

# Socially Responsible Licensing at Berkeley

IPIRA combines IP licensing and industry-sponsored research in one office to develop and deploy Berkeley innovations. Through its Socially Responsible Licensing Program, Berkeley partners with industry, start-ups, and not-for-profits to formulate technologies that lack traditional profit drivers. IPIRA has set new paradigms for research partnerships since its founding, helping to develop malaria therapies, tuberculosis drug targets, protein-enhanced sorghum, diagnostics for dengue fever and other infectious diseases, novel anti-viral compounds, water purification filters, and pesticide-free crops.



## Product Development Partnership for Malaria Therapies

Production costs of malaria-therapy artemisinin are a barrier to its availability. Professor Keasling sought a new approach: engineer *Saccharomyces cerevisiae* to produce it. With funding from the Gates Foundation, Keasling's Berkeley lab researched the basic gene cloning. Amyris, a Berkeley-founded start-up, continued the strain engineering and fermentation scale-up, while lead grantee, the Institute for One World Health (iOWH), managed the regulatory and distribution aspects of the project. Simultaneous funding from the Foundation enabled parallel performance of basic, translational, and regulatory work, cutting years off the typical bench-to-bedside timeline. The product development partnership involved a three-way collaboration agreement and two royalty-free licenses from IPIRA. In 2004, the partners de-risked the project by advancing it along the value chain, and in 2008 sanofiaventis sublicensed the rights from iOWH and Amyris.



## CellScope's Cell-Phone Microscope

Bioengineering Professor Daniel Fletcher and his students developed a low-cost, clinical-quality microscope that attaches to a conventional cell phone. The technology enables health workers to send digital images of blood or tissue samples, removing the need for field-based laboratories and accelerating disease diagnosis and epidemic tracking in countries lacking health infrastructures. Supported by Microsoft External Research, CellScope will offer free licenses in developing countries.

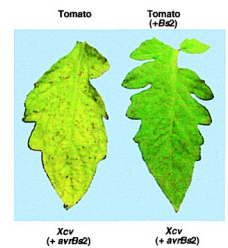
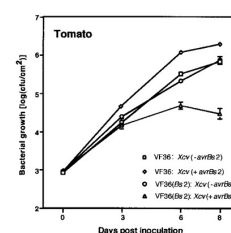
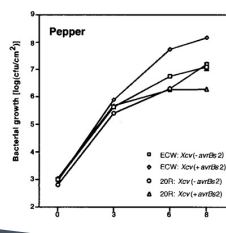
## Samoan Anti-Viral Compounds

The Mamala tree contains significant anti-viral properties, and a partnership between the Government of Samoa, Falealupo Village, Professor Jay Keasling, and Berkeley aims to identify and isolate its prostratin genes. Discoveries will be attributed to, and commercialization revenues shared with, Samoa and ten villages. Berkeley further endeavored to use best efforts to license therapies for the public benefit.



## Durable & Pesticide-Free Crops

The BS2 gene confers resistance to plant pathogens, and can be introduced into plants to enhance durability. Two Blades Foundation licensed BS2 to develop pesticide-free, resilient crops for subsistence agriculturalists. The license expressly aims to benefit "less developed" farmers, and waives royalties for distribution in the Least Developed Countries. It also includes tiered-royalties from wealthier countries to subsidize delivery for free, or at minimal cost in the poorest countries.



## Rapid & Handheld Point-of-Care Diagnostics

Dengue viruses infect more than 50 million every year, causing severe and life-threatening infections. Professor Eva Harris' lab and the Sustainable Sciences Institute partnered with the Department of Electrical Engineering to develop a low-cost, hand-held diagnostic for dengue. IPIRA patented and licensed the invention to SSI, where grants from the Rockefeller & Acumen Foundations supported development. Outside "for-profit" countries, Berkeley's license empowers royalty-free and not-for-profit use of SSI's resulting product.

As doctoral students in Berkeley's Computer Science and Electrical Engineering departments, Octavian Florescu and Karl Skucha invented the technology behind a microchip-based, rapid, point-of-care diagnostic that can be configured to detect nearly any antigen (HIV, malaria, HPV). IPIRA's license to their start-up, Silicon BioDevices, preserves the end product's availability in the UN-defined Least Developed Countries.



## In the Pipeline

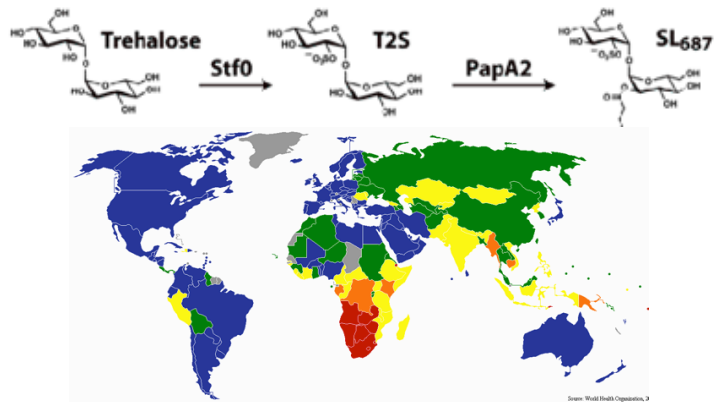
IPIRA collaborators Institute of One World Health and Silicon BioDevices are pursuing joint research on the latter's microchip-based diagnostics. Development of cell phone-based diagnostics continues with new investors. In 2011, IPIRA aims to develop contracting tools for clean technology, following successes in IT and life sciences licenses.

## Low-Cost Water Treatment

Partnering expertise from engineering (antimicrobial filters) and the Haas School of Business (market and user adoption studies), Berkeley and a sponsor executed two research agreements to develop and test low- and no-cost water purification devices. By leveraging the sponsor's expertise in developing and delivering clean water innovations in developing countries, UC Berkeley extended its research into areas where its partner has both technical expertise and field relationships.

## New TB Drug Target

Mycobacterium tuberculosis lies latent in one-third of all people and is the world's top killer of individuals with HIV, but novel TB therapies are rare. Professor Carolyn R. Bertozzi discovered four genes within the bacteria that may be linked to its latent survival. Four patents on TB's sulfotransferase pathway were "donated" to the Pool for Open Innovation in 2010, for the express purpose of advancing research on sixteen neglected diseases in the Least Developed Countries. Berkeley is the first university to contribute its IP to the Pool. Under a Creative Commons Green Exchange Public License, licensees – such as the TB Alliance – can inspect both the patent rights offered by Berkeley and the accompanying license, reducing uncertainty and transaction costs, and streamlining uptake for patent rights with biomedical utility in the Least Developed Countries.



## Nutritionally-Fortified Sorghum

Sorghum is a staple for over 500 million, but a poor source of nutrition, protein, and starch. The research of Bob Buchanan and Peggy G. Lemaux enhances its digestibility by modifying sorghum's grain endosperm. Supported by a grant from the Gates Foundation, Berkeley partnered with Africa Harvest and DuPont/Pioneer to maximize its social impact. The contract involved a paid-up, royalty-free, worldwide perpetual license, and defined the field of use as "any charitable objective."

