The DPF Taskforce on Instrumentation

- From Universities
  - Marina Artuso, Syracuse
  - Ed Blucher, Chicago
  - Bill Molzen, Irvine
  - Gabriella Sciolla, Brandeis
  - Ian Shipsey*, Purdue
  - Andy White, UT Arlington
- From laboratories
  - Marcel Demarteau*, Argonne
  - David Lissauer, Brookhaven
  - David MacFarlane, SLAC
  - Greg Bock, Fermilab
  - Gil Gilchriese, LBNL
  - Harry Weerts, Argonne
- Ex-officio
  - Chip Brock, DPF MSU
  - Patty McBride, DPF Fermilab
  - Howard Nicholson, DOE Emeritus

(*) co-Chair

Object	Weight (tons)
Boeing 747 [fully loaded]	200
Endeavor space shuttle	368
ATLAS	7,000
Eiffel Tower	7,300
USS John McCain	8,300
CMS	12,500

Instrumentation triumph

ATLAS

CMS

DIGITAL CAMERAS THE SIZE OF CATHEDRALS

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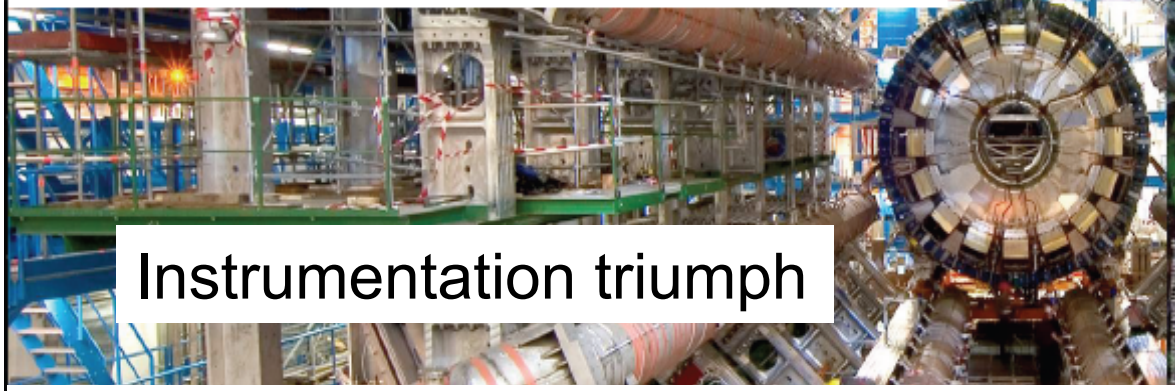
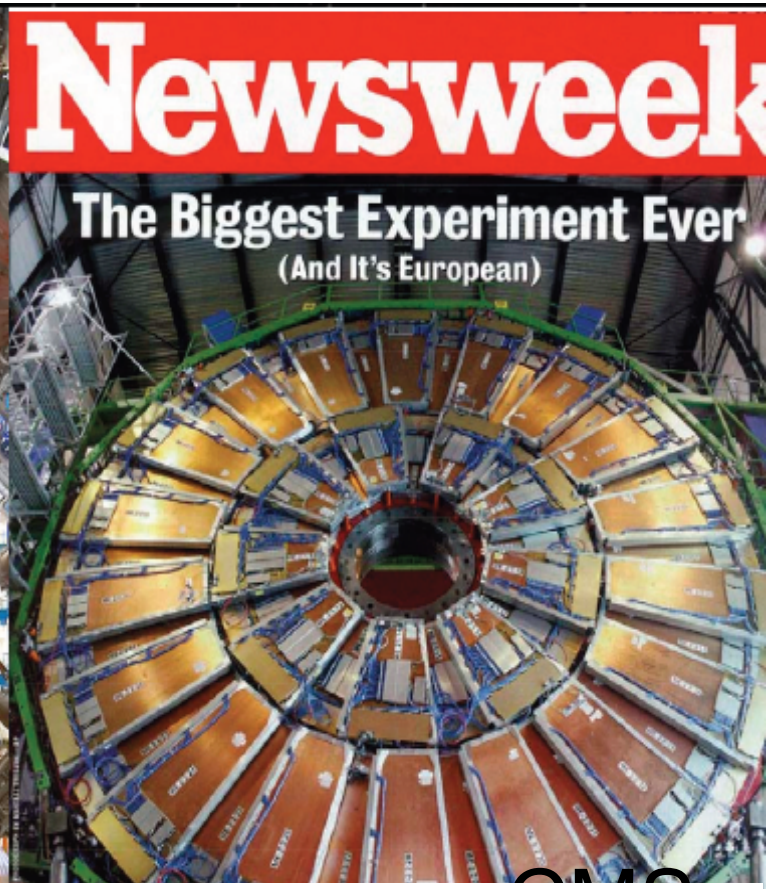


Instrumentation triumph



Instrumentation Challenge

ATLAS

DIGITAL CAMERAS THE SIZE OF CATHEDRALS

How the taskforce came to be

- Summer 2009: A review of the detector R&D programs at the five national laboratories urged development of a coherent national instrumentation program & self-organization of the community
- October 2010 A workshop dedicated to an overview of Detector R&D in the country was organized. This was a first.
- The workshop was informative and positively received by the community. A great deal of high quality R&D is being carried out
- There seems to be an acute awareness that for a sustained viability of the field a renewed investment in instrumentation development with the appropriate organization is needed
- A DPF taskforce has been established to address the organization of HEP instrumentation

Taskforce Charge

Charge organized in three broad areas

I. Structure for a National Instrumentation R&D strategy
    I. Need, merit and process for evaluating and promoting the national R&D program through a National Instrumentation Advisory Panel
    II. Appropriate role for a standing panel on instrumentation vis-à-vis existing and new projects
    III. Models for universities-laboratory collaborative projects
    IV. Strategic links to other scientific disciplines
    V. Strategic links to industry
II. Models for Entrepreneurial Instrumentation Science Strategy
    I. Availability of targeted resources at each of the five national laboratories to specifically support particular needs of individual researchers at the universities and the laboratories?

Taskforce Charge

III. Graduate Student and Post Doctoral Training

I. Role of experience in instrumentation R&D in the life of US graduate students

II. Academic, intensive, US-based instrumentation experience for graduate students with academic credits, within the context of a global program of coordinated instrumentation schools

III. National instrumentation fellowship program for Ph.D. Students and postdoctoral scholars to encourage and support research in instrumentation.

Perspective, broad input, ownership

International Advisors

Asia: Yoshitako Kuno, Geoff Taylor, Yifang Wang. Hitoshi Yamamoto

Europe: Ariella Cattai, Joachim Mnich Tatsuya Nakada Peter Weilhammer

National Advisors

Karen Byrum. Minfang Yeh, Paul O'Connor, Mike Crisler, Ron Lipton, Joel Butler
Simon Kwan Hogan Nguyen Ted Liu Erick Ramberg Juan Estrada Steve Holland
Carl Haber David Nygren Chris Bebek Jim Fast David Asner Aaron Roodman
Chris Keeney SuDong Jerry Va'vra Natalie Roe

James White Priscilla Cushman Sally Seidel Wesley Smith Abe Seiden
David Saltzberg Bonnie Fleming Daniela Bortoletto, Mani Tripathi Jim Brau

~20 invitees have not yet responded, more invites being sent
20 have provided multi-page answers to detailed questions related to the themes and scope of the six tasks. They will continue to provide advice for the duration, and also have the option to serve on subgroups of the taskforce

The Six Tasks & Six Subgoups to develop them

In response to the charge, recognizing its breadth & scope we formed six subgroups who will meet in parallel & report back to the taskforce

National Instrumentation Board

Blucher Artuso Lissauer Gilchriese Weerts

Targeted Resources @ the National Labs

All lab reps + White Molzon Blucher

National Fellowships

Sciolla Schumm (*) Bock MacFarlane

Instrumentation School

Cattai (*) Para (*) Sciolla Bock MacFarlane

National Prize

Molzon Lissauer

Interdisciplinary

Artuso White Gilchriese Weerts (*) denotes National Advisor

We encourage the community to join subgroups

Taskforce Timeline

December/January Charge written

February Taskforce members identified

March/April National and International Advisors identified

March Expressions of interest & support from agencies (at HEPAP mtg)

End April Working groups created to address charge

May 1st taskforce kickoff meeting

June TIPP conference, Taskforce meeting and town hall for community input

August DPF Brown Taskforce mtg and detector town hall for community input

August main ideas and recommendations well-advanced and available for community comment at Brown meeting

September Final report to DPF by end of September

regular subgroup meetings throughout period

Taskforces meetings at midpoint between APS and TIPP and between TIPP & DPF

Agenda of the Kickoff Meeting of the Instrumentation Taskforce May 2 10:00-12:00 PDT

10 Welcome/Introduction/ Goals and methods/ The six tasks/ Schedule

10:10 National Instrumentation Board (Summary of input received from advisors)
Discussion

10:30 Targeted Resources @ the National Labs (Summary of input received from advisors)
Discussion

10:50 Instrumentation School
Ariella Cattai/Adam Paras EDIT and its evolution
Discussion

11:10 National Fellowships
Summary of input received from advisors
Discussion

11:30 Instrumentation Prize
Alan Chodos (10')

11:40 Interdisciplinary
Summary of input received from advisors
General Discussion

The Six Tasks & Six Subgoups to develop them

In response to the charge, recognizing its breadth & scope we formed six subgroups who will meet in parallel & report back to the taskforce

National Instrumentation Board

Blucher Artuso Lissauer Gilchriese Weerts

Is there a need for a national body to evaluate & promote the national instrumentation R&D program? What is the need, merit and process for evaluating and promoting the national R&D program through a standing body…….

Advisor input

Will elevate & champion instrumentation, guide, community voice, representative of the community ensure complete coordinated balanced program, promote cooperation across community, decadal perspective, advocate with congress and industry & other disciplines

Concerns: additional bureaucracy, should not impact running projects

Mandatory to have agency buy in.

The Six Tasks

Targeted Resources @ the National Labs

All lab reps + White Molzon Blucher

Might targeted resources be established at each of the five national laboratories in order to specifically support particular needs of individual researchers at the universities and the laboratories? This will be in several forms: engineering design time and specific resources for small---scale collaboration among and between university and laboratory scientists. How might such a program be administered and funded?

Advisor input:

Essence of lab + university partnerships in instrumentation

Collaborative use of resources at labs is a good idea

Create centers of excellence @ labs each with own specialty, needs national coordination. Models to emulate (1) Large Area Planar Photo Detector development multiple labs, multiple disciplines, multiple universities, multiple industrial partners benefits HEP & industry required LDRD, ADR MRI, DOE mission need for future nu detector (<100M$ for phototubes) , vision of Howard and Dennis, + ARRA (2) RD system at CERN. Concerns labs: reluctance to be a "job shop" strengthen detector development groups, universities: strengthen university program

The Six Tasks

National Fellowships

Sciolla Schumm (*) Bock MacFarlane

Please comment on the suggestion that a national instrumentation fellowship program be created by the NSF and DOE and Industry for Ph.D. students and postdoctoral scholars to encourage and support research in instrumentation. How should industry be involved and what industries should be targeted?

A possible model: create high---stipend fellowships with travel budgets to be tenable at National labs and universities. Competitive proposals would determine where the fellowships were located. The successful institutes will then be responsible for filling the fellowship through an advertisement. Some fellowships might be sponsored by Industry in reciprocation for access to instrumentation schools (see below).

Advisor input

Very popular. Exist in Europe CERN+ univs. Suggest 50% instrumentation 50% physics. Will be hard to get industry funding target companies with many HEP PhDs/companies near national labs

The Six Tasks

Instrumentation School

Cattai (*) Para (*) Sciolla Bock MacFarlane

The recent EDIT school for instrumentation and technology at CERN was a great success. What are the thoughts of the committee members on establishing an EDIT style instrumentation school at the US labs (possibly rotating between them), possibly with academic credits. How would the school be organized? Sponsorship & interest from industry?

Advisor input

Very popular. Many good schools International Sch. Trigger&DAQ (at CERN) IEEE NSS short courses popular, ICFA, EIROforum on Instrumentation (8 Euro labs) Nuclear summer school BNL & San Jose State. Many noted school is no substitute for working in an instrument group @ Uni, or lab. & with test beam where a systematic training program of generic (but useful) measurements could be undertaken

The Six Tasks

National Prize

Molzon Lissauer

The APS has the annual Sakurai prize for theoretical particle physics and the annual Panofsky prize for experimental particle physics. What are the committee's thoughts on the establishment of a named prize for instrumentation in experimental high energy physics? How will it be funded?

Advisor input

Very popular, elevates instrumentation, overlap with APS Keithley Instrum. Prize & IEEE Radiation Instrum Award.
Sponsor also “best paper” “best poster” & young investigator type recognition. Concern: already have Panofsky sometimes awarded for Instrumentation- do we need another prize?

The Six Tasks

Interdisciplinary

Artuso White Gilchriese Weerts

Please comment on the relative importance of developing strategic links to, for example, nuclear physics, materials science, condensed matter physics, and electrical and computer engineering both in academia and in industry to the future of HEP instrumentation as the complexity of our experiments increases. How might these links be developed and sustained?

Advisor Input

Exchange programs and targeted workshops that engage other disciplines broadly. Example NP & BES front end electronics workshop at BNL, other win-wins grid computing & rad hard silicon