

HEPAP Activities

HEPAP Meeting

Bethesda, MD; March 13-14, 2013

Andrew J. Lankford

HEPAP Chair

University of California, Irvine

Announcement 1

1/3 of HEPAP membership rotates each year.

The following members are completing their 3rd year of service at this meeting:

- Dr. Karen Byrum, ANL
- Professor Peter Fisher, MIT
- Professor John Hobbs, Stonybrook
- Professor Klaus Honscheid, Ohio State
- Dr. Lia Merminga, TRIUMF
- Professor Jonathan Rosner, U. of Chicago
- Professor Hitoshi Yamamoto, Tohoku, Japan

THANK YOU !

Appointment of new members is not complete, but is imminent.

Announcement 2

Next HEPAP meeting - May 22-23, 2014 - DC area

HEPAP Activities

Subcommittee for Assessment of Workforce Development

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Background

Charge to Chairs of all Federal Advisory Committees for DOE Office of Science

- **From Dr. Patricia Dehmer, Acting Director, Office of Science**

“The Office of Science research programs have a long history of training graduate students and postdocs in disciplines important to our mission needs as part of sponsored research activities at universities and DOE national laboratories. In addition, the Office of Workforce Development for Teachers and Scientists supports undergraduate internships, graduate thesis research, and visiting faculty programs at the DOE national laboratories.

“We are asking the assistance of each of the Office of Science Federal Advisory Committees to help us identify disciplines in which significantly greater emphasis in workforce training at the graduate student or postdoc levels is necessary to address gaps in current and future Office of Science mission needs. ...

Key elements of the charge

- **Identify disciplines in which significantly greater emphasis in workforce training is necessary**
 - **To address gaps in current and future Office of Science mission needs**
 - **At the graduate student or postdoc levels**
- **Please consider:**
 - **Disciplines not well represented in academic curricula**
 - **Disciplines in high demand resulting in difficulties in recruitment and retention at U.S. universities and DOE national laboratories**
 - **Disciplines identified above for which DOE labs may play a role in needed workforce development**
 - **Specific recommendations for programs that can address discipline-specific workforce development needs.**
- **Letter report**
 - **Describing findings and recommendations**
 - **Due no later than June 30, 2014**
 - **Implies discussion at May HEPAP meeting**

Subcommittee process

Subcommittee composition:

- **Small committee (4-6) members**
 - **in order to practically work on short two-month time scale**
- **Composed of members with previous involvement in workforce training in at least one discipline of concern**
- **Drawn primarily from HEPAP; open to any interested HEPAP member**
- **Supplemented by non-HEPAP members as needed**

The subcommittee should:

- **Consult HEPAP and the HEP community for input on possible disciplines in need of workforce development.**
- **Consult members of the community with experience and expertise in workforce training for disciplines of interest.**
- **Consult subcommittees of other SC FACAs regarding disciplines of common concern or interest.**
- **Make use of existing resources from past studies.**

Letter report

- **Discussion by HEPAP at May meeting**
- **Submission of final draft to HEPAP in advance of meeting**

Possible disciplines of interest

Possible disciplines to which this charge is appropriate:

- **Accelerator science**
- **Particle detectors and instrumentation**
- **Scientific computing**
- **Specific areas of particle theory**
- **Other**

Note that most of these disciplines are of interest also to other fields.

Subcommittee membership

The following individuals have graciously agreed to participate:

- **Ritchie Patterson** (Cornell) - Chair
- **Ilan Ben-Zvi** (BNL, HEPAP)
- **Tao Han** (Pittsburgh, HEPAP)
- **Patty McBride** (Fermilab, HEPAP)
- **Ian Shipsey** (Oxford/Purdue, DPF, incoming HEPAP *ex officio*)

I welcome participation of other HEPAP members in this assessment, either via full commitment to the subcommittee or through input and consultation.

HEPAP Activities

Subcommittee on Accelerator R&D

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Accelerator R&D

Overview

Accelerator R&D is crucial to the future of particle physics, both mid-term and long-term.

Particle physics demands a healthy, multi-faceted program of R&D.

- **Focused on** (time dimension):
 - **Accelerator projects in the foreseeable future**
 - *e.g. HL-LHC, Japanese-hosted ILC*
 - **Enabling technologies for new accelerators in the more distant future**
 - *e.g. muon collider, very high energy hadron collider*
 - **Striking a balance between “directed” & “basic” accelerator R&D**
- **Focused on** (technology dimension):
 - **Numerous technical subjects:** novel concepts for acceleration; superconducting RF; accelerator, beam and computational physics; particle sources; beam instrumentation and control; normal gradient/high gradient structures & RF sources; superconducting magnets (also see Snowmass)
- **Accelerator test and user facilities** (*e.g. ATF at BNL, FACET at SLAC*)
- **Basic accelerator science**

Accelerator R&D is a major commitment of the HEP program.

- **Significant fraction of HEP budget** (15-20%)
- **New thrust for NSF in basic accelerator science**
- **Also, HEP stewardship responsibility**

Recent related HEPAP activities - 1

National accelerator R&D program has been brought into focus recently by:

- **HEP Committee of Visitors (CoV)**
- **P5**

CoV:

Comment: “The (GARD) program thrusts largely reflect the history and past priorities of OHEP, rather than the current understanding of the medium- and longer-term needs of the domestic HEP program. The most notable omissions include R&D on the enabling technology of high power targets, on research towards future high power proton accelerators, and on the Intensity Frontier (discussed in the 2013 Snowmass report and elsewhere). Reconsideration of the GARD portfolio will therefore be needed soon, synchronized with the delivery of the P5 report in 2014.

“It is desirable and even necessary to identify activities that are central to the HEP mission, and therefore properly located within the General Accelerator R&D (GARD) program, and to distinguish them from activities that are more suitably included under the category of Accelerator Stewardship.”

Recommendation: “*Evaluate the General Accelerator R&D (GARD) program to identify and prioritize components that are central to the evolving HEP mission, after delivery of the 2014 P5 report.*”

Recent related HEPAP activities – P5

- **Some relevant elements of P5 charge:**
 - “... a **critical examination of the investments that would be needed to ensure the vitality, scientific productivity, and discovery potential of U.S. high energy physics research during this timeframe**. Specifically, we request that HEPAP examine current, planned, and proposed U.S. research capabilities and assess their role and potential for scientific advancement; assess their uniqueness and relative scientific impact in the international context; and **estimate** the time and resources (the facilities, personnel, **research and development** and capital investments) **needed** to achieve their goals.”
 - “... articulate ... the approximate overall **level of support that is needed in** the HEP core research and **advanced technology R&D programs** to achieve these opportunities in the various scenarios.”
- **Investment in accelerator R&D competes with other elements of HEP program** (from physics research to facility operation to **projects**).
- **P5 will address accelerator R&D with a broad brush.**
 - **Defining detailed R&D plan is beyond the scope & means of P5.**
 - **Strategic plan may indicate directions for R&D emphasis**
 - **e.g., in terms of future accelerators of notable interest**
 - **e.g., in terms of goal-oriented vs. blue-sky R&D**
 - **P5 may articulate approximate overall level of support for R&D.**

Subcommittee concept - 1

- **A HEPAP subcommittee**
 - **Composed of HEPAP members and others**
- **Outline of a possible initial mandate/charge:**
 - **Define the general goals of the accelerator R&D program.**
 - **Identify R&D directions that align with the P5 strategic plan and long-term vision.**
 - **Assess how present program aligns with general goals & P5 plan/vision.**
 - **Recommend a balanced program, addressing goals, aligned with P5, within budgetary guidance.**
- **Charge is still in development.**
- **Timescale – to follow shortly after P5 report**

Subcommittee concept - 2

- **Possible future scope:**
 - **Demographics:**
 - Report on the current demographics and capabilities of the HEP community engaged in accelerator R&D.
 - Articulate lab-university roles, cooperation, balance.
 - **Program:**
 - Suggest an appropriate mechanism to monitor, review, and update the program.
 - Assess the manpower and capabilities requirements of program.
 - Comment on how to match “resources” and “requirements”.
 - **Stewardship:**
 - Comment on interplay of HEP accelerator R&D and accelerator stewardship
 - e.g., identify R&D that addresses HEP strategic plan, that is primarily of interest to applications in other fields and in industry, that is of general interest to HEP and to other fields

Subcommittee status

Initial charge in development

Committee membership:

- **Co-chairs: Marty Breidenbach & Don Hartill**
- **Members from:**
 - **HEPAP**

| | |
|---------------------------|--------------------------|
| Ilan Ben-Zvi | Robert Tschirhart |
| Georg Hoffstaetter | |
 - **Particle physics accelerator and experiment communities**

| | |
|-------------------------|-------------------------|
| William Barletta | Young-Kee Kim |
| Bruce Carlsten | James Rosenzweig |
| Roger Dixon | Michael Syphers |
| Steve Gourlay | Rik Yoshida |
 - **International accelerator community**

| | |
|------------------------------------|-----------------------------|
| Oliver Bruning (CERN) | Lia Meringa (TRIUMF) |
| Tadashi Koseki (KEK/J-PARC) | |
- **Observers from Nuclear Physics & Basic Energy Sciences**

HEPAP Activities

National Scientific Program Advisory Subpanel

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Concept - 1

A National Scientific Program Advisory subPanel is a concept in development.

- **Mentioned as a possibility at December 2013 HEPAP meeting**
- **The concept as described today is partial, and is DOE-centric,**
 - ***i.e.* focuses on goals/needs/methods of HEP**
 - **Response to previous HEPAP/CoV concerns about having a more transparent/regular review process**
 - **for new projects and for projects that have undergone significant cost/scope changes since they were last reviewed by P5.**
- **We will work to make the subpanel useful for NSF, as well,**
 - **recognizing that “one size does not fit all”**

Goal: A more effective and transparent mechanism for HEPAP to advise on the execution of particle physics projects

- **P5 process does strategic planning, *i.e.* sets overall goals and priorities.**
- **DOE CD process and NSF review process take over technical review when a project concept is ready to become a project (to be *projectized*).**
- **Often there are scientific & technical issues to be evaluated between.**
 - **Especially for projects in the early phases**
 - ***e.g.*, for small experiments to be added to the portfolio**

Concept - 2

NSPAsP will perform scientific & technical review

- **Role analogous to that performed by PAC for experiments at FNAL**
- **With additional criterion of alignment with objectives of P5 strategic plan and considering P5 selection criteria.**
- **Scope of scientific review:**
 - **Usual merit review criteria, including e.g.:**
 - **significance of scientific objectives**
 - **capability to achieve scientific objectives**
 - **Quality of the team**
 - **Technical approach**
 - **Budget review sufficient to set CD0 range.**
 - **Assessment of potential for impact on the particle physics program**
- **Advice on project viability & appropriateness to the portfolio**

Concept - 3

NSPAsP is planned as a subpanel of HEPAP

- **Convened as needed**
- **Provides initial review of experiments proposed to join the US particle physics portfolio**
- **Membership adjusted to provide appropriate range of expertise**

NSPAsP & FNAL PAC

- **NSPAsP will review in a manner analogous to FNAL PAC**
- **NSPAsP is a more general mechanism applying to all aspects of the program, and is FACA-compliant.**
- **Where applicable NSPAsP will work in concert with, not duplicating FNAL PAC.**

Possible mode of operation

- **Agencies collect proposals on a regular basis through solicitation/FOA**
 - **Perform initial screening for appropriateness to call and of cost**
- **Proponents would provide any prior outside reviews, to see if ready for NSPAsP**
 - **e.g. FNAL PAC review, LHCC review, lab director's review**
 - **If no outside review, one would be performed prior to NSPAsP**
- **NSPAsP provides scientific evaluation, incl. compatibility with P5 strategic plan and position within global context, and evaluation of technical readiness**
- **In cases of multiple projects, NSPAsP provides prioritization**

Next steps

Refine concept, including:

- **NSPAsP role with respect to each agency, DOE & NSF**
 - **In consideration of different nature of each**
- **Interplay & interactions of NSPAsP & FNAL PAC**
- **Role in interagency projects or initiatives**
- **Possible role in review of projects previously recommended by P5 that experience significant changes in cost or schedule, in particular for continuing compatibility with the P5 strategic plan**

Formal charge sometime after P5 report

Feedback today on concept as input to the charge.

HEPAP Activities

Future subcommittee laboratory & university roles

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Approaching the subject of laboratory & university roles

- **HEPAP discussed the formation of a subpanel or subcommittee to consider the respective roles of laboratory & university groups in the execution of the HEP program.**
 - Arising from topics such as university infrastructure, senior scientists, Theory Panel Report, differences in costs
- **CoV recommended an examination of the balance between the laboratory & university research programs.**
- **An approach:**
 - **Start discussion in the context of agency (DOE & NSF) missions**
 - What are the missions of the agencies?
 - How do labs, and how do universities contribute to agency missions?
 - What are “missions” of labs and of uni’s in this context?
 - What can agencies do to enable labs and uni’s to fulfill their “missions”?
 - **Focus on: How to best accomplish science goals in this context?**
 - **What are respective roles of the various types of institutions in accomplishing the program’s science goals, and in satisfying the missions of the program?**
 - **How can roles and working relationships be defined (or redefined) so as to optimize science accomplishment and to satisfy missions?**

Laboratory & university roles - 2

- **Bear in mind:**
 - **DOE & NSF missions differ**
- **Consider:**
 - **How does DOE mission differ for Fermilab & multi-purpose labs?**
 - **How do mission or goals differ for large and small universities?**
- **How do respective roles vary in experimental areas as experiments progress stage by stage from detector R&D through construction to physics analysis?**
- **How do respective roles vary in different areas of theory?**
- **How can roles be designed such that there are no 2nd class citizens?**
- **What degree of “academic freedom” should there be: in theory? in experiment? at universities? at labs?**
 - **What degree of mobility should there be within the field? to neighboring fields? (forays?)**

Update

In presence of P5 and other HEPAP activities, only modest further progress has been made on formulating the concept and charge.

- **I believe that this subpanel, once well conceived, can have a very positive impact on research in our field.**

This subpanel will be addressing difficult and controversial issues.

- **It must conduct its activity in a thoughtful and collegial manner.**
- **Recall its purpose is to optimize the scientific capabilities of our field.**
 - **Not to serve (or please) any single sub-community**
- **Needs a balanced composition**
 - **Institution type** (Lab/Univ; Single/multi-purpose; big/small)
 - **Subfield** (Theory/experiment; frontier)
 - **Sponsoring agency** (DOE & NSF)
- **Expect to receive a formal charge**

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Future Topics

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