

**Early Learning and Brain Development**  
MEG brain imaging, P2

# Life Sciences DISCOVERY FUND NOW

www.lsdfa.org



**New Wheat Strain Could Bring Relief to Millions**  
Valuable Washington crop envisioned, P3

## Timely Investment by LSDF Pays Off Big

A 1700% Return on LSDF Investment

Millions of Americans live with serious heart, lung, and blood diseases that impact their overall health, reduce their quality of life, and require billions of dollars for treatment. But advances in gene mapping have opened up new opportunities to identify the genetic basis of these diseases and allow the development of patient-specific approaches for the prevention, diagnosis, and treatment of these diseases.

The state of Washington had the opportunity to become a leading center for this cutting-edge research. Deborah Nickerson, of the University of Washington, is a recognized expert in the field and was in the process of building a strong team of researchers.

But the team had a big problem: it needed \$2 million to purchase additional gene sequencing machines to meet the requirements of a prestigious federal grant award to support their work and to help them establish the first center for this type of research in the Northwest. Enter the Life Sciences Discovery Fund. By responding rapidly with an "opportunity grant" to allow her team to purchase the machines they needed, LSDF also helped Nickerson and her colleagues attract some \$35 million in new federal research funding to the area. That's already a 1700 percent return on the LSDF investment. As these funds are used to bring even more talented scientists and researchers to the area, and their work continues, prospects for even more federal grants are excellent.



## Home, Smart Home

What if a home could monitor its elderly residents' performance of routine daily tasks and provide reminders and alerts as needed? P2

## SCOAP Project Saves Lives, Money

\$50 Million Saved by Reducing Complications and Improving Efficiency

Surgical complications and misdiagnoses are an unfortunate, but often preventable, byproduct of today's increasingly complex health-care services.

But surgical patients all across Washington are less likely to suffer these bad outcomes, thanks to the Surgical Care and Outcomes Assessment Program (SCOAP). Led by David Flum of the University of Washington, in association with the Foundation for Healthcare Quality and supported by critical funding from the Life Sciences Discovery Fund, SCOAP provides a straightforward approach to significantly improving surgical results.

SCOAP is a physician-led, voluntary program creating a surveillance and response system that improves surgical quality. SCOAP's approach is to create a collaborative of clinicians who work to increase the use of quality and efficiency measures to avoid errors and increase cost-effective care. For example, SCOAP developed a safety and quality checklist for the operating room not unlike the preflight checklists used by pilots. This checklist is now used at three-quarters of the hospitals in Washington, at the start of surgery as part of an extended "time out," and after surgery as part of a detailed debriefing. This checklist guarantees that vital steps to a successful procedure are carried out and reinforces a culture of patient safety.

Clinicians receive detailed SCOAP performance reports translating the best evidence into practice. SCOAP is producing real improvement in quality and has been reporting those results to the public (<http://www.scoap.org/data/index.html>).

Some 56 hospitals, representing more than 85 percent of all general

### Cover story

surgeries performed in Washington, have signed on to participate, bringing the benefits of the SCOAP approach to all corners of the state.

SCOAP is bending the cost curve by empowering clinicians with data and tools to help them do the right thing. In just the first three years since it was launched, SCOAP estimates that it has saved more than \$50 million by

reducing complications and improving efficiency. This represents a huge return on the \$1.3 million grant provided to Flum and his team by the Life Sciences Discovery Fund in 2007. And with health care costs rising dramatically everywhere, these savings benefit everyone: patients, private insurers, and publicly funded health care programs and agencies.

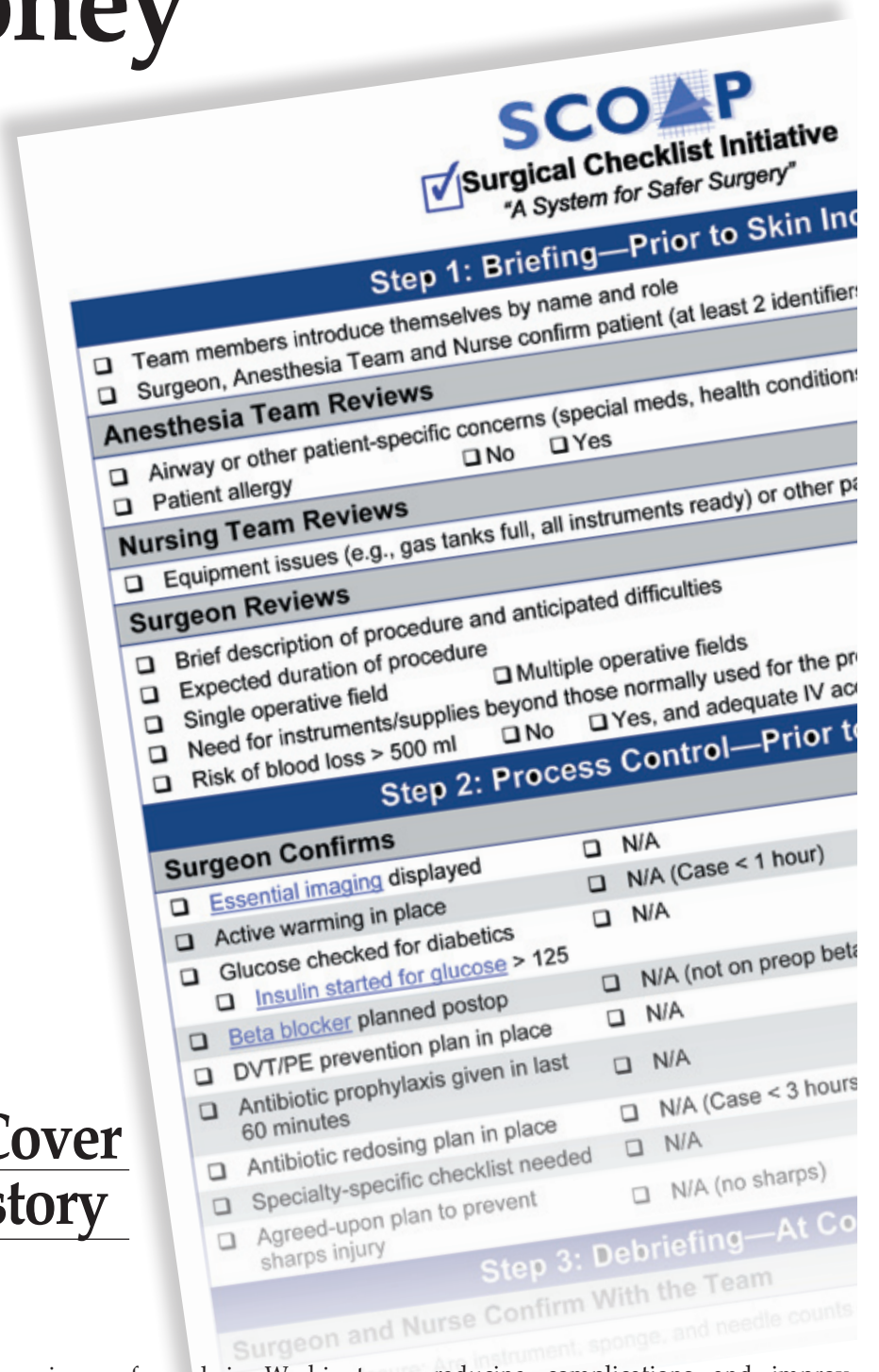


Photo by Clare McLean/UW Medicine

# Home, Smart Home

Technologies designed to keep the elderly and disabled in their homes longer and out of institutional care

It's a problem that most families face sooner or later: how to care for aging loved ones who cannot safely remain in their own homes?

What if that home could monitor its elderly residents' performance of routine daily tasks and provide reminders and alerts as needed? Such a system isn't a Jetsons fantasy; it's taking shape today, right here in Washington.

Diane Cook, a computer science professor at Washington State University, is leading a team developing "smart home" technologies designed to keep the elderly and disabled in their homes and out of institutional care as long as possible.

For instance, someday an elderly person required to take prescription medications twice daily would be

prompted to do so and a monitoring agent would be informed when those tasks were completed. The system could also monitor the performance of household systems, providing an alert if the oven or cook top were left on too long. Initial limited trials of the system are already underway.

Estimates are that by 2040, 23 percent of the US population will consist of people over the age of 65. If just 10 percent of this population can remain in their homes two years longer, Washington families and government agencies will save some \$341 million per year.

The Life Sciences Discovery Fund considered support of Cook's "smart home" technologies a smart investment. So did the federal government, which, based partly on preliminary data from Cook's LSDF award, subsequently gave Cook a \$3 million grant to create a doctoral training program for health-assistive smart environments.

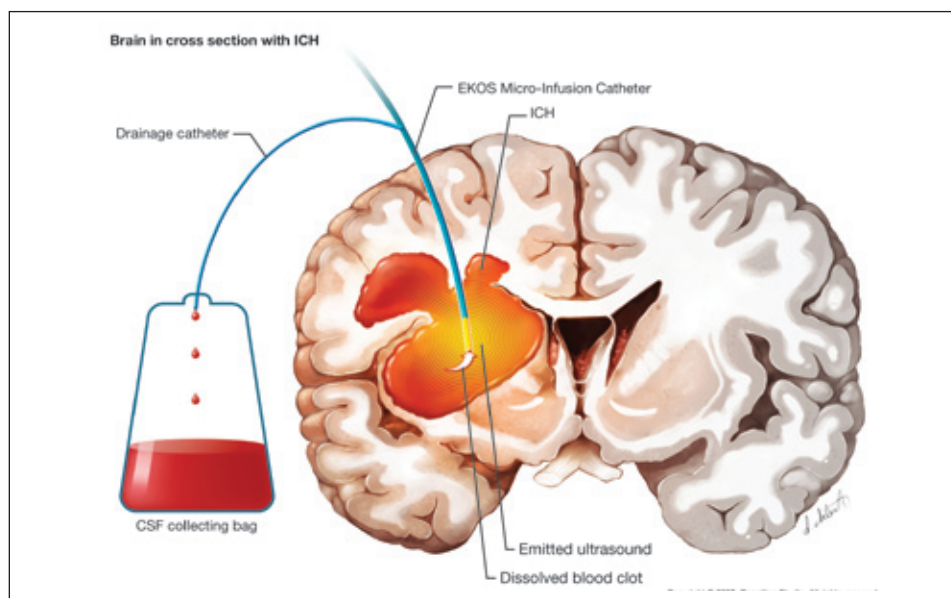
All told, it has the potential to make an important decision a lot easier for thousands of Washington families.



# Innovative Stroke Treatment Shows Promise

Consisting of a combination of catheter-delivered ultrasound and a clot-busting drug, this new therapy is showing encouraging results

Intracranial hemorrhage is a devastating form of stroke. Half of all patients die within one month of the event, and those who survive typically suffer dramatic loss of brain function and motor skills. Often, they are unable to resume normal activities such as caring for themselves, placing a stressful burden on family members or requiring more extensive—and expensive—ongoing care. The more quickly a clot can be removed the better, and hours count.



Recognizing this challenge, the Life Sciences Discovery Fund provided a \$170,000 grant which allowed David Newell, of the Swedish Neuroscience Institute, to team up with Bothell-based EKOS Corporation in evaluating an

innovative new stroke treatment. Consisting of a combination of catheter-delivered ultrasound and a clot-busting drug, this new therapy is showing promising results in the race to remove clots.

Just ask one of the clinical trial participants.

A Tacoma-area police officer suffered a stroke and his prognosis using conventional therapies was poor. But a lucky chain of events and swift action by the officer's girlfriend resulted in almost immediate treatment with the innovative catheter. He returned to work rather than likely progressing to a coma leading to death.

This work has the potential to save lives in Washington and across the nation, allowing stroke survivors to return home and to resume their daily lives and normal activities more quickly than ever before. The work is exciting enough to have been accepted for presentation at an important international stroke conference.

And EKOS Corporation, which has been working with Dr. Newell since 2007, is well positioned to ensure that the economic benefits of this breakthrough therapy accrue in Washington.

## What's Really Happening in an Infant's Brain?

A stethoscope for the brain



What's really happening in the brain of an infant? The answer is critical to understanding early learning and how it can go wrong. Identifying children in need of learning support when they start school is already too late for the most effective intervention.

Patricia Kuhl and her group at the University of Washington are establishing a center to image the child (and adult) brain. The magnetoencephalography (MEG) imaging system is a non-invasive machine large enough to need its own room. Relying on detection of incredibly tiny electrical currents flowing through an active brain, the

MEG detects areas of activity in real time. Its incredible sensitivity and high degree of patient comfort—subjects sit in something resembling hair dryers from the 1950s—make it ideal for understanding what happens in the brain when, for example, a person encounters an unfamiliar word.

Kuhl and co-director Andrew Meltzoff had lined up private donors to help create the brain imaging center. But they needed a significant investment to jumpstart the purchase of the machine (at over \$2.5 million, a substantial investment) and the renovation of space needed to accommodate it. Faculty and staff

also needed to be hired to manage the center's research and operations. LSDF stepped in with a \$4 million grant, unleashing the donor funds and helping to create this unique resource for the region. Along with Kuhl and Meltzoff's research into early learning, the center will be a resource for the state's researchers in child and adult learning, including, importantly, understanding what goes wrong in the brain in autism and other disorders. Incidence (or detection) of autism is on the rise and significantly impacting public education's ability to provide special education resources.

# New Wheat Strain Could Bring Relief to Millions



LSDF's \$1.1 million grant supports development of a gluten-free strain of wheat

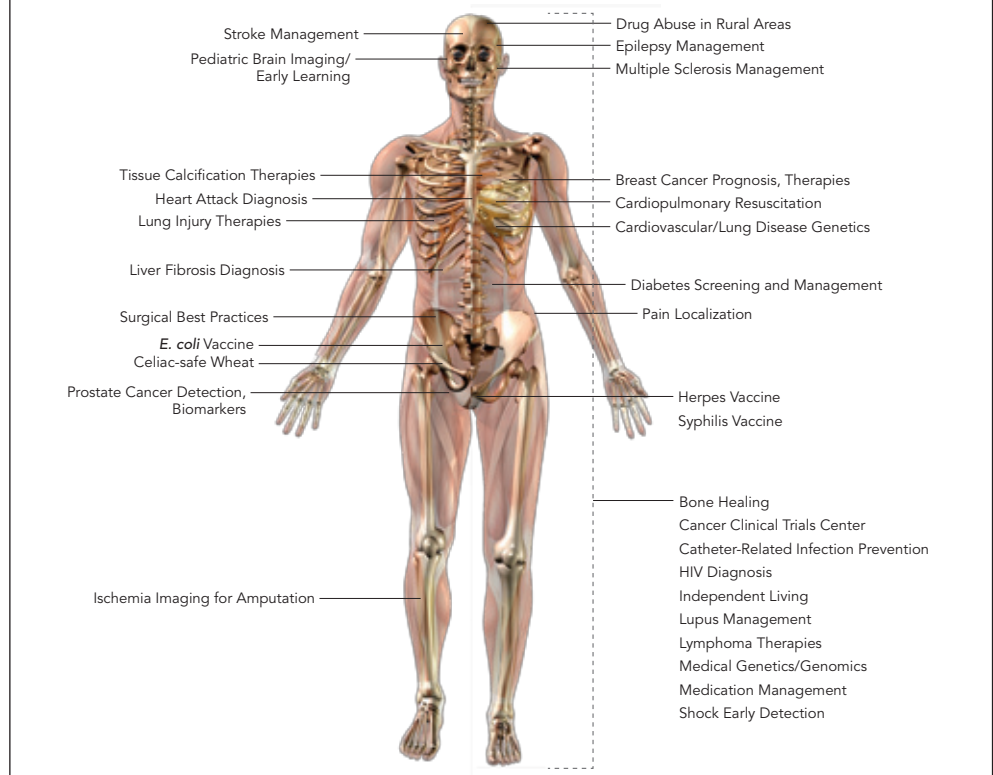
Although not nearly as well-known as other conditions such as multiple sclerosis or Parkinson's disease, celiac disease is one of the most common genetic conditions in the world, affecting roughly one in 133 people.

When people with the disease eat gluten and other proteins found in wheat, barley, and rye, an immune-mediated toxic reaction causes damage to the small intestine and does not allow food to be properly absorbed.

The symptoms of the disease can vary from individual to individual, and are sometimes quite painful and severe. But regardless of the individual's reaction, the dietary challenges posed by a gluten-free restriction are always significant.

With this in mind, the Life Sciences Discovery Fund has provided a \$1.1 million grant to Washington State University agricultural professor Diter von Wettstein to support his work to develop a gluten-free strain of wheat. If von Wettstein is successful in creating wheat that is safe for consumption by those with celiac disease, it will help bring relief to millions around the world and establish an economically valuable crop for Washington farmers.

## LSDF Grants Improve Health from Head to Toe



# LSDF Grant Will Help Combat Drug Addiction in Rural Areas



Substance abuse and mental illness are ruining lives and fracturing families in large cities and small towns alike

Washington is a diverse state, having both densely populated urban areas and remote rural areas with far fewer people. While these areas face many challenges unique to their demography, there are some devastating problems they do share.

Substance abuse and mental illness are two such problems, ruining lives and fracturing families in large city and small town alike. But the resources available and appropriate methods to help treat these problems are often very differ-

ent. It's estimated that evidence-based treatment options developed in urban areas could save more than \$1 billion statewide. But without adaptation to rural settings, these savings will not be fully realized.

That's where John Roll and his colleagues at Washington State University come in. Supported in part by a \$4 million grant from the Life Sciences Discovery Fund, Roll's team is establishing a program of excellence in Rural Mental Health and Substance Abuse Treatment to test and then implement appropriate evidence-based treatments in underserved rural areas. Their first target is painkiller addictions, and if that produces successful results, they will soon have other drugs in their sights.

Given the societal costs of drug addiction, there are huge opportunities: each dollar spent on the delivery of evidence-based treatment of addiction returns almost four dollars.

## LSDF Impact Felt Across Washington

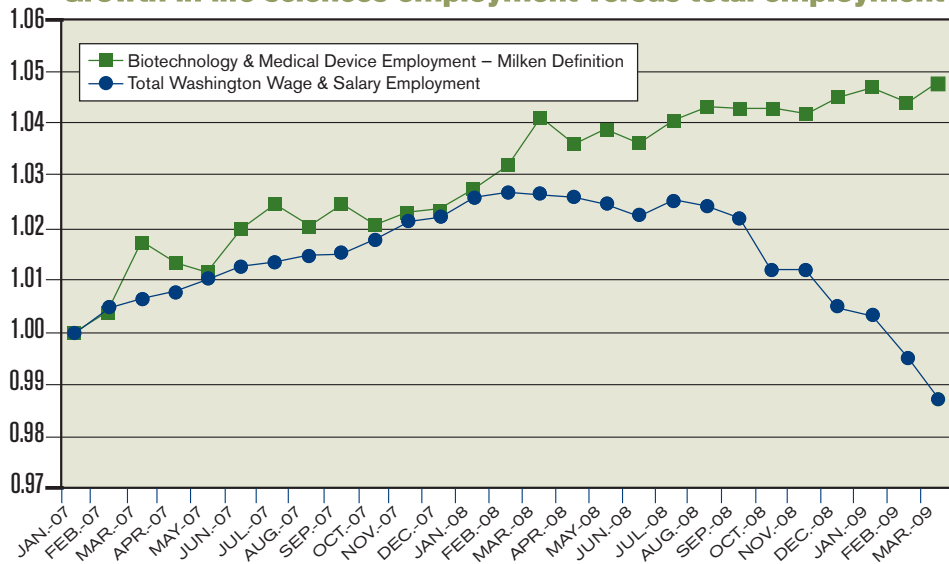


## Washington's Life Sciences Landscape

A November 2009 economic impact study by the Washington Research Council concluded that the "life sciences industry forms an important and growing segment of Washington's economic base." The study found that:

- The life sciences are responsible for providing more than **22,000 jobs** and generating more than **\$5.35 billion** in personal income.
- Those jobs support as many as **55,000 additional jobs** in the state, for a total employment impact of some **77,000 jobs**.
- In 2007-2008 alone, the National Institutes of Health made grants totaling nearly **\$1.6 billion** to life sciences organizations in Washington state.
- In 2007, the Bill & Melinda Gates Foundation invested more than **\$150 million in grants** to Washington-based health research organizations.
- In the second quarter of 2009 alone, more than **\$43 million** in venture capital was invested in Washington biotechnology and medical device manufacturing firms.
- Washington is becoming a significant player in global health initiatives. These activities are worth about **\$130 million** per year to University of Washington and Washington State University and generate more than **3,600 direct jobs** and almost **10,500 additional jobs**.

**Growth in life sciences employment versus total employment**

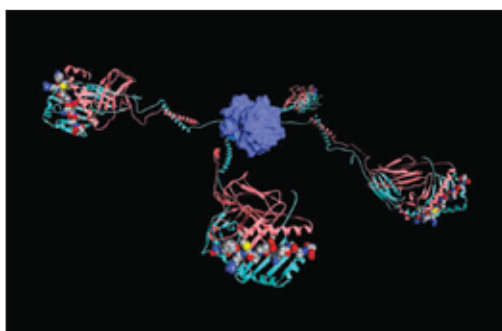


# New Research Improves Diagnosis and Treatment of Autoimmune Diseases

Late diagnosis, imperfect therapy approaches, and limited access to care all can negatively impact patients' health, quality of life, and their very survival

Tens of thousands of Washingtonians live with autoimmune diseases such as multiple sclerosis, lupus, and type 1 diabetes. In these conditions, the patient's immune system—which normally protects against germs and other invaders—goes awry and attacks the body's own tissues. Late diagnosis, imperfect therapy approaches, and limited access to care all can negatively impact such patients' health, quality of life, and their very survival.

Gerald Nepom, of the Benaroya Research Institute at Seattle's Virginia Mason Medical Center, is leading a group of investigators—including a renowned multiple sclerosis researcher



who was recently recruited from Harvard Medical School—to develop new strategies for early diagnosis and treatment of these conditions. Nepom has developed tools to study immune system activity and look for genes associated with autoimmune diseases. Now, with the support of a \$5.6 million grant from the Life Sciences Discovery Fund, he is adapting these

profiling tools for diagnosing autoimmune diseases in their earliest stages, evaluating therapy options for each patient, and monitoring responses to treatment. He and his colleagues at the University of Washington are also developing novel therapies that can dampen destructive immune system activity.

Additionally, a significant portion of Nepom's work is a statewide outreach program to educate and empower patients and expand access to clinical trials of promising new therapies. His team works closely with advocacy groups, such as the National Multiple Sclerosis Society and Juvenile Diabetes Research Foundation, in their outreach efforts. Many of the patients who are contacted through this program choose to participate in the Benaroya Research Institute's disease registries, which consist of patient clinical data and tissue samples that are vital to helping researchers unlock the mysteries of autoimmune diseases. Over 1000 individuals with autoimmune diseases across Washington are already participating in the registries.



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