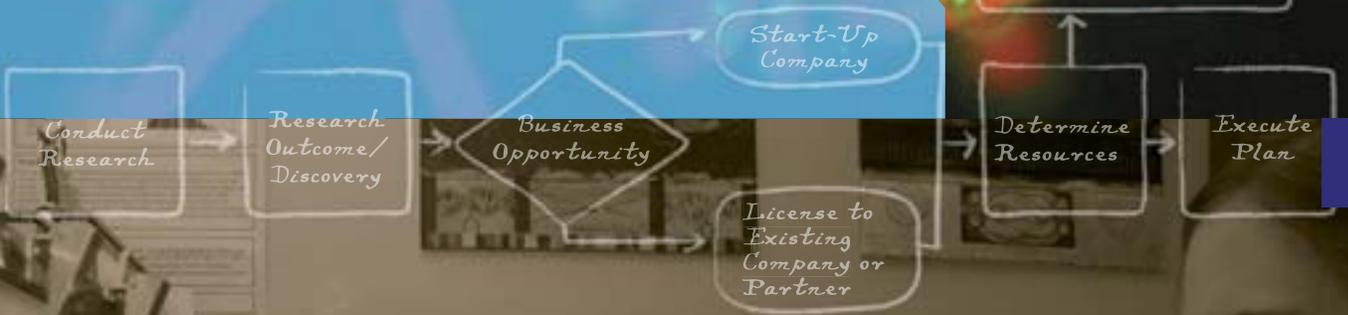
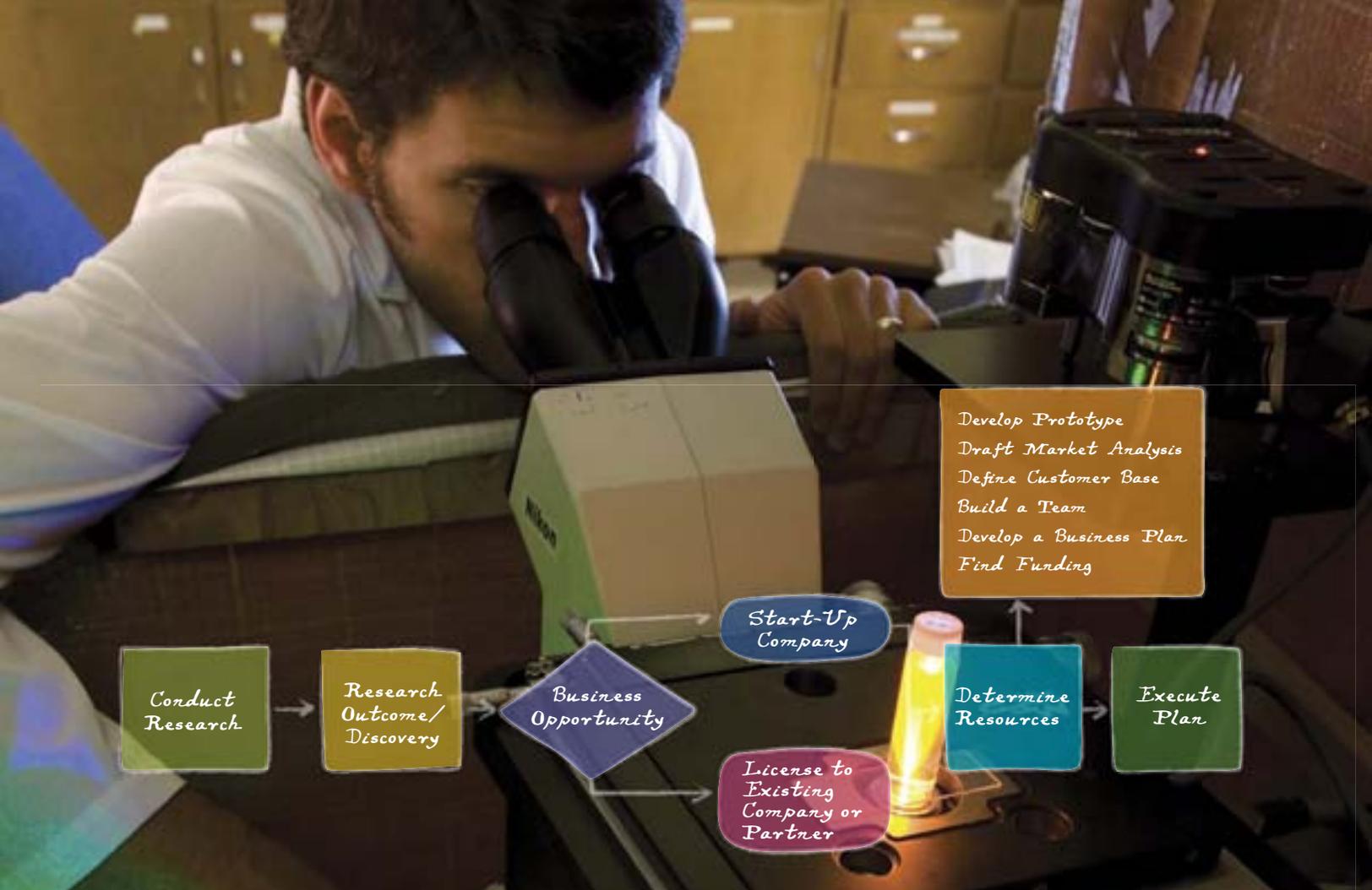


UNIVERSITY of WASHINGTON

THE CENTER for COMMERCIALIZATION





The mission of the UW Center for Commercialization is to make the University of Washington the best place in the world to do research by providing unparalleled commercialization support to our entrepreneurial researchers.

## Our New Approach to Commercializing University Research

This annual report summarizes the work of our office during my first year at the University of Washington. Over the past year our team has accomplished a lot, and everything we have learned has reinforced our new vision. As of January 2010, UW TechTransfer will become the UW Center for Commercialization.

What's in a name change, and why do it now? Our office has been exploring models to go beyond simply transferring UW technology into industry. Our new name embodies a commitment by the Regents, President Emmert, Provost Wise, and other key UW leaders and stakeholders to broaden and deepen the services we offer to facilitate commercial opportunities for UW researchers. One important reason for this change—which is already producing results—is to help UW continue to attract and retain the top researchers in the world.

The technologies created at the University of Washington can change the world, but only if they are embraced by thousands or millions of people. For a technology to be broadly adopted and have enduring impact requires consistent, focused effort by a team of skilled professionals and business people. Such stewardship can come from a start-up company, existing industry, or a dedicated commons.

We are deepening our working relationships with our community: entrepreneurs, investors, industry, the Department of Commerce and WEDC, and our sister organizations, including the Technology Alliance, WRF, WSU, PNNL, ITHS, WTC, WBBA, and the LSDF.

We have enhanced our level of service at every stage of commercialization. In-house patent agents are now available to position the researchers' discoveries in the intellectual property landscape. As examples of creating deep working relationships with industry, we are helping the Center for Serious Play at UW Bothell, and the medical device incubator at the core of the MedTech Discovery Center. With OSP and Advancement, we created a UW Industry Relations Task Force to work closely with all segments of the campus community to broker and facilitate positive and productive relationships with business and industry partners.

We have dramatically increased the support we offer during company formation. This year we introduced our Entrepreneur-in-Residence (EIR) program. Each of our three emeritus EIRs now has a role in at least one promising start-up that they helped set in motion. Our six active EIRs continue to provide constructive guidance to dozens of researchers. They represent an industry perspective as they participate in our other programs, and they provide invaluable feedback on our own practice.

We have also worked to provide our start-ups with greater access to early-stage funding. Our gap-funding program now offers a suite of integrated services—coordinated support to make significant progress toward commercialization. With the Technology Alliance we founded the new Innovation Showcase, where select nascent companies from the region's universities and research institutes present to angel investors. With the WBBA we founded the WINGS: Medical Technology Angel Network. Our staff now includes personnel with SBIR and STTR grant-writing expertise, and we offer assistance in locating applicable calls for proposals, identifying or establishing partner companies, and preparing the applications. We have already helped researchers win a number of these important grants, and we look forward to helping many more researchers win such invaluable funding for their start-ups.

Even after company launch, particularly in this tough economic climate, we want the Center to stay in touch with our start-up companies. As these UW start-ups continue to grow, we can help connect the entrepreneurs behind UW start-ups to experienced management and follow-on investors.

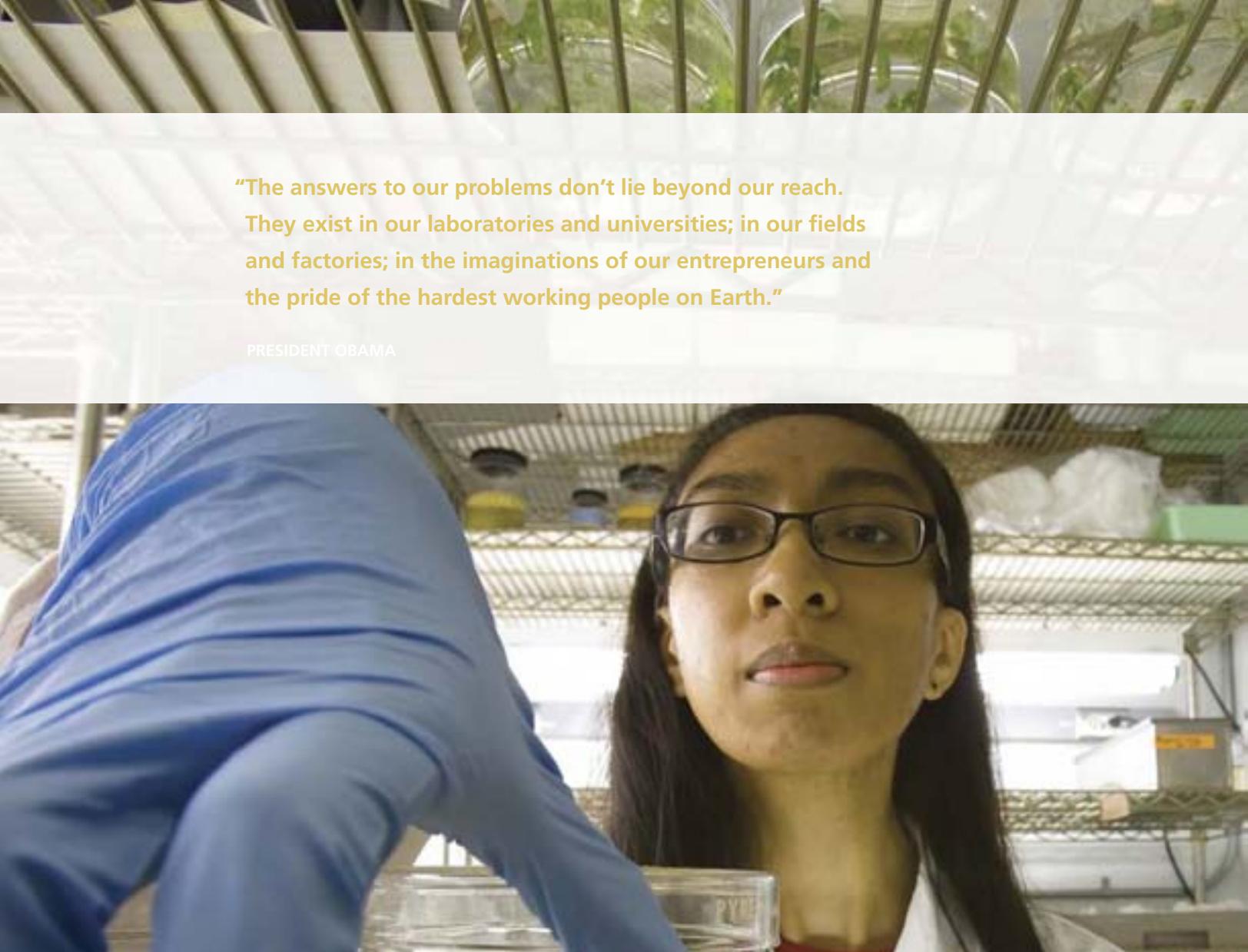
As you read the following summary of our activity from July 2008 to June 2009, know that we are poised on the threshold. A new Program for UW Entrepreneurial Faculty Fellows, increased resources for life science and clean tech ventures, and the establishment of industry partnerships are already on the docket for 2010. Our vision is bold, and it calls for increased service to the entire campus community.

The Center for Commercialization encourages UW researchers to put their innovations into everyday use. We do everything we can to make this happen. Our goal is to make it routine for UW researchers to see their inventions attain commercial success while they remain dedicated to the University of Washington, increasing its prestige as *America's premier public research university*.

### Linden Rhoads

*Vice Provost, Technology Transfer  
Executive Director, The UW Center for Commercialization*





“The answers to our problems don’t lie beyond our reach. They exist in our laboratories and universities; in our fields and factories; in the imaginations of our entrepreneurs and the pride of the hardest working people on Earth.”

PRESIDENT OBAMA

1 WELCOME FROM THE VICE PROVOST

---

3 2009 FAST FACTS

---

4 NEW VENTURES

---

**SUMMARY OF ACTIVITY:**

6 Agreements

7 Innovations

8 Patents

---

8 2009 STARTUP COMPANIES

---

**FEATURES:**

10 CleanTech

12 Software

14 Life Sciences

---

**RESEARCHER HIGHLIGHTS:**

16 Michael Hochberg

17 David Russell

---

18 2009 TOP TEN REVENUE-GENERATING TECHNOLOGIES

---

21 FINANCIAL RESULTS

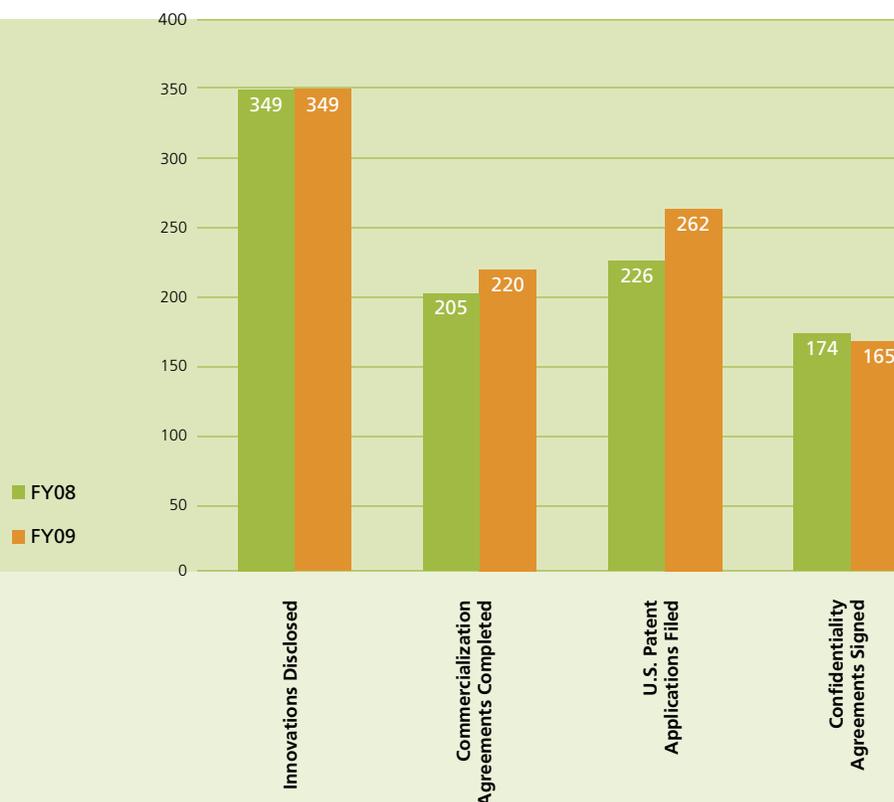
---

24 THE UW CENTER FOR COMMERCIALIZATION 2009 EXTERNAL ADVISORY BOARD

## Fast Facts

- The UW Center for Commercialization manages a total patent portfolio of over 2,200 issued and pending patents filed in the U.S. and around the world.
- Over 250 companies have been started by UW students and faculty or with UW technology.
- Over \$3 million in Commercialization Gap Funds (formerly Technology Gap Innovation Fund) have been awarded to 66 projects since the program was introduced in 2004. This joint program of the UW Center for Commercialization and the Washington Research Foundation (WRF) supports UW innovations that are commercially promising.
- UW innovators earned \$12 million from their successful technologies in FY09.
- The UW Center for Commercialization revenues contributed over \$20 million in FY09 to the UW's Royalty Research Fund, which advances new directions in research.
- In FY09 over 6,600 licenses were executed for academic no-charge software/content. Through the UW Center for Commercialization portals (UW OpenDOOR and Express Licenses), UW innovators make available academic licenses, open source software, freeware, and data sets.
- In FY09, the UW Center for Commercialization launched the Entrepreneur-in-Residence program where veteran entrepreneurs meet with UW researchers to identify start-up opportunities and provide counsel on next steps.

### FY08-FY09 COMPARISON





## New Ventures

The goal of the UW Center for Commercialization's New Ventures (previously LaunchPad Services) is to build a strong supportive system in which UW innovators can transition their research from academia to a commercial endeavor. Our new name reflects the exciting changes taking place within the UW Center for Commercialization. In 2010, the group will welcome two new directors: Tom Clement will be the Director of New Ventures—Life Sciences; Rick LeFaivre, Ph.D. will be the Director of New Ventures—Technology. In addition, this year we added new programs and resources and strengthened existing programs to better serve the UW innovation community. The enhanced New Venture services include:

### **The UW Center for Commercialization Entrepreneur-in-Residence and New Ventures Advisor Programs**

To grow the university's start-up activity, the UW Center for Commercialization launched the New Ventures Advisor (formerly LEA) and Entrepreneur-in-Residence programs. The UW Center for Commercialization Technology Managers work with New Ventures staff to identify and match New Ventures Advisors and EIRs with specific technology researchers who have promising technologies that have the potential to be the basis for start-up stage companies. New Ventures Advisors include experienced local business executives, entrepreneurs, attorneys, and investors who meet regularly with UW innovation teams. The sessions are designed to help the teams focus their ideas, practice their business plan pitches, and anticipate questions from potential investors. New Ventures Advisors work closely with faculty to educate and mentor them on the company formation process. The EIR program was developed with direction and funding from the

Washington State Legislature and the Washington State Economic Development Commission (WEDC), and with financial support from the Washington Research Foundation. EIRs generally become involved when a project needs product development and market development strategy and expertise. To date, the UW Center for Commercialization has successfully recruited 25 executives to serve as New Ventures Advisors and 9 highly experienced entrepreneurs into the Entrepreneurs-in-Residence program.

### **Innovation Showcases**

The Innovation Showcase events, conceived by the UW Center for Commercialization, provide a venue to connect angel investors with the innovation community—a unique and forward thinking partnership between the UW Center for Commercialization, WSU, Washington Research Foundation, Fred Hutchinson Research Center, Pacific NW





National Lab (PNNL), and the Technology Alliance. At showcase events, researchers present their technologies to investors, entrepreneurs, business development professionals, and business community members who are interested in evaluating early-stage, commercially viable technologies. These events highlight the most compelling commercial opportunities from academic and research institutions with the goal of increasing access to capital and resources for these high potential projects.

### **Interns and Class Projects**

The UW Center for Commercialization affiliation with the Foster School of Business Center for Innovation and Entrepreneurship partners MBA students, College of Engineering Certificate graduate science students, and technology students with UW technologies. This program grew to over 30 interns during Fall 2009. Depending on the stage of the technology, student teams and interns conduct market research, review the patent landscape, develop business plans, and explore funding potential. These partnerships have proven mutually beneficial as they provide valuable start-up and business experience for the students and key market acceptance data and evaluations of the opportunity for UW researchers.

### **Funding Support**

Raising money to fund a start-up is challenging; never more so than in 2009. The UW Center for Commercialization works closely with our innovation teams to determine the best fund-raising strategy for each opportunity. In addition to the Commercialization Gap Fund managed by the UW Center for Commercialization with support from the Washington Research Foundation, there are a number of gift/gap funding programs at the state and local level including the Life Sciences Discovery Fund, the Washington Research

Foundation Gift Program, the Washington Technology Center (WTC) Research and Technology Development Grant Program, the ITHS/Pharmacy Ignitions Awards, and the Coulter Foundation Grant Program. Federal funding mechanisms include the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.

In 2009, the UW Center for Commercialization and New Ventures introduced new resources and staff to expand how we are able to assist our innovation teams in their efforts to identify opportunities and to win commercialization grant funding. To date, there have been more than 12 proposals submitted, with 3 awards already won, and nearly \$1 million in key seed funding secured for Arzeda, Nanofacture, and Portage Bay Photonics.

Other New Ventures programs for commercially-focused and entrepreneurial faculty included the From Invention to Start-up lecture series and the Wendy Kennedy Inventor Commercialization Workshop.

The UW Center for Commercialization staff is committed to helping our innovators succeed. In addition to the formal programs, each Technology Manager forms a partnership with New Ventures staff to coach researchers as they build their investor pitches and work on business plans.



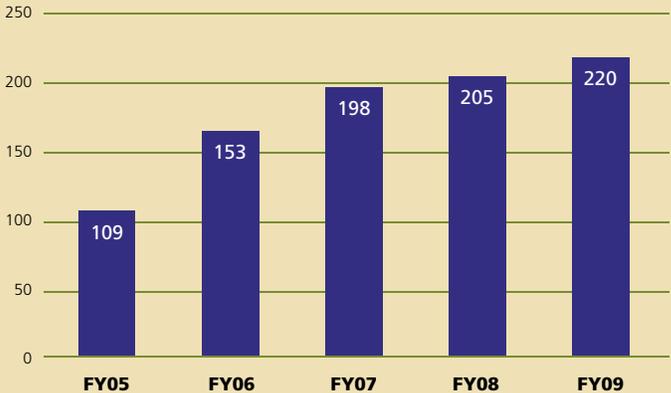
# Summary of Activity

“The UW Center for Commercialization plays a vital role in building our state’s innovation economy. Washington’s competitiveness is strengthened by having a premier research institution like the UW. The UW Center for Commercialization is at the vanguard in its efforts to support researchers and to see more start-ups founded around their innovations.”

ROGERS WEED, Director, Washington State Department of Commerce

## Agreements & Innovations

Licenses/Options	100
Software Use Agreements over \$1000	96
Research Tool Use Agreements over \$1000	24
<b>TOTAL</b>	<b>220</b>

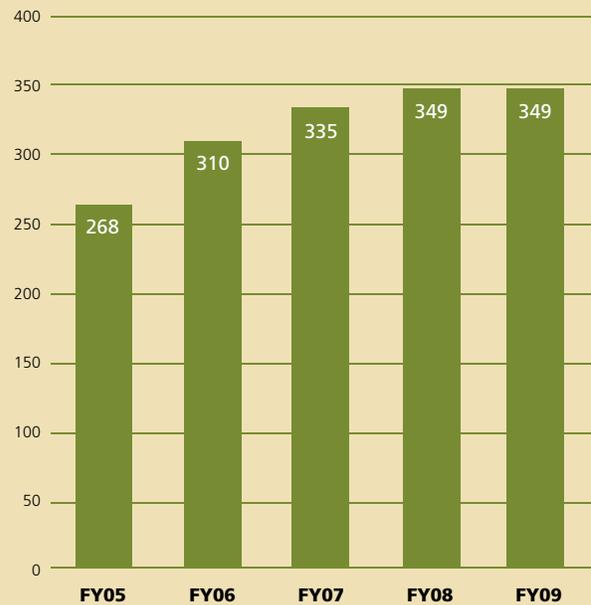


FY09 COMMERCIALIZATION AGREEMENTS COMPLETED

FY05-FY09 LICENSES AND OPTIONS COMPLETED



	FY05	FY06	FY07	FY08	FY09
Arts and Sciences	26	23	27	27	31
Dentistry	1	1	3	1	2
Engineering	122	156	172	169	151
Forest Resources	0	0	0	0	2
Information School	0	0	1	2	2
Medicine	94	102	111	115	128
Ocean and Fishery Sciences	11	12	8	18	23
Pharmacy	2	4	4	4	1
Public Health	2	5	4	6	2
Other	10	7	5	7	7
	<b>268</b>	<b>310</b>	<b>335</b>	<b>349</b>	<b>349</b>

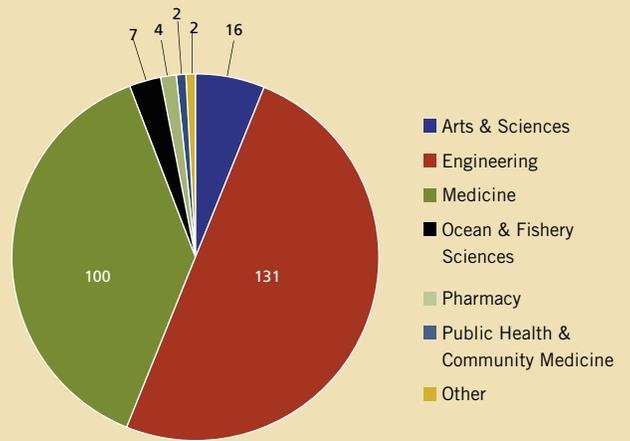
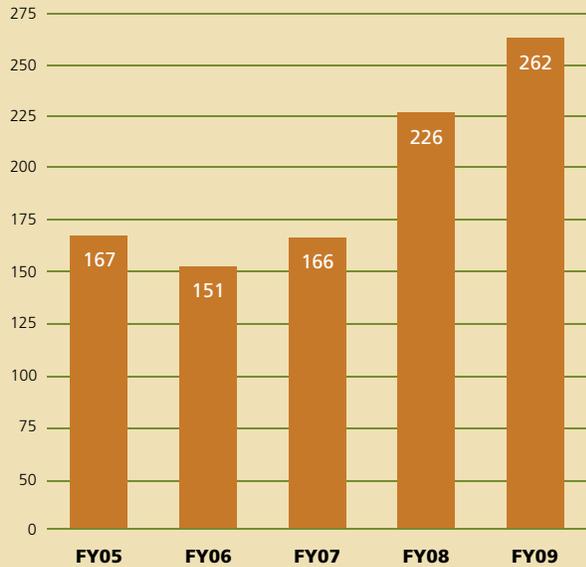


### FY05-FY09 INNOVATIONS REPORTED BY COLLEGE/SCHOOL

The above table illustrates the college/school affiliation for innovations reported in FY09. The percentage is pro-rated in the case where more than one college/school is affiliated with the innovation. The Department of Bioengineering reports jointly to the School of Medicine and College of Engineering; thus, half of the total number of innovations is credited to each college/school.

### FY05-FY09 INNOVATIONS REPORTED

# Patents



FY05-FY09 U.S. PATENT APPLICATIONS FILED

FY09 U.S. PATENT APPLICATIONS FILED, GROUPED BY COLLEGE OR SCHOOL

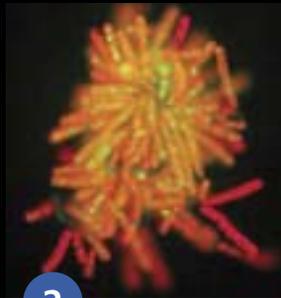


1

**Arzeda Corporation**  
BIOCHEMISTRY

**David Baker**  
**Daniela Grabs**  
**Alexandre Zanghellini**  
**Eric Althoff**

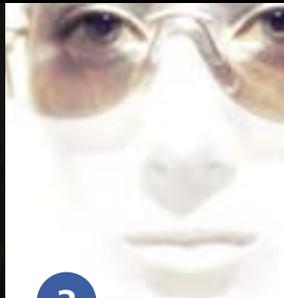
Arzeda develops novel biocatalysts using groundbreaking computational enzyme design and engineering technology.



2

**AXI, LLC**  
BIOLOGY

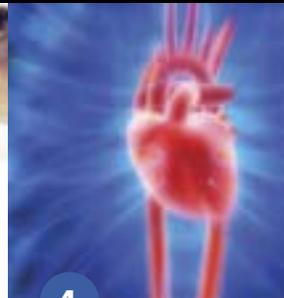
**Rose Ann Cattolico**  
AXI is creating commercially advantageous strains of algae for the production of biofuels.



3

**AYA Optics, LLC**  
MECHANICAL  
ENGINEERING

**Minoru Taya**  
**Chunye Xu**  
AYA Optics is advancing "smart" sunglasses and window technology that allows users to adjust the transparency.



4

**Calcionics**  
BIOENGINEERING

**Cecilia Giachelli**  
Calcionics develops first-in-class peptide therapeutics targeting calcification to prevent and treat cardiovascular disease and other medical conditions.



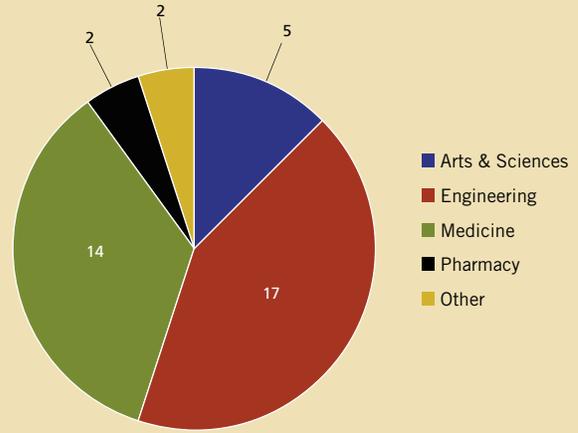
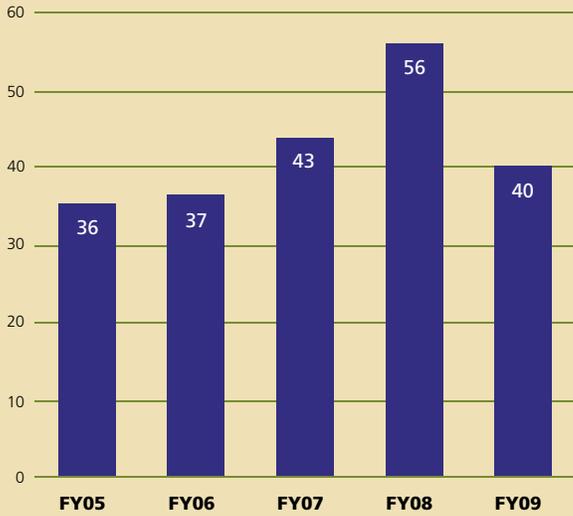
5

**FATE Therapeutics Inc.**  
PHARMACOLOGY

**Randall Moon**  
FATE is working toward the development of small molecule modulators of adult stem cells.

## Start-Up Companies

In FY09, agreements for ten new company starts were completed

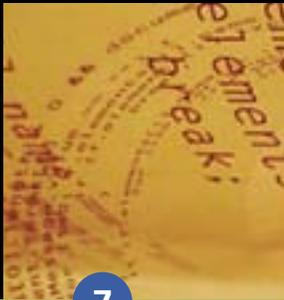


**FY05-FY09 U.S. PATENTS AWARDED**

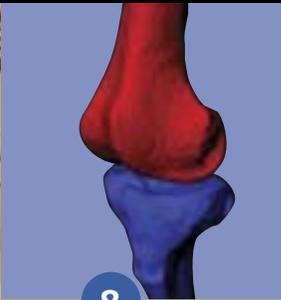
**FY09 U.S. PATENTS AWARDED, GROUPED BY COLLEGE OR SCHOOL**



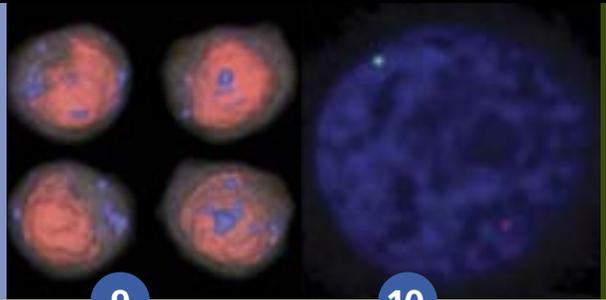
6



7



8



9

10

**Impel NeuroPharma**  
PHARMACEUTICS

**Rodney Ho**  
**John Hoekman**  
Impel NeuroPharma is creating a new way to deliver pharmaceutical drugs directly to the brain, resulting in a more effective and efficient means of treating chronic pain, Alzheimer's, and brain cancer.

**PetraVM, Inc.**  
COMPUTER SCIENCE & ENGINEERING

**Luis Ceze**  
**Mark Oskin**  
PetraVM is developing software to improve the development and testing of multi-threaded software.

**SegVue**  
MECHANICAL ENGINEERING & RADIOLOGY

**Randal Ching**  
**Mark Ganter**  
**David Haynor**  
**Duane Storti**  
SegVue is working on advanced algorithms and 3D image software solutions for the medical imaging, biomechanical, and security industries.

**VisionGate**  
MECHANICAL ENGINEERING

**Eric Seibel**  
VisionGate has developed an in vitro, cell characterization platform technology.

**XORI**  
IMMUNOLOGY AND BIOCHEMISTRY

**Nancy Maizels**  
**W. Jason Cummings**  
**Munehisa Yabuki**  
XORI is working toward a unique and potentially disruptive technology for the rapid discovery and development of monoclonal antibodies (MAbs) in vitro.

## Featured Research

CONDUCT RESEARCH



### New material extends the life of touch screen devices

If the letter “e” goes dead on the touch screen of an iPhone, Tablet PC, or other mobile device, a recycling or trash bin is the next stop. A supermarket touch screen wears out after about 50,000 uses. Alex Jen, Professor and Chair of Materials Science and Engineering, is developing new technology to extend the durability of these products, no small goal given the burgeoning market for touch screens.

Jen and his team are developing a transparent organic electrode film to replace indium tin oxide (ITO), a brittle and expensive material now used in about 90 percent of touch screens, flat panel displays and TVs, and portable electronics. His hybrid electrode unites conductive organic polymer with a metal grid of silver or copper.

“This material will be much cheaper to produce than ITO by using a roll-to-roll printing process as in printing newspapers. It has excellent transparency and is so flexible it can even be incorporated in rollup displays,” Jen said.

In 2009, the UW Center for Commercialization awarded Jen a Commercialization Gap Fund award to conduct a market analysis. The UW Center for Commercialization has filed patent applications, connected him with potential investors and manufacturers, and is guiding establishment of a spin-off company.

“The UW Center for Commercialization has been very helpful in providing seed funding and connecting us with the business world, especially helping us to identify potential target markets and advisors who can help steer the company. Technology Manager Bolong Cao was critical in putting together a team of advisors that has enabled us to move from research to start-up. The team identified the first application among the many potential directions and brought clarity to the strategy,” Jen said.

With an infusion of capital and progression to licensing and manufacture, Jen’s innovation could be on the market within three to five years, extending the lifespan of the letter “e” and its cohorts, and the billions of touch-screen and electronic devices consumers rely on daily.

**“The breadth of UW research in the clean tech arena is impressive, and it was rewarding to help bring together the necessary business expertise to position these technologies for future commercial success.”**

**JEFF CANIN**

*The UW Center for Commercialization  
Emeritus Entrepreneur-in-Residence*



## A new approach in the treatment of drinking water

In the industrialized world, drinking water undergoes a rigorous purification process to remove harmful contaminants. In the developing world, more than a billion people lack access to clean, safe drinking water.

Mark Benjamin, Professor of Civil and Environmental Engineering, is using a common water treatment additive, aluminum oxide, in an innovative new way to improve conventional water filtration processes. In laboratory studies Benjamin heated aluminum oxides to produce microparticles that form a thin layer over polymer filtration membranes. The layer protected the membranes from fouling and, surprisingly, removed pollutants from the water far more effectively and efficiently.

“In this approach, the aluminum oxide layer is the critical component, and the membrane becomes just a support structure,” Benjamin said. “This simple, low-tech advance suggests we can use much cheaper membranes and significantly decrease treatment costs.”

The UW Center for Commercialization awarded Benjamin a Commercialization Gap Fund award in 2008 to continue work confirming the science behind his approach. “Patrick Shelby in the UW Center for Commercialization has not only provided key market information and potential licensees, but also helped me understand how industry views my technology and how to attract their attention,” Benjamin said. The next step will be to demonstrate practicality for municipal, industrial, and even portable field uses of the scaled-up prototype.



## UW start-up company, MicroGREEN Polymers, takes recycling to a new level

A UW spin-off company is on a mission to create a greener cup for your coffee and more environmentally friendly containers for your food. MicroGREEN Polymers, Inc., based in Arlington, Washington, is developing an expanded plastic made from recyclable water bottles (PET). The patented technology, created in the laboratory of Mechanical Engineering Associate Professor Vipin Kumar, creates billions of microcellular bubbles in solid thermoplastics to produce an expanded material that uses only about 20 percent of the original source plastic.

Krishna Nadella, co-founder and CTO, earned his doctorate at UW while assisting Professor Kumar to refine the solid-state microcellular foaming process. With the UW Center for Commercialization and additional investor support, Krishna has guided the seven-year old company through its start-up phase. Company milestones include technology patent protection in the U.S., Europe, and Japan, patents pending in 20 countries, joint development agreements with electronics, defense, and consumer packaged goods companies, and its first royalty-bearing license with a Japanese company that uses the material as a light reflector plate in large-screen LCD TVs.

The UW Center for Commercialization Vice Provost Linden Rhoads introduced the company to Atlas Accelerator, which helped MicroGREEN close its most recent round of funding. MicroGREEN Polymers recently won a 2009 ZINO Zillionaire Investment Fund award for the viability of its business plan.

“The next step is to demonstrate that the expanded sheets can be thermoformed into containers at commercial production speeds,” Nadella said. Food containers are a \$25 billion market, and gaining even a small share would be huge.

“The UW Center for Commercialization has had a big hand in getting us to this point and continues to add value and encouragement even after a license has been signed. They are working to keep high-technology jobs in the state,” Nadella said. “And a portion of the royalties paid to UW go back to fund continuing research by Vipin Kumar and his students.” That, in itself, is a fine example of recycling.

# Tech

# Soft

## Applying mathematics in the fight against cancer

Treatments for malignant brain tumors (glioma) vary little from one patient to the next and are limited to radiation, surgery, and drugs that often cause debilitating side effects with modest survival improvement. Mathematics might seem an unlikely addition to the mix, but could provide a powerful new tool enabling more accurate prognosis and more personalized treatment that could improve quality of care and of life. That's the goal of Kristin Rae Swanson, a mathematical biologist and Research Associate Professor of Pathology, Neuropathology, and Applied Mathematics.

Malignant gliomas are fatal because the cells tend to spread rapidly and diffusely in the brain. Swanson developed a mathematical model and computer simulation that can predict with startling accuracy where a tumor will grow and how likely a patient would be to respond to various treatment protocols. She recently received a five-year \$1.9 million grant from the National Institutes of Health to study patient response to radiation therapy and is collaborating with clinicians and researchers at the UW and three other institutions, including one in Paris.

Just a decade after earning her doctorate at UW, Dr. Swanson is a rising star in the new and burgeoning field of mathematical oncology. The UW Center for Commercialization began working with her about a year ago to develop an intellectual property strategy to protect her mathematical algorithm and software. These early-stage discussions focused on future research directions, a possible patent application, and a business strategy to assess potential demand for her tools and the likely adopters. With a goal of impacting patient care, these early discussions can identify key questions to be pursued to increase the likelihood of translating her work to the clinic.

"The partnership between my lab and the UW Center for Commercialization has laid the groundwork that could allow us to translate these mathematical tools into clinical application as early as 2011," Swanson said.

The hope is that her innovative work will lead the way for the next generation of treatments that could extend the lives of patients with glioma.

## Clinic's pilot project taps into health care system inefficiencies

America's health care system is regularly in the news, with calls for increasing efficiency and effectiveness, expanding access, and reining in escalating costs. Every health care dollar must be spent responsibly. Mental health and substance abuse problems affect one in four adults in the U.S. each year, and providers seek ways to demonstrate the effectiveness of their interventions to consumers, agencies, and third-party payers. A comprehensive, computer-based tool to fill this need may soon be available, thanks to the work of Corey Fagan, Ph.D., Director of the Psychological Services and Training Center, a clinic operated by the UW Department of Psychology. With a 2009 Commercialization Gap Fund award from the UW Center for Commercialization, Fagan and her team (Jon Hauser and Gareth Holman) are refining an evidence-based outcomes tracking tool developed as a pilot project for the clinic.

The Tracking Outcomes of Psychological Services (TOPS) system combines modules for administrative functions such as scheduling and billing, tracking client progress, and quality assurance. The progress-tracking module includes a library of established assessments of general outcomes, problem-specific outcomes, and individualized client targets that therapists can administer during each session. Immediate scoring and graphing enhance interactions between therapist and client and prompt adjustments to interventions. The platform also has useful research applications and allows university programs to integrate client outcome assessment into practitioner training.

The TOPS team is working with the UW Center for Commercialization to explore collaborations, grant funding, marketing, and licensing models to position the tool for scientist-practitioners in training clinics and private practices. "Mary Fabien of the UW Center for Commercialization continues to shepherd us through the process of distributing copyrightable materials, helping us to understand what the steps are to ensure all the contributors are on board with the project," Fagan said. The UW Center for Commercialization has also been instrumental in identifying early adopters to start building a user base.

Through TOPS, the UW Department of Psychology can contribute to the broader mental health services community and encourage research collaborations to further the science underlying the delivery of mental health services.



$$\iint (\frac{\partial L}{\partial y}) dA = \int \int \int \left[ \frac{\partial L}{\partial y} (x, y) \right] dy dx$$

# EXECUTE PLAN **tw**are

## Software startup, PetraVM, sees a big future

The 2008 economic downturn didn't stop two UW Computer Science and Engineering (CSE) faculty members from launching a software start-up. And it didn't discourage Madrona Venture Group and WRF Capital from investing \$1.5 million in PetraVM. The founders, investors, and the UW Center for Commercialization believe the fledgling company has great promise because its products will ensure that complex programs work more reliably.

Professor Mark Oskin is on temporary leave from the UW to devote his time to building PetraVM as its CEO. Co-founder Luis Ceze, a CSE Assistant Professor, is advising the company as it develops its technology. Both are experts in computer architecture and parallel computing.

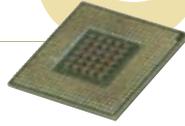
Today's multi-core "multi-threaded" computers and mobile devices have more than one CPU, which divide software processes into multiple pieces and interact to increase operational speed. That increases the challenges for software developers who can no longer write step-by-step, sequential code, but must consider how the multiple cores communicate and divide up information for processing.

"It's so complex that the human brain is the limiting factor," Ceze said. "We can't risk coding errors and bugs that could bring down a bank system or a search engine."

Their software innovation makes a multi-core processor behave more like a sequential machine and permits development of cheaper, simpler, more reliable software. The first product now on the market, Jinx, helps programmers find elusive coding errors.

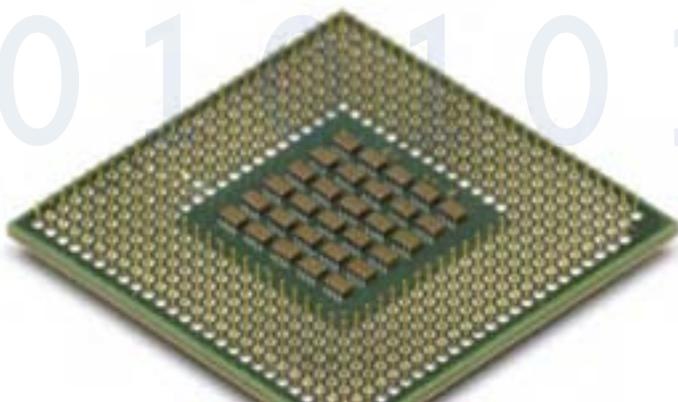
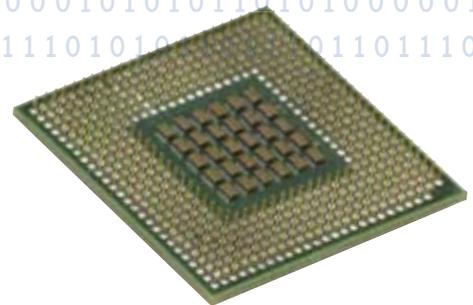
"The UW Center for Commercialization helped us navigate the start-up process, from licensing to garnering approval of outside work engagements," Ceze said. "They helped expedite the process for us."

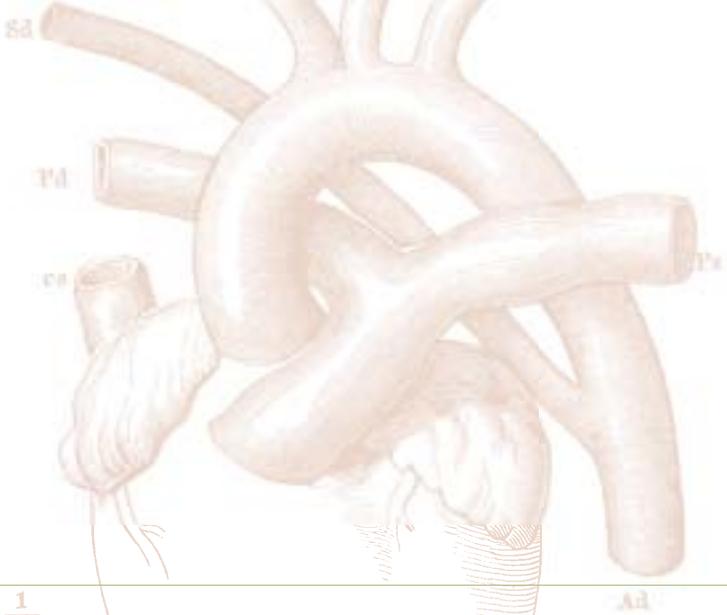
The potential market for PetraVM's future products is growing, and its founders are working to turn PetraVM into a top multi-core software development company.



**"The UW Center for Commercialization has developed a strong program of services to support our innovative faculty. They are an important partner and resource for actively reaching out across campus and within our business community to help build out our UW research commercialization ecosystem."**

**MARK EMMERT**, *President, University of Washington*





## Research could lead to more accurate testing for coronary artery disease

Some 150 million blood lipid panels are done annually in the U.S. to assess levels of cholesterol, high-density (HDL “good”) and low-density (LDL “bad”) lipoproteins, and other substances that affect risk for coronary artery disease – the leading cause of death in the U.S. For the 80 percent of the population with levels in a broad range of normal, these tests are as accurate in assessing risk as “flipping a coin,” says UW physician Jay Heinecke, a Professor in the Division of Metabolism, Endocrinology, and Nutrition.

In conducting groundbreaking research on the protein composition of HDL and LDL, Heinecke and his colleagues are upending long-accepted theories. They discovered that the pattern of protein expression varies significantly between people with and without coronary artery disease. Heinecke theorizes that the cardioprotective effects of HDL can be harmed when specific proteins alter the “good” lipoprotein. Their discovery could lead to far more accurate screening tests for risk of coronary artery disease and more individualized treatment that could save lives and reduce health care costs. Their papers on their findings, published in the *Journal of the Clinical Investigation* and *Circulation*,

are drawing wide attention. Additionally, they believe the screening method could have wide application for other metabolic diseases, such as diabetes.

“The UW Center for Commercialization has filed for patents on our testing method and has been extraordinarily helpful in providing the commercialization roadmap and resolving roadblocks so we could progress towards licensing the technology and impacting patient care,” Heinecke said. “They’ve also brought in EIRs and other experts to explore whether our screening method could have wider applications, perhaps for other metabolic diseases, such as diabetes.”

Heinecke notes that challenging long-accepted knowledge and methods can involve a “long haul” to prove the value of a new approach. His team’s next step is to secure the considerable funding needed to conduct further studies and clinical trials.

**“The UW’s Center for Commercialization is a vital link between break-through life science discoveries and better health care solutions. The WBBA views this partnership as a key to strengthening the life science community in Washington State.”**

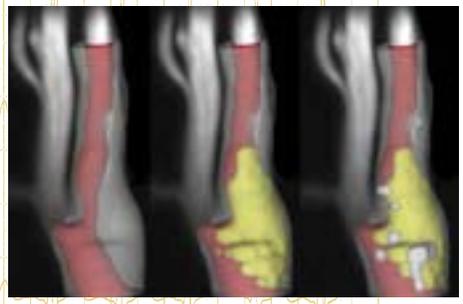
CHRIS RIVERA, *President, Washington Biotechnology and Biomedical Association*



RESEARCH OUTCOME



EXECUTE PLAN



### Researcher's skill set tackles monitoring of abnormal heart rhythms

David Linker is a UW cardiologist with engineering training and the technical chops to invent a device to improve monitoring and diagnosis of atrial fibrillation (AF), the most common abnormality in heart rhythm. The UW Center for Commercialization began working with Linker in 2004, providing a Commercialization Gap Fund award to develop a prototype device and identifying additional support from the Washington Research Foundation.

Five years later he received one patent and a second one is pending. Laura Dorsey in the UW Center for Commercialization has been working with Linker every step of the way. The Center also helped Linker establish a company, Cardiac Insight, Inc., that is working to partner with an existing medical device company to bring the technology to market.

More than two million Americans have atrial fibrillation, which increases with age, but they may be asymptomatic or only intermittently experience palpitations, shortness of breath, or chest pain. A routine physical exam is unlikely to detect the problem, and current bulky monitors can store heart rhythm data for only brief periods and may miss episodes. Patients with long-term AF are at greater risk for stroke and disability or death, consequences that could be prevented with better diagnosis and medication.

Linker solved the monitoring challenge by developing a mathematical algorithm that recognizes AF while discarding normal heart rhythms, and by designing a small, wearable device that weighs less than one ounce and can store data over a month of monitoring. It is 98% accurate in identifying AF, with a false positive rate four times lower than that of current devices. This inexpensive diagnostic approach could thus reduce health care costs and save lives.

"In addition to funding for the prototype, the UW Center for Commercialization provided invaluable help in understanding the complex market landscape," Linker said. "I now have a National Institutes of Health grant to begin a small clinical study and hope to commercialize the device within the next year or two."

### Image analysis technology helps prevent strokes

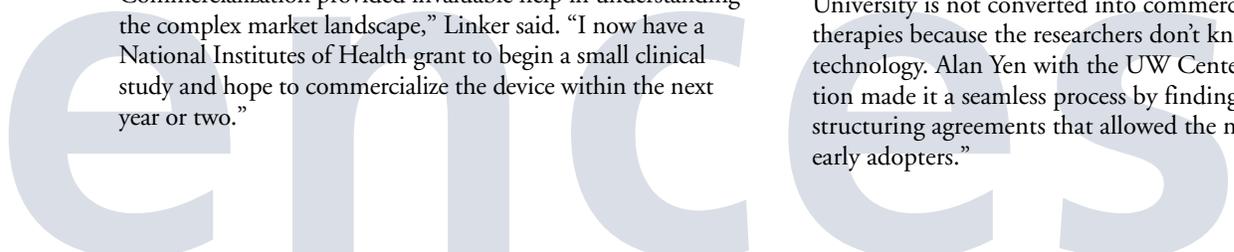
More than 15 years of UW research to identify patients at high risk for a stroke has matured into technology now exclusively licensed to a UW start-up company, VPDiagnosics. The Seattle company received a \$2.9 million grant from the National Institutes of Health (NIH) to fund a multi-center clinical study to evaluate use of the technology in more than 300 patients.

MRI-PlaqueView is image-processing software that incorporates technology developed by the UW's Vascular Imaging Laboratory (VIL). It gives researchers and clinicians an efficient tool for analyzing magnetic resonance (MR) images of plaque that can form inside arteries and is linked to heart attacks and stroke. MRI-PlaqueView provides automatic identification and 3D visualizations of plaque components not seen with other diagnostic methods. The software rapidly and accurately summarizes key findings and images in a format easily shared among radiologists, cardiologists, and surgeons. The NIH-funded clinical trial is the first prospective study to evaluate the clinical use of MR direct atherosclerosis imaging analysis for stroke prediction.

"This powerful tool will enable researchers to study the progression of atherosclerosis in patients and their response to treatment," said Chun Yuan, UW Professor of Radiology and Co-Director of the VIL.

MRI-PlaqueView should also enhance stroke prevention efforts, save lives, and help reduce the annual \$60 billion in stroke-related health care and economic costs. VPDiagnosics licensed the technology from the UW in 2007. It received FDA clearance in late 2008 and is now commercially available. The UW Center for Commercialization, VPDiagnosics, and VIL continue to work in close partnership on research, clinical studies, and commercialization efforts.

"The UW Center for Commercialization was instrumental in licensing this technology," commented Hui Hu, President and CEO of VPDiagnosics. "Too often research knowledge from a University is not converted into commercially available tools and therapies because the researchers don't know how to validate their technology. Alan Yen with the UW Center for Commercialization made it a seamless process by finding early Beta testers and structuring agreements that allowed the market to be built around early adopters."



# Michael Hochberg

## UW STAR researcher innovates on a small scale

Michael Hochberg is pursuing goals of Olympian magnitude, but instead of “swifter, higher, stronger,” his quest is faster, lighter, smaller—astonishingly small. Imagine fitting 100 images of the Washington State seal on the end of a human hair. That is the nanoscale at which he is working.

A 29-year-old Caltech-trained physicist, Hochberg is an Assistant Professor of Electrical Engineering recruited to the UW in 2007 for his visionary expertise in nanophotonics. His challenge is to manipulate and control laser light particles (photons) to encode information in extremely small silicon-polymer chips and circuitry. Computers and other devices now powered by electronics could then communicate using light, saving energy and speeding up computations.

Silicon nanophotonic research could result in significantly improved chip speeds, a boon for scientists analyzing data from the far reaches of the universe to the workings of the human genome, and for ordinary users running increasingly sophisticated applications remotely through cloud computing. Practical application is still years away, but its arrival will usher in a paradigm shift in research and innovation, with enormous economic impact and practical benefit to many sectors of society.

The UW Center for Commercialization has worked closely with Hochberg since he arrived at the UW, an example of investing time and resources in providing early support to an exceptionally promising researcher. In the two years since Hochberg joined the UW, the Center for Commercialization has filed numerous patents to protect his work. We have connected him with senior business executives, entrepreneurs, and venture capitalists who can offer guidance on establishing start-up companies focused on his intellectual property, and strategy on funding sources.

“The UW Center for Commercialization has been extremely supportive. They have a world-class team, and are going the extra mile to support my research and commercialization efforts. They were key in enabling me to win my recent STTR grant, helping with company formation, grant writing, and market analysis,” Hochberg said.

Hochberg’s nanophotonics work requires a \$3.5-million electron beam lithography facility, which is being installed in the Washington Technology Center. The only instrument of its kind in the Northwest, it generates an electron beam just six billionths of a meter wide. A gift from the Washington Research Foundation and funds from the Washington Strategically Targeted Academic Research (STAR) program enabled the acquisition.

This is a tool that can be used to draw arbitrary structures on the nanoscale, like a pencil that is only a few nanometers wide. The arrival of both Hochberg and the electron beam machine at the UW are helping to build critical mass that will attract other outstanding researchers, talented students, and grant funding that will stamp the region as a world-class center and leader in nanophotonics innovation. The UW Center for Commercialization is actively working with Hochberg to establish an IP framework that creates opportunities for industry participation and support.

Hochberg’s work is already earning prestigious recognition. In January 2010 he will be among 100 top young scientists honored at a White House ceremony as recipients of 2009 Presidential Early Career Awards for Scientists and Engineers. His award provides \$1 million over five years to support his research.



# David Russell

## Drug Development Market Catches Up To UW Researcher's Technology

David Russell, Professor of Medicine and Biochemistry, is a classic example of building a better mousetrap long before the world was ready to use it. The UW Center for Commercialization has been working with Russell since 1996, when discussions began around commercial opportunities for his innovative process for genetically engineering human cells. At the time it attracted relatively little attention from existing biotechnology companies. Russell's visionary work to create human cell lines with many potential uses was far ahead of developments in his field. The UW Center for Commercialization recognized the promise and invested early by filing for patent protection around his work. Now, with other scientific advances, the field has caught up, and patience and persistence are giving way to studies that could lead to clinical applications that save lives. More than a decade after the UW Center for Commercialization began working with Russell, a British biotech company acquired the rights to his process, which shows great potential to advance the diagnosis and treatment of cancer and other devastating diseases.

Medical researchers typically develop drugs targeted for the most common genetic mutations that cause cancer. The problem is that numerous genes may interact in complex ways to promote tumor growth. Individual patients with the same type of cancer may respond differently to a standard drug combination because the mix of genes involved and their interactions often differ from person to person. It is difficult and expensive to design drug combinations to target these interactions and also less common mutations.

Most new cancer drugs are tested in mice genetically engineered to express a specific cancer-causing gene. Results of such tests are imprecise and cannot reliably predict how patients will respond to the drug. The key to significantly advancing diagnosis and treatment is to develop "personalized" diagnostic gene profiles and medicines for subgroups of patients who share similar patterns of disease and gene interaction.

Russell's method quickly and reliably alters any gene naturally found in a human cell line so laboratory studies can compare how normal cells and those with the altered gene respond to a test drug. It allows researchers to efficiently study the effects of different drugs on all the gene mutations in a tumor.

In 2008 the UW Center for Commercialization negotiated the licensing of his method to Horizon Discovery, Ltd., a new British biotech firm with a mission to accelerate the search for more personalized, targeted medicines. Horizon gave the name Genesis to Russell's gene-engineering technology and X-MAN to the lines of mutant and normal cells. Russell's work now has worldwide reach. Horizon markets the cell lines to academic research institutions and biotechnology and pharmaceutical laboratories.

"Our licensing agreement went through about five or six drafts to clarify specific rights and make certain there were no restrictions to my ongoing research," Russell said. "It's been a good collaboration with the UW Center for Commercialization, specifically Angela Loihl, who has done a great job of making certain the broadest possible dissemination and impact of my technologies will be achieved through the structure of the license and the relationship built with Horizon.

Thus, Russell's better mousetrap could significantly decrease the population of laboratory mice as researchers discover the advantages of using the X-MAN cell lines.



# 2009 Top Ten Revenue-Generating Technologies

1

**\$33,844,984**

## Polypeptides in Yeast

A method of producing recombinant proteins in yeast

GENOME SCIENCES

Hall  
Ammerer

2

**\$7,366,501**

## Clotting Factor/ Factor IX

Construction of a plasmid containing the human gene for factor IX (Christmas Factor)

BIOCHEMISTRY

Davie  
Kurachi

3

**\$1,007,888**

## Hepatitis B Vaccine

A method of producing synthetic hepatitis B antigen. Jointly developed with the University of California

GENOME SCIENCES

Hall  
Ammerer

4

**\$885,825**

## Metabolism-Based Drug Interaction Database

A web-based research tool that allows researchers to search peer-reviewed literature and ask specific questions about the content of drug interaction studies

PHARMACEUTICS

Levy  
Ragueneau-Majlessi  
Carlson  
Hachad

5

**\$652,492**

## Tape Management Library for STK 4400 Systems

A series of client software for the Unisys STK 4400 tape library

UW TECHNOLOGY

Profit  
McHarg  
Mason

THE UW CENTER FOR COMMERCIALIZATION SUPPORTS UW'S INAUGURAL

## Environmental Innovation Challenge

The UW Center for Commercialization was proud to be the Grand Prize sponsor at the inaugural UW Environmental Innovation Challenge produced by the Center for Innovation and Entrepreneurship held in April. Interdisciplinary teams of business and engineering students were challenged to develop products that addressed up-and-coming market conditions and showed potential to generate revenue while enhancing environmental sustainability.

Sixteen teams competed for \$22,500 in prize money representing a range of ideas to reduce environmental impacts and improve ecological sustainability. Of the sixteen teams, eight of the projects were technologies managed by the UW Center for Commercialization.

The HydroSense team captured the grand prize with their sensor that screws onto a single water bib or faucet and uses the analysis of acoustic, vibration, and pressure differential signatures of water flow to determine usage. The sensor can calculate real-time water flow and automatically

detect leaks and pipe ruptures, giving consumers a way to track their water usage and be alerted to costly problems. The team projected a 10 to 25 percent reduction in home water usage and savings of \$50 to \$120 a year for one household.



6

7

8

9

10

**\$613,348****Mass Spectrometry  
Fragmentation  
Patterns of Peptides**

Patterns of peptides used to identify amino acid sequences in databases

GENOME SCIENCES

Yates  
Eng

**\$541,168****Flow Cytometry  
Technologies**

A method to analyze the characteristics of individual cells

GENOME SCIENCES

van den Engh  
Esposito

**\$512,063****Clotting Factor/  
Factor XIII**

Recombinant expression of biologically active factor XIII

BIOCHEMISTRY

Davie  
Ichinose

**\$472,384****Simplified High  
Frequency Tuner and  
Tuning Method**

An efficient low-IF architecture that improves the performance of wireless devices

ELECTRICAL ENGINEERING

Suominen

**\$269,961****Bioinformatics Tools**

Includes PHRAP, CROSSMATCH, SWAT, PHRED, and CONSED-AutoFinish software

GENOME SCIENCES

Green

THE UW CENTER FOR COMMERCIALIZATION PROJECTS RECOGNIZED WITH

## Life Sciences Discovery Fund grant awards

The UW Center for Commercialization managed projects that have secured over \$12 million in grant awards from the Life Sciences Discovery Fund (LSDF). The LSDF supports innovative research in Washington State to promote life sciences competitiveness, enhance economic vitality, and improve health and health care. The UW Center for Commercialization works closely with UW researchers assisting them in preparing grant applications and supporting them as they carry out commercialization grant awards.

With help from the UW Center for Commercialization, Drs. Ken Schenkman, Philip Fleckman, and Cecilia Giachelli were each awarded \$150,000 under the newly created Commercialization Grant program which supports commercial translation of health-related technologies. Dr. Schenkman and his team will use the funds to test a new

instrument for the diagnosis and monitoring of shock. Dr. Philip Fleckman will use his funds to test the ability of a percutaneous catheter to resist infection. Dr. Cecilia Giachelli will use the new grant to examine the ability of a modified osteopontin to safely treat vascular calcification while avoiding inflammation.

Dr. Patrick Stayton was awarded the largest LSDF grant to date securing over \$7 million to create a multi-disciplinary research center where scientists will develop new approaches for delivering biological drugs inside human cells. Highly-targeted delivery and release of these drugs to their sites of action inside the cells optimize drug therapy in defined cell populations and minimize damage to other areas of the body.

Other LSDF awardees include:

**Daniel Chiu** **\$763,454**  
CHEMISTRY

**Eberhard Fetz** **\$1,068,985**  
PHYSIOLOGY AND BIOPHYSICS

**Cecilia Giachelli** **\$1,469,606**  
BIOENGINEERING

**Daniel Leotta** **\$509,051**  
APPLIED PHYSICS LABORATORY

**Andre Lieber** **\$202,759**  
MEDICAL GENETICS

**Pierre Mourad** **\$224,958**  
APPLIED PHYSICS LABORATORY

**Deborah Nickerson** **\$1,999,650**  
GENOME SCIENCES

**Tomikazu Sasaki** **\$1,451,193**  
CHEMISTRY



## COMMERCIALIZATION GAP FUND

# Expanded Support for Awarded Projects

The Commercialization Gap Fund has expanded to incorporate a team approach beyond funding. This joint program of the UW Center for Commercialization and the Washington Research Foundation advances the development of UW innovations that are commercially promising. Commercialization awards bridge the funding gap between academic research grants and the stage of development that must be reached to attract seed stage investment. Researchers use the funds to test or refine innovations or create prototypes. In order to leverage the project's funding by contributing market research, IP research, and domain expertise, project support teams include

a UW Center for Commercialization Entrepreneur-in-Residence, Technology Manager, and Patent Agent, an MBA student, and WRF personnel. The team approach was advanced in 2009 in order to help researchers think about realistic milestones, secure critical market input from target customers, and improve the outcome from leveraging resources combined with grant funding.

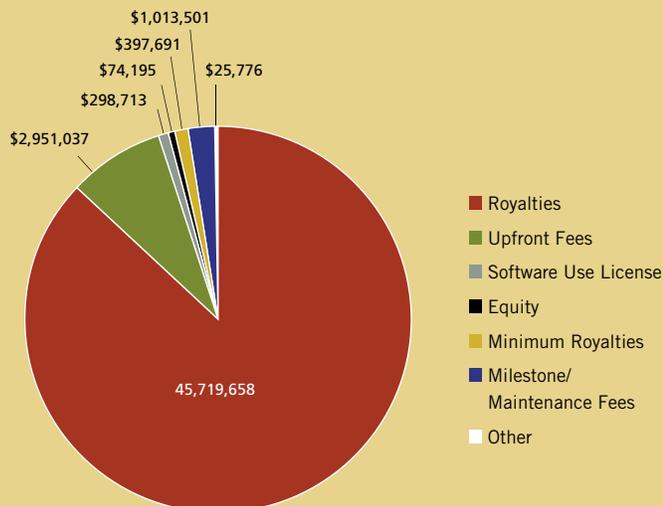
To date, 66 projects have been awarded over \$3 million in Commercialization Gap Funds.

### FY05-FY09 REVENUE

	FY05	FY06	FY07	FY08	FY09
WRF	\$11,174,046	\$12,384,443	\$26,544,945	\$38,226,019	\$42,833,575
The UW Center for Commercialization	7,288,095	11,097,654	8,317,947	7,692,538	7,572,802
Equity	181,573	5,032	3,361,011	1,132,779	74,195
<b>Total</b>	<b>\$18,643,714</b>	<b>\$23,487,129</b>	<b>\$38,233,903</b>	<b>\$47,051,336</b>	<b>\$50,480,572</b>

## Financial Results

### FY09 REVENUE BY TYPE



## FY05-FY09 LEGAL EXPENDITURES

	FY05	FY06	FY07	FY08	FY09
Expenditures	\$2,824,399	\$3,277,839	\$3,157,640	\$4,165,195	\$4,057,070
Reimbursements	\$1,375,385	\$1,091,946	\$1,685,094	\$2,344,302	\$2,447,865

Note: The data for the table above has been reformatted and calculated to be consistent with how the UW Center for Commercialization submits data to the Association of University Technology Managers (AUTM) survey. Legal fees, as defined by the AUTM survey, include patent and copyright prosecution, maintenance, and interference costs, as well as minor litigation expenses.



## FY05-FY09 DISTRIBUTIONS

	FY05	FY06	FY07	FY08	FY09
The UW Center for Commercialization					
Administrative Fee	\$3,149,003	\$2,590,701	\$4,702,479	\$7,154,628	\$8,203,400
Expenses	188,440	174,587	252,128	245,741	172,261
Inventors/Developers	4,588,513	3,624,202	8,057,138	10,064,057	12,763,627
Departments	2,109,870	1,722,095	3,073,636	6,277,601	6,398,868
Project Budgets	2,168,106	1,945,392	2,245,351	2,029,199	1,306,528
Colleges/Schools	954,304	570,935	1,007,620	1,385,527	2,122,567
UW Research Funds	6,743,084	5,485,340	10,891,527	16,130,112	20,900,256
Other Institutions	264,868	44,758	91,590	134,874	182,232
Waived by Inventor for Research			64,083	117,909	179,847
<b>Total</b>	<b>\$20,166,188</b>	<b>\$16,158,010</b>	<b>\$30,385,152</b>	<b>\$43,539,648</b>	<b>\$52,299,586</b>

NOTE: Expenses are legal expenses withheld from royalty distributions and costs from UW Treasury to manage equity. Waived by Inventor is a new category; this option for inventors became available in FY04.

THE UW CENTER FOR COMMERCIALIZATION INTRODUCES

# Entrepreneur-in-Residence Program

In FY09, the UW Center for Commercialization launched an Entrepreneurs-in-Residence program which partners seasoned entrepreneurs and business executives with UW researchers who have promising technologies for creation of a start-up company. The EIRs work closely with the UW researcher and the UW Center for Commercialization Technology Manager assigned to guide them through commercialization milestones such as market development, fundraising strategy, and go-to-market strategy.

## CURRENT EIRS:

### Gino Borland

SERIAL ENTREPRENEUR AND ENERGY ANGEL INVESTOR

### Tom Clement

CO-FOUNDER AND FORMER CEO OF PATHWAY MEDICAL TECHNOLOGIES AND BOARD CHAIRMAN OF THE WBBA

### Michael Cockrill

MANAGING PARTNER OF ATLAS ACCELERATOR AND FORMER CTO OF QPASS

### Perry Fell

BOARD CHAIRMAN AND FORMER CEO OF NANOSTRING TECHNOLOGIES AND CO-FOUNDER OF SEATTLE GENETICS

### Richard Mander

FORMER EXECUTIVE AT APPLE, HUMAN WARE, AND BIG SCREEN LIVE

### Bob Wilcox

FORMER SENIOR BIOMEDICAL EXECUTIVE AT EKOS AND LIFESPEX

## EMERITUS EIRS:

### Jeff Canin

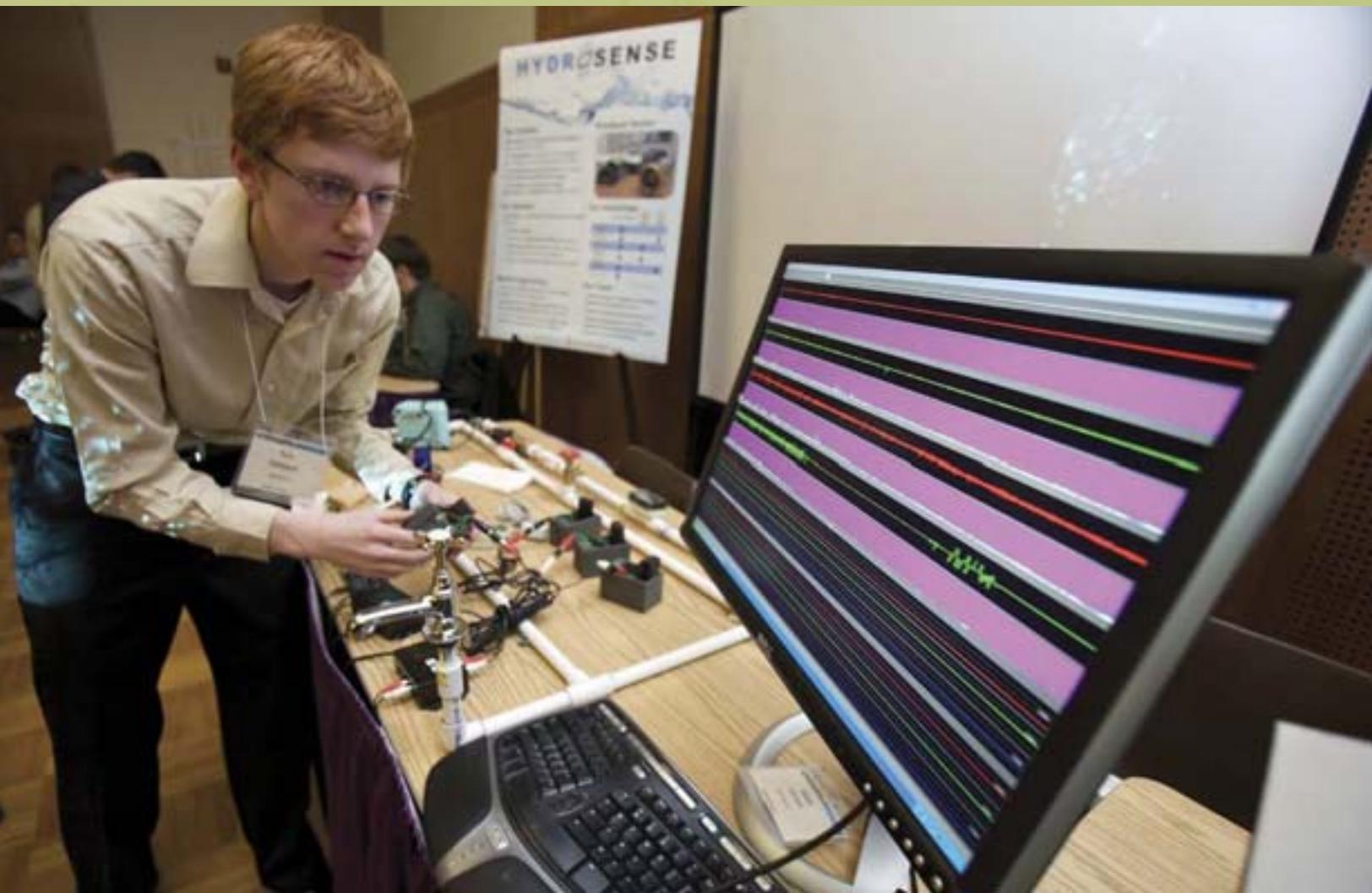
ENERGY ANGEL INVESTOR, FORMER VENTURE CAPITALIST, INVESTMENT BANKER, AND WALL STREET ANALYST AND CO-FOUNDER OF 3 ENERGY RELATED COMPANIES

### Deborah Kessler

FORMER SENIOR EXECUTIVE AT ACUCELA AND ROSETTA INPHARMATICS

### Alex St. John

FOUNDER OF WILD TANGENT AND FORMER MICROSOFT GAMING EVANGELIST





## The UW Center for Commercialization 2009 External Advisory Board

**Rich Barton**  
Zillow

**Brian Bershad**  
Google

**Connie Bourassa-Shaw**  
UW Center for Innovation  
and Entrepreneurship

**Bill Bryant**  
Draper Fisher Jurvetson

**Russ Daggett**  
Denny Hill Capital

**Emer Dooley**  
CIE and Alliance of Angels

**Joe Eichinger**  
CoAptus

**Patrick Ennis**  
Intellectual Ventures

**Oren Etzioni**  
UW Computer Science and  
Engineering

**Greg Gottesman**  
Madrona Ventures Group

**Nick Hanauer**  
Second Avenue Partners

**Ron Howell**  
Washington Research  
Foundation/  
WRF Capital

**Karen Kerr**  
Intellectual Ventures

**Jan Labyak**  
UW Principal Giving Program

**Alan Levy**  
Frazier Healthcare Ventures

**Susannah Malarkey**  
Technology Alliance

**Bill McAleer**  
Voyager Capital

**Matt McIlwain**  
Madrona Venture Group

**Cameron Myhrvold**  
Ignition Partners

**Bob Nelson**  
ARCH Venture Partners

**Bob Overell**  
PhaseRX

**H. Stewart Parker**

**Joe Piper**  
Integra Ventures

**Will Poole**  
NComputing Inc

**Chris Porter**  
Medical Genesis, Inc.

**Chris Rivera**  
Washington Biotechnology and  
Biomedical Association

**Dan Rosen**  
Rosen & Associates

**Carl Weissman**  
Accelerator Corp.

**Dan Weld**  
UW Computer Science and  
Engineering

**Dave Whitlock**  
Leigh Stowell & Co.





We would also like to thank the Advisory Board to our New Ventures programs:

**Erik Benson**  
Voyager Capital

**Paul Budak**  
Confirma Inc.

**Michael Cockrill**  
Atlas Accelerator

**Joe Eichinger**  
Coaptus

**Sonya Erickson**  
Cooley Godward Kronish LLP

**Bill Gossman**  
Retoku Capital

**Dick Haiduck**  
WBBA

**John Hansen**  
GoAhead Software

**Brad Harlow**  
B. Harlow & Associates LLC

**Michael Hovanes**  
Independent Consultant

**Ron Howell**  
WRF Capital

**Kathi Jones**  
Swift HR Solutions

**Scott Larson**  
Vashon Partners

**Carl Lombardi**  
Telasio LLC

**Brock Mansfield**  
Keeler Private Equity  
Fund LLC

**Byron McCann**  
Ascent Partners Group LLC

**Ed Parker**  
iVideoTrack

**Chris Porter**  
Medical Genesis

**Michael Tobiason**  
Chihuly Studio

**Jerrold Walton**  
BPT Design

**Rochelle Whelan**  
Keeler Investments Group

**Mike Wilson**  
Connect Northwest

**Kurt Wedgwood**  
IBM North America



#### Acknowledgements

This report was prepared by Lori Seabright, Communications and Outreach Manager; Sandy Marvinney, freelance writer; and the Finance and Business Operations Group, The UW Center for Commercialization.

Design and layout provided by UW Creative Communications.

For more information or additional copies of this report, please contact the UW Center for Commercialization at (206) 543-0905.

#### Photo Credits:

UW Photography, UW Marketing, Paul Gibson, Michael G. Foster School of Business, Adam Buchanan Photography

A special thanks to the many UW researchers, departments, centers and companies who supplied images and graphics to this publication.

65-5814

