

Social Environments that Promote STEM Education

Auraria Emerging Technologies Prototyping Lab

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AETPL is a growing collaboration of students, staff & faculty on the Auraria campus to convert new scientific findings and technical advancements into viable technologies and products. This collaboration extends to the CU Health Sciences campus and many of the projects are oriented towards biomedical innovations. We also seek active involvement of regional industry and other research institutions in Colorado. Secondary school students and teachers are invited to participate in AETPL's programs as well.

<http://carbon.cudenver.edu/~rtagg/Research/AETPL.html>

Brain Awareness Week

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As a part of Brain Awareness Week sponsored by the Society for Neuroscience, several faculty members have gone out to local schools to show students a human brain and discuss how the nervous system works. Additionally, one Cell and Developmental Biology lab (PI: Diego Restrepo, Ph.D.) hosted a group of students from DPS Montbello High School this past spring. Students learned how to pour and run a gel as well as the basic concepts of PCR and mouse genotyping.

Cell & Developmental Biology - Open House for Local Public High School Students

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Since 2004, the Department of Cell and Developmental Biology in the CU School of Medicine has sponsored a one-day open house for our public schools either in the fall or the spring. About 80 high school students, along with their teachers and a few parents participate in either a morning or an afternoon session that includes a number of hands-on science demos. The demos are run by faculty, graduate students and postdoctoral fellows and include worksheets that provide the scientific background and the demo description, activities that teachers/students can do at their own school, reference websites and contact people who can provide additional resources, lab supplies, personnel, etc. Recently, two outreach students, Mike Polmear and Lalith Polepeddi, participated in a research program with Dr. Brian Tseng. They placed in both our state and national science fairs for their research investigating novel treatments for muscular dystrophy, as well as appeared on the TV show Good Morning America to discuss their results. The next open house will be held Spring 2008.

Chesapeake Bay Project

Bruce Nash, Christine Johnson, Anita Davis, Eddie Gonzalez, Anne O’Neill, Becca Rennard, Kirstin Lucke, Erica Mateo, Deborah Thomas, Michael Marlow- Associate Professor Education & Human Development 303-556-8111 Mike.Marlow@cudenver.edu
This project is a collaboration between the NPS (Bruce Nash), NASA (Christine Johnson, Anita Davis), National Park Foundation (Eddie Gonzalez, Anne O’Neill, Becca Rennard), UCDHSC-SEHD (Michael Marlow, Kirstin Lucke, Erica Mateo), and CLAS (Deborah Thomas) to develop educational materials for middle school classrooms with a natural hazards component.

Colorado Microenterprise Technology Center

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CMTC is a joint project between AETPL (University of Colorado at Denver and Health Sciences Center) and the Microbusiness Development Corporation. Its function is to engage students in providing technical assistance and prototyping for small businesses. A laboratory and technology development area called the Snarkworks provides access to advanced prototyping equipment, scientific instruments, materials, and technical components. In addition to serving regional small business clients, a goal is to engage youth in early activities that connect science, technology, and entrepreneurship. (Website under construction)

Comparison of Hawaii Volcanic to Mars Volcanic Project

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www.science.nasa.gov

This project is in collaboration with the NPS and NASA to develop a film and curriculum comparing volcanic features on earth and Mars.

GEMS (Graduate Experiences for Multicultural Students)

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<http://www.uchsc.edu/gems/>

GEMS introduces undergraduate students from diverse and traditionally under-represented groups to the biomedical research career opportunities offered at the graduate level of a major health sciences center. Students enroll in a ten-week summer research internship course. The course is conducted by distinguished science faculty and consists of lectures, demonstrations, and laboratory research assignments. Participating basic science programs at UCDHSC include biochemistry and molecular genetics, cell biology, experimental pathology, human medical genetics, immunology, microbiology, molecular biology, neuroscience, pharmacology, and physiology. The director and sub-directors of this program are under-represented minorities and are therefore good role models for the participating students. Funded by: NIH/NHLBI

Health Career Pre-Collegiate Program

School of Medicine & HSC Office of Diversity – College of Liberal Arts and Sciences

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This is an academic enhancement program. The program is designed to motivate first-generation high school students to successfully complete a college preparatory high school curriculum and matriculate to the post-secondary institution of their choice with the necessary academic skills to succeed and graduate from that institution.

The primary goal of the Health Careers Pre-Collegiate Program is to adequately prepare 80 potential first-generation college students for a successful high school career and eventually a successful professional career by exposing them to specific areas of interest in the healthcare field, complemented with the essential academic advising of high school course selections (in cooperation with their parents and guidance counselors). In addition, during the academic year the students are offered Saturday Academies in Basic Study Skills, Academic Skills Enhancement, Interpersonal Skills Development, and Health Career options. Parents of participating students are also offered workshops during Saturday Academy sessions which include Effective Parenting Strategies, as well as strategies on how to prepare financially for their student's college education.

Students also participate in a summer program. Sophomores attend a two-week summer program and juniors attend a five-week summer program where they are exposed to the rigors of college life. Application necessary for program.

HOMES program

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The HOMES program gives DPS high school students the opportunity to find out about career opportunities through interaction with Oyate (student organization of UCD healthcare students) CU health science center and career mentoring. HOMES also provides hands on science activities that highlight different career options. Through these activities and interactions HOMES aims to give students a better idea of future career options. Some of their activities include: a career panel with students from the different schools at the CU Health Science Center; a cow eye dissection where students learn about the anatomy and function of the eye; a cardiovascular lab where students learn about the heart and it's diseases by looking at normal and diseased human hearts; a dental plaque assay where students learn about dental health; and a day when students come to the health science campus and meet students from other DPS high schools that have participated in the HOMES program. There is a panel on preparing for college, a hands on science activity, and opportunities to meet professionals such as pharmacists, dentists, doctors, etc.

Junior Ranger Program

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This program provides teachers as summer Junior Ranger Coordinators in National Parks and participates in program curriculum development for K-12 classrooms. NPS-Lynda Lutz-Ryan, SEHD-Michael Marlow.

Middle School Summer Science & Technology Camp

*Larry Armenta; Director of Pre-Collegiate and Pipeline Programs UCDHSC;
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The University of Colorado at Denver (UCD), the Center for Pre-Collegiate Programs (CPCP), and the Center for Applied Science and Mathematics for Innovation and Competitiveness (CASMIC) are sponsoring a summer science and technology camp (Non-residential) for middle school students. This camp is FREE for Partner District Students, Non-Partner District student eligible for free or reduced lunch. The camp will consist of six one-week sessions beginning in June. Each day will start at 9:00 a.m. and end at 3:30 p.m. Lunch will be provided. Daily attendance is required. All sessions will be held at the University of Colorado and Health Science Center Downtown Denver Campus (located at Speer and Colfax). The topics will vary each week and will include topics like environmental science, air quality, artificial intelligence, global positioning systems (GPS), and DNA forensics.

Northeast Front Range Mathematics /Science Partnership

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This grant funds 90 additional teachers from four school districts (St. Vrain, Platte Canyon, Fort Lupton, and Adams 12) to participate in the Rocky Mountain Middle School Math and Science Partnership summer institutes. In addition, funding will be used to develop an articulation team of Teacher Leaders and higher education faculty to work on issues of secondary-post-secondary articulation. The articulation team will analyze student work at the middle and high school levels and introductory college level for comparison and delineation of expectations. They will also make reciprocal classroom visits to view the secondary-college interface from the perspective of the “other” side.

Oyate

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Oyate is a student organization on UCD campus that strives to create an environment that promotes unity and open lines of communication among minority and disadvantaged students between all branches of UCHSC. Oyate actively mentors college and high school students who are interested in health professions. Oyate members are students from the University of Colorado Health Sciences Center and represent the *School of Medicine, School of Nursing, School of Dentistry, School of Pharmacy, Graduate School, Physician’s Assistant Program and Physical Therapy Program*. It is composed primarily of students of color or disadvantaged status with a strong desire to see more underrepresented minorities in health science careers. Oyate sees the importance in having high school and undergraduate students exposed to career opportunities available in science in order to increase diversity in the healthcare field.

P-20 STEM Redesign to Support Colorado's Workforce, Economy, and Innovation Capacity

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In addition to the Title II Math and Science Partnership grants, CASMIC has been named as one of five regional Compacts as part of a National Governor's Association grant led by Governor Ritter's office. The role of the Compacts is to identify local challenges and assets around the alignment of K-12 outputs and expectations and support development and implementation of policy and promising practices at the local level. Overall the goals of the grant are to align P-20 STEM education requirements (standards, curricula, and assessments) and outputs (achievement) with postsecondary and workplace expectations for STEM competencies of entering students and employees; and develop the local capacity of public-private partnerships — among leading economic clusters and local businesses, K-12 districts, post-secondary institutions, state, county, and local government agencies, and the general public — to support the redesign of Colorado's P-20 STEM education system to help meet regional economies' needs for innovation

Partnership with the DSST (DPS Denver School of Science and Technology)

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UCDHSC Fitzsimons campus has established a partnership with the DSST, a DPS charter school located in the Stapleton neighborhood of northeast Denver. Dr. Simon Levinson initiated the partnership and the first junior class began their internships on September 11, 2006. Students with an interest in health and research related careers are paired with a faculty mentor for a 10 week internship (with three 10 week trimesters per academic year), providing them with exposure to a real-world professional experience. Fourteen faculty representing UCDHSC graduate and professional programs (School of Medicine, School of Pharmacy and School of Dentistry) at the Fitzsimons campus, the VA Hospital and National Jewish Hospital are currently serving as faculty mentors.

Professional Learning Access in Science and Mathematics through Internet Delivery (PLASMID)

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This grant will utilize the coursework of the Rocky Mountain Middle School Math and Science Partnership and the online infrastructure of Colorado Online Learning to deliver a high quality middle school math and/or science certification program to teachers across Colorado. This grant partners with 11 rural school districts and will begin offering courses on-line Spring 2008.

Rocky Mountain-Middle School Math Science Partnership (RM-MSMSP)

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The University of Colorado Denver and Health Sciences Center (UCDHSC) in collaboration with four other institutions of higher education, seven school districts, one BOCES, and the National Science Foundation initiated the Rocky Mountain-Middle School Math and Science Partnership (RMMS-MSP) in fall 2004. The purpose of the partnership is to increase student achievement in grades 6-8. Through the partnership, teachers participate in professional learning development courses and thus increase their impact on student learning through increasingly effective instruction in mathematics and science. In addition, the teacher participants in the RM MSMSMP professional learning will help create a cadre of mathematics and science leaders across Colorado. In addition to professional development of teachers, middle school students are able to participate in summer mathematics and science camps which will increase their understandings of central concepts in mathematics and science.

Scholars for Knowledge in Learning and Leadership (SKILL) Mathematics Science Partnership

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The Scholars for Knowledge in Learning and Leadership (SKILL) Mathematics Science Partnership draws on and focuses the commitment and expertise of Denver Public Schools (DPS) and the University of Colorado at Denver and Health Sciences Center (UCDHSC) to advance the science and math achievement of middle school students. The SKILL MSP targets the further development of middle grade science teachers through intensive summer research internships at the Health Sciences Center (HSC). The internships will increase the scientific knowledge base of the participating teachers while providing hands-one experience in inquiry-based research. Middle school science teachers will be paired with basic or clinical research faculty mentors at the HSC for a six-week period to conduct a research project. Graduate students/postdoctoral fellows from the HSC will serve as the lab advisors for the teachers and will host on-line discussion groups for participating teachers during the following academic year.

School of Education and Human Development (SEHD) Internship Program

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This project places education interns into the National Park Service 'Views of the National Parks' directed by Bruce Nash. Existing on-line modules- (1) Caves and Karst and (2) Glaciers (SEHD- Michael Marlow, Kristin Lucke). Funded by NPS grants.

Scientific Instrumentation Past, Present and Future Project.

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. www.science.nasa.gov

A collaboration with NPS and NASA to develop a curriculum and associated film on scientific instrumentation using rafting the Grand Canyon as a stage.

STEP Project

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A collaboration with the Space Science Institute and eight museums across the country to investigate Science Theater impacts on the public and the presenters.

Summer Cancer Fellowships

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Summer Cancer Fellowships provide numerous opportunities for nearly 100 high school students and college undergraduates who are interested in exploring careers in medical research related to cancer. The program is supported in part by the University of Colorado Cancer Center and the Cancer League of Colorado. The 6 to 8-week fellowships pair students with preceptors from a variety of laboratories and clinics at the University of Colorado Denver, University of Colorado-Boulder campus, and other Denver area healthcare institutions. The fellowships are open to college undergraduates, as well as medical, dental, nursing, and other students in the health professions. Minority students are urged to apply.

Summer Enrichment Program

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The mission of the Summer Enrichment Program is to recruit and prepare students for success in the Pharm.D. degree program. The program is targeted at students who contribute to the cultural and ethnic diversity of the school, are educationally or economically disadvantaged or are first generation college students to the School of Pharmacy.

The Summer Enrichment Program is a unique experience that has proven effective in equipping new students with skills, knowledge and a group of friends who remain supportive throughout their pharmacy education. The program offers academic preparation, learning skills preparation and practical experience through an eight-week summer program worth six credit hours. The program has a number of components.

Summer Institute for Health Careers

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SIHC is a two-week program for high school students recruited from across the state of Colorado. Each regional AHEC Center (Greeley, Clifton, Alamosa, Pueblo and Denver) runs a weeklong program in their region. The students are then transported to Denver to continue the program at the Health Sciences Center. The capstone of the project is a shadowing experience with the health profession of their choice. The curriculum varies from year to year and region to region, but the main theme remains constant-an exploration of health careers that goes beyond the surface discussion.

Teacher-Ranger-Teacher Project

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This SEHD project (Michael Marlow) provides the national parks with a team of eight teachers to develop curriculum materials for a more diverse population for both classroom and park use. These eight teachers will work as rangers in eight national parks. Funded by NPS (Linda Lutz-Ryan).

Upward Bound-Power Up Program

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The Upward Bound Power Up Program (UBPUP) at the University of Colorado Denver, a federally funded TRIO program, is an educationally pre-college program for selected students from Sheridan and Jefferson High Schools. Upward Bound's mission is to prepare and help motivate students with potential for success in post-secondary education. Participants are selected based on their academic performance, motivations for success, recommendations from teachers and counselors and additional criteria. Upward Bound aims to provide program participants with the necessary skills needed to successfully graduate from high school and complete a 4-year college degree. Students participate in after-school and weekend programs which include supplemental education, academic themed workshops, field trips and college campus tours. Every student also participates in a 6-week summer program designed to prepare them for high school classes and the college application process. Additionally, all students participate in a shadowing program with current college students and working professionals in the Denver-Metro area.

Undergraduate Pre-Health Program (UPP)

School of Medicine & HSC Office of Diversity – College of Liberal Arts and Sciences
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The UCD Anschutz Medical Campus- Undergraduate Pre-Health Program (UPP) is modeled after the highly effective and successful Health Careers Pre-Collegiate Program. Students selected for this program must be first-generation, low income and/or underrepresented in the health professions, have a minimum of 24 credit hours from an accredited undergraduate institution and 3.0 GPA. Participants spend 8 weeks on campus where they shadow medical professionals, conduct research and participate in workshops on health disparities and cultural competence. The participants in UPP also meet monthly throughout the academic year for Saturday Academy sessions on topics ranging from health disparities to study skills. All participants are required to take the one of the test and prep-courses necessary to apply to medical, pharmacy, nursing, dental or other health profession school (i.e.: DAT, MCAT or GRE). Application necessary for program.
<http://www.uchsc.edu/diversity/Undergraduate-Pre-Health-Applicaiton.doc>

Virginia Tech project PREP: Partnership for Research and Education in Plants

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PREP is a collaborative effort with high school classes to do inquiry based science. Information is presented by Lisa Johansen, DDC Biology Assistant Professor, on her research on Arabidopsis (genetic model organism in plants) to the students. They design experiments to look for phenotypes in mutant plant lines that are caused by environmental stress. The fascinating part of this project is that the students are doing real science. They are working on mutant plant lines that Johansen works on in her research lab. They are designing and analyzing their own experiments. The students then get together with Johansen and discuss their results and try and put it into the big picture of current research on plant biology. USCHSC has just become an official dissemination site, with the like of Univ. of Wisconsin, Iowa State, and Cornell.

<http://www.biotech.vt.edu/outreach/partnerships.html>

<http://www.prep.biotech.vt.edu/index.html>