

The Dialog

May 2004

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Spring Meeting Highlights

A big thank you to **Mark Brooks Hedstrom**, chair of sciences at Oakwood High who organized a wonderful event.

Synopsis of speakers:

- * **Elizabeth George** - Wittenberg University - presented details of the World Year in Physics 2005. It is 100 years since Einstein's 3 major papers. Focus on Einstein in the 21st century; international celebration and activities!
- * **Mark Fischer** - Mt. St. Joseph College and 03-04 president
Trombone-sound and Mathematics Modeling - complexities in a "simple" model. Conclusion, the simple model is grossly incomplete!
- * **Bev Taylor** - Miami University, Hamilton Campus, reported on her experiences with students determining the physics of toys. Good practice in work on variables, trials, error analysis etc. Bev gave several examples of these projects.
- * **Gordon Aubrecht** - Ohio State, Marion, reported on research from his course on Physics by Investigation, a course to future teacher of physics. "Can the teaching of physics be changed?" Problem of loss of student curiosity and the focus on "the right answer" instead of process was presented. Based on his end of course responses only about 40% of his future physics teachers see any need for investigative process. By far the tendency is to focus on lecture and telling students what they have to know. Gordon was not well pleased!
- * **Dr Alan Kerrick**, Invited Speaker, presented Simulations with Colored Petri Nets: which focused on computer modeling of complex processes especially tailored to military utilization. As Alan noted, it is especially applicable to discrete event analysis but not for processes more easily described by differential equations.
- * **Dr. Brian Meadows**- University of Cincinnati, Invited Speaker, presented on New and Strange Charmed Particles and How they are Formed. Issues of spin conservation and other conservation problems were presented as were considerations of the present state of particle detectors.

We are indebted to the wonderful presentations of the speakers and the richness that they brought to our experiences.

Executive Committee and Business Meeting

The executive committee meeting was held at lunch with two members representing OSAPS: Paul Wold and Perry Yaney. SOS/AAPT executive members in attendance were: Mark Fischer, B. Kuhlman, D. Church, E. George, G. Aubrecht, J. Sullivan, F. Reuter.

*Discussion of the joint AAPT & APS meeting for the **Spring April 8 & 9 at U. Dayton**. Elizabeth George is our official liaison for this meeting with APS. Call for papers, need addresses for mailing and emailing. See C. Parrott. Starts @ noon on Friday, 7:30 a.m. Saturday -> SOS/AAPT will co-host the meeting.

***Fall meeting is 13 November at Ohio State** (SOS/AAPT). This is the same day that prospective high school seniors look at the Ohio State campus.

Session papers, 2 invited speakers, one from APT and one from OSU - topic of String Theory?? Also "How I do it."

*Gordon invites members to set up physics demos 2-3 minutes, to show the gathered students as a favor to OSU. Please contact him if you are able to do so.

(Gordon needs data on our meetings before 1996 for the web-site.)

***Fall 2005 meeting will be at Mt. St. Joseph**, Mark Fischer is in charge.

*Spring of 2006 meeting is yet to be determined. Any ideas???

*Slate of Officers to be elected:

>Elizabeth George:	President Elect (x05)
>Fred Reuter:	Recording Secretary (x05)
>Pat Shields:	Treasurer (x05)
>Mark Fischer:	4 year College Representative (x07)
>Steven Yerian:	Section Rep to National AAPT (x07)

moved & second & voted.

Moved immediately to the Open Business Meeting of the Whole:

ANNOUNCEMENTS:

*Fall meeting is November 13 @ OSU. NEED demos for prospective OSU students. Duration 2-3 minutes. Please contact G. Aubrecht if you are able.

*Spring meeting is joint with AAPS: it is at U. Dayton on April 8 & 9. Speakers will present on the World Year of Physics, among other things. Jointly hosted by SOSAAPT.

*L. Letterman will be at OCAS Oct 6 at U>S> at 4:00 PM. Call J. Sullivan for details.

*G. Aubrecht needs 14 more judges for the physics award for the state science day, May 8. This is a very real and crying need. Please contact Gordon.

How I do It

Mark Fischer presented a led light source that can be imaged even at less than 2 f for mirrors!
Bernie Clemens pitched USB temperature probes for Vernier as very good.

Door Prizes were awarded and the meeting closed about 3:00 PM.

An Introduction to LabVIEW and ELVIS**Chautauqua Course 106****REX L. BERNEY and PETER E. POWERS**, Department of Physics, University of Dayton**May 13-15, 2004 in Dayton, OH****Apply: DAY**

In the last few years, LabVIEW has become a very popular software product for experiment design and interfacing in graduate and industrial laboratories. National Instruments (NI) recently introduced ELVIS (Educational Laboratory Virtual Instrumentation Suite), a custom-designed benchtop workstation and prototyping system, for training students in experiment design, instrumentation, electronics, and data acquisition.

This course will assume no previous experience with LabVIEW or ELVIS. We will take a very hands-on approach to learning the basic operation and programming features of LabVIEW and ELVIS. As with Berney's earlier Chautauqua course, "Microcomputers as Laboratory Tools," many different applications will be presented. These include instruments which are interfaced through the NI ELVIS system, COM ports, parallel ports, GPIB (General Purpose Interface Bus) cards, and DAQ (Data Acquisition) cards. Finally, we will learn how to write our own instrument drivers.

For college teachers of: undergraduate science courses, instrumentation and electronics courses, and those interested in computerized data acquisition and analysis.

Prerequisites: none.

Dr. Berney is an Associate Professor of Physics at the University of Dayton. He has long been involved with the application of microcomputers in the undergraduate laboratory. He has served as the Course Director for some two dozen Chautauqua courses on microcomputer interfacing. Four of his twenty-five years of university teaching have been spent overseas working with faculty and students in developing countries to introduce modern electronics and microcomputer interfacing. Dr. Powers is an Associate Professor of Physics and Electro-Optics at the University of Dayton. His research interests are in nonlinear optics and spectroscopy. His laboratory makes wide use of LabVIEW for instrument control and data acquisition.

Teaching Introductory Astronomy**Course 33****GARETH WYNN-WILLIAMS**, Institute for Astronomy, University of Hawaii**May 27-29, 2004 in Green Bank, WV****Apply: DAY**

Note: This course is offered at the National Radio Astronomy Observatory in Green Bank, West Virginia. Applications should be sent to the DAY Field Center. Limited on-site lodging at \$25 per night will be available.

College faculty are frequently called upon to teach undergraduate astronomy courses even when their own field of specialization is in another science. This course is designed to assist in organizing such a course, and starts from the premise that astronomy is an ideal tool for communicating a broad range of scientific ideas to liberal-arts students.

In this workshop we will examine various approaches to teaching elementary astronomy lecture classes. Among the topics to be covered are:

- Overview of the Universe and its content, Designing a syllabus, Including or avoiding mathematics, Linking as tronomy with other sciences, Making astronomy relevant to students, Using astronomy to teach the scientific method, Visual aids and other teaching tools, Choosing a text, and Using internet resources and simulation software.

Participants will tour the Green Bank facility, including the recently completed Green Bank Telescope. It is the world's largest fully steerable single dish radio telescope. Also, a 40-ft. diameter radio telescope will be provided for the use of those taking the course.

For college teachers of: all disciplines. **Prerequisites:** none.

Dr. Wynn-Williams is a Professor of Astronomy and Chair of the Astronomy Graduate Program at the University of Hawaii. In his research he uses infrared and radio telescopes to study the formation of new stars in interstellar gas clouds and in the nuclei of distant galaxies.

**SOUTHERN OHIO SECTION OF THE AMERICAN
ASSOCIATION OF PHYSICS TEACHERS**

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Please email your address as the Dialog is moving to an all electric format. The Dialog will be sent via email and can also be found at:

www.physics.ohio-state.edu/~adbrecht/sosaapt.html

When did you last pay your membership dues?

If you can't answer this question and are not a lifetime member, it is time to pay your \$10.00 dues to the SOS/AAPT.

Checks for membership can be made out to the SOS/AAPT and sent to the address at the left. Please ask teaching colleagues and valued friends to consider becoming a part of our organization. New members are always welcome and needed.

The executive board of SOS/AAPT are looking for volunteers to serve as at large members of the board. If interested please contact any of the officers list on page one.

There is limited space available in several Chautauqua Short Courses that could be of interest to you. These courses are designed for college faculty but do accept occasional high school teachers.

Four of the courses are:

Introduction to LabVIEW (May 13-15, Dayton)

A Radio View of the Universe and the New Green Bank Telescope (May 24-26, Green Bank, WV)

Teaching Introductory Astronomy (May 27-29, Green Bank, WV)

Interferometry in Radio Astronomy, the VLA and the VLBA (July 28-30, Socorro, NM)

Descriptions for these four courses are included.

LabVIEW is a very popular software produce for experiment design and interfacing.

The Radio View and the Teaching course are held back-to-back at the National Radio Astronomy Observatory in Green Bank WV where the new GBT scope recently went on air. The Interferometry course is held at the site of the Very Large Array - 27 coordinated telescopes in New Mexico.

The only course cost for each of these is the \$50 application fee. Reduced rate lodging is available for each (\$75 total for three nights at Green Bank, \$60 total for three nights at the VLA).

Other available courses include Java (May 17-19, Dayton), Advanced Java (June 14-16, Dayton), Earthquakes and Tsunamis (June 23-25, Anchorage), and Hawaiian Volcanoes (July 12-16, Hawaii). For more details on these just ask.

If you or a colleague is are interested in any of these, call us at the number below. Please note that some of the dates are rapidly approaching.

We hope to hear from you.

George K. Miner, Ph. D.

Professor Emeritus, Department of Physics, and

Director, Chautauqua Field Center

University of Dayton

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PHILIP JEWELL and **STAFF**, National Radio Astronomy Observatory

May 24-26, 2004 in Green Bank, WV

Apply: DAY

Note: This course is cosponsored by and offered at the National Radio Astronomy Observatory in Green Bank, West Virginia. Applications should be sent to the DAY Field Center. Limited on-site lodging at \$25 per night will be available.

For millennia our understanding of the universe was based only on the information carried to us by visible light. Today human vision is enriched by the knowledge provided by the full complement of electromagnetic radiation. Radio astronomers provided the initial breakthrough and their study of cosmic radio waves has revealed unsuspected components of the universe.

- **Quasars.** Powerhouses at immense distances whose energy content equals that of thousands of galaxies but whose dimensions are on the scale of the solar system.
- **Pulsars.** Spinning, magnetized, dead cores of exploded stars whose radio signature is repetitive, periodic pulses.
- **Interstellar Molecules.** More than 100 molecules, some complex and organic, have been identified by the narrowband signals they radiate.
- **Cosmic Background Radiation.** The echo of the primordial fireball. Remnant radiation left over from the big bang origin of the universe.

These constituents will all be discussed. In addition, since the course will be held at the telescope site, the instruments used to study them will be described and inspected, including the recently completed Green Bank Telescope. It is the world's largest fully steerable single dish radio telescope. Also, a 40-ft. diameter radio telescope will be provided for the use of those taking the course. Projects will be available.

For college teachers of: all disciplines. **Prerequisites:** none.

Dr. Jewell is the Assistant Director of the National Radio Astronomy Observatory in charge of its Green Bank operations. His research interests include interstellar chemistry, and biomolecules, evolved stars, and radio astronomy instrumentation and techniques. The staff includes other scientists, electronic engineers and programmers.

DAVID G. FINLEY and STAFF, National Radio Astronomy Observatory

July 28-30 2004 in and near Socorro, NM

Apply: DAY

*Note: This course is cosponsored by and offered at the National Radio Astronomy Observatory in Socorro, New Mexico. Applications should be sent to the DAY Field Center. This course, along with the previous course, **Radio View of the Universe and the New Green Bank Telescope**, form a two-session pair. Applications from individuals applying for both will receive priority consideration. Single course applications are also welcome. Limited on-site lodging at \$20 per night will be available.*

Multiple radio telescopes used in concert can form a synthetic antenna providing the resolving power of a much larger dish. These techniques of interferometry are the focus of this course. Twenty-seven identical reflector antennas operating together on the Plains of San Agustin in New Mexico form the Very Large Array (VLA). They are interconnected, and each can be moved to different observing stations over an area of about 20 by 20 miles. The 25 meter (82-foot) antennas are precise, yet strong enough to stand the snow and wind at the 7000-foot elevation of the site. They are moved every few months to different locations in the Y-shaped layout. They are controlled by a central observing station to which they return data. The VLA is an extremely versatile research instrument and a valuable tool for investigations ranging from planetary and other solar-system observations, to studies of stellar life cycles, galactic structure and evolution, and cosmological studies of the far-distant universe. Dedicated in 1980, the VLA now is undergoing a major expansion, aimed at replacing older technologies with equipment at the current state of the art. This project, resulting in an Expanded VLA (EVLA), will increase the scientific capabilities of the instrument tenfold.

The Very Long Baseline Array (VLBA) is composed of ten identical 25-meter reflector antennas located at independent sites geographically distributed across the United States, from Hawaii to the Virgin Islands. Each antenna independently records data, which is then synthesized into output with the resolution of an 8000-kilometer (5000 miles) single radio telescope. The VLBA's extremely high resolution makes it a premier tool for researchers studying the details of stars and other objects within the Milky Way, as well as distant galaxies, quasars and gravitational-lens systems. In addition, the VLBA provides important data on Earth's plate-tectonic movements.

The course will be held at the NRAO Array Operations Center in Socorro, NM. It will feature lectures by research astronomers on areas of current research in which the VLA and the VLBA play world-leading roles. Techniques for radio astronomy interferometry will be described. Participants will tour control rooms and central computer processing facilities at the Operations Center. On the second day of the course, participants will take an in-depth tour of the VLA. Current and future observing programs with the VLA, EVLA, and VLBA will be discussed, along with the scientific contributions expected from the Atacama Large Millimeter Array (ALMA), an international millimeter-wavelength interferometer under construction in Chile's high Atacama Desert.

For college teachers of: all disciplines. **Prerequisites:** the Chautauqua course, Radio View of the Universe and the New Green Bank Telescope, or equivalent elementary knowledge of radio astronomy.

David G. Finley is Public Information Officer for the National Radio Astronomy Observatory in Socorro, NM. A former science editor and writer for The Miami Herald, he taught astronomy and geology at Florida International University in Miami. Author of one book and co-editor of another, his articles on astronomy and other topics have appeared in numerous publications, including Astronomy and Air & Space. He has lectured extensively at observatories, museums, universities, national parks, aboard cruise ships and to clubs and organizations. The staff includes other scientists, electronics engineers and programmers.