

# UNIVERSITY OF HAWAI'I SYSTEM

## ANNUAL REPORT

REPORT TO THE 2005 LEGISLATURE

Annual Report on  
Discoveries & Inventions Revolving Fund

Chapter 304-8.92 (b), Hawaii Revised Statutes

April 2005

**Office of Technology Transfer  
and Economic Development**

**Report to the  
Hawai'i State Legislature**

**April 2005  
Manoa Innovation Center  
2800 Woodlawn Drive  
Honolulu, Hawai'i 96822  
University of Hawai'i**



## Preface

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This report was produced by the Office of Technology Transfer and Economic Development (OTTED) of the University of Hawai'i in accordance with the provisions of Section 304-8.92, Subsection (b), *Hawai'i Revised Statutes*.

Funding for the establishment of a technology transfer and economic development program at the University of Hawai'i was authorized by the 1988 Legislature as part of the Governor's supplemental budget request. In addition, the Legislature approved the establishment of the Discoveries and Inventions Revolving Fund (*Act 40, SLH 1988*) to provide the University with a funding mechanism "to develop technologies that have potential commercial value, support the administration of technology transfer activities and facilitate economic development through education and research undertaken at the University." The Board of Regents formally approved the establishment of the Office of Technology Transfer and Economic Development in April 1989.

During the period of this Report those changes implemented in the past few years have begun to bear fruit, with increases in licensing activity and licensing revenue, improved communication with UH faculty and research staff, and more focused outreach to the State's business community. These successes have been achieved despite significant reductions in OTTED's budget; OTTED is a much leaner and more efficient organization. OTTED now reports to the University's Vice President of Research and, in close coordination with the Office of Research Services and University Connections, is working to help build the research enterprise at the University of Hawai'i.



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# Technology Transfer

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## Program Profile

The Office of Technology Transfer and Economic Development performs an essential, on-going service for the University of Hawai'i — identifying, evaluating, protecting, marketing, and commercializing valuable intellectual property owned by the University. The activities of the program are guided by UH Executive Policy E5.500, which sets forth the following objectives:

- To define, clarify and protect the rights and equities of inventors and authors, the University, governmental or private sponsors of research and the public in inventions and original works by providing for just and equitable recognition of the legitimate interests of each in such innovations.
- To encourage broad utilization of the results of University research and to provide a vehicle for the transfer of new technology and ideas from the University to the community at large, by permitting exploitation of research results—in the public interest and for the public benefit—while protecting the integrity of the academic process and the goal of public dissemination of research results.
- To stimulate innovative and creative scholarship, research and writing and its recognition, by facilitating, where appropriate, the receipt of fair economic rewards from such activities in the form of royalty payments to inventors and authors from licensees and publishers.
- To protect and benefit scholars and researchers in the University by encouraging recourse to the patenting and copyright process and by providing information and support on the procedures and problems involved.
- To encourage and assist scholars and researchers in identifying patentable discoveries; to require prompt and early reporting of such discoveries to the Patent and Copyright Committee; and to promote scholarly publication in a manner that does not prejudice the obtaining of a patent.
- To devise and promulgate clear and practical regulations, procedures and forms for reporting and disclosing original works and ensuring the timely prosecution of patent applications.
- To provide for the patenting and licensing of any invention or the registration and licensing of the copyright in any work, where appropriate, in cooperation with the Patent and Copyright Committee.
- To protect the rights of any government or other sponsor of research in any invention or work that may be generated and to ensure compliance with the other terms of research grants.
- To protect the rights of the University in inventions or other original works which result from the use of University funds or facilities by its faculty and other employees.

Previous reports denoted an increase in licensing activity and revenues. Happily, the trend continued throughout 2004. While the number of new licenses signed was down slightly from the year before, the level of licensing revenues continued to increase. Further, OTTED made a significant contribution to the UH Business Plan Contest, held by the UH College of Business, and was rewarded by seeing the top two teams, each based on a UH technology, split the OTTED prize money and go on to form actual start up companies based on their winning business plans and the UH technologies they licensed from OTTED. OTTED's Technology Showcase Series also continued throughout the year and drew appreciative attendees that led to serious inquiries into the technologies presented.



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## **Program Objectives**

- Transfer University-developed technologies to industry in the public interest and for the public benefit.
- Work with faculty researchers, department chairs, deans and directors to identify promising new technologies developed at the University and encourage their participation in the technology commercialization effort.
- Market, promote, and license the University's inventory of intellectual property.
- Secure the rights to commercially viable discoveries and inventions.
- Negotiate and draft all appropriate contractual agreements related to technology transfer, including confidentiality agreements, materials transfer agreements, license option agreements, and inter-institutional agreements for technologies co-developed and co-owned by other universities.
- Work with the Office of Research Services to negotiate and provide for appropriate intellectual property terms in industry-sponsored research agreements.
- Participate in efforts to assist faculty entrepreneurs in the creation of new companies to commercialize University-owned technologies.
- Conduct ongoing outreach efforts to inform faculty members on all campuses about OTTED services and activities, and technology transfer and commercialization concepts, principles and procedures.
- Conduct ongoing outreach efforts to alert Hawai'i businesses and others about the research capabilities, programs, and technologies available at the University of Hawai'i.

## **Program Accomplishments**

The new technology assessment and licensing strategy that was developed and implemented by OTTED over the past few years is starting to pay off, as is evident from the results of the most recent fiscal year. That approach, which treats patents as economic tools, tends to discourage investments in patents that will not appreciably contribute to the licensability of a technology. Rather, the approach used by OTTED presently focuses on evaluating the true market potential of technologies before making significant investments in patents. To that end, OTTED is filing provisional patent applications on virtually all technologies disclosed by faculty to the Office, but is using the first year after filing to market technologies to potential licensees. Provisional patents, which can be filed for as little as \$100, and more selective patenting practices by OTTED's Licensing Associates contributed to a 50% decrease in patent and legal expenses over a 3 year period.

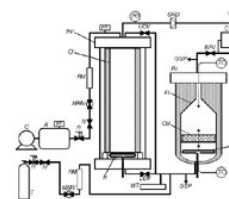
Concurrent with the decrease in overall legal expenses, the level of licensing activity has increased. In FY2004, OTTED signed 21 license or option agreements. While this is down slightly from year-earlier levels, it must be pointed out that this is still well above the goal of 15 licenses or options for the year.

Licensing revenues continued to grow in FY2004 and topped \$800,000 for the year, an increase of greater than 50% over the previous year. However, OTTED remains less focused on licensing revenues, which can fluctuate quite widely from year to year, and more focused on increasing the number of active licenses. Thus, OTTED continued to work diligently to increase the number of active licenses, which grew to more than 70 as of the end of FY2004.

## Several Exemplary Licensing and Other Agreements Executed

### Carbon Diversion, LLC

Carbon Diversion, LLC — a Hawai'i company — was granted an option for an exclusive license for the State of Hawai'i for the Flash Carbonization™ process developed by Dr. Michael Antal of the Hawai'i Natural Energy Institute. Inquiries from other firms, in the US and around the world, are being addressed. Charcoal produced via Flash Carbonization™ has a number of commercial uses, including barbecue charcoal, boiler fuel, filtration, and activated charcoal. The University's licensing approach has been to grant territorial exclusivity with regard to production of Flash Carbonization™ charcoal and non-exclusive rights to sell such charcoal worldwide. The UH is especially interested in licensing arrangements that give UH the opportunity to take an equity interest in its Flash Carbonization™ licensees.



### NovaSol

NovaSol, a Hawaii-based company specializing in the research, and engineering and development of next-generation active and passive optical systems, received an exclusive license to an ultraviolet correlation spectrometer developed by Keith Horton, John Porter, Peter Mouginis-Mark and Harold Garbeil of the Hawai'i Institute for Geophysics and Planetology, and Clive Oppenheimer of the Department of Geology of the University of Cambridge, UK.

This portable instrument, dubbed the *SkySpec™* by NovaSol, is an on-site tool for locating sources of sulphur dioxide emissions, mapping SO<sub>2</sub> concentrations from volcanic plumes and industrial sources, and for correlating other remote sensing systems.



*SkySpec™*

### Athenix

Athenix, a biotechnology startup working to discover and develop novel technologies and processes for the agricultural and chemical industries received a non-exclusive option for two polyubiquitin gene promoters derived from sugarcane that were developed by Heirong Wei of the Department of Molecular Biosciences and Biosystems of the College of Tropical Agriculture, and Heinrich Albert of the Tropical Plant Physiology, Disease, and Production Unit of the USDA's Pacific Basin Agricultural Research Center.



The two gene promoters regulate when a gene expresses a protein conferring a particular trait or function and can be used in a wide variety of plants for incorporating desirable traits—like insect resistance, or heat or cold tolerance—into new cultivars. The promoters have been tested in sugarcane, rice, pineapple, sorghum, garlic, bananas, corn, and other plants and will be used by Athenix to support its ongoing research and development efforts.

### Kyocera Wireless

Kyocera Wireless, a manufacturer of innovative wireless consumer products, received a non-exclusive license to Site Planning Software for Wireless Networks developed by Iskander Magdy, Zhengqing Yun, and Zhijun Zhang of the Hawaii Center for Advanced Communication of the College of Engineering. The



software allows efficient and accurate estimation of the propagation of cellular phone transmissions within buildings and across towns and cities.

### Other Agreements

Forty-five confidentiality agreements (incoming, outgoing, and mutual), three inter-institutional agreements, thirty-eight material transfer agreements, five memoranda-of-understanding, and two testing agreements were executed during the period of this report. These agreements protect the interests of the University in research collaborations and in the commercialization of UH intellectual property.

### Program Activity Indicators and Measures of Effectiveness

<b>Program Activity Indicators</b>	FY 2002-2003	FY 2003-2004
Invention Disclosures Received	28	56
U.S. Patents Filed	26	38
U.S. Provisional Patents Filed	21	26
U.S. Patents Issued	7	11
License/Option Agreements Executed	33	21
Intellectual Property Held (Cumulative)	180	225 <sup>†</sup>

<b>Measures of Effectiveness</b>	FY 2003-2004	FY 2003-2004
Active License/Option Agreements	83	84
Gross License Income Received	\$521,851	\$809,340

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<sup>†</sup> Includes cryptophycin patents donated to UH by Eli Lilly and Co.

# Economic Development

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## Program Profile

### Overall

The goal of OTTED's Economic Development Program is to help Hawai'i businesses and the community gain access to academic, technical, and research expertise at the University of Hawai'i. In cooperation with other State and local economic development organizations, OTTED helps Hawai'i businesses find R&D funding, research partners, student interns, and technical experts at UH.

## Program Objectives and Accomplishments

### Outreach Activities

OTTED's economic development outreach activities complement the licensing activities of the Office and focus on promoting UH research, discoveries and inventions, facilitating University-industry collaborations, and supporting University-based economic development. To meet these objectives, OTTED sponsored several activities in FY2004, including the *Ke Ka'ana 'Ike* UH Faculty Seminar Series, UH Technology Showcase Series, and made two awards in the UH Business Plan Competition.

*Ke Ka'ana 'Ike* (The Sharing of Knowledge) lectures are brown bag events that are open to the UH community as well as the general public, and are held during 8 months of the year on the UH Manoa campus. Faculty members are invited to present an area of their research and discuss the social and academic significance of their work. The event recognizes faculty research accomplishments, brings students, administrators, and researchers together for interdisciplinary interaction, and highlights diverse areas of research ongoing at UH. In FY2004, seminar topics included complementary and alternative medicine, non-invasive biomedical sensors, tracking the migration of sea turtles, sharks, and tunas, interpersonal relationship studies, neutrinos, Egyptian mummies, and genetics research.

In the UH Technology Showcase Series, faculty members and researchers present their UH inventions to Hawaii technology companies, venture investors, and others interested in UH research. It is a semi-annual event started by OTTED in response to inquiries from companies wanting to know about commercially-applicable research projects and opportunities for technology licensing and research collaborations with UH. OTTED, the College of Tropical Agriculture and Human Resources (CTAHR), and the University of Hawaii Foundation co-sponsored OTTED's third showcase event on December 3, 2003. Three CTAHR inventors presented discoveries and inventions in the areas of novel genetic tools to improve color and disease resistance in plants, optical-based high-throughput biotechnology and bioengineering systems, and an anaerobic wastewater treatment system for dairy and food processing operations. They highlighted the commercial applications, advantages, and benefits for users. The event has been successful in leading to discussions with venture investors and companies interested in the technologies presented, and in generating licensing activity. Two of the technologies are now in the process of being licensed.

In the 2004 UH Business Plan Competition, OTTED awarded \$30,000 in cash prizes to two teams with the top business plans for technology invented at UH. The first place winner, Pipeline Communications and Technology Inc., was awarded \$20,000 in addition to the \$25,000 first place prize, and the second place winner, Agri-Wastewater Solution, received a \$10,000 award from OTTED in addition to the \$15,000 it received as the

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second place winner. Winning teams must spend the OTTED awards to advance the commercialization of their respective technologies.

To be eligible for the award, participants were required to prepare a business plan based on a licensable UH technology from OTTED's portfolio. The award was designed as an incentive for teams to enter the competition with business plans focused on commercialization strategies for UH technologies they felt had promising potential. When members of Pipeline Communications and Technology read about advanced antenna technology that provides secure communication, invented by a team of students and researchers in the Electrical Engineering Department, they were enthusiastic about the commercial possibilities, and partnered with the UH inventors to start a business venture that would license commercialization rights from UH. OTTED is currently finalizing its licensing negotiations with the company.

The second place team, Agri-Wastewater Solution, built their business plan around an animal wastewater treatment system co-invented by a UH faculty member and project engineer. Prior to the Business Plan Competition, the technology was also presented to investors and high tech companies at OTTED's UH Tech Showcase in December 2003. However, the Business Plan Competition provided an opportunity for the team, which includes UH students in electrical engineering and economics, to formulate a commercialization plan for the technology and encouraged them to start a company to implement that plan. OTTED is presently negotiating a license with the company.

Based on initial results, OTTED's participation in the Business Plan Competition was a worthwhile and successful opportunity to promote the commercial spin-off of UH inventions to entrepreneurial students and faculty. As a result, UH inventors are involved in two new business start-ups, and the awards given by OTTED are helping get these new ventures off the ground to further develop the technologies to benefit society in the future.

Other events supported by OTTED in FY2004 were the Hawaii SBIR/STTR Conference in November 2003 sponsored by the High Technology Development Corporation (HTDC), and the Pacific Symposium for Science and Sustainability in February 2004, sponsored by the Hawaiian Academy of Science. OTTED staff also put Hawaii and mainland companies in touch with UH researchers to discuss collaboration opportunities, reviewed companies' federal grant proposals and enlisted companies to participate in a grant review program sponsored HTDC, and facilitated partnership agreements between UH researchers and Hawaii companies.

# Financial Allocations

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## Discoveries and Inventions Revolving Fund

### Statement of Cash Balances, FY2003-04

Beginning cash balance, July 1, 2003		1,208,391
Revenues:		
Interest earned on short term TCD's	92,855	
Royalty income	809,340	
Indirect overhead (section 304-8.92(a), HRS)	<u>205,000</u>	
Total Revenues:		1,107,195
Expenditures:		
Technology transfer program	816,479	
Royalty distributions to inventors	<u>393,506</u>	
Subtotal Expenditures		1,209,985
Other Expenditures		
Prepayment to Research Corporation of the University of Hawaii	<u>(256)</u>	
Subtotal Other Expenditures		(256)
Total Expenditures:		1,209,729
Ending Cash Balance, June 30, 2004		<u>1,105,857</u>
Outstanding Obligations, June 30, 2004		
Act 106, SLH 1990 - UH Software Development and Marketing Program	61,317	
Special Projects		
Kauai Tropical Fruit Disinfestation Facility	66,081	
Reserve for vacation pay	<u>45,000</u>	
Total Obligated Funds		172,398
Working Capital		<u>933,459</u>