

Report of the 2016 APS Prizes and Awards Task Force

I. INTRODUCTION

Special committees have in the past carried out periodic reviews of APS Prizes and Awards, with the most recent examples being the 1998 Dresselhaus and 2002 Sarachik Task Forces. In response to a recommendation by the Sarachik Task Force, this procedure was changed after 2002, leading to the following description in the old APS Constitution and Bylaws,

“Committee on Prizes and Awards. The membership of the Committee on Prizes and Awards consists of six (6) Councilors, selected by the Committee on Committees and appointed by the President-Elect to staggered three-year terms, which may include one year of service beyond their term as Councilor. The President-Elect appoints the Chair from among these six members. The Committee reviews all proposals for new prizes and awards and makes recommendations to the Council. It reviews all existing Society prizes and awards at least once every five years to insure they are properly funded and that the subject area of each prize and award remains relevant. The Committee also ensures that prize and award selection committee members represent the broadest possible context of the prize or award subject area and considers any other administrative issues related to prizes and awards.”

However the envisioned five-year reviews have not taken place. Thus, at the urging of Council, the current APS Committee on Prizes and Awards is conducting the first review since 2002. Our committee was allowed to determine the overall scope of the review. We initially selected the following topics and questions:

1. An assessment of the funding sustainability of existing prizes and awards.
2. The appropriateness of the number and diversity of current prizes and awards. At the time of the Sarachik Task Force there were 36 prizes and awards. Today there appear to be 52 prizes and awards as well as 13 dissertation awards, and several others are in various stages of approval.
3. Should there be an effort toward greater standardization of prizes and awards, including both existing prizes and awards, and ones in the proposal stage? Potential issues include
 - Eligibility criteria, particularly restrictions that may limit awards in ways that may not be appropriate, e.g., given the growing international role of the APS.
 - Funding requirements, including greater clarity in the requirement to endow new prizes and awards in a timely way.
 - Scientific scope: are there prizes that, either intrinsically or due to the passage of time, are too narrowly focused?
 - Under what conditions should a prize be discontinued, and the funding redirected, if any?
 - Should the rules governing unit awards follow those of Society awards?
4. Are prize and award funding levels keeping pace with inflation? If not, what action should be taken, if any?
5. An assessment of the nomination and selection process, to identify opportunities for improvements.
6. Is the distribution of prizes and awards consistent with APS demographics, including gender and nationality?
7. Is the growing use of unit funds to temporarily or permanently support awards appropriate, given that these funds derive primarily from revenues generated at meetings from registration fees paid through federal grants?

The report is organized around these issues and questions.

The members of the Prizes and Awards Committee responsible for this report are:

Cary Forest	University of Wisconsin
Tom Gallagher	University of Virginia
Wick Haxton (chair)	University of California, Berkeley
Nadya Mason	University of Illinois
Gail McLaughlin	North Carolina State University
Michael Tuts	Columbia University

We were assisted in our efforts by APS staff including especially
 Mary Raucci APS Honors Program Manager
 Trish Lettieri APS Director of Membership

II. PRIZE, AWARD, AND FELLOWSHIP CATEGORIES

The APS prizes, awards, and fellowships can be divided into several categories

- The APS-wide prizes that recognize achievements in any branch of physics, with selection performed by the APS Medal and Prize Committee, chaired by the APS President-Elect. These prizes include the APS Medal for Exceptional Achievement in Research (\$50K), the George E. Valley, Jr. Prize (\$20K), and the Julius Edgar Lilienfeld Prize (\$10K).
- Other APS prizes. As of our initial data compilation (mid 2014), there are 29 such prizes. Typically but not uniformly, the prize amount is \$10K.
- APS awards and lectureships, typically at the award amount of \$5K.
- Dissertation awards, most of which have been established relatively recently. Currently there are 14 such awards, representing all divisions except DPOLY. One Division (DPF) has awards for both experiment and theory, while two Divisions (DCMP, DMP) share one prize. One Topical Group (Hadronic Physics) has a dissertation award.
- Fellowships. These include the Blewett Fellowship for women physicists returning to careers, the Ovshinsky Fellowship (Sustainable Energy), and the Stacey Magnetic Fusion Energy Graduate Fellowship (currently in the fund-raising stage).
- Unit Awards: There are approximately 41 (so far identified) unit awards, including student and postdoctoral travel awards, service awards, mentoring awards, etc.

More detailed descriptions can be found in Appendices A-E.

A. Prizes and Awards Web Page

The main Prizes and Awards vehicle for interfacing with the community is the APS website. The current header organization is

Prizes, Awards, and Fellows

- Prizes
- Awards and Lectureships
- Dissertation Awards
- APS Fellows
- Other APS Honors

We also note that the above listing appears under the high-level banner “program,” which we find confusing. We hope this can be fixed, and the subsequent tree reorganized.

Administrative Recommendation 1: Reorganization of the header and associated web pages as follows:

APS Prizes, Awards, and Fellowships

General Prizes and Awards

Subfield Prizes, Awards, and Fellowships

- Prizes
- Awards and Lectureships
- Dissertation Awards
- Fellowships

Unit Awards

Service and Policy Fellowships

APS Fellows

The operational definition of these categories is:

1. APS Society-wide Prizes: The APS Medal, Lilienfeld, and Valley Prizes, selected by Council committees under the President-Elect (See Appendix A). Also, we recommend that the Apker Award, recognizing undergraduate research, be included in this category.
2. APS Prizes: All other APS prizes listed in Appendix A and on the current APS website under the “prizes” category.
3. APS Awards and Lectureships: The awards and lectureships listed in Appendix B. We suggest below that additional lectureships be added to this category.
4. APS Dissertation Awards: These are listed in Appendix C.
5. APS Research Fellowships: The Blewett, Ovskinsky, and potentially the Stacey Fellowships (see Appendix D).
6. Unit Awards: All awards selected and administered by the units (see Appendix E).
7. Service and Policy Fellowships: Selected from the current “Other APS Honors” category, candidates are the APS/AIP STEM Education Policy Fellowship, the Congressional Science Fellowship Program, and the Mass Media Fellowship Program.

The “Other APS Honors” section appears to serve as a home for awards that perhaps do not fit elsewhere. We recommend that this category be deleted, with the listings moved as follows:

Administrative Recommendation 2: Reclassification of “Other APS Honors” as follows:

- The Blewett (women returning to research) and Ovskinsky (sustainable energy) fellowships are substantial awards (\$15K-\$35K typically) and deserve to be prominently displayed as APS Fellowships. The pending Stacey Fellowship (magnetic fusion energy graduate fellowship) seeks an endowment of \$500K. In our view, these fellowships should be moved to the new APS Research Fellowship category, described above.
- The APS/AIP STEM Education Policy Fellowship, the Congressional Science Fellowship Program, and the Mass Media Fellowship Program could be moved to the new Service and Policy Fellowships category.
- The remaining listings in the “Other APS Honors” category are
 1. The Beller Lectureship, which funds typically three overseas lecturers to participate in the March and April meetings.
 2. The Distinguished Lectureship on the Applications of Physics, which carries a \$5K award and lecturing costs up to \$5K.
 3. The Marshak Lectureship, which funds travel for a developing nation or Eastern block speaker attending the March or April meetings.

We recommend that these three lectureships be grouped with the David Adler Lectureship and the Distinguished Lectureship on the Applications of Physics, both of which are currently in the APS Awards and Lectureship category, to form an expanded “Lectureship” category of “APS Awards and Lectureship” web page, arranged in the style of Appendix B. This could give these lectureships more visibility.

An additional category, APS Travel Awards, may be needed, as discussions are underway to create such awards. The unit award category is large and not organized coherently at the Society level. The listings in Appendix E are likely incomplete, as units sometimes create awards but do not communicate that fact outside of the unit. This situation is longstanding, also noted in the Sarachik Report. Even if incomplete, the information in Appendix E would be helpful to the APS membership, so we suggest that it be transferred to the web page.

Administrative Recommendation 3: Building on the staff work that was invested in compiling the information in Appendix E, we recommend that the available information on unit awards be included on the APS web page.

Currently the APS web administrator handles web updates from the units, with the Honors office signing off on all requests mentioning prizes and awards. Thus if the above recommendation is implemented, Honors would be aware of future changes to unit awards, and could keep the web page up to date. When the initial draft page is created, the units could be asked to proof the page and identify missing information. This process could be repeated every several years, to maintain some level of organization in these awards.

Administrative Recommendation 4: It is currently difficult for members to sort through a long list of prizes and awards, to determine which ones might be relevant to candidates from their subfields. We recommend, during web page reorganization, that search capabilities be added that can help members quickly identify prizes by unit, category, etc.

This recommendation is well timed due to APS efforts to improve its web services and capabilities. As part of overall upgrades, searches should be enabled to allow users to identify prizes specific to particular units, or relevant to certain classes of candidates (undergraduate, graduate, early career, etc.). This would significantly improve efficiency and functionality.

B. Prizes and Awards Data Used in this Report

The data used in this report comes primarily from three sources

1. Information gathered by the staff on the description and unit affiliations of Prizes, Awards and Lectureships Dissertation Awards, Fellowships, and Unit Awards, including a separate compilation of funding sources and prize/award levels. This information is included in Appendices A-E.
2. Information gathered by the committee from an email survey on recent Prize Committee and Unit chairs, which focused primarily on operational issues in the prize and award selection process. We also had many interactions with Mary Raucci and Trish Lettieri about their experiences with the Prize and Awards process, and their suggestions for improvements. We also contacted CEO Kate Kirby, to invite her input.
3. A report from the APS Development Office on fundraising for prizes, awards, and other honors (included as Appendix F).
4. We had hoped to gather detailed data on prize demographics, but found that the necessary tools for tracking are just now being developed. We did on our own a short survey of prize demographics over the past decade, compiling data on age, gender of prize winners, and the number of winners from nonUS institutions. We also greatly benefited from a report from the Committee on Minorities addressing the success rate of underrepresented minority group members in competing for prizes and awards. This report is included as Appendix G.

We thank the staff for the effort they invested to gather this information and display it in an attractive way.

III. THE NOMINATION AND SELECTION PROCESS

One of the Committee's first actions was to try to assess the current nomination and selection process, to see how it is working and to gather suggestions from APS members for improving the process. To this end, the committee contacted current Prize Committee chairs as well as unit chairs to inquire about the nomination and selection processes. There were many positive comments, which we do not list below. There were also suggestions and concerns, including:

- Incomplete nominations packages, e.g., ones lacking c.v.s or biographical information.
- Nomination package formats that call for too little information, especially in cases of prizes with broad scopes, such as the prize for a Faculty Member for Research in an Undergraduate Institution, where the committee may not be expert in all areas.
- Poor communications between committees and the APS Prize Office: There are examples where a committee chair and/or member was unaware he/she had been appointed.
- Guidelines for prize committees that are vague, lacking clear guidelines about the selection.
- Insufficient vetting of nominations by the APS, leading to out-of-date nominations being sent to committees. In one case a deceased candidate's nomination was sent to a committee in two consecutive years, though the error was reported after the first year. In another case, the nomination of a successful candidate was returned to the same committee in the two following years.
- Committee chairs that fail to start the selection process in a timely way, leading to a rushed process.

- Committees whose members are concentrated in one area, skewing the selection process.
- Difficulties in determining, from the Prizes and Awards web page, which prizes are most relevant to a given unit.
- Prizes with too few nominees, including from under-represented groups, perhaps indicating too little effort on the part of the committee, unit, and APS in generating nominations.
- Too many prizes, leading to small applicant pools and indicating that criteria for new prizes should be tightened.
- A nomination process that makes poor use of online capabilities, leading to communications errors, lost nominations, etc.
- Inadequate tracking, so that statistics on past nominees and their demographics are not readily available. This database should include a register of past awardees, so that current committees are aware of past prizes a nominee may have received, as well as the citation. It should also alert committees if the same nominee is proposed in the same year to two different committees.
- The absence of clear instructions about the role of a unit's chair or executive committee. Some have tried to insert themselves into the selection process, leading to worries about confidentiality, independence, etc.
- Too much emphasis on international candidates.

A. Committee Responses to Community Input

In response to these comments, we make the following recommendations,

Recommendation 1: *Expedite the current transition to an online, paperless nomination and selection process, with primary goals being efficiency, reliability, application completeness, and security.*

Excellent progress has already been made: the new online system should be fully operational by the end of 2016. The new system will include standardized forms and streamlined procedures for uploading recommendation letters and ancillary materials by one or more nominators. Our committee hopes that the system will allow uploading of large documents, such as a PhD thesis, and make crosschecks to prevent submission of a nomination unless all required elements are in place. It would be helpful to selection committees if the system could provide information on APS awards the nominee has received in previous years and on any pending nominations other than the one being submitted. Such information would also help nominators, reminding them that a new nomination for a previous prize winner should distinguish current work from that previously recognized.

This recommendation applies to APS prizes and awards: once the system is fully implemented for these, it could also be extended to unit awards. We return below to a discussion of unit awards and their relationship to APS, including services that APS could provide to support unit awards.

Several community comments had to do with nominations being rolled over automatically to new years, even though some important aspect had changed, making the nomination obsolete. Thus:

Recommendation 2: *Yearly requirements for renomination of a continuing candidate, for any year in which a nomination can be reconsidered.*

The APS would be responsible for reminding the lead nominator that this step is required, well before the nominations deadline. The re-nomination step should allow updating of the original nomination – but not require this. That is, re-nomination could be as simple as checking a box. As the lead nominator will be most knowledgeable about the candidate's status, this step should guarantee that the nomination remains up-to-date and viable. Other nominators could be copied on the request, to guard against situations where the lead nominator is not available.

Recommendation 3: *The APS Prizes and Awards Office should implement systematic protocols for interacting with selection committee chairs, to help ensure an early start to the selection process, adequate attention to building a diverse pool of candidates, and a fully engaged committee.*

We have a suggestion that could help in the implementation of this recommendation. Committees are appointed in spring, often just after changes in unit leadership. There is naturally a lag between appointment and the start of committee work. It takes time for new committees to recognize potential problems. Consequently, it is often too late - past the nomination deadline - to find solutions. Thus we suggest a reorganization in which a retiring committee, after its selection work has been completed, would complete two final tasks:

1. Evaluation of the candidate pool (nominations being held over to the next year). If there are any concerns about its adequacy or diversity (including nominations from abroad), the retiring committee should reach out to the community, seeking new nominations. It is in fact preferable for the retiring committee to take this responsibility: some of its members will not be returning, lessening concerns about committees who both generate nominations and then judge those nominations.
2. Forwarding suggestions to the unit governance about replacement members. Because the committee has worked through one nominations cycle, it will be in a position to identify missing expertise and make appropriate suggestions to the unit. If unit selection of new committee members can be completed in the fall, with names then forwarded by the unit to the APS, appointment letters can go out early in the next calendar year.

Although the units are responsible for selecting new committees, we feel it is important for official appointment letters to come from the APS. 2) will allow sufficient time to do this. This will provide quality control, making sure that all committee chairs and committee members receive the information they need to function optimally. We envision the APS creating and providing to each chair a brief "best practices" description of the committee process, including a recommended timeline as well as instructions about reporting and confidentiality, guidelines on handling conflicts of interest, etc. The instructions on confidentiality should include a reminder that the names of unsuccessful candidates should not appear in reports.

It is increasingly common for university search committees to include, in instructions to committees, information on the impact of implicit bias. One possibility that should be explored is the creation of an online course that newly appointed committee members could take. A similar recommendation is made in the report of the Committee on Minorities APS Honors Study, which we discuss later.

B. APS Nomination and Committee Guidelines

We reviewed the online nomination guidelines and committee guidelines posted on the APS Prizes and Awards website. We found these to be clear, complete, and concise. We have just a few suggestions:

1. In the "Canvassing" section of the Selection Committee guidelines, we recommend that it state that such canvassing be conducted well before the nominations deadline. In fact, if the suggestion above is adopted to ask retiring selection committees to shoulder the task of canvassing (in cases where the candidate pool should be strengthened), a substantial rewriting might be needed.
2. In the Conflicts of Interest sections, a committee member from the same institution as a nominee should be included.
3. The online listing of current and past recipients is a very valuable tool for selection committees. It would be good to remind selection committees that this information is available, by including a link to the relevant listing on the selection committee web site.
4. It would be appropriate to state in the guidelines that if the committee decides the pool of candidates in a given year does not meet past standards, no award should be made.

C. Clarity and Consistency of Selection Criteria

Our committee reviewed the portfolio of prizes and awards, evaluating the clarity of the selection criteria as well as the consistency among comparable prize and award requirements. We point out here some of the Prize issues that Council might consider

1. The APS Medal is new and thus its selection criteria are just being put to the test. The rules specify that previous winners of APS prizes and awards are eligible. Is this provision contingent on the usual condition, that a second prize or award is justified only if the work is substantially distinct from that previously recognized? Other awards, including high-level awards such as the Nobel Prize, the Breakthrough Prize, and the Wolf Prize,

are not mentioned. As the goal of the Medal is to recognize the most distinguished physicists worldwide, it is likely that most viable candidates will have received major awards, so some agreement should be reached on how this affects eligibility. Selection committees should strive for year-to-year consistency. Nominators should be given clear guidance, so that work is not invested on candidates that may, effectively, be ineligible.

2. The Valley Prize carries a stipend of \$20K/year, substantially more than any other APS early career award. But it is awarded only every other year. Consequently the expected frequency of an award in an area represented by one of our Divisions might be once every three decades. We suggest that a reduction in the level of the prize to \$10K be considered, so that it can be awarded every year. Even at \$10K the Valley Prize stipend would be substantially above that of other early career awards. Yet twice as many young researchers will be recognized, augmenting their careers. Given the difficulty of comparing young researchers working in different fields, doubling the number of awards would reduce the “lottery” aspect of the current Valley Prize.
3. Prize rules are remarkably uniform, with the exception of the question of the number of recipients. Several awards are restricted to one recipient for reasons that are connected to the nature of the award - the Pake Prize combining research and industrial leadership, the early-career Valley Prize, the Lilienfeld Prize combining research and lecturing, and the Research in an Undergraduate Institution Prize. There are two awards in which the award descriptions do not stipulate the number of recipients – the McGrody and Onsager Prizes – and these have in fact been awarded to teams. The Bethe, Broida, and Langmuir Prizes are explicitly limited to one individual, though both the Bethe and Broida Prizes have in fact been awarded to two-person teams. The APS Medal and Pais and Feshbach Prizes can be awarded to up to three. The remainder (and majority) of the prizes simply allow a prize to be shared when all recipients have contributed equally to the work being honored. Given the collaborative team structure of modern physics, we find the simple, nonrestrictive language of the last to be sensible.

Recommendation 4: *Pending consideration of restrictions that may be connected with donor requirements, we ask Council to discuss the three issues raised above, with the goal of better aligning prize descriptions with prize goals of recognizing deserving science.*

In the case of Awards, our primary concern is low award levels, an issue we address separately below. There are a few cases where the number of awardees is restricted, e.g., the new Landauer and Bennett Award is described in terms of a single scientist, though this restriction is not inappropriate for an early-career award.

Dissertation awards have received little attention from past committees, which may explain the lack of uniformity in dissertation requirements:

1. While most awards place no restrictions on location, several do. Among the variations are a) US university or US education abroad program (Acrivos Award, Fluid Dynamics; Sakurai Award, Theoretical Particle Physics); b) US university, non-US university with a research residency requirement in the US, or an APS membership requirement (Hadronic Physics); c) North American University (Nuclear Physics); d) US university or US student abroad (Rosenbluth Award, Plasma Physics); and e) North American university or a North American study abroad program (Tanaka Award, Experimental Particle Physics).
2. The Jankunas Award (Chemical Physics) requires the nominator and nominee to be members of the DCP; DAMOP requires the nominator (the thesis advisor) to be a member of DAMOP.
3. Stipends and travel allowances vary substantially - an issue we address elsewhere.

International researchers play an important role in the APS and in supporting our journals. Restrictions on the location of the thesis research are thus somewhat at variance with other APS efforts to engage the international community. It is not clear to us that student or thesis advisor membership in a unit is relevant to the main goal of thesis awards, recognition of outstanding student research.

Recommendation 5: *We recommend that Council discuss the appropriateness of Dissertation Award criteria that restrict the location of thesis research or require Society or Unit membership of the student or thesis advisor.*

IV. NUMBER AND DIVERSITY OF PRIZES AND AWARDS

Currently there are 33 prizes, of which six were established in the 14 years that have passed since the 2002 Sarachik Task Force. There are 27 non-dissertation awards, eight of which were created after 2002. The sharpest growth has

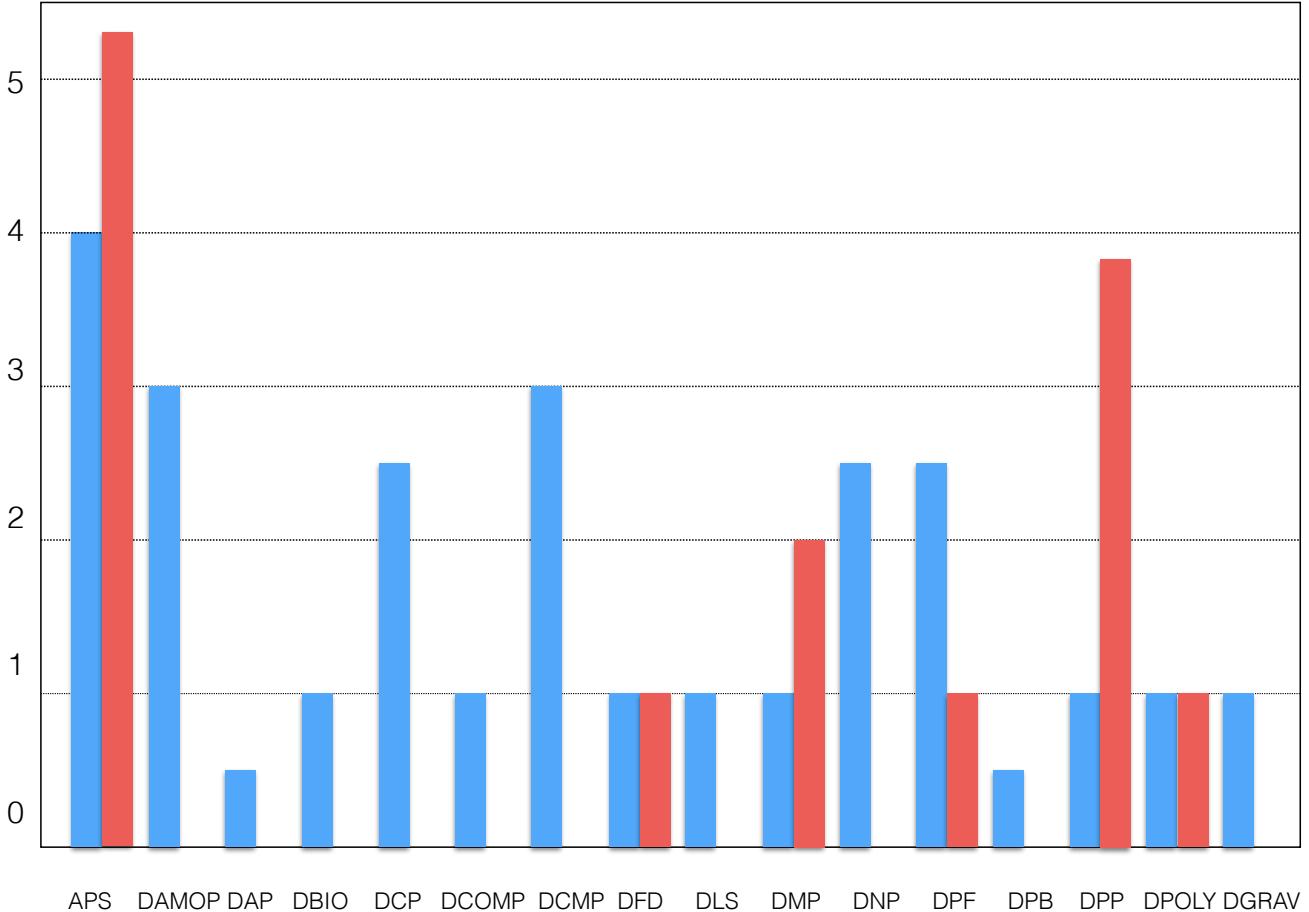


FIG. 1: Distribution of prizes (blue) and awards (red) among the Society and its Divisions.

been in dissertation awards, where 8 of the 14 awards were created during the last seven years.

If one counts a prize shared by two divisions (or by a division and a topical group) as a half unit for each, then there are currently 22.5 prizes that focus on research one can associate with specific divisions. There are also three APS-wide prizes (APS Medal, Lilienfeld, Valley). The distribution of prizes, which presumably reflects division efforts to establish prizes through fund raising, is illustrated in Figure 1. Every division shares in at least one prize. Five divisions (DAMOP, DCP, DCMP, DNP, DPF) have or share in three or more prizes. There are a few divisions that appear to be less well represented in the prize and award lists. For example, the Division of Astrophysics shares a single prize (the Bethe Prize, with DNP) and thus might be a priority area for a new prize, especially in observation or experiment, as the Bethe Prize has frequently gone to theorists. Similarly, the Division of Physics of Beams has only one shared prize, the Wilson Prize, joint with DPF.

Figure 1 also includes awards and lectureships. These are distributed more randomly among the divisions, but the overall effect, when prizes, awards, and lectureships are added together, is to smooth out some of the variations apparent when only prizes are considered.

Certain forums (Education, History of Physics, Industrial and Applied Physics) and the topical group on Statistical and Nonlinear Physics have prizes. The Committee on the International Freedom of Scientists sponsors the Sakharov Prize.

A larger number of forums and topical groups sponsor awards, including the Forums on International Physics (3), Physics and Society (2.5), Education (1), and Industrial and Applied Physics (2), and the Topical Groups on Shock

Compression of Condensed Matter (1), Soft Matter (1), Instrument and Measurement Science (1), and Precision Measurements and Fundamental Constants (1). The Committee on Minorities in Physics and the Committee on the Status of Women in Physics sponsor the Bouchet and Goeppert-Mayer Awards.

With the exception of DPOLY, each Division has a dissertation award (DCMP and DMP share one award). One Division, DPF, supports two. Among forums and topical groups, the Topical Group on Hadron Physics is the only organization to sponsor a dissertation award.

Although there has been growth in the number of prizes and awards over the last decade, we do not regard the number as currently excessive. While the distribution of prizes and awards, which we suspect largely reflects the initiative of the sponsoring divisions, is not even, it also is not badly askew. Thus we see no urgent issues that need to be addressed, and recommend only that the balance of prizes and awards be kept in mind in the standard process of Prize and Award Committee review of new proposals, including in determining stipend levels (discussed in more detail in the next section).

Recommendation 6: *In the case of Division prizes, we regard the current balance of prizes as reasonable, though we would also encourage the APS Development Office to be especially proactive in supporting future initiatives from Divisions such as Astrophysics and Physics of Beams, both of which currently have just shared prizes. The stronger growth in unit awards and dissertation awards does not by itself raise concerns, though we propose stricter guidelines in the following section on award amounts and uniformity that could damp future growth in the number of awards.*

V. PRIZE AND AWARD FUNDING AND FUNDING LEVELS

A. APS Prize Award Levels

One of the key recommendations of the Sarachik Task Force was to require all major APS prizes to carry a minimum stipend of \$10K by the end of 2006. At the time of that recommendation only 6 of the then 26 prizes met that standard. The rationale for the 2002 recommendation was that amounts below \$10K – some of the prize stipends at the time were as low as \$3K – did not represent appropriate recognition of prize winners. As more than one recipient may be chosen in a given year, the awarded amount can be half or one third the nominal stipend. In response to the Sarachik Report and after discussions with the affected units, Council made a largely successful effort to follow the 2002 Task Force recommendation. Of the 33 prizes that now exist, 27 have stipends at or above the \$10K level.

Those prizes that do not meet this standard include:

Prize	Unit(s)	Estab.	Frequency	Stipend	Needed Endowment	Existing Funds
Broida	DAMOP/DCP	1979	alternate years	\$5K	\$50K	\$49.4K
Davisson – Germer	DAMOP/DCMP	1965	yearly	\$5K	\$125K	\$150.3
Isakson	DCMP	1979	alternate years	\$5K	N/A	N/A
Pake	FIAP	1983	yearly	\$5K	\$125K	\$102.3K
Undergraduate	FED	1984	yearly	5K/5K	N/A	N/A
Wilson	DPF/DPB	1986	yearly	\$7.5K	\$150K	\$246.6K

All of the prizes in this category were established during or before the 1980s. As the cumulative inflation since 2002 is 33.5%, a \$5K prize today is equivalent to a 2002 prize of \$3.7K.

The Wilson Prize has a current endowment adequate to cover a \$10K stipend (as well as travel costs). The prize for a Faculty Member for Research in an Undergraduate Institution includes a \$5K grant for research as well as a \$5K stipend, and thus can be regarded as a \$10K award. Alternatively, an effort could be made to increase the stipend portion to \$10K. The Broida, Davisson-Germer, and Isakson prizes involve DAMOP, DCP, and DCMP in various combinations. Two of these prizes are only given in alternate years. While their existing prizes do not meet the \$10K standard, DAMOP's current funding efforts are focused on establishing a new prize (Ramsey). The Pake Prize recognizes and encourages outstanding work by physicists combining original research accomplishments with leadership of research or development in industry. One of the APS's current goals is greater involvement of industrial physicists.

Recommendation 7: We support the Sarachik Task Force recommendation that \$10K be regarded as the minimum stipend for any APS Prize. Specifically,

1. The APS should propose to the DPF that the Wilson Prize be increased to \$10K beginning in 2017.
2. The Undergraduate Prize should be advertised as a \$10K prize, split between stipend and research.
3. FIAP should be given the option of initiating a campaign to raise funds adequate for a \$10K Pake Prize, or changing the frequency of the prize to once every other year.
4. The APS should address, in discussions with DAMOP, DCP, and DCMP, the need to raise additional funding to support the Broida, Davission-Germer, and Isakson prizes. If unit efforts are not sufficient to fund these prizes at the \$10K level by 2019, we recommend that they be reclassified as APS Awards.
5. New prizes should not be approved unless funds raised or pledged indicate that an annual prize of \$10K can be supported. This does not preclude approval of a prize that is initially awarded once every two years, while fund raising continues.

The financial status of current prizes should be considered when a unit proposes a new prize and endowment effort. Currently, for example, DAMOP is involved in fund raising for the Ramsey Prize, while it still has prizes that have not met the 2006 requirements of the Sarachik Committee. Council could consider a moratorium on new prizes in cases where units have not met the Sarachik requirements.

If the next review of Prizes occurs after 2020, inflation alone could justify an increase in the canonical Prize stipend from the 2002/2006 level of \$10K to \$15K. But at present, we are not recommending any such adjustment, in order to focus on stipend issues affecting Awards/Lectureships and Dissertation Awards.

We point out that alternative to periodic campaigns to re-endow prizes that have eroded with inflation, would be initial endowments sufficient to avoid such erosion. We understand from Development that the current multiplier for endowments ($25\times$) is based on maintaining a constant dollar prize, not one of constant worth. We suggest that a constant worth multiplier also be developed and used, so that endowment campaigns that are doing well can be continued to that new level.

B. Unit Awards

The Sarachik Task Force noted in 2002 that various units had established their own awards, without approval of Council, in seeming contradiction to APS Bylaws. The Task Force's recommendations were

- that Council recognize unit awards as a distinct category under the APS Bylaws; Council will delegate the administration of these awards and the selection of recipients to the particular unit;
- that Council give ex post facto approval to the existing unit awards;
- that Council require all potential new unit awards to submit a brief proposal outlining its nature and purpose to the standing committee on Prizes and Awards, and that Council consider approval of such awards upon recommendation of the committee;
- that all unit awards, including the currently existing ones, undergo periodic review by the standing committee at intervals of not more than five years.

Despite these recommendations, our committee's best guess is that the situation today resembles that of 2002. We have identified 40+ unit awards and suspect others exist. Some new awards have gone through a formal approval process, others have simply been established by units. Council has not commissioned periodic reviews, nor has the Prizes and Awards Committee done such reviews. While APS bylaws are not being followed, it is unclear to us whether existing requirements make sense for all classes of awards, e.g., for unit mentoring and unit service awards.

Recommendation 8: We recommend that Council reconsider its current approach to unit awards, in which all such awards require formal APS approval and periodic APS monitoring, given that such requirements have been frequently ignored over the past two decades.

Council should ask whether a more efficient and sensible system can be found, that provides for APS approval when a new award is likely to require significant APS staff support, but otherwise allows units to take responsibility for awards that do not have implications outside the unit. One possible approach would be to require any unit award that involves an endowment or any other form of fund raising, to go through a formal proposal and approval process. Once approved, the fund raising would then be coordinated by the APS Development Office. This approach effectively defines the subset of unit awards requiring a formal approval/monitoring process to be those where APS Development plays a role. It makes sense to treat unit awards requiring fund raising in a different way, as conflicts can arise if units and the APS are in parallel approaching the same donors. Thus awards like the recently approved Lustig Award – where an endowment is being created – would be subject to APS scrutiny, while other unit awards – mentoring and service awards that do not carry stipends, or other unit awards supported entirely by unit funds – could be the exclusive responsibility of the units.

This recommendation should not be interpreted as a decrease in APS support of unit awards. On the contrary, even for unit awards in the second tier (not requiring APS fund raising), APS administrative support would remain strong. Units would continue to receive

1. APS help in preparing award certificates;
2. APS web services to publicize the awards and describe award criteria; and
3. APS support on online nominations, should the unit desire this.

C. APS Awards and Lectureships

The Sarachik Task Force did not address award funding levels, but did call for periodic reviews of unit awards by a standing committee at intervals of not more than five years (which have not occurred).

Funding levels for awards currently range from \$1K to \$5K, with a pattern that is somewhat random. This includes several early career award stipends that are at or below the level of typical dissertation award stipends.

Recommendation 9: *We recommend that minimum award funding levels should be established, taking into account differences among award types:*

1. *The APS awards that recognize research accomplishments and are not restricted by age should carry stipends of not less than \$5K.*
2. *APS Divisional Early Career Awards should carry stipends of not less than \$3K (distinguishing these from dissertation awards).*

Newly proposed awards should have funding sufficient to meet these stipend minimums.

Awards in the first category include the Adler Lectureship (DMP; \$5K), the Distinguished Lectureship Award on the Applications of Physics (FIAP/CCPD; \$5K plus up to \$5K travel)), Bouchet Award (\$3.5K plus travel), the Excellence in Physics Education Award (\$5K), Duvall Shock Compression Science Award (\$5K), Dawson Award (DPP, \$5K), Wheatley Award (FIP, \$2K every other year), Reichert Award for Laboratory Instruction (\$5K plus travel), Burton Forum Award (\$3K plus travel), Keithley Award (GIMS, \$5K), Landau-Spitzer Award (EU/USA, \$4K plus travel), Leo Szilard Lectureship (\$3K plus up to \$2K travel), Apker (APS, \$5K plus \$5K to recipient's undergraduate institution's physics department), Landau/Bennett Award (Quantum Computing, \$5K), and the Corrsin Award (DFD, \$5K).

Implications of a \$5K stipend floor for research awards: The Bouchet, Burton Forum, and Szilard Awards appear to have endowments that are adequate or nearly adequate to support a \$5K/year award. Consequently the stipends should be raised prior to the next award cycle, as any small endowment shortfalls can be addressed with modest effort. The Landau-Spitzer Award involves a EU/US agreement in which the stipend is billed annually (not endowed), but hopefully this arrangement will not complicate efforts to raise the stipend level from \$4K to \$5K. The Wheatley Award, \$2K awarded every other year, is far short of the proposed stipend floor. A significant fund raising effort would be required. Alternatively, the Wheatley Award could be reclassified as a unit award, remaining at its current level and frequency.

Early Career Awards include the Pipkin Award (Topical Group on Precision Measurements, not more than 15 years post PhD, \$2K every other year), the Primakoff Award (DPF, not more than seven years post PhD, \$1.5K), the Dillon Medal (DPOLY, not more than 12 years post PhD, \$2K plus up to \$1K travel), the Maria Goeppert Mayer Award (not more than 10 years post PhD, \$2.5K plus a \$4K travel allowance), and Stix Award (DPP, not more than 10 years post PhD, \$2K).

Implications of a \$3K stipend floor for early-career awards: The Maria Goeppert Mayer Award is nearly at the recommended level, and is fully endowed. The Primakoff Award endowment is currently adequate to support a \$3K award. Thus we recommend that both awards be raised to the \$3K target as soon as possible. The Dillon Medal is billed annually to Elsevier: thus the steps required to raise the level would need to be explored. The Pipkin Award endowment is currently sufficient to support a biennial award in excess of \$3K, and thus can be raised in the next cycle. The Stix Award lacks an endowment and is supported by DPP operating funds. With this status, perhaps it should be reclassified as a unit award. Alternatively, APS Development could work with the DPP to start an endowment effort.

The Nicholson Medal (DPP/FPS) is unique in lacking any stipend. Perhaps some thought should be given to either introducing a stipend, or removing this medal from the awards category.

D. Dissertation Awards

Dissertation award stipends range from \$1K to \$3K. To bring a greater degree of uniformity to the awards,

Recommendation 10: *We recommend \$1.5K as a minimum dissertation award stipend.*

Although five of the 14 dissertation awards have stipends that fall below this level, several of these have endowments that appear adequate to support larger stipends. With unit support for travel, an endowment of \$30K would be needed to support a \$1.5K stipend. Most units should be able to raise funding at this level from appeals to their members. The APS Development Office should be proactive in helping the various units reach the stipend levels suggested in this section.

E. Use of Unit Funding for Stipends

There has been increased use of unit funds to initiate and support new awards, including unit investments in endowments. To the extent that unit reserves derive from meetings where registration fees are paid from federal grants, there is a concern about appearances, as contributions to awards from federal grants would normally not be allowable. Once registration fees are collected by the APS, we suspect technically they are no longer subject to federal restrictions on allowable costs, though we lack the expertise to address this question definitively. But regardless of the legal issues, we believe the optics of using registration fees to support prizes and awards are not good. So if adequate unit funds are available for an award that are not from federal sources, it could be helpful to document this. The ready availability of unit funds is also making it easier to create new prizes and awards, while removing the incentive for building endowments, another potential concern. We recommend:

Recommendation 11: *The use of unit funds to support APS prize and award stipends should be regarded as an interim step, to allow a prize to be started while fund raising is still underway. We recommend that such funding be normally limited to three years.*

If a prize or award can only be sustained through long-term use of unit funds, that itself is an indication that support for the prize/award is weak. If, after three years, a prize or award remains dependent on unit funds, it would be appropriate to ask the proposing unit to submit an updated proposal to the Prize and Awards Committee that includes a report on fundraising. The Committee could then make an appropriate recommendation to Council – such as an extension of unit funding to allow completion of a promising campaign, or a reclassification of the prize/award as a unit award, in cases where it appears the campaign has failed. In this sense, Council approval of a new prize or award should be considered provisional, as long as it remains dependent on unit funding. All of these comments refer to stipends, not to unit funding of associated travel.

F. Distribution and Scope of Prizes

Taking prizes and awards together, we noted above that the distribution among the various units is reasonable. In the introduction two additional questions were raised: 1) Are some prizes, either intrinsically or due to the passage of time, too narrowly focused? 2) Under what conditions should a prize be discontinued, and the funding redirected?

While there are some exceptions, in most cases prizes appear to have been awarded broadly (in some cases perhaps more broadly than the posted descriptions). Thus there is no pressing need for a broad restructuring of prizes and rewards. Furthermore, restructuring would be a very difficult charge for our committee, as in general we lack the detailed knowledge of specific divisions that such restructuring would require. Thus our suggestion, perhaps in conjunction with the release of this report, is to invite units to review their prizes and awards, to see if adjustments are needed. Such adjustments might address issues we have already raised about the clarity and consistency of selection criteria, the consistency of prize descriptions with actual selection practices, and potentially cases where some refocusing of the prize or award is deemed by the unit to be appropriate.

In cases where prizes and awards are underfunded and the joint efforts of the unit and APS to rebuild the endowment fail, we would recommend that the APS end support for the prize/award. The APS and unit should then discuss whether and how the remaining funds supporting the prize should be redirected.

VI. ASSESSMENT OF FUNDING SUSTAINABILITY

Summaries of the funding status of prizes and awards are presented in Appendices A-C.

The APS currently estimates needed endowments at $25 \times$ the stipend if the recipient's travel and meeting costs are supported by the endowment, and $20 \times$ the stipend if the recipient's travel and meeting costs are instead covered by unit funds. We define a prize as under-funded if the difference between the endowment target and the funds on hand exceeds 20% of the target amount. On this basis the following prizes are not sustainable:

• Delbruck Prize in Biological Physics	Stipend \$10K	Shortfall 66%
• Onsager Prize (DCMP/GSNP)	Stipend \$10K	Shortfall 24%

While it may appear from the appendices that the Dawson Award in Plasma Physics (stipend \$5K), the Landau-Spitzer Award in Plasma Physics (stipend \$4K), and the Industrial Applications Lectureship (stipend \$5K) have shortfalls in their endowments, they have other, continuing sources of support. Similarly, while the appendices show a shortfall of 38% for the Buckley Condensed Matter Prize, a donor has pledged \$140K – seven \$20K contributions over the next seven years– to help stabilize this prize.

In general the prizes and awards are healthy, with endowments at, near, or above target levels. The most significant shortfall is that for the Delbruck Prize, which was established in 1981 (renamed in 2006) and is the only prize or award associated with the Division of Biological Physics.

Recommendation 12: *A new APS Development Officer is now in place. We recommend that she meet with the leadership of the Division of Biological Physics to discuss a funding campaign to support the Delbruck Prize.*

Dissertation awards supported through endowments appear to be generally healthy - several are substantially over-endowed. The DBIO, DPF (Sakurai), and DAP awards are supported out of unit operating funds. If our recommendation restricting long-term use of unit funds is adopted, endowment campaigns will be needed to continue these awards.

VII. DIVERSITY AND DEMOGRAPHICS OF PRIZES AND AWARDS

Our committee was interested in determining whether the distribution of prizes and awards tracks the demographics of our membership, including gender, US or nonUS institution, and membership in an under-represented group. We largely failed in this goal, as we could not obtain the demographic data needed to do the kind of analysis we envisioned. We may be the last committee to face this roadblock: as part of APS upgrades to improve its on-line management of nominations and the selection process, there are plans to routinely gather demographic data. Thus

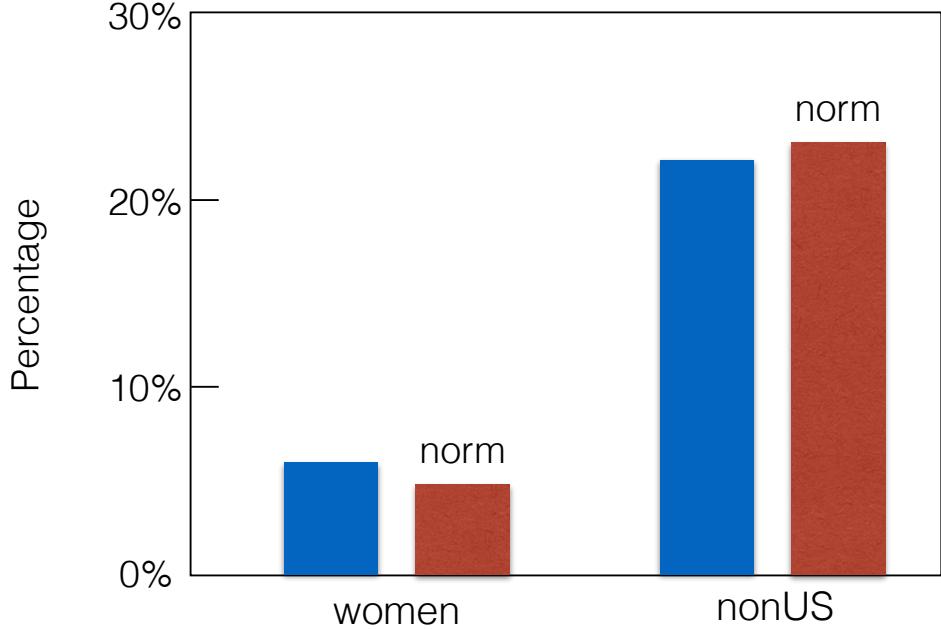


FIG. 2: The percentages of prizes earned by women and by physicists from nonUS institutions are compared to normalizations meant to reflect the composition of the pool of possible candidates. See text for details, including a discussion of the need for better demographic data.

Recommendation 13: *As soon as a reasonable database on the demographics of prize and award nominees and winners is available – perhaps results from five years – we recommend that an analysis be undertaken to evaluate whether nominations and selections are properly reflecting the diversity of our community.*

A. Women and NonUS Physicists:

We did on our own make a very crude analysis of the demographics of prizes over the past 10 years, limited to the categories of women and physicists from outside the US. We excluded the Valley Prize, due to its focus on early career researchers. Of the 331 prize winners from 2007-2016, 20 are women and 73 have their primary research appointments in nonUS institutions. The percentages are 6.0% and 22.1%, respectively.

Are these percentages reasonable? The evaluation for women is complicated by the large change in the percentage of doctoral degrees earned by women over the past 40 years, which has increased from approximately 2.5% in 1966 to approximately 20% in 2013, according to charts compiled by APS Education and Diversity. To correct for this we sampled approximately 60 prize winners, drawn from five of our prizes selected randomly, to determine the typical age today, of those who received prizes in the last decade. We found an average age of 68.4 years, somewhat higher than we had anticipated – this number varied among the five prizes we sampled, but in all cases was above 60 years. (We stress this is the age today – thus the typical age when the prize was earned would be about 63, as we sampled over one decade.) We then used the APS Education and Diversity chart to determine the percentage of PhDs earned by women at the relevant PhD date, which we concluded would be approximately 1975. We found 4.8%, and used this as a comparative normalization.

We wanted to make a similar age adjustment for nonUS prize winners, but could not find the needed data. Thus in this case we used as our normalization the current percentage of APS members holding positions outside the US, using data from a recent compilation by the APS Office for International Affairs, without any adjustment for how this percentage might have changed over the last three decades. That normalization is 23%.

The results are displayed in Fig. 2. The numbers of women and nonUS physicists receiving prizes are roughly in accord with expectations, using the crude the normalization just described. We stress that the quality of this analysis

is poor, motivating Recommendation 13.

B. Underrepresented Minorities

Our committee benefitted from an excellent recent study on the number of underrepresented minority (URM) nominations for APS honors. The report, compiled by the Community on Minorities, the CoM Subcommittee on APS Honors, Monica Plisch, and Bill Reinhardt, is included as Appendix G. While the APS Fellowship program is not part of our committee's charge, the CoM report shows that over the four-year period 2010-2013, only 13 Hispanics were among the 750 Fellows selected (1.7%), and only 6 of these completed their undergraduate studies in the US. The results for prizes and awards, summarized in Table 1 of Appendix G, show only three URM physicists received prizes (all Hispanic), and only 5 URM physicists (three Hispanic, two African American) received awards over a five-year period. The corresponding percentages for the samples the CoM considered are roughly 2.2% and 4.0%, respectively. AIP reports that 5.3% of all physics faculty are URM, as are 3.9% of faculty from PhD-granting physics departments.

Recommendations made by the committee that are relevant to our charge include (we have summarized these recommendations and in some cases combined them)

1. Creation of a canvassing committee for fellows and awards, to identify candidates and arrange for their nomination.
2. A CoM partnership with appropriate APS units to ensure that minorities are nominated to serve on prize and award selection committees.
3. Renewed APS efforts to remind selection committees of the importance of giving full consideration to URM nominees, noting the ways implicit bias can affect the selection process. Committees should adopt procedures known to help minimize implicit bias.
4. As noted above in Recommendation 13, the establishment of tracking procedures that can help APS determine whether progress is being made.
5. Reminders from the Prizes and Awards Committee informing CoM of pending deadline for prizes, awards, and fellowship, so the CoM can help with canvassing efforts.

Recommendation 14: *We endorse the CoM report and ask Council to discuss how to most effectively implement its recommendations.*