

## News from The March 1993 Meeting

### New Officers Elected for 1993-94

by Paul Discher

A meeting of the St. Louis Area Physics Teachers was held Saturday, March 20, 1993 at the campus of SIU-Edwardsville. Dr. Fred Zurheide was our host and 25 teachers were in attendance. New executive officers were nominated and elected for the 1993-94 academic year. The nominations were as follows: Dave Bross, Jim Small, Ellen Barr, and Anthony LaPinski. Dave Bross and Ellen Barr were elected. A farewell and special thanks was extended to outgoing officers, Frank Cange and Gary Shepek.



**Ellen Barr** received her Bachelors and Masters degrees from Webster University, and has been teaching General Science at Ferguson Middle School for the past 2-years. Ellen is a Member of NSTA, and has been active with the St. Louis Area Physics Teachers for the past 3-years. Recently she completed the STARS Internship, (Sciences Teachers as Research Scientists), and is under consideration for

the Harvard-Smithsonian Center for Astrophysics program this summer 1993, SPICA, (Support Program for Instructional Competency in Astronomy).



**Dave Bross** received his Bachelors degree in Physics from University of Missouri-Rolla and his Masters Degree in 1981 from the University of Missouri - St. Louis. Dave has been teaching Physics at Parkway West Senior High School for 19 years and has been an active member of the St. Louis Area Physics Teachers since its inception. He holds membership in

## April 1993 Meeting at St. Louis University Features talks by three local teachers



*April Meeting speakers from left to right: Joan Biela, Lindbergh High School, Gail Haynes Hazelwood West High School, and Susan Lowry, Althoff Catholic High School, Belleville Ill.*  
.....See Page 2 for more on the April 1993 Meeting.....

STOM, Science Teachers of Missouri and the Missouri Academy of Science. In previous years Dave was active in the Missouri Section of the AAPT as well as past Vice-President. This year he has been elected to the post of President of the Missouri Section of the AAPT for 1993-94.

**Frank Cange** conducted the business and announcements for the meeting. He started by citing information obtained from the March 1993 issue of the Physics Teacher concerning the Stephen Hawking motion Picture, "A Brief History of Time", from his best selling book with the same name. The video to this motion picture will soon be available, and at this time cost and exact date of release are uncertain.

**Bill McConnell** and **Fred Zurheide** both addressed the needs of teachers desiring academic credit for attending workshops and meetings this academic year. Teachers were reminded that they must complete a minimum of 12 hours of workshops and have a total of 18 hours at meeting / workshops attendance in order to qualify for graduate credit. Webster University will be offering 2-hours of graduate credit for the program. Bill McConnell distributed forms for this purpose. Dr. Zurheide ask teachers to contact him personally to arrange for credit. SIUE will be listing the course as Physics 520: Selected Topics in Physics.

At the conclusion of the business meeting we were fortunate to have talks presented by Dr. Gerald J. Pogatshnik, Associate Professor of Physics, SIUE and Dr. Arthur J. Braundmeier Jr., Professor and Chairman of Physics, SIUE.



**Dr. Pogatshnik**

**Dr. Pogatshnik** gave an overview of SIUE's undergraduate Physics courseware elaborating on the integration of increased instructional laboratory work within these courses. An example of a typical intermediate laboratory exercise was demonstrated by Dr. Pogatshnik. This diffraction experiment was unique in that it fully integrated computer control and data acquisition in its operations. The apparatus

consisted of optics tables which were configured with a laser, and a collimation and focusing lens array. The output beam targeted a diffraction grating. An Apple Macintosh IIxi computer with analog interface boards and LabView Software from National Instruments was used to articulate photo sensors across the diffraction field while data was acquired and digitized from the sensors. Charting and display options were presented by use of built in functions within the LabView Software.



**Dr. Braundmeier**

**Dr. Arthur J. Braundmeier Jr.**, presented a talk on the principles and recent developments in thin film optical coatings. He detailed his work in thin film optical coatings and discussed the physics of complex coating systems. Dr. Braundmeier explained in simple terms how the application of coatings are employed in the modification and enhancement of optical systems characteristics. A lively and enthusiastic discussion session followed and the talks were concluded with a brief tour of the SIUE research and teaching facilities.

**Unable to attend this meeting but interested??** — You can still acquire a copy of the meeting video, or any other meeting video, (except Feb. 1993). Just simply state in your written request which month's tape you would like, and send this request to the address below with a check in the amount of \$8.00 for each tape that you wish (*Payable to Paul L. Discher*). Mail video requests to Physics *Tempo* Editor: Paul Discher, Washington University Electrical Engineering\Campus Box 1127, St. Louis, Missouri 63130-4899.

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## News from The April 1993 Meeting at St. Louis University

*by Paul Discher*

Saturday, April 17, 1993, was a sunny, crisp, spring day when our regular meeting of the St. Louis Area Physics Teachers was held at the campus of St. Louis University. The site and timing of this meeting was chosen to coincide with the annual St. Louis University High School-Physics Competition. Dr. Robert Delaney, Chairman of the Physics Department — St. Louis University, was our host and guest speaker. Gary Shepek opened our meeting welcoming 30 teachers and guests, as Frank Cange was "doing service" proctoring the annual St. Louis University High School-Physics Competition on the other side of the campus. Gary

Introduced our newly elected officers, Ellen Barr and David Bross elected at the March meeting. Once business was concluded a variety of speakers were scheduled and began their programs.

**Dr. Robert Delaney**, Chairman of the Physics Department — St. Louis University, gave an interesting presentation on his development for teaching college physics he called "An Electronic Blackboard for University Physics". The unique presentation detailed the employment of high-tech lecture graphics entirely composed and presented via a computer applications program called Super Card. This applications software, very similar to Apple Computer's HyperCard supported full color graphics and was operating on an Apple Macintosh computer connected to a large screen color projection television system. A set of 76 "cards" or lectures was developed by Dr. Delaney for his college physics course that follows the Halliday & Resnick physics text. This color presentation included dynamic graphics and animation of figures an instructor would not normally be able to illustrate on the blackboard. Dr. Delaney concluded his presentation by summarizing a number of student surveys that he compiled critiquing the "Electronic Blackboard" method. The results clearly indicated that students felt that they learned more and enjoyed the presentation over that of conventional blackboard lecturing.

**Susan Lowry**, Althoff Catholic High School, Belleville, Ill. presented a slide show and talk on the results of her innovative science teaching project completed under a grant from the AAPT. The project, a student science outreach team called the Science Squad, brought interesting science demonstrations to nearby elementary schools. Susan's presentation included slides of the "science squad's" presentation of various on-site science demonstrations. The science squad, consisted of 4 teams of two students that conducted 28 different shows and contacted more than 1000 children in the course of the outreach program. The "peer presentation style" was a real hit with elementary school children as was evident by their enthusiasm and program reviews.

**Gail Haynes**, Hazelwood West High School presented results on her recent incorporation of modern physics topics into the physics curriculum at Hazelwood High School. The physics curriculum at Hazelwood consists of three semesters, I. Mechanics, II. Heat /Light & Sound, III. Modern Physics Topics. Gail summarized the teaching methods and syllabus used in teaching modern physics including equipment used for laboratories. This included discussion of the popular Radiation Evaluation Kits formerly loaned by Union Electric. Most recently Union Electric donated the (20) Radiation evaluation kits to the University of Missouri - Columbia for loan administration to secondary schools in Missouri. If you are interested in scheduling the radiation evaluation kits please contact Dr. Bill Miller, Professor of Nuclear Engineering (314-882-9692) or his associate Ms. Gayla Neumeyer (314-882-8366), University of Missouri - Columbia, E2433 Engineering Building East, Columbia , Missouri 65211. Telephone 314-882-9692.

**Joan Biela** made a presentation reviewing her trip and attendance of the Fermilab: Topics in Modern Physics - National Institute. This three week program in modern physics was held on the 6800 acre Fermi Lab complex outside of Chicago. This site managed by the U.S. Department of Energy houses one of the largest particle

accelerators in the world. At Fermi Lab, scientists from all over the world attempt to investigate and understand the cosmic code, the nature and source of the universe, and all matter as we know it. This investigation of minute particles has an unusual relationship to the work of astrophysicists and therefore many of the scientists that participate in research at Fermilab collaborate with astrophysicists.

### The St. Louis University Physics Competition

attracted a record turnout of 252 students from 23 different high schools in the bi-state region. The competition results are as follows:

Top Three High Schools for combined scores: (1st Place) Clayton High School, (2nd Place) Tie St. Louis University High School & Webster Groves High School, (3rd Place) O'Fallon Township High School, O'Fallon Illinois.

Top Four Individual scores: (1st Place) Youssef Marzouk, Webster High School; (2nd Place) Tim Gunter, Clayton High School; (3rd Place) Aaron Mohrman, Clayton High School; (4th Place) Jean Sun, Clayton High School.

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### News from The May 1993 Meeting at Lafayette High School

by Paul Discher

A meeting of the St. Louis Area Physics Teachers was held Saturday, May 15, 1993 at the campus Lafayette Senior High School, Rockwood School District. Michelle Atkins, physics instructor at Lafayette School was our host. Eighteen teachers were in attendance at this meeting including Tom Roberson, Science Coordinator for the Rockwood School District, and Ed Nothdruft, Physics Instructor, Lafayette High School.



Michelle Atkins, Lafayette High School, and guest speaker, Rudy Reyna

**Frank Cange** conducted a brief business meeting prior to the start of our main program. Frank was seeking participants in the Illinois Science Teachers Association's meeting and share-a-thon scheduled for Saturday October 2, 1993. He also announced the Illinois section meeting of the AAPT was scheduled for October 16, 1993 at Greenville Illinois, and reminded teachers of our big upcoming meeting of October 30, 1993. This October meeting of the St. Louis Area Physics Teachers will be combined with the Missouri Section Meeting of the AAPT, and will be held at Parkway West High School. Other events for the fall in which participants were sought included the STOM convention in St. Charles and APS-Plasma Group Physics Convention in St. Louis and participation in the APS Physics Day activities. Frank announced that St. Louis University has extended a standing invitation to the St. Louis Area Physics Teachers to meet there every year on the date of the Physics Competition. A planning meeting of the Executive Committee was announced and scheduled for Washington University Department of Electrical Engineering Conference Room Bryan 305 at 4:00pm on Friday May 28, 1993.

**Paul Discher** presented a concept of using video tape storage boxes for electrical demonstration and potential experiments. One example was the solderless breadboarding system built upon empty video tape boxes. This system had previously been shown at a meeting, April 4, 1992, Parkway West Senior High School. Paul demonstrated another method for using video tape boxes for making electrical circuits demonstrations on magnetic blackboards. This system was devised to meet the needs for demonstrations used by the faculty at Washington University Department of Electrical Engineering. These fixtures are currently used by faculty in teaching EE280 an Electrical Networks class. A make-and-take Physics Teacher's workshop "On The Blackboard Demos" is scheduled for January 1994. Consult the calendar for more information.

**Michelle Atkins** introduced our speaker Rudy Reyna. Mr. Reyna is Director of User Interfaces, Southwestern Bell Corporation Technology Resources. At Southwestern Bell, Mr. Reyna's team is responsible for the coordination and the implementation of advanced technology in aspects of customer products / services and information management.

**Rudy Reyna** spoke on "A Systems Approach to Teaching Using Technology". Mr. Reyna first discussed the principles of thinking and learning and labeled the most commonly used as being "linear" as opposed to methods employing a "systems approach". The dynamics of analyzing natural and social problems using a "systems approach" was demonstrated by example in the teaching of physical sciences. A video tape was shown that illustrated several successful applications of "systems" teaching and learning. Some methods utilized common teaching materials in different ways. Of particular interest were applications of "systems" teaching / learning which used higher technologies.

Mr. Reyna demonstrated a dynamic modeling program called STELLA II. This program was installed on an Apple Macintosh SE30 computer and connected to a liquid crystal projection system for presentation to the audience. The software provided a method to make various physical models or problems and solve them both graphically and numerically.



#### **Six Flags Seconds.....**

*This year Math and Physics Day 1993 was an enormous success. The attendance was double that of 1992. At Six Flags we are very excited about the growth of the Physics and Math Day Program, and the staff is continuing to work to make certain that this success continues in the upcoming year. We would like to thank everyone for their participation and support in the past 1993 program. We look forward to seeing you at the park when Math and Physics Day at Six Flags next year is held on April 29, 1994. If you have any questions please call me at 938-5300 ext. 304.*

*Chris Geisert  
Six Flags Sales Dept*

## A Message from your Officers.....

Welcome to the start of another great year of teaching physics. A number of us just got back from the AAPT national meeting in Boise, Idaho and we are charged up for another year of teaching. We have planned what we hope will be some of the best meetings ever and want you to mark your calendars now to attend. If you cannot attend meetings regularly that's OK, come when you can. For those of you who have never attended our meetings, try us once. I think you will find the September 18, 1993 and October 30, 1993 meetings really different and interesting.

We also need your support financially. Please get your \$10.00 dues in as soon as possible so we can keep the newsletter, *Physics Tempo* going. *Physics Tempo* is intended to keep you informed of our activities and we welcome your suggestions. If by some chance you do not wish to receive the newsletter please inform us and we will remove your name from our mailing list. This summer we made an attempt to update our mailing list, if by chance we still have errors please contact us with changes.

We know that there is a lot of teaching expertise out there that we could draw on, and regardless of how many years you've taught, we can all benefit from each other. Invite the physical science teachers in your school to come along with you. The more interaction, the better. Hope to see you this fall.

David Bross & Ellen Barr  
Officers 1993-94, St. Louis Area Physics Teachers

### Mission Statement

*Physics Tempo* is the newsletter of and by the St. Louis Area Physics Teachers, an affiliate of the American Association of Physics Teachers (AAPT), and is intended as an organizational support group for the betterment of Physics and Physical Science teachers throughout St. Louis and Illinois.

Subscription cost is \$10.00 per academic year, September through June. Collected donations are entirely used to print and mail the newsletter. Please make checks payable to Paul L. Discher.

*Physics Tempo* is dedicated to report achievements and announce the activities of the St. Louis Area Physics Teachers. In addition, *Physics Tempo* is intended to help disseminate useful and innovative information for teaching High School Physics, Physical Science and Chemistry. *Physics Tempo* is your newsletter. Editorial contributions are encouraged and welcomed. No idea is too small. Send articles, as well as subscription requests to: *Physics Tempo*, Editor / Paul Discher, Washington University-Electrical Engineering Campus Box 1127 St. Louis, Missouri 63130-4899. You can also FAX articles or ideas to Washington University- Electrical Engineering Fax Line: 314-935-4842. Please mark your fax mail to the attention of the *Tempo* Newsletter Editor, Paul Discher.

### Next Meeting —September 18, 1993

#### "Physics Day Workshop & Boomerang Physics"

Date: Saturday September 18, 1993

Time: 10:00 a.m.

Place: Six Flags Park - Eureka Mo.

Host: Chris Geisert, Six Flags Sales Representative

The next regular meeting of the St. Louis Area Physics Teachers will be held on Saturday, September 18, 1993, 10:00am, at the facilities of Six Flags Over Mid-America Theme Park. Our host will be Chris Geisert, Six Flags Sales Representative. A short general business meeting conducted by Dave Bross and Ellen Barr will precede the day's events. At this meeting teachers will be reviewing the Six Flags Physics & Math Day workbook experiments, evaluating various accelerometer designs used in the Park this year, and an opportunity to access the park rides for the day free. Six Flags will also be extending reduced rates for family and guests that accompany participating teachers. In addition to the Six Flags events, a special talk will be made at this meeting by Mr. Tom Fitzgerald, aka "The Boomerang Man of St. Louis". Mr. Fitzgerald operates his own business at St. Louis Union Station called "Return to Sender Boomerangs". He will be making a presentation similar to those that he has made to numerous local groups and schools regarding the physics, construction, and throwing of boomerangs.



**Mr. Fitzgerald** is a native St. Louisian, and has been involved in the throwing and construction of boomerangs for the past 7 years. In 1989 he formed his company, Return to Sender Boomerangs. Since the company's inception, Mr. Fitzgerald has made hundreds of boomerang presentations for schools and organizations, and has sold tens-of-thousands of boomerangs and related materials.

Besides operating his company and making presentations on the subject of boomerangs, Mr. Fitzgerald is founder and president of the St. Louis Boomerang Club. The Boomerang Club, in cooperation with the St. Louis Science Center, cosponsored the 6th Annual Gateway Boomerang Classic competition this May 1993 at Forest Park. This Boomerang throwing competition attracted participants from St. Louis, and across the nation. Mr. Fitzgerald maintains an ongoing relationship with The St. Louis Science Center, and in the past four years participated in the Centers annual "Festival of Flight". Mr. Fitzgerald is also currently on the Board of the Australian-American Chamber of Commerce of St. Louis, and has previously served on the Board of the United States Boomerang Association. Teachers can arrange for a boomerang presentation for their students by contacting Mr. Fitzgerald directly at: Return to Sender Boomerangs, 314-839-1604.

### Directions and Special Instructions:

Six Flags Over Mid-America Theme Park is located in southwest St. Louis County halfway between Pacific Missouri and Eureka Missouri on Interstate 44. To get there

drive southwest from St. Louis on Interstate 44 to the Allenton Six Flags Exit. Enter the park through the normal parking entrance. Teachers will be admitted to the park free but will be expected to pay for their own parking. (*Consider car pooling to this event to save money and gas!!*). We also suggest that you arrive early in order to deal with traffic from other park guests, as the park will be open for the general public on this day. After parking, proceed directly to the **Group Sales Booth** just outside the park entrance before **Guest Relations**. Attending Science and Math Teachers will need a Photo I.D. such as drivers license to enter the park free. Park maps and instructions for the location of the assembly will be available at the **Group Sales Booth** at this time. Special park admittance prices will be in effect for guests and family members for this event. Adult guests passes: \$15.50 and children: \$13.95 .

#### ***Special Event:***

#### ***"ISTA, Illinois Science Teachers Association annual convention and Teachers Shar-A-Thon"***

**Date:** Friday October 1, 1993  
and Saturday, October 2, 1993  
**Time:** To Be Announced  
**Place:** Gateway Convention Center  
Holliday Inn I-70 and I-255  
**Host:** Illinois Science Teachers Association  
**Contact:** Dave Bross 314-391-4730  
Ann Scates SIUE 618-692-3065

The St. Louis Area Physics Teachers have been invited to participate in the annual meeting of the ISTA, Illinois Science Teachers Association . This year the meeting will be held at the Gateway Convention Center of the Holliday Inn at Interstate 70 and 255. For this "shar-a-thon" format program we will need some presenters and are seeing members to contribute. This event will consist of a 2-hour block of presentation time scheduled on Saturday October 2, 1993. If you have an idea for a presentation please contact Dave Bross at 314-391-4730. For additional information on the ISTA convention contact Ann Scates at SIUE 618-692-3065.

#### **Next Meeting —October 30, 1993**

#### ***"Combined Meeting of the Missouri Section -AAPT and the St. Louis Area Physics Teachers"***

**Date:** Saturday October 30, 1993  
**Time:** 8:30 a.m.  
**Place:** Parkway West High School  
**Host:** Dave Bross

The next regular meeting of the St. Louis Area Physics Teachers will be a combined meeting of the Missouri Section AAPT and the St. Louis Area Physics Teachers. The Missouri Section AAPT meets only twice annually and this unique combined meeting will be held on Saturday, October 30, 1993, 8:30am and will be hosted by David Bross at the facilities Parkway West High School.

A call for papers will go out to all state members prior to the meeting in order to compile and agenda for the state section. Val Michael will be presenting a special make-and-take session representing the St. Louis Area Physics Teachers. If you have any other ideas or suggestions please contact Dave Bross at 391-47630 (s) or 639-6409 (h).

Parkway West Senior High School is located on Clayton Road about 2 miles west of Clayton and Woods Mill Road (141) . To get there, travel US-40/ I64 west to Woods Mill Road (141), exit south on Woods Mill Road, continue south to Clayton Road, then exit west (right) on Clayton Road. Approximately 2 miles west of Woods Mill Road you should see the entrance to the school. Signs will be posted on the exterior grounds of the building directing you to the correct location.

#### ***Special Event:***

#### ***"APS, American Physical Society High School Physics Teacher's Day"***

**Date:** Friday November 5, 1993  
**Time:** 8:30am - 3:30pm  
**Place:** To be Named Later  
**Host:** APS, American Physical Society  
**Contact:** Dave Bross 314-391-4730

You are invited to attend the High School Physics Teacher's Day at the American Physical Society National Conference on Plasma Physics in St. Louis on November 5, 1993. A special day has been planned, which includes attending part of the conference.

Included in your attendance:

- Registration for the day
- Special High School Teachers Program
- Twenty Dollars for expenses
- Luncheon with researchers in Plasma Physics
- Presentation of cutting edge ideas and materials that you can use in your classroom
- Meeting and being with people of like interests.
- Ideas that can be used in our local St. Louis Area Physics Teachers meetings

The APS is the largest organization of researchers and educators in Physics, with a membership of about 44,000. Through its Committee in Education, and in cooperation with the American Association of Physics Teachers and local Physics Teachers, APS has organized this special event as part of the conference in St. Louis.

The program planned takes advantage of the expertise of the members of the APS and of its commitment to enhance science education nationwide.

To register call Dave Bross at 314-391-4730 or watch for separate mailing with registration and program information coming soon!!!

## **Special Event:**

### **STOM, Science Teachers of Missouri Fall 1993 Conference"**

**Date:** Friday November 19, 1993  
and Saturday, November 20, 1993

**Time:** To Be Announced

**Place:** St. Charles High School

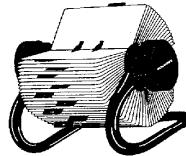
**Host:** Science Teachers of Missouri

**Contact:** Dave Bross 314-391-4730  
Mike McCoy home: 314-947-4391  
school: 314-724-3940 ext 150

The St. Louis Area Physics Teachers have been invited to participate in the annual meeting of STOM, Science Teachers of Missouri. This year the meeting will be held at St. Charles High School. For this "Physics Share-a-thon" we will need some presenters and are seeking members to contribute. This event will no doubt be similar to the ISTA program and if you can participate in both events, that would be great. Please try to help out by volunteering for one of these important events. To sign up and help out please contact Dave Bross at 314-391-4730. For additional information on the STOM program or to register write or call: Mike McCoy 1209 Parkside Drive, St. Charles, Missouri 63301 home: 314-947-4391 school: 314-724-3940 ext 150.

## ***The Physics Teachers Rolodex***

This is the Physics Teachers Rolodex, the place where you find the places to get the things that you really didn't know you needed.



Return To Sender Boomerangs  
St. Louis Union Station  
1820 Market Street  
At. Louis, Missouri 63103  
Mr. Tom Fitzgerald  
314-839-1604

Located on the first and second level vendors area of the St. Louis Union Station. Sell Boomerangs and Boomerang Tee shirts, Kites, Paper Airplane Kits all sorts of throwing and flying things...fun and different.

St. Louis Boomerang Club  
Mr. Tom Fitzgerald- President  
1159 Holly River Drive  
Florissant, Missouri 63031  
314-839-1604

Organization for Boomerang enthusiasts.  
Annual competitions on boomerang throwing held in cooperation with the St. Louis Science Center. Also other activities.

# **Physics Tempo**

**The Newsletter of The St. Louis Area Physics Teachers  
an affiliate of the American Association of Physics Teachers**

*Editorial and Subscriptions information:*

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*First Class Mail*

# 1993-94 St. Louis Area Physics Teachers Calendar

September 1993 Meeting

"Six Flags Teacher Workshop and The Physics of Boomerangs

Date: Saturday, September 18, 1993

Time: 10:00 am

Place: Six Flags

Host: Chris Geisert

**Review Physics Day Manual, accelerometer designs, free access to park rides & talk by the "Boomerang Man of St. Louis"**

October 1993 Event

"ISTA Share-a-thon"

Date: Saturday, October 2, 1993

Time: TBA

Place: Holiday Inn / I70 & I255

Host: ISTA

**Physics Demonstrations, Papers**

October 1993 Meeting

"Missouri Section AAPT Meeting at Parkway West"

Date: Saturday, October 30, 1993

Time: 8:30am

Place: Parkway West

Host: Dave Bross

**Demo competition and regular meeting combined with the Missouri section meeting.**

November 1993 Event —

"APS High School Physics Day"

Date: Friday, November 5, 1993

Time: TBA

Place: TBA

Host: American Physical Society  
Plasma Physics Group

**Conference attendance, possible demonstrations, papers.**

November 1993 Event—

"STOM Share-a-thon- St. Charles"

Date: Saturday, November 20, 1993

Time: TBA

Place: St. Charles High School

Host: STOM

**Physics Demonstrations, Papers**

December 1993

"PTRA Workshop"

Date: Saturday, December 4, 1993

Time: 8:30am

Place: Gateway Technical High School

Host: Debbie & Rex Rice

**Topic Open**

January 1994

"Make & Take Workshop - On the black board Electronics demos"

Date: Saturday, January 8, 1994

Time: 8:30am

Place: Washington University Department of Electrical Engineering

Host: Paul Discher

**Build and take apparatus for real DC electricity demos on the black board. Developed for teaching at Washington University.**

January 1994

"PTRA Workshop"

Date: Saturday, January 12, 1994

Time: 8:30am

Place: Clayton High School

Host: Debbie & Rex Rice

**Topic Open**

March 1994

"High Speed Photography Workshop"

Date: Saturday, March 12, 1994

Time: 8:30am

Place: Parkway Central High School

Host: Val Michael

**Demonstration and construction techniques for equipment used in producing High Speed Photographs.**

April 1994

"St. Louis University Physics Competition and Annual Meeting"

Date: Open

Time: 8:30am

Place: St. Louis University

Host:

**Annual meeting for Physics Competition — Meeting Topic Open**

May 1994

"Laboratory Practium - SIUE"

Date: **Open**

Time: 8:30am

Place: SIUE

Host: Dr. Zurheide

**Physics Lab Practium**