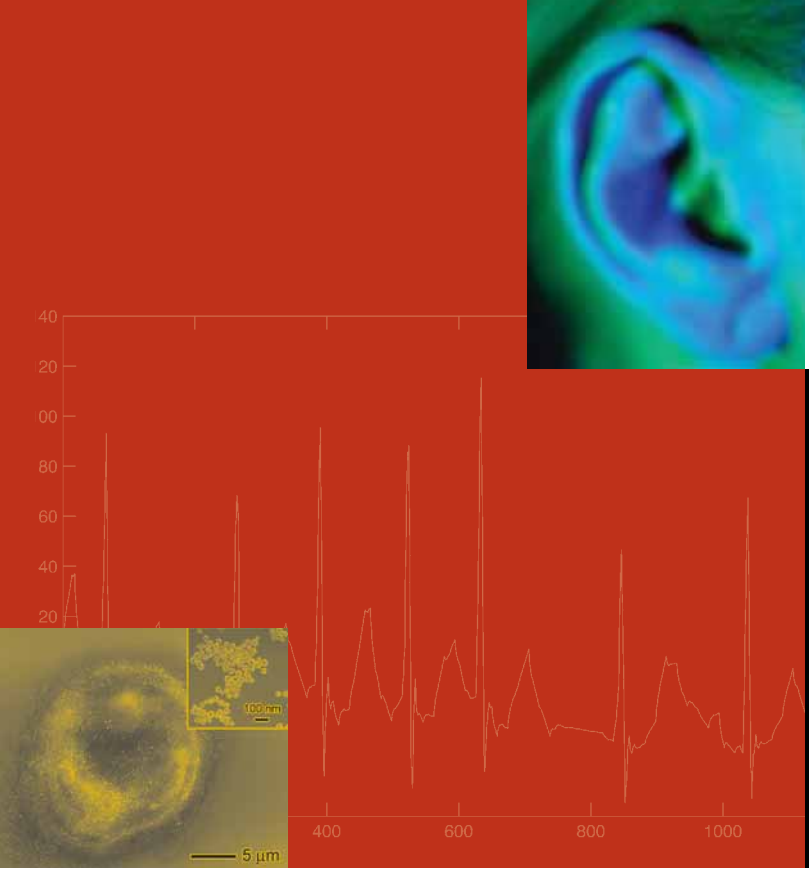

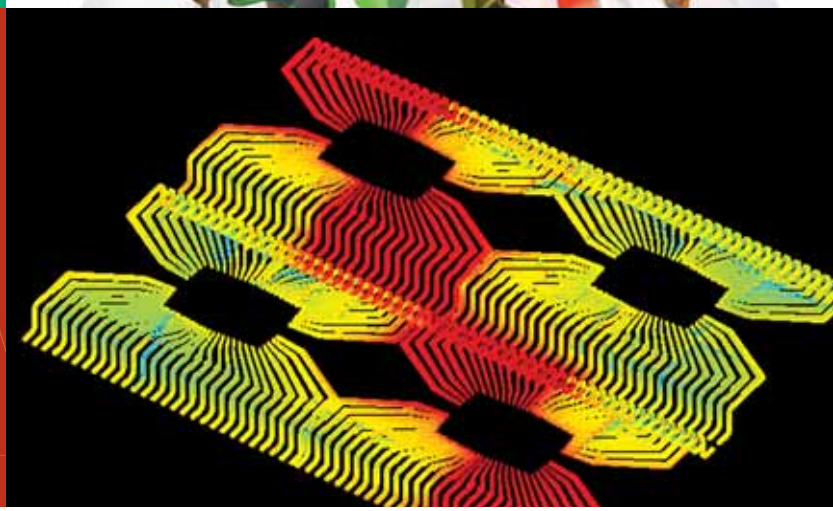

FY2005 ANNUAL REPORT

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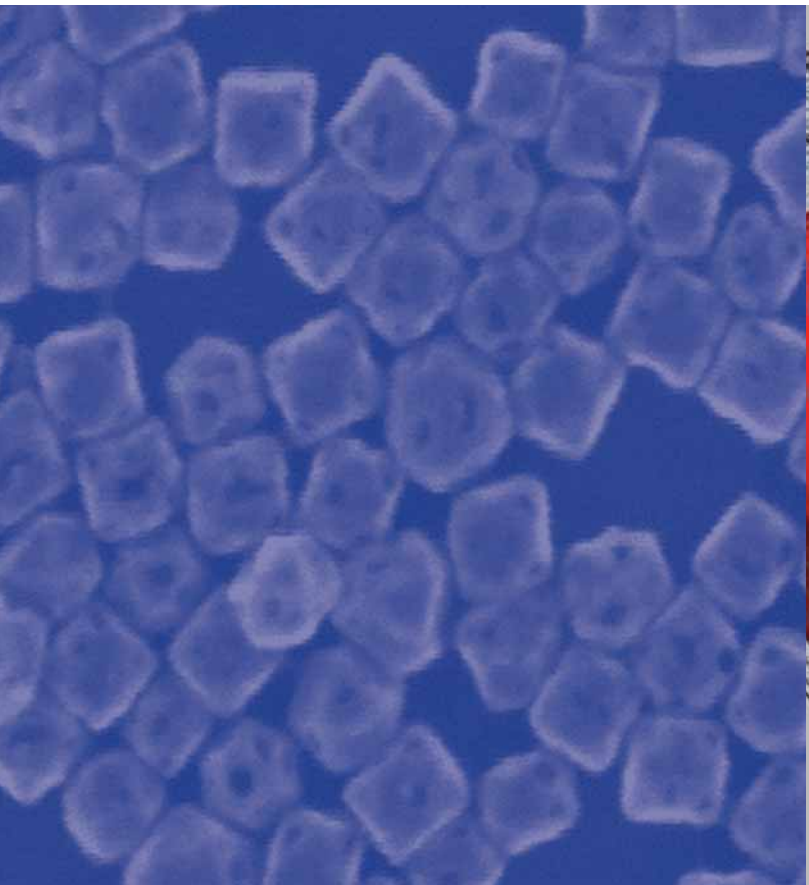

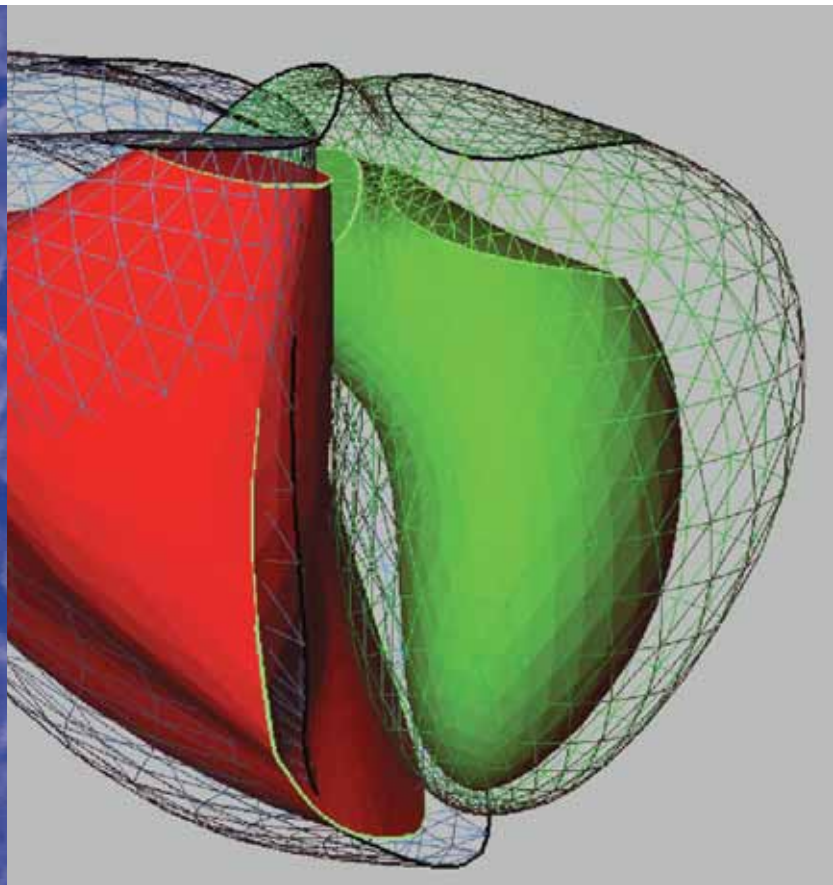

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WELCOME FROM THE VICE PROVOST

Welcome to the UW TechTransfer Annual Report for fiscal year 2005. This year's report highlights initiatives that invest in the further development of promising innovations.

UW TechTransfer continues to explore new models for the development, and transfer for development, of promising innovations. The external environment for the development of early-stage innovations and discoveries, UW's stock-in-trade, is evolving. Firms and individuals who in the past have invested in the development of early-stage discoveries are shifting to less risky investments. We are in a continuous evaluation of our current approaches and we seek new avenues for technology transfer to compensate for this shift in investment and to maintain a flow of new discoveries from the University into commercial development. The examples that are presented here represent the start of that effort.

We are exceptionally pleased to feature the results of our first year of the Technology Gap Innovation Fund (TGIF). This program extends the long-standing and productive collaboration between the University of Washington (UW) and the Washington Research Foundation (WRF) to seek commercial outcomes from UW research. This fund, created with a portion of the University's royalty proceeds and a gift from WRF, has generated significant interest from the UW research community.

One feature of the TGIF program, final review of projects by a committee of external experts, has reinforced the focus of the program on the commercial development of innovations. Review of projects by outside experts has deepened the relationship between the UW and the local business community by reinforcing networking connections and providing mentoring for researchers who have received funding under this program.

A second funding program, Project Budgets, has been used by UW TechTransfer Digital Ventures for several years with very positive results. This option for researchers puts royalty proceeds back into the project lab for the further development of the innovation.

The Waiver/Match Program is a novel feature that was added to UW Patent Policy when revisions were implemented in 2003. In this one-of-a-kind program, University developers can opt to return their personal share of revenue from an innovation to a research account and have that amount matched by the University. UW developers are beginning to take advantage of this feature. The drafters of the revisions in the UW policy are to be congratulated for their creativity and foresight in designing a program that funnels resources back into the laboratories that developed revenue-generating ideas.

While in this report we present the metrics that are typically associated with technology transfer, we are pleased to note a significant increase again this year in invention and software disclosures received from UW researchers. Disclosures reached 268 in FY05. UW has achieved a 15% average increase in disclosures in each of the last two years. This is significant progress in the rate of new ideas coming from the laboratories of the UW research community.

I look forward to any questions or comments that you might have regarding this report and the activities of UW TechTransfer.

Sincerely,

James A. Severson, PhD
Vice Provost, Intellectual Property and Technology Transfer

INVESTING IN INNOVATION:

TECHNOLOGY GAP INNOVATION FUND (TGIF)

In 2004, UW TechTransfer partnered with the Washington Research Foundation (WRF) to create a new funding source for UW innovations that are commercially promising, but need a way to bridge the gap between academic research and full-fledged commercial product or service. What resulted was the Technology Gap Innovation Fund (TGIF), a program that is at the heart of UW TechTransfer's overarching goal: moving UW innovation into the public sector to benefit society by providing goods, services, healthcare, and jobs. The UW provided funds for the TGIF from the Royalty Research Fund, and the WRF provided a gift, for a total of $750,000 per year for TGIF project support.

TGIF provides up to $50,000 to UW projects to develop prototypes or further refine technologies to make them commercially viable. The funds are awarded twice a year to a diverse set of projects, and UW TechTransfer has already seen positive signs that the program works: several of the projects awarded TGIF funds in the first round have already signed commercial license agreements with companies.

THE FOLLOWING ARE PROJECTS FUNDED BY THE TGIF IN ITS FIRST YEAR, WITH COMMENTS FROM THE INNOVATORS ON WHAT THE TGIF AWARD MEANT FOR THEIR PROJECTS.

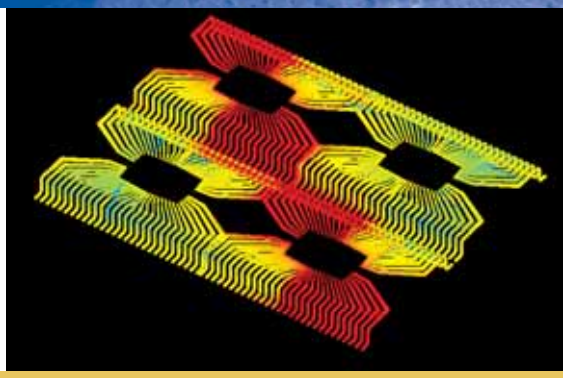
- John W. Gastil of Communication and John D. Wilkerson of Political Science are the authors of the popular simulation software *Election Day* and *LegSim*. They will repackage and reversion the software into *Desktop Democracy*, an interactive software package designed to give high school students true-to-life experiences in the electoral and legislative processes. Gastil said the TGIF funds were used to create educational and marketing materials and hire programmers to write code.

- Maya Gupta of Electrical Engineering is working on improving image quality on fast printers. "Our work combines understanding of color images, printer hardware, and the human visual system to develop fast and sharp printed images. The TGIF grant has enabled us to go from theory to practice, and prove and adjust our ideas for realistic conditions," Gupta said.

- Vikram Jandhyala of Electrical Engineering has designed a unique suite of simulation software, called PILOT, for designing micro- and nano-electronics. "PILOT simulator technology, developed at our Applied Computational Electromagnetics Lab, has the potential to revolutionize the design and analysis of future micro- and nano-electronic systems on chips," said Jandhyala. "The TGIF funding is a critical piece that enables us to direct resources toward developing PILOT interfaces and frameworks that are directly usable by designers and end-users. We are very excited about this capability being made available thanks to TGIF funding."

- Alex Jen of Materials Science and Engineering is using TGIF funds to develop a prototype white light-emitting diode device made of thin films of organic polymers. This revolutionary, highly energy-efficient and bright lighting can be deposited on glass, ceramics, and even flexible plastics. Jen is working with a company interested in licensing and further developing the technology. "This scientific-business development would be difficult to achieve without the help of the TGIF fund," Jen commented.

DESKTOP DEMOCRACY



- Vipin Kumar of Mechanical Engineering is developing and testing prototype microcellular vinyl siding, which uses less material and is a better insulator than traditional vinyl siding. The prototypes will be used in demonstrations to potential licensees. "For us the TGIF support will come at a critical point in our efforts to move this technology toward realizing its commercial potential," said Kumar.

- Robert M. Sweet of Urology has developed a virtual simulator to train new surgeons on a common procedure to treat enlarged prostate. "The TGIF funds were vital to our project," Sweet said. "They allowed us to complete development and rapidly license our product. TGIF got us through the 'Valley of Death' so common in technology projects."

- Wei-Chih Wang and Per Reinhall of Mechanical Engineering are developing a prototype electro-optic imaging system whose small size will render medical procedures such as endoscopies much less invasive.

- Miqin Zhang of Materials Science and Engineering and the UW Engineered Biomaterials program (UWEB) is using TGIF funds for the construction of a novel biomaterial for the repair and regeneration of bone. "The TGIF award allows us to conduct prototype experiments for the commercialization of a novel ceramic/thermogel hybrid scaffold for load-bearing and large bone defect repair," said Zhang.

MONITORING

Atrial Fibrillation

LONG TERM

While atrial fibrillation (AF) is the most common type of abnormal heart rhythm (up to 9% of the population experiences it in some form), it can be one of the most difficult conditions to diagnose. The difficulty has been due, in part, to an inability to measure heart rhythms long term. Now, UW cardiologists David Linker, Associate Professor of Medicine, and Robert Rho, Assistant Professor of Medicine, have invented a simple, portable device that monitors AF long term but doesn't require a large amount of computer memory. The device will give physicians a more accurate picture of atrial activity and will likely lead to improved treatment regimens. Linker and Rho received TGIF funds from UW TechTransfer to support the development of a prototype monitor.

AF is complicated because it presents in several different ways. Some patients experience symptoms such as heart palpitations, shortness of breath, or chest pain; these patients are diagnosed quickly and easily with an electrocardiogram (ECG). But some patients have AF only intermittently and may not have any symptoms. These patients are difficult to monitor accurately because currently available devices store only one or two days of heart rhythm data, giving physicians only a tiny window into the heart's activity.

Because physicians are not seeing the complete picture, a patient with long episodes of intermittent AF, for example, who may be at risk for stroke and should be placed on lifelong blood thinning medication, may not be if they are not exhibiting AF when their heart is monitored for only a brief period. Likewise, a patient who has only one or two episodes that never recur, who should be on a different regimen, may be placed on blood thinners unnecessarily.

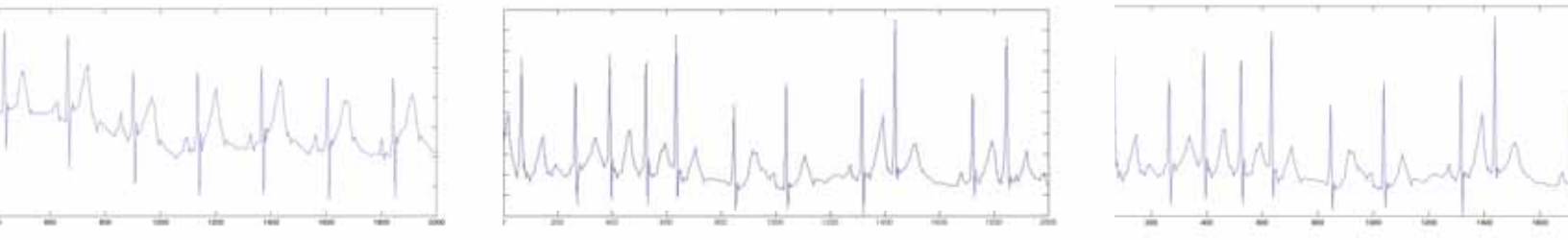
Photo: UW cardiologist Dr. David Linker

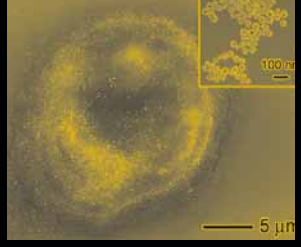
The challenge, said Linker, who has an engineering background, was to make a small, lightweight, portable device to be placed outside the body that also had sufficient computational power. Ultimately Linker developed a unique algorithm that recognized when AF was occurring and saved this data while discarding normal heart rhythm data. This allowed for a much greater data storage capacity. When Linker tested his algorithm against an online database of ECG patterns, he found it was highly successful at recognizing AF patterns—even those as short as only seven heartbeats.

Linker envisions this scenario: The patient wears the half dollar-sized device against the skin for one month, during which time the monitor would record about two days' worth of potentially abnormal heart rhythms. The patient then mails the device to the laboratory where the data is downloaded to a computer and analyzed.

Linker said receiving the TGIF award allowed him to dream big and move ahead with the project. "It enabled me to set my sights higher in terms of what we could do with this project. We will actually be able to create a prototype device. It removed the uncertainty from a business point of view," he explained. Several companies have expressed interest in developing the monitoring device, which can easily be upgraded with more memory. Competing products on the market are larger, heavier, and more costly, and hold only about ten minutes of useful data.

This simple but intelligent device may lower the risk of stroke and potentially other heart conditions. There are still many mysteries to be solved, however. "Because this is a new technique, we don't know what the results will be," Linker said. For instance, how often do high risk patients have AF? With this innovative monitoring device, this question and many others may soon be answered.



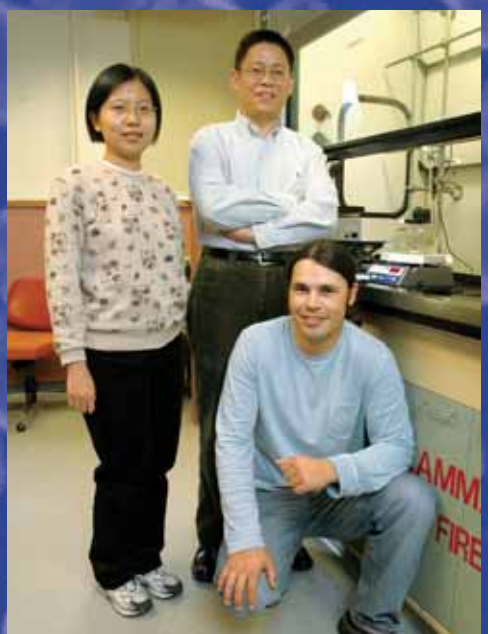


APPLYING

NANOTECHNOLOGY

TO

Cancer Detection and Treatment



While traditional cancer treatments such as chemotherapy and radiation have improved at targeting cancer cells, they still cause severe side effects because they also damage healthy tissue. Now, one UW chemist has developed technology that may lead to diagnostic tests and treatments for cancer that minimize side effects while detecting cancer earlier.

Professor of Chemistry Younan Xia has developed a process for synthesizing gold "nanocages"—tiny hollow boxes with porous sides. The gold nanocages have unique optical properties that make them ideal for imaging cancer and for specifically targeting and destroying cancer cells while sparing healthy cells. UW TechTransfer has applied for patent protection on this unique method, and a TGIF grant will help prepare the technology for commercial development.

Xia's unique approach involves first synthesizing solid silver nanocubes, which then act as templates for the gold nanocages. The dimensions and porous nature of the nanocages give them their unique properties: they can both absorb and scatter light, and can be tuned to nearly any wavelength—from the visible to the near-infrared—by controlling the chemical reaction.

Xia is collaborating with other UW research groups to explore several of the many potential applications of this method. He has partnered with UW Assistant Professor Xingde Li in the Department of Bioengineering and Professor Michael B. Kimmey in the School of Medicine's Division of Gastroenterology. The aim of the collaboration is to develop new diagnostic and therapeutic technologies for cancer.

Because nanocages can be tuned to near-infrared wavelengths and these wavelengths are ideal for imaging the body's soft tissues, gold nanocages could make effective contrast agents, especially when combined with an emerging and powerful technology called optical coherence tomography (OCT). OCT uses scattered near-infrared light to non-invasively image tissues such as tumors, and can detect even very small tumors.

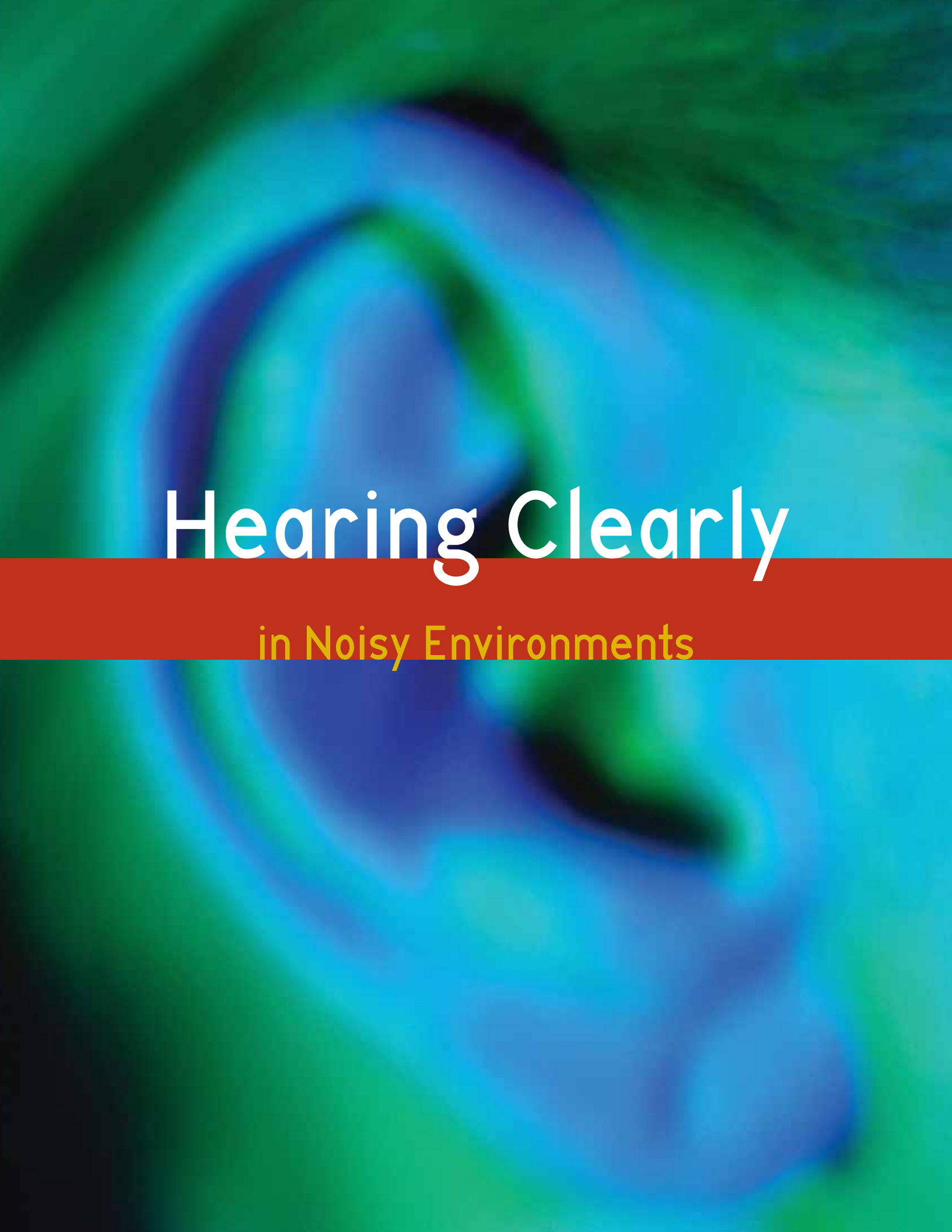
Xia's group found that the gold nanocages provide a much higher contrast for OCT than conventional dyes. And they can do something dyes cannot: they can be used as carriers of drugs against specific tumor cells.

Xia's laboratory demonstrated that the nanocages can be treated so they are covered with antibodies that target specific tumor cells. The tumor cells with the bound nanocages can be imaged with OCT and then heated from outside the body to a temperature that destroys cancer cells but spares normal cells. This combination of early detection and targeted thermal treatment could eventually reduce the use of invasive procedures such as biopsies and surgery.

TGIF funds will allow UW investigators to continue research on these applications and to market their technology by providing samples for commercial evaluation. "The TGIF support means a lot to us," said Xia. "It allows us to scale up the production of silver and gold nanostructures that hold the promise for biomedical imaging and many other applications. Now we can run the synthesis on a volume ten times larger than our previous demonstrations and should be able to scale up ten times more soon. Usually it is hard to get federal funds to support this kind of technical improvement work. The TGIF grant made it possible in a timely fashion."

Dr. Xia's technology is attracting attention from small and large companies around the world interested in developing many other products based on this unique method. In addition, a UW group of MBA interns comprising engineers and scientists has developed a commercialization plan for Xia's technology. They are submitting their business plan to the Washington Research Foundation (WRF) Capital/Gates Technology Entrepreneurship Fellowship program and will present their plan at the UW's Business Competition in May.

Photo: Younan Xia and graduate students Joe McLellan (kneeling) and Jingyi Chen



Hearing Clearly

in Noisy Environments

While hearing aids work well in most situations, they are limited in one significant way: they have difficulty distinguishing between multiple talkers in noisy environments. In a busy restaurant, for example, multiple conversations and background noise make it difficult for a hearing impaired person to isolate and understand a particular speaker.

Now, two UW professors have adapted, and are testing and refining, new technology to isolate and clarify a single talker's voice in the presence of other talkers. With initial support from the Washington Research Foundation (WRF) and a recent TGIF award, the researchers are working toward licensing the innovative technology to hearing aid manufacturers.

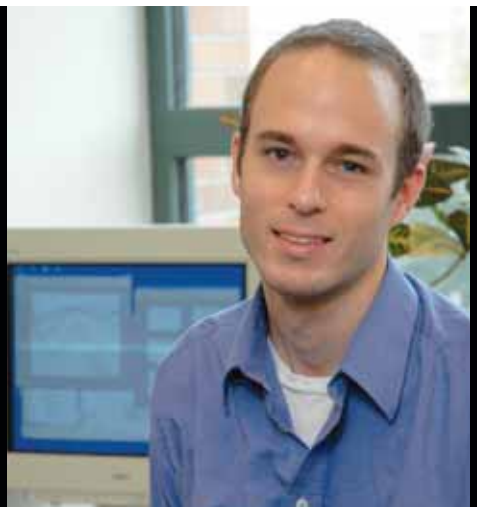
Les Atlas, Professor of Electrical Engineering and Pamela Souza, Associate Professor of Speech and Hearing Sciences, are collaborating on the project. Atlas discovered a way to alter traditional time-varying acoustic signal processing to nearly eliminate the common problem of distortion, such as buzzing. He found that the distortion could not be corrected by traditional filters, whose mathematical representations were based on assumptions that were too narrow. When he changed these assumptions, he found he could modify the rates of frequency changes of speech. This new "modulation filtering" technique isolated and enhanced the desired speaker's voice while reducing other voices to low-level background noise.

A hearing aid equipped with modulation filtering technology would be tuned to a desired talker's (such as a family member's or friend's) unique speech patterns, such as modulation, volume, and duration of speech sounds. PhD student Steve Schimmel is programming and testing a system to teach hearing aid devices to adapt to an individual's speech patterns.

Souza, a researcher and clinical audiologist, studies how hearing aids alter the sound patterns people use as cues to understand speech. She conducted laboratory studies using small numbers of subjects and several sets of words that showed modulation filtering improved the ability of the subjects to understand the desired speaker. Souza will now design and conduct larger studies with more realistic scenarios and more subjects.

Said Atlas, "Under TGIF funding, we are greatly extending the possible set of words which can be used in adaptation, potentially making the technique useful in everyday conversation. If successful, our proposed technique could be interesting to any manufacturer of programmable hearing aids."

The TGIF award will also provide the funds for live demonstrations to leaders in the hearing devices industry. With help from the TGIF program, Atlas's and Souza's new approach to hearing aids may lead to a wearable solution to a difficult problem.



Left: Pamela Souza (standing) and PhD student Stephanie Bor

Right: PhD student Steven Schimmel

INVESTING IN INNOVATION:

PROJECT BUDGETS AND THE WAIVER/MATCH PROGRAM

Project Budgets

By using options made available by the flexibility in UW policy, UW TechTransfer has developed a number of innovative programs to support ongoing UW projects. One of these innovative tools is Project Budgets, a program for copyright- and informatics-based research projects whose intellectual property is being managed through UW TechTransfer Digital Ventures.

A Project Budget reinvests licensing earnings back into the project to fund, for example, maintenance of software or databases, continued development of research tools, or the purchase of capital equipment. A few other universities have similar programs, but UW was one of the first to put it into practice.

The program has been used extensively: Of the $35.5 million in software and informatics licensing revenue from 1990 to 2005, $14.5 million has been returned to Project Budgets.

Investigators can participate in the program for any length of time, and at the start of each fiscal year can opt to discontinue participation.

Requirements for participating in the Project Budgets program are simply that: (1) the project is located at the UW; (2) the project's intellectual property is under UW TechTransfer management; (3) the principal investigator's department chair approves the Project Budget; and (4) all of the developers agree to set up a Project Budget.

Many projects that license software, databases, or content have successfully used Project Budgets (some for more than ten years) to continue innovative programs or bootstrap spin-off companies. The following projects are just a few examples:

THE TERATOGEN INFORMATION SYSTEM. An online database of common pharmaceutical and environmental agents and their associated risks to a developing fetus.

THE DRUG INTERACTION DATABASE. A Web-based, interactive research tool for scientists in drug discovery and development that lists details of peer reviewed drug interaction studies.

POLYPHRED. Bioinformatics software that has become a key tool in genomics research.

FEFF. Software for x-ray spectroscopy.

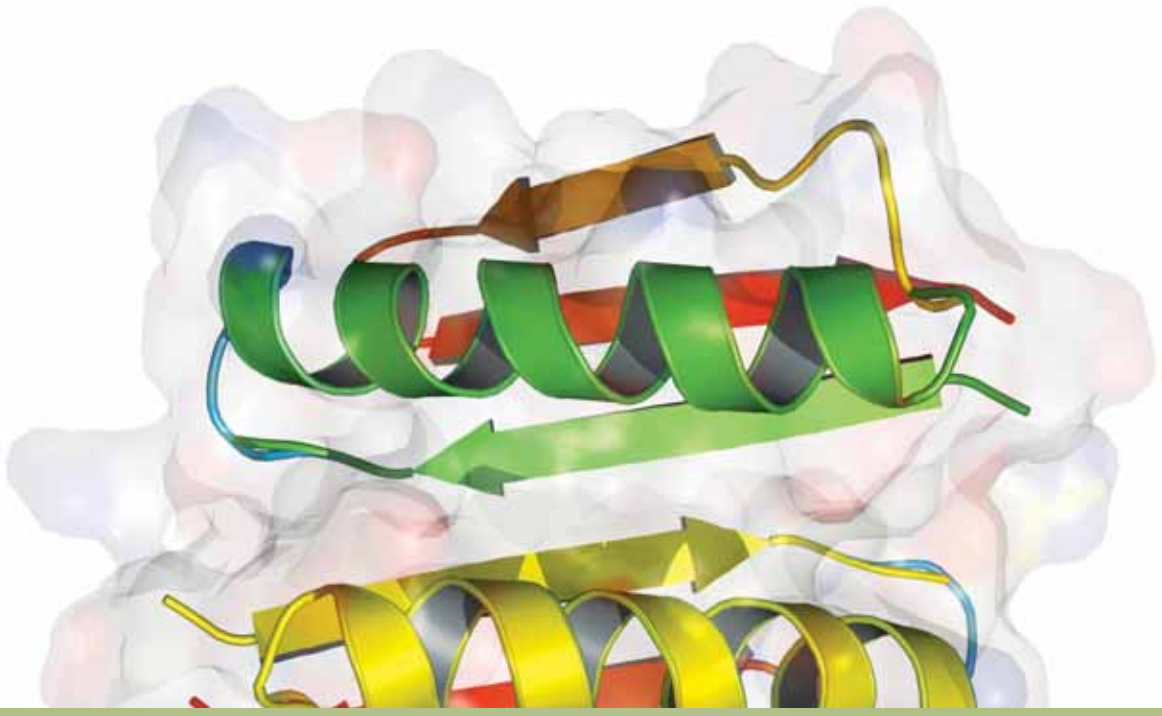
POWERON. A Web site and network of localized community resources for AIDS education, prevention, and support.

ROSETTA COMMONS. A multi-institution software development community based on Rosetta software, which is making history in the area of protein structure prediction. (Read more about Rosetta on page 14.)

The Waiver/Match Program

Another funding option for UW innovations is the Waiver/Match Program. In this program, faculty can choose to reinvest a portion of personal royalty earnings from a licensed technology back into their own, or another UW research laboratory or program. These waived funds, upon approval, will then be matched by the University.

Both the Waiver/Match Program and Project Budgets should continue to fuel innovative work and sustain UW projects for years to come.



POWER
THROUGH
AWARENESS

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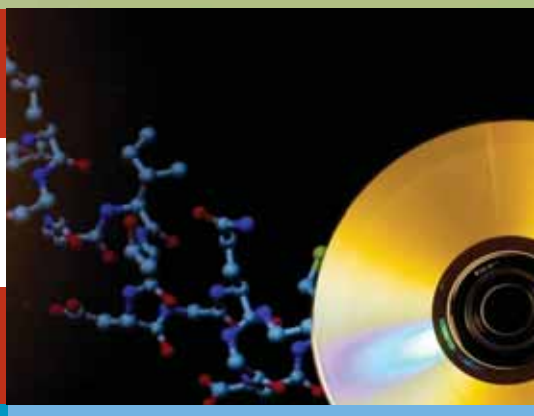
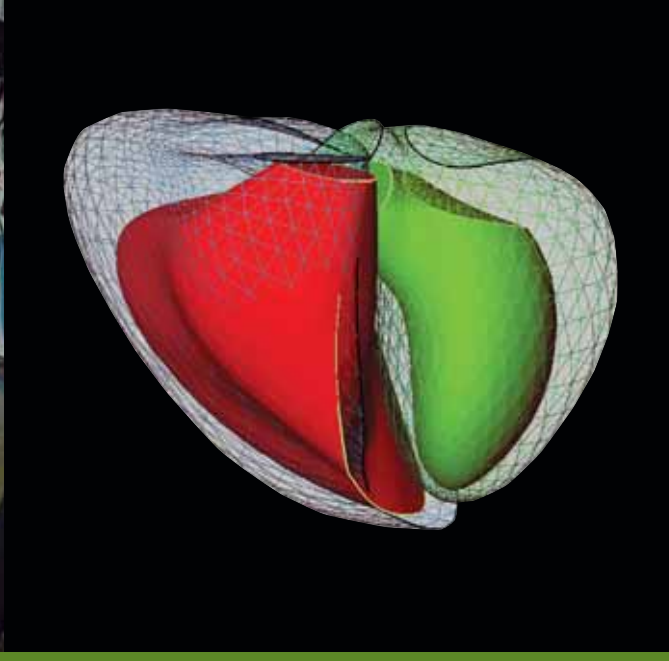




VentriPoint:

Florence Sheehan Reconstructs the Picture of Congenital Heart Disease

What was once called the "holy grail" of cardiology—the all-but-unobtainable goal of accurately measuring the function of the heart's right ventricle—has now been achieved by Dr. Florence Sheehan, cardiologist and Research Professor of Medicine at the UW. Sheehan and biotech entrepreneur Joe Ashley have founded VentriPoint, a Washington state startup built around new software that reconstructs the right ventricle from images and measures its volume and function.

The patented software will provide highly useful information that will aid cardiologists in treating many heart conditions, especially congenital heart disease in children. UW TechTransfer Digital Ventures licensed the software package to VentriPoint in 2005.

The right ventricle problem

The function of the heart's left ventricle has always been easy to measure because it is conveniently shaped like a football, a geometric ellipsoid, which has made computing its volume straightforward since the 1960's. The right ventricle, however, is non-geometrically shaped and thus much more difficult to measure. For many years, cardiologists merely compared its size to the left ventricle visually, which provided little useful information. Sheehan's sophisticated software is now providing physicians with detailed right ventricle data, leading to improved treatment regimens.

One test for accurate heart data and imaging

The software uses a knowledge-based reconstruction model. The user (a hospital technician) traces a small number of data points from an MRI or echocardiogram (ECHO) study of a patient's heart. The data are sent via the Internet to a server at VentriPoint, where the software's algorithms compare the data to a database of both normal and diseased hearts. When the software finds the best fit, it reconstructs a 3-D heart and accurately computes the volume of blood pumped. The information is then relayed back to the user's computer. The entire test takes about three minutes—much faster than traditional methods which can take an hour or more to complete. Currently, cardiologists must assemble

two-dimensional ECHO data in their head to form a mental picture, or take the time for a traditional (and tedious) analysis of MRI images. Sheehan's method provides both imaging and heart function data in one rapid test, before the patient has even left the laboratory.

Improving heart testing in children

Traditionally the right ventricle has received little attention from cardiologists who focused their attention on measuring left ventricle function. But recently, its importance in some types of heart disease has been recognized. The right ventricle is involved in about 60% of congenital heart disease cases, which makes imaging and measuring it especially critical for pediatric cardiologists. Understanding right ventricle activity can be the deciding factor for whether and when surgery is warranted, and can obviate repeated testing and invasive procedures.

Sheehan says it may appear that the technology has a small market because congenital heart disease makes up only 1% of heart disease cases (coronary artery disease makes up the other 99%). But because the software is compatible with both MRI and ECHO, and VentriPoint is offering a service and not a product, there is a market niche for VentriPoint that will, over time, provide opportunities to move the technology into other areas, such as heart diagnoses and other body organs.

Sheehan came to the UW in 1980 as a research fellow. She now directs the UW's Cardiovascular Research and Training Center. Previously, as a student at MIT (one of only 52 women in a class of 950), she learned programming as part of her required coursework. Although she now leaves the programming to others, she has extensive experience validating MRI and ECHO techniques for the left ventricle of the heart. Her suite of image analysis software for the left ventricle has been licensed to 15 companies and generated more than $1 million in licensing revenue.

Sheehan became interested in pediatric cardiology and the right ventricle in an unusual way. In 2002, while attending a medical conference in Washington, D.C., she was approached by a colleague who abruptly asked, "Do you do 3D echocardiography?" When Sheehan answered that yes, she had validated 3D echo and MRI software for years, the pediatrician launched into a discussion of the need for a better method for imaging the hearts of children with congenital heart disease. This need has been echoed by every one of the more than 20 cardiologists to whom Sheehan has introduced her software.

Ashley is an engineer with an extensive background in research and business. He started Beckmann Pharmaceuticals, which was sold to SmithKline, and has founded and sold several software and biotechnologies companies.

Building a heart database

VentriPoint's first task will be to build a database of heart images from congenital heart disease patients. VentriPoint has awarded a research grant to Professor Sheehan and UW to assist in the data collection process in collaboration with Oregon Health & Sciences University. A formal validation trial will follow and then the data will be sent to the FDA in support of an application for approving the software's use.

When asked what advice she would give academic researchers interested in starting a business, Sheehan says they should be aware that they need a "whole new skill set." "Finding a good business partner is just as important as finding a good research partner," she says.

VentriPoint is poised to become a vital source of critical information that will likely extend the lives of children and adults with congenital heart disease and make living with the disease more tolerable.

Photo: UW cardiologist Dr. Florence Sheehan and sonographer Mary Pierre Waisse with a patient

Rosetta Commons:

David Baker leads collaborators on a quest to unravel the mysteries of human proteins

The fundamental challenge

One of the most important and challenging problems in biology is the accurate prediction of protein structure from amino acid sequence. Proteins, the ubiquitous molecules that make up our cells and carry out many cellular functions, consist of amino acids in a string-like sequence, like beads on a necklace. But unlike a necklace, a protein twists and folds into a unique three-dimensional shape. Because a protein's shape is related to its function in the body, protein structure is vital information for scientists seeking to understand and find cures for significant diseases such as AIDS, malaria, and cancer.

The structures and functions of many human proteins are unknown, however, and traditional methods of determining structure, such as X-ray crystallography and spectroscopy, are labor intensive and slow.

An accurate method for predicting and designing 3-D proteins

Now, accurate protein prediction is a reality because of sophisticated software called Rosetta, developed in the UW laboratory of David Baker, Professor of Biochemistry and a Howard Hughes Medical Institute investigator. In a broad collaboration with other scientists and students, collectively called Rosetta Commons, Baker and Rosetta are making considerable progress on this long-standing problem of computational biology.

Rosetta predicts protein structure by folding an amino acid sequence into thousands of possible shapes based on certain protein folding "rules" that are known by scientists. For example, areas of the protein molecule that dislike water will tend to bury themselves in the protein's core. Using these rules and other known information about proteins, Rosetta gives each configuration a score that rates how likely it is to represent the actual shape of the protein.

Protein models created by Rosetta have proven to be highly accurate. In a 2001 competition, labs from around the world used computational methods to predict the structures of several proteins using only the amino acid sequences. Baker's group won easily: Rosetta predicted the structures of several proteins with unprecedented accuracy.

More recently, Baker and five colleagues won the American Association for the Advancement of Science Newcomb Cleveland Prize for an outstanding article in

the journal *Science*, in which they detailed a method, using Rosetta, for creating proteins not found in nature.

Baker's group has developed a suite of Rosetta software that includes modified versions of Rosetta. UW TechTransfer licenses the Rosetta code to academic institutions free of charge to accelerate research in proteomics. Licensing revenue from industry distribution supports the lab's continuing work through the Project Budgets program. (Read more about Project Budgets on page 10).

A large-scale effort to unlock the secrets proteins hold

One of Baker's first objectives was to obtain structures of the 60% of human proteins with unknown function, an enormous task. An effort this large would take many thousands of lifetimes to complete with conventional computers, but Baker found a solution. By running on millions of computers simultaneously, the project could be completed far sooner.

Richard Bonneau, formerly with Seattle's Institute for Systems Biology (ISB) and now at NYU, is leading the Human Proteome Folding (HPF) Project, a monumental effort to build models of human proteins by running Rosetta in the background of millions of volunteers' PCs around the world. The computers are part of a massive network called the World Community Grid, developed by IBM.

The goal of Phase I of the HPF Project, which has been achieved, was to use the Grid to quickly generate low resolution models of the most biologically important proteins.

Refining and testing new versions

In Phase II of the HPF project, a more streamlined version of Rosetta will run on IBM's grid to create even more accurate, high-resolution models of a subset of biologically important proteins, which include those found in pathogenic bacteria.

UW researchers, including Lars Malmstroem of the Baker lab, are working on integrating Rosetta findings from the Grid with known protein information. Their goal is to create a huge database of protein structures and functions, a valuable resource for scientists researching new drugs and treatments for many human diseases.

Baker's newest research project, called Rosetta@home, is based on distributed computing, similar to the World Community Grid. To continue refining the software algorithms, Baker developed a version of Rosetta to run on an open source program called BOINC, which provides a central server to link the thousands of participating PCs. The UW's Food and Housing Services has volunteered time on 175 administrative computers, and is now recruiting freshmen entering the dorms to participate. Baker invites all interested parties to join Rosetta@home, available online at boinc.bakerlab.org/rosetta. "This is a great way for individuals to make important contributions to biomedical research without any noticeable effect on their computers," said Baker.

Worldwide collaborations and impact

The Rosetta Commons group is made up of scientists from the UW and many other institutions, including John Hopkins University, University of North Carolina at Chapel Hill, Los Alamos National Laboratory, UC Santa Cruz, UC San Francisco, and Vanderbilt University, with more scientists and institutions joining all the time.

With each laboratory creating new versions of code, the intellectual property issues might have become tangled, but UW TechTransfer Digital Ventures, working with Baker, proactively established creative strategies to effectively manage the complex IP issues involved. Participation agreements allow all members access to versioning and consolidates the copyrights of all members, so that the UW can act as the central licensing point for Rosetta software.

Institutions around the world are following Rosetta progress closely. Baker's group has several evaluation agreements with large pharmaceutical companies, and holds multiple collaboration agreements with other institutions, among them Fred Hutchinson Cancer Research Center and a European vaccine developer. Grants from the National Science Foundation and the National Institutes of Health, among others, help support further research.

The exciting developments coming from Baker's UW lab and from the labs of Rosetta Commons collaborators may someday allow researchers to generate the 3-D structures of all human proteins directly from the human genome, and even generate a whole new world of molecules with novel and useful functions.

While much work needs to be done, Baker and colleagues have demonstrated that a solution to this most important problem is not only possible, it is only a matter of time, computer power, and the combined efforts of a dedicated group.

Photo: UW Professor of Biochemistry David Baker

SUMMARY OF ACTIVITY:

NEW AGREEMENTS

FY05 Licensing Activity

In FY05 UW TechTransfer executed a total of 109 agreements for the commercial use of inventions and copyright works owned by the UW. This total includes both non-exclusive and exclusive licenses and options for commercial development of products and services utilizing inventions and copyright works, as well as software site licenses and research tool use agreements in excess of $1000 each.*

TABLE 1. FY05 AGREEMENTS COMPLETED

Commercialization Agreements	
Digital Ventures	18
Invention Licensing	10
Software Use Agreements over $1000	74
Research Tool Use Agreements over $1000	7
Total	**109**

UW TechTransfer also negotiated and executed a substantial number of agreements that facilitate technology transfer but do not typically grant commercial development rights or generate licensing income. These include confidentiality agreements, inter-institutional technology agreements for jointly-owned technologies, and non-revenue bearing transfer or use licenses for software and research tools such as cell lines, antibodies, and mouse models.

TABLE 2. FY05 OTHER AGREEMENTS COMPLETED

Confidentiality Agreements	165
Material Transfer Agreements	527
Technology Administration Agreements	14
Fee-Based Software Use Agreements	91
Fee-Based Research Tool Use Agreements	0
Total	**797**

In addition, Digital Ventures completed 2,958 academic and no-charge licenses in FY05. These are non-fee based licenses for UW-owned software. This number demonstrates the broad availability and impact of UW software, and reflects hundreds of software projects managed by Digital Ventures.

* This definition is employed by the Association of University Technology Managers (AUTM) in its Annual Licensing Survey. UW TechTransfer uses the definition here to provide consistency and facilitate comparisons with peer institutions.

FY05 Startup Activity

In FY05, agreements for three startups were completed:

VentriPoint, a Seattle startup based on technology developed by Professor Florence Sheehan at the School of Medicine will develop methods to assess cardiac function in congenital heart disease. (See page 12 for more on Ventripoint.)

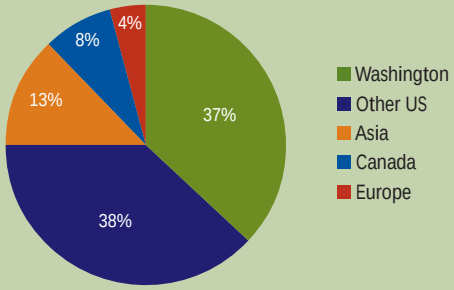
Sienna Software, a Seattle-based startup, will offer Audbase, a database program designed for testing of hearing levels (audiometric testing). The company was founded by Professor Marc Coltrera of the UW School of Medicine's Department of Otolaryngology-Head and Neck Surgery. Audbase incorporates licensed technology developed by the UW and is based on the Otobase® Database Kernel.

UW technology developed in the laboratory of Professor Mani Soma of Electrical Engineering was licensed to **Somatronics**. The company will design and manufacture low-cost electronic lab kits for electrical engineering students, providing a hands-on experimental laboratory at home.

Measuring Local and International Economic Impact

In FY05, 37% of commercial development licenses for UW technologies went to Washington state companies. Our international collaborations are also important in our efforts to extend the impact of University of Washington research as broadly as possible.

EXHIBIT 1. FY05 COMMERCIAL DEVELOPMENT LICENSES BY LOCATION



Creating Worldwide Partnerships

FY05 licensed technologies are used and developed not only in Washington, but also in 17 other US states and 11 countries around the world.

SUMMARY OF ACTIVITY:

NEW INNOVATIONS

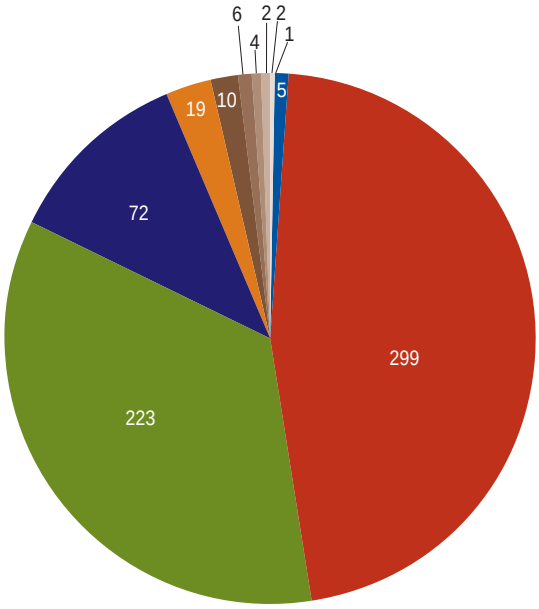
In FY05, UW researchers reported 268 new innovations, an increase of 13% over the previous year.* Researchers in the College of Engineering contributed to 46.5% of the innovation disclosures, and researchers in the School of Medicine contributed to 34.7%. The most active innovator in FY05, with 16 innovations, was Wei-Chih Wang, Research Assistant Professor of Electrical Engineering. Wang is working in two separate but related areas, harnessing the power of light through photonics technology.

One research project is a shear/stress sensor, a flexible sheet-like material that can sense the distribution of pressure and shear. This unique optical fiber-based sensor has applications in prosthetic device fitting by measuring where forces are high or low. It can be used to properly fit a shoe, to replace bite indicators used by dentists, and for hundreds of other applications.

Wang's second research project is technology for an electro-optic scanner. This technology uses an electro-optic material—one that changes its index of refraction in response to an electrical signal—in an imaging system. Conventional systems use tilting mirrors, an array of imaging devices, or a vibrating fiber to take a "picture" of the scene of interest. Dr. Wang's inventions use electrically-steered light beams to accomplish the same thing, with the advantage of having no moving parts. This allows for a much smaller imaging system, making it potentially highly useful in medical endoscopes. Other imaging applications, such as industrial inspections systems, are possible as well, but the initial focus is the medical device field.

*In the charts below, each department that contributed to an innovation was credited with one innovation; thus, if added together, department innovation numbers would total to more than the actual number of innovations reported.

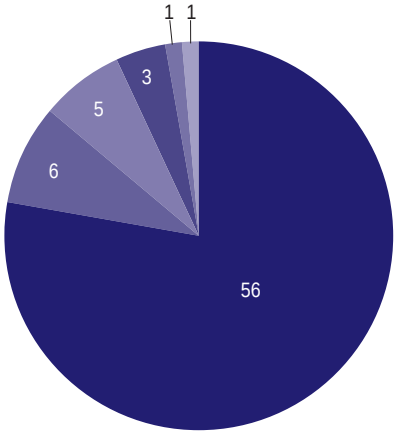
EXHIBIT 2. FY05 Innovations Grouped by College/School



Engineering	299
Medicine	223
Arts & Sciences	72
Ocean & Fishery Sciences	19
Forest Resources	10
Community Medicine & Public Health	6
Pharmacy	4
Dentistry	2
Nursing	2
Information	1
Other	5

FY05 Innovations by Department

EXHIBIT 3. FY05 INNOVATIONS: COLLEGE OF ARTS & SCIENCES

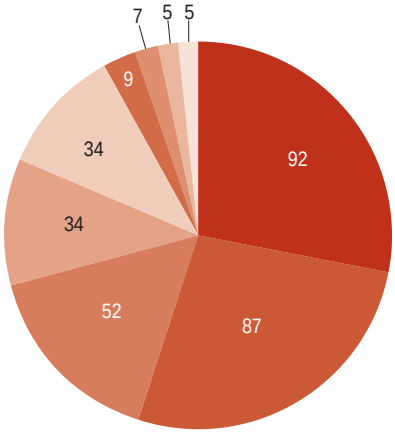


Chemistry	56
Psychology	6
Biology	5
Physics	3
Statistics	1
Communication	1

TABLE 3: FY05 Innovations Grouped by Individual

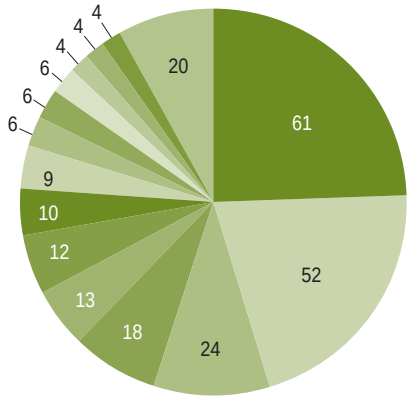
NAME	DEPARTMENT	COLLEGE/SCHOOL	NO. OF INNOVATIONS
Wei-Chih Wang	Mechanical Engineering	Engineering	16
David Koelle	Medicine	Medicine	14
Lichen Jing	Medicine	Medicine	13
Eric Seibel	Mechanical Engineering	Engineering	12
Minoru Taya	Mechanical Engineering	Engineering	11
Deirdre Meldrum	Electrical Engineering	Engineering	9
Larry Dalton	Chemistry	Arts and Sciences	8
Mark Holl	Electrical Engineering	Engineering	8
Henry Lai	Bioengineering	Engineering/Medicine	7
Narendra Singh	Bioengineering	Engineering/Medicine	7

EXHIBIT 4. FY05 INNOVATIONS: COLLEGE OF ENGINEERING



- Mechanical Engineering 92
- Electrical Engineering 87
- Bioengineering 52
- Computer Science & Engineering 34
- Materials Science & Engineering 34
- Chemical Engineering 9
- Aeronautics & Astronautics 7
- Civil Engineering 5
- Human Interface Technology Lab 5

EXHIBIT 5. FY05 INNOVATIONS: SCHOOL OF MEDICINE



- Dept. of Medicine 61
- Bioengineering 52
- Pathology 24
- Genome Sciences 18
- Pediatrics 13
- Radiology 12
- Biochemistry 10
- Surgery 9
- Immunology 6
- Ophthalmology 6
- Otolaryngology 6
- Biological Structure 4
- Microbiology 4
- Pharmacology 4
- Other 20
  - Comparative Medicine 3
  - Laboratory Medicine 3
  - Neurological Surgery 3
  - Orthopaedics & Sports Medicine 3
  - Family Medicine 2
  - Obstetrics & Gynecology 2
  - Dean of Medicine 1
  - Physiology & Biophysics 1
  - Psychiatry 1
  - Urology 1

SUMMARY OF ACTIVITY:

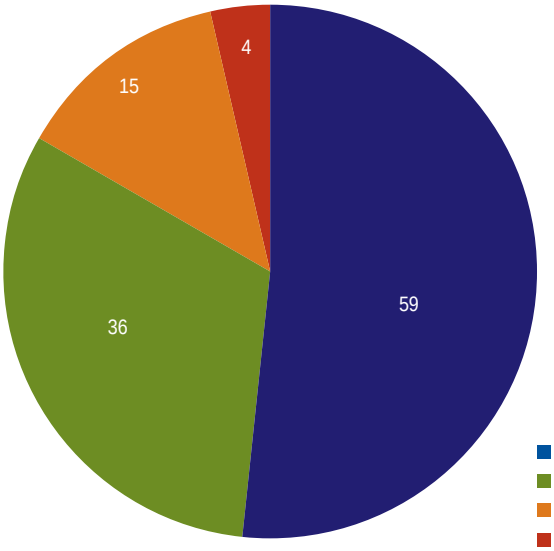
NEW PATENTS

In FY05 UW TechTransfer filed 178 US patent applications on UW innovations, an increase of 25% over FY04. UW TechTransfer was awarded 36 US patents from applications filed in previous years. Many of the issued patents were the result of collaborations of multiple individuals and departments within the UW: 85 researchers from 18 departments contributed to the total of US issued patents.*

In the following charts, issued patents are shown grouped by college or school, and departments are listed within the College of Arts and Sciences, College of Engineering, and School of Medicine. All patents awarded for the College of Ocean & Fishery Sciences arose from inventions from the Applied Physics Lab. The Department of Bioengineering reports to both the College of Engineering and the School of Medicine; thus, in the chart depicting issued patents by college/school, half of the patents from Bioengineering are shown in the College of Engineering totals and half in the School of Medicine totals. In the charts depicting the department breakdown, the Bioengineering total is shown within a single college or school as a basis for comparison of total activity.

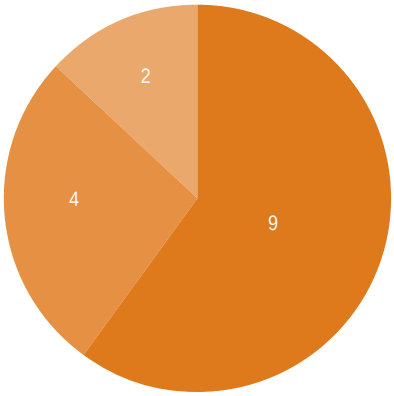
* In the charts below, each department that contributed to a patent was credited with one patent; thus, if added together, department patent numbers would total to more than the actual number of patents issued.

EXHIBIT 6. FY05 US Issued Patents Grouped by College/School



Engineering	59
Medicine	36
Arts & Sciences	15
Ocean & Fishery Sciences	4

EXHIBIT 7. FY05 US ISSUED PATENTS: COLLEGE OF ARTS & SCIENCES

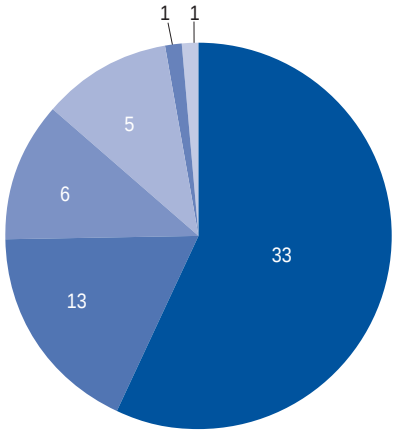


Chemistry	9
Genetics	4
Center for Process Analytical Chemistry	2

FY05 Issued Patents

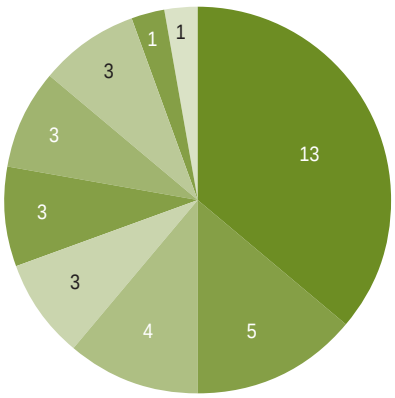
1	6,912,310	Video object segmentation using active contour model with directional information
2	6,906,333	Magnetic separator for linear dispersion and method for producing the same
3	6,888,892	Method for padding macroblocks
4	6,888,153	Capacitive shield for containing radiofrequency magnetic fields
5	6,887,707	Induction of viral mutation by incorporation of miscoding ribonucleoside analogs into viral RNA
6	6,885,700	Charge-based frequency measurement bist
7	6,875,254	Methods for detecting and extracting gold
8	6,875,176	Systems and methods for making noninvasive physiological assessments
9	6,870,945	Video object tracking by estimating and subtracting background
10	6,867,753	Virtual image registration in augmented display field
11	6,867,020	Method of making glycoprotein exhibiting erythropoiesis regulating and glycoprotein produced by this method
12	6,865,735	Process for rewriting executable content on a network server or desktop machine in order to enforce site specific properties
13	6,861,265	Flow cytometer droplet formation system
14	6,859,870	Method and apparatus for compressing VLIW instruction and sharing subinstructions
15	6,856,712	Micro-fabricated optical waveguide for use in scanning fiber displays and scanned fiber image acquisition
16	6,855,317	Immunological herpes simplex virus antigens and methods for use thereof
17	6,852,544	Rapid quantitative analysis of proteins or protein function in complex mixtures
18	6,852,284	Liquid analysis cartridge
19	6,847,036	Charged particle beam detection system
20	6,845,190	Control of an optical fiber scanner
21	6,843,375	Magnetic separator for linear dispersion and method for producing the same
22	6,842,177	Macroblock padding
23	6,835,393	Enhanced transport using membrane disruptive agents
24	6,833,448	Annexin derivatives with endogenous chelation sites
25	6,831,745	Optical immersion probe incorporating a spherical lens
26	6,830,729	Sample analysis instrument
27	6,819,460	Apparatus and methods for routing of optical beams via time-domain spatial-spectral filtering
28	6,814,969	Immunologically significant herpes simplex virus antigens and methods for using same
29	6,804,771	Processor with register file accessible by row column to achieve data array transposition
30	6,790,341	Microband electrode arrays
31	6,785,743	Template data transfer coprocessor
32	6,782,470	Operand queues for streaming data: A processor register file extension
33	6,779,101	Method and apparatus for processing compressed VLIW subinstruction opcodes
34	6,775,404	Apparatus and method for interactive 3D registration of ultrasound and magnetic resonance images based on a magnetic position sensor
35	6,767,898	Methods for using specific saccharides for treating alzheimer's disease and other amyloidoses
36	6,759,037	Compositions and methods for treating diabetes

EXHIBIT 8. FY05 US ISSUED PATENTS: COLLEGE OF ENGINEERING



Electrical Engineering	33
Bioengineering	13
Human Interface Technology Lab	6
Computer Science & Engineering	5
Aeronautics & Astronautics	1
Mechanical Engineering	1

EXHIBIT 9. FY05 US ISSUED PATENTS: SCHOOL OF MEDICINE



Bioengineering	13	Radiology	3
Medicine	5	Microbiology	1
Molecular Biotechnology	4	Neurological Surgery	1
Laboratory Medicine	3		
Pathology	3		
Pediatrics	3		

FINANCIAL RESULTS

Revenue Summary

The University of Washington receives revenue from UW technologies managed by the Washington Research Foundation (WRF) as well as from UW technologies managed by both the Invention Licensing and Digital Ventures units of UW TechTransfer. Total revenue received in FY05 from all sources was $18,643,714, an 18% increase from FY04. Technologies managed by WRF continue to account for the largest percentage of total revenue (60%), followed by Digital Ventures with 21% of the total and Invention Licensing with 18%. The remaining revenue (1%) arises from sales of equity.

The WRF portfolio primarily includes technologies initially disclosed in the 1980s, including significant revenue from the Hall and Davie technologies (polypeptides in yeast and clotting factor, respectively). UW TechTransfer manages the majority of technologies disclosed to the University after 1990. Another source of revenue is the liquidation of equity received as part of licensing transactions. Shares received but not yet liquidated are not included in this report. The timing of liquidations and the distribution of proceeds are managed by UW's Treasury Office.

In FY05, 316 licenses for 181 different technologies generated licensing revenue. This total represents revenue received from commercial development agreements, software use licenses, and transfers of biomaterials. Fourteen technologies generated over $100,000 each; four technologies generated over $1 million each. Licenses on the top five technologies account for 75% of the total revenue received.

EXHIBIT 10. FY05 Revenue by Managing Unit

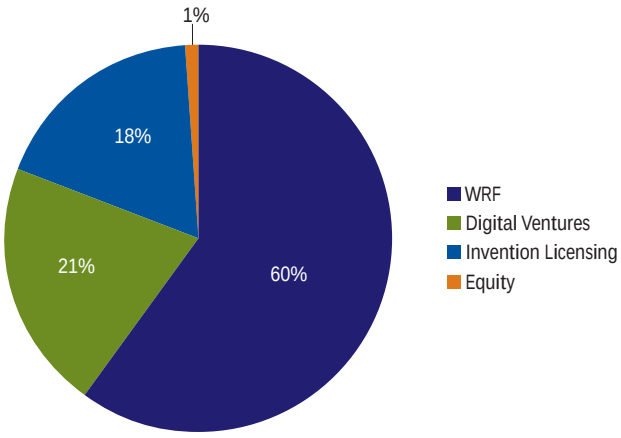


TABLE 4. FY05 REVENUE BY MANAGING UNIT

WRF	$ 11,174,046
Digital Ventures	3,870,099
Invention Licensing	3,417,996
Equity	181,573
Total	**$ 18,643,714**

Revenue by Type

Revenue includes several components: royalties on sales of products or services; lump sum or upfront fees generally received when a license is signed; periodic fees tied to milestones or time periods over the life of the license; liquidation of equity received as consideration for a license; and ongoing fees for continued use of licensed software. Over 68% of total revenue received in FY05 was from royalties on sales of products and services.

Expenses

UW TechTransfer utilizes legal counsel from outside the University for the preparation and prosecution of all patent applications, and currently oversees more than 200 outside counsel appointments with over 20 firms. Firms and attorneys are selected on a case-by-case basis depending on the particular expertise required. Legal expenses are also incurred for trademark registrations, legal opinions on intellectual property protection available, and for conflict resolution such as arbitration and litigation.

UW TechTransfer invested a total of $2,895,920 on patent protection and other legal expenses in FY05, of which 41% was repaid by or is due from UW's licensees. UW TechTransfer made a significant increase in investment in patents in FY05. The amount invested in legal expenses in FY05 was 88% higher than the amount invested in FY04.

EXHIBIT 11. FY05 Revenue by Type

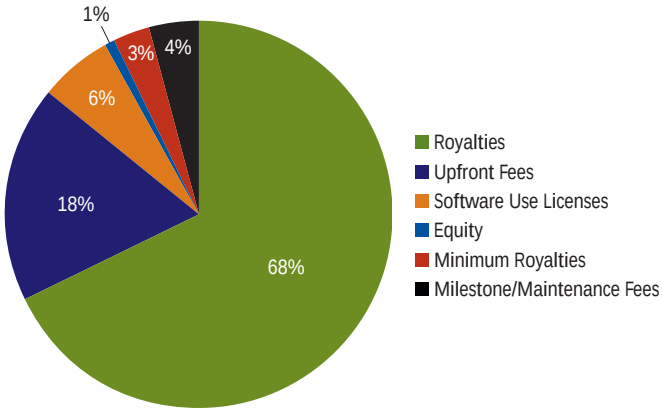


TABLE 5. FY05 REVENUE BY TYPE

Royalties	$	12,732,622
Upfront Fees		3,317,696
Software Use Licenses		1,040,731
Equity		181,573
Minimum Royalties		569,192
Milestone/Maintenance Fees		801,900
Total	**$**	**18,643,714**

EXHIBIT 12. FY05 Expenses

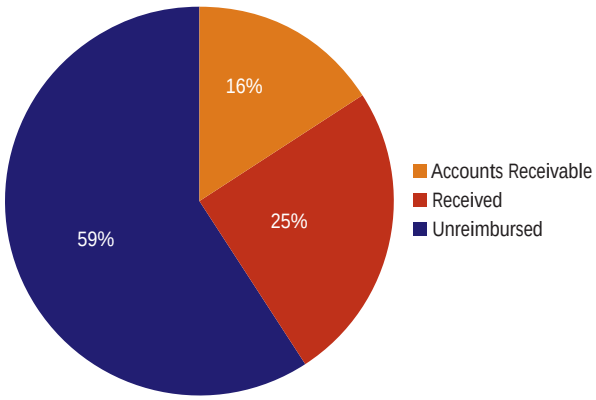


TABLE 6. FY05 EXPENSES

Accounts Receivable	$	454,171
Received		712,604
Unreimbursed		1,729,144
Total	**$**	**2,895,920**

Distributions

Of the revenue received by UW TechTransfer, 84% is distributed to joint rights holders, inventors and developers, departments, laboratories, colleges and schools, and University research funds, in accordance with contractual obligations and University policies. UW TechTransfer retains an administrative fee and recovers certain expenses prior to distributions. Revenue received through the close of each fiscal year (June 30) is generally distributed in the following December, in accordance with University policy. A portion of revenue received may be held for later distribution due to actual and anticipated expenses not reimbursed by licensees, or for final determination of recipients. The figures listed below represent income from FY04 that was distributed in FY05.

EXHIBIT 13. FY05 Distributions

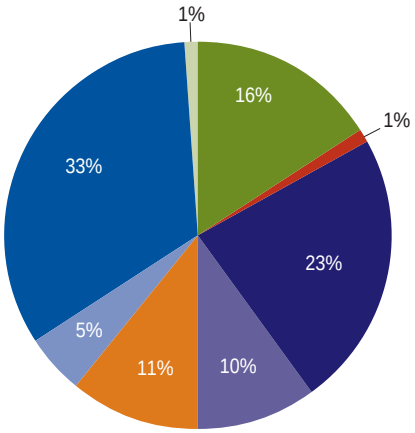


TABLE 7. FY05 DISTRIBUTIONS

UW TechTransfer Administrative Fee	$ 3,149,003
Expenses (Cost Recovery and Treasury Costs)	188,440
Inventors/Developers	4,588,513
Departments	2,109,870
Project Budgets	2,168,106
Colleges/Schools	954,304
UW Research Funds	6,743,084
Other Institutions	264,868
Total	**$ 20,166,187**

FY05 Top Ten Revenue-Generating Technologies

TITLE	MANAGING UNIT	INVENTOR/INNOVATOR & DEPARTMENT	TOTAL INCOME
Polypeptides in Yeast	WRF	GENETICS Hall, Ammerer	$4,917,461
Clotting Factor/Factor IX	WRF	BIOCHEMISTRY Davie, Kurachi	$3,944,653
Hepatitis B Vaccine	WRF	GENETICS Hall, Ammerer	$2,072,895
Tape Management Library for STK 4400 Systems	DV	COMPUTING & COMMUNICATIONS Profit, McHarg, Mason	$1,334,569
Mass Spectrometry Fragmentation Patterns of Peptides	IL	MOLECULAR BIOTECHNOLOGY Yates, Eng	$772,458
Metabolism-Based Drug Interaction Database	DV	PHARMACEUTICS Ragueneau, Carlson, Lévy	$ 692,428
Bioinformatics Tools*	DV	GENOME SCIENCES Green	$499,145
DNA Sequence Coding of Protein C	IL	BIOCHEMISTRY Davie, Foster	$300,000
Java Security Architecture and Verification	DV	COMPUTER SCIENCE & ENGINEERING Bershad, Grimm	$300,000
Treatment of Retinal Degenerative Diseases through Inhibition of the Retinoid Cycle	IL	OPHTHALMOLOGY Palczewski, Golczak, Kuksa	$250,000

* Includes PHRAP, CROSSMATCH, SWAT, PHRED, and CONSED-AutoFinish software. PHRED and CONSED-AutoFinish were not included in previous annual report totals.

ACKNOWLEDGEMENTS

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For more information or additional copies of this report, please contact UW TechTransfer: 206-543-0905.

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