



*55<sup>th</sup> Annual  
CSEF Awards Ceremony  
April 9, 2010*

# Colorado Science and Engineering Fair

## 2010 Awards Ceremony

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### Welcome

Ms. Courtney Butler, CSEF Director

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Announcer..... Nissa Schmidt

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### Presentation of Signature Special Awards

Lockheed Martin Teacher of the Year Award..... Bill Meersman

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### Presentation of Special Awards

Air & Waste Management Association	Colorado-Wyoming Society of American Foresters
American Association of University Women	Covidien Energy-based Devices
American Chemical Society	Division of Reclamation Mining & Safety
American Institute of Chemical Engineers	Fort Collins Conservation District
American Meteorological Society	Hands and Minds, Inc.
American Statistical Association	Human Factors and Ergonomics Society
American Vacuum Society	Institute of Electrical & Electronics Engineers
American Water Works Association & Rocky Mountain Water Environment Association	Little Shop of Physics
Armbruster Associates	Lockheed Martin
ASM International	Morris Animal Foundation
Association for Women Geoscientists	MWH Americas, Inc.
Boulder Flycasters – Trout Unlimited	National Geophysical Data Center
Colorado Association of Meat Processors	Optical Society of America
Colorado Association of Science Teachers	Rio Tinto Minerals, Inc.
Colorado Biology Teachers' Association	Rocky Mountain Association of Geologists
Colorado Dental Association	Seagate Technology & Science Buddies
Colorado Division of Wildlife	Society for Advancement of Chicanos and Native Americans in Science
Colorado Environmental Health Association	Society for Mining, Metallurgy, & Exploration
Colorado Foundation for Agriculture	Society of Manufacturing Engineers
Colorado Geographic Alliance	Society of Women Engineers
Colorado Medical Society	Soil & Water Conservation Society
Colorado Mineral Society	SPIE – The International Society for Optics and Photonics
Colorado Mycological Society	The Inventor's Roundtable
Colorado River Watch	United States Department of Commerce
Colorado Scientific Society	United States Geological Survey
Colorado State University Department of Biochemistry & Molecular Biology	University of Colorado Health Sciences Center Medical Scientist Training Program
Colorado State University Department of Chemistry	University of Northern Colorado MAST Institute
Colorado State University Department of Horticulture & Landscape Architecture	Xcel Energy
Colorado Trout Unlimited	Yale University Science and Engineering Association
Colorado Veterinary Medical Association	Zonta Club of Boulder County

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### Presentation of Military Special Awards

United States Air Force..... Captain Aaron Hansen

United States Army.....

United States Navy & United States Marine Corps..... Captain Bill Emslie, USNR-R

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# Colorado Science and Engineering Fair

## 2010 Awards Ceremony

Announcer.....Jody Oaks

### Presentation of Grand Awards

#### Junior and Senior Division Individual and Team 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

### Presentation of CSEF Special Awards

#### Pioneers of Science Awards

(Please see pages 9 & 10 of the program for more information on these awards.)

Poster Art Contest

Student Choice Awards

Ralph F. Desch Memorial Technical Writing Award

Society for Science & the Public Awards

American Psychological Society

Intel Corporation

Mu Alpha Theta

National Oceanic and Atmospheric Administration

National Society of Professional Engineers

Ricoh Americas Corporation

Society for In Vitro Biology

United States Metric Association

United States Public Health Service

Water Environment Federation

### Presentation of Scholarships

Adams State College Foundation.....	Dr. Larry Sveum
Colorado School of Mines .....	Mr. Adam Schelffo
The Ryan Patterson Scholarship .....	Mr. Ryan Patterson
Propst Medicine & Health Scholarship.....	Ms. Penny Propst
Propst Moving Science Forward Scholarships.....	Ms. Penny Propst

### Presentation of CSEF Top Awards

Junior and Senior Division Best Team Project Awards

Junior and Senior Division Best Individual Project Awards

PACE Teacher Awards

### Colorado ISEF Finalist Recognition & Closing Remarks

Ms. Courtney Butler

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# Special Awards Organizations

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

The Air & 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.

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## **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.

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## **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.

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## **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.

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## **American Meteorological Society, Denver/Boulder Chapter**

The American Meteorological Society is an organization whose membership is open to anyone who has an interest in meteorological matters. The aims of the American Meteorological Society are to promote "the development and dissemination of knowledge of meteorology in all its phases and the advancement of its professional ideals." To this end, the American Meteorological Society awards certificates for outstanding achievement, ability and creativity in an atmospheric, oceanic or hydrologic science project in both divisions

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

The American Statistical Association 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. This award is named after David Young (1945 – 2007) from the University of Colorado at Denver, Department of Preventive Medicine and Biometrics. David's skills in both science and statistics allowed him to collaborate with medical investigators at the University of Colorado and help communicate results. The Colorado/Wyoming Chapter of the ASA 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.

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## **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.

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## **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.

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## **Armbruster Associates**

Armbruster Associates is an organization which designs, develops, and markets motivational products for use in learning. The Charles Armbruster Memorial Award is given for the best example by a Junior Division contestant for energy, creativity and enthusiasm in problem solving using readily available existing or recycled materials and/or inexpensive common objects to complete their Project.

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## **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.

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## **Association for Women Geoscientists, Larimide 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 Laramide Chapter, awards a \$75 check and an engraved achievement medal for the most interesting Senior and Junior Earth Science projects by a female student. Interesting is defined by our special award judges and can change yearly!

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## **Boulder Flycasters – Trout Unlimited**

Boulder Flycasters, a local chapter of Trout Unlimited, is a non-profit volunteer organization that is dedicated to improving Boulder County's fishing habitats and the preservation of their cold water ecosystems. The national Trout Unlimited actively works to conserve, protect and restore North America's coldwater fisheries and their watersheds. Conserving wild trout and salmon begins with conserving the watersheds that gave us our native coldwater fish stocks, and today support a bounty of native and wild fish.

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## **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; collect information about the industry or areas impacting upon it and communicating it promptly and clearly to the membership and the community it serves; provide members with formal and informal opportunities for education and information exchange; 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; encourage the principles of efficiency and effectiveness, while supporting the humane treatment and handling of animals and livestock.; and 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.

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### **Colorado Association of Science Teachers**

The Colorado Association of Science Teachers (CAST), a state chapter of the National Association of Science Teachers, has as its purpose to support, stimulate, and improve science education at all levels of instruction (pre-K through college) in the State of Colorado.

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### **Colorado Biology Teachers' Association**

The Colorado Biology Teachers' Association 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; Outstanding Biology Teacher Award program; and a Newsletter to keep teachers informed about a variety of activities designed to improve teaching.

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### **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, at the Colorado Science and Engineering Fair, prizes and plaques to the Senior and Junior participants whose projects best relate to dental technology.

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### **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.

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### **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 over 250 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.

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### **Colorado Foundation for Agriculture**

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

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### **Colorado Geographic Alliance**

The Colorado Geographic Alliance was founded in 1989 by the National Geographic Society and geographers in Colorado. Our main objective is to provide resources and professional development for elementary and secondary school teachers, ensuring the public understands the rationale behind comprehensive geography education throughout the State of Colorado. COGA is a state-wide educator's organization in which the collective knowledge of experienced teachers of geography is shared with others to strengthen the position of geography in all Colorado schools. Communication and programs supported by COGA develop and foster grassroots collaboration to facilitate interaction of teachers and to encourage conversations about geographic concepts across the state

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### **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 CSEF.

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### **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 55-year history of the State Science Fair.

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### **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 of the fungi.

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### **Colorado River Watch**

River Watch is a statewide volunteer water quality-monitoring program operated by Colorado Watershed Assembly 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.

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### **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 each for 1st and 2nd place winners in the Senior Division; and \$75 and \$50 respectively, for 1st and 2nd place winners in the Junior Division, in fields relating to Geology and the Earth Sciences.

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### **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. As a biochemistry major, your studies will include macromolecular structure and function; cellular biochemistry; metabolism; gene expression, structure, replication, and repair; cell organization, communication, growth, aging, and death with an emphasis on animal cells. 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. More than 25% of the 180 biochemistry majors are participants in the university honors program, the largest representation from any major. Most of our majors engage in independent research projects under the guidance of one of our 13 faculty members. 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.

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#### **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 Fair 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.

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**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.

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**Colorado Trout Unlimited**

Colorado Trout Unlimited is a non-profit conservation organization with over 9,000 members in 22 chapters statewide, dedicated to conserving, protecting, and restoring Colorado's coldwater rivers and watersheds. As part of the national group Trout Unlimited, CTU promotes healthy watersheds and fisheries through advocacy on behalf of rivers, on-the-ground projects for habitat improvement and native trout restoration, and youth education programs.

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**Colorado Veterinary Medical Association,  
CVMA Auxiliary, & Auxiliary to the AVMA**

The Colorado Veterinary Medical Association's 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 from every region of the state representing clinical practice, public health, academia, industry, and the military.

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**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.

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**Covidien Energy-based Devices**

Energy-based Devices and Respiratory Monitoring Solutions are Boulder-based divisions of Covidien, which produce electrosurgical generators, vessel-sealing devices and ablation devices for general surgery and interventional oncology (tumor ablation) and pulse oximetry, airway and temperature management devices plus mechanical ventilation and respiratory care devices. Our research scientists and engineers take pride in developing industry-leading solutions to surgical and respiratory challenges. Our technology enables surgeons to operate with reduced blood loss during surgery, improving care for patients by speeding procedure times and patient recovery times and to help patients breathe easier. We are also developing minimally invasive radio-frequency and microwave ablation technologies for tumor ablation; these have been used for liver, lung, bone and kidney cancer treatments. We are enthusiastic about supporting CSEF in promoting the educational growth and development of our next generation of scientists and engineers.

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**Division of Reclamation Mining & Safety**

The Division 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.

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**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 heal 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 Junior and Senior divisions with a soil or water conservation theme.

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**Hands and Minds, Inc., The Anatomy in Clay®**

The Anatomy in Clay® System engages students hands-on to learn anatomy by building human body systems with modeling clay, eliminating rote memorization. The outcomes are that student retention improves, comprehension is real and higher test scores are achieved. Recently published academic research by City University of New York and Penn State University document these results. Our motto is "The Mind Cannot Forget What The Hands Have Learned"™. On behalf of Hands and Minds, I am honored to present a Maniken® skeletal model to a participant in the Colorado Science and Engineering Fair.

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**Human Factors and 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.

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**Institute of Electrical & Electronics Engineers  
Centennial Subsection**

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.

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**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.

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**Lockheed Martin**

Headquartered in Bethesda, Maryland, Lockheed Martin employs over 140,000 people worldwide and is principally engaged in the research, design, development, manufacture and integration of advanced technology systems, products and services. The Corporation reported 2008 sales of \$42.7 billion. Lockheed Martin Space Systems Company 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 includes interplanetary and science spacecraft, advanced instruments such as LADAR based systems, spacecraft for commercial and government customers, fleet ballistic missiles and missile defense systems.

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**Morris Animal Foundation**

Morris Animal Foundation is the world's largest charitable, nonprofit organization dedicated to funding research studies to protect, treat and cure companion animals and wildlife. Founded in 1948, Morris Animal Foundation has funded over 1,400 studies with funds over \$54 million - with 100% of all annual donations going to fund animal health. Animal health has always been the unwavering commitment of Morris Animal Foundation, and is the goal supported in every study funded.

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**MWH Americas, Inc.**

MWH, based in Broomfield, CO, is a global leader in providing knowledge-driven services in wet infrastructure and natural resources. Our 7000 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 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 in wet infrastructure and natural resources to "BUILD A BETTER WORLD" sustainably and in the face of the uncertainty of climate change. MWH congratulates the winners of the Sustainable Future Award.

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### **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.

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### **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.

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### **Professional Association of Colorado Educators**

The Professional Association of Colorado Educators is a Colorado-based, non-profit, professional educators association, dedicated to the academic and personal growth of every student. PACE is committed to advancing the teaching profession through personal growth, professional development, advocacy and protection, and strives to empower educators as professionals, promotes collaborative and innovative educational partnerships and helps improve Colorado's educational opportunities for teachers and students.

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

Rio Tinto Mineral's 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, key ingredients in fiberglass, glass, ceramics, fertilizers and wood preservatives. Worldwide headquarters is located in Greenwood Village, CO.

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### **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).

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

SACNAS is dedicated to encouraging Chicano/Latino and Native American 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-SACNAS Chapter was founded in 2007 with the following purposes: 1) CONNECT people from ALL racial, ethnic, & professional backgrounds who are passionate about working with diverse populations in the science and engineering fields; 2) ENCOURAGE ethnically diverse students to pursue graduate education and obtain advanced degrees needed for science & engineering research, leadership, & teaching careers.

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### **Society for Mining, Metallurgy & 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.

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### **Society of Manufacturing Engineers 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. The Colorado Chapter (354) serves all of Colorado and adjoining states. Our programs and activities emphasize 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.

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### **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).

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

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

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

SPIE is the international society for optics and photonics founded in 1955 to advance light-based technologies. Serving more than 188,000 constituents from 138 countries, the Society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth. The Society provided over \$3 million in support of scholarships, education outreach grants, and other education programs around the world.

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### **The Inventor's 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.

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

The US 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 DOC 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.

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### **United States Geological Survey**

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

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### **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.

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### **University of Northern Colorado, MAST Institute**

The MAST Institute, within the College of Natural and Health Sciences at the University of Northern Colorado, is committed to equitable and systemic reform in the teaching and learning of science, mathematics and technology education. The Mathematics and Science Teaching (MAST) Institute, established in 1987 provides leadership and coordination for projects and programs to improve mathematics and science education, within the University, the State and nationally.

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### **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.

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### **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.

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### **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**

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### **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.

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### **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 2009 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.

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### **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.

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## **Scholarship Providers**

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### **Adams State College Foundation**

A scholarship has been established by Adams State College. 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 (approximately \$2000) and will be awarded to one student in each of the Senior Division categories as well as a team project.

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### **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 specific to earth, energy and the environment. 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.

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### **Propst Scholarships**

Penny Propst, a science educator, wishes to honor a student that shows excellent interest in medicine as well as quality of research with their study. The \$3000 scholarship award will be paid to the college of the recipient's choice once they have been accepted to that school.

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### **Ryan Patterson Scholarships**

The Colorado Science and Engineering Fair, with funds from Intel Corporation have established a nonrenewable scholarship of \$2,000 in the name of Ryan Patterson, the 2001 Intel International Science and Engineering Fair top winner. The scholarship is presented to a deserving high school senior based on criteria set by CSEF.

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# Pioneers of Science Awards

<u>Category</u>	<u>BOD Sponsor</u>	<u>Pioneer</u>
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<b><i>Animal Sciences</i></b>	<b><i>Robert Morrow</i></b>	<b><i>Georges L. C. F. Cuvier</i></b>
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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.

<b><i>Behavioral &amp; Social Sciences</i></b>	<b><i>Dan Kowal</i></b>	<b><i>Sigmund Freud</i></b>
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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.

<b><i>Behavioral and Social Sciences</i></b>	<b><i>Karen McCarthy</i></b>	<b><i>Margaret Mead</i></b>
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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.

<b><i>Chemistry</i></b>	<b><i>Larry Sveum</i></b>	<b><i>Marie Curie</i></b>
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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 person to ever be awarded a second Nobel Prize.

<b><i>Earth &amp; Space Sciences</i></b>	<b><i>Amanda Parker</i></b>	<b><i>Edwin Powell Hubble</i></b>
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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.”

<b><i>Energy &amp; Transportation</i></b>	<b><i>Linda Lung</i></b>	<b><i>James Prescott Joule</i></b>
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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.

<b><i>Energy &amp; Transportation</i></b>	<b><i>Doug Hooker</i></b>	<b><i>Sir William Grove</i></b>
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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.

<b><i>Engineering</i></b>	<b><i>Dave Cenedella</i></b>	<b><i>Nicola Tesla</i></b>
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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.

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# Pioneers of Science Awards

<u>Category</u>	<u>BOD Sponsor</u>	<u>Pioneer</u>
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<b><i>Environmental Sciences</i></b>		
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	<b><i>Mike Bemski</i></b>	
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		<b><i>Rachel Louise Carson</i></b>
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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, *Silent Spring* 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.

<b><i>Environmental Sciences</i></b>		
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	<b><i>Elemer Bernath</i></b>	
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		<b><i>Rosalie Edge</i></b>
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Rosalie Edge (1877 - 1962) was a firebrand suffragette, who worked to secure women's right to vote. In the early 1900's, she used her advocacy skills to influence conservation organizations to protect and conserve wildlife and natural resources. The Audubon Society was one of her main targets because of its early reliance on gun manufacturers for financial support and its early support of unlimited hunting of predators. She appreciated raptors at a time when they were considered vermin and established the first preserve for raptors, Hawk Mountain in Pennsylvania. This woman, who learned to love birds in Central Park, became one of the most effective environmental activists in an era when women were not to engage in public controversy or challenge the establishment.

<b><i>Mathematics &amp; Computer Sciences</i></b>		
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	<b><i>Russ Chadwick</i></b>	
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		<b><i>Grace Hopper</i></b>
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Grace Hopper (1902-1992) joined the Navy during WWII where she worked on the Navy's first modern computer. By the end of WWII she had published a 500 page manual for its use and was working on a successor. By 1953 she invented the compiler, a computer language, translating program. In 1955 she introduced FLOW-MATIC, the first business oriented programming language. Hopper returned to the Navy in 1967 to compile USA Standard COBOL, retiring from the Navy in 1986 with the rank of rear admiral. She was one of the most forward thinking computer programmers of her time.

<b><i>Medicine &amp; Health</i></b>		
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	<b><i>Ryan Patterson</i></b>	
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		<b><i>Greene Vardiman Black</i></b>
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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.

<b><i>Microbiology</i></b>		
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	<b><i>Carol Morrow</i></b>	
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		<b><i>John Edward Salk</i></b>
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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 *Salk vaccine* is made by cultivating three strains of the poliovirus separately in monkey tissue.

<b><i>Microbiology</i></b>		
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	<b><i>Jody Oaks</i></b>	
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		<b><i>Louis Pasteur</i></b>
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Louis Pasteur (1822-1895) was a French chemistry professor. Louis Pasteur gained his first success by studying the wine making, fermentation process. Pasteur discovered that both good and bad yeasts were produced in wine making and that he could kill the bad microbes through heating, a process we now call pasteurization. Pasteur further learned that many common diseases were caused by microbes. This realization led Pasteur to develop ways of inoculating animals by injecting them with the same heat weakened microbes, thus finding vaccines for the prevention of anthrax, cholera and rabies.

<b><i>Physics</i></b>		
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	<b><i>John Parker</i></b>	
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		<b><i>Max Planck</i></b>
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Max Planck (1858 – 1947), a theoretical professor of physics at the University of Berlin 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.

<b><i>Plant Sciences</i></b>		
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	<b><i>David Holm</i></b>	
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		<b><i>Mankombu Sambasivan Swaminathan</i></b>
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Mankombu Sambasivan Swaminathan (1925 - ) is a plant geneticist whose contributions to the agricultural renaissance of India have led to his acceptance as the scientific leader of the green revolution movement and as an acknowledged world leader in the field of sustainable food security. The International Association of Women and Development presented him with their first international award for his contributions to promoting the knowledge, skill and technological empowerment of women in agriculture and for his pioneering role in mainstreaming gender considerations in agriculture and rural development. Professor Swaminathan was awarded the Albert Einstein World Science Award in 1986 and the first World Food Prize in 1987.

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# Colorado Science and Engineering Fair

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Radford Walker

### Memorial Contributions

Several individuals made contributions in the name of the following friends of CSEF:  
Paul Wojtaszek – Grand Awards Judge  
John Prentice – Grand Awards Judge

# CSEF Needs Your Help

**Colorado Science  
and Engineering Fair**



**Dear Friends of the Colorado Science and Engineering Fair,**

It is the intent of the Board of Directors of the Colorado State Science Fair, Inc. that every student in Colorado have the opportunity to participate in a science and engineering fair at some level. Unfortunately, this is not currently the case. Some schools and districts simply do not have the resources to mentor their students and conduct science fairs. Others participate, but could use help to enhance the learning experience for their students.

To help alleviate this condition, the BOD of the CSSF, Inc. has set a goal of hiring a full-time CSEF Director who will be able to work directly with the 13 Regional Fair Directors and interact more with teachers at the school-level to better support teachers doing science fair in their classrooms.

The full-time director would also assist district and regional science fairs in increasing participation in their science fairs through guidance, materials & on-site assistance.

As always, we can't do anything without your support. It is only through the support of the generous individual donors, companies, foundations, government agencies, and organizations who believe in the importance of science education, that we have been able to serve Colorado students for 55 years.

Because funding this full-time position will require a significant, sustainable increase in funding for the CSEF, we are commencing a year-long Sponsorship Drive. We would like to encourage everyone to consider becoming sponsors of the CSEF and encouraging your company or organization to become a sponsor as well. Please complete a contact card and a member of the board will contact you to discuss the details. If a personal, tax-deductible donation better suits your situation, there is a place on the card to do that. Envelopes will be available in the foyer as you leave. Further details are available at the CSEF web site ([www.csef.colostate.edu](http://www.csef.colostate.edu)).

Thank you for your continuing support of Science Education,

*Sam*

Samuel Bartlett, President Board of Directors  
Colorado State Science Fair, Inc.

# Thank You!!