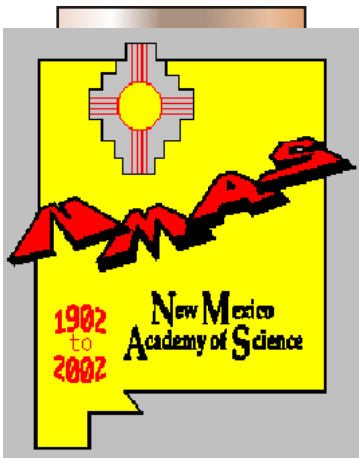

Centennial Conference



New Mexico Academy of Science

The New Mexico Academy of Science was founded in 1902, ten years before New Mexico became a state. Please join us in celebrating the Academy's 100th anniversary by attending an outstanding one-day conference that will highlight New Mexico scientists and educators, and scientific solutions to problems facing our state and nation. Invited speakers will include leaders in government and prestigious New Mexican scientists and science educators.

Science Today- Solutions Tomorrow

November 16, 2002 7a.m. to 4:30p.m.

Sheraton Old Town, Albuquerque

In the evening, join us for the annual banquet and award ceremony at the New Mexico Museum of Natural History and Science. Dr. Kenneth Miller from Brown University, author of "Finding Darwin's God", will be our featured speaker for the evening banquet.

Mark this date on your calendars. Register for the conference and the banquet before October 1 to get the best registration rate...see page 8.

NMAS OUTSTANDING TEACHER AWARDS

Send your nomination for outstanding New Mexico science teacher to:

Mr. Harry F. Pomeroy, Jr.
 NMAS Awards committee
 1512 Kingston Place
 Clovis, NM 88101
 505-762-0878
 cathryn@plateautel.net

Two awards will be given, one for elementary and one for middle-high school. Deadline for nomination is October 11, 2002. Contact Mr. Pomeroy for a nomination form and more information.

DID YOU KNOW?

In 1930, the year closed with the NM Academy of Science having a financial balance of \$26.92 after all expenses. Due to this great resource for the coming year, the motion was made, seconded, and passed that dues for the next year be waived.

Unfortunately, in 2002, more funds are needed to perform the work of the Academy.....

Please fill out and mail in your membership registration and your dues payment.

And consider making an extra donation to the Academy on its Centennial Anniversary.

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DID YOU KNOW?

The Presidents of the NM School of Mines (now NM Tech), UNM, NM Normal University (now NM Highlands University) and NM Normal School (now Western NM University) all served as Presidents or Vice-Presidents of the NM Academy of Science during its first four decades.

Now YOU have a chance to direct the future of the Academy. We need a Vice President and Treasurer for next year. Contact any board member for more information on these positions.

NMAAS Member News.....

Recent gifts to the NMAAS in the category "Under \$100" have been given by:

Mercedes Agogino
Marshall Berman
Harry and Mona Pomeroy

Thank you for your support. Monetary donations help to support the educational programs of the NMAAS.

NEW EDITOR FOR THE JOURNAL

Dr. David Hacker has retired from his position as editor of the New Mexico Journal of Science. We thank Dr. Hacker for his work as Journal editor; and welcome Dr. Joseph Sabutis as new editor. The delayed 2001 Journal will be sent to members within the next few months. The Journal will continue to accept contributed papers on any topic related to science or science education in New Mexico. To contact the new editor call Dr. Sabutis at NM Highlands at 505-454-3119 or email jsabutis@physics.nmhu.edu

Member of the National Association of the Academies of Science (NAAS)

Affiliated with the American Association for the Advancement of Science (AAAS)

NMAAS Newsletter
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NEW MEXICO ACADEMY OF SCIENCE

Founded in 1902 to foster scientific research and scientific cooperation, increase public awareness of the role of science in human progress and human welfare, and promote science education in New Mexico.

The Academy has been in continuous existence since 1915, and became formally associated with the New Mexico Museum of Natural History and Science in 1995.

President's Message - June 2002 by Marshall Berman

SCIENCE LITERACY....

The National Science Foundation recently released the results of its 2002 annual "science literacy poll" <<http://www.nsf.gov/sbe/srs/seind02/c7/c7h.htm>>. It found that about 90% of U.S. adults reported being very or moderately interested in new scientific discoveries and the use of new inventions and technologies. But less than 15 percent described themselves as well informed about new scientific discoveries. And indeed, their knowledge of basic science remained very poor. Only about 50% knew that it takes the Earth one year to go around the sun, that electrons are smaller than atoms, and that antibiotics do not kill viruses. More than two-thirds favored teaching both evolution and creationism in public schools.

In a recent Tonight Show, Jay Leno quoted the NSF survey saying, "70% of Americans lack a clear understanding of the scientific process. But here's the sad part: 30% don't know what 70% means.

That second statistic is a joke, but these are not:

22% did not know what a molecule was;

36% oppose genetically modified food production;

41% said that astrology was at least somewhat scientific;

60% believed that some people possess psychic powers or ESP;

30% believe that Earth is being visited by space aliens;

and more than two-thirds said that magnetic therapy was at least somewhat scientific, although there is no scientific evidence that it is effective in treating any ailment.

The natural curiosity of a young child is sublime to behold. But as most children progress through our school system, and ultimately enter the adult world, their knowledge of the real world has improved very little. Indeed, many take pride in their ignorance of science and math principles, facts, and methods. And the media rarely contribute to improving their science literacy.

Some of the goals of the Academy include:

1) promoting science and science education within New Mexico;

2) improving communication among scientists, science educators, and the general public and its governmental representatives;

3) encouraging increased public awareness of the role of science in human progress and human welfare.

The Academy has undertaken a major effort to address these goals this year at our Centennial Conference: Science Today – Solutions Tomorrow. The Conference will be held on November 16, 2002 at the Sheraton Old Town. We hope to involve our political and science leaders, and to inform the public of the major contributions being made by New Mexico scientists and science educators.

The NMAAS Board encourages all members to attend this conference, to invite others to attend, and to participate in the planning and execution of the best conference ever conducted by the Academy. We can make a difference – but only with your help.

2002 NEW MEXICO JUNIOR ACADEMY OF

2002 NMJAS Paper Competition Senior Division First Place Winner

Naveen Sinha

This year's first place winner in the NM Junior Academy of Science Senior Division was Naveen Sinha, a junior at Las Alamos High School. SEE HIS ABSTRACT ON PAGE 5. As well as winning first place in the paper competition this year, Naveen won first place in the Senior Physics Division and "Best of Show" in the Northeastern Region Science and Engineering Fair; then at the State Science and Engineering Fair, he won first place in the Senior Physics Division and the Senior Division Grand Award in Physical Sciences. He was awarded an all-expenses paid trip to the American Junior Academy of Science meeting held in conjunction with the meeting of the National Association of Academies of Science which will be in Denver, Colorado in February of 2003. Naveen will have the opportunity to present his paper in oral and poster form to young scientists from all over the U.S. Naveen is an outstanding young scientist who was also our first place winner in 2000. Abstracts of both of his papers have also been published on the NMJAS web site at <http://www.nmas.org/junior.html>.

New Mexico Chapter of the American Vacuum Society Winners

The New Mexico Chapter of the American Vacuum Society sends judges and selects its own winners in the Jr. Academy paper competition and awards prizes to these winners as well as to their teachers/sponsors.

Senior Division

First Place: Jora Sliwinski Cuba HS

Sponsor: Hilma Lewis

Second Place: Elizabeth Yaros Farmington HS

Sponsor: Ann Gattis

Junior Division

First Place: Brittany Anderson, House HS

Sponsor: Wayne Anderson

Second Place: Brandi Bahringer Hofacket MS

Sponsor: Steve Goodgame

Senior Division NMAS Winners

First Place

Naveen Sinha

*Bubble-Based Resonance-Doppler Sensor for
Liquid Characterization*

Las Alamos High School, Las Alamos, NM

Second Place

Christopher Brill

Photocatalytic Oxidation

Deming High School, Deming, NM

Third Place

Aimee Albro

*The Effects of Genetically Modified Food on
Size, Intelligence and Behavior of the
Species mus musculus*

Farmington High School, Farmington, NM

Honorable Mention

Andria Mirabal

*The Effect of Temperature and Humidity on
anes gardu*

St. Pius High School, Albuquerque, NM

Junior Division NMAS Winners

First Place

Brandi Bahringer

*"The Remediation of Arsenic Contaminated
Water*

Hofacket Middle School

Deming, NM

Second Place

Keely Goodgame

"A New Phage in Antibiotics

Deming Middle School

Deming, NM

Third Place

Phillip Houk

*"Environmental Pollution: One More Dinosaur
Extinction Theory*

Heights Middle School

Albuquerque, NM

SCIENCE PAPER COMPETITION WINNERS ...2002

2002 American Junior Academy of Science annual meeting, Boston, MA

by Lynn Brandvold
Director, NM Junior Academy of Science

The National Association of Academies of Science (NAAS) created the American Junior Academy of Science (AJAS) to promote science to America's middle and high school students. NAAS volunteers have organized a mini convention held yearly in conjunction with the meeting of the NAAS and American Association for the Advancement of Science (AAAS). Participating state academies choose young scientists on the basis of a scientific paper presentation to send to the meeting, where the students present their papers in both oral and poster format to each other and NAAS attendees. This year's New Mexico delegate, Tom Widland, was chosen on the basis of the State Paper Competition held in conjunction with the State Science and Engineering Fair in April 2001. This year's AJAS/NAAS/AAAS meeting was held February 13-17, 2002 in Boston, MA. The events planned for the students were outstanding. The students spent one morning touring science labs at Harvard in small groups. There was a wide variety of lab choices available to the students from molecular and cellular biology, to chemistry, physics, evolutionary biology, and genomics. The researchers were able to discuss very complicated procedures in terms that were easily understandable. A late lunch was provided at the American Academy of Arts and Sciences; then there were interesting and again understandable presentations by researchers from Harvard and MIT. That evening the students presented their posters and attended the lecture given by the incoming AAAS President. Friday morning was "Breakfast with the Scientists", where well-known scientists in attendance at the AAAS meeting are invited to sit down for breakfast at small tables and talk to the students one-on-one. This is always a very popular event with the students and this year was no exception, as there were several Nobel laureates in attendance as well as other "big names" in science. On Friday afternoon the student delegates gave oral presentations of their papers. Saturday morning, the students were able to attend a lecture by Wolfgang Ketterle, Nobel laureate in Physics, on Bose-Einstein condensates. Sounds complicated and it is, but he brought it down to a level that the students and non-physicists could understand. Then there was a tour of Boston, with stops to see the Bunker Hill Monument, the Old North Church, Paul Revere's home, "Old Ironsides", as well as the "Big Dig". Lunch was at "Ye Olde Oyster House", the oldest restaurant in the U.S. Saturday afternoon was "on your own" with the students being able to attend sessions of the AAAS meeting if they desired. An awards banquet was held Saturday night followed by a picture taking session of the state delegations with the NAAS President and the AJAS Director. Sunday the delegates and sponsors headed for home.

Bubble-Based Resonance-Doppler Sensor for Liquid Characterization

Naveen Sinha

Los Alamos High School, Los Alamos NM 87544

Abstract

I have developed a novel technique that can monitor all stages of an air bubble's evolution, from its formation and growth at a nozzle, through its detachment and resonance, to its rise toward terminal velocity, in order to derive multiple physical properties of the surrounding liquid. Other methods, such as high-speed photography and laser Doppler anemometry can study only one aspect of the bubble evolution. This technique, on the other hand, uses passive acoustic listening combined with active ultrasonic Doppler observation to study all aspects of the evolution.

The setup consists of a metal syringe needle positioned vertically at the bottom of a water-filled tube. A small aquarium pump forces air through the needle, forming a series of evenly spaced, mm-sized air bubbles. A hollow cylindrical transducer is located around the needle and a dual-element transducer is positioned several centimeters above the tip of the needle. To continuously monitor the motion of the bubbles, I constructed a frequency-mixing based Doppler system and used the Short-Time Fourier Transform technique. The cylindrical transducer detects the resonance of the bubble following its detachment. The Doppler setup detects both the growth and rise of the bubble, including shape oscillations and the terminal velocity. All steps in the evolution of the bubble are affected by the presence of contaminants (surfactants, suspended particles, and alcohol). Each measurement agrees well with theory. This technique has a real potential for use as a novel liquid characterization sensor in many industrial applications (e.g. chemical, environmental, food, and medical).

DID YOU KNOW?

In 1957, after several years of organizational work, the New Mexico Junior Academy of Science was founded; and the first annual meeting of the Junior Academy was held along with the 40th annual meeting of the NMAAS. Eight papers were presented by Junior Academy participants, including students from Wagon Mound High School and Alamogordo High School.

HAPPY 100TH BIRTHDAY TO THE NEW MEXICO ACADEMY OF SCIENCE

DID YOU KNOW?

The first official “annual meeting” of the reorganized NMAS was held in 1915 and began the continuing pattern of a scientific/business conference held annually with contributed scientific “papers” presented by scientists and science teachers from throughout New Mexico. The scientific program for 1915 included “Electrical Resistance Produced by Electrical Waves,” “Decorations on the Walls of New Mexico Cave Dwellings” and “Modern Ideas of Immunity in Tuberculosis”. Although these topics do not sound very earthshaking today, this program represented the leading edge of world scientific thought for its time.

The annual meetings of the New Mexico Academy of Science always included “hot topic” papers or topics that were ahead of their time and presented by eminent authorities. In 1925, Dr. James Zimmerman, Professor of Government UNM, presented “The League of Nations”. In 1928, P.S. Donnell, Dean of the Engineering School UNM, presented a paper on “Television”. In 1934, a paper entitled “Does a Nationwide Test Assist Local Teachers?” was presented by John E. Smith, NM Military Institute, Roswell.

Be on the cutting edge of science....attend the NMAS Centennial Conference this year. Register for the Conference on page 8 of this newsletter.

DID YOU KNOW?

Jesse Bingaman was president of the NMAS in 1939. He was Chairman of the Physical Science Division of Western NM University during that period and an active faculty member at WNMU for more than 35 years. Although his field was chemistry, he worked on diverse projects related to math, geology, physics, biology, history and economics; he is considered to be one of the southwest’s great science educators. And, in case the name sounds familiar, he is the father of New Mexico’s current U.S. Senator Jeff Bingaman.

DID YOU KNOW?

In 1918, the double trouble of war and the great influenza epidemic caused the annual November meeting of the New Mexico Academy of Science to be cancelled. Many school systems throughout the state were closed for almost the entire academic year because of the flu epidemic.

In 1920, the NMAS almost passed out of existence. Its officers left to enter whatever fields might offer a chance to make a living. Scientific societies were not trying to promote entry into the science professions. Scientific fields were crowded and large numbers of students who had been trained as engineers or scientists were not able to find work in their fields. There was no NMAS annual meeting that year.

DID YOU KNOW?

In 1922, a young employee of the U.S. Forest Service named **Aldo Leopold**, presented a paper entitled “Erosion as a Menace to the Social and Economic Future of the Southwest” at that year’s annual meeting of the New Mexico Academy of Science.

The 1938 meeting of the Academy was held in Roswell and the featured speaker was **Dr. R.H. Goddard** who presented his pioneering work on rockets being conducted at that time near Roswell. Only 30 or so people attended. One of the attendees remembers “he seemed overjoyed to appear before us...he made a very fine presentation...he brought some sample rockets and cutaway sections...there was a kind of urgency in his voice, and just for a little while we also saw some of the vision that was his. It does not resound to our credit that we were not destined to go out as disciples....we returned to business as usual and left one of the great scientific pioneers of the ages as a voice crying in the wilderness”.

DID YOU KNOW?

Fayette Jones, a civil/mining engineer was V.P. of the NMAS in 1916. He had previously been president of the NM School of Mines (now NM Tech). In early mining work in Arizona he had narrowly escaped death during one of the last attacks of the Apache war. In 1910, he was asked to consult on the creation of what would be the largest dam in the U.S. and the largest artificial lake in the world...it was to be called Elephant Butte. After examining the site that had been selected, Jones declared that the rock at the site would not hold water. His solution was to borrow the newly invented diamond drill equipment from the copper mines near Santa Rita, drill hundreds of holes into the shattered foundation rock, and force hundreds of tons of concrete into the crevices...the foundation held!

DID YOU KNOW?

The first NMAS Journal was published in 1960. For 31 years, until 1992, two journals were published each year, a spring and a winter issue. From 1991 to 1999, the NMAS Journal altered its contents from miscellaneous contributed science research papers to invited papers relating to a single thematic topic and a single journal was published each year. In 2000, the NMAS Journal returned to its roots and once again welcomed contributed papers on a variety of science topics for each annual journal.

Send your science and science education contributed articles for the 2002 NMAS Journal to our new editor, Dr. Joseph Sabutis, Highland University. Contact Dr. Sabutis at 505-454-3110 or email jsabutis@physics.nmhu.edu for information on Journal submission and format.

Membership Form

New Mexico Academy of Science

NOTE: If you are not yet a member and you register for the Centennial conference, your registration fee includes a one year membership to the Academy

New Membership [] Renewal [] Membership Year 2002 [] Additional Donation []

Date _____ Name _____

Employer/ Firm/ Other _____ Title _____

Field of Interest (geology, biology, physics, science education, etc.) _____

Mailing Address: _____

Phone _____ FAX _____ email _____

Check if your address is different from that on the mailing label of this newsletter []

NMAAS PUBLICATIONS

| | |
|--|------------|
| <i>New Mexico Journal of Science</i> | |
| Set of all available pre-1992 back issues | \$10 _____ |
| <i>From Sundaggers to Space Exploration</i> | \$4 _____ |
| (NMAAS Sigma Xi, 1986) | |
| <i>Dinosaurs of New Mexico</i> | \$10 _____ |
| (NMAAS Journal v. 32, 1992) | |
| <i>The Importance of Agricultural Science in New Mexico's Economy</i> | \$10 _____ |
| (NMAAS Journal v. 34, 1994) | |
| <i>Astronomy in New Mexico: Past, Present and Future</i> | \$10 _____ |
| (NMAAS Journal v. 35, 1995) | |
| <i>New Mexico's Natural Heritage: Biological Diversity in the Land of Enchantment</i> | \$10 _____ |
| (NMAAS Journal v. 36, 1996) | |
| <i>Environmental Management: Current and Future Needs</i> | \$10 _____ |
| (NMAAS Journal v. 37, 1997) | |
| <i>Water Resource Issues in New Mexico</i> | \$10 _____ |
| (NMAAS Journal v. 38, 1998) | |
| <i>Ensuring Sustainable Development of Arid Lands Through Time</i> | \$10 _____ |
| (NMAAS Journal v. 39, 1999) | |
| <i>NMAAS Journal v. 40, 2000</i> | \$10 _____ |
| Subtotal: | \$ _____ |
| + Handling: | \$ 2.00 |
| TOTAL: | \$ _____ |

Membership Class (check one)

- [] Member \$20/ year
- [] Student \$15/ year
- [] Subscription \$30/ year
(Libraries only)

Publication subtotal: \$ _____
Total: \$ _____

Membership includes 3 newsletters and one journal annually.

Send check for membership and/ or additional publications, payable to NMAAS, to:

New Mexico Academy of Science
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