
Climate Change Comes to the Rio Grande

INSIDE THIS ISSUE:

NMAS Awards Junior Academy of Science Winners for 2013

See Page 4 for more information

NMAS Selects National Youth Science Camp Delegates from New Mexico

See Page 5 for more information

NMAS Awards Outstanding New Mexico Science Teachers

See Page 6 for more information

NMAS Honors Dr. George Fischbeck

If you watched a particular TV weatherman in Albuquerque in the 1970s, or in Los Angeles more recently, you were watching a former President of NMAS.

He began his career as a science teacher at Ernie Pyle Junior High in Albuquerque and eventually became the "Television Science Teacher" for the Albuquerque Public Schools. In 1961 he won the National Education Television Award. In 1965 he was elected President of the NMAS. In 1970 he was awarded Outstanding NM Science Teacher.

He went on to educate the general public in Albuquerque and Los Angeles. This year he will be honored by the City of Albuquerque as the first inductee onto the *Albuquerque Wall of Fame*. And, at the same time, the NMAS will give him our highest honor, the *Award for Outstanding Contributions to Science and Science Education in New Mexico*. Watch for more info in the next newsletter....

NMAS CO-SPONSORS SPECIAL LECTURE

July 10, 2013 at 7 p.m.

"Impacts of Climate Change on the Upper Rio Grande Basin: Adaptation and Mitigation Strategies."

*by Dagmar Llewellyn
Hydrogeologist,
US Bureau of Reclamation*

Lecture will be held at the NM Museum of Natural History and Science
1801 Mountain Rd. NW, Albuquerque, NM

Free. No registration required

Co-sponsored by New Mexico Academy of Science, New Mexicans for Science and Reason and the New Mexico Museum of Natural History, and Science

2013 - NMAS Annual Meeting

**Save the date
November 9, 2013**

Our annual meeting this year will be on "Impacts of Climate Change on Water" and will be co-hosted with EPSCoR. Plan to join us for the NMAS annual meeting, banquet, award ceremony, and distinguished lecture. More information will be in the next NMAS newsletter.

Time to Pay Membership Dues!

If you have already paid your dues for 2013, THANK YOU. If you have not yet paid your dues, please fill out the form on page 7 and send the dues to NMAS.



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of Science**

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NMAAS MEMBER NEWS...

We welcome new (and returning) officers
and board members for 2013:

Kurt Anderson, NMAAS President
Professor, Astronomy, NMSU (Retired)
(and Past President NMAAS in 1999)

Michaela Buenemann, NMAAS President-Elect
Assistant Professor, Dept of Geography, NMSU

Jason Jackiewicz - NMAAS Vice President
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(and Past President NMAAS in 1996)

Deb Novak - NMAAS Director at Large
Chief of Education, NM Museum of Natural
History and Science

Our Thanks to those who have made donations to NMAAS

General Donations 2013:

Harry & Mona Pomeroy

Endowment Donations 2013:

Dr. Richard Nygren
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General Donations 2012:

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Why not plan ahead today to make
NMAAS a part of your legacy!

NMAAS Newsletter
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Spring, 2013

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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 exist-
ence since 1915, and became formally asso-
ciated with the New Mexico Museum of Nat-
ural History and Science in 1995.

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

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

President's Message - May 2013

Kurt Anderson

Science & New Mexico

Two scientific matters should be of great concern to New Mexicans and to members of the Academy. The first is the scientific education of our children; the second is addressing the consequences of climate change. The two are related since a scientifically literate and informed electorate is necessary if we are to confront the changing environment of the 21st century.

Climate change, attendant upon global warming, is occurring. This is not in doubt. That human activity is a significant cause for the warming is recognized and understood by the scientific community. An increasing concentration of radiation-absorbing greenhouse gases, principally carbon dioxide, is the main cause of the global warming that has occurred since the middle of the nineteenth century. This measured increase can be largely attributed to the human burning of fossil fuels, principally coal and oil. Deforestation has also been a contributor. More recently, the injection of methane into our atmosphere, as a consequence of warming and the commercial production of natural gas, is of growing concern; methane, the principal constituent of natural gas, is a particularly potent greenhouse gas. Unfortunately, some of our citizens and elected representatives neither understand these events nor accept their reality.

For New Mexico the consequences of global warming will be particularly devastating. Even if precipitation were to rise in some parts of the country, rising temperatures will serve to increase evaporative losses, reducing the rate at which that water reaches our major streams and aquifers. In particular, the winter snow pack in the mountains of Colorado, the source of much of New Mexico's surface water, will become thinner and more distant. A multiyear drought has already significantly affected New Mexico and is expected to continue for many decades. Agriculture in our state is already forced to confront serious water-supply difficulties.

Again, a portion of the public refuses to believe in global warming, its causes, or its consequences. This reflects, in part, a misunderstanding of science in general and of "climate science" in particular. Fundamentally, science is based upon the observation of nature and the interpretation of those observations in terms of well-understood principles and processes. We are failing to communicate this understanding to many of our citizens and it is essential to the well-being of our civilization that we find better ways of doing so. The most effective approach is probably through improvements in K-12 education, but this cannot be accomplished without well-educated teachers and well-founded scientific standards in our classrooms.

What should be the role of the New Mexico Academy of Science in dealing with these matters? We have supported K-12 science education through activities such as our Visiting Scientist Program, our sponsorship of Science Fairs, and our annual Teacher Awards. However, we are limited in our resources. In particular, we must depend very much on our active membership for their contributions of time and ideas. If the Academy is to play a significant role in addressing the serious issues confronting New Mexico, its environment, its economy, and its educational system, our membership must grow and those members must take a more active role in the activities of this organization. Please let us know how you can contribute.

2013 State NMJAS Paper Competition Winners

Lynn Brancvold, Director, Junior Academy of Science and NAAS Delegate

The NMJAS was founded in 1957. The Junior Academy promotes student research by sponsoring scientific paper and presentation competition in conjunction with all of the regional and state NM Science and Engineering Fairs. The regional 1st and 2nd place winners compete at the State Science and Engineering Fair, where 1st, 2nd, 3rd place (and sometimes honorable mention) awards are given in the Senior and Junior Divisions. The State 1st place winner in the Senior Division represents New Mexico at the national competition held annually at the National Academies of Science meeting.

Senior Division

First Place

Amanda Mercer
Los Alamos H.S.
Los Alamos, NM

Second Place

Holly Erickson
Los Alamos H.S.
Los Alamos, NM

Third Place

Elias Clark
Cibola High School
Albuquerque, NM

Honorable Mention

Vladislav Sevostianov
Las Cruces H.S.
Las Cruces, NM

Junior Division

First Place

Paul Rosenberg
Albuquerque School of Excellence
Albuquerque, NM

Second Place

Rusty Ludwigen
Desert Willow Family School
Albuquerque, NM

Third Place

Ruby Selvage
Los Alamos M.S.
Los Alamos, NM

Honorable Mention

Jarek Kwiescinski
Albuquerque Institute for Math and Science
Albuquerque, NM

The New Mexico Academy of Science thanks
Sandia National Laboratories for funding to support this program.

The New Mexico Academy of Science would like to thank all of the judges for the regional and state NMJAS science fair competitions, and the NMJAS 2013 Regional Directors for their service to this program.

Senior Division First Place Winner Abstract

Tautochrone Time

Amanda Mercer

Los Alamos High School

Problem: The tautochrone problem is one of the earliest to be solved using calculus. The problem is to find a curve down which a point placed anywhere will slide to the bottom in the same amount of time. Christian Huygens, a clockmaker, first solved this problem in 1673, and the curve he discovered is a cycloid. I want to confirm this discovery using modern calculus, numerical methods, and physical measurements of a cycloid-path pendulum.

Hypothesis: The period of a cycloid pendulum is independent of amplitude, so it is a tautochrone.

Procedure:

1. Use modern calculus methods to find the period of a cycloid pendulum and demonstrate that this period is independent of amplitude.
2. Use numerical methods to find a tautochrone shape without prior assumption, then compare to a cycloid.
3. Construct a physical cycloid pendulum and test whether the period is independent of amplitude. Try the same for a simple circular pendulum.

Data/Results: Using only first-semester high school calculus, I was able to recreate the proof that a cycloid is a tautochrone. The numerical method for finding a tautochrone curve also produced a cycloid shape. My physical measurements confirmed my hypothesis: The cycloid pendulum's period varied by only $\pm 0.045\%$ over the full range of amplitudes. The circular pendulum's period varied by $\pm 2.8\%$ over the same range.

Conclusions: A cycloid pendulum is a tautochrone; unlike the simple circular pendulum, its period is independent of amplitude.

Rio Grande Chapter AVS Science & Technology Society Winners

The AVS Science & Technology Society, formerly the New Mexico Chapter of the American Vacuum Society, sends judges and selects its own winners in the paper competition and awards prizes to these winners as well as to their teachers/sponsors. The New Mexico Academy of Science is very grateful for their support.

Senior Division First Place

Andrew Miller
Miller Home School
Albuquerque, NM

Second Place

Amanda Mercer
Los Alamos H.S.
Los Alamos, NM

Junior Division First Place

Carmen Resnik
Taos Charter School,
Taos, NM

Second Place

Ruby Selvage
Los Alamos M.S.,
Los Alamos, NM

National Youth Science Camp 2013 Program for Two Graduating NM High School Seniors With All Expenses Paid

Richard Nygren, NYSC-NM Coordinator

Two New Mexico high school seniors who are interested in science have been selected for an all-expenses- paid, month-long stay at the National Youth Science Camp (NYSC) in West Virginia's Potomac Highlands this summer.

The New Mexico delegates for 2013 are:

Maria Morrow

**El Dorado H.S., Albuquerque
and**

Evan Liu

Albuquerque Academy, Albuquerque

Alternate for 2013 is:

Stephen Jenkins

Ocate H.S., Las Cruces

Each year in the summer following graduation, two New Mexico high school seniors attend an intense month- long camp for young scientists. The NYSC program pays all expenses for the students including airfare. The New Mexico Academy of Science (NMAS, <http://www.nmas.org>) administers the National Youth Science Camp (NYSC) program in New Mexico. NMAS judges select the delegates based upon their academic achievement, leadership in school and community activities, and a genuine interest in the sciences.

NMAS congratulates these fine students for their achievements and wishes them well in their future careers in science and engineering.

Five Ways to Give to NMAS

Promote Science Research and Education in New Mexico

Ruth Duggan, NMAS Board Member-Publicity

Did you know there are several ways to give lasting gifts to NMAS to build its capability to meet its mission?

1. Cash gifts are always welcome and can be deducted from taxes as a charitable donation. Specify that the donation is for the endowment and that provides an on-going benefit to NMAS.
2. Payable upon death CDs, savings accounts, brokerage accounts, and checking accounts where you retain full ownership and control during your life, but upon your death, the account balance may be paid to NMAS named as your beneficiary without probate.
3. Leaving a contribution to the NMAS endowment through a will is another way to keep giving to NMAS after your death.
4. By naming the NMAS endowment as the beneficiary of an existing life insurance policy you have kept current, you can donate very generously.
5. Retirement account funds may also be donated to NMAS by proper beneficiary designation.

Award for Outstanding Contributions to Science and Science Education in New Mexico

Since 1962, the Academy has intermittently presented awards to distinguished New Mexicans for their outstanding contributions to science or science education. The historic list of awardees is below and includes W. Randolph Lovelace II, the founder of the Lovelace Clinic and a pioneer in space/astronaut medicine; Norris Bradbury, after whom the Bradbury Museum in Los Alamos is named; and Clyde Tombaugh, the discoverer of Pluto and NMSU astronomer.

This award is being presented in 2013 to honor the lifetime commitment to science and science education of Dr. George Fischbeck.

Year	Awardee	Affiliation	Field
2013	George Fischbeck		Science Education
2002	Jesse Bingaman	WNMU	Science Education
1984	David C.H. Hsi	NMSU	Agriculture
1982	Robert Golden	NMSU	Engineering
1981	Kaiser Kunz	NMSU	Physics
1980	Charles E. Holley, Jr.	Los Alamos	Energy
1978	Marx Brook	NM Tech	Physics
1977	Arthur H. Guenther	Air Force Lab.	Physics
1976	Cecil E. Land	Sandia Nat. Lab.	Engineering
	George A. Cowan	Los Alamos	Chemistry
1974	Morton C. Smith	Los Alamos	Engineering
1973	Howard J. Dittmer	UNM	Biology
1972	Joseph A. Schuffe	NM Highlands	Chemistry
1970	John W. Evans	Air Force Observ.	Astronomy
1969	Clinton P. Anderson	U.S. Senate	Public Service
1968	Clyde W. Tombaugh	NMSU	Astronomy
1967	Richard S. Claasen	Sandia Corp.	Physics
1966	Jesse L. Riebsomer	UNM	Chemistry
1965	Lora M. Shields	Highlands Univ.	Biology
1964	Norris Bradbury	LASL	Administration
1963	W.R. Lovelace II	Lovelace Clinic	Medicine
1962	E.J. Workman	NM Tech	Physics

From the N^MAS Time Capsule...

DID YOU KNOW?

In 1928, Dr. R. W. Goddard was President of the NMAS. Dr. R. W. Goddard should not be confused with Dr. R. H. Goddard, the "father of rocketry" (and who was the distinguished lecturer at the Academy's 1938 annual meeting). Dr. R.W. Goddard was a leader in an entirely different field of science. He was, at the time, the entire electrical engineering department at NM A&M College (now NMSU) and one of the nation's pioneering radio men. When a radio was still a curiosity, he build a radio station in New Mexico. For the first few years, it operated out of the college in Las Cruces; and the station tested and refined broadcasting techniques that would be used nationwide. Later the station was moved to Albuquerque and was initially operated by UNM.

It then went on to become nationally known as KOB radio (now KKOB).

NMAS has a long history...be proud of your membership...and encourage a friend or colleague to join...

The 2012 NMAA Outstanding Science Teacher Awards

Harry F. Pomeroy, Jr.
Education Awards Chairman, NMAA

NMAA recognized the 2012 outstanding New Mexico science teachers at the annual meeting held in December last year. The teachers were given an award plaque from the Academy, cash awards contributed by the American Chemical Society, and classroom materials from the New Mexico Museum of Natural History and Science.

This annual award has been given by the NMAA since 1968. Nominations are open to all science and math teachers in New Mexico. Prior to 1990, annual awards were given to one K-12 teacher and one post-secondary instructor. Since 1990, awards are given to two K-12 teachers, one from elementary-middle school and one from high school level science.

Vickie Funk-Sheley
Tibbetts Middle School,
Farmington, New Mexico

I am a 6th grade science teacher at Tibbetts Middle School in Farmington, New Mexico. I have been a teacher in Farmington for 15 years, having taught science for grades 5-8, all at Title I schools. I am also an adjunct instructor for the University of New Mexico's teacher education program, and have been for four years now. I have written several grants and won awards throughout my career, but none so prestigious as this, and it truly is an honor to me to be recognized by my peers.

I first began my hands-on experience with science when I was one year old, so I am told. I would sit in the yard and turn rocks over, methodically examining roly-polies one by one and then very carefully taste them, much to my mother's horror. By age 3, I had graduated to fireflies, beetles, and grasshoppers, only by then, had lost my desire to qualitatively observe using taste. At age 4, I could often be found outside with my grandmother, barefoot and caked in mud, assisting her with transplanting flowers one minute and climbing as high as I could in one of her many overgrown trees the next minute. When I was around 8 years old, my mother bought a set of medical encyclopedias from a door to door salesman, that became my main source of entertainment for hours at a time over the next few years...my favorite being the human body overlays of bone, muscle, nerve, blood vessels, and skin...and so continued my love and wonder for the world around me.

Science was always a favorite subject in school, for me. I took every chemistry, physics, and biology class I could in high school. Though I started out pre-med in college, I eventually found myself in the teacher education program at UNM, studying to become a science teacher, where I earned a BS in education, as well as an MA in curriculum development. In education, there is a saying that "you teach in the manner that you were taught", and many of my science teachers had taught hands-on labs, which I enjoyed and excelled at. I often attribute this to the reason I teach with a very hands-on approach, balanced with an emphasis on reading comprehension, academic writing, and technology...and I most definitely also attribute my hands-on approach to my childhood adventures of exploration and wonder, in hopes of instilling that same sense of wonder in my students.

That is why my favorite days to teach are my lab days, and I schedule as many as I possibly can. I plan labs that are gooey, and messy, and that always have a surprise to them so that students truly have to hypothesize without knowing the outcome. It is always a reward for me to see their smiles and enthusiasm for science and I love to hear that science is their favorite subject, especially when they come back to see me as college students and tell me that they are science majors.

Gail Silva

Piedra Vista High School,
Farmington, New Mexico

It is an honor just to be considered for this award, much less one of the recipients. I've been a teacher in the Farmington District for 15 years, 10 years at Hermosa Middle School and 5 at Piedra Vista High School. I am married to Hud Silva and have three children, my stepdaughter Corrie who is 15, son Joseph, 6, and Porter who is about to turn five. While I go to work to teach every day, I come home to "learn" every night. My husband and I laugh every night as we get to view the world through the eyes of our children. I was a teacher first, before I became a parent. Being a parent has given me a whole new appreciation for my student's lives and their parents.

Twenty years ago if you told me I was even going to be a science teacher I would have said you were crazy. Every year one of my students asks me "what made you want to be a science teacher". I tell them it is the best decision I never thought I'd make. I originally went to college, at NMSU, intent on being a physical therapist. I was three years in to a pre-med Biology degree when I started to volunteer in the field. I wish that I had tried it sooner because I soon discovered that it was not the field for me. I was too far in to my Biology degree not to finish. In the mean time I was in the need of a job that was flexible enough to work around my school schedule. My sister, a kindergarten teacher, suggested subbing. I decided to give it a try. From my first day in the classroom I felt "at home". I continued subbing and found that my personality was best suited for the older students. Upon completion of my Bachelor's degree I decided to stay and get a Masters degree in Curriculum and Instruction, specializing in secondary science.

To be honest, the only reason that I chose secondary science was because I already had the necessary science credits. I had not yet developed a passion for teaching the subject. It was not until I did my student teaching with Susan Brown, in her 8th grade classroom, at Sierra Middle School that I realized how exciting the subject could be for students, and for the teacher. She had students, from every walk of life, "experiencing" science. As I reflected on how I wanted my classroom to look, I knew that it would be one where students dove in, feet first, in to the world of science. I was raised in an era where science was big words in a textbook. Susan taught me that it could be so much more for students. Along with the students I was learning to teach, I realized that I had been "surrounded" by science my whole life, and loved it. It was just never referred to as "science".

Being raised in an agricultural environment I was immersed in science from a very young age. I realize now that raising show animals for 4-H was a 10 year long "science fair" project. In middle school and high school sports became my passion. That was what led me to want to pursue physical therapy. I loved learning about how the body works. Now, as a teacher, I try to have students make these connections with their own worlds. More than anything I try to convince my students that science is "accessible" to every single one of them and that it is so much more than just big words in a textbook. Science surrounds them every day, in every aspect of their lives.

As I continue to teach, my appreciation for science grows. I continue to learn about the world around me. Maybe it is age that has allowed me to slow down and enjoy the beauty in the complexity of a living "system". Teaching Biology has opened up my curiosity for the subject of genetics. When taking genetics in college I recall that lining up letters in Punnett Squares seemed like Greek to me. As I have read and learned more about the history of Genetics it has opened up a whole new appreciation for the subject. I share bits and pieces of my readings with my students, hoping to
(continued on page 8)

Membership Form New Mexico Academy of Science

New Membership [] Renewal 2013 [] Renewal for another year [] Publications [] Donation []

Date _____ Name _____

Employer/Firm/Affiliation _____ Title _____

Primary Interest (geology, biology, chemistry, physics, science education, etc.) _____

Mailing Address: _____

Phone _____ FAX _____ email _____

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

Membership Class (check one)

- [] Member \$25/year
- [] Student \$15/year
- [] Life \$400
[3/4 of amount goes to NMAS Endowment]
- [] Subscription \$30/year
(Libraries only)
- [] Contribution to the NMAS Endowment \$_____

Membership Subtotal: \$ _____
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Publication subtotal: \$ _____

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Membership includes newsletters, and occasional special Journal of Science volumes (sent to life members and members who have paid their annual dues during the volume's year of publication).

Send check for membership and/or publications and donations, payable to NMAS, to:
New Mexico Academy of Science
1801 Mountain Rd. NW
Albuquerque, NM 87104

Please...make a donation to the NMAS Endowment to support science education programs!

NMAS PUBLICATIONS

<i>New Mexico Journal of Science</i> Set of all available pre-1992 back issues	\$10 _____
<i>From Sundaggers to Space Exploration</i> (NMAS/Sigma Xi, 1986)	\$4 _____
<i>Dinosaurs of New Mexico</i> (NMAS Journal v. 32, 1992)	\$10 _____
<i>The Importance of Agricultural Science in New Mexico's Economy</i> (NMAS Journal v. 34, 1994)	\$10 _____
<i>Astronomy in New Mexico: Past, Present and Future</i> (NMAS Journal v. 35, 1995)	\$10 _____
<i>New Mexico's Natural Heritage: Biological Diversity in the Land of Enchantment</i> (NMAS Journal v. 36, 1996)	\$10 _____
<i>Environmental Management: Current and Future Needs</i> (NMAS Journal v. 37, 1997)	\$10 _____
<i>Water Resource Issues in New Mexico</i> (NMAS Journal v. 38, 1998)	\$10 _____
<i>Ensuring Sustainable Development of Arid Lands Through Time</i> (NMAS Journal v. 39, 1999)	\$10 _____
<i>NMAS Journal v. 40, 2000</i>	\$10 _____
<i>NMAS Journal v. 41, 2001</i>	\$10 _____
<i>NMAS Journal v. 42, 2002 (Centennial CD)</i>	\$10 _____
<i>NMAS Journal v. 43, 2003</i>	\$10 _____
<i>Science on the Border</i> (NMAS Journal v. 44, 2006)	\$10 _____
<i>Energy in the Southwest</i> (NMAS Journal v. 45, 2008) <small>Online at www.nmas.org</small>	\$ _____
<i>New Mexico's Water Resources</i> (NMAS Journal v. 46, 2012) <small>Online at www.nmas.org</small>	\$ _____
Subtotal:	\$ _____
+ Handling:	\$ 2.00
TOTAL:	\$ _____

NMAS Newsletter
Volume 99 no. 1
Spring, 2013

Time to Pay Membership Dues!

The last year for which you paid is listed on your mailing label. If you have already paid your dues for 2013, THANK YOU. If you have not yet paid your dues, please fill out the form on page 7 and send the dues to NMAS.

(Gail Silva...Continued from page 6)

spark the same curiosity in them. I've been able to allow my students to experience genetics through the help of the Howard Hughes Medical Institute program. Students are able to extract and study their own DNA using all of the equipment that a scientist working in the field would use.

My 15 years of teaching and being a science fair sponsor have flown by faster than I ever thought imaginable. There is one word I've never used to describe my life as a science teacher, "boring". In these years students have never ceased to amaze me. Given the chance, their ingenuity will impress. My best days in the classroom were ones in which I sit back and watch my students try to figure out a problem without my help. I have learned far more from them than they have from me. The most important lessons they have taught me are that the most important thing you wear to school is a smile and a good sense of humor. Some people worry about their future being in the hands of our young people. I am not. The curiosity my 4 year old displays examining a pill bug in the backyard is still present in our high school students, we just need to give them the chance to explore. The valuable lessons of science are also valuable life lessons; hard work, perseverance, critical thinking, problem solving. These are lessons that I want my students to learn.



NEW MEXICO
ACADEMY
OF SCIENCE

Newsletter

1801 Mountain Rd NW
Albuquerque, NM 87104