Meeting invited sessions.
2. Offer webinars (including Q&A) that provide scientific lectures on significant physics research.

#### Develop a “Master Class” program of webinars to benefit physicists of all ages in all countries for Open Science and other initiatives.

**BACKGROUND:** International “Open Science” is a major trend in Europe and could be appealing to developing countries. (See articles by the EPS, giving a European Commission perspective.) The main activity is to provide access to data, such as LHC experiments, and tools for analyses together with the training to use them. These “Master Classes” could extend to astronomy, materials physics, and virtually every discipline.

#### SUGGESTED ACTIONS:

1. Develop a curriculum of attractive Master Classes for analytic and computational tools (e.g., Gaussian [density functionals] and MCNP [Monte Carlo neutron propagation]). Study the IPPOG (International Particle Physics Outreach Group) examples, in which Master Classes are given in cosmic ray physics. Events can be highlighted by a named event, such as “International Cosmic Ray Day.”
2. Hold “Jam Sessions” and “Hackathons” for online interest groups seeking collaborations. A good example might be quantum computing algorithms.

### Make journal editorial boards, editors, and referee pools more international.

**BACKGROUND:** The journals are already very international (for example, when looking at submitted and published papers). APS should strive to better reflect the global physics community in its editorial practices. It is an ongoing effort to find more international editorial board members, referees, and editors in ways that reflect the journal readership.

**SUGGESTED ACTION:** Continuously add new international referees to the database.

### Consider editorial offices and/or expand editorial contacts abroad.

**BACKGROUND:** Creating editorial offices in Europe or Asia is often suggested as a way to demonstrate that APS journals are not only focused on the United States. However, logistics and costs of creating such offices may be high. Consequently, the pragmatic issues and usefulness must be carefully evaluated. (Even without foreign offices, many editors currently have contacts abroad.) Such offices could be useful for planning and to learn about areas where APS could be of help to international authors.

#### **SUGGESTED ACTIONS:**

1. Increase information sharing about editors' contacts and connections abroad, and about countries and subjects that are being targeted for international initiatives.
2. Consider establishing editorial offices abroad.

### Organize *Physical Review* editorial board meetings outside of the United States.

**BACKGROUND:** Each *Physical Review* journal has an annual meeting of its editorial board at an APS-organized meeting. Many Editorial Board members are from outside of the United States. However, they do not necessarily attend APS meetings. Editorial board meetings could be organized outside of the United States from time to time, either instead of, or in addition to, the current annual meetings. This currently happens on occasion, but in an ad hoc fashion.

**SUGGESTED ACTION:** Create and support a process for organizing APS editorial board meetings abroad.

**Provide education and support for scientists abroad about publishing and writing, as well as article processing fees.**

**BACKGROUND:** Guidance about publishing and writing is especially useful for early-career scientists, particularly for scientists in regions such as Asia and Latin America where there has been recent growth in the investment made in physics research. Such guidance could be provided through editorial visits to institutions and meetings. APS could also develop resources on publishing and writing that could be posted online to reach a broader audience. This would be most useful for underserved communities.

**SUGGESTED ACTIONS:**

1. Add weekend workshops or side meetings/sessions/joint sessions at international meetings or joint meetings with other physics societies that would be attended by APS editors.
2. Provide a budget to sponsor these types of gatherings (i.e., travel for speakers if needed, printing).
3. Develop teaching materials on publishing and writing for presenters to use.
4. Provide similar information online.



