



*53<sup>rd</sup> Annual  
CSEF Awards Ceremony  
April 11, 2008*

# Colorado Science and Engineering Fair 2008 Awards Ceremony

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## Welcome

Ms. Courtney Butler, CSEF Director

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## Presentation of Special Awards

Announcer..... Keith Kasunic, IEEE Lasers & Electro-Optics Society

Announcer..... Heather Messick, CSEF Alumni

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## Colorado Organizational Special Awards

|  |   |
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| Air & Waste Management Association   | Eastman Kodak Company Colorado Division   |
| American Association of University Women   | Eppler Family   |
| American Chemical Society  | Fort Collins Conservation District  |
| American Institute of Chemical Engineers   | Human Factors & Ergonomics  |
| American Statistical Association   | Institute of Electrical and Electronics Engineers                                   |
| American Vacuum Society  | The Inventor's Roundtable   |
| American Water Works Association &<br>Rocky Mountain Water Environment Association | Little Shop of Physics  |
| Armbruster Associates  | Lockheed Martin   |
| ASM International  | MAST Hotline  |
| Association for Women Geoscientists  | MWH Americas, Inc.  |
| Colorado Association of Meat Processors  | National Geophysical Data Center  |
| Colorado Association of Science Teachers   | National Renewable Energy Laboratory  |
| Colorado Biology Teachers' Association   | Optical Society of America  |
| Colorado Dental Association  | Rio Tinto Minerals, Inc.  |
| Colorado Division of Wildlife  | Rocky Mountain Association of Geologists  |
| Colorado Environmental Health Association  | Rocky Mountain Goats Foundation   |
| Colorado Foundation for Agriculture  | Rocky Mountain Inventors' Association   |
| Colorado Geological Survey &<br>Division of Reclamation Mining and Safety          | Society for Advancement of Chicanos and Native<br>Americans in Science              |
| Colorado Medical Society   | Society for Mining, Metallurgy and Exploration                                      |
| Colorado Mineral Society   | Society of Manufacturing Engineers  |
| Colorado Mycological Society   | Society of Women Engineers  |
| Colorado River Watch   | Soil & Water Conservation Society   |
| Colorado Scientific Society  | SPIE  |
| Colorado Veterinary Medical Association,   | The International Society for Optics & Photonics                                    |
| Colorado-Wyoming Society of American Foresters                                     | United States Department of Commerce  |
| Colorado State University<br>Department of Biochemistry & Molecular Biology        | United States Geological Survey   |
| Colorado State University<br>Department of Chemistry                               | University of Colorado Health Sciences Center<br>Medical Scientist Training Program |
| Colorado State University<br>Department of Horticulture & Landscape Architecture   | Xcel Energy   |
|  | Yale University Science & Engineering Association                                   |
|  | Zahourek Systems, Inc.  |
|  | Zonta Club of Boulder County  |

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## Military Special Awards

United States Air Force  
United States Army  
United States Navy & United States Marine Corps

# Colorado Science and Engineering Fair 2008 Awards Ceremony

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## Presentation of Grand Awards

Announcer.....Linda Lung, National Renewable Energy Laboratory

### Junior and Senior Division Individual Project Category Awards

|                              |                          |                   |
|------------------------------|--------------------------|-------------------|
| Animal Sciences              | Energy & Transportation  | Medicine & Health |
| Behavioral & Social Sciences | Engineering              | Microbiology      |
| Chemistry                    | Environmental Sciences   | Physics           |
| Earth & Space Sciences       | Math & Computer Sciences | Plant Sciences    |

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## Presentation of Other Special Awards

### Pioneers of Science Awards

(Please see pages 10 & 11 of the program for more information on this award.)

Society for Science & the Public Middle School Competition Nominations

### Society for Science & the Public Awards

American Psychological Society

Herbert Hoover Presidential Library Association

Intel Corporation

Mu Alpha Theta

National Society of Professional Engineers

Ricoh

Society for In Vitro Biology

United States Metric Association

United States Public Health Service

Water Environment Federation

Poster Art Contest

Student Choice Awards

Ralph F. Desch Memorial Technical Writing Award

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## Presentation of Scholarships

Adams State College.....Dr. Larry Sveum

Colorado School of Mines ..... Ms. Heather Boyd

Colorado State University – Pueblo..... CSEF

University of Colorado.....Mr. Ryan Patterson

The Ryan Patterson Scholarship .....Mr. Ryan Patterson

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## Presentation of CSEF Top Awards

Junior and Senior Division Best Team Project Awards

Junior and Senior Division Best Individual Project Awards

BP Special Awards for Energy

Lockheed Martin Teacher of the Year Award

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## Colorado ISEF Finalist Recognition & Closing Remarks

Ms. Courtney Butler

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# Special Awards Organizations

## **Adams State College Foundation**

A scholarship has been established by the Adams State College Foundation, Board of Directors. The Scholarship is intended to recognize students participating in the Colorado Science and Engineering Fair who are identified as having significant performance potential in science and mathematics. The value of the scholarship will be equivalent to one-year resident tuition and fees and will be awarded to one student in each of the following Senior Division categories: Animal Sciences, Behavioral & Social Sciences, Chemistry, Earth & Space Science, Energy & Transportation, Engineering, Environmental Sciences, Mathematics & Computer Sciences, Medicine & Health, Microbiology, Physics, Plant Sciences and a team project.

## **Air & Waste Management Association Rocky Mountain States Section**

The Air and Waste Management Association, Rocky Mountain States Section, is a non-profit professional organization whose mission is to provide a forum for the discussion of technical concepts and issues related to complex air quality and waste management problems. The membership is comprised of local, state and federal government employees, industry representatives, private consultants, environmental activists, and students.

## **American Association of University Women**

The American Association of University Women became interested in presenting an award to girls in middle school in the fields of math and science when our studies showed that girls were falling behind in these two fields. In principle and in practice, AAUW values and seeks a diverse membership. There shall be no barrier to full participation in this organization based on gender, race, creed, age, sexual orientation, national origin, or disability.

## **American Chemical Society Colorado Local Section**

The Colorado Section of the American Chemical Society was founded over 100 years ago as an organization to support and promote the profession and interest of chemists and chemical engineers. One major aim of the Society is to encourage an interest in the chemical sciences in the young people of Colorado.

## **American Institute of Chemical Engineers, Rocky Mountain Section**

The Rocky Mountain Section of the American Institute of Chemical Engineers contains over 500 members in a geographic area that includes Colorado and Wyoming as well as parts of South Dakota and New Mexico. Its members are involved in the petroleum, energy services, chemical and environmental industries, and are well represented in both academia and government.

## **American Statistical Association Colorado/Wyoming Chapter**

The American Statistical Association (ASA) is a scientific and educational society founded in 1839 with the following mission: to promote excellence in the application of statistical science across the wealth of human endeavor. The Colorado/Wyoming Chapter of the American Statistical Association organizes local activities for members in the Rocky Mountain regions. Members include statisticians from a variety of backgrounds such as biostatistics, bioinformatics, pharmaceutical statistics, environmental statistics, quality control statistics and much more.

## **American Vacuum Society Rocky Mountain Chapter**

The AVS is a member society of the American Institute of Physics. We promote communication, dissemination of knowledge, recommended practices, research, and education in the use of vacuum and other controlled environments to develop new materials, process technology, devices, and related understanding of material properties for the betterment of mankind. The Rocky Mountain Chapter of the AVS is made up of several hundred scientists, engineers, technicians, and others involved with the use of vacuum in their work in the Rocky Mountain Region.

## **American Water Works Association Rocky Mountain Section & Rocky Mountain Water Environment Association**

The Rocky Mountain Section of the American Water Works Association (RMSAWWA) and the Rocky Mountain Water Environment Association (RMWEA) are the leading organizations of dedicated and knowledgeable professionals collectively working together to preserve and enhance the watershed environments originating in the states of Colorado, Wyoming, and New Mexico. The RMWEA is affiliated with the Water Environment Federation, the United States national sponsor of the Stockholm Junior Water Prize (SJWP), which is the most prestigious international youth award for a high school water science research project. The awards are open to projects aimed at improving the quality of life through improvement of water quality, water resources management, water protection, or water and wastewater treatment. The awards are \$400 cash for the first place recipients in both the junior and senior division and \$200 for the second place recipients in both divisions.

## **Armbruster Associates**

Armbruster Associates is an organization which designs, develops, and markets motivational products for use in learning.

## **ASM International**

ASM International is a professional society of materials scientists and engineers, who develop materials for engineering or functional purposes, or help materials to be selected or manufactured for use in society. It was formed during the 1920's as an outgrowth of the Heat Treating Society. The Rocky Mountain Chapter was founded in 1941 and has about 450 members. The materials engineering "family" plays a critical role in society, and serves nearly every industry, from basic manufacturing to nanotechnology and biomaterials.

## **Association for Women Geoscientists Laramide Chapter**

The goals of the Association for Women Geoscientists, Laramide Chapter, are to encourage the participation of women in the geosciences; to exchange education, technical and professional information; and to enhance the professional growth and advancement of women in the geosciences. To this end, the Association for Women Geoscientists, Laramide Chapter, awards a \$50 check and other "goodies" for the best senior and junior division Earth Science project by a female student.

## **BP**

BP is a global leader in the production and manufacturing of energy in a variety of forms. With operations in 100 countries and more than 90,000 employees, BP develops oil and natural gas to meet the growing demand for energy around the world. BP Alternative Energy invests more than \$1 billion every year in wind, solar and other forms of clean power generation and it is a leader among large corporations for its sustainable business principles, policies and processes. Here in Colorado, BP will invest more than \$2 billion over the next 10 years to sustain its natural gas operations near Durango and it recently commissioned a new \$500 million wind farm east of Grover with partner Babcock & Brown that produces enough electricity to power 90,000 homes.

## **Colorado Association of Meat Processors**

It is the mission of the Colorado Association of Meat Processors to advance and improve the meat and related food industry through various channels; to collect information about the industry or areas impacting upon it and communicating it promptly and clearly to the membership and the community it serves; to provide members with formal and informal opportunities for education and information exchange; to serve as a forum and resource for discussion and development of industry positions and courses of action on any matter affecting the industry or its consuming public; to encourage the principles of efficiency and effectiveness, while supporting the humane treatment and handling of animals and livestock; to support full measure and full disclosure within the trade and to its community and moving toward an even safer, healthier meat and food supply for the consumer.

## **Colorado Association of Science Teachers**

The Colorado Association of Science Teachers represents educators from elementary and secondary schools, colleges, and universities. They are dedicated to superior teaching. The awards are given on the basis of the teaching value of the exhibit display to the general lay public. Two awards are given in both the Junior and Senior Divisions in recognition of those who show excellence in the use of the scientific method.

## **Colorado Biology Teachers' Association**

The Colorado Biology Teachers' Association (CBTA) is dedicated to the improvement of biological science instruction at all educational levels. Our activities include a Spring Seminar and a Fall Workshop to improve teacher and student understanding of a variety of biological topics; co-sponsorship of the Colorado Science Conference for Professional Development each fall in Denver; mini-grants for the support of classroom activities; the Outstanding Biology Teacher Award program; and a Newsletter to keep teachers informed about a variety of activities designed to improve teaching.

## **Colorado Dental Association**

The Colorado Dental Association is the largest professional association of dentists in Colorado, representing over 80 percent of the licensed dentists in the state. The Colorado Dental Association is actively involved in public education projects promoting oral hygiene and care. To this purpose, the Colorado Dental Association awards prizes and plaques to the Senior and Junior Division participants whose projects best relate to dental technology at the Colorado Science and Engineering Fair.

## **Colorado Division of Wildlife**

The mission of the Colorado Division of Wildlife is to perpetuate the wildlife resources of the state and provide people the opportunity to enjoy them. We manage the state's 960 wildlife species. The Division regulates hunting and fishing activities by issuing licenses and enforcing regulations. We also manage more than 230 state wildlife areas for public recreation; conduct research to improve wildlife management activities; provide technical assistance to private and other public landowners concerning wildlife and habitat management; and develop programs to protect and recover threatened and endangered species. We provide wildlife recreation opportunities for residents and visitors, including hunting, fishing and wildlife viewing.

## **Colorado Environmental Health Association**

The Colorado Environmental Health Association is a nonprofit professional organization whose mission is to promote environmental health as a profession which strives for continual improvement in environmental health quality and the growth of individual professionalism. CEHA has 325 members comprised of local and state health department professionals and industry representatives. CEHA is educationally structured, providing scholarships, one-day trainings, and an Annual Educational Conference to educate and inform environmental health professionals.

## **Colorado Foundation for Agriculture**

The purpose of the "Agriculture in the Classroom" Task Force is to educate food, fiber, and nutritional supplement consumers on the importance of agriculture in our daily lives through educational programs.

## **Colorado Geological Survey &**

### **Division of Reclamation Mining and Safety**

The Colorado Geological Survey and Division of Reclamation Mining and Safety serve the people of Colorado by providing sound geologic information and evaluation, and educating the public about the important role of earth sciences in everyday life in Colorado.

## **Colorado Medical Society**

The Colorado Medical Society is a 133 year-old professional organization of 5,500 physician members dedicated to providing excellence in healthcare to all Coloradans. The Colorado Medical Society Education Foundation is a non-profit, tax-exempt charitable foundation established primarily to support educational and charitable programs in Colorado. It has dedicated itself to funding first-year medical student scholarships and educational programs such as the Colorado State Science and Engineering Fair.

## **Colorado Mineral Society**

The Colorado Mineral Society is an educational society of professionals and amateurs with an interest in the earth sciences. The Society promotes the study of minerals and other geologic materials, encourages mineral collecting as a hobby, and conducts public meetings, lectures, and field trips. In addition, the society engages in a number of other activities which relate to the society's purposes. The Colorado Mineral Society is the only private organization that has presented special awards during the entire 53-year history of the State Science Fair.

## **Colorado Mycological Society**

The Colorado Mycological Society was founded in 1966 to stimulate interest in and advance the understanding of the field of mycology or the study of fungi. The Society's major emphasis is the study of wild mushrooms; however the Colorado Mycological Society presents a Special Award for the best exhibit advancing our knowledge of any type of the fungi.

### **Colorado River Watch**

River Watch is a state-wide volunteer water quality-monitoring program operated by Colorado Watershed Network in cooperation with the Colorado Division of Wildlife. Our mission is to work with voluntary stewards to monitor water quality and other indicators of watershed health, and utilize this high quality data to educate citizens and inform decision makers about the condition of Colorado's waters. This program is unique in its statewide focus and frequency of data collection. We applaud the discipline required to conduct honest scientific research. We make this investment in order to encourage students to continue their valuable studies.

### **Colorado School of Mines**

Colorado School of Mines is a public research university devoted to engineering and applied science related to resources. CSM has dedicated itself to responsible stewardship of the earth and its resources. It is one of a very few institutions in the world having broad expertise in resource exploration, extraction, production and utilization which can be brought to bear on the world's pressing resource-related environmental problems. Colorado School of Mines is dedicated to educating students and professionals in the applied sciences, engineering, and associated fields. This mission will be achieved by the creation, integration, and exchange of knowledge in engineering, the natural sciences, the social sciences, the humanities, business and their union to create processes and products to enhance the quality of life of the world's inhabitants.

### **Colorado State University Department of Biochemistry & Molecular Biology**

The Department of Biochemistry and Molecular Biology at CSU is committed to providing high quality undergraduate education. A strong, well-balanced background in the biological, physical, and mathematical sciences is provided. Our Biochemistry Major is ideally suited for pursuing advanced degrees in biochemistry, molecular biology, or related life sciences; for health professions; and for employment in the biotechnology industry. Several opportunities for experiential learning and working closely with our faculty are provided. Dedicated modern laboratories with state-of-the-art instrumentation ensure that our students receive the best possible training. For outstanding undergraduates, the Department offers the opportunity to do a semester abroad, funded by a grant from the National Science Foundation, the only such program in biosciences in the United States. A local internship program providing our students with work experience in our Macromolecular Resource Facility or in industrial laboratories is also available.

### **Colorado State University Department of Chemistry**

The faculty and students of the Department of Chemistry at Colorado State University are committed to excellence in chemical education and research. Research at all levels promotes the practice of the scientific method. In that spirit, the Department of Chemistry recognizes through financial awards the excellence in chemistry research at the CSEF by presenting awards for two projects - one from the senior division and one from the junior division - judged to have represented the best exhibits in the area of chemistry.

### **Colorado State University Department of Horticulture & Landscape Architecture**

Horticulture is the application of scientific principles in the growing, developing, marketing, processing and utilizing of fruits, vegetables, flower and foliage plants, trees, shrubs, and turfgrasses. The major requires a strong grounding in botany, chemistry, horticulture, and business. There are four concentrations in the horticulture major - floriculture, horticultural business management, horticultural food crops, and horticultural science.

### **Colorado State University – Pueblo**

Colorado State University-Pueblo is a regional, comprehensive university with moderately selective admissions standards. The University offers a broad array of baccalaureate programs with a strong professional focus and a firm grounding in the liberal arts and sciences. The University also offers a select number of masters level graduate programs. The University addresses students' immediate and long-term educational needs through a focus on career-oriented education grounded in the traditional liberal arts and sciences. Students graduate with the knowledge to enter their professions and with the learning skills (e.g. problem solving, critical thinking, research, communication) to keep current in those professions into the future.

### **Colorado Scientific Society**

The Colorado Scientific Society was founded in 1882 to promote the interchange of information among Colorado scientists. The Society seeks to stimulate the interest of young people, and to educate the general public in areas relating to earth sciences. The Colorado Scientific Society awards cash prizes of \$100 and \$75 for 1st and 2nd place winners in the Senior Division and \$75 and \$50 for 1st and 2nd place winners in the Junior Division, in fields relating to geology and the Earth sciences.

### **Colorado Veterinary Medical Association; CVMA Auxiliary; & Auxiliary to the AVMA**

The Colorado Veterinary Medical Association and its auxiliary's mission is to enhance animal health and welfare and the status of the veterinary profession through advocacy, education, and increased public awareness of the value of Veterinary medicine. It is a proactive group of more than 1,500 professionals representing clinical practice, public health, academe, industry, and military.

### **Colorado-Wyoming Society of American Foresters**

The Society of American Foresters, Colorado-Wyoming State Society, is a nonprofit professional organization whose mission is to use the knowledge, skills and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society. The membership is comprised of local, state and federal government employees, industry representatives, private consultants, and students.

### **Eastman Kodak Company Colorado Division**

The Eastman Kodak Company contributes from its Colorado Division to award students who make the most effective use of photography in a science fair project. The project itself need not be concerned directly with the science of photography.

### **Eppler Family**

The Eppler family of Berthoud, Colorado supports general and science education through teaching, volunteering, and donations. This award is intended to give deserving science students both recognition and the tools they need to continue their work on future projects. This year's award is for outstanding use of electrical measurement and/or control, and consists of a microprocessor development kit and a digital multi-meter.

### **Fort Collins Conservation District**

The Fort Collins Conservation District was formed in 1945, along with many districts across Colorado and across the nation, to assist landowners in healing the scars of the Dust Bowl days. The District's boundaries contain irrigated and non-irrigated cropland, range land, forest land, and urban areas. The purpose of the Conservation District is to deal with soil and water conservation problems through a cooperative effort with landowners, state and federal agencies, and other groups and organizations concerned with water and soil conservation issues. The Fort Collins Conservation District gives awards to the best Project in both the Junior and Senior Divisions with a soil or water conservation theme.

### **Human Factors & Ergonomics Society Rocky Mountain Chapter**

The Human Factors and Ergonomics Society, Rocky Mountain Chapter, promotes the discovery and exchange of knowledge concerning the characteristics of human beings that apply to the design of systems and devices of all kinds. In other words, we help to ensure that systems are well suited to their human audience. Our chapter offers programs of interest to human factors engineers, product designers, industrial psychologists, corporate ergonomists, software engineers, safety engineers and professionals in related fields.

### **Institute of Electrical and Electronics Engineers**

The Institute of Electrical and Electronics Engineers is a non-profit professional organization that supports the advancement of technology. Its mission is to promote the development and application of electrical and electronics engineering concepts for the benefit of humanity.

### **The Inventors' Roundtable**

The Inventors' Roundtable is an innovative, safe and free forum, where talented inventors and value-driven service providers can meet, connect and share experiences, insights and wisdom. At the Inventors' Roundtable, experienced inventors mentor beginners and we all work to "get it right." The ultimate goal of the Inventors' Roundtable is to help the inventor find the information and support needed to go through the invention process successfully. The Inventors' Roundtable is co-sponsored by the Denver Metro Chamber of Commerce and the Colorado Small Business Development Centers. We are pleased to participate in the Colorado Science and Engineering Fair.

### **Little Shop of Physics**

The Little Shop of Physics is a hands-on science outreach program at Colorado State University. Our focus is using everyday objects in new ways to help the next generation learn and explore the wonders of the world. The Matthew McCausland Memorial Award recognizes the spirit of this kind-hearted inventor, and is given to the project which displays the most creativity and "out of the box" thinking.

### **Lockheed Martin**

Headquartered in Bethesda, Maryland, Lockheed Martin employs about 130,000 people worldwide and is principally engaged in the research, design, development, manufacture and integration of advanced technology systems, products and services. Lockheed Martin Space Systems Company, headquartered near Denver, Colorado, is one of the major operating units of Lockheed Martin Corporation. Space Systems Company designs, develops, tests and manufactures a variety of advanced technology systems for space and defense. Chief products include space launch systems, defense systems, interplanetary and science spacecraft, spacecraft for commercial and government customers, fleet ballistic missiles and missile defense systems.

### **MAST Hotline**

The MAST Hotline at the University of Northern Colorado has been an information and support center for educators in Colorado since 1988. Content and pedagogical materials, along with professional assistance and services are available to educators and pre-service teachers at no cost. The MAST Institute provides resources, opportunities, and services of which the Hotline is a part.

### **MWH Americas, Inc.**

MWH Americas, Inc. is a global leader in providing knowledge-driven services. Our 6,100 professionals in over 35 countries have proven expertise in a wide array of integrated solutions, including environmental engineering, power generation, facilities development, laboratory services, construction, multi-sector program management, asset management, financial services, IT consulting, government relations and applied sciences. From Boston to Beijing, Melbourne to Mexico City, clients rely on MWH Americas to optimize their operations' overall performances, forecast future needs, address regulatory concerns, satisfy diverse stakeholders, manage complex programs and achieve maximum benefit from capital investments.

### **National Geophysical Data Center**

The National Geophysical Data Center provides scientific stewardship, products and services for geophysical data describing the solid Earth, marine, and solar-terrestrial environment, as well as Earth observations from space.

### **National Renewable Energy Laboratory**

The National Renewable Energy Laboratory (NREL) is the U.S. Department of Energy's primary laboratory for renewable energy research, development and deployment, and a leading laboratory for energy efficiency. As such, NREL is a world leader in the development of these technologies, benefiting both the environment and the economy. The laboratory's mission is to develop renewable energy and energy efficiency technologies and practices, advance related science and engineering, and transfer knowledge and innovations to address the nation's energy and environmental goals.

### **Optical Society of America Rocky Mountain Section**

The Rocky Mountain Section of the Optical Society of America fosters interest in optics and seeks to advance the study and practice of optical science and engineering.

### **Rio Tinto Minerals, Inc.**

Rio Tinto Minerals' talc and sodium borate deposits provide benefit to a wide range of products in the agricultural, paper, plastic, and personal care industries. Rio Tinto Minerals supplies twenty-five percent of the world's talc consumption and nearly half the global demand for refined borates, which are key ingredients in fiberglass, glass, ceramics, fertilizers and wood preservatives. The company's Worldwide headquarters is located in Greenwood Village, CO.

### **Rocky Mountain Association of Geologists**

The Rocky Mountain Association of Geologists is one of the largest associations of geologists in the United States. The RMAG is composed of earth scientists from industry, government, and academia encompassing a wide spectrum of backgrounds. All share a common interest in the geology of our Rocky Mountain area. Founded in 1922, the RMAG is one of the most active geological societies in the country. The Rocky Mountain Association of Geologists supports professional exchange and education through sponsorship of events, publications, training, and seminars. RMAG publishes a monthly newsletter, *The Outcrop*, a quarterly scientific journal, *The Mountain Geologist*, and regular guidebooks on a variety of subjects. For additional information about the Rocky Mountain Association of Geologists visit: [www.rmag.org](http://www.rmag.org).

### **Rocky Mountain Goats Foundation**

The Rocky Mountain Goats Foundation is a non-profit group dedicated to the preservation of high-country wildlife, habitat and overall wildlife conservation. The Foundation funds various educational and scholarship activities, grade-school through college. Wildlife habitat is disappearing in Colorado at the rate of 72 football fields every day and because of that, we are trying to encourage the study of wildlife habitat. The Rocky Mountain Goats Foundation has purchased 3 new Rocky Mountain Goat kids for the Cheyenne Mountain Zoo in Colorado Springs as well as provided monies for improvements to the shelter facilities at the zoo.

### **Rocky Mountain Inventors' Association**

The Rocky Mountain Inventors' Association (RMIA) is a non-profit organization that is celebrating thirty years of helping inventors and entrepreneurs. Members learn "what to do when" from successful member inventors, entrepreneurs, and service providers. Many of the members hold multiple patents and run businesses. Service provider members include such supporters of inventors as patent attorneys and agents, marketers, engineers, and prototypes and machinists, among others. Meetings are held in the Denver Metro Area, Fort Collins, and Colorado Springs. See [www.RMInventor.org](http://www.RMInventor.org) for details about the RMIA

### **Society for Advancement of Chicanos and Native Americans in Science**

The Society for Advancement of Chicanos and Native Americans in Science is dedicated to encouraging underrepresented and diverse students to pursue graduate education and obtain the advanced degrees necessary for science research, leadership, and teaching careers at all levels. The Colorado State University-Society for Advancement of Chicanos and Native Americans in Science (CSU-SACNAS) Chapter was founded in 2007 with the following purpose: CONNECT people from ALL racial, ethnic, & professional backgrounds who are passionate about working with diverse populations in the science and engineering fields; and ENCOURAGE ethnically diverse students to pursue graduate education and obtain advanced degrees needed for science & engineering research, leadership, & teaching careers.

### **Society for Mining, Metallurgy and Exploration, Colorado Section**

The Society for Mining, Metallurgy, and Exploration, Inc. is a professional society of geoscientists, engineers, and other professionals involved in the exploration, mining, beneficiation, and production of metals, industrial minerals, and energy minerals worldwide. It is the principal publisher of textbooks and handbooks for the mineral industry and establishes the standards of ethics and engineering practice in the United States for mining and mineral processing engineers.

### **Society of Manufacturing Engineers Northern Colorado, Chapter 354**

The Society of Manufacturing Engineers (SME) is a non-profit professional organization that serves the technical and professional growth of its members by providing a variety of information resources and seeks to increase the image and public awareness of manufacturing. Its membership consists of engineers, scientists, technicians and students engaged in supporting manufacturing. [refer to [www.sme.org](http://www.sme.org)] The Northern Colorado Range Chapter (354) -- serving members from Denver to Cheyenne, and east to Kansas and Nebraska -- emphasizes electrical and electronics and mechanical manufacturing. The Special Award(s) are given to finalist(s) who's project(s) best exemplify manufacturing principles, processes, or preparation for manufacturing.

### **Society of Women Engineers**

#### **Rocky Mountain Section**

The Society of Women Engineers is a nonprofit educational service organization. It consists of women and men who are graduate engineers as well as those with equivalent engineering experience and/or those interested in supporting SWE's education goals. The national organization of SWE was founded in 1950. The Denver Section was chartered in 1954 and renamed the Rocky Mountain Section in 1986. One of SWE's goals is to inform young women, their parents, counselors and the general public of the qualifications and achievements of women engineers and the opportunities open to them. To fulfill this mission, the Rocky Mountain Section provides outreach and career guidance activities in math, science and engineering at the elementary, middle, high school and college levels. In addition to participation in events such as the CSEF, SWE has college scholarship programs at both the local and national levels. To learn more about SWE go to [www.societyofwomenengineers.org](http://www.societyofwomenengineers.org).

### **Soil & Water Conservation Society Colorado Chapter**

The Soil and Water Conservation Society is dedicated to advancing the science and art of good land and water use world-wide to the end that soil, water, air, wildlife, and plants in abundance may be used and enjoyed by all mankind.

### **SPIE - The International Society for Optics & Photonics**

SPIE-The International Society for Optical Engineering is a nonprofit organization dedicated to advancing scientific research and engineering applications of optical, photonic, imaging and optoelectronic technologies through its meetings, educational programs, publications, and exhibitions.

### **United States Department of Commerce**

The U.S. Department of Commerce, through its Agencies, the National Institute of Standards and Technology, the National Ocean and Atmospheric Administration, and the National Telecommunications and Information Administration, provides a major sponsorship of the Colorado Science and Engineering Fair. The Department of Commerce research laboratories in Boulder, Colorado, serve as a center around which a major technological complex has developed in the Boulder area. The Department of Commerce awards an opportunity for summer employment for a graduating student in a research environment with professional scientists. This offer also provides a possibility for future continuing employment with the Department of Commerce.

### **United States Geological Survey**

The United States Geological Survey (USGS) is a science research organization established by Congress in 1879 and is responsible for providing the nation with reliable and impartial research of earth science problems relevant to society. The USGS is organized into geologic, water resource, mapping, and biological resource divisions. The USGS produces geologic and topographic maps, databases, and research reports of the earth sciences, all of which are available to the general public.

### **University of Colorado – Boulder**

This award is given by the College of Engineering at the University of Colorado at Boulder to recognize outstanding innovation and excellence in science and engineering. At the College of Engineering and Applied Science at the University of Colorado at Boulder, we strive to train engineers who are not only creative and have deep technical knowledge, but who are also broadly educated as citizens and future leaders of the world. The one year scholarships may be renewable, based on the academic performance of the recipient.

### **University of Colorado Health Sciences Center Medical Scientist Training Program**

At the University of Colorado, School of Medicine, the Medical Scientist Training Program (MSTP) is a seven to eight year program for highly motivated students interested in a career in academic medicine. Our program excels in preparing students for such a career by having students complete a Medical Degree (M.D.) and a Doctorate in Philosophy (Ph.D.). This program in the biomedical sciences combines graduate training in basic research skills with outstanding clinical preparation. To learn more about our program please check us out on the web at <http://www.uchsc.edu/sm/mstp/>. Our program will award a certificate and a \$50 check to each of the top two biomedical sciences projects.

### **Xcel Energy**

Xcel Energy is the fifth largest combination electricity and natural gas utility in the country, offering a comprehensive portfolio of energy-related products and services to 3.3 million electricity customers and 1.8 million natural gas customers. We are dedicated to providing our customers the best in service, value and information to enhance their professional and personal life. As the leading wind energy provider in the nation, we are continuously improving and exploring new technologies in all aspects of our operations.

### **Yale University Science & Engineering Association**

Yale University is a well known educator in the sciences and engineering. The Yale Science and Engineering Award is given to an 11th grade student for the most outstanding exhibit at a state or regional high school Science Fair in Computer Science, Engineering, Physics, or Chemistry. The Award consists of the YSEA medal and a formal certificate. Each winner also receives a brochure about undergraduate studies in Engineering at Yale. The list of winners is forwarded to the Yale Admissions Office.

### **Zahourek Systems, Inc.**

Zahourek Systems' Anatomy in Clay(TM) provides hands-on educational resources for teachers and students to learn anatomy. Students use their kinesthetic intelligence to understand body patterns and relationships. Teachers quickly assess their students' progress by observing how well they grasp the principles taught. Accountability for teachers is supported by independent university research which report that students who build body systems in clay produce statistically significant higher test scores on questions which require critical thinking than students who have learned anatomy through traditional teaching techniques involving lectures, note taking and rote memorization.

### **Zonta Club of Boulder County**

Zonta International, founded in 1919, is an organization of executive and professional women. Amelia Earhart was one of its most famous members, and this award is given in her memory.

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## **Special Awards Military Organizations**

### **United States Air Force**

Air Force ROTC, Detachment 90, at Colorado State University is the tenth largest AFROTC unit in the nation. The mission of Detachment 90 is to commission highly qualified Air Force officer candidates by recruiting, educating, training and motivating cadets at both CSU and UNC and prepare them to lead in the world's greatest air and space force.

### **United States Army**

The U.S. Army and the Fort Collins U.S. Army Recruiting station would like to recognize and congratulate all of the participants involved with the 2008 Colorado State Science Fair. The U.S. Army understands the importance of these events and the effects they can have on an individual's academic record. The categories the U.S. Army has recognized are Engineering, Environmental Sciences, Mathematics & Computer Sciences, Life Sciences, and Physical Sciences in the Senior Division. The winners in each of the 5 categories will receive a certificate of achievement with a presentation folder. Four of the five category winners will each receive a \$50 U.S. savings bond. The most outstanding of the five will receive a \$100 U.S. savings bond and the Army's silver medallion for science and engineering excellence.

### **United States Navy & United States Marine Corps**

The Office of Naval Research encourages the study of science and technology. Research initiatives undertaken by Naval scientists and engineers have enabled the extremely capable Naval forces we depend upon today. Science is a central aspect of our society and economic productivity. Advancement in science and technology helps us maintain the military advantage that is vital to our national security.

# Colorado Science and Engineering Fair

## Pioneers of Science

| Category   | Sponsor               | Pioneer                        |
|--|-----------------------|--------------------------------|
| <i>Animal Sciences</i>   | <i>Carol Morrow</i>   | <i>Georgse L. C. F. Cuvier</i> |
| <p>Georges Leopold Chretien Fredric Cuvier (1769 - 1832) was a French naturalist who was a pioneer in the science of comparative anatomy. Georges Cuvier originated a system of zoological classification that comprised four phyla based on differences in structure of the skeleton and organs. His reconstruction of the soft parts of fossils based on skeletal remains greatly advanced the science of paleontology.</p>  |                       |                                |
| <i>Behavioral &amp; Social Sciences</i>  | <i>Karen McCarthy</i> | <i>Margaret Mead</i>           |
| <p>Margaret Mead (1901 - 1978) was an American social anthropologist, receiving her Ph.D. from Columbia University in 1929. Margaret focused her studies on problems of child rearing, personality and culture. Margaret is best known for work among the people of Oceania. Margaret rose to become the president of the World Federation for mental health.</p>  |                       |                                |
| <i>Behavioral &amp; Social Sciences</i>  | <i>Dan Kowal</i>      | <i>Sigmund Freud</i>           |
| <p>Sigmund Freud (1856 – 1939) was an Austrian psychiatrist and founder of psychoanalysis. Psychoanalysis is the treatment of mental ailments by realizing that present patient symptoms are directly traceable to psychic trauma experienced earlier in life. Originally, Sigmund Freud’s work was not well received by the medical profession, but is now accepted practice in treating mental patients. Freudian theory has had a wide impact, influencing anthropology, education, art and literature.</p>   |                       |                                |
| <i>Chemistry</i>   | <i>Larry Sveum</i>    | <i>Alfred Bernhard Nobel</i>   |
| <p>Alfred Bernhard Nobel (1833 - 1896) was a Swedish chemist and inventor. Nobel’s most noteworthy invention was dynamite, which is a combination of nitroglycerine and diatomaceous earth. Nobel who was a pacifist, developed strong misgivings about the potential uses of his invention for warfare and as part of his will, left a fund to be used for annual awards in physics, chemistry, physiology and medicine, literature and peace. Over the years, dynamite lost favor as an instrument of war and destruction, but the Nobel prizes will forever leave their mark on civilization.</p>   |                       |                                |
| <i>Chemistry</i>   | <i>Amanda Parker</i>  | <i>Marie Curie</i>             |
| <p>Marie Curie (1867 - 1934) a chemist and physicist became the first woman Professor of General Physics in the Faculty of Sciences at the Sorbonne, in Paris, France. In 1903 she shared the Noble Prize in physics with her husband Pierre and Henri Becquerel, for their work on radioactivity; thus, becoming the first woman to win a Noble Prize. Dr. Curie went on to receive a second Nobel Prize in Chemistry in 1911 for isolating the element radium and thus became the first <u>person</u> to ever be awarded a second Nobel Prize.</p>   |                       |                                |
| <i>Earth &amp; Space Sciences</i>  | <i>Mike Bemski</i>    | <i>Edwin Hubble</i>            |
| <p>Edwin Powell Hubble (1889 – 1953) was an American astronomer best known for changing our views of the universe from being of limited size to being ever expanding and for laying the foundation for modern understanding of the cosmos. Edwin Hubble explained the “red shift” when studying stars. He also formulated Hubble’s Law: the greater the distance of a galaxy, the faster it recedes and he devised Hubble’s constant for calculating that rate. Hubble explained, “Equipped with five senses, man explores the universe around him and calls the adventure science.”</p>   |                       |                                |
| <i>Earth &amp; Space Sciences</i>  | <i>Sam Bartlett</i>   | <i>Alfred Lothar Wegner</i>    |
| <p>Alfred Lothar Wegner (1880 - 1930) was a German geologist, geophysicist, meteorologist and artic explorer who is known for the theory of continental drift. Alfred Wegner was the first to investigate in detail the idea of continental drift and published his findings in 1915. However his work was widely criticized and it was not until the late 1960’s that his theory was accepted as the basis for plate tectonics.</p>   |                       |                                |
| <i>Energy &amp; Transportation</i>   | <i>Linda Lung</i>     | <i>James Prescott Joule</i>    |
| <p>James Prescott Joule (1818 - 1889) was an English physicist, born in Sale, near Manchester. Joule studied the nature of heat, and discovered its relationship to mechanical work. This led to the theory of conservation of energy, which led to the development of the first law of thermodynamics. The SI unit of work, the Joule, is named after him. He worked with Lord Kelvin to develop the absolute scale of temperature, made observation on magnetostriction, and found the relationship between the flow of current through a resistance and the heat dissipated, now called Joule’s Law.</p>  |                       |                                |
| <i>Energy &amp; Transportation</i>   | <i>Doug Hooker</i>    | <i>Sir William Grove</i>       |
| <p>Sir William Robert Grove (1811 - 1896) is known as “Father of the Fuel Cell.” As a professor of physics at the London Institution (1840 - 1847), he used his platinum-zinc batteries to produce electric light. Grove also invented two cells of special significance. His first cell consisted of zinc in dilute sulfuric acid and platinum in concentrated nitric acid, separated by a porous pot (Grove Cell). His second cell, a “gas voltaic battery” was the forerunner of the modern fuel cell; knowing that sending an electric current through water splits the water into its component parts of hydrogen and oxygen, Grove reversed the reaction – combining hydrogen and oxygen to produce electricity and water.</p> |                       |                                |
| <i>Engineering</i>   | <i>Ryan Patterson</i> | <i>Nicola Tesla</i>            |
| <p>Nicola Tesla (1856 - 1943), a brilliant inventor, was born in Austria and migrated to the United States in 1884. Tesla pioneered the invention of the fluorescent light. AC induction motor, radio, various transformers, wireless communications, and alternating current power transmission. All of these inventions were critical to the modern industrial revolution, and are still in use today. Throughout his life, Tesla received more than 700 patents, along with the Edison Medal.</p>   |                       |                                |

# Colorado Science and Engineering Fair

## Pioneers of Science

| Category   | Sponsor                    | Pioneer                      |
|--|----------------------------|------------------------------|
| <i>Engineering</i>   | <i>Gina Holland</i>        | <i>James Buchanan Eads</i>   |
| <p>James Buchanan Eads (1820 - 1887) was an American engineer and inventor. James invented the diving bell in 1841 for work on the first major bridge that he designed and built to span the mighty Mississippi River. This railroad bridge is still in regular use today. In addition, James engineered a system of jetties at the mouth of the Mississippi River to prevent silting of the mouth, ultimately making New Orleans a major seaport. James Eads also constructed a fleet of ironclads for the Union navy during the Civil War.</p>   |                            |                              |
| <i>Environmental Sciences</i>  | <i>Elemer Bernath</i>      | <i>Rachel Louise Carson</i>  |
| <p>Rachel Louise Carson (1907 - 1964) was an American writer and marine biologist. Her widely known books on sea life combined keen scientific observation with rich poetic description. Rachel Louise Carson's book, <i>Silent Spring</i> is a provocative study of the dangers involved in the use of insecticides and is widely believed to have initiated the environmental movement in the United States.</p>   |                            |                              |
| <i>Mathematics &amp; Computer Sciences</i>   | <i>Ed &amp; Lucy Adams</i> | <i>Charles Babbage</i>       |
| <p>Charles Babbage (1792 - 1871) was a British mathematician and inventor who designed and built mechanical computing machines on the principles that anticipated the modern computer. Charles Babbage excelled in a variety of scientific and philosophical subjects though his present-day reputation rests largely on the invention and design of his vast mechanical calculating engines, causing him to frequently be referred to as the "father of the computer."</p>  |                            |                              |
| <i>Medicine &amp; Health</i>   | <i>Robert Morrow</i>       | <i>Greene Vardiman Black</i> |
| <p>Greene Vardiman Black (1836 - 1915) was an American dentist. Greene Vardiman Black rose to become the dean of the Dental School at Northwestern University. Greene Vardiman Black made large contributions to dentistry as a teacher, as an originator of dental methods and instruments, and as an author. The method of preparing amalgam alloys for fillings is still in use today.</p>  |                            |                              |
| <i>Medicine &amp; Health</i>   | <i>Bill Kieger</i>         | <i>Albert Schweitzer</i>     |
| <p>Dr. Albert Schweitzer (1875 - 1965) was a Swiss philosopher, theologian, musician and doctor. Dr. Schweitzer established a missionary hospital in Lambarene, Gabon in 1913. There he remained, except for fund raising trips, until his death, establishing extensive medical facilities for native Africans. Dr. Schweitzer's philosophy required a respect for the lives of others and demanded the highest development of an individual's skills. Dr. Schweitzer lived by these principles in devoting his medical skills and resources to the betterment of the poor. Dr. Schweitzer was awarded the Nobel Peace Prize in 1952.</p>   |                            |                              |
| <i>Microbiology</i>  | <i>Carol Morrow</i>        | <i>John Edward Salk</i>      |
| <p>Jonas Edward Salk (1914 - 1995) was an American microbiologist who was an authority on virus diseases. Jonas Edward Salk is best known for his development of the first polio vaccine. The <i>Salk vaccine</i> is made by cultivating three strains of the poliovirus separately in monkey tissue.</p>  |                            |                              |
| <i>Physics</i>   | <i>John Parker</i>         | <i>Albert Einstein</i>       |
| <p>Albert Einstein (1879 - 1955) was a professor of theoretical physics who is best known for his general theory of relativity and his contributions to quantum physics. Albert Einstein received the Noble Prize for physics in 1921 for his work in theoretical physics, most notably on the photoelectric effects. Albert Einstein fled Nazi Germany in 1933 and became an American Citizen. Albert Einstein was an ardent pacifist and was active in the cause of world peace.</p>   |                            |                              |
| <i>Physics</i>   | <i>Al Bedard</i>           | <i>Sir Isaac Newton</i>      |
| <p>Sir Isaac Newton (1643 - 1727) was an English physicist, mathematician, astronomer, natural philosopher, and alchemist, regarded by many as the greatest figure in the history of science. He laid the groundwork for classical mechanics with his work on universal gravitation and the three laws of motion. He enunciated the principles of conservation of momentum and angular momentum, invented the reflecting telescope and shares credit with Gottfried Leibniz for the development of calculus. English poet Alexander Pope was moved by Newton's accomplishments to write the famous epitaph: Nature and nature's laws lay hid in night; God said "let Newton be" and all was light.</p> |                            |                              |
| <i>Physics</i>   | <i>Keith Kasunic</i>       | <i>Max Planck</i>            |
| <p>Max Planck (1858 - 1947), a theoretical professor of physics at the University of Berlin (1889 - 1928) came from an ancient German family of great scholars, theologians and lawyers. Max Planck's curiosity about the laws of nature and thermodynamics led him to introduce a whole new realm of physics called quantum mechanics that would transform our understanding of the microscopic world of atoms and subatomic particles. Max Planck's research in thermodynamics evolved into the Quantum Theory for which he received the Nobel prize for physics in 1918.</p>  |                            |                              |
| <i>Plant Sciences</i>  | <i>David Holm</i>          | <i>Luther Burbank</i>        |
| <p>Luther Burbank (1849 - 1926) was widely known as a horticulturist, botanist, and scientist. Luther only had an elementary education, but he was an avid reader. Luther went on to become one of history's most inventive and productive plant breeders. Luther has been credited with being the "world's greatest plant breeder." Luther Burbank established a nursery garden, greenhouse and experimental farms in Santa Rosa, California that have become famous throughout the world.</p>  |                            |                              |

# Colorado Science and Engineering Fair

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