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Director's Matters

By H. Frederick Dylla, Executive Director



Big *and* small science: No need to choose

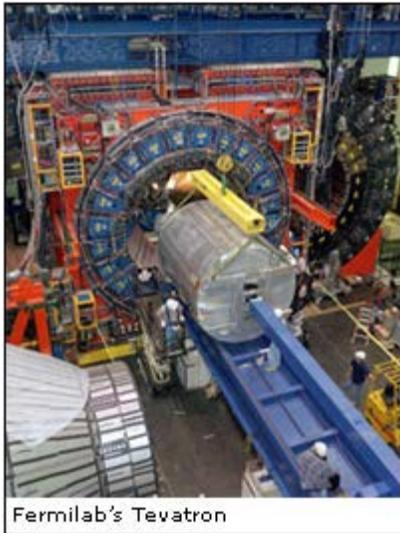
Funding for "big science" versus "small science" is a contentious topic that often fuels debates among scientists and funders of science. Big science is characterized by major projects such as high-energy particle accelerators and major telescope facilities. These projects are conceived, designed, built, and used by large groups of scientists and engineers. Small science typically involves a principal investigator and a small group of students conducting laboratory research. The scientific enterprise requires both: most scientists are trained in small science, and big science often requires hundreds of small science investigations that are integrated into the grand plan.

My own career in physics is a good example of this co-mingling. As a graduate student, I devoted four years of my graduate student life as principal investigator of a small-scale research project, and I would later become involved in some very large-scale scientific programs. Demonstrating the capability to conceive, design, build, implement, and summarize the key results of a scientific investigation is the primary requirement for a PhD in experimental science. In today's climate of frontier research, this is usually the last time that any scientist works in the research community as a lone agent—progress requires working with research teams of varying sizes and various scientific disciplines.

A recent take on this debate appeared in a [letter by John Waymouth published in the September 2011 issue of *Physics Today*](#). Waymouth laments over the funds that the federal government has dedicated to large scientific facilities for high-energy physics as opposed to the fraction of funds dedicated to the lower-energy physics and chemistry of practical electronic devices. I have known Waymouth, an R&D pioneer for electric lighting products, since my student days at MIT and often interacted with him at local and national AVS meetings. As director of R&D at GTE Sylvania's Lighting Group through the late 1980s, Waymouth led valuable research efforts in electric lighting that produced usable products and economic gain for his company. The development of practical, efficient, and safe lighting products requires materials science, vacuum science, plasma science, and their associated technologies. Anyone visiting the light bulb aisle in Home Depot knows that the Edison light bulb has evolved into a dizzying array of options involving incandescents, fluorescents, and LEDs—and that is just the consumer market.

Would the US be developing more consumer products if we had in the past devoted more funds to research that directly affects our daily lives than to high-energy physics? I do believe this is true.

Following the lighting example, the new generation of LED lighting is made possible by ultrahigh vacuum technology that was paid for by federal investments in hardware needed for high-energy physics,



fusion, and space projects. Plasma lighting and plasma displays owe similar debts to the investments made in basic plasma physics by the nation's fusion program. [*For those interested see an [article I wrote for the 50th anniversary of the AVS in JVST A](#) 21(2003) S25.*]

Basic research generates financial returns to the nation's economy through several pathways. It usually takes many years to produce innovative products derived from the original research, but numerous studies have shown this return to be many times the original investment. The developed world's investment in high-energy physics over the last 50 years has been in the tens of billions

of dollars. However, the return to the world's economy from just one invention from this field—the World Wide Web—is orders of magnitude higher. The less visible return from basic research is the scientific and technical workforce it creates that can, in turn, more effectively advance commercial endeavors through the power of critical thinking and the scientific method.

Publishing Matters

Key STM publishers converge at ALPSP conference



A contingent from AIP's management team—Fred Dylla (executive director and CEO), John Haynes (vice president, Publishing), and Terry Hulbert (director of Business Development)—attended this month's [Association of Learned and Professional Society Publishers \(ALPSP\) International Conference](#) in the United Kingdom. ALPSP, with 340 members in 37 countries, represents a broad range of nonprofit publishers and is a critical advocate for the scholarly publishing community. Only in its fourth year, the conference is already a fixture on AIP's meetings calendar. The event helps us stay engaged with our fellow international publishers, vendors and customers.

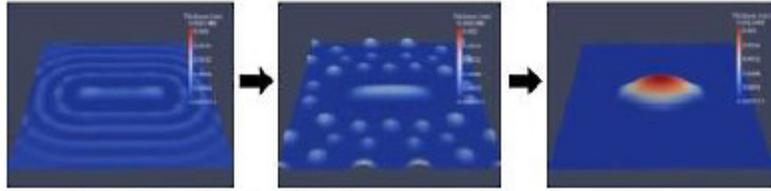
Hulbert (left) delivered a talk at the conference entitled, "Social media and the scholarly record: A square peg and round hole interface?" His [presentation](#) looked at, among other things, the current state of social media and addressed such questions as whether social media is too informal or ephemeral to be included in the scholarly record. He also discussed whether publishers should help in establishing policy or look to communities to lead the way.

Physics Resources Matters

Rational designs for industrial outreach



AIP has partnered with The Society of Rheology to plan an industrial outreach event on October 9 at the upcoming [SOR 83rd Annual Meeting](#) in Cleveland, OH. This forum, entitled "Rational Design with Soft Materials," features a panel of scientists and engineers who will demonstrate successful applications of rheology in the commercial sector. The panelists represent activities in academia, industry, and US national laboratories. Rheological design inspired by humans and rheology in nature and nature-inspired materials will be shown in brief presentations with discussions and Q&A opportunities. See the [full program](#) on the AIP Industrial Outreach website. A social/networking hour will follow with refreshments.



Panelist Randy Schunk of Sandia National Laboratories will address simulation software development for nanomanufacturing processes and fuel cells.

Faster than the speed of light!?

Around AIP



Photo credit: Mary Catherine Adams

ACP employees gathered on Friday to listen to the live press conference at CERN, divulging the results of an experiment that detected neutrinos breaking the speed of light. The impromptu gathering was organized by James Riordan, head of APS Media Relations. For more information, visit [Physics Today's Science and the Media](#).

ACP blood drive

The American Red Cross and America's Blood Centers, which supply all of the blood banks across the U.S., are reporting severe shortages of blood. The ACP Events Committee is having a blood drive on October 5. Interested donors are asked to email [Donna Jones](#) of Human Resources to schedule an appointment. There's no better time to give.

Coming Up

Monday, September 26

- AIP Executive Committee meeting. (College Park, MD)

Tuesday – Thursday, September 27–29

- *Physics Today* sales meeting. (Turf Valley, MD)

Wednesday, September 28

- ACP personnel lunchtime social, 12–1 pm. Take some time to connect with others in the building; join us for bingo. Bring your lunch, and we'll dress up the meal with light refreshments. (College Park, MD)

