Bears Breaking Boundaries 2009
Fact Sheet

In 2009, Bears Breaking Boundaries received 146 submissions. Thirty-three projects were selected to receive seed funding in the $500 - $13,000 range, totaling $85,000 for the competition as a whole.

Curricular Innovation

1st prize of $5000: The Economics and Business Perspectives of Philanthropy by Eric Rodriguez: This is an interdisciplinary undergraduate course that aims to give students a better understanding of philanthropy. There are insufficient resources available to fund all charitable causes, so funds should be prioritized to the projects that yield the highest returns in social benefit on dollars invested. Students will be challenged to prioritize causes with this framework, and will explore needs, roles, and strategies from the perspective of both donors and charitable organizations. By the end of the course, students should be better prepared to make educated decisions as future non-profit leaders, policy makers, and philanthropists.

2nd prize of $3000: Disability Awareness Through Sport by Mickey Kay: The Disability Awareness Through Sport (DATS) project partners UC Berkeley and the Bay Area Outreach & Recreation Program (BORP) in a collaborative effort to increase disability awareness and student service on the Cal campus and in the surrounding Berkeley community. These two organizations will work together to implement a course in which students will use the sport of wheelchair basketball as a framework for exploring issues of disability awareness, advocacy, and outreach. In addition to learning how to play wheelchair basketball, students will also work in close collaboration with BORP as mentors, coaches, and community organizers.

3rd prize of $1000: Cal Science Corps by Andrew Robertson: The Cal Science Corps (CSC) will place teams of scientists and engineers from UC Berkeley research programs at universities and research institutes in developing countries to share expertise and collaborate with local partners. Modeled after the Global Science Corps proposed in 2001 by Dr. Harold Varmus,1 the six- to nine-month CSC program will offer UC Berkeley students and researchers a unique opportunity to participate in scientific research in a middle-income country while helping develop the scientific capacity of the developing world. By assuming temporary roles in science education and research, CSC Fellows will offer a valuable service to fledgling science programs in poorer nations, gain an exceptional experience in applying their scientific understanding in the developing world context, and provide a service to UC Berkeley and the United States by developing good-will between two distant countries.

3rd prize of $1000: CS0: Beauty, Awe and Joy of Computing by Colleen Lewis:
We propose to develop Computer Science 0 (CS0): a new introductory general service course, available to students across the university, to share the beauty, joy and awe of computing. This course has the potential to serve as a model for a new CollegeBoard Advanced Placement course in the works, which could have national impact. Students will be gently introduced to programming and computational thinking using a new graphical programming language called Scratch, with the emphasis on problems relevant to themselves and society.

Honorable Mentions:

1. Clinical Engineering and Applied Science Course by Daniel Cohen

2. Genetics, Public Policy & Law Course by Andrew Robertson

3. Pinoleville Pomo Nation - UC Berkeley Collaborative Partnership for Tribal Energy, Land Use and Sustainability (TELUS) by Ryan Shelby: The project is a partnership between the Pinoleville-Pomo Nation (PPN) and the University of California, Berkeley. The purpose of this project is to develop a series of community-based service learning modules (CBSLM) in which graduate and undergraduate students at UC Berkeley will partner with members of the PPN to co-design a Tribal Energy, Land Use, and Sustainability (TELUS) Plan. The TELUS plan will aid the PPN in achieving their sovereignty, economic self-sufficiency, and environmental goals, as well as educating students at UC Berkeley and members of the PNN about designing sustainable communities, using the tenets of human-centered design.

Improving Student Life

1st prize of $5000: Berkeley Student Food Cooperative by Alli Reed, Christina Oatfield, Megan Coontz, Yonatan Landau, Kaan Caglar: The mission of the Berkeley Student Food Cooperative (BSFC) is to provide fresh, healthy, environmentally sustainable, and ethically produced food at an affordable price to Berkeley students. The BSFC will be a student-run cooperative natural and sustainable foods cafe and market. Its innovative business structure is aimed at addressing current economic and health concerns, as well as global climate change and local student community involvement and leadership.

2nd prize of $3600: Men's Story Project by Matthew Singh, Jocelyn Lehrer and Tammy Kremer: The Men's Story Project (MSP) is a replicable, performance-based, community discussion project through which participants critically examine social ideas about masculinity. The MSP mission is to strengthen social norms that support healthy masculinities and gender equality, and to help eliminate gender-based violence, homophobia, transphobia, sexism, and other oppressions that are intertwined with masculinities, through ongoing events of men's public story-sharing and collective dialogue. The Bears Breaking Boundaries funds are supporting: a) bringing a production

of the MSP to UCB in April 2009, b) filming the production for educational use, and c) conducting a qualitative study with UCB students and MSP presenters regarding project content, process, and perceived short-term impacts, to inform development of a Masculinity Studies DeCal and UCB MSP initiative for the 2009-10 academic year.

Honorable Mentions:

1. Berkeley Green Home - Sustainable Student Housing by Kevin Casey, Evan Schwimmer, and Anu Sridharan: Community education for energy efficient student housing program

2. Cal Recreational Trail Project by Corey Harkey

3. Indaba Leadership Retreat by Calvin Liu

IT For Society

First prize of $13,000: San Quentin All-access computer center
West Hays, Alayna Johnson, Erik McDonald, UC Berkeley
Through the introduction of an all-access computer center at San Quentin State prison, we propose a feasibility study and a pilot impact study of computer training in two distinct educational programs: one program will focus on instructing basic computer literacy to inmate students in the GED preparation class, and the other will concentrate on teaching advanced computer-aided design (CAD) to inmate-students in the prison's vocational-training machine shop. This will be the first study of the ability of Information Technology to reduce the crisis of overcrowding in California's prisons. This project has the full support of San Quentin's administration and expands upon a thriving service-learning project that we coordinate, in which 70 UC Berkeley undergraduates teach and tutor weekly at San Quentin.

Second prize of $8,000: Hyoumanity
Xiaomeng Zhong, Jon Hicks, Brad Kittredge and Elise Singer, UC Berkeley
Patients facing the most complex and difficult diagnoses sometimes see dozens of doctors and spend years searching for answers. Ultimately, resolving many of these cases depends upon matching a patient with a unique, complex, and potentially rare condition to the doctor with the expertise, experience, and insight to recognize and diagnose it. By providing a forum that allows patients to post a structured medical profile and offer a monetary reward for information leading to a diagnosis, Hyoumanity flips diagnostic search around, giving doctors both a mechanism and incentive to find the patients they can help. Using the reach of the web and the power of market forces to better match patient needs with distributed medical expertise will help to lower medical costs, improve health outcomes, and alleviate pain and suffering. Learn more at
http://hyoumanity.blogspot.com

Third prize of $5000: Silicon Based Portable Imaging Device Amin Arbabian and Ali Niknejad, UC Berkeley: This research aims at the design and realization of a high-precision, low-cost, handheld, pulsed-based, reflection-sensing imaging module in microwave and millimeter-wave frequencies. The device termed the Time-Domain Ultra-Wideband Synthetic Imager (TUSI) would be capable of accurately detecting minute reflections and by capturing the data from multiple transceivers form a synthesized image of the object. The transceivers are synchronized using a common reference clock and individual locking circuits. The TUSI system is designed for battery operation and given the integrated processing unit, could be interfaced to a laptop PC or another display device for image visualization. Some of the applications are the detection of breast cancer, leukemia, melanoma and also non-invasive blood glucose monitoring as well as assessment of internal injuries at the accident site.

In addition to the top three prizes, there were four honorable mentions, who each received $1000 to support their work:

Honorable mentions, $1,000:

1) CINCH: Cell Phone Technologies to Increase Nigerian Community Health
Evelyn Castle, Jenny Scafidi, Adam Thompson and Paul Lubeck, UC Santa Cruz
This project aims to determine suitable mobile technologies that will improve the health care system in Nigeria. Cell phone technologies are the most efficient way to get information to the majority of citizens in cities and in rural areas. Most of Nigeria does not have access to a constant electricity source. Mobile phones are much more versatile than computers or the Internet because they do not require electricity to run. Data can be collected and disseminated regardless of what the situation is regarding electricity. Mobile technologies are also a means to collect health information and surveys in a more organized manor.

2) Metamouse: Technology to Aid Multiple Users in Sharing Existing Applications
Kurtis Heimerl, Anuj Tewari, Kelly Buchanan, Eric Brewer, Tapan Parikh and John Canny, UC Berkeley
We propose an easy to implement interaction system that allows multiple users to share existing applications without modification. We call this system Metamouse. Metamouse provides each user their own mouse and cursor. These cursors are then mapped down to one metacursor, which interacts with the existing applications. This allows the applications to see just one cursor, as they expect, but the cursor is controlled by many students at once. Our preliminary tests have shown that this interaction paradigm is viable and achieves our goal of involving multiple students more thoroughly in a learning activity. We feel that with proper execution, this technology has the potential to enrich educational environments all over the world.

3) Chronic Disease Tracking & Management by Sean Ahrens, Arthur Klepchukov, and Devon Shurick, UC Berkeley

4) Point of Care Device by Octavian Florescu, Karl Skucha and Tayson Siegel, UC Berkeley: We are developing a novel, easy-to-use, patent-pending, point-of-care platform for multiplexed, digital disease detection. We have applied digital Integrated

Circuit (IC) technology, the same technology that has underpinned the IT revolution, to encapsulate the performance of a laboratory assay in the palm of the hand. We envision that our device will be capable of communicating with computers via Ethernet and with cell phones via Bluetooth to enable truly distributed, low-overhead, diagnostic testing.

Finalists:

CARES: Community Assessment of Renewable Energy and Sustainability by Ryan Shelby, Yael Perez, Adarsh Krishnamurthy, Sara Beckman and Alice M. Agogino, UC Berkeley: Reducing our environmental impact is essential for sustainable living. CARES believes that giving consumers, communities, governments and corporations access to the latest data, models and solutions will accelerate adoption of sustainable solutions, thus enabling communities to reduce their environmental footprints.

VIRTUAL DOCTOR: Using Telemedicine to Increase Healthcare Outreach in Developing Countries by Muhammad Azfar Nisar and Ayesha Masood, UC Berkeley: Developing countries are facing a chronic shortage of qualified medical personnel in primary health care centers. Telemedicine has emerged as a potential solution to this problem. This project aims at creating clusters of primary health care centers in developing countries (pilot project will be carried out in Pakistan). These centers will be connected to each other via high speed internet and telemedicine equipment. One doctor will be assigned to each cluster. The doctor will visit each center for two day per week. However, by means of telemedicine equipment, the doctor will be virtually present at all BHUs throughout the week. Thus, he will be able to prescribe medication to the patients needing primary care and will be able to refer other patients to secondary health care centers directly. In this way, patients will have access to a qualified medical doctor throughout the week. This project will have high impact on health indicators while having low costs suitable for developing countries.

Squash and Vine by Shawna Hein, Hazel Onsrud, Aylin Selcukoglu and Jenna Burrell, UC Berkeley: At a time when our economy is weak, salmonella outbreaks are common, farmers are disappearing, and climate change threatens, it is more necessary than ever to critically examine our food system. Today, farmers rarely enjoy a profit, are disconnected from the people eating their food, and have no easy means to support or learn from one another. Additionally, consumers eager to eat fresh and healthy food are not sure where to turn, and retailers committed to sourcing locally face an upward battle finding producers and encouraging people to consider the value of food beyond its cost. This paper proposes a suite of tools focused around a new online social network to aid communication and information sharing between consumers, producers, and retailers (e.g. restaurants and grocery stores) involved in the food community. The methods we used to understand the space and define what problems exist are detailed, our goals are outlined, and our system, Squash & Vine, is presented.

Intelligent Traffic Light Control with Wireless Vehicle-to-Vehicle and Vehicle-to-Infrastructure Communication by Kartik Pandit, Dipak Ghosal, Chen-Nee Chuah and Michael H. Zhang, UC Davis: This proposal examines the possibility of deploying an adaptive signal control system at intersections; a system that can base its control

decision on information received from vehicles. We assume each vehicle is equipped with a short-range wireless communication device, as is a controller node placed at the intersection with the traffic light. The controller node receives information from approaching vehicles such as the number of vehicles approaching the intersection, their speed of approach, the spatial headway between successive vehicles. The controller will process this data and create a signal timing plan that can optimize parameters such as waiting time of vehicles at the intersection (idling time of vehicles), size of the vehicle queues, and creating a smoother traffic flow through the intersection.

DexterNet: A Platform for Health Application Technology: Victor Shia, Curtis Wang, Irving Lin, Michael Roy, Posu Yan and Edmund Seto, UC Berkeley: Obesity is a growing epidemic. Currently, there are over 1.7 billion overweight or obese people worldwide. Recent studies primarily attribute this growth to lack of physical activity during childhood. This has led to a new generation of health-promoting applications aimed at incorporating physical activity into the daily lives of children. This includes a growing market for exergames—video games that incorporate physical activity into the gaming experience. At the same time, the market has grown considerably for mobile devices among children and adolescents. Development of applications that leverage existing sensors on many of today's mobile devices is hampered by the lack of a robust software architecture for processing sensor data. We propose an open source framework called DexterNet for mobile platforms to encourage the development of mobile games and applications promoting physical activity and health. This framework supports data collection from a variety of sensors, motion classification, and access to online services for multi-user interaction and collaboration.

Citizens.gov by Tim Durbin, Hansoo Lee, Mili Mittal, Karl Rinderknecht, Takashi Tada and David Riemer UC Berkeley: At the heart of citizen.gov is a redefinition of the relationship between citizens and government. A principal goal of citizen.gov is to reestablish the democratic ideal that the government should exist at the will of its people with the primary objective of improving its citizens' quality of life. Then, in the language of business, citizens are redefined as the customers and the government is redefined as the service provider. To that end, citizen.gov will enable the government service provider to deliver superior products, services, and experiences to its citizen customers and thereby strengthen the citizen-government relationship.

Neglected Diseases

1st prize of \$5000: A point-of-care malaria drug resistance assay by Peter Ledochowitsch, Ardian Sprenger, Debkishore Mitra, and Latitha Muthusubramaniam,: We propose to develop a palm-sized microfluidic device which permits culturing of malaria-infected red blood cells under physiological conditions in suspension. The extent of parasitemia is determined by a label-free magneto-optic technique. Such a device will enable point-of-care antibiotic resistance assays for testing different malarial strains primarily targeting countries in the developing world.

2nd prize of $1500:Examining levels of estriol and seroprevalence of Hepatitis E virus during pregnancy in India by Jacqueline Barin and Michael J. Casteel: In Northern India, nearly 60% of viral hepatitis in pregnant women is attributed to hepatitis E infection (HEV). Given the growing rates of HEV in South Asia and the hypothesis that levels of hormones may affect disease severity in pregnant women with HEV, this study proposes a cross-sectional approach to examine estriol levels and seroprevalence of anti-HEV (IgG and IgM) in village dwellers in Uttar Pradesh, India.

2nd prize of $1500: Long-term impacts of early childhood de-worming by Owen Ozier: Parasitic worms infect over 1 billion people in the developing world today, yet the treatments are inexpensive. For people infected with worms, taking these medications can improve school attendance and performance, but little is known about the long-term gain from de-worming treatment early in life. In my study this summer, I aim to collect data to answer exactly that question, in the context of de-worming interventions that took place in East Africa from 1998-2001.

3rd prize of $1000: Evaluation of a simple point-of-care rapid test for detecting Trichomonas vaginalis in young women in Mysore, India by Stephanie Trammell: The study will evaluate the performance of the OSOM® Trichomonas Rapid Test for the detection of trichomoniasis in women from rural and peri-urban areas of Mysore, India, in comparison to PCR, culture and wet-mount preparation.

3rd prize of $1000: Development of a simple prognostic test for rheumatic heart disease by Brooke Finkmoore: We aim to develop a simple prognostic tool for rheumatic heart disease. In the first phase of the project we aim to identify a set of peptides that induce a pro-inflammatory cytokine response from T cells isolated from rheumatic heart disease patients in Salvador, Brazil. The development of a prognostic tool which is inexpensive, simple and portable will help neglected populations get the appropriate treatment and care necessary to prevent severe outcomes from this preventable and neglected disease.

Synthetic Biology

1st prize of $5000: Engineering Health-Conscious E coli: Probiotics That Reduce Saturated Fats by W. Roger Lowe,: Intake of saturated fats has been linked to heart diseases such as atherosclerosis and coronary heart disease. Engineering probiotic bacteria that can turn saturated fats into unsaturated fatty acids, generally deemed healthful, could help reduce saturated fat intake and lessen the chance of developing a saturated fat linked disease.

2nd prize of $3000:Sunlight to electricity: Combining the photosynthetic properties of cyanobacteria and the extracellular organization of electrocytes in E. electricus to produce energy via repeating action potentials" by Jay Garg0: Cyanobacteria transform solar energy into chemical energy through photosynthesis. Once modified by plasmid transformation, they will be able to use this chemical energy to establish electric potentials across their membranes. This project aims to design a plate, based off the

extracellular organization of Electrophorus electricus, that will be able to harness this stored energy.

3rd prize of $2000: Synthesis of Coral-like Material by Susan Chen: This project proposes to make a synthetic coral-like material using the methods of synthetic biology for bone graft applications.

Science, Technology and Engineering Policy

1st place Undergraduate Award, $1500: Medical Smart Card System for Patient Record Management by Arthur Yu and Changrui Xiao: Rising healthcare spending is a serious issue for the United States. Electronic medical records are seen as an effective way to solve the problem, however they are difficult to implement. We propose the development of personal portable healthcare record smart cards and a corresponding framework to simplify maintenance and transfer of patient records as an incremental step towards a nationalized electronic records system.

2nd place Undergraduate Award, $1000 + $500 travel grant: Neurological Priming of ASD Patients in Human-Robot Interaction Studies: Need for Novel Approach in Technology Regulation by Julia Piper

Berkeley Award, $500 award + $500 travel grant: Coal Power and Reversing Climate: Can They Work Together? by Anna Sommer: Hundreds of U.S. companies have a stake in continued use of coal-based electricity. Unfortunately, burning coal is a major source of greenhouse gas emissions which in turn cause climate change. This paper examines potential solutions to this problem and suggests policies to commercialize an emerging technology called carbon capture and storage.

3rd place Graduate Award - $1000: KnowPrivacy by Joshua Gomez, Ashkan Soltani, Travis Pinnick, Mark McCans, Sona Makker, Brian Carver: This project aims to increase interest in the current state of data collection practices and privacy concerns by demonstrating greater salience of the types of data collected by commercial websites and the potential risks involved, along with the uses and value for those collecting it.

1st place Graduate Award, $2000 + $500 travel grant: Magneto-Optic Technology Hits The Field: A pilot program to implement a new malaria diagnostic device in Southern Benin by Natasha Keith Vidangos: Malaria is a disease endemic to regions of South America, Sub-Saharan Africa, and South Asia that continues to do serious humanitarian and economic damage to developing countries. A new diagnostic tool (the MOT device) has recently been invented that would improve access to accurate malaria diagnosis at low costs. To collect information on the best way to bring these devices to the communities that need it, we propose a fact-finding pilot program to provide MOT-malaria diagnosis and treatment centers to 25,000 people in Southern Benin.

2nd place Graduate Award, $1500: Policy Proposals to Reduce Overharvest From Marine Fisheries by Evelyn Chang, Historically, marine management policies have been unable to ensure sustainable, economically viable fishing practices. These policies have been ineffective in regulating technological advancements in fishing, and flawed policies have contributed towards hastening the use of harmful technologies. As a result, several once-major fishing stocks are overfished or collapsed, resulting in both severe environmental degradation and large economic losses. This paper proposes a series of initiatives to encourage the fishing industry to adopt sustainable fishing practices and provide support to maintain healthy, profitable commercial fish populations.

Partnerships for Social Innovation

1st prize of $5000: BTTR Ventures by Nikhil Arora and Alejandro Velez: BTTR Ventures (pronounced Better) stands for "back to the roots," a phrase that encompasses the idea of creating a company that stands for sustainability, progress, and social responsibility. BTTR Ventures aims to turn one of the largest waste streams in the Bay Area, the tons of coffee ground waste generated daily, into a highly-demanded, nutritious, and valuable food product – specialty mushrooms. Along the way, not only do they play to create a healthy food source, but also to provide urban jobs, save thousands of tons of valuable substrate from being dumped into landfills, and donate substantial amounts of cash flow back into the communities from which the coffee ground waste originated.

Honorable Mentions:

1. Berkeley Green Home - Sustainable Student Housing by Kevin Casey, Evan Schwimmer, and Anu Sridharan: Community education for energy efficient student housing program

2. Future Scientist by Richard Novak: Future Scientist seeks to improve the lives of resource-poor communities through science education. We believe that technical knowledge is inseparable from any outreach effort, as it enables communities to help themselves.

3. The Upeksha Yoga Institute by Yehoshua Sayar, Flora Krivak-Tetley, Sarah A. Brady and Simona Balan