PARTNERSHIP

STANFORD UNIVERSITY

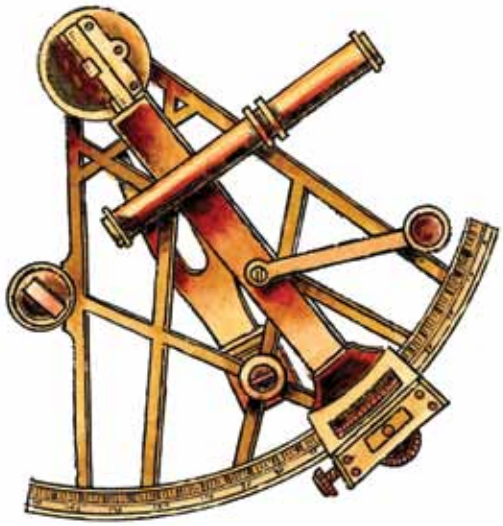
OFFICE OF TECHNOLOGY LICENSING

ANNUAL REPORT

2012

"The sooner we learn
to be jointly responsible,
the easier the sailing
will be."

ELLA MAILLART, SWISS ADVENTURER



All Hands on Deck

WORKING TOGETHER TO TRANSFER TECHNOLOGY

Technology transfer for the benefit of society relies on many important factors, but none are more important than successful partnerships between universities and industry. And given the dramatically different cultures and priorities of academia and the corporate world, creating effective and successful partnerships isn't always smooth sailing.

Universities are open environments that encourage free exchange of information and ideas. We publish our research results rather than keeping them as trade secrets. Students and researchers come and go on our campuses; we welcome visitors from all countries without regard to citizenship. We do not wear badges nor do we have to sign in to be allowed entrance. The faculty set the academic policies for this bottom-up, consensus-driven, non-profit organization. The administration supports the faculty to enable the best research and education possible.

Companies are closed environments, keeping trade secrets and confidential information that are keys to their success. Outsiders cannot freely visit company facilities without permission. The corporate board and the CEO set the policies for the top-down management of a for-profit company. The employees support the company in its goals and objectives for generating revenues from sales of products.

No wonder it is sometimes difficult for universities and companies to forge good partnerships. Yet while we may sometimes feel that we are rowing against the tide, universities and companies need each other to facilitate the transfer of knowledge, ideas, and technology for the benefit of us all. At OTL, we recognize that companies are in the best position to turn the results of research into useful commercial products.

CHARTING A NEW COURSE

The National Academy of Sciences recently issued a report entitled "Research Universities and the Future of America," which advises:

It is essential that the unique partnership that has long existed among the nation's research universities, the federal government, the states, and business and industry be reaffirmed and strengthened. This will require:

- A balanced set of commitments by each of the partners...
- Sufficient flexibility to accommodate differences...
- A commitment to address challenges and take advantage of opportunities.

Further, the National Academy advises that: The relationship between business and higher education should become more peer-to-peer in nature, stressing collaboration in areas of joint interest rather than remaining in a traditional customer-supplier relationship, in which business procures graduates and intellectual property from universities.

PULLING TOGETHER

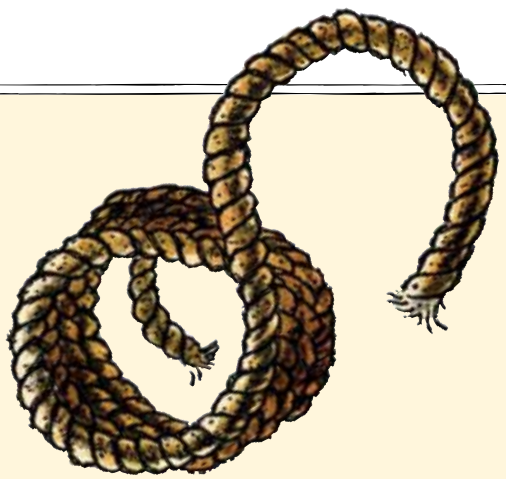
What are the qualities of a good partnership? Equal status between partners, genuine respect, and a commitment to clear communication are certainly key factors. We are proud of Stanford's long history of good industry partnerships through both informal and formal collaborations. Many companies have worked with the University for decades, spawning new businesses and products, collaborating on research and discovery, and educating students to meet the challenges of the future.

For instance, we have 56 Industrial Affiliate programs with 354 members who have a window into current research in areas of interest and access to students who may be future employees. We have many master agreements with companies that wish to fund a series of research projects on campus, as well as individual research agreements for faculty who want to work with particular companies. We also have 1,400 license agreements with companies that take advantage of the intellectual property assets of the University. These relationships all require careful nurturing to flourish.

The US government is encouraging public-private partnerships and consortia that require groups of companies and universities to collaborate on important research. Each company and each university in the consortium has its own culture, interests, and policies, so melding all into one effective research partnership can be a challenge. GCEP, the large, multi-year Global Climate and Energy Project; the Bay Area Photovoltaic Consortium (BAPVC) supported by the Department of Energy and several companies; and the Energy Research Consortium supported by the National Science Foundation, water districts and utility companies each serve as a model for the next consortium, so that over time, we all learn how to weather the inevitable storms that arise when such different cultures clash.

THE BENEFITS OF KNOWING THE ROPES

We find that our best corporate relationships have an active advocate both within the university and the company, enabling both sides to take advantage of what the other has to offer, while troubleshooting when either side hits rocky waters.



A FLEET OF SUCCESSFUL PARTNERSHIPS

PARTNERING WITH FOUNDATIONS

Foundations and other non-profit funding organizations have supported years of promising research with millions of dollars at Stanford thanks to good partnerships. Foundations too have their own missions to contribute to the public good and demonstrate value to their donors, and while we are all non-profit organizations, it sometimes takes work to understand one another's priorities. Getting the most out of inventions, managing royalty expectations and support for infrastructure costs are among the issues that arise between universities and foundations. The Veterans Administration and the Howard Hughes Medical Institute are examples of two such effective partnerships; we are in close communication, we keep them informed about our licensing activities, and we each work hard to understand each other's cultures.

CORPORATE UNIVERSITY RESEARCH PARTNERSHIPS

Lockheed Martin

In an example of a long and productive corporate university research partnership, Stanford's long-standing research relationship with Lockheed Martin (LM) was reinforced with the signing of a new Memorandum of Understanding (MOU) renewing the joint Stanford-Lockheed Martin Institute for Space Research to encourage cooperative relationships in Astrophysics and Space Research. The Stanford-Lockheed Martin Institute for Space Research started in 1986 when Stanford and Lockheed Martin Advanced Technology Center (then called the Lockheed Palo Alto Research Laboratory) signed the original MOU. The MOU was instrumental in facilitating programs such as the Soft X-ray Telescope on the Yohkoh satellite, the Helioseismic and Magnetic Imager (HMI), the Space Dynamics Observatory (SDO), the Joint SDO Operations Center (JSOC), the Interface Region Imaging Spectrograph (IRIS), and the Solar Oscillations Investigation for the SOHO spacecraft, all of which were undertaken as joint efforts.

The most significant partnership between Stanford and Lockheed was on the NASA-funded Gravity Probe-B (GP-B) Science Mission from 1963 to 2008, which at 45 years is the longest-running continuous experiment at both Stanford and NASA.

Lockheed Martin is a long established supporter of Stanford Engineering, with contributions to the Center for Integrated Systems Extension in the early 1990s, The Center for Excellence in Commercial Space Transportation, the Robert E. Gross/Lockheed Aircraft Corporation Fellowship Fund, the Vance D. & Arlene C. Coffman Faculty Scholar Fund, and support for student groups and diversity efforts.

Lockheed Martin has also participated in several affiliate programs, including:

- Aero & Astro Affiliates Program
- Stanford Computer Forum (2009-2011)
- Bio-X Forum Membership (2009)
- Stanford Center for Position, Navigation, and Time Affiliates Program

STANFORD HAS
56
INDUSTRIAL AFFILIATE PROGRAMS

STANFORD'S PARTNERSHIP WITH LOCKHEED MARTIN PRODUCED THE LONGEST-RUNNING CONTINUOUS EXPERIMENT AT NASA:
45
YEARS

Samsung Electronics
Samsung Electronics has been one of our most prolific research and licensing partners of late. Samsung Advanced Institute of Technology (SAIT) is collaborating with Stanford on several projects and has licensed patents in a variety of fields from Stanford. In addition, Samsung is looking forward to collaborating even more with Stanford, with its newly established Samsung Strategy and Innovation Center (SSIC) and Open Innovation Center (OIC) in Silicon Valley, which aims to build closer relationships with the technology and innovation ecosystem in Silicon Valley.

Energy & Environment Affiliates Program
The three-year-old Energy & Environment Affiliates Program brings industry and university faculty together in energy, environment, materials, chemistry, and sustainability research. The program offers a portfolio of events, including semi-annual conferences and a seminar series featuring new faculty. The Fall 2011 conference focused on advanced materials for energy and environmental applications. Topics ranged from new catalysts for sustainable energy to nanoscale materials for water purification. The Spring 2012 conference explored sensing and sensors in harsh environments. One current research initiative is focused on the convergence of sensors, big data, and climate change.

As a result of these effective partnerships, we have an increasing number of joint inventions with our corporate partners. These joint inventions arise from research collaborations or visiting scientists who participate in the research at Stanford. We often work out a relationship with our joint-owner partner so that each can use the invention for its own purposes.

COMMERCIALIZATION PARTNERS

Our longest partnerships are often with our licensees because the relationships span years, from the beginnings of an invention to the sale of products in the marketplace. As innovations are under development, market conditions often change or unexpected technical challenges arise. We often say that a successful agreement and partnership is renegotiated and renewed regularly over the 20-year life of a license. The commitment to "make it work for both parties" over the long haul is what makes for a productive relationship, and at OTL we are willing to make that commitment.

Transfer Devices, Inc.
Our relationship with Transfer Devices, Inc. (TDI) has been a long one, as we have worked with founder Dr. Chuck Schaper on developing licenses consistent with the business strategy for his start-up, which was initially formed in 2004. His invention has many possible applications, and while there were too many for a young company to handle at once, it was unclear which application would enable the business to grow significantly. Consequently, to see how the company would progress, OTL gave TDI enough rights to pursue different applications through four licenses in different fields of use, some exclusive, with the understanding that as the business developed, TDI could possibly acquire more rights. Dr. Schaper

"IF ONE DOES NOT KNOW
TO WHICH PORT ONE IS SAILING,
NO WIND IS FAVORABLE."

SENECA, ROMAN PHILOSOPHER

has been tenacious. He initially addressed a niche application in photonics to prove that the technology was capable of producing differentiated real commercial products. Recently he has partnered with a major semiconductor company that will enable TDI to make major contributions to the industry by manufacturing novel high performance products. We have renegotiated the TDI agreement three times.

Chronic Disease Management Programs

One of our most successful long-term academic partnerships has been with Professor Kate Lorig and the licensing of her Chronic Disease Management Programs for diabetes, arthritis, pain, cancer and many other diseases. OTL works closely with the Lorig team to license academic and governmental entities and commercial companies who wish to offer the program in over 20 languages to patients throughout the world. A clickable map of the US and other countries with lists of organizations that are licensed (now in China and quite a few sites in Hong Kong) can be found at http://patienteducation.stanford.edu/organ/cdsites.html.

Five years ago we formed a partnership with the National Council on Aging (NCOA) to commercialize the online versions of the workshops, which are now being offered by health plans and employers in the US and health services organizations in the UK and Canada. We are in constant communication with Professor Lorig and the NCOA so that we can balance academic and patient care goals with commercialization. In order to simplify licensing, we set up an e-commerce capability with ready-to-sign agreements and credit card payments so that Stanford can collect and track small royalties associated with certain users. Other entities can negotiate individual licenses suited to their specific needs. Over the 14 years of this licensing program, we have worked with over 90 entities and generated approximately $1M dollars in cumulative revenue.

Becton, Dickinson and Company

From the early days of the Fluorescence Activated Cell Sorter license in 1972 to the phycobiliprotein license of 1982 to the latest research reagent license in 2012, Becton, Dickinson has entered into 28 licenses with Stanford. These technologies, commercialized by BD, have enabled significant leaps in the scientific and medical communities' understanding of cellular biology, disease, and immune function. They have enabled researchers to accelerate their understanding of disease and, in the hands of clinicians, have improved diagnosis and disease management for diseases such as HIV/AIDS, leukemia, and lymphoma.

Intel

While semiconductor companies may have varying perspectives on university research and licensing, Stanford's excellent relationship with Intel has been a bright spot. Over the years, Intel has supported numerous Stanford Fellowships, entered into more than 30 research-related agreements with Stanford, and licensed many inventions through OTL. The company was one of the first subscribers of the Engineering Portfolio of Inventions for Commercialization program (known as EPIC), in which Stanford offered participants the option to take fixed-

CHRONIC DISEASE MANAGEMENT PROGRAMS HAVE GENERATED

$1M

OVER 14 YEARS

STANFORD HAS ENTERED INTO

28

LICENSES WITH BECTON, DICKINSON

INTEL HAS ENTERED INTO

30

RESEARCH-RELATED AGREEMENTS WITH STANFORD

priced, nonexclusive licenses to certain categories of patents, a prime example of the university and industry coming together to find a mutually agreeable licensing model and of OTL's continued efforts to implement innovative technology transfer solutions.

Life Technologies

Life Technologies has been a Stanford commercialization partner since 1989. As their business has expanded from research tools to molecular diagnostics to applied markets, so has Life Technologies' partnership with Stanford. Life Technologies and its acquired companies have concluded more than fifty licenses to date and continues to be a key partner for commercialization of Stanford innovations. Other companies such as eBioscience, Biolegend, Santa Cruz Biotechnology, Inc. are consistent licensees of Stanford research reagents.

Xenogen

Our partnership with Xenogen has been an interesting and fruitful saga. Originally a start-up company founded by Professor Chris Contag, Dr. Pam Contag, and Professor David Benaron around a technology to detect light originating from a mammal, Xenogen entered into an Option Agreement in 1996. Xenogen took four years to develop animal models, engineer optical hardware and software, and test products with customers. Xenogen began selling its IVIS products in 2002 and broadly out-licensing the technology in 2004. Xenogen also completed an initial public stock offering in 2004 and a successful merger with Caliper Life Sciences in 2006. At the end of 2011, Caliper was acquired by PerkinElmer. PerkinElmer is now our licensee and continues to develop and distribute the Xenogen IVIS Systems.

Picarro

Founded in 1998, Picarro was originally based on work done in Professor Richard Zare's laboratory on cavity ring-down spectroscopy, a highly sensitive technique that enables measurement down to the parts per trillion level. Dr. Barbara Paldus, an inventor, became the CTO of the start-up, originally called Informed Diagnostics, Inc. The company spent many years developing the technology but they were looking for an application that could meet a significant market need. Informed Diagnostics became BlueLeaf Networks when the company decided to focus on the telecommunications market. But in the market downturn, BlueLeaf had to change direction and eventually also changed its name to Picarro. Picarro has found its place in the sun, pioneering a unique intersection of hardware, software, and cloud-based computing unlike anything being done today, transforming how world-class scientific and regulatory compliance measurements are made, and, more importantly, who makes them. Picarro instruments were at the 2012 Olympics in London, measuring the air pollution in the city. The company received the World Economic Forum 2012 Technology Pioneer award and is now the leading provider of stable isotope and gas concentration measurement instruments and geo-informatics to the science community.

LIFE TECHNOLOGIES HAS CONCLUDED OVER

50

EXCLUSIVE AND NON-EXCLUSIVE LICENSES WITH STANFORD

THE 17-YEAR STANFORD/ XENOGEN PARTNERSHIP HAS RESULTED IN

1

LICENSE TO 3 SUCCESSIVE COMPANIES

PICARRO'S TECHNOLOGY CAN MEASURE

500

PARTS-PER-TRILLION OF METHANE GAS IN LESS THAN ONE SECOND

FORGING OTHER KEY PARTNERSHIPS

WITH UNIVERSITIES

Our researchers collaborate with researchers from other universities or research institutes all over the world. We often enter into master collaboration agreements that detail the contributions and expectations of both parties. In addition, we have jointly owned inventions in which one party takes the lead in patenting and licensing decisions. These InterInstitutional Agreements (IIA's) are widespread among the non-profit sectors and help enable efficient handling of joint intellectual property. Many of Stanford's licensed inventions are jointly owned, including this year's biggest royalty producer: the Functional Antibody technology invented by Professor Sherie Morrison, then of Columbia University, and Stanford researchers Professor Len Herzenberg and Dr. Vernon Oi, and licensed to Johnson & Johnson. In this case, Columbia has taken the lead in a very strong partnership with Stanford.

Because we have many research relationships with various faculty from the University of California system, we have many IIA's with the UC campuses. We work collaboratively with the intellectual property and research policy group at the University of California Office of the President to exchange information and share best practices.

Finally, we belong to the IvyTech university technology group, the Industrial Contracts Officer Network, and to the University Industry Working Group because we believe strong relationships with our sister institutions help us accomplish our mission.

WITH PROFESSIONAL ORGANIZATIONS

Our staff is actively involved in leadership positions within the Association of University Technology Managers (AUTM) and the Licensing Executives Society (LES). Last year, we were on the Board of Governors of the Certified Licensing Professional organization and the Board of Biotechnology Industry Organization (BIO). We all often speak at conferences and to visitors within and outside the US.

WITH ENTREPRENEURIAL GROUPS

We have close relationships with Stanford entities in the entrepreneurship space: Stanford Entrepreneurship Network, SPARK, Biodesign, Coulter Program, etc., and we actively participate with these groups to support entrepreneurship.

StartX was started by Stanford students to accelerate the development of Stanford's entrepreneurs through experiential education. Many Stanford start-ups, licensed through OTL or started independently of Stanford, are taking advantage of the StartX's benefits of mentorship. At OTL, we want our start-ups to succeed so any advice and mentorship that helps them is terrific.

ON AN INTERNATIONAL SCALE

We are also expanding our horizons with potential partnerships in other parts of the world. With Stanford's newly established Center at Peking University, it makes sense to explore partnerships with Chinese organizations, both corporate and academic. We are working with a Chinese company to translate our website into Chinese. In addition, we are exploring possibilities with Peking

THERE ARE
31
MEMBERS OF STANFORD'S ENTREPRENEURIAL NETWORK

STANFORD PARTNERS WITH MORE THAN
65
UNIVERSITIES

University to fund translational research focused on practical applications of research in China as well as the US.

WITH OTHER STANFORD ORGANIZATIONS

Our partnerships within the University continue to be strong. We work closely with the Office of Sponsored Research whose administrative functions are synergistic with ICO's; with the General Counsel's Office for legal advice; with Export Compliance for questions regarding export regulations and with the Dean of Research for academic policy guidance. Most important, we strive to be good partners with our faculty to enable them to work with companies in both research and commercialization capacities. The key to our successful internal partnerships is that we believe in keeping people well-informed with regular communication.

Begun as a pilot in 2011, The Stanford Innovation Farm (iFarm) Team program draws upon Stanford's culture of innovation and its community of innovators, including students, faculty, alumni and subject-specific experts. The aim of the program is to provide participants with an educational entrepreneurial experience by helping OTL advance the commercialization of certain Stanford inventions. In 2012, two iFarm teams were formed around two technologies. These teams did a "deeper dive" into the technologies, producing in-depth marketing reports and commercial feasibility assessments. One team has extended their original six-month program commitment and is studying plausible business models. We have continued the program with 5 teams being formed in 2013.

FULL SPEED AHEAD

All of our many partnerships are important to us. We stay connected, we keep the lines of communication open and frequent, we are flexible and we respect our partners in our mutual desire to move research and commercialization forward for society's benefit. Come cast off with us!

"IT IS NOT THE SHIP
SO MUCH AS THE SKILLFUL SAILING
THAT ASSURES THE PROSPEROUS VOYAGE."

GEORGE WILLIAM CURTIS, WRITER

All Boats Rise

THE YEAR IN REVIEW

Stanford received $76.7M in gross royalty revenue from 660 technologies, with royalties ranging from $5.32 to $51M. Ninety-eight percent of the income came from licenses signed many years ago. Thirty-six of the 660 inventions generated $100,000 or more in royalties. Five inventions generated $1M or more. We have evaluated 504 new invention disclosures this calendar year, and concluded 115 new licenses. Of the new licenses, 60 were nonexclusive, 33 were exclusive, and 22 were option agreements.

ROYALTY DISTRIBUTION

Stanford's royalty-sharing policy provides for the distribution of cash net royalties (gross royalties less 15% for OTL's administrative expenses, minus direct expenses) to inventors, their departments, and their schools. In 2011-12, inventors received personal income of $19.5M, departments received $19M, and schools received $16.9M. The University assessed an infrastructure charge on the department and school shares of royalty income.

We contributed $1M to the University General Fund and $1M to the OTL Research Incentive Fund, which is administered by the dean of research for the support of early-stage, innovative research ideas, novel interdisciplinary research, cost sharing of shared instrumentation, and other research facilitation needs. With respect to liquidated equity, we transferred $434,023.14 to the Dean of Research for the OTL Research Fund and $301,341.46 to the Vice Provost Graduate Education for the VPGE/OTL Graduate Education

Fund. Stanford also paid the University of California and other organizations $771,189 for jointly-owned technologies for which Stanford has licensing responsibility.

EXPENSES

OTL spent $8.7M on patent and other legal expenses, of which $3.1M was reimbursed by licensees. We have an inventory of $18.8M, which represents patent expenses for unlicensed inventions. Our operating budget for the year (excluding patent expenses) was $6.6M.

We take a financial risk each time we decide whether or not to file for a patent. In this period of tremendous change in the intellectual property landscape as court cases determine new patent law, we must weigh the likelihood of licensing a technology versus the expense of patenting or litigation.

EQUITY

As of August 31, 2012, Stanford held equity in 124 companies as a result of license agreements. The market for initial public offerings was slow this year and share prices were down. For institutional conflict-of-interest reasons and insider trading concerns, the Stanford Management Company sells our public equities as soon as Stanford is allowed to liquidate rather than holding equity to maximize return. This year, we received equity from 17 start-up companies. We also received $1,230,502.67 in liquidated equity from 4 other companies.

START-UPS

While Stanford entrepreneurs are still starting companies, the uncertain economy clearly affects the Silicon Valley entrepreneurial ecosystem. Venture capital investors are generally shying away from early stage technology. Yet we licensed these companies: ALDEA Pharmaceuticals, Annexon Inc., Atreca, Inc., Blueprint Genetics Oy, Bonsai Development Corp., Circuit Therapeutics, Inc., Eve Biomedical, Inc., Gaster-Hall Technologies, HeartVista, Inc., Inception 3, Inc., Inscopix, Inc., Miret Surgical, Moleculo, Inc., Organ-I, Inc., Pathogenica, Inc., Pelfunc, Inc., and Root3 Technologies, Inc.

NEW DISCLOSURES

In calendar year 2012, we received over 504 new technology disclosures. Approximately 40% were in the life sciences and 60% were in the physical sciences, including computer science technologies and medical devices.

STANFORD TRADEMARK ENFORCEMENT FUND

The chief financial officer and general counsel of Stanford recommended that Stanford provide a permanent source of funding for extraordinary cases associated with the protection of the Stanford name and associated trademarks. Based on their recommendation, the president and provost approved the creation of the Stanford Trademark Enforcement Fund (STEF). Funding for the STEF comes from 1% of the department and school shares of net revenue OTL receives. In 2011-12, we transferred $415,007 to STEF for a total to date of $3,397,940. Because the fund has

$76.7M
IN GROSS ROYALTY REVENUE FROM
660
TECHNOLOGIES

$1,230,502
IN LIQUIDATED EQUITY FROM 4 COMPANIES

reached the amount originally intended when established, beginning FY13 OTL will receive the 1% to offset the expected increased filing expenses associated with the new America Invents Act Patent Law, described below.

BIRDSEED FUND

The OTL Birdseed Fund, administered by the dean of research, has provided small amounts of money (typically up to $25,000) to fund prototype development or modest reduction-to-practice experiments for unlicensed technologies. In 2012-13, this fund will be expanded significantly to provide more funding for prototype development, proof of concept and specific translational development activities.

TRIBECA AWARD

The 2012 Tribeca Film Festival co-founders Craig Hatkoff and Clayton Christensen and the Disruptor Foundation hosted its Third Annual Tribeca Disruptive Innovation Award ceremony in New York City. OTL was among the 29 honorees chosen for our innovative way of looking at – and often dramatically changing – the world we live in. In particular, OTL was recognized for over 40 years' history of "wrapping innovative business models around inventions that maximize the reach of technology." Among the other honorees were singer Justin Bieber for his YouTube-based rise to fame, actor Ed Burns for making the film Newlyweds on a shoe-string, the DARPA "hummingbird" prototype nano-drone, and Jack Dorsey, founder of Twitter and Square.

UNPATENTED BIOLOGICAL MATERIAL

Licensed biological materials – cell lines, mice, etc. – often get overlooked. Yet these biological materials have been a steady source of licensing income for many years. We currently have 179 active invention disclosures for biological material. Of those dockets we are actively marketing 119 of which 83 have been licensed. Among these 83 there are 334 active licenses, including 245 that are royalty bearing and 89 that are fully paid. Overall, we have entered into a total of 574 licenses through our biological materials licensing program, generating a cumulative $37,500,000 in royalties.

AMERICA INVENTS ACT (AIA)

On March 16, 2013, the first-inventor-to file provision of the America Invents Act took effect. This aspect of the new patent law will have the greatest impact on Stanford researchers since we will essentially move to a first-to-file system in the US. The practical ramification for OTL and inventors is that OTL will only file patent applications prior to any public written disclosure of the invention. So inventors should be aware that they should disclose to OTL before publication if they wish to seek patent protection for an invention.

504
NEW TECHNOLOGY DISCLOSURES

115
NEW LICENSE AGREEMENTS

60
NON-EXCLUSIVE

33
EXCLUSIVE

22
OPTION AGREEMENTS

STANFORD RECEIVED EQUITY IN

17
NEW START-UPS

OTL inducted seven new inventions to the OTL Hall of Fame, for a total of 17 inventions out of over 9,200 cumulative inventions received. These Hall of Fame inventions have generated over $5M each in cumulative royalties to date. The first two digits of the docket number (Sxx-xxx) indicate the year the invention was disclosed, and provide a reminder of how long it can take an invention to generate significant royalties.

S79-066
MOUSE ANTI-HUMAN HYBRIDOMAS
DEVELOPED BY RON LEVY AND LOIS LAMPSON

S81-035
OPTIMIZATION SOFTWARE (MINOS ET AL)
DEVELOPED BY MICHAEL SAUNDERS, WALTER MURRAY, PHILIP GILL, BRUCE MURTAGH AND MARGARET WRIGHT

S82-028
METHOD AND APPARATUS FOR MEASURING FLOW
DEVELOPED BY MARK YELDERMAN

S87-012
AMPLIFICATION OF NUCLEOTIDE SEQUENCES
DEVELOPED BY JOHN BOOTHROYD, JAMES BURG AND PHILIPPE POULETTY

S93-097
MICROARRAYS
DEVELOPED BY PATRICK BROWN AND DARI SHALON

S94-044
DETECTING LIGHT FROM A MAMMAL
DEVELOPED BY CHRISTOPHER CONTAG, PAMELA CONTAG AND DAVID BENARON

S96-213
HYPERTEXT SEARCHING
DEVELOPED BY LARRY PAGE AND SERGEY BRIN

Smooth Sailing

INDUSTRIAL CONTRACTS OFFICE

Within OTL, the Industrial Contracts Office (ICO) specializes in research agreements with industry.

In FY12, ICO finalized 139 new industry-sponsored research agreements, where companies provide funding for, and sometimes collaborate on, research projects in Stanford laboratories. The School of Medicine accounted for just over 40% of the sponsored research agreements and the School of Engineering accounted for slightly less than 40% of these agreements. With 11 new sponsored research agreements, the School of Earth Sciences accounted for a growing proportion of the total. The rest of the agreements were in the School of Humanities and Sciences, School of Education, the Graduate School of Business, and the Independent Laboratories.

Among other agreements ICO finalized, Material Transfer Agreements (MTAs) continued to account for the largest number, with about 470 new MTAs for incoming materials and 80 outgoing MTAs. Another 20 agreements were for outgoing human tissue transfers.

139
NEW
INDUSTRY-SPONSORED
RESEARCH AGREEMENTS

- **40%** SCHOOL OF MEDICINE
- **40%** SCHOOL OF ENGINEERING
- **10%** EARTH SCIENCES
- **10%** SCHOOLS OF H&S, EDUCATION, BUSINESS AND INDEPENDENT LABORATORIES

Other ICO agreements included more than 100 amendments to existing agreements, plus new collaborations, data sharing agreements, equipment loans, NDAs, and other research-related agreements. ICO also handles agreements for Industrial Affiliates programs.

MASTER AGREEMENTS

Companies and university researchers typically are eager to start new research programs as quickly as possible. To this end, Stanford encourages master sponsored research agreements, with 37 currently, including some new and others in place for 10 years or longer. In FY12, ICO negotiated a master sponsored research agreement with Ford Motor Co. Ford is currently identifying projects to support under the master agreement. Ford also is supporting the Center for Automotive Research at Stanford (CARS) Industry Affiliates program.

Siemens Medical Solutions has long supported research at Stanford. Currently, Siemens is working with Professor Rebecca Fahrig in the Radiology Department on C-arm computed tomography (CT) image quality and expanding its clinical applications. Siemens is also supporting two projects in the Radiation Oncology department: Professor Dimitre Hristov's research on motion evaluation and modeling for quantification of positron emission therapy (PET) and perfusion CT as imaging biomarkers in response to therapy, and Professor Elizabeth Kidd's research on perfusion CT for cervical cancer.

Looking forward, Stanford and Siemens will be collaborating on two significant projects. A state-of-the-art Siemens Flash CT Scanner will be installed in the Lucile Packard Children's Hospital. This scanner offers ultrafast scan speed at a substantially reduced radiation dose. Both are technical features beneficial for pediatric patients. Professors Frandics Chan and Richard Barth in the Radiology Department will investigate use of this scanner in children without sedation or anesthesia to evaluate radiation dose reduction in pediatric cardiovascular CT scans, and to assess pulmonary perfusion using dual-energy CT technique. It is hoped that the results from these projects will significantly improve safety for children.

Professor Dominik Fleischmann in the Radiology Department will look at developing, validating, and implementing novel tools for optimizing contrast medium injections for cardiovascular CT. Accurate modeling of contrast dynamics, integrated with technical parameters, and individual patient factors (such as body size, cardiac output, renal function, IV access) will allow patient-specific individualized injection protocols for sub-second cardiovascular CT. Professor Fleischmann will also explore the potential of dynamic contrast enhanced CT for predicting the treatment response of various solid organ tumors to radiation therapy, chemotherapy, and treatment with anti-angiogenesis agents.

470
NEW MATERIAL TRANSFER AGREEMENTS

37
ONGOING MASTER SPONSORED RESEARCH AGREEMENTS

ICO HAS WORKED WITH
137
COMPANIES OVERALL

OTHER RESEARCH EFFORTS: FROM SMART CARS TO GENE SEQUENCING

Companies in a wide range of industries fund research at Stanford. Among the other agreements negotiated by ICO during the year, Professor Clifford Nass in the Communications Department received funding through Toyota Motor Corp.'s Collaborative Safety Research Center to develop a set of psychological principles that will guide the design of a driver-vehicle interface that provides effective, real-time support for drivers of a partially intelligent vehicle.

The Discovery Channel funded Professor Barbara Block at Stanford's Hopkins Marine Station to support an ongoing project tagging lamnid (great white, salmon and mako) sharks off the California coast to track shark migration patterns.

Professors Dolly Tyan and Matthew Anderson in the Pathology Department received funding from Life Technologies Corporation to develop human leukocyte antigen (HLA) applications using next-generation sequencing. The major histocompatibility complex (MHC) is the most important genomic region for clinical transplantation. Genes within the MHC encode HLA proteins, key molecular determinants of the adaptive immune response and the major immunologic barrier to successful solid organ and bone marrow transplantation. As HLA genes are the most polymorphic in the human genome, accurate HLA genotyping is essential to determine compatibility between donors and patients and reduce the risk of transplant rejection or graft versus host disease.

"A SHIP IN PORT IS SAFE, BUT THAT'S NOT WHAT SHIPS ARE BUILT FOR."

GRACE MURRAY HOPPER, US ADMIRAL & COMPUTER SCIENTIST

IN MEMORIAM

Jon Sandelin worked at OTL from 1984 to 2006 as a Senior Licensing Associate. He was instrumental in establishing excellent long-term working relationships with many of our licensees in the early years of OTL when we were just starting to grow. In particular, he worked closely with GE to enable broad research and licensing relationships at Stanford. As the Associate with responsibility for the physical science inventions, he identified the commercial potential for carbon nanotubes, the scanning acoustic microscope, laser/optical inventions, and atomic force microscopy. He also managed the OTL emblematic licensing program from 1987 to 1999.

He will be fondly remembered for his time spent as a mentor to new staff members, his independence, his love of travel, his booming voice, his athletic prowess at tennis and golf and for choosing not to wear shoes in the office.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