

The following are samples from a collection of UC research examples gathered from existing UC documents (e.g., from Los Alamos National Labs) and a survey of UC humanities, arts, behavioral science, and social-science faculty conducted by the “Research Mission & Principles” subgroup of the UCOF Research Strategies Working Group in spring 2010. Additional samples from this collection will be written up and added in summer 2010 to serve as material for a possible future UC research advocacy and public engagement effort.

[Note: These descriptions have not yet been fact-checked. Image permissions will have to be cleared for any future publication. (Most, but not all, of the images are taken from the relevant research sites. Some are generic placeholders) This document not yet prepared for general circulation.]

UC RESEARCH CONTRIBUTIONS TO THE PUBLIC

STEM Disciplines (Science, Technology, Engineering, Mathematics)



Oil Spills and Wildlife

When an oil spill spreads over the surface of the ocean endangering birds and other small mammals, rescuers spring into action, thanks to a formidable network led by UC Davis wildlife veterinarians in conjunction with the California Department of Fish and Game. Injured animals are cleaned and rehabilitated at a dozen facilities stretching along the entire 1,100 miles of California’s coast.



Cyclotron

Ernest O. Lawrence, namesake of the Lawrence Berkeley National Laboratory, designed the first cyclotron, launching the scientific use of particle physics to discover the fundamental structure of matter. The cyclotron has had a major impact on the treatment of diseases, making it possible to create in large quantities the radioactive isotopes used in medical treatments.



Insect control

UC Berkeley Professor Edward Steinhaus, a pioneer in the field of insect pathology, used bacteria to attack a caterpillar that infests alfalfa. This was the first successful use of an insect pathogen to control insects in the field. Today these bacteria, *Bacillus thuringiensis*, are used worldwide to fight crop disease



Laser Diode

UCSB researchers, from the Solid State Lighting and Display Center in UCSB’s College of Engineering, achieved lasing operation in nonpolar gallium nitride (GaN) semiconductors and demonstrated the world’s first nonpolar blue/violet laser diodes. These new orientations of GaN will result in laser diodes with lower operating power and longer lifetimes, which are necessary for high performance operation.



Dairy

Better sanitation procedures, improvements in raw milk handling and quality, and innovations that have reduced the environmental impact of livestock waste have contributed to making California the nation's largest dairy state. The J15 vaccine alone, developed in 1988 by veterinary medicine faculty to prevent mastitis in dairy cattle, saves producers \$11 million every year.



Baby Sign Language

UC Davis research gave birth in the 1980s to "baby sign language," a then-revolutionary way to communicate with infants. Ongoing studies by UC Davis psychology professor Linda Acredolo have demonstrated that children who sign as babies have higher IQs at age 7 and 8 than those who don't.



Diabetes

UCSF scientists isolated the gene for insulin, leading to the mass production of genetically engineered insulin to treat diabetes.



Cleaner Smokestacks

Frederick G. Cottrell, UC Berkeley professor of chemistry, developed an electrical precipitation device to clean smokestack emissions; it is still in use today.



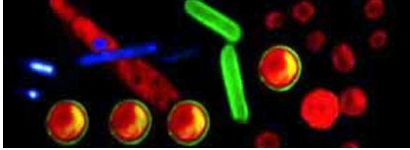
State Water Project

Engineering work at UC Davis played a big part in the design of the 444-mile-long California Aqueduct and other elements of the State Water Project that today serves 23 million Californians and 755,000 acres of farmland. Jaime Amorcho and others built water project models in a laboratory that now bears his name and that is used today by scientists designing river pumps and other diversion works that are safer for fish like the endangered delta smelt.



Renewable and Appropriate Energy Laboratory

The PACE -- property assessed clean energy -- program was developed in a collaboration between the City of Berkeley, CA, and a research team at the UC Berkeley Renewable and Appropriate Energy Lab led by Professor Daniel Kammen. The program flips the conventional financing model around, building equity in clean energy investments. PACE has rapidly been adopted by 10 states, the White House, and is part of the Waxman-Markey Climate bill.



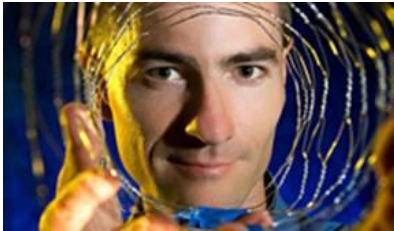
Discovery of Earliest Known Life on Earth

In 1993, UCLA paleobiologist J. William Schopf found the earliest evidence of life on Earth, dating back 3.5 billion years, and in 2002, he substantiated the biological origin of the earliest known cellular fossils. In 2006, Schopf and colleagues produced 3-D images of ancient fossils - 650 million to 850 million years old - preserved in rocks, an achievement that had never been done before. The technique could be used to look for life on Mars.



Most Powerful Magnet Helps Create Futuristic Materials

A world-record-breaking magnet is helping scientists create next-generation materials that will help make our buildings greener, our gadgets smaller, and our power and light systems more efficient.



Nanotechnology for Tech, Environment, and Medical Benefits

Los Alamos scientists are creating miniature machines that have cellular characteristics. Capabilities are endless: self-repairing computer chips, removing greenhouse gases, making human organs self-healing.



UC Planetarium Brings Research to the Public

UCLA faculty and graduate students run the UCLA planetarium and offer weekly, free shows for the public and schoolchildren to give a sense of the excitement of hands-on research into the universe. Visitors at the shows view planets, nebulae, star clusters, and other celestial objects through the facility's telescopes.

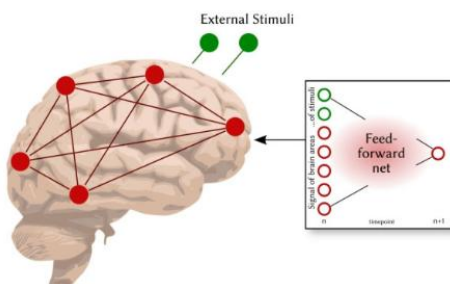
HABSS Disciplines (Humanities, Arts, Behavioral Science, and Social Science)

[selected examples sent to Alan Liu in spring 2010; not yet fact-checked or prepared for general circulation]



Treasure of Previously Unknown Letters by Benjamin Franklin

In the Spring of 2007, in the British Library, UC San Diego Political Science professor Alan Houston discovered nearly 50 previously unknown letters by Benjamin Franklin. "I couldn't sit still; I couldn't work," Houston remembers. "On the last day, on the last document [of my research trip], and I had this incredible discovery. I ran out of the library and called my wife in San Diego." When the letters were published in 2009, they created a stir in national and international media. The letters, Houston says, show "an example of Franklin's skill in working with people of different agendas and different concerns, appealing to their interests, appealing to their passions, appealing to their political beliefs."



Research into Human Cognition Leads to Credit Card Fraud Prevention

With collaborators of the Cognitive Science Program at UC San Diego, Professor David Rumelhart played a leading role in the development of the "backpropagation algorithm" as a theory of human learning and cognition. Developed in the late 1970s and early 1980s, the theory became a major machine-learning algorithm now used in countless engineering applications. It is also used today in familiar applications such as credit card fraud detection.



DigitalOcean

Researchers at the UC Santa Barbara Carsey-Wolf Center for Film, Television, and New Media working on "environmental media" have created the DigitalOcean online network to encourage communities of scientists, educators, students, policy makers, media specialists, ocean enthusiasts, and others to share in producing and learning knowledge about the seas. Their "Sampling the Sea" Learning Space engages middle and high school students in 200 classrooms around the world in monitoring, analyzing, and sharing information about the declining global fish population.



World History For Us All

Led by researchers Ross Dunn at San Diego State University and Edmund Burke at UC Santa Cruz (in cooperation with the UCLA National Center for History in the Schools), the “World History For Us All” project makes available a free, publicly available model curriculum adaptable for K-14 world history courses.



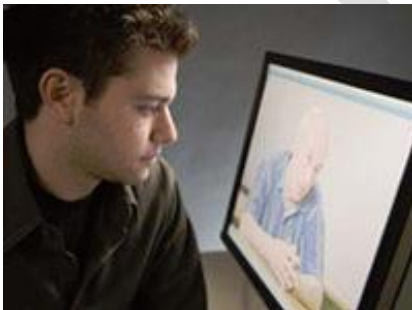
Culture and Human Moral Life

Jason Throop at UCLA, Stephen Parish at UC San Diego, Joel Robbins at UC San Diego, and other professors work in the anthropology of morality, exploring the cultural aspects of ethical subjectivity that deepen our understanding of human ethical subjectivity and may lead to new perspectives on ethics.



California Newspaper Project

A project of the Center for Bibliographical Studies and Research at UC Riverside, the California Newspaper Project identifies, describes and preserves California newspapers. Close to 9,000 California newspapers were inventoried in over 14,000 repositories throughout the state, 1.5 million pages of California newspapers were preserved and made available on microfilm, and 100,000 rolls of negative microfilm rolls are being processed for permanent storage at the UC Regional Library Storage Facilities.



Students Learn from California Holocaust Survivors

Professor Deborah Hertz founded and directs the Holocaust Living History Workshop at UC San Diego. Its aim is to use the Visual History Archive, a database at USC of 52,000 Holocaust survivor testimonies, to connect undergraduate students and local survivors. The Workshop brings local speakers to the library to speak to students, and the students in Professor Hertz’s “Holocaust as Public History” class make their own video interviews.



Helping Drivers Avoid Collisions

Professor John Andersen of the Psychology Department at UC Riverside studies how the brain processes information in performing complex tasks. His research focuses on improving driving performance and safety, including among aging people. One facet of his studies has been to identify the perceptual mechanisms drivers employ to detect and avoid collisions. His findings have important implications for how to design effective in-vehicle warning systems and semi-autonomous driving systems that can take control of a vehicle when a driver fails to detect an impending collision.



The Prehistory of Multitasking

Professor Monica Smith at UCLA conducts research on the long-term development of human behavior as exhibited in archaeological remains. Her book *A Prehistory of the Ordinary Person* examines the long history of multitasking as a human adaptive strategy. “Multitasking is not just a modern notion,” she says, “it has characterized human activities for more than a million years. The ability to undertake many tasks simultaneously through complex processes of language, cognition, and social interaction enabled our species to go from being merely one type of clever but vulnerable primate to being the only species whose conscious actions with material objects continually shape the landscape.”



AlloSphere for 3-D Science and Art Visualization

A collaboration of artists, musicians, and engineers at UC Santa Barbara led by Professor JoAnn Kuchera-Morin of the Music Department and Media Arts & Technology program are at work in the one-of-a-kind AlloSphere. The AlloSphere is a globe-like, immersive 3-D visualization facility used to explore the complex multi-dimensional data essential in such sciences as nanotechnology, neuroscience, and chemistry. It is also a stage for experimentation in combining art with science--as when visitors fly through a brain-scan map of artist-architect Marcos Novak’s mind, which Novak compares to a bodily “architectural space.”



Preuss School Prepares K-12 Students from Minority and Low-Income Backgrounds for College

A college preparatory public charter school on the campus of UC San Diego, the Preuss School has been named Best High School in California Serving Low Income Youth, the 8th Best High School in the U.S., and one of the Top Ten High Schools in the U.S. For example, 82% of Preuss graduates in the 2004 and 2005 classes enrolled in college compared to 36.5% of students in comparison groups for those years. The school achieved the highest API score among San Diego County high schools in 2009.



Big Humanities

Digital media and arts researchers in the UC San Diego Software Studies Program are at work on a federally-funded "Cultural Analytics" project that uses new digital technologies to explore and present large datasets of humanities, art, and cultural material. For example, the project allows researchers and students to move seamlessly between seeing any individual painting by artist Mark Rothko and seeing it on the developmental plot of thousands of his paintings.



Protestors in Hong Kong after arrest of Liu Xiaobo



UC and Human Rights Around the World

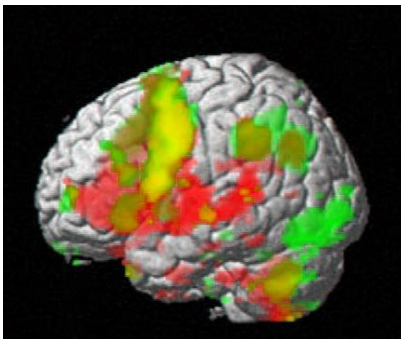
In fall 2008, Professor Perry Link of the Comparative Literature and Religion and Foreign Languages Department at UC Riverside worked with the drafters of China's "Charter '08" to produce an English version of the Charter. The Charter, which was signed by over 300 Chinese intellectuals and human rights activists, argues for democratization in China. It has had a public impact around the world and in the U.S. Congress. Liu Xiaobo, arrested in 2008 as a drafter of the Charter, was nominated for the Nobel Peace Prize.

Berkeley Center for Independent Living

The Berkeley Center for Independent Living was the first of its kind in the U.S. It brought together students and the community to find ways for disabled people to live independently from parents and from institutions. Stressing peer counseling and support, the Center provided a wide array of services, and it undertook a major role in advocacy for reform legislation in California and the nation. The Berkeley model, used in the 1973 Rehabilitation Act as a demonstration of best practice, spread rapidly around the country and eventually the world. It provided a basis for national and international legislative and other social changes that transformed disabled people's lives.

Literature and Neuro-cognitive Science

Some scholars are turning to magnetic resonance imaging of the brain and cognitive theory to explore how and why people read fiction. As the New York Times reported in a story titled "Next Big Thing in English," a prominent leader in the field is the scholar Lisa Zunshine, who trained in neuro-cognitive and evolutionary-psychology approaches to literary studies as a graduate student at UC Santa Barbara.



An Ancient South American Empire

UC San Diego archaeologists working in the southern Peruvian desert discovered a previously unknown system of agricultural colonies of the Tiwanaku culture, dating to the 7th century AD. Ongoing excavations are discovering how this early state society watered the desert and organized its vast provincial network through work at the region's only Tiwanaku temple, as well as towns and cemeteries. Research on ancient societies' relationship to land and resources has great relevance to modern problems. Ongoing work on the Tiwanaku includes studies of desert ecology, climate change and irrigation, analyses of ancient ceramics, metals and textiles, and mortuary and isotopic studies of excavated Tiwanaku mummies' to understand diet and migration patterns over the long term.



Helping Dual-Career Working Middle Class Families

Researchers in Anthropology, Applied Linguistics, Education, and Psychology at the UCLA Sloan Center on Working Families have started a Center on Everyday Lives of Families to study

how working parents and their children approach the challenges of balancing the demands of work, school, and family life using detailed, ethnographic research of everyday life.



What is the Community Reading?

UC Santa Barbara Media Arts & Technology Professor George Legrady's "Making the Invisible Visible" media installation was chosen as permanent art installation at the Seattle Public Library. The installation, which consists of a series of high-definition screens behind the main library circulation desk tied into the library's computer system, visualizes the books being checked out, providing a visualization of what the whole community is reading

Sources:

- UC Research Contributions_032510-1.pdf
- Los Alamos National Lab, <http://www.lanl.gov/discover/science>
- Survey of UC HABSS faculty conducted in April 2010 by Alan Liu, member of UCOP Research Strategies Working Group
- Suggestions from various UCOP working group members and UC faculty