ASTROPHYSICS
newsletter

The Division of Astrophysics
•
The American Physical Society
•
January 2000

DAP Student Travel Grants and Award

Trevor Weekes, Chair DAP

The future of the Division of Astrophysics (DAP) depends on its younger members and we must do everything we can to ensure that they join the division, attend its meetings and participate in its sessions. At the Atlanta Meeting (March 1999) the DAP Executive Committee decided to take some measures to encourage this participation; these are described below. You, as existing members, should see that this information is brought to the attention of the graduate students in your department, particularly those who havenot yet joined the DAP.

1) Travel Grants.
To encourage more participation by graduate students we will establish TEN travel grants of $300 each for attendance at the main (annual) meeting of the division. To be eligible for these awards, the student should send a short letter of application to the DAP Program Chair (Virginia Trimble, Physics Department, University of California, Irvine, CA 92697-4575). They should include a copy of the abstract of the paper they are submitting for the upcoming meeting (APS April 2000 in Long Beach, California). They should also ask their supervisor to send a short letter endorsing their proposal. The deadline for these letters will be the same as the deadline for submitting the abstract to the APS (January 14, 2000); the abstract should also be sent directly to the APS via the Web.

2) Award for Best Student paper.
In addition to the Travel Grants the DAP will offer an Award of $500 to the best paper presented by these students at the meeting; the Award will be selected by an Ad Hoc Committee of DAP Executive members attending the meeting who will attend these sessions. The committee to be chaired by the outgoing DAP Chair. To facilitate this selection, the ten student papers will normally be allotted to one session (with diverse topics). The award will be based on the quality of the

- Continued on page 4

DAP Upcoming Election

Trevor Weekes, Chair DAP

In April, 2000 we will be electing a new Chair-Elect and two Members-at-Large to take office at the April APS 2000 Meeting in Long Beach. These are onerous tasks and, as the current committee have learnt to their dismay, there is no remuneration. To help in the important tasks of finding suitable candidates, we have set up a Nominating Committee of three consisting of:

Dietrich Muller, Chair
muller@odysseus.uchicago.edu
David Thompson, djt@egret.gsfc.nasa.gov
Jack Burns (APS Nominee), burns@missouri.edu

You may contact the Nominating Committee with suggestions of appropriate candidates. Also, nominations for any of the positions are accepted from the general membership if submitted in the form of a petition signed by 2 % of the DAP.

Each candidate must supply to the Secretary / Treasurer (1) a written statement that he or she will serve if elected and (2) a paragraph or two listing their qualifications and thoughts about the DAP and the state of astrophysics in general. These will be published in the Spring Newsletter, together with the election ballots.

Ring out the Old, Ring in the New

Trevor Weekes, Chair DAP

The present officers of the DAP have pleasure in expressing their collective thanks to Josh Grindlay for his three year service as Chair-Elect, Vice-Chair (Program Chair) and Chair. We go forward with the knowledge that in his new position as Past Chair he will not hesitate to give us his wise counsel.

We are pleased to welcome to the committee the new Chair-Elect, Chuck Dermer and the two new Members-at-Large, Michael Cherry and Meg Urry.

In This Issue

Report on the Centennial Exhibit of the DAP/APS

Chuck Dermer, Vice Chair DAP

I was given this space to summarize the outcome of the DAP Centennial Exhibit Display, which I volunteered to develop. In the end, it took quite a chunk of time and no small effort. It's one of those things that if you had it to do over again, you probably wouldn't do it, but since it's already over, you're glad that you did it.

Perhaps the best thing about the outcome of the DAP exhibit is that, unlike the Centennial Meeting held in Atlanta last March, the DAP display does not fold up shop and go home. You do what everyone else does: put up a web site. But more about that later.

First I would like to thank everyone who helped out with the Exhibit. This turns out to be quite a large number of people. In terms of learning new skills, I must acknowledge Mark Strickman, here in my branch at NRL, and Kurt Mitman, a bright and talented student from the Thomas Jefferson High School for Science and Technology. I learned an amazing amount of computer stuff: Corel, postscript to bitmap conversion, powerpoint, html, even a little perl. Skills for life, you might say. For organizational help I thank Mike Arida at GSFC, who stepped me through the process of putting on a display, Mike Andrews in the Solar Physics Branch at NRL, who worked with me in all aspects of interior decoration and aesthetics, and Liz Pentecost at USRA. Liz thankfully took the paperwork off my shoulders. Chris Wanjek from GSFC helped with the presentations, and gave me wry and welcome advice from the point-of-view of a media-savvy outsider.

But for content and lasting value, I must wholeheartedly acknowledge the many people who undertook the task of preparing posters on "Astronomy: 100 years of Great Discoveries." Though just one part of the exhibit, this was its centerpiece. DAP members gave freely of their time to make large posters that are filled with wide-ranging knowledge and the centerpiece images found in different fields of astronomy. The guideline was to produce "a colloquium on a poster." I invite you to check them out, download them, print them out, and marvel at their beauty. A collection of such posters would make a good book. Maybe this will happen at some point, but for the moment they can only be found, in various forms, on the web site (http://gamma.nrl.navy.mil/dap-aps).

Before I mention the posters separately, you might wonder how one chooses the great discoveries in astronomy. We could have been democratic and put them up for a vote. But with time running short, we were forced to be pragmatic: It was a great discovery if someone agreed to prepare a poster for it. With this criterion, therefore, here are the great discoveries: The pp Chain. Dieter Hartman and the nuclear astrophysics group at Clemson agreed to do this poster on the energy-generation mechanism of the Sun, highlighting Hans Bethe's discovery of the p-p cycle.

Solar and Stellar Neutrinos. The detection of neutrinos opens a completely new view of the universe, utterly different from the more familiar electromagnetic probe. John Bahcall from the Institute for Advanced Study and Princeton University prepared a poster verifying the energy generation mechanism in the Sun through the detection of neutrinos. Wick Haxton (University of Washington), a past chair of the DAP, prepared another poster on neutrino detectors. These detectors will surely lead to some of the great discoveries in astronomy during the next 100 years.

Solar activity. The sun isn't just a quiet ball of gas, quietly pumping out its energy. It is a churning MHD fluid, with flares, coronal mass ejections, energetic particles, X-rays and gamma rays. Mike Andrews developed this poster.

Solar and Stellar Winds. Stan Owocki from Bartol prepared this beautiful poster about the winds from the Sun and stars, linking them finally to outflows from starbursts and quasars.

Discovery of Extrasolar Planets. This poster, produced by Geoff Marcy of UCB and San Francisco State University, underwent continuous modifications due the rapid pace of this field. (The areas showing artist Lynette Cook's imaginative renderings of planets in other star systems have been blacked out due to copyright restrictions.)

Cosmic Rays. This poster, by past DAP chair Richard Lingenfelter (UCSD), begins historically, provides a great summary of the field, and ends with a description of the most energetic particles known.

Isolated Neutron Stars. This poster was prepared by Alice Harding (GSFC) and Mark Strickman, and gives us the big picture about these little objects.

Accretion-Powered Neutron Stars. MSFC scientists (Mark Finger, Matt Scott, Colleen Wilson, Robert Wilson, and Pete Woods) who work with BATSE, which has yielded so much new information about these objects, covered the subject of this poster.

Black Holes in the Galaxy. Eric Grove (NRL) and Josh Grindlay (Harvard), who chaired the DAP during the year leading up to the Centennial meeting, put this poster together. Black holes, like neutron stars, come in many disguises, also perhaps including one responsible for the mystery at the center of our Galaxy.

Active Galactic Nuclei. Kim Weaver from GSFC developed this spectacular poster, which summarizes evidence for supermassive black holes in other galaxies.

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The Centennial in Retrospect

Trevor Weekes, Chair DAP

Those of you who attended the APS's Centennial Meeting in Atlanta last March will probably agree that this was a memorable meeting and one that we hope does not occur again for a hundred years. With 11,000 physicists in attendance and a large turnout of Nobel Prize winners and otherwise distinguished senior physicists this was something for the record books. The DAP played its part and had a good turnout at all the sessions it sponsored. The Centennial and Invited paper sessions that we organized featured some excellent papers and were favorably commented on by non-DAP members. Those who organized these sessions, Gerry Fishman, John Huchra, Virginia Trimble, as well as the co-organizers with other divisions and the many speakers and chairpersons, deserve the gratitude of all members of the DAP.

Particular thanks must go to Chuck Dermer who did a magnificent job of organizing the DAP Exhibit which was the subject of much attention in the Exhibition Hall. The posters that Chuck put together are a lasting memorial of this exhibit.

Planning for April 2001

April 28- May 1, 2001
Washington, DC

Thinking ahead to Y2K+1.

Chuck Dermer, Vice-Chair, DAP/APS

The compass points to X-rays in 2001.

This is the first thing that crosses my mind when I think of highlight astrophysics for the Washington DC meeting in 2001.

And not only the astonishing views of the universe that Chandra is providing. On top of the recent successes of Beppo-SAX, ASCA, RXTE and USA, we can count on new science from XMM (January 2000 scheduled launch date), Astro-E (early 2000), and HETE-II (23 January 2000). It should be a good time to hear about X-ray spectroscopy and the physics of highly ionized plasmas, and shock waves and blast waves and particle acceleration physics.

Given the Solar cycle and the upcoming HESSI launch (August 2000), we should also have a Sun session. The astonishing TRACE videos deserve to be seen again - and if you haven't seen them, then you're in for a treat. For my part, I would like to learn more about the theory behind the TRACE observations. Please send me your suggestions for speakers in an invited Solar session.

The third thing that crosses my mind are the opportunities that a meeting in DC affords, and not only for the museums, restaurants, and art galleries. We'll have a new president and a new legislative agenda. It'll be a springtime weekend for the new congress and their staffs, and perhaps there will be no better time than this to think about the system that keeps our science strong.

Given this opportunity, I suggest a session exploring the astrophysics / defense department connection, and how the two have cross-fertilized each other. It is a dynamic tension through which many of us navigate, and which provides I think a mutually beneficial relationship.

So I ask, if any DAP members are working with advanced detector technology that has produced good astronomy (if not scored a major discovery) and furthermore has interesting history in terms of NASA and DoD or DOE labs, please let me know. There are lessons to be learned here.

Finally, I append the following memo from my advisor / spouse regarding the Spring 2001 meeting:

"The date of Easter in 2001 is April 15th, so it's very unlikely they [Congress] will be in recess. Monday the 30th would be good to set up meetings with staff, Tuesday better shot at getting Members.

Things are still pretty early in the appropriations process in the spring. The President will have already submitted his budget to Congress, and Congress will be reacting. Discussions in the spring are more 'big picture,' with an eye towards setting overall spending goals for the year.

It's a good time to 'build relationship' with the VA / HUD Subcommittee members who will be deciding things later in the fall, so you might want to set up some meetings with members and with the other leaders of your committee.

The thing to do now (over next 12 months) is to cultivate a relationship with Phil Graham, then later he can help you get into see GWB. Also, continue to be nice to Mikulski, in case the Dems take over the Senate.

Your 'message' will depend upon which of the 6 possible outcomes of the election has happened."

We'll try to organize an exciting meeting to attend and a good forum at which to present your latest research. Please send any comments and suggestions so that we can have a meeting that best serves the interest of the DAP. Decisions will start getting made at the Y2K meeting in Long Beach next spring.

DAP Centennial Exhibit *continued*

Quasars and Jet Sources. Michael Catanese (ISU) and Trevor Weekes (Harvard-Smithsonian CfA), the DAP Chair during the Centennial meeting, prepared this poster on these extraordinary manifestations of black hole activity.

Gamma-Ray Bursts. This was my training ground and our first poster, which I prepared with Mark Strickman and Kurt Mitman. Given the pace of the field, it's surprising to me that it's still not seriously out of date. A poster on the Cosmic Microwave and Infrared Background was prepared by Eli Dwek (GSFC and DAP). I'll say no more; it is beautiful.

Dark Matter in the Universe. Lawrence Krauss (CWRU and DAP), provided this poster on the evidence for dark matter, also mentioning the heroic efforts that are being made to detect the stuff.

Big Bang Nucleosynthesis. Scott Burles, K. Nollett, and Mike Turner produced this poster, which is truly a colloquium on a wall, providing the essential information about one of the most exciting chapters in contemporary astronomy.

From this list of the Great Discoveries in Astronomy, there are a few glaring absences. For the most part, these were the older discoveries, and I tried to correct this omission with a collage.

Besides the posters, the DAP / APS Centennial Exhibit included presentations on the Sun, the Solar system and planets, our Galaxy, the universe, high-energy phenomena, and the Multiwavelength Milky Way. Thanks again to Chris Wanjek for his help, to David Malin for providing the breathtaking AAO images for view at the Exhibit, and to Stan Davis, who converted many of the posters to html.

Finally, I should acknowledge Trevor Weekes and Josh Grindlay of the DAP Executive Committee. They gave me enough rope to hang myself; so I thank them, and also to Neil Gehrels, DAP Secretary / Treasurer. Jim Kurfess and Herb Gursky of NRL offered encouragement and support. NASA's Education and Public Outreach Office provided financial support, and the Office of Naval Research supported my time.

The Role of the Astrophysicist in a Physical Society

Trevor Weekes, Chair DAP

Those of us physicists who are privileged to work in astrophysics or astronomy should be mindful of the responsibility that we bear to the whole community of physicists. Whether we like it or not we work in an area that has the public's attention and their interest, and in a time of shrinking government interest in the funding of basic science we should be sure that we capitalize on this interest. In the absence of a Cold War motivation for the support of basic physics research, we are more and more dependent on the goodwill of our taxpayers. It is difficult to engender much enthusiasm from the man in the street on the support of basic science in the abstract. However give him an imaginative description of a recent astrophysical discovery and he begins to have some feel for the creative process that is basic science.

Most of us have the experience, be it on an airplane or at a cocktail party, of introducing ourselves as a physicist and having polite disinterest in our profession. However when we redefine ourselves as astrophysicists, there is a definite interest and almost in variably the conversation turns to some recent astronomical phenomenon that has attracted the public's attention and demands further discussion. Even if the subject matter is outsideour immediate expertise we know enough to elaborate on the media account and to satisfy the listener's curiosity. Our own work may be dull and full of drudgery but we are close enough to the exciting areas to share some of the thrills of discovery. However, an attempt to steer the conversation to some of the more esoteric (but useful) sub-disciplines of our profession and you may be politely ignored. Astrophysics is of interest to the public and we should exploit it on behalf of all our fellow physicists who work in areas that do not catch the public's imagination.

How should we do this? One way is to make ourselves available to give public talks on an astrophysical topic to local civic groups, to youth clubs, to schools, to anyone who will listen. Personalize the talk where you can but do not give a dull account of your own little field, which may currently be in the doldrums. Each of us should have a standard well-illustrated talk of 30 minutes or so in which we try to explain some astrophysical discovery or astronomical phenomenon with which we are well acquainted. Once prepared it can be easily regurgitated and fine-tuned to the particular audience and occasion. Surely all of us can spare time for one such speaking engagement every couple of months. It is surprising how rewarding it is to hear public interest and appreciation of your discipline; it makes you want to be a better astrophysicist! And, of course, be prepared for the inevitable questions; what good is this kind of work? why should the taxpayer support your expensive hobby?

Popularity is a two-edged sword. A matter of some concern for all of us who worry about the public perception of science is the number of reports that appear in the media about important discoveries that are not verified. The public are not particularly scientifically literate but they are not stupid; they are dismayed to find that many of the major "discoveries" reported by seemingly reputable scientists and institutions are premature and are often not substantiated. The correlation in dates of press releases and grant renewal deadlines is easy to see and we all live under the pressure of declining research dollars. If we are skeptical of colleagues who seem to talk to the media before they talk to their scientific peers it is not just professional jealousy; good scientific press coverage is good for everyone and we should congratulate those of our fellow workers who can do it well. But we should not be slow to condemn those who jump the gun and seek publicity for its own sake or for the sake of their next grant. An announcement of a controversial or marginal result to a scientific meeting is perfectly in order; a presentation of the same result at a public press conference must be done with great caution. Our scientific colleagues have enough experience to judge the veracity of such results; the general public does not. One bad science announcement negates ten good ones and implants in the public's mind that we are not to be trusted.

As astrophysicists we have a greater burden in this regard; greater public interest in our discipline means greater public scrutiny and therefore, surely, greater responsibility. Unfortunately we do not often measure up too well to this scrutiny. Perhaps the most alarming aspect is that public announcements, often premature and unreliable, are encouraged by some agencies, which take the narrow and short-term view, that any scientific news is good news. The retraction need not come in this year's budget cycle, itmay even be in the back pages and will probably be forgotten next year anyway! We should certainly not be shy about sharing our important results with the public but we should be conscious that they are less well qualified to critically review our results that our colleagues and hence expect a greater standard of certitude. Crying wolf too often is bad for science and will ultimately be fatal to our public support.

Trevor Weekes, Chair DAP (The opinions expressed here are those of the Chair, not of the DAP)

DAP Student Travel Grants and Award

Continued from page 1

research described, the clarity of the audio and visual presentation, and the professional manner in which the paper is presented.

3) Dissertation Papers.
Independent of the above, graduate students who are presenting a paper that is the final summary of their dissertation work may be awarded twice the normal time allotted for apaper (2 x 12 minutes). To determine if the paper falls in this category, it must be verified by an e-mail to the Program Chair from the student's supervisor. At the discretion of the Program Chair these papers may be scheduled in the normal sessions of submitted DAP papers or in the student session described above. These students will also be eligible for the travel grants and DAP Student Award.

Program for DAP April 2000

Virginia Trimble, Chair-Elect

Saturday, 29 April. 11AM - 2PM

Origin of Cosmic Magnetic Fields

Organizer: Amitava Bhattacharjee (for TGPAP), Virginia Trimble (for DAP)

Speakers:

A. Olinto (University of Chicago) Cosmological Magnetic Fields

P. Kronberg (University of Toronto) Galactic and Intergalactic Fields Since Recombination: Their Origins and Recent Results From Probing Them

C. Heiles (University of California, Berkeley) The Magnetic Field in the Milky Way Galaxy

A. Bhattacharjee (University of Iowa) Magnetic Reconnection and the Dynamo Effect

R. Kulsrud (Princeton University) Where Do We Stand on the Origin of Cosmic Magnetic Fields?

Saturday, 29 April. 2:30 - 5:30PM

Engine of Gamma Ray Bursters

Organizers: Clifford Will (for TGGR), Charles Dermer & Peter Meszaros (for DAP)

Speakers:

Chryssa Kouveliotou (USRA and NASA / MSFC) Recent Developments in Gamma-Ray Burst Research

Stanford E. Woosley (UCSC) Collapsars, Gamma-Ray Bursts, and Supernovae

Maximilian Ruffert (University of Edingburgh) Merging Netron Star - Black Hole Binaries

Wai-Mo Suen (Washington University) Numerical Relativity and Neutron Star Mergers

Sam Fin (Penn State) Detecting Gravitational Radiation from Gamma-Ray Burst Sources

Sunday, 30 April. 11AM - 2PM

Cosmic Rays: Probing the Extremes

Organizers: Michael Cherry, Gaurang Yodh

Speakers:

Brenda Dingus (University of Utah) Gamma Ray Bursters at TeV Energies

James Buckley (Washington University) Supernova Remnant Origins of Cosmic Rays at 10s of TeV and Above

James Matthews (Louisiana State) Maximum Rigidity and the Composition of Cosmic Rays above 1 PeV

Charles Jui - Extremely High Energy Cosmic Rays

Jonathan Ormes (GSFC) Antimatter

Sunday, 30 April. 2:30PM - 5:30PM

First Results from the Chandra X-ray Telescope

Organizer: Harvey Tananbaum

Speakers:

Martin Weisskopf (NASA / MSFC) The Chandra X-ray Observatory, OverviewPart I

Harvey Tananbaum (Center for Astrophysics) The Chandra X-ray Observatory, OverviewPart II

Leon van Speybroeck (Center for Astrophysics) Chandra ObservatoryMirror Performance and Sample Galaxy Cluster Results

Steve Murray (SAO) Chandra High Resolution Camera - On-orbit Performance and Early GTO Results

Gordon Garmire (Penn State) Early Results from the Chandra-Xray Observatory obtaind with the Advanced CCD Imaging Spectrometer

A. Brinkman (ESA) Early Results of the Low Energy Transmission Grating Spectrometer on Board Chandra

Claud Canizares / Herman Marshall - First Results from the Chandra High Energy Transmission Grating Spectrometer

Monday, 1 May. 11AM - 2PM

Triumphs of 20th Century Astrophysics

Speakers:

Charley Lineweaver (Univ. New South Wales, Australia): How We Know there was a Big Bang

Mitchell Begelman (JILA, Univ. of Colorado): How We Know there are Black Holes in Quasars

Judith Lean (Naval Research Lb): What We Know (and Don't Know) about the Sun's Influence on the Earth

Roger Ulrich (UCLA): How We Know the Stars Run on Nuclear Energy

Michael Turner (Univ. of Chicago): How We Know What the Universe Is Made Of.

Tuesday, 2 May. 8 - 11 AM

The Women of Stellar Astrophysics

Organizers: Beverly Berger for CSWP, Virginia Trimble for DAP

Speakers:

C. Megan Urry (STScI): Stellar Astronomy Today

Dorrit Hoffleit (Yale): Fleming, Cannon, and the Classification of Stars

Kathy Gaposchkin Haramundanis: Cecilia Payne Gaposchkin and the Composition of the Stars

Martha Hazen (Center for Astrophysics, Harvard): The Unsung Heroines, 1935-1965

Barbara Anthony-Twarog (Univ. of Kansas): Beatrice Tinsley and the Assembling of Stars into Galaxies

Contributed talks and posters on these and other topics in Astrophysics are much desired. Graduate students reporting for the first time on their thesis work will be given a double time slot (roughly 20 minutes rather than 10). There will be some travel grants for student presenters and a prize for the best student presentation.

DAP Executive Committee and Officers 1999

Chair ..... Trevor Weekes
Chair-Elect ..... Virginia Trimble
Vice Chair ..... Charles Dermer
Past Chair ..... Jonathan Grindlay
Secretary/Treasurer ..... Neil Gehrels
Division Councilor ..... Stephen Holt

Executive Committee Members (1999) ..... Patricia Boyd
Executive Committee Members (1999) ..... Gerald Fishman

Executive Committee Members (2000) ..... Michael Cherry
Executive Committee Members (2000) ..... C. Megan Urry

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