Report and recommendations of the ad-hoc committee for an accurate demographic study of HEP

Members:
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1. Final Recommendations for a Continuing Accurate Demographic Survey of HEP
2. Report of the Ad-hoc Committee on HEP Demographics (submitted in March, 2003)
3. Presentation to HEPAP in March 2003

Final Recommendations for a Continuing Accurate Demographic Survey of the HEP field

'Report of the ad-hoc committee on HEP demographics', item 2, was delivered to HEPAP along with a verbal presentation from Helen Quinn, item 3, at its March meeting. There was an active discussion at which the members of HEPAP expressed strong support for the need for such demographic data. Pressed by John O'Fallon about whether that meant they would support more funding for this purpose, the response was clearly positive. Some discussion ensued about how best to do this and what it would cost. HEPAP then requested that this committee submit a plan for doing this, along with a budget. This report contains the proposal and budget. First, a short explanation for the needs is included. The prime goal of our proposal is to achieve an accurate demographic record of our community. Only then can the original goal of this committee, to study the outflow and inflow of young people in our field, be addressed.

The major issues that have been raised are:

1. Data Collection, including mechanisms to guarantee full responses;
2. Ability to respond to queries about the data;
3. Annual Reports to the community on the data;
4. Ongoing maintenance of the database and associated software.

The Particle data group has been carrying out the survey for some years. The 2003 survey was modified in response to the suggestions made by this committee in their March report to HEPAP and the committee members made a small contribution to the task of reminding delinquent institutional representatives to fill out their responses.

The particle data group no longer has a programmer assigned even part time to this work so it has not been possible to generate new queries to the database to investigate responses to these new questions. This situation is clearly unsatisfactory, and our funding proposal below recognizes that a half time database programmer is needed to support both the continuation of the survey and our investigation of its data. Michael Barnett has stated that if this position is funded then he, as leader of the particle data group, can ensure that the survey continues and generates a standard report to the community each year based on the data received. Without such a position, reformatting the past data and successful use of the present data with tracking of individuals will not be possible as some expert coding is needed in order to reformat and analyze the data.

In addition, in order to continue the work that this committee has begun and reach the point where we can develop the outline for an annual report on demographics to the community, this committee needs a small amount of support to hire a student to do the initial validation studies on the data such as those initiated (voluntarily) by Usha Mallik and Florencia Canelli and reported in Helen Quinn's presentation to HEPAP in March.

Thus the budget we give below includes two items:

1. A half-time programmer in the particle data group at LBL; The half-time salary for such a position at LBL is $30K to $35K. With benefits and overhead this requires

   $70K to $75 K.

2. Part time funding to a for a student level support person working under Usha Mallik at The University of Iowa. The cost of this would be $25K to $30K, including overhead.

Thus we estimate a total additional annual cost, for approximately the next three years, of $100K. After three years we would expect this committee's work to result in a format for ongoing annual reports to the community and item 2 would no longer be needed. The need for an ongoing programmer to support the survey at the particle data group would not disappear, but would be reduced according to the fraction of time assigned to this task.

In addition to funding, the survey process needs the full support of the community. Every year it takes a significant number of follow up calls to get full responses. The committee believes that the response rate could be improved if the next survey request is supported by a strong letter from HEPAP and DPF stressing the importance of this data and promising a report to the community based on it. In this case, we, the members of this committee, are willing to send such a letter and stand ready to help draft it.

Respectfully submitted,

Usha Mallik (Chair), Michael Barnett, Florencia Canelli,
Rocky Kolb, Helen Quinn, Stephen Richichi,
Frank Scuilli and Maury Tigner.

Report of the Ad-hoc Committee on HEP Demographics

Members:
Usha Mallik (Chair), Michael Barnett, Florencia Canelli (**Y**oung **P**article **P**hysicists),
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Over the last few decades the field of particle physics has gone through many advances and developments, as have many other research areas. Deep and exciting questions confront us in particle physics. Boundaries between various areas have become more fluid. More than ever, Astrophysics, Cosmology and Particle Physics interests are overlapping. At the same time other areas such as Biophysics, and various disciplines of Condensed Matter have also made exciting scientific advances and continue to do so.

We often have heard it said that the numbers and quality of the young people entering particle physics have waned in recent years. This is felt acutely while recruiting postdocs and graduate students. Sometimes it is said that the best and the brightest are not staying in particle physics.

While these claims are not based on irrefutable evidence, they bring up two important topics:

1) What does the available statistical information say about Particle Physics demography?
2) If this information is inadequate, what can be done to improve the information collected?
3) If the concerns stated above are confirmed, what can and should be done to rectify this situation.

A realistic demography is critical; both from the point of view of funding as well as the current and future strength/interest in the field. (As an example big experiments like LHC and LC will need a minimum number of scientists to participate, aside from all other proposed and planned experiments.)

Rocky Kolb, Usha Mallik, Helen Quinn, Frank Sciulli and Maury Tigner formed a committee to study the above questions. Florencia Canelli and Stephen Richichi joined our committee from the Young Particle Physicists (YPP) organization. Michael Barnett, who has spearheaded the census from the PDG group also graciously joined our committee when invited, to help us understand the data and the difficulties of collecting such data. Interim reports were made to HEPAP and to the APS Division of Particles and Fields (DPF) and we were encouraged to continue our work on their behalf.

Since there was so much work already done by Michael Barnett and the PDG census, the first focus of the committee was to examine that data to see what it revealed. The Census data was collected over the past eight years. As a test sample, Michael sent Usha four years worth of census data of the people flagged as leaving the field and those entering the field. Usha first studied the information and then it was studied by Florencia. The issue was to track individuals through institutional transitions. [The results are shown in Helen Quinn's presentation to HEPAP in March, enclosed.]

The data is entered for each department with a HEP group by an individual (typically one of the PIs) in that group. The person entering the data records who arrives and who leaves, but does not necessarily know where they came from or where they went. The same names can be entered slightly differently by two institutions. We note that job transitions between countries are not uncommon, and that these pose a particularly difficult tracking problem. Thus one can not simply extract the number of people entering or leaving the field from the raw data. Florencia and Usha, who tried to follow up on the individuals by names had some success in tracking individuals through institutional transitions, but even after a lot of work many question marks remained. It does appear there is some outflow of people after more than one year as HEP researchers, but based on the current data the committee could not determine the scope of the problem.

The committee recognizes that the survey should not be drastically changed as continuity of data is important. However, the committee suggests that improvements to the survey questions to facilitate tracking of individuals who change positions should be made, and recommends the following steps:

A. When an individual has left a group, the PI should be asked to fill out fields labeled 'New Position' and 'New Institution' for that individual. Sabbatical or any such temporary leaves should be specified.
B. When an individual has been added to the group the PI should be asked to fill out fields labeled 'Previous Position' and 'Previous Institution' for that individual.
C. Students should only be recorded when they are accepted as thesis research students and have been admitted to candidacy in their degree program including completion of any required qualifying exams. For students added to a group, the field for 'Previous Position' should be filled out as 'New Student'.
D. The support source should be indicated for each individual.

Further recommendations:

- [It is difficult to get all respondents to respond in a timely fashion.] The committee recommends that the funding agencies make it clear that timely annual completion of this survey is important to support the agencies in planning and in making the case for ongoing funding of the field as a whole.

- An effort to track individuals, and otherwise test the integrity of the data needs to be made each year. Any steps to automate such tracking would be helpful in making the data both reliable and usable.
- The committee strongly recommends continuing the census. The above changes and also the subsequent verification are essential to meaningful study of our questions and should be implemented. A half-time programmer at LBNL has been available in the past, but is no longer available. Such a programmer is needed to implement the changes needed and to maintain the census software. In addition, we suggest that a savvy student be retained to test the data as needed (as was done by Usha and Florencia).
- Results should continue to be monitored and conclusions drawn on an annual basis. HEPAP should take ownership of this work and ensure that this is done on a continuing basis.
- The prime goal is to achieve an accurate demography of particle physics. Only then can we tackle the question that motivated the formation of this group, of whether the field has an unacceptable level of inflow or attrition of young scientists.