

2006 AAS Chairs Meeting Notes: by Caty Pilachowski and Peter Shull

Friday Dinner November 3, 2006: Astro 101 discussion (about 20 attendees)

Clickers: Omnidirectional radio-frequency models are better than line-of-sight IR models.

Opinions on usefulness ranged from enthusiastic to not worth it. Clickers are valuable to some for grading or attendance, to others for purely informational purposes, without grading. Some think clickers increase student engagement, others don't.

Reliability issues include the directionality of IR units (which necessitates multiple signal receivers), dead batteries, students' forgetting to bring clickers to class, the sharing of clickers to cheat, occasional failure of inputs to register, and the logistics of distributing clickers to students (e.g., by university upon matriculation, or at the start of each semester or lecture). Some universities organize clicker systems and their software centrally, others expect each instructor to do it for him- or herself.

Training graduate students to teach: Many schools prohibit classroom teaching by grad students – but how to train those PhD students who go directly to professorships at smaller schools? Develop a separate course in which graduate students teach each other? Do summer teaching at their own school, or another? PIs could include teaching duties for postdocs when writing NSF proposals.

Value of traditional lectures: Why should students show up if so much can be delivered electronically? Because good lectures are like live musical performances, with their own flow and adaptability, so they engage students better than a screen.

Cool appliance: Several enthusiastically recommended Celestron's GPS-based "SkyScout". Aim it at any celestial object for an instant identification.

Fat textbooks: Overloaded, bewildering texts are disliked by some. They are expensive, and the two-year edit cycle costs students money at resale time. Some professors have moved to using only their own notes. *Astronomy* by Dinah Moché (\$20), published by Wiley, is an excellent, inexpensive introductory text because it is half the usual length and has only greyscale illustrations.

Action item for 2008: get a private room for this discussion, with a buffet or food brought in from the restaurant.

Saturday Morning November 4, 2006 – Roundtable Session (39 attendees)

Opening Remarks

The Chairs were welcomed by Kevin Marvel, Executive Officer of the AAS, which is sponsoring the meeting. The AAS helps to support the meeting because discussion among the Chairs is of benefit to the community. Marvel briefly described the main functions of the AAS, including journals, facilitating communication, education, and advocacy for research funding. Marvel is available to visit departments to give colloquia on public policy and advocacy, and several departments have found his visits to be quite helpful. Marvel described his vision for the AAS, including membership value, internationalization, and sound fiscal management. He also described the new “meetings in meetings” format planned for the St. Louis meeting in the summer of 2008.

Undergraduate Education

Access to Telescopes

Access to small telescopes and their role in training students was an issue brought up by many departments. Visits to telescopes were seen as a key factor to engage students in science and science research, and to encourage students to go on to graduate school. The decline in availability of access to telescopes was a problem for many departments, and could have an impact long-term on the vitality of the field.

The University of Toledo noted that they had funding through their PREST grant to host undergraduate students for a week or two to gain telescope experience. Some REU programs, including Indiana University's, routinely take students to telescopes to gain experience.

Remote Observing

Many departments have explored remote observing as an option to assist students learning about observing. Experience was mixed, with some departments finding that remote observing was the only way they could give their students observing experiences. These departments are generally those with telescope access in the southern hemisphere where travel is prohibitive due to time and cost. Other departments felt that remote observing experiences did not provide the hands-on, active engagement that students need to get excited about observational astronomy. Remote observing was useful for obtaining research data, but less so for attracting undergraduates to the field or for training students to fix broken equipment and become ‘real observers’.

Robotic telescopes are becoming more common. Mutel: Iowa has one in operation for undergraduate observing. Shull: Oklahoma State will install an 0.6-m robotic RC telescope in December 2006, and is looking for graduate students wanting to use it for MS projects. (Any more robotic telescopes?)

Student Travel Funds

Most departments reported little or no difficulty in finding travel funding for students to visit observatories.

Course Offerings

Some departments felt understaffed to the extent that they were unable to keep up with demand for course offerings, both at the introductory level and at the upper division level. In some cases, additional faculty are being hired to meet the demand, while in other cases adjunct or part-time faculty are teaching the courses.

Some departments were concerned to keep over-educated students who had studied calculus or some physics out of the introductory survey courses.

Transitional students

Opportunities for transitional students who wanted to work for a year or so between undergraduate and graduate school are limited. Such programs are needed, but the substantial effort needed to train students at observatories or in instrument labs is too much to justify for relatively short-term employment. NRAO offers co-op programs, mainly for students with skills in engineering or computer science. It does hire transitional students sometimes; some of those students stay longer than a year.

Other Options for Undergrads Interested in Science

Some departments reported concern about relatively high loss rates of potential majors who found physics or astronomy too difficult, and pressure from university administrators to retain such students. Other options for such students, including joint programs in science education, writing, public policy, etc. might be considered. Virginia offers a BA program along these lines. **Who else?** Where should programs in Astronomy education be housed: Astronomy departments, or the School of Education?

Diversity Issues

Diversity is an issue in many departments: often there is money to start initiatives, but not to continue even successful ones.

Graduate education

Undergraduate Training in Computation

Some departments noted that a lack of formal computational training at the undergraduate level is being seen in the entering graduate population. Students are adept at 'point and click', but not able to create their own programs. Opposite views were also expressed - that entering undergraduates were more technically competent than graduate students.

Non-Traditional Masters Programs

Several departments reported on non-traditional masters programs (Fisk/Vanderbilt, Wesleyan, Iowa State) aimed at students who are able but under-prepared for a PhD program: or example, they are returning to academia after being in the workforce. The students can earn a masters degree and then move on to Ph.D. granting institutions to complete doctorates. Historically, such programs have proven successful.

Physics Prelims and Qualifying Exams

Several departments also noted a trend to shift the qualifying exams earlier in the students' graduate careers, as well as a trend to emphasize upper division undergraduate physics in the exams, rather than graduate-level physics.

Several joint Physics & Astronomy programs noted concerns with physics prelims and qualifying exams. In joint departments, students often take exams based on 3 or more basic physics courses, independent of their intended research area. For astrophysics students, these exams force them to concentrate on these core physics courses to the near-exclusion of astronomy and astrophysics courses. Sometimes the required core physics courses cover material that is not necessarily appropriate or central to the students' future research expertise, and the students must delay taking core astrophysics courses that are needed for their research areas. Some departments reported that they use weekly seminars to provide some connection for the student to astrophysics. Some astronomers have tried to introduce astrophysics questions on the prelim, but there is often resistance to this.

Graduate Curricula

At least one participant was concerned that graduate courses be kept current, with the form of the curricula not remaining static while the field changes.

Instrumentation

It is increasingly difficult to find opportunities for students to become involved in astronomical instrumentation. The major observatories often cannot accommodate student participation, even when the costs are paid by universities.

NRAO noted that they have programs available for graduate students interested in pursuing dissertations in radio astronomy and instrumentation.

Costs for Graduate Students Up

The cost of supporting graduate students continues to rise as stipends, tuition, benefits, and overhead keep going up. Where tuition costs must be paid from grants, the cost of a graduate student can amount to that of a half-time or two-thirds-time postdoc.

Faculty Issues

Joint Physics & Astronomy Departments

Most representatives from joint Physics & Astronomy departments felt that their “marriages” with physics departments were happy and healthy, and had few, if any, complaints. They emphasized the value of such arrangements, including access to the resources of a larger department and the synergy that is possible with a larger group of faculty. One noted they were essentially their own department within the physics department. Another relatively large astronomy group, which had split off recently into its own department, found they were more “nimble” in responding to changing circumstances.

Interdisciplinary Programs

Many departments reported an institutional focus on interdisciplinary programs, as well as frustration at the difficulty of connecting astronomy with other disciplines to make interdisciplinary hires. Areas that have been tried include astrobiology, computational science,

engineering (link with astronomical instrumentation) and planetary science, but these appointments have proved to be difficult to arrange in practice. Only one institution insisted that all faculty hired in interdisciplinary programs have appointments split between departments.

External Reviews

Several joint Physics & Astronomy departments summarized their experience with external review. In some cases, the external review was of benefit to the astronomy programs, while in other cases, astronomy programs were overlooked or misunderstood by the physics-dominated review committee. One department was considering organizing an "independent" review of just the astronomy program. Suggestions were made to select carefully the members of all reviews, and particularly to include members with (good) experiences in joint departments.

Spousal and Dual Career Hires

Several departments expressed frustration with the difficulty of spousal and dual career hires. It is difficult to arrange a hire in another department, and even harder if a spouse is a non-academic. Nonetheless, many departments are finding that for the majority of highly-ranked candidates, spousal hiring must be addressed.

Women in Astronomy

Some departments reported that funds were available at their university for diversity hires (women and minority), but they were concerned about the relatively small pool available. This is particularly difficult if the targeted group is senior women. At the junior level, the pool is reasonably large, with some 42% of astronomy Ph.D. degrees being awarded to women in 2004. One (small!) department noted that its astronomy faculty will be 50% female starting in 2007 and challenged other departments to reach the same goal.

Performance Evaluation for Departments

The criteria that university administrators want to use to evaluate the performance of some departments were discussed. The Delaware criteria (www.udel.edu/IR/cost/welcome.html) were proposed for use at one institution, but were found to be difficult to apply fairly. Counting 'butts on seats' values survey and remedial courses above courses for majors; one program reported problems because *fewer* of their incoming students now require remedial mathematics teaching.

Facilities

Planetariums and Historic Facilities

A number of departments represented at the meeting operate planetariums as part of their instructional or public programs. Some of these are subsidized by the institution, while one is able to be self-sustaining through gate receipts. In one case, a planetarium has recently been moved to the School of Education, which may have difficulty in using it effectively. Overall, the level of institutional support varies widely.

Other departments are evaluating the future of historic facilities that are no longer primary research facilities. Some are considering converting such facilities for use in public programs, and are beginning to coordinate with local science museums concerning the future of facilities.

Facility Operations

Institutions that operate observatories and other facilities are concerned about the cost of operations. These costs continue to go up, and in some cases, the costs are higher than can be afforded, particularly in cases where departments operate multiple facilities. One department was able to transfer operations costs from research to undergraduate education, but even so, operating the facility as an undergraduate resource was time-consuming. Institutions involved in multiple telescope consortia sometimes found their faculty stretched too thin in trying to cover all the commitments.

Research Funding

Many departments expressed concern about the future of external grant support, which is a high priority in all departments. The pressure on the NSF grants program is high and still increasing, while levels of NASA's support of grants programs is increasingly uncertain. External grants are essential to maintain the research productivity in astronomy, particularly in this era of fundamental new discoveries, and also essential to maintaining the pipeline of highly trained scientists to meet national needs. DoE is funding astroparticle physics and some dark-energy observations.

General comment

This session over-ran because we had almost 40 participants, a 25% increase on 2004. Next time, perhaps title it 'bugbears', and limit participants to one bug and one bear apiece.

AAS Education Programs

Susana Deustua of the American Astronomical Society noted two recent publications available from the AAS.

1. The career booklet "A new Universe to Explore - Careers in Astronomy" was distributed. The booklet includes salary figures and mentions other career options. The booklet needs to be updated and Deustua welcomes suggestions of information to include, particularly about what do students need to know and do to get into graduate school in astronomy.
2. The second is a booklet on opportunities for research in astronomy and astrophysics for undergrads. It includes mostly REU programs, but other programs are included, too. The booklet is not fully up to date, the content is correct online.

The AAS Education Office is a source of information and connections and help for education issues. Deustua noted that the astro 101 compendium within Compadre is edited by Gina Brissenden, and that they are looking for a (paid) editor for a similar compendium of upper division astronomy lab activities.

Saturday Afternoon November 4, 2006

Senior Review

Eileen Friel (AST) from the National Science Foundation presented the finding of the Senior Review Panel, released on Nov. 3 after acceptance by the Advisory Committee of the Division of Mathematics and Physical Science at NSF. Information about the Senior Review process, and the report itself, can be found at

http://www.nsf.gov/mps/ast/ast_senior_review.jsp

Friel's presentation is available on the NSF website at:

http://www.nsf.gov/mps/ast/seniorreview/senior_review_rollout.pdf

Question/Answer/Discussion.

- *What will be the role of community input from this point forward?* The NSF will hold town-hall meetings to talk about the process of the Senior Review and explain how it happened. Community input may affect the pace of implementation, but NSF will not revisit the recommendations. Community support is needed to carry out this process, and the NSF will ask for community input about where to put savings resulting from the Senior review.
- *How does the NSF plan to proceed with big projects? Is there a framework in mind for moving forward for setting priorities for the 20-30-meter telescope projects, between TMT and GMT?* The NSF will be working with projects and NOAO to move large projects forward. AST hopes to have a plan in place in spring 2007.
- *How will the Senior Review and lessons learned from the Senior Review process affect the upcoming Decadal Survey for Astronomy and Astrophysics?* The Committee on Astronomy and Astrophysics is producing a white paper about how to proceed with the upcoming decadal study, but no decisions have been made yet. Clearly, the next study must consider realistic costs, provide for a reexamination of priorities and viability through the course of the next decade, and plan more effective mechanisms to obtain input from community; many members of the community felt excluded from the last decadal survey. Senior Review recommends (7.5.1) that the next Decade Survey consider how to balance the costs of continuing to operate current facilities against building new ones.
- *What is the state of the grants program? With success rates at 1/4 officially, and worse at NASA, can the grants program be called healthy?* AST start with a target amount for the grants program each year, currently about \$32M not including REU programs, CAREERS, or ATI, and does not reduce the available funds below the initial target. Additional funding is added if available. Grants funding has been increased the last two years, but proposals have gone up by 50%.
- *What opportunities are likely to be available to NSF and AST from the American Competitiveness Initiative (ACI)?* Conversations are ongoing within NSF and MPS about how NSF and MPS can best achieve the national objectives outlined in ACI. ACI is primarily focused on innovation and research with direct economic benefit to society. There is no guarantee of doubling the NSF budget, let alone AST's budget. AST could benefit by providing examples of ACI-related contributions from astronomy. Such examples certainly include adaptive optics, imaging, radio spectrum management, etc. Marvel noted the importance of writing our elected representative to make our views known and of educating our students to participate in the public policy process.

- *Are the NSF or AST concerned about the decreasing number of domestic students choosing careers in science?* Yes. The new MPS Associate Director, Tony Chan from UCLA, has made this a serious concern within MPS.
- *How might NSF and NASA coordinate to minimize impact on the community of the changing funding priorities at NASA?* Regular conversations between NSF and NASA are being held to minimize impact on community and on the Foundation, as the pressure on the NSF grants program increase.

General Issues related to NSF programs:

Grant Support with Observing Time

Is the US system of funding grants and providing observing time at national facilities separately the most efficient way to fund science? The VLA runs very cheaply, but investigators must be highly skilled to use it effectively. As a consequence, foreign investigators who receive basic government research funding use the telescope more productively. ALMA will be more of a user facility with a higher level of support for all astronomers, so non-radio astronomers should be able to use ALMA effectively. But competition for science success with Europe will be stiff, since European investigators will get research funding. The same problem can be seen with the Gemini observatory - US Gemini investigators don't publish as much or as quickly than their funded colleagues in the Gemini partner countries. Do we want a more European system with funding associated with successful observing proposals?

At NSF, there is no mechanism to attach funding for grants with observing proposals, and AST hasn't been able to come to a good resolution of this problem. One advantage of separating grants and observing is that many more people can get observing time than can be supported by grants. It is possible to supporting basic observing costs, including travel and page charges) but supporting graduate students or postdocs is not feasible. Another difficulty is to justify funding the use of telescopes at public observatories but not private ones.

The NASA funding cliff is getting nearer. Are NASA and NSF holding discussions to coordinate their financial planning? Yes, NSF is trying to coordinate these.

Kevin Marvel: The community and students should communicate with government officials about the damage caused by funding cuts.

NASA Space Science Funding

Hashima Hasan from NASA's Office of Space Science spoke on the prospects for science funding in the coming years. She highlighted the reinstatement of SOFIA and Servicing Mission 4 for the Hubble Space Telescope, but noted that continuing funding for SM4 through 2008 will lead to many problems and issues that must be resolved.

The President's 2007 budget and the planned Science Mission Directorate 2007 research budget put science funding at NASA at \$1B per year, but the budget includes a 15% cut to basic Research & Analysis (grants to entire community). Should SMD respond by making fewer

grants of reasonable size or should SMD conserve the number of grants but make each smaller? There must be some balance. The size of instrumentation grants cannot be cut. Theory may get smaller grants, but with a comparable number of investigators still being funded. One other funding model is also under discussion - should NASA offer solicitations only every 3 years or should they have a solicitation every year for 1/3 of the budget?

SMD is doing their best to respond to the situation and to minimize the impact of the cuts on science.

SMD is hoping for an Explorer solicitation in early FY08, but budget and launch vehicle questions are delaying the solicitation. Discovery and Explorer budgets look inadequate to support programs at the level we've seen in the past decade. The goal was one launch per year, but no new programs have been started in the last 2-3 years. The launch rate has fallen to one every other year.

A Science Plan is now available from SMD and will be distributed at the AAS meeting in Seattle.

Questions/Answer/Discussion

Science seems to be a small influence on the direction of NASA, but science opportunities associated with a return to Moon and Mars are just beginning to be addressed. SMD-level initiatives will emerge through the NASA Advisory Committee (NAC). We are still at an early planning stage for lunar science.

What's going to happen to GO/archival/theory budget through 2013 for Hubble? These programs should be sustained through 2013.

The Senior Review commented on balance of small and large programs and individual investigator grants at NSF. How can the balance at NASA be reviewed? NASA has little flexibility to adjust the balance. The Hubble and JWST budgets are set by Congress, and there are no ongoing discussions within NASA about how to restore balance. The community has said it wants to do SM4 for Hubble, so other things must be delayed.

Has NASA's attitude toward taking advice from scientists changed? Yes, scientific input to NASA committees has been reinstated.

To what degree do problems in smaller missions come from overruns on bigger missions? Does NASA learn lessons from overruns that have already happened? Yes, NASA always considers lessons learned from missions. NASA does difficult, one-of-a-kind missions and costs are not always well understood at the beginning.

Many opportunities for long term support at NASA have been eliminated. NASA still provides opportunities for 3 or more year grants, including programs in detectors, sub-orbital flights, balloons, laboratory astrophysics, and some ground-based support. Astro Theory, Beyond

Einstein foundation science, some TPF foundation science programs, and Origins are also still available.

PI funding via LTSA has been discontinued, ADP has been cut 50% to \$1M/year, and there are fewer 3-year grants. This has a serious impact on the community: new faculty may not get tenure, and graduate student support is slipping. Marvel noted that such arguments should not be used with Congress. We are being portrayed as an entitlement community, and this message reinforces that perception. Astronomers need to send the message that science is important and that the nation needs to invest in scientific achievement and in training the younger generation. Cuts are eroding the core competency in the community, and science impacted in a bad way by shifts of NASA's funding. Right now, advocating through headquarters is not effective, but general arguments for science funding on the Hill will be more effective.

Saturday Afternoon: Final Discussion

Sellwood: thanks for providing data about staff support etc. as requested in the questionnaire.

NRC Survey: Several comments on the fuzziness or degeneracy of the taxonomy employed in the survey. One program noted that their 'Astrophysics' PhDs (in a program jointly with the Physics department) do not count for either department. Perhaps a shift should be made toward decile rankings. Although listings are designed to help students select the best programs for them, they are used by deans to assess program quality.

Chair communication: Should there be an informal chairs' reception at regular AAS meetings? Should there be an annual spreadsheet of departmental data? Yes, both are good ideas.

Action items:

The Assembled Chairs agreed that we should meet again in 2008, on a date again adjacent to the Midwest Physics Chairs meeting here in Chicago.

Do we want an e-mail listserv for Chairs to consult each other as issues arise?

We should decide how much data we can usefully collect: the Midwest Physics Chairs are all public universities and collect salary data that private institutions would not release.