STUDY ABROAD IN THE SCIENCES

A national science policy challenge: access to major research facilities abroad in an era of increased globalization

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A Workshop Held at the Center for Strategic and International Studies June 1, 2009

Sponsored by the Lounsbery Foundation and the University of Michigan

WHAT'S THE PROBLEM?

- In an era of increased globalization, more and more frontier research centers will be located elsewhere (LHC, ITER, WHO, telescopes, ...)
- Exposure to actual frontier research has been a key recruitment and training tool for science undergraduates in the past
- * There is a risk that future U.S. long term science priorities will be set by convenience rather than by scientific importance as today's undergraduates make their career choices

A PERSONAL INTEREST/ OBLIGATION - H. NEAL

NATIONAL SCIENCE BOARD /86-100

SMITHSONIAN REGENTS

CERN REU PROGRAM

BEYOND SPUTNIK

HEPAP STUDY ON HEP IN UNIV.

555 BOARD OF OVERSEERS

WHY STUDY ABROAD?

- Concept has been widely accepted as a powerful learning and teaching tool in the humanities and arts (e.g., Florence and the Uffizi)
- Why are study abroad programs so little used in the sciences? What is the difference between Florence/Uffizi and Geneva/LHC -- Or Geneva/WHO?

WHAT IS HAPPENING IN HIGH ENERGY PHYSICS?

- For decades the U.S. and Europe were the two indisputed leaders in this field – arguably the most fundamental field of all scientific disciplines
- Now we are facing the prospect of having no fieldleading frontier facility within the U.S. national boundaries, with the world's undisputed center being in Geneva with no U.S. counterpart
- Now facing the prospect that U.S. undergraduates will have little opportunity to directly participate in cuttingedge high energy physics research

THE QUEST FOR HIGHER ENERGIES – AND DEEPER INSIGHT



RECENT HEPAP P5 REPORT EXCERPT.....

Particle physics in the United States is in transition. Two of the three high-energy physics colliders in the US have now permanently ceased operation. The third, Fermilab's Tevatron, will turn off in the next few years. The energy frontier, defined for decades by Fermilab's Tevatron, will move to Europe when CERN's Large Hadron Collider begins operating. American high-energy physicists have played a leadership role in developing and building the LHC program, and they constitute a significant fraction of the LHC collaborations—the largest group from any single nation. About half of all US experimental particle physicists participate in LHC experiments.

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Research in particle physics has inspired generations of young people to engage with science, benefiting all branches of the physical sciences and strengthening the scientific workforce. To quote from the EPP2010 report:

"A strong role in particle physics is necessary if the United States is to sustain its leadership in science and technology over the long term."

The present P5 panel therefore makes the following overall recommendation:

The panel recommends that the US maintain a leadership role in world-wide particle physics. The panel recommends a strong, integrated research program at the three frontiers of the field: the Energy Frontier, the Intensity Frontier and the Cosmic Frontier.

http://www.science.doe.gov/hep/files/pdfs/P5_Report%2006022008.pdf

HEPAP UGPS SUBPANEL REPORT ...

- Now that many experiments are operating overseas, we have the opportunity not only to engage our students in the excitement of science but also to engage them in international collaboration. Whether these students go on to become particle physicists or to work in some other field, they will carry this valuable experience with them.
- × Finding: Undergraduates thrive in research, and those who so participate are
- ***** more likely to pursue careers in science and technology.
- **×** Finding: The LHC and other experiments abroad offer a spectacular opportunity
- * to engage undergraduates and high school teachers in research. This research
- experience will be particularly powerful for those who spend time at the experiment site.

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- *providing a remarkable opportunity for any young physics student. It is even conceivable that such a cooperative agreement would allow students to incorporate their REU experience into their university's study-abroad program, perhaps even receiving credit for their work. All in all, opportunities exist for a sizable expansion of this program, in spite of the challenges.
- http://www.science.doe.gov/hep/files/pdfs/ugpsreportfinalJuly22,2007.pdf

GLOBALIZATION

- We should celebrate the fact that many nations are now interested in, and capable of, hosting major scientific facilities
- The challenge falls to U.S. universities and the U.S.
 Government to make sure that our students continue to have access to cutting-edge research facilities
- There is no reason to expect that the U.S. dominance in most fields will continue – but we should not ignore the need to evolve our educational system accordingly to mitigate the effects

U.S. OPTIONS

- Do nothing special and hope that "market forces" and student interest will do their job
 ..or
- Pick a few strategic scientific fields and do whatever is necessary to insure student access to the frontier facilities in those fields

TOUGH QUESTIONS

- × How to site it
- × How to manage it
- × How to fund it
- × Host country considerations
- Identification of instructors
- × Taking local courses
- Host laboratory considerations
- × Student mentorship
- Measurement of success
- × Planning process
- Sunrise and sunset considerations

CONFERENCE GOALS

- Assess the scope, tractibility and completeness of the questions on the previous slide
- Assess the likely level of support and interest on the part of the physics community, international program officers at universities, university consortia, key agency officials, and the Department of State
- × To receive general guidance on next steps



Mann U.S. Study Abroad Initiative

Monday 01 June 2009 from 10:00 to 19:00 Europe/Zurich at Center for Strategic & International Studies (*B1C*) chaired by: *Prof. Homer A. Neal* support: Steven.Goldfarb@cerr..ch

Description: A one-day meeting sponsored by the University of Michigan and the Lounsbery Foundation focusing on the feasibility of creating a U.S. LHC Study Abroad Program in Geneva. Though the Meeting will focus on the specific case of undergraduate student research participation in the Large Hadron Collider Program in Geneva, the issues involved pertain much more broadly to overall U.S. national science policy, as more and more frontier research facilities are being located beyond the borders of the United States.



Images from the CERN-Based NSF REU Summer Student Program.

CSIS: [Home Page] [Contact] [Google Map]

This Agenda: http://indico.cern.ch/event/StudyAbroad2009

Participants: David Abshire; Robert Berdahl; Fred Bernthal; Linda Blevins; Marta Cehelsky; Stephen D'Arcy; Patricia Dehmer; Deborah Derrick; Sarah Eno; Marvin Goldberg; Steven Goldfarb; Howard Gordon; Al Goshaw; Graham Harrison; Allan Lerner; Daniel Levin; Kathleen McCloud; Peter McPherson; Robert Megginson; Homer Neal; Howard Nicholson; Elizabeth O'Malley; Randal Ruchti; Robert Samors; Donald Shapero; Michael Tuts; Bill Valdez

Material: 🍉 Event Description 🖾 🛄 🛸 List of Participants (Excel); 🝉 pictures

Monday 01 June 2009

11:50

(20')

10:00->*10:50* **⊿ ≧** Introduction

	10:00	ピ 🖻 Welcome (15')	Ambassador David Abshire
		President Lounsbery Foundation,	
		Vice Chair, CSIS, Former LLS, Ambassador to NATO	
		President, Center for the Study of the Presidency and Congress	
	10:15	🖋 📴 🖹 Nature of the Challenge (15)	Prof. Homer A. Neal
		Former Chair, HEPAP Subpanel Study on the Future of University High Ene Former Member, U.S. National Science Board, Professor of Physics, University of Michigan	ergy Physics Programs,
	10:30	🖋 🖻 The Congressional Study Abroad Landscape (20')	Dr. Peter McPherson
		President, APLU (formerly NASULGC)	
		Former President, Michigan State University Former Director, USAID	
10.	E0->	11,10 Conscility Examples with Anticipated	Limited II.C. Undergraduate Student
Acc	ess		Linited 0.5. Undergraduate Student
	10:50	🖋 🖻 The Large Hadron Collider, ITER and the WHO (20)	Prof. R. Ruchti
		Professor of Physics, Notre Dame University, Former NSF Physics Program Officer, Former Outreach Coordinator, CERN CMS Experiment	
11:	10->	11:50 🖉 🖻 Examples of Existing International	Programs for Undergraduate Studies
	11:10	🖋 🖻 Current CERN REU Program (20)	Prof. Homer A. Neal
	11:30	🖋 🖻 International Undergraduate Programs at the NSF	Graham M. Harrison, Program Manager, International Programs,

Lunch (1h10')

NSF

13:00->13:50 🖋 🖻 Interest of Scientific Community						
	13:00	American Physical Society Division of Particles and Fields	(20') Prof. Raymond Brock			
	13:20	🖋 📾 🖹 U.S. ATLAS Collaboration Board (15)	Prof. Al Goshaw			
	13:35	🖋 🖻 U.S. CMS Collaboration Board (15)	Prof. Nick Hadley			
13:	50-2	24:25 Benefits and Operational Challenges of	or Study Abroad Programs			
	13:50	Electric of Michigan Programs (10)	Associate Dean R. Megginson, University of Michigan			
	14:00	🗹 🖻 🖹 University of Illinois - Chicago ; Switzerland Program (10)	Associate Provost A. Lerner, University of Illinois - Chicago			
	14:10	🖋 📾 🖹 State Department: Host Country Issues (15)	Representative from U.S. State Department / OSTP			
14·25-> <i>14·45 Real</i> ALHC Study Abroad Proposal						
	14:25		Dr. S. Goldfarb, University of Michigan			
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14.45	5	00//00/				
15:15-> <i>15:55 🛯 🖉</i> 🖻 Observations from University Consortia						
	15:15	🖋 📾 🖹 Association of American Universities (10')	R. Berdahl, President, AAU			
	15:25	🖋 🗃 🖹 Universities Research Association (10')	F. Bernthal, President, URA			
	15:35	🖋 🖻 Committee on Institutional Cooperation (CIC) (10')	Associate Provost A. Lerner, University of Illinois - Chicago			
	15:45	🖋 🖻 🖹 Association of Public and Land-grant Universities (NASU	LGC) (10') Pres. Peter McPherson (TBC)			
		Former President Michigan State University,				
		President, APLU (formerly NASULGC)				
		(comments may be presented/consolidated in the 10:30 am slot)				
15:55->16:25 demonstrate and Operation Strategies						
	15:55	د المعنى المع	Dr. Deborah Derrick, Program Officer, Gates Foundation			
	16:10		Mr. Steven D'Arcy, PriceWaterhouseCoopers			
16:25->17:00 If Description:						
Myron Campbell, Professor of Physics and Chair, University of Michigan,						
Associate Dean, LS&A Homer Neal, University of Michigan						