



UNIVERSITY OF UTAH
HEALTH SCIENCES

INNOVATION REPORT 2012

Δ gorithms hms *for innovation*

CREATIVE
SOLUTIONS
TRANSFORMING
THE FUTURE

OF

HEALTH CARE

IS IT REALLY POSSIBLE TO CREATE
ALGORITHMS FOR INNOVATION?

IS THERE AN INHERENT
DISCONNECT BETWEEN
STANDARDIZING PROCESSES AND
CREATING SOMETHING NEW?

ONLY IF YOU THINK OF THE
ALGORITHM AS THE
FINAL DESTINATION.

*We think of ours as just
the beginning.*

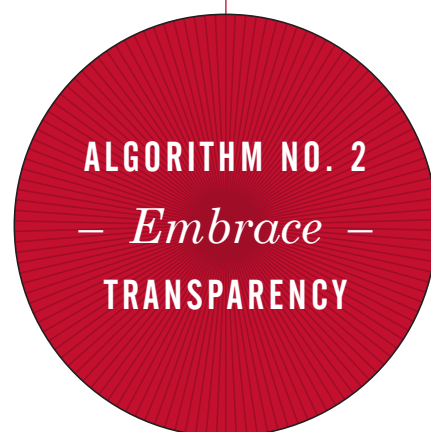
ALGORITHMS FOR INNOVATION

OUR LEADERSHIP ALGORITHM 4



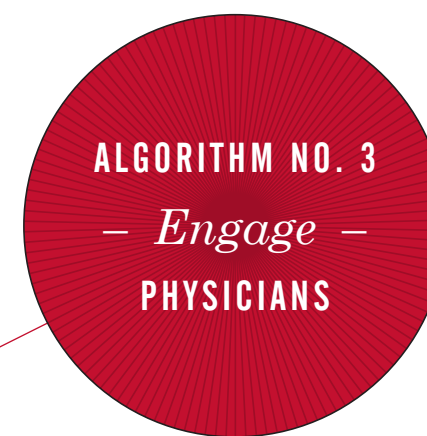
*What if we thought
of primary care
clinics as important
research labs?*

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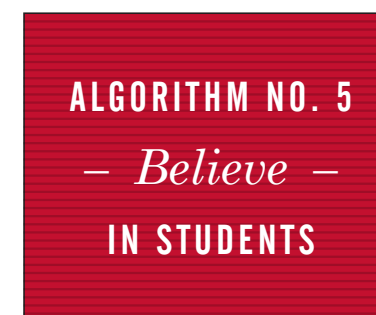
*Can exposing
our weaknesses
actually make
us stronger?*

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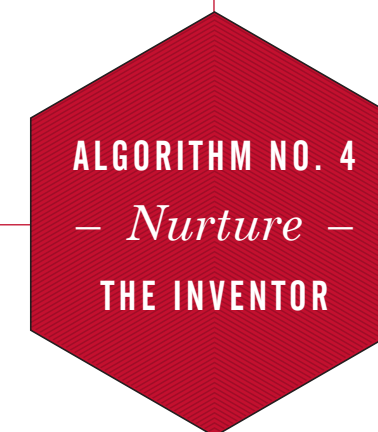
*How can we make
physicians our cost-
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*What if undergrads
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*Can anyone in
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“Clearly, times are tough for health care in the U.S. EVERY YEAR, WE SPEND TRILLIONS OF DOLLARS ON HEALTH CARE, EXPONENTIALLY MORE THAN WHAT OTHER COUNTRIES SPEND, THREATENING TO BANKRUPT THE COUNTRY. AND YET THE U.S. SYSTEM HAS BEEN RANKED 37TH IN THE WORLD, WITH MORE THAN 40 MILLION ADULTS REPORTING THAT THEY CAN’T AFFORD MEDICAL CARE. *Research funding is on the chopping block, a profound physician shortage is looming, and the political discussion around health care reform is polarizing the nation.*

Our health care system is facing overwhelming pressure to change, and that gives us a burning platform to rethink everything we do and an opportunity to create an unprecedented transformation. No single academic medical center can fix the whole health care system, but we each have unique potential to transform a part of it.

Our ambition at the University of Utah Health Sciences Center is shaped by our geography and demographics. We have one of the fastest-growing and healthiest states in the nation. As the only academic medical center in Utah, Wyoming, Montana, and Idaho, our reach extends to 10 percent of the geographic area of the continental United States. Building on a legacy of innovation at the University of Utah, and a remarkable foundation created by my predecessor, Lorris Betz, M.D., Ph.D., we’re searching for sustainable and innovative approaches to improve the health our population and beyond.

To do that, we’re challenging ourselves to shift the way we think about who and what academic medicine should be. Our **Algorithms for Innovation**

- Chart new paths to care for entire populations
- Champion transparency to improve patient care
- Engage physicians to care about cost and the system as a whole
- Spark the entrepreneurial spirit latent in academic medicine
- And embrace diversity and the full potential of students

We believe that the questions we’re asking, the boundaries we’re pushing, and the answers we’re finding are just the beginning. Join us online, where we’ll continue to share our algorithms for innovation—and invite you to share yours—at healthsciences.utah.edu/innovation or [@utahinnovation](https://twitter.com/utahinnovation). Or simply email me at vivian.lee@utah.edu.

Together, we will move our nation’s health care forward.

LEADERSHIP

ALGORITHM

VISION

LEADERSHIP

*Innovation
is the ability to
see change as an
opportunity.*

VIVIAN S. LEE, M.D., PH.D., M.B.A.

Senior Vice President, University of Utah Health Sciences
Dean, University of Utah School of Medicine, CEO, University of Utah Health Care



PASSION
& RESEARCH

DEAN LI, M.D., PH.D.

Professor of Medicine, Vice Dean for Research
Chief Scientific Officer, University of Utah Health Care

*“We’re not the ivory tower.
We shouldn’t think of ourselves as
smarter than anyone else.”*

We should think of ourselves as passionate people taking enormous risks. That’s the culture we need to develop. We need to hire people who want to change the world—people we didn’t even know we were looking for, people who dream outside of what we think is possible. And then we need to find a way to control the chaos and when we see that spark, be ready to add fuel so that it can catch on fire.

The academic medical center is a unique American invention. We put the medical center next to the research departments and ask people to do something

better and faster than no one else has ever done. That’s incredibly entrepreneurial. And we should nurture that, because the spirit to innovate is our lifeblood.

I’m counting on innovation to make the way we practice medicine and do science today obsolete in ten years. In order for that to happen we have to ask ourselves: Are we prepared to be leaders? Do we have the stomach to take the risk?

CLINICAL CARE
— AND —
PARTNERSHIPS



DAVID ENTWISTLE, M.H.A.

Chief Executive Officer, University of Utah
Hospitals and Clinics

“So often, we reward individual achievement. But success really comes when you have a team of people who sincerely want to work together to make the organization better. *A collaborative environment is the secret glue that keeps things together and moving forward.*”

But that’s not enough. You also need to have a clear vision for the organization—a compelling reason for people to engage. Once people buy into what you want to achieve, you can get out of the way and let them be creative. It’s my job to make sure everyone has the tools; it’s not my job to be prescriptive about how we reach our goals.

Academic medicine is an incredibly complex environment. Personally, I thrive in the energy and dynamics of this place. The challenge is to create greater efficiency in the clinical environment so we can support our research and education missions. It’s not so much a tension between our missions, but rather a constant effort to achieve that perfect balance.”

PHYSICIANS
&
COLLABORATION



SEAN J. MULVIHILL, M.D.

Professor and Former Chair of Surgery
Associate Vice President for Clinical Affairs
CEO, University of Utah Medical Group

“We’re able to function individually because we are part of an organizational structure. The more we embrace that idea, the more progress we can make. Physicians have controlled a lot of the decisions made in health care, but change is in the air. We can either resist that change or we can be active in creating the kind of health care we envision.”

We can make great progress if we let go of the fear that we’re somehow going to come out worse, and instead ask, “What’s the need of the patient? What are the needs of the population? And do we have the right balance of services to take care of them?”

There’s a lot of opportunity right now, and I think we need to ask ourselves, “Are we living in the past or moving toward the future?”

What if we thought of primary care clinics as important research labs?

ACADEMIC MEDICAL CENTERS ARE EXCEPTIONAL AT DEVELOPING CUTTING-EDGE TECHNOLOGY, TREATMENTS AND CURES. BUT WHAT ABOUT PUTTING SOME OF THAT BRAINPOWER TOWARD CREATING NEW HEALTH CARE DELIVERY MODELS?

SOUTH JORDAN HEALTH CENTER, SALT LAKE COUNTY, UTAH

The culmination of a decade-long transformation of our primary care model is a new multispecialty clinic in one of the fastest growing parts of the Salt Lake City metropolis. The South Jordan Health Center is a 200,000-square-foot, LEED-certified building that incorporates primary, specialty and emergency care into one building. Every aspect of the clinic's design was informed by a transformative new primary care model, Care By Design, that's fundamentally restructuring the way we deliver care.

THE IDEA: REVOLUTIONIZE THE WAY WE DELIVER PRIMARY CARE

Ten years ago, our primary care clinics were failing. WE WERE RUNNING THEM SEPARATELY FROM THE REST OF THE HEALTH CARE SYSTEM—AND LOSING \$20 MILLION PER YEAR.

The loss was so deep and devastating that it was actually threatening the bond rating of the University. “We were a toxic asset,” says Michael Magill, M.D., chair of the Department of Family and Preventive Medicine. “People were mad, scared and very worried about our group.” That turned out to be the perfect environment for real innovation. With mounting financial and administrative headaches, the community clinics were restructured as a separate entity under the wing of University of Utah Hospitals and Clinics, while integrating all of their functional areas, from scheduling to marketing to billing, in a way that was needed to survive the crisis. And that’s when the real experimentation began.

Taking a cue from innovation luminary Clayton Christensen and his theory of “Disruptive Innovation,” the restructured clinics untethered themselves from organizational bureaucracy. This allowed them to rapidly create new models of management and patient care and envision all-new care delivery systems.

“We were a toxic asset. People were mad, scared and very worried about our group.”

And so our community clinics became a powerful health services research lab, complete with wild ideas, new experiments, disappointing detours, unexpected discoveries and, ultimately, a new understanding of how to move forward. In the end, the guiding principles all came down to a single question: What does the patient want? By honestly exploring this question—and staying consistently focused on finding the answers—break-throughs began to emerge. “We knew what changes had to be made, and we made them,” says Robin M. Lloyd, M.P.A., executive director of University of Utah Health Care’s Community Clinics. “We didn’t ask permission.”

Today, University of Utah Community Clinics have become a national model for patient-centered medical homes, a new approach that provides patients with a home base to coordinate all of their health care. The financial losses have been turned into profits, patient satisfaction scores have risen dramatically, and hospital administrators now come from all over the country to learn about our model and connect the dots at their own organizations.

“We’re creating the kind of care that keeps people well and keeps costs down,” says Magill. With health care costs rising faster than the national inflation rate and health care reform just around the corner, there’s never been a better time for efficient, affordable and integrated primary care. “Primary care saves money by cutting the incidence of major health problems like heart disease or diabetes later in life,” says Paul Grundy, M.D., adjunct professor in the Department of Family and Preventive Medicine. As the global director of health care transformation at IBM, Grundy is a major employer advocate for shifting health care delivery to patient-centered, primary care-based systems. IBM spends \$2 billion a year for employee health care, and Grundy feels that far too much of that money flows to specialists for procedures instead of primary care doctors for prevention. “That’s why we need a back-to-the-future approach to the family doctor, enabled by advanced information technology and innovative health services.”

That is precisely what our newest community clinic, the South Jordan Health Center, aims to deliver.



“In a constrained payment world, we need to think of primary care as part of our institutional strategy and as a way to survive.”

—Michael K. Magill, M.D.

Chair of the Department of Family and Preventive Medicine and Director of Research for University of Utah Health Care’s Community Clinics

Primary Care 3.0. For the past eight years, that’s exactly what **Michael Magill, M.D.**, has been trying to create through a transformative new care delivery model called Care by Design. Magill has received three federal grants totaling \$4.5 million to redesign what many consider a failing health care delivery system. “As an academic medical center we have amazing potential to help accelerate change around processes and care delivery,” says Magill.

“In order to innovate, you have to have a burning platform. And then you need to ask: How hot is the platform? How high are the flames?”

—Robin M. Lloyd, M.P.A.

Executive Director of University of Utah Health Care’s Community Clinics



When **Robin Lloyd, M.P.A.**, looked at the University’s community clinics, which were losing \$20 million a year, he knew the fire was red hot. “We used Lean design practices to break down and examine every little process, eliminate waste and do things more efficiently. Most importantly, we asked, ‘What does the patient want?’ We started redesigning and were never satisfied,” says Lloyd. Over the past several years, he and his team have hosted more than 300 physicians and administrators from 55 health systems across the country who came to learn more about the Utah model.

We've designed the South Jordan Health Center to model a different kind of health care system—one that delivers better care at a lower cost; one that provides integrated, continuing care rather than just managing single episodes; one that's smarter, simpler and altogether better for the patients we serve.

"In truth, the current health care system isn't a system at all," says Grundy. "It's antiquated. It doesn't link diagnosis, drug discovery, health care deliverers or insurers. And it's expensive. Every year, personal health care expenses push more than 100 million people worldwide below the poverty line. Our current health care processes are simply not smart enough to be sustainable."

"In truth, the current health care system isn't a system at all. It's antiquated . . . and it's expensive."

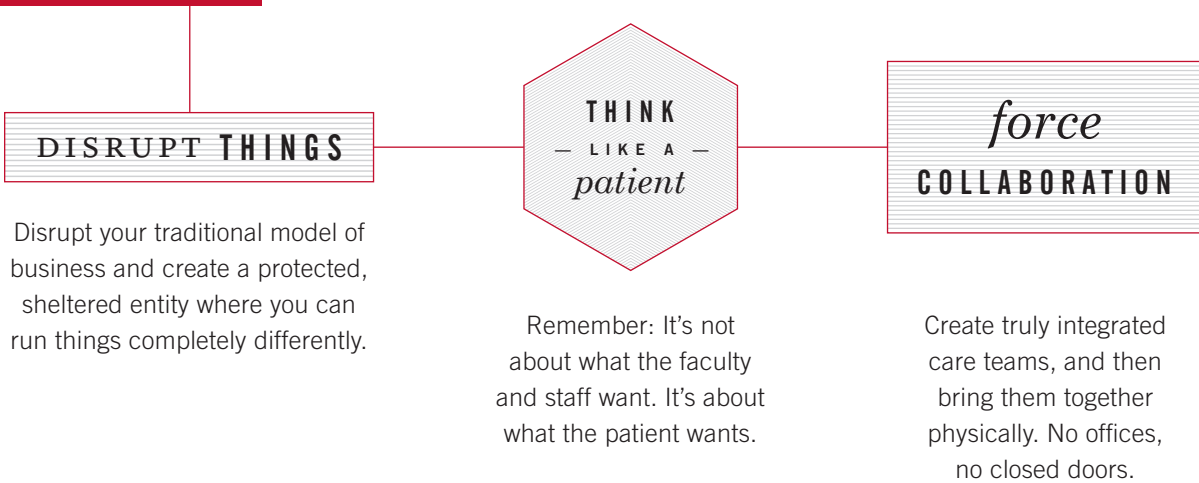
But here's the challenge: The clinical arm of a typical academic medical center, such as University of Utah Health Care, generates 94 percent of its revenues from specialty care and only 3 percent from primary care. (The other 3 percent comes from emergency services.) So how could we afford not to focus on specialty care? For Paul Grundy, the answer will soon become obvious: If the value proposition you offer to employers and patients isn't competitive, quite simply, they'll take their business elsewhere.

"Our addiction to high-margin business is toxic, dangerous and wasteful," says Grundy. "I don't want to see five different specialists working independently on my employee with no one looking at the big picture. It's unethical and immoral to manage an episode of care only and not coordinate care for a patient."

SO HOW WILL WE GET TO THE FUTURE?

Grundy, Lloyd, Magill and other health care visionaries firmly believe that the transformation of American medicine will revolve around patient-centered, community-based medical home clinics. "Someday, we're going to quit building ICUs and start building more South Jordans," says Lloyd. "This model is going to save the system." Grundy agrees. "Over the next couple of years, there will be winners and there will be losers. And though it may not be easy to see now, I believe we will see new leaders emerge who win not by surviving the storm, but by changing the game." In the meantime, we're continuing our research in our community clinic "labs."

ALGORITHM NO. 1



"We just need to expand our perception of who we are and what we do."

—Richard Orlandi, M.D.
Professor of Surgery and
Executive Medical Director,
South Jordan Health Center

Otolaryngologist **Richard Orlandi, M.D.**, professor in the Department of Surgery, is exactly the kind of subspecialist you wouldn't expect to find anywhere near a community clinic. He's the only fellowship-trained nasal and sinus specialist in the Intermountain West, author of more than 70 articles and book chapters, reviewer for all of the major journals in his field—you get the picture. So what is he doing at a community clinic like South Jordan? He's trying to shift the mindset of department chairs and physician colleagues that an academic medical center shouldn't just be where patients go to receive end-of-the-line care. He believes it should also include a cadre of first-contact general specialists—cardiologists, neurologists, dermatologists, oncologists—who practice out in the community. "Why make the patient leave our system between primary and tertiary care? Why not provide the full spectrum of care so we can take care of patients in the most coordinated way?"

"There were so many lost opportunities in the traditional model of care. At South Jordan, we're bringing them back."

—Susan A. Terry, M.D.
Executive Medical Director of University
of Utah Health Care's Community Clinics



Over the last 15 years, **Susan Terry, M.D.**, has seen the transition from a one-on-one, physician-patient relationship to a collaborative team approach, which she believes is the model for the future. "It's not reasonable to expect physicians to do everything we've done in the past," says Terry, especially as access to health care increases. "We've created a state-of-the-art team model for patient care that gives nurses, pharmacists, dieticians, medical assistants and others new opportunities to help maintain and improve the health of patients."

THE IMPLEMENTATION: SOUTH JORDAN HEALTH CENTER



THE FRONT STAGE

NEVER ABANDON THE PATIENT

From the moment the patient is greeted at the front door, systems are designed to shepherd the patient through her visit and eliminate waiting. Self-check-in kiosks streamline the admittance process and electronically notify providers that the patient has arrived. A guest relations specialist walks the patient directly to an exam room, where a medical assistant meets the patient. Seating in waiting rooms is minimal since the goal is to never leave them waiting. On average, patients are in and out of the clinic in just 30 minutes, instead of the nationwide average of 1½ hours.

DESIGN UNIFORMLY FOR EFFICIENCY

Every exam room is designed exactly the same, so providers know where things are. Simple design features such as the ability to stock cabinets from the back stage keep staff from interrupting patient care. Details like having printers in the exam room keep doctors in the room with the patient instead of sifting through a stack of documents at a shared printer.



TAKE A CUE FROM DISNEY

The architecture reduces patient anxiety by creating a calming front stage for patients and an efficient working back stage for providers. Patient-facing spaces are quiet and softly lit—more like a boutique hotel than a busy clinic. Patients never see syringes or EKG machines, and they don't hear phones ringing or devices beeping. The back stage is designed to foster collaboration between medical team members.





ENCOURAGE EVERYONE TO PRACTICE AT THE TOP OF THEIR LICENSE

Medical assistants stay with the patient the entire visit and are trained to do a variety of tasks that free up physicians to practice at the top of their license. Using the electronic health record, they enter the medical history and vitals. They are cross-trained to draw blood, give injections, perform EKGs or take X-rays if authorized by the physician. At the end of the appointment, they print out the post-visit summary and answer any questions.



INTEGRATE PRIMARY, SPECIALTY AND EMERGENCY CARE

Having everything in the same building streamlines care for patients and improves communication between providers. Co-locating primary and specialty care makes financial sense too. South Jordan provides patients with convenient access to Huntsman Cancer Institute, Moran Eye Center, 15 specialties, pharmacy, physical therapy, radiology and same-day surgery. The Emergency Department is open 24/7, and trauma patients can be transferred to University Hospital in 16 minutes.

THE BACK STAGE

MAKE PATIENT CARE A TEAM SPORT

"Physicians in cubicles? It was heresy when we told our doctors they wouldn't have an office," says Lloyd. "But a marvelous transition occurred. They loved hearing what nurses and medical assistants were saying to patients." At the nurses' station, all sight lines are unobstructed, so that everyone can easily and naturally collaborate with one another in a common space.

QUIET THINGS DOWN

A centralized call center schedules across all 10 of our community clinics and is the hub for passing along messages from patient to provider, which eliminates phones from ringing in patient care areas. Patients can typically get appointments to see their doctors on the same day they request them, as long as they call by 10:30 a.m.



Can exposing our weaknesses actually make us stronger?

HOW A CULTURE OF TRANSPARENCY IS TRANSFORMING
CLINICAL OUTCOMES AND PATIENT SATISFACTION.

Rob Glasgow, M.D., section chief of Gastrointestinal Surgery and General Surgery, reports the latest surgical outcome data at a joint vascular and general surgery Morbidity and Mortality meeting. Attending surgeons, residents, and students on the surgical service are required to be at the weekly meetings. Nurses and support staff are also invited to openly discuss how we can improve patient outcomes.

CASE STUDY: DATA AND TRUST IMPROVE SURGICAL OUTCOMES

TALKING ABOUT A BAD SURGICAL OUTCOME USED TO BE A STRICTLY CONFIDENTIAL MATTER THAT COULD MAKE EVEN THE MOST STOIC SURGEON BRISTLE. *“It was a big deal to ask an attending surgeon to talk openly about a complication,”* SAYS FORMER CHAIR OF SURGERY SEAN J. MULVIHILL, M.D. *“There was a lot of fear.”*

So when Mulvihill announced to the department that they were going to document every complication and adverse outcome, discuss them openly at weekly meetings, and report them to a national database, there was some pushback. To allay the angst, Mulvihill made his intentions perfectly clear: “I told my staff that this wasn’t about getting anyone fired. It was about quality improvement.”

Mulvihill proved his point by openly discussing his own complications during weekly Morbidity and Mortality (M & M) meetings, and changed the word *complication* to *occurrence*. “The tone of the conversation was never punitive,” says surgical clinical reviewer Judy Larsen, R.N., who was tasked with the delicate job of collecting and distributing the data to the surgeons and bringing every occurrence to M & M meetings. “It was always educational.”

“I told my staff that this wasn’t about getting anyone fired. It was about quality improvement.”

Mulvihill wanted his department to lead the way in establishing greater transparency to improve surgical outcomes. The new protocols were part of joining a pilot program to test the National Surgical Quality Improvement Program (NSQIP) in the private sector. In 2001, University Hospital was one of 18 hospitals to join NSQIP, which was developed by the Department of Veterans Affairs and the American College of Surgeons.

A few key factors helped create buy-in among his staff. The metrics were created and defined by surgeon colleagues. Definitions of outcomes were specific and consistent. The data were impartially analyzed through a central database and risk-adjusted to account for sicker patients. In other words, NSQIP created meaningful data that the faculty trusted. The most persuasive factor, however, was seeing firsthand how the process helped improve patient care.

ALGORITHM NO. 2



“We know how we compare nationally, and we see firsthand how our quality projects are improving patient care.”

*When the Department of Surgery joined NSQIP in 2001, a surgical clinical nurse reviewer was embedded into the department and tasked with documenting every surgical complication and submitting it to a national database to be analyzed and compared to peers. “At first, I think some faculty felt that it would be like getting a red mark on their paper,” says quality specialist **Judy Larsen, R.N.** “But now everyone’s familiar with the definition of an ‘occurrence’ and that breeds confidence in the data. We know how we compare nationally, and we see firsthand how our quality projects are improving patient care.”*

When NSQIP data showed that the surgery department was a high outlier in postoperative urinary tract infections (UTIs), Rob Glasgow, M.D., section chief of gastrointestinal surgery, led a multidisciplinary team to make procedural changes in catheter management. The next time NSQIP data came out, our surgeons and staff had reduced postoperative UTIs by 75 percent. By NSQIP standards, we went from a 10 (the worst) to a 4 (better than half of the participating hospitals). “This was about real people having better outcomes,” says Glasgow, who is now the NSQIP Surgeon Champion. “We had to create a culture of critical appraisal to know where we could improve.”

The department took transparency even further by opening its weekly M & M meetings to residents, nurses and students. “It’s an excellent teaching opportunity,” says Larsen. “And now it’s just automatically assumed that when we have an outlier, not just one faculty member but a whole team of people, including residents, will take it on,” says Larsen.

The department also expanded the conversation to include issues of professionalism, honest disclosure and positive communication to engender trust in patients. As the move to transparent quality improvement became a fully accepted part of the department’s culture, uncertainty and fear were replaced with a common sense of purpose that everyone could embrace. “The essence of quality improvement is something we all buy into,” says Mulvihill, who is now the associate vice president for clinical affairs and CEO of the physician group. “At the end of the day, we all want better outcomes. We all want to be proud of what we do.”

Learn how more of our NSQIP projects have resulted in cost-saving in our case studies on pages 27-29.

% OF PATIENTS WITH ANY POSTOPERATIVE OCCURRENCE

19%

REDUCED TO

11%

FROM 2002 TO 2011

Based on NSQIP data for general and vascular surgery

CASE STUDY: PHYSICIANS ENGAGE TO IMPROVE PATIENT SATISFACTION

One percentile patient satisfaction. It's not a pretty statistic. But it's the lonely number that one physician, Jim Ashworth, M.D., had to face WHEN THE EXECUTIVE DIRECTOR OF OUR NEUROPSYCHIATRIC INSTITUTE, ROSS VANVRANKEN, CALLED HIM IN FOR A MONTHLY MEETING TO REVIEW HIS PERFORMANCE.

Ashworth, a board-certified physician in adult psychiatry and child and adolescent psychiatry, had returned to University Neuropsychiatric Hospital (UNI) to help out with the crushing load of patients in the acute child and adolescent unit. He was working time and a half to try to keep up. So the performance meeting and abysmal patient satisfaction scores were a little confusing to him. He was supposed to be the good guy.

What Ashworth didn't realize was how much the culture had changed since he had left five years earlier to work at an outpatient clinic. The transition started with a clear mandate from Lorris Betz, M.D., Ph.D., former senior vice president, to improve the patient experience throughout the system. At an all-staff UNI meeting, he called upon each and every individual, from physicians to housekeepers, to change the patient experience from "good" to "exceptional."

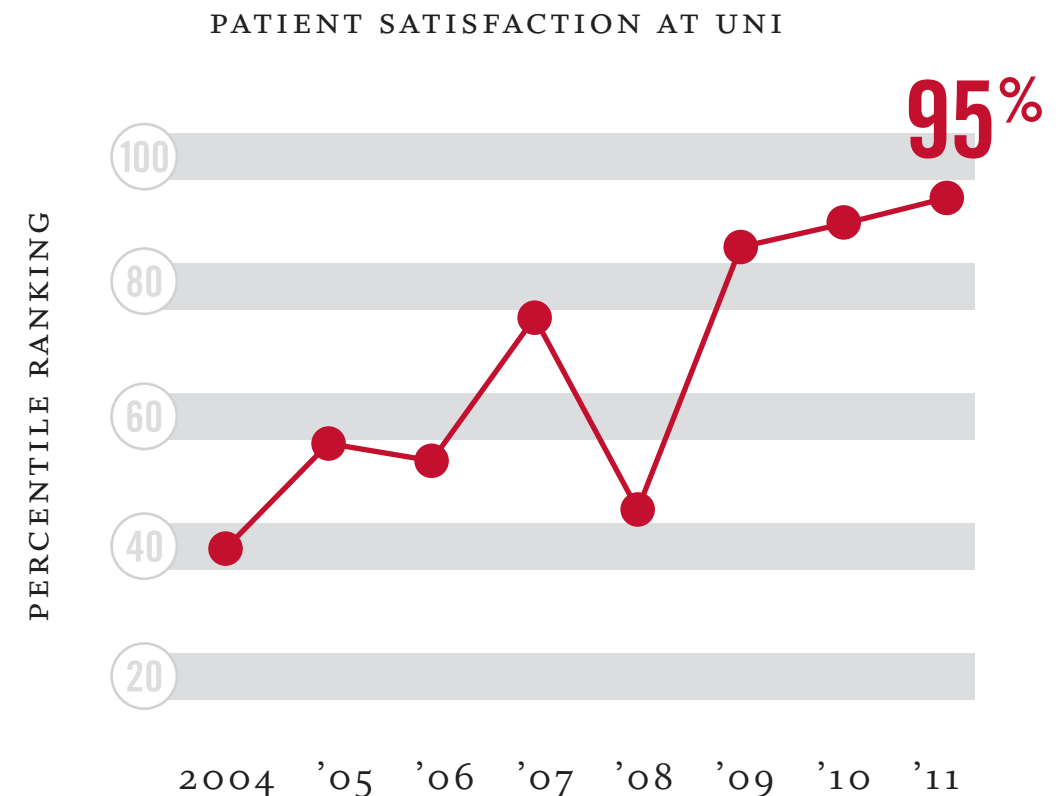


Jim Ashworth, M.D., chief of the Division of Child and Adolescent Psychiatry, received an impossibly low patient satisfaction score one quarter in 2009. Instead of dismissing it, he used it as an opportunity to reevaluate his practices and change.

UNI had tried to do this before. The staff was on board but the physicians weren't engaged. The difference this time around was that it was a mandate from the top. At the center of the strategy was a commitment to benchmarking provider performance with total and complete transparency.

"We called out physicians by name and didn't apologize for it," says VanVranken. The facility also created a new standard: all providers were required to improve their patient satisfaction scores to 90th percentile or higher.

At first, there were naysayers. "People felt it was just another marketing thing. They said, 'Don't tell us how to practice medicine,' recalls VanVranken. They also felt that the data didn't account for how difficult and sick some of their patients were. But VanVranken paired each doubter with a "physician champion" who had both complicated patients and high satisfaction scores. "Senior leadership gave us the impetus to change," says VanVranken. "We also needed informal peer leaders who could encourage and motivate their colleagues."



In mid-2008, University Neuropsychiatric Institute (UNI) received a mandate from then Senior Vice President Lorris Betz, M.D., Ph.D., to improve patient satisfaction scores. Today, UNI receives some of the highest scores in our health system.

With such an impossibly low score, Ashworth could have dismissed the metrics altogether. But instead, he saw it as an opportunity to reevaluate his practices. "I wasn't trained in this culture, so there was a learning curve," says Ashworth. "The culture had gotten it down, and I wanted to find out what others were doing that I wasn't. So I looked at my colleagues who were really in tune with patient satisfaction, and I tried to emulate what they were doing."

Ashworth didn't see the push for provider transparency as an abstract institutional goal. In his mind, it was about creating a positive place for patients, so that if they got sick again, they would be more willing to seek treatment. "We really have only one chance with some of these patients," says Ashworth. "We have to make sure we get it right." And that's precisely what Ashworth began to do. In just one quarter, his patient satisfaction scores rose from the first percentile to the 92nd percentile, and have stayed there.

"I think if you tell physicians, 'We want to be the best in the world,' that's something we can all get behind," says Ashworth. "I knew we could do it, and I wanted to be a part of it." Ashworth has been a great leader, VanVranken says, and has helped bring all of the child psychiatrists into the mid-90th percentile.

As patient satisfaction scores throughout the facility began to rise, staff became obsessive about looking for their scores and their peers' scores on the unit. "Now, it's really competitive," says VanVranken. "Everyone wants to be the star employee."

Today, UNI enjoys record-high patient satisfaction scores, and the transformation is palpable. "Doctors get tears in their eyes when we talk about patient satisfaction," says VanVranken. "It's like a love fest around here. It's really a team deal. It's the best staff we've ever had."



Ross VanVranken, executive director of UNI, paired providers with high-performing peer mentors to improve patient satisfaction scores to the 90th percentile or higher.

How can we make physicians

“Why should I care?” THAT WAS THE QUESTION THAT UROLOGIST BLAKE HAMILTON, M.D., SHOT BACK AT A HOSPITAL ADMINISTRATOR WHO HAD APPROACHED HIM ABOUT A COST-SAVING IDEA. *“It’s not my hospital.”*

A PHYSICIAN’S PERSPECTIVE



Blake Hamilton, M.D.
Medical Director of the Urology Center

Admittedly blunt, Hamilton’s reaction echoes what many physicians at academic medical centers feel about proposed cost-saving measures. Doctors have fiercely guarded against the reach of business interests into the decision-making realm of patient care. Plus, they’ve had no financial incentive to save the system money. At the time, Hamilton saw nothing in it for him or his patients.

Over the past seven years, he’s undergone a complete transformation from being uncommitted to becoming medical director of the Urology Center, a member of a profit-sharing committee that rewards physicians for cost-saving ideas (see page 26), and excited about spending the rest of his career here. “I’m pretty much all in,” he says.

What prompted the change? It was the director of surgical services, Kathy Adamson, R.N., who set the wheels in motion. She told him he was a “terrific, bright surgeon” and encouraged him to join a risk-management task force. The idea wasn’t appealing—“junior faculty don’t want to be involved in the business of medicine”—but he was flattered. Then he received a follow-up invitation from the one person who always has your attention—the department chair. “The next thing you know, they were asking me to run a few things.”

The more involved Hamilton became in the institution, the more he felt the institution’s commitment to him. In short, he began to care. Now Hamilton wants to engender that kind of loyalty and engagement in his junior faculty by showing them early on that both he, and the institution, are invested in them. “If you position your institution as one on the move—as a model for the country—young physicians won’t want to let go of it. And once you make a long-term commitment, then you want it to be good.”

our cost-cutting champions?

GORDON CRABTREE DIDN’T KNOW MUCH ABOUT HEALTH CARE WHEN HE BECAME THE CFO OF UNIVERSITY OF UTAH HOSPITALS AND CLINICS TEN YEARS AGO. *Health care pricing was like a foreign language to him, and the world of Medicaid a sort of dangerous foreign land.*

A CFO’S PERSPECTIVE



Gordon Crabtree, C.P.A., M.B.A.
CFO, University of Utah Hospitals and Clinics

But Crabtree knew plenty about business and politics, which he quickly realized would serve him well in an environment that had so many competing interests. First order of business was to prove to the physician group that he was genuinely interested in developing a win-win relationship. Serendipitously, a flier landed on his desk for a Medicaid 101 meeting in Chicago. He returned from the four-hour meeting with a list of 25 action items that would annually enhance faculty revenues by \$10 million and hospital revenues by \$45 million. “Keep the money,” Crabtree told the executive director of the physician practice group. “Just give me the credit.”

That paved the way for Crabtree to begin making some fundamental changes: to create a culture of financial transparency and to “preach the unified gospel,” as he puts it—converting people to the idea that there weren’t different buckets of hospital revenue and corresponding margin for each specialty or patient care unit. There was only one bucket, which was for the entire system. And that money needed to be allocated strategically to support all of the missions of an academic medical center.

When CEO David Entwistle arrived five years later, he pushed Crabtree’s ideas even further and revamped the most contentious and least transparent financial process—the transfers made from the clinical enterprise to the academic departments. Instead of meeting with individual chairs privately, Entwistle and Crabtree invited all of the chairs to decide how to allocate that single profit margin, shifting the full responsibility of making those hard decisions to them. “We use a formula to determine how much money there is to spend, and then they prioritize how to do it,” says Crabtree. “Once they realize it’s a zero-sum game, they come to an agreement about what the community really needs.”

THE IDEA: CREATE PROFIT-SHARING OPPORTUNITIES FOR PHYSICIANS

No one is in a better position to figure out how to provide higher quality care at a lower cost than physicians. BUT HOW DO YOU SHIFT THE MIND-SET SO THAT THEY CONSIDER FINANCIAL STEWARDSHIP A FUNDAMENTAL PART OF THEIR JOB DESCRIPTION? *One way is to have them share in the profits.*

The University of Utah Health Care Partners Program (UHPP) is designed to have the clinical enterprise award the academic department 50 percent of the annualized savings for any cost-saving idea its faculty members implement. The department can use the one-time money for anything except salaries—including funding research projects and purchasing new equipment and supplies. “It’s the hospital saying, ‘We want to partner with you; we want to share these savings with you,’ ” says Quinn McKenna, M.H.A., chief operating officer of University of Utah Hospitals and Clinics.

“Physicians are scientists. If you give them good information, they’ll make good decisions. If you give them bad information, they’ll know it.”

Critical to UHPP’s success has been the hospital’s investment in the people, process and technology necessary to generate and openly share meaningful and reliable data. When physicians trust the data, they’re more willing to scrutinize their practice patterns and determine how they—not administrators or analysts—can best improve the value of care they’re providing. “Physicians are scientists. If you give them good information, they’ll make good decisions. If you give them bad information, they’ll know it,” says Jann Lefler, M.B.A., director of Financial Planning and Decision Support at University of Utah Hospitals and Clinics.

According to McKenna, UHPP is creating a new dialogue between physicians and administrators and shifting the culture dramatically. “Now we have everyone around the same table; everyone’s involved in the conversation,” says McKenna. “We have no intention of stepping back. We want to be part of the national solution to improve the value of health care.”

ALGORITHM NO. 3

RETHINK
everything

Procedures, medications, processes, technology and devices—it can all be improved. Make figuring out ways to provide higher quality care at a lower cost everyone’s responsibility.

DEMAND DATA

Invest in the tools and resources needed to generate accurate, reliable data. Then allow physicians, not administrators, to determine the best areas for cost-cutting initiatives.

SHARE *the*
WEALTH

CASE STUDY: REDUCING VENTILATOR TIME DRIVES DOWN COSTS

Who wants to be an outlier when it comes to quality metrics? No one.

SO WHEN NSQIP DATA REVEALED THAT THE RATE OF SURGICAL INTENSIVE CARE UNIT (SICU) PATIENTS AT UNIVERSITY HOSPITAL RECEIVING MORE THAN 48 CUMULATIVE HOURS OF MECHANICAL VENTILATION WAS HIGHER THAN THE NSQIP AVERAGE, *a team of experts got together to figure out how they could improve.*

SICU physicians, respiratory therapists, nurses and quality experts formed a Performance Excellence Team to identify the problems and then devise and implement a series of interventions to improve patient care. “It turned out to be less about establishing new protocols and more about communication, timing and education,” says SICU medical director Richard Barton, M.D. “Getting everyone on board was key to getting the job done.”

The result? In one year, the new protocols reduced ventilator hours by 8,747, decreased the average length of stay from 13 days to 11.2 days (which added up to 1,458 total hospital days), and reduced the number of ventilator-associated pneumonia cases by 18. The direct cost savings for respiratory therapy alone was \$100,000, and the UHPP Committee awarded \$50,000 to the Department of Surgery. If associated costs, such as pharmacy, nursing and room charges, had been assessed the potential savings were even greater.

General surgery resident Gillian Seton, M.D., submitted the SICU ventilator quality improvement project to NSQIP and won the award for best abstract. She was the only resident invited to present at the NSQIP annual meeting.

\$100K

**SAVED IN ONE YEAR THANKS
TO A SURGERY INITIATIVE TO
REDUCE VENTILATOR HOURS**

PICTURED FROM LEFT TO RIGHT

Earl Fulcher, RRT, Respiratory Therapy Manager
Richard Barton, M.D., SICU Medical Director
Gillian Seton, M.D., General Surgery Resident
Steven Johnson, M.B.A., Senior Business Analyst



Engage physicians with incentives like cold, hard cash to motivate them to think differently. Create win-win partnerships between administrators and physicians. Be generous.

CASE STUDY: SWITCHING ANESTHESIA CUTS COSTS AND EMISSIONS

WHEN FACED WITH AN OPPORTUNITY TO SAVE HUNDREDS OF THOUSANDS OF DOLLARS A YEAR AND HELP REDUCE THE EMISSION OF GREENHOUSE GASES, THE DECISION IS PRETTY EASY. *The trick, however, is finding those opportunities and then acting on them.*

That's what Michael Cahalan, M.D., chair of the Department of Anesthesiology, did when he discovered a study that showed desflurane, the drug used almost exclusively in the OR since the early 1990s, costs more than \$14 an hour, while the cost of an equivalent drug, isoflurane, had plummeted to just 53 cents an hour.

What resonated even more than the cost savings with the department's faculty and residents was the environmental impact. During a one-hour surgery, desflurane emits greenhouse gases equivalent to a car driven 235 miles, while isoflurane emits the equivalent of a car driven only 20 miles. Although patients wake up a bit more slowly from isoflurane, tapering the isoflurane dose appropriately or switching to desflurane at the end of each procedure solved that issue so that patient safety and comfort were equivalent with both drugs.

\$300K

A YEAR SAVED ON ANESTHETIC DRUGS

Why hadn't they switched sooner? Quite simply, they weren't looking. "If you don't care about what it costs, it's easy to use the more expensive drug," says Cahalan. "We need to think more carefully about which drugs we choose."

Cahalan's careful thinking has paid off. The green anesthesia program saved the hospital \$300,000 on anesthetic drugs in 2011 and reduced greenhouse gas emissions by 25 percent. Meanwhile, Cahalan's department is making the most of its UHPP windfall, using some of the reward money to upgrade computers and train residents.

**25% REDUCTION
IN GREENHOUSE EMISSIONS**



"If you don't care about what it costs, it's easy to use the more expensive drug."

—Michael K. Cahalan, M.D.
Chair of the Department of Anesthesiology

CASE STUDY: NEW FAST-TRACK PROTOCOL IMPROVES PATIENT CARE

WHEN NSQIP DATA SHOWED THAT THE LAPAROSCOPIC COLECTOMY LENGTH OF STAY FOR OUR PATIENTS WAS AMONG THE LONGEST IN THE NATION, *colon and rectal surgeon Bradford Sklow, M.D., rallied two of his surgeon colleagues to figure out how to turn that data around.*

Surgical oncologist Courtney Scaife, M.D., colon and rectal surgeon William Peche, M.D., and Sklow conducted a thorough review of the literature and then developed a new protocol for laparoscopic colectomies based on a Mayo Clinic study. Their goals were to improve recovery time, shorten length of stay and decrease morbidity.

They established a new fast track protocol and the results were dramatic, thanks in part to nurses who implemented the new protocol and created key patient education materials. After one year, the average length of stay decreased from 6.1 days to 4.6 days (better than Mayo Clinic's average). "Some of our patients were ready to go home just two days after surgery, which is unbelievable," says Peche. In addition to improving patient care, the hospital saves an average of \$1,765 per surgery on direct labor and supplies.

"Some of our patients were ready to go home just two days after surgery, which is unbelievable."

PATIENT LENGTH OF STAY

6.1

DAYS REDUCED TO

4.6

**DAYS, AND \$1,765
SAVED PER PROCEDURE**



PICTURED FROM LEFT TO RIGHT

William Peche, M.D., Assistant Professor of Surgery

Courtney Scaife, M.D., Associate Professor of Surgery

Brad Sklow, M.D., Associate Professor of Surgery

HOW ARE YOU PROVIDING BETTER CARE AT A LOWER COST?

SHARE YOUR IDEAS AND SUCCESS STORIES AT healthsciences.utah.edu/innovation

Can anyone in academic medicine be an inventor?



“Academic medical centers shouldn’t just evaluate faculty by the size of their NIH grants. University entrepreneurs can have a greater impact on patient care and bring in more revenue than some researchers will generate over the entire course of their careers. We need to recognize that the traditional model isn’t the only model for improving health care.”

—John Langell, M.D., Ph.D., M.P.H., assistant professor in the Division of General Surgery, is the executive director of our new Center for Medical Innovation (CMI). Conveniently located in the heart of our health sciences campus, CMI is designed to help guide and educate entrepreneurs at every level.

ALGORITHM NO. 4

For the past two years, the University of Utah has been number one IN THE NATION FOR CREATING STARTUPS BASED ON UNIVERSITY RESEARCH. THESE ARE A FEW OF THE THINGS WE’VE LEARNED ALONG THE WAY.

CREATE
A SPACE FOR
innovation

Academic medical centers are overflowing with brilliant ideas. The challenge is figuring out how to turn them into commercially viable products. Provide the support and resources that make it easy and convenient for would-be inventors to take their projects all the way from concept to commercialization.

REWARD INNOVATIONS JUST AS *much* AS PUBLICATIONS

Attempting to change the academic review system can feel like trying to move a glacier. But keep pushing if you want to create a truly entrepreneurial medical center. Expand the idea of academic success from NIH grants and published research to include efforts that improve patient care and attract venture capitalists as well as biotech and medical device companies.



Not to play favorites, WE HAVE TO ADMIT THAT ONE OF OUR MOST IMPRESSIVE INNOVATION STORIES IS THE STUDENT-RUN BENCH TO BEDSIDE (B2B) COMPETITION, WHICH BRINGS TOGETHER MORE THAN 100 MEDICAL, ENGINEERING AND BUSINESS STUDENTS TO WORK IN TEAMS AND SOLVE REAL-WORLD CLINICAL PROBLEMS.

At last year's competition, Utah venture capitalist Dinesh Patel marveled at the "\$2 million to \$200 million ideas" that students presented. "This is what our top students can come up with using \$500 in their spare time over six months," says Matthew Sorensen, a University of Utah medical student and director of B2B. "Imagine what they'll do with more time and funding." Winning teams receive from \$5,000 to \$15,000 and institutional support to help commercialize their projects. Students **Camilo Corredor, Chris Ciancone, Jamal Abdinor** and **Jackson Murphy** (pictured above) won this year's \$15,000 grand prize to help commercialize a product they created to improve asthma inhalers. The device, called LIYEN, stands for "Last Inhaler You'll Ever Need."

TRANSFORM STUDENTS INTO INVENTORS

Students often think outside the box—because they haven't yet been given a box to think in. Tap into their unbridled potential. Create interdisciplinary courses, programs and competitions to fuel the entrepreneurial spirit, then connect them to faculty mentors and community business people who can help guide, shape and finance their brightest ideas.



One of the most stressful situations for a new parent and pediatrician alike is when a newborn baby develops a fever, which about 400,000 U.S. babies do every year. Even though in the vast majority of cases, the cause of the fever is a common viral infection, there's always that unsettling possibility that it's due to a life-threatening bacterial infection. For the past 15 years, **Carrie Byington, M.D.**, professor of pediatrics, has been working on developing diagnostic tools and creating a care process model for the febrile infant. Along the way, she has created the largest study of infants with fever in the world—12,000 and counting. In 2008, she implemented her care process model in Intermountain Healthcare facilities and recently published her findings in **Pediatrics** (June 25, 2012). "We were able to show that infants had better outcomes, families were very satisfied, and the hospital is saving \$2 million a year," says Byington. Health systems across the country are beginning to adopt the model and Byington is helping to write new guidelines for the American Academy of Pediatrics.

INVENT PROCESSES, NOT JUST devices

You don't have to create a new medical device to be an inventor. Process innovations can be more revolutionary. Expand the definition of what it means to be an inventor and empower everyone in health care to become leading-edge thinkers.

Asking patients to rate their pain from 1 to 10 turns out to be a loaded question that often doesn't solicit a helpful response. Chief nursing officer Margaret Pearce, Ph.D., R.N., wanted to create a better pain care experience for patients and asked quality improvement specialist **Brenda Gulliver, R.N.**, to lead the effort. Gulliver discovered that researchers at the University of Utah Pain Management Center had been working on a similar goal for years. In a large team collaboration with **Gary Donaldson, Ph.D.**, professor of anesthesiology and director of the center, nurses began asking patients more conversationally about their pain and how it affected their ability to function during the day. Although the questions were more open-ended, the documentation was highly structured. Since piloting the new project six months ago, patient satisfaction pain care scores have risen from the 48th percentile to the 95th percentile.



reject the PROTECTIONIST MENTALITY

Throw open the books. Many organizations and institutions are so worried about protecting ideas that they miss out on opportunities. Encourage entrepreneurs to partner with people who have different expertise to help move their ideas forward. Innovation is a team sport.

What if undergrads authored high-profile research papers?

STUDENTS, ESPECIALLY UNDERGRADS, ARE OFTEN MALIGNED FOR BEING A LIABILITY IN THE LAB—AN OCCUPATIONAL HAZARD. BUT WHAT IF WE PROVIDED MORE INCENTIVES AND OPPORTUNITIES TO CONTRIBUTE MORE THAN WASHING DISHES AND CLEANING OUT MOUSE DROPPINGS? THREE OF OUR TOP INVESTIGATORS CREDIT STUDENTS FOR PLAYING A PIVOTAL ROLE IN SOME OF THEIR BEST WORK.

DAVID GRAINGER'S LAB

David Grainger, Ph.D., chair of the Department of Pharmaceutics and Pharmaceutical Chemistry, College of Pharmacy, says his lab is built on trust and fun. Grainger has won several teaching awards, including the University of Utah 2010 Distinguished Graduate and Post Doctoral Scholar Mentor Award. "Group diversity drives innovation. Without it, you either have my graying hair or a monolith of students thinking the same way," says Grainger. "And what does that get you? Same old, same old."

CASE STUDY: DAVID GRAINGER'S LAB

David Grainger, Ph.D., is a busy guy. He just finished co-editing the most comprehensive treatise on biomaterials, IS THE EDITOR OF SEVERAL LEADING JOURNALS, CHAIR OF A NATIONAL INSTITUTES OF HEALTH PANEL AND SEVERAL INTERNATIONAL RESEARCH CENTER ADVISORY BOARDS, AND PRINCIPAL INVESTIGATOR ON SEVERAL ACTIVE RESEARCH GRANTS. He also has a travel and speaking schedule that rivals Hillary Clinton's.

But he's not too busy for students. He's also quick to give them credit. "The first author on my most highly cited paper is an undergrad," says Grainger, who has spent his career mentoring students such as University of Utah alum Kenneth Hinds, Ph.D. As an undergrad, Hinds had the ambition and the patience to take a project Grainger suggested to the corner of the lab. He figured out how to analyze gold surfaces decorated with protective films for quality control. His findings were published in a widely cited article in the American Chemical Society's publication, **Langmuir**. "If undergrads are courageous and they work hard, they'll do real science." But Grainger doesn't just invite students into his lab so he can be a good academic citizen. He invites them for their ideas. "When students dump a new, perhaps naive, idea onto the table, rather than just brushing it into the trash can, I try to say, 'Let me indulge you for a moment and see how this might actually work.'" He purposely brings together a diverse mix of bioengineering and pharmaceutical researchers, and then eschews traditional lab hierarchy for a more organic mentoring system. That philosophy has helped shepherd high school students all the way to the national Intel Science Talent Search. And much of the research generated in his lab results in invention disclosures and patent applications. "Anyone who works here can have the next big idea," says Grainger.

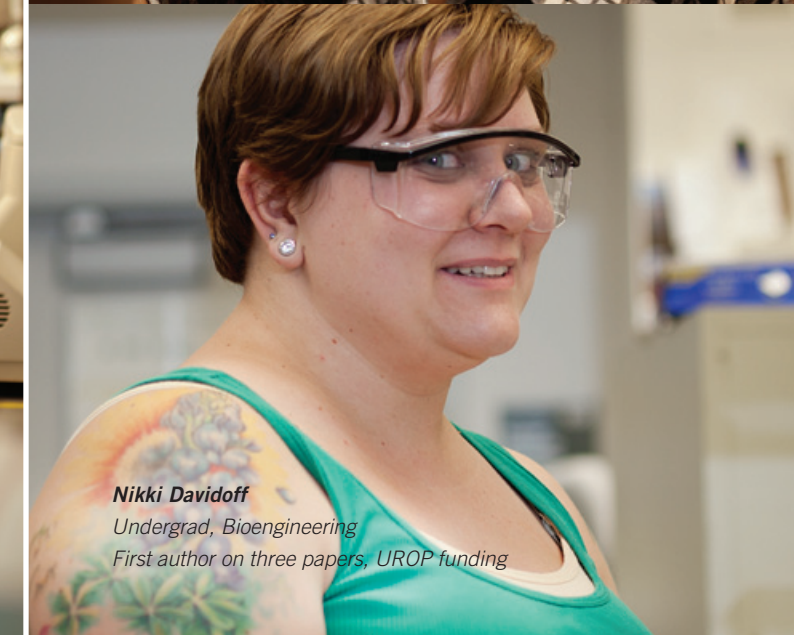
Grainger acknowledges that youthful energy isn't always easy to harness. "Students can be loose cannons in the lab," says Grainger. "They're reputed to break things, cause accidents and divulge lab secrets, which can make the effort/reward gap feel too wide. Having to tow an inexperienced high school or undergrad student around the lab can feel like a boat anchor to a grad student." Grainger thinks small things can make a big difference. "A thousand dollars per student pays for meaningful supplies or rewards a graduate student to dedicate time to an undergrad. This makes the effort and opportunity worthwhile and more attractive to all. It takes so little to change the game."



Dorina Diekjuergen
Ph.D. Candidate
Pharmaceutics and Pharmaceutical Chemistry
Lab Group Coordinator



Archana Roa
Ph.D. Candidate
Pharmaceutics and Pharmaceutical Chemistry
Submitted two papers, filed patent disclosure



Nikki Davidoff
Undergrad, Bioengineering
First author on three papers, UROP funding



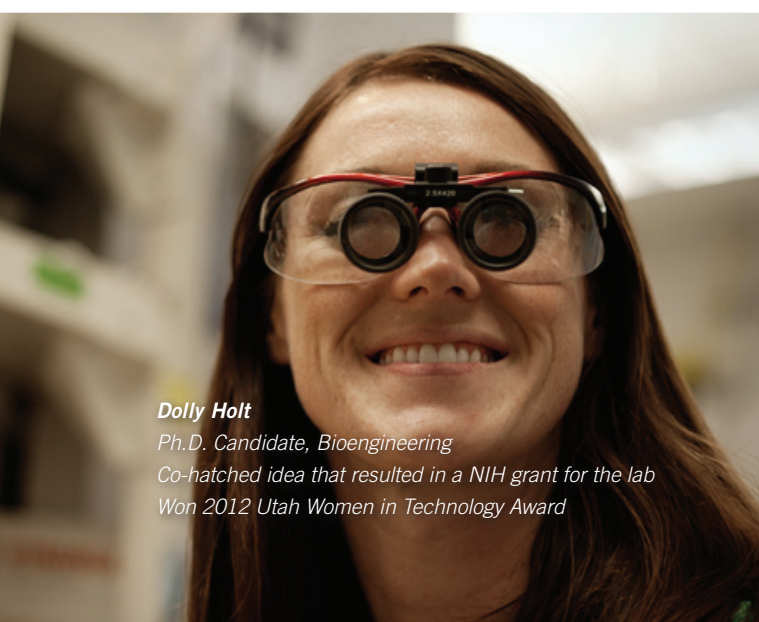
Mahender Avula
Ph.D. Candidate, Bioengineering
Co-authored two papers, filed patent disclosure



David Au
Undergrad, Bioengineering
Assisted with proving new instrumentation capabilities and submitted two research grant applications

In addition to enjoying pizza and donuts at lab meetings, Grainger's students organize holiday events, work together on community service projects, and get some opportunities to enjoy Utah's great outdoors and famed powder, especially on the annual lab ski day when Grainger foots the bill. "Work hard, play hard is a great rule," he says. "I tell my group, 'If it's a powder day and you can't go skiing, I feel sorry for you.' But then I expect to see them in the lab on Saturday." These extracurricular activities help create a community where students aren't afraid to share their ideas, professors make time to listen, and innovation is an open, collaborative process. "Our lab is built on trust," says Grainger. "And fun."

"When students dump a new, perhaps naive, idea onto the table, rather than just brushing it into the trash can, I try to say, 'Let me indulge you for a moment and see how this might actually work.'"



Dolly Holt
Ph.D. Candidate, Bioengineering
Co-hatched idea that resulted in a NIH grant for the lab
Won 2012 Utah Women in Technology Award



Darren Cootey
Undergrad, Bioengineering
Former military surgical tech, whose expertise produced 2,000 surgical procedures

CASE STUDY: DAVID JONES' LAB

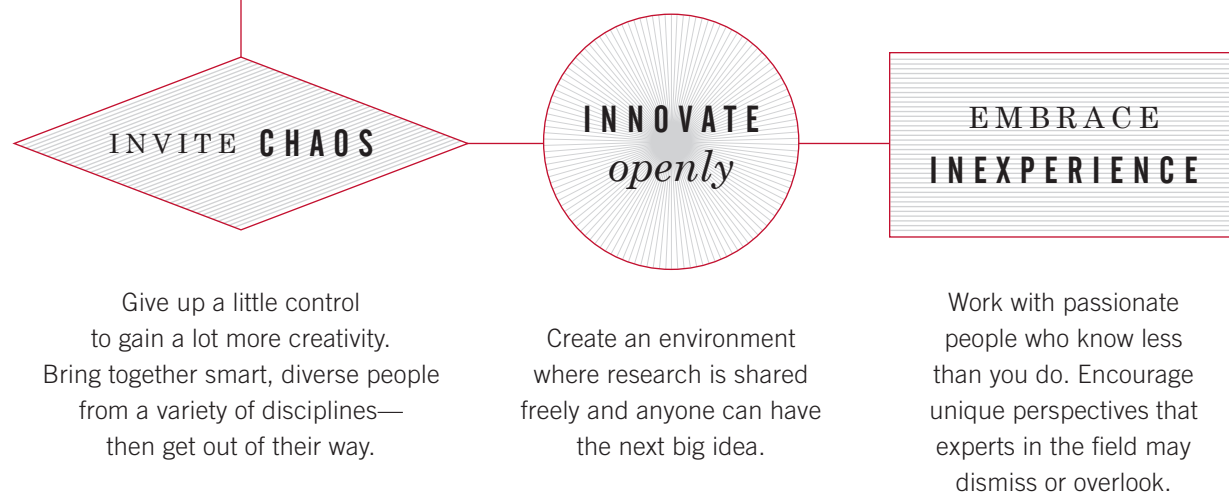
Dave Jones, Ph.D., thought “forcing” students to give 30-minute presentations at weekly meetings sounded like a good idea for several reasons. THE MEETINGS WOULD GIVE STUDENTS EXPERIENCE PRESENTING, ENCOURAGE THE CROSSBREEDING OF IDEAS, AND FOSTER A COLLEGIAL, OPEN ENVIRONMENT AMONG THE DEPARTMENT’S DIFFERENT LABS. He never imagined that one of those presentations would completely transform his own research.

Jones, who is now co-chair of the Department of Oncological Sciences and senior director of Early Translational Research at Huntsman Cancer Institute, was dutifully listening to a student from his colleague Joe Yost’s lab present her studies on the organ asymmetry in zebrafish. In the back of his mind, however, he was perseverating about his grant proposal rejected by the NIH the day before. He thought he was on the verge of understanding why the adenomatous polyposis coli (APC) gene causes 85 percent of colon cancers. NIH reviewers, however, told him he first needed to test his hypothesis using knockout mice. Building a mouse model would tack on two years, Jones thought, and there was a good chance it wouldn’t prove anything. As the young student explained how she was able to manipulate genes to flip the zebrafish’s heart from the left to the right side, Jones lasered in on the fish’s intestine. He could see it perfectly through the transparent body of the fish. That’s when the light bulb went on. He didn’t need mice. He needed fish. They’re cheaper, easier to manipulate, and completely transparent. “It was all just sitting there,” he says. “And I suddenly knew exactly what to do.”

One month after knocking out the APC gene in zebrafish, Jones had the result he was looking for (though it took another two months to realize what they had discovered). He credits another student, who serendipitously had just joined the lab, for making that research happen. Like Jones, M.D./Ph.D. candidate Lincoln Nadauld had never worked with a zebrafish in his life. But his willingness to take his research in a completely different direction paid off. Nadauld was the first author of the paper published in the **Journal of Biological Chemistry** (September 9, 2004) that demonstrated how the APC gene controls conversion of vitamin A into retinoic acid and how mutations in the APC gene may cause cancer in humans.

Ten years after that student presentation, Jones has thousands of fish, which he uses to test thousands of drugs that may prove beneficial in colon cancer treatment. Some of those drugs are now in clinical trials. Along the way, Jones has noticed fascinating effects that different drugs have on the development of zebrafish. Although they are unrelated to his specific study, Jones wants to create an open-source database to share those findings with a broad range of scientists. He’s also collaborating with medicinal chemists in the College of Pharmacy to tap into the vast potential zebrafish have to improve the drug discovery process. “It’s a unique environment here,” says Jones. “I wouldn’t be doing the science I’m doing now without such a collaborative community.”

ALGORITHM NO. 5



“It was absolutely pivotal. I went into that student presentation with a problem and came out of it with a completely different idea about how I was going to pursue my research.”

CASE STUDY: JODY ROSENBLATT'S LAB

Jody Rosenblatt, Ph.D., had a hunch. THE HUNTSMAN CANCER INSTITUTE INVESTIGATOR AND ASSOCIATE PROFESSOR OF ONCOLOGICAL SCIENCES NOTICED THAT WHEN CELLS WERE CROWDED, SOME WERE SHOVED OUT TO THEIR DEATH. *“It was a very simple idea, but really a departure for anyone to think about it like that.”*

What she needed was a way to artificially crowd cells in tissue. “We were coming up with some crazy schemes, and we needed a bioengineer to help with our experiments,” says Rosenblatt. “We asked leading scientists around the country where we might turn for help, but they had no ideas.” Serendipitously, she received an impressive cover email from a bioengineering undergraduate student, Patrick Loftus, that caught her attention. She didn’t have any space in the lab, but there was something about the email that seemed savvier than most. After talking to Loftus and listening to the kind of questions he was asking, she decided she wanted him in her lab “no matter what.” “When you find someone who is very excited and enthusiastic about the research or a project or a topic, like Patrick was, it’s contagious,” says Rosenblatt.

Loftus enthusiastically introduced her to his bioengineering teachers and classmates. “Working with bioengineers and students opened all sorts of new possibilities. That kind of crossbreeding is really important,” says Rosenblatt. As it turns out, the device she needed already existed around the corner in the lab of a colleague, Masaaki Yoshigi, M.D., Ph.D., research associate professor of pediatrics and bioengineering (adjunct). “Masaaki had created a sort of evil torture chamber for stretching cells and suggested that I could just use it in reverse,” says Rosenblatt. It worked.

“Working with bioengineers and students opened all sorts of new possibilities. That kind of crossbreeding is really important.”

Loftus went to work with Yoshigi’s device in collaboration with postdoctoral fellow George Eisenhoffer, Ph.D., who was using zebrafish skin as the model for epithelia, the cellular covering of internal and external body surfaces. With the help of colleagues and students, Rosenblatt’s hunch eventually led to an important discovery of a connection between cell division and cell death never before identified. The findings, which could possibly identify new avenues for cancer therapies, were described in a paper in **Nature** (April 15, 2012). She is quick to give credit to her young collaborators.

Rosenblatt suspects she takes on more undergraduates than most of her colleagues, but she doesn’t accept just anyone. “I have no use for just a pair of hands. I need an attached brain, and I need someone who is self-motivated.” Her interest in students dips way below the undergraduate level. She routinely invites middle-school science classes to tour the lab for “science days” at Huntsman Cancer Institute. Scientists at all levels set up stations for students to do real experiments, such as forensic DNA testing or looking at their own cheek cells stained fluorescently. It gives scientists the chance to explain science in lay terms and try to answer some of the best, most poignant questions about the field—from 12-year-olds. And it gives students the chance to learn that science is about learning new stuff, not memorizing things from the past. “Growing up, I never thought about science because it was taught in such a boring way; it was all about memorization,” she says. “But science is about discovery. It’s really the only frontier left. I want kids to know how fun it is.”

WATCH ROSENBLATT EXPLAIN HER CELL DIVISION AND CELL DEATH DISCOVERY AT
healthsciences.utah.edu/innovation



“Growing up, I never thought about science because it was taught in such a boring way; it was all about memorization. But science is about discovery. It’s really the only frontier left. I want kids to know how fun it is.”

Huntsman Cancer Institute Investigator **Jody Rosenblatt, Ph.D.**, collaborated with undergraduate bioengineering student **Patrick Loftus**, postdoctoral fellow **George Eisenhoffer, Ph.D.**, and colleague **Masaaki Yoshigi, M.D., Ph.D.**, among others to discover a revolutionary connection, reported in **Nature**, between cell division and cell death. “Jody and George included me and made me feel like I had my own project and that my contributions were important,” says Loftus, who worked in Rosenblatt’s lab for three years and started medical school at the University this fall. “I felt like I helped create new knowledge and discovered something that could help people. That was a really motivating experience for me.”



More Questions We're Considering

What if we sent the problem to the specialist, instead of the patient?

What if we radically changed the way we train providers?

What if we handed off expertise instead of holding onto it?

What if we shared information freely instead of guarding it closely?

What if we thought of ourselves as a startup company designed to serve the public?

What if we looked to developing nations to solve our most vexing health care problems?

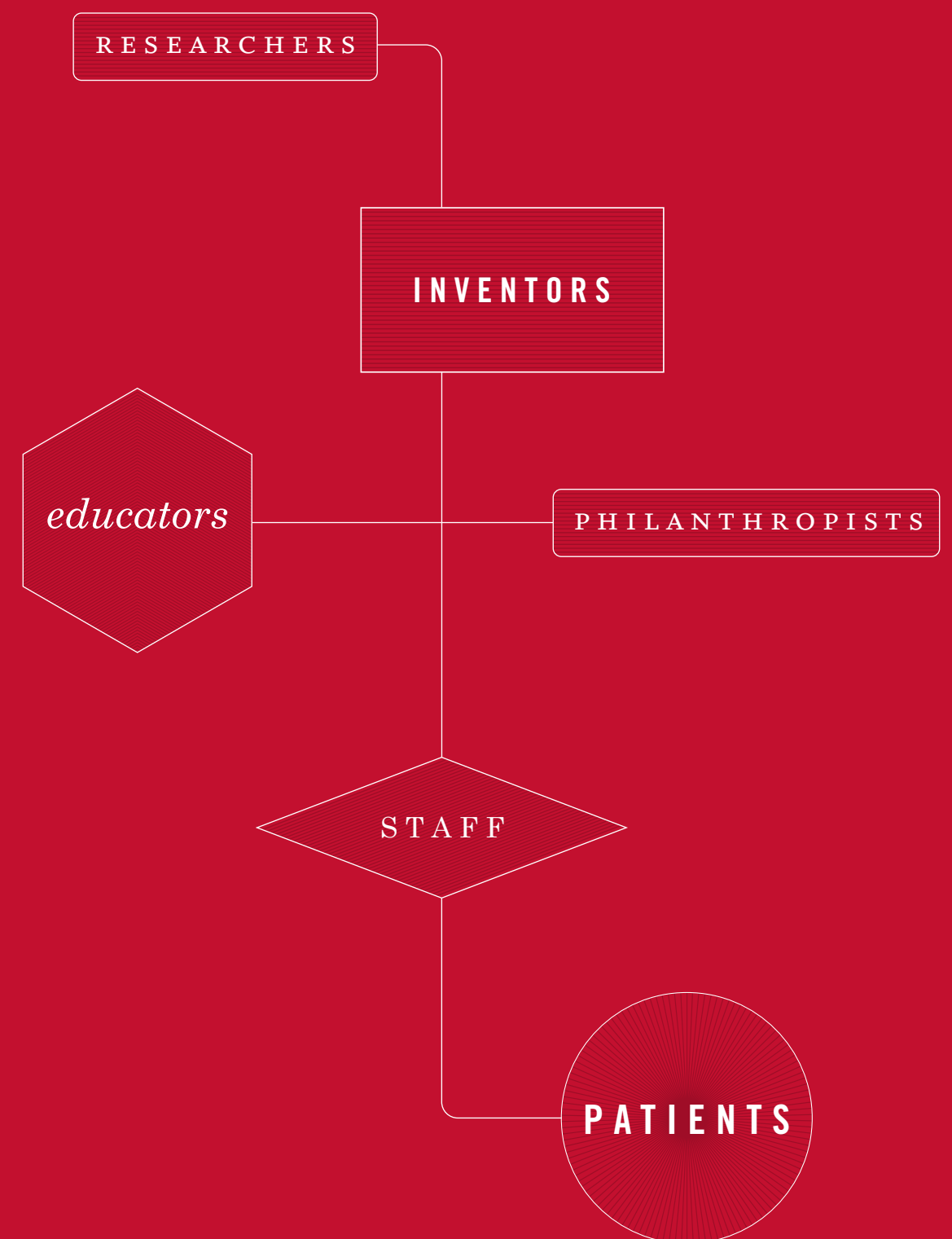
What if we moved as quickly as we could toward payment reform?

What if we made chairs responsible for both the academic department and the clinical service line?

What are the questions you're asking?

Join us in the conversation at healthsciences.utah.edu/innovation and [@utahinnovation](https://twitter.com/utahinnovation)

THERE ARE NO ALGORITHMS FOR INNOVATION WITHOUT PEOPLE.
THEY ARE THE FUEL THAT POWERS ALL OF OUR GREATEST
ACHIEVEMENTS. HERE WE HIGHLIGHT JUST A FEW OF THE FANTASTIC
PEOPLE WHO ARE SHAPING THE FUTURE OF HEALTH CARE.

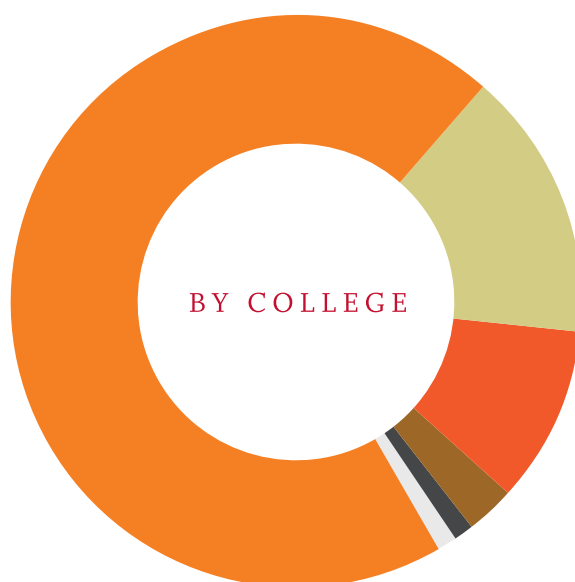
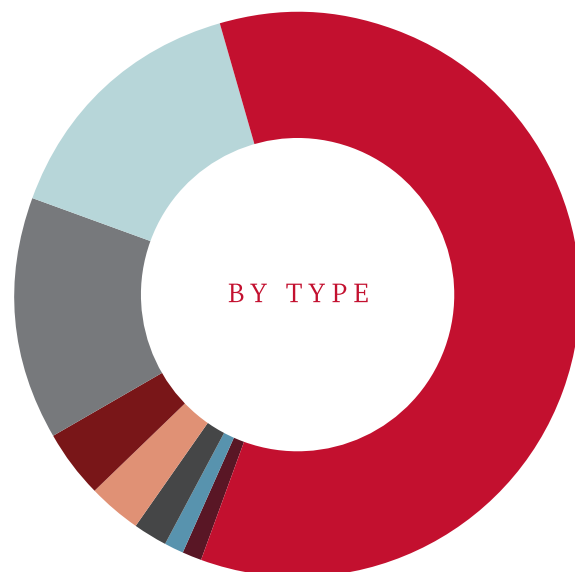


From finding a cure for AIDS to advancing end-of-life care to developing new prosthetic limbs for veterans, our research changes things. WE'RE PROUD TO HAVE SECURED 622 GRANTS REPRESENTING \$230.5 MILLION IN 2011. HOW ARE WE USING THE MONEY? IN HUNDREDS OF DIFFERENT WAYS, ALL UNITED BEHIND A SINGLE CAUSE: TO MAKE LIFE BETTER FOR PEOPLE EVERYWHERE. SEVEN OF OUR INVESTIGATORS TALK ABOUT INNOVATION, CREATIVITY AND THEIR HOPES FOR THE FUTURE.

\$230.5 MILLION: 2011

622: TOTAL NUMBER OF GRANTS

NIH:	\$141.5 million
Fed Government (Non-NIH):	\$32.1 million
Industry:	\$29 million
Universities:	\$9.8 million
Associations:	\$8.4 million
Local/State Government:	\$5.4 million
Institutions:	\$2.3 million
Hospital:	\$2 million



School of Medicine:	\$157.4 million
Senior Vice President's Office:	\$41.7 million
College of Pharmacy:	\$20 million
College of Nursing:	\$5 million
VP for Research:	\$4.7 million
College of Health:	\$1.7 million

COLLEGE OF PHARMACY RANKED #3 IN THE NATION FOR NIH FUNDING
COLLEGE OF NURSING RANKED #16 IN THE NATION FOR NIH FUNDING

WHAT IS THE HOLY GRAIL OF YOUR RESEARCH?

"To understand how the HIV virus uses the host cell's own machinery to replicate or spread. The better we understand how the virus works on the molecular level, the greater the chances are for developing transformative treatments, such as a microbicide to prevent transmission, a vaccine or a cure. Those are far-off goals, but in the past couple of years there have been genuine successes, so I'm cautiously optimistic."



—**Wes Sundquist, Ph.D.**, co-chairs the Department of Biochemistry with longtime collaborator Christopher P. Hill, Ph.D. In 2007, Sundquist was awarded a five-year \$19 million NIH grant to establish a center to study the structural biology of HIV. This year, Sundquist's grant was renewed for \$22 million for another five years.



HOW DO YOU SUSTAIN INNOVATION?

"When you look around the lab, you see lots of young people wandering around and working hard. To me, that's beautiful. I don't expect to be around here forever. That's why we need to continue the investment in the next generation of biomedical investigators. If we fail, then we'll have a huge gap that will take another generation to fill."

—**E. Dale Abel, M.D., Ph.D.**, chief of the Division of Endocrinology, Metabolism and Diabetes, received grants from the NIH, JDRF, American Diabetes Association and American Heart Association to study the effects diabetes has on heart muscle. Abel was honored with the 2011 Distinguished Mentor Award for supporting the career development of graduate students and postdoctoral fellows.

WHAT MATTERS MOST IN YOUR RESEARCH?

"Most people are focused on finding a cure. I'm focused on how to improve the quality of life and well-being in the face of illness. Some people think that if you're being cured, you need to just put up with unpleasant side effects and pain. But I think the life you save has to be worth living. If the treatment profoundly affects a person's well-being, then we haven't fully done our job."

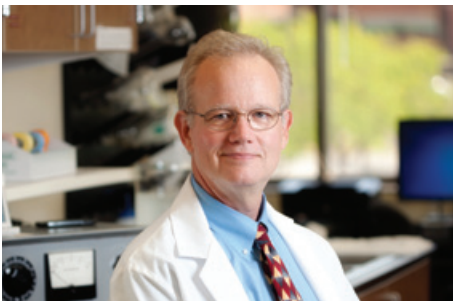


—**Kathleen Mooney, Ph.D., R.N.**, professor in the College of Nursing, was awarded a five-year \$8 million NIH grant to research enhancing end-of-life and bereavement outcomes among cancer caregivers.

RESEARCH GRANTS

WHAT MAKES SCIENCE CREATIVE?

“Creativity is using pre-existing knowledge to formulate a hypothesis that has yet to be considered. Much of my creative energy is derived from the students and colleagues I work with. I’ve always been a strong believer in collaborative science because of the diversity of opinions and resources that can be brought to bear to answer a scientific question.”



—**H. Steve White, Ph.D.**, is a professor of pharmacology and toxicology and scientific director of the NIH-sponsored Anticonvulsant Drug Development Program, established in 1975. The program received another \$24.5 million contract to identify novel treatments for therapy-resistant epilepsy.



HOW DO YOU CONTINUE TO COME UP WITH NEW IDEAS?

“First, you have to be curious by nature, because then you want to discover something that’s unknown. All the good scientists I know are honest enough to admit when they don’t know something, then take a guess and set up an experiment to see whether it’s right. No longer can one guy, like Einstein, drive a scientific effort. You have to find the right environment, the right tools and the right people.”

—**Roy D. Bloebaum, Ph.D.**, is a research professor of orthopedics, biology and bioengineering, and director of the Salt Lake City Veterans Affairs Bone and Joint Research Lab. Bloebaum received a \$2.7 million grant from the Department of Defense to explore a replacement option for standard prosthetic limbs.

HOW CAN LIBRARIES DRIVE INNOVATION?

“Our library empowers people to apply past information to create new knowledge. We give people more than information; we give them permission to be creative when they come into our space. We’re moving toward becoming a true innovation and discovery center.”

—**Jean P. Shipman, M.S.L.S.**, is director of the Spencer S. Eccles Health Sciences Library, which received two contracts (\$13.2 million) from the NIH National Library of Medicine to serve as a national and regional training center.



HOW DO YOUR INNOVATIONS CHANGE LIVES?

“The best day of my week is the day after surgery when I get to take the patch off of a patient. The gift of vision is a wonderful thing to be able to give. The ideas we come up with in the lab are intended to make this kind of a difference in people’s lives.”

—**Bala Ambati, M.D., Ph.D.**, an associate professor of ophthalmology and visual sciences, received three grants from the NIH National Eye Institute. His research at the Moran Eye Center explores new treatments for abnormal blood vessel formation and the development of new surgical technology and devices.

IN 2011,

UNIVERSITY OF UTAH HEALTH SCIENCES FACULTY MEMBERS PUBLISHED

1,992

PAPERS IN PEER-REVIEWED JOURNALS

Here at University of Utah Health Sciences, we go after questions. Aggressively. We ponder. We test. We find answers. And then we ask new questions. Here are just 6 of the big inquiries we explored, along with the new discoveries that we published as a result in 2011. It’s the kind of research that’s pushing science forward—and it all sprung from experience combined with wild daydreams, bold what-ifs, and out-of-the-box musings.

RESEARCH PUBLICATIONS

HOW CAN WE EFFECTIVELY DESTROY LEUKEMIA CELLS?

"It's probably the most interesting time to be involved in oncology that's ever existed. We finally have the tools to understand precisely molecular networks so we can tailor treatment to a given patient. It's not the time to shy away from complexity. Cancer will never be finite—it will continue to evolve. But we are on the brink of making significant dents in cancer research that will make a substantial difference in people's lives."

Michael W. Deininger, M.D., Ph.D.,

chief of the Division of Hematology and Hematologic Malignancies, has identified a novel mechanism that suggests a promising new treatment for leukemia patients who have a common mutation. His recent research was published in **Blood** (December 8, 2011).



CAN WE INCREASE THE CAPACITY FOR EXERCISE IN OLDER PATIENTS?

"Our overall guiding question is, How does muscle blood flow match skeletal muscle metabolic demand and how is this linkage affected by age and disease? Our goal is to assimilate this knowledge and use it to increase mobility and therefore disease resistance in older people."

Russell S. Richardson, Ph.D.,

professor of exercise and sport science, College of Health, and internal medicine, published a study in the **Journal of the American College of Cardiology** (September 20, 2011) identifying the mechanisms by which small muscle-mass exercise training facilitates whole-body exercise capacity in heart failure patients. His group, the Utah Vascular Research Laboratory at Salt Lake City's VA Hospital, has published 20+ papers so far this year.

University of Utah Health Sciences. www.healthsciences.utah.edu/innovation



HOW DOES GENE 'PACKAGING' HELP REGULATE GENE EXPRESSION IN CELLS?

"Humans have 30,000 genes in every cell, but the genes selected for activation vary in each cell type. We try to find out how normal cells make proper gene expression decisions, and how they're misregulated in cancer cells. Through the emerging field of genomics, we can examine gene packaging at every gene in the genome, which has caused a revolution in our understanding of the regulation of gene expression."

Brad Cairns, Ph.D.,

senior director of Basic Science at Huntsman Cancer Institute and co-chair of the Department of Oncological Sciences, published in **Genome Research** (April 2011), that genes necessary for embryo development are already marked for activation in the DNA of zebrafish sperm.

@utahinnovation



CAN DNA SEQUENCING HELP US FIND CURES FOR COMMON DISEASES?

"We can find genes for rare diseases. But how much can genetics tell us about the diseases that are more common? I'm excited and cautiously optimistic about what we may soon find out. I think it's the nature of scientists to be optimistic. You have to be optimistic to explore."

Lynn B. Jorde, Ph.D.,

chair of the Department of Human Genetics, published a study in **Genome Research** (May 2011) that described a new method for using genetic data to prove how closely related two people are. Jorde and human genetics professor Mark Yandell, Ph.D., published a new method in **Genome Research** (July 2011) for analyzing DNA sequences to find disease-causing genes in families. The software is free of charge to academic researchers.



HOW CAN WE PREVENT STILLBIRTH?

"Stillbirth is a very emotional event for families, and they may feel as though undergoing an evaluation may not make a difference—that it won't bring their baby back to life. But often the act of participating in research and trying to find an answer brings hope and closure for families. Our goal is to find out why stillbirths happen and ultimately to try to prevent them."

Robert Silver, M.D.,

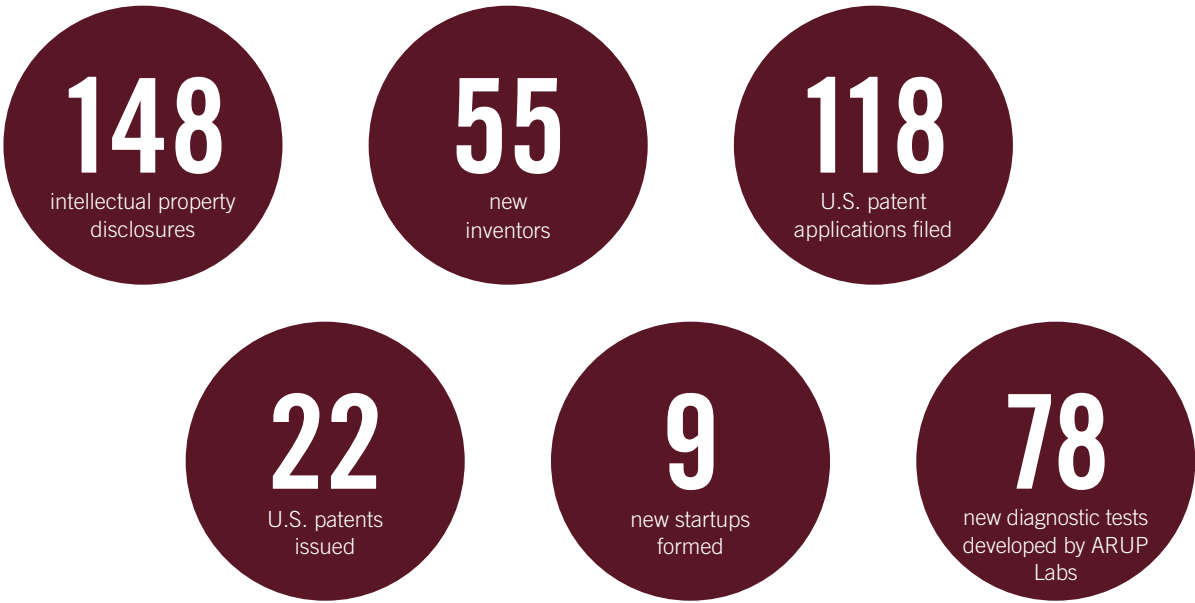
chief of the Division of Maternal-Fetal Medicine, reported that by performing a systematic medical evaluation—including an autopsy—leads to a probable cause of death in the vast majority of stillbirths. The article in **JAMA** (December 14, 2011) also showed that the most common causes of stillbirth differ across racial and ethnic groups.

[healthsciences.utah.edu/innovation](http://www.healthsciences.utah.edu/innovation)

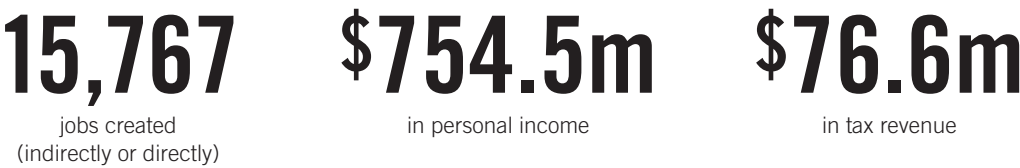
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When it comes to taking academic ideas into the real world, we’ve learned a thing or two. In fact, for the past two years, we’ve been #1 in the nation for creating startups based on university research. It shows how deeply ingrained the entrepreneurial spirit is in the culture at the University of Utah. IN THE HEALTH SCIENCES, WE HAVE A MORE SINGULAR FOCUS FOR COMMERCIALIZING IDEAS—TO IMPROVE THE LIVES OF PATIENTS. FROM A PRODUCT THAT PROTECTS AGAINST CATHETER-RELATED BLOODSTREAM INFECTIONS TO A COATING THAT BLOCKS LIGHT KNOWN TO TRIGGER MIGRAINES TO A NOVEL DRUG-DELIVERY DEVICE FOR TREATING EYE DISEASES, INCLUDING MACULAR DEGENERATION, *our entrepreneurial efforts are making a difference in the world.*

2011 Innovations in the Health Sciences at the University of Utah



ANNUAL ECONOMIC IMPACT OF THE UNIVERSITY OF UTAH’S STARTUP COMPANIES ON THE STATE’S ECONOMY*



To see profiles of some of our latest inventions, download the 2012 Technology Venture Development Annual Report at techventures.utah.edu/news/

*2009 stats based on a report by the University of Utah’s Bureau of Economic and Business Research.

Mixing it up. That’s where we’re headed with our emphasis on interprofessional education. WE’RE FORTUNATE TO HAVE A CENTRAL HEALTH SCIENCES CAMPUS AND SHARED LEARNING SPACES, LIKE THE SPENCER F. AND CLEONE P. ECCLES HEALTH SCIENCES EDUCATION BUILDING, SO WE CAN CREATE INTERDISCIPLINARY OPPORTUNITIES. WE ALSO HAVE STATE-OF-THE-ART TECHNOLOGY, SUCH AS OUR *12,600-square-foot virtual hospital simulation center, to help better prepare students for the real world.*



WE'RE THE ONLY ACADEMIC MEDICAL CENTER IN THE INTERMOUNTAIN WEST. AND WE'RE NESTLED RIGHT INTO THE FOOTHILLS OF ONE OF THE MOST MAJESTIC MOUNTAIN RANGES IN THE WORLD. WE'RE MORE THAN **1,500 COMMITTED PHYSICIANS, SCIENTISTS AND INVESTIGATORS** SUPPORTED BY **12,000 DEDICATED STAFF MEMBERS** PUSHING THE LIMITS OF KNOWLEDGE IN SCIENCE AND MEDICINE. TOGETHER, WE'RE WORKING TO PROVIDE AN EXCEPTIONAL EXPERIENCE FOR EVERY PATIENT WE SERVE.

4

Hospitals

10

Community Clinics

1,200

Physicians

TOP 10

IN QUALITY

For the past three years, University of Utah Health Care has been ranked among the top 10 academic medical centers by the University HealthSystem Consortium for delivering the highest quality of care in the country.

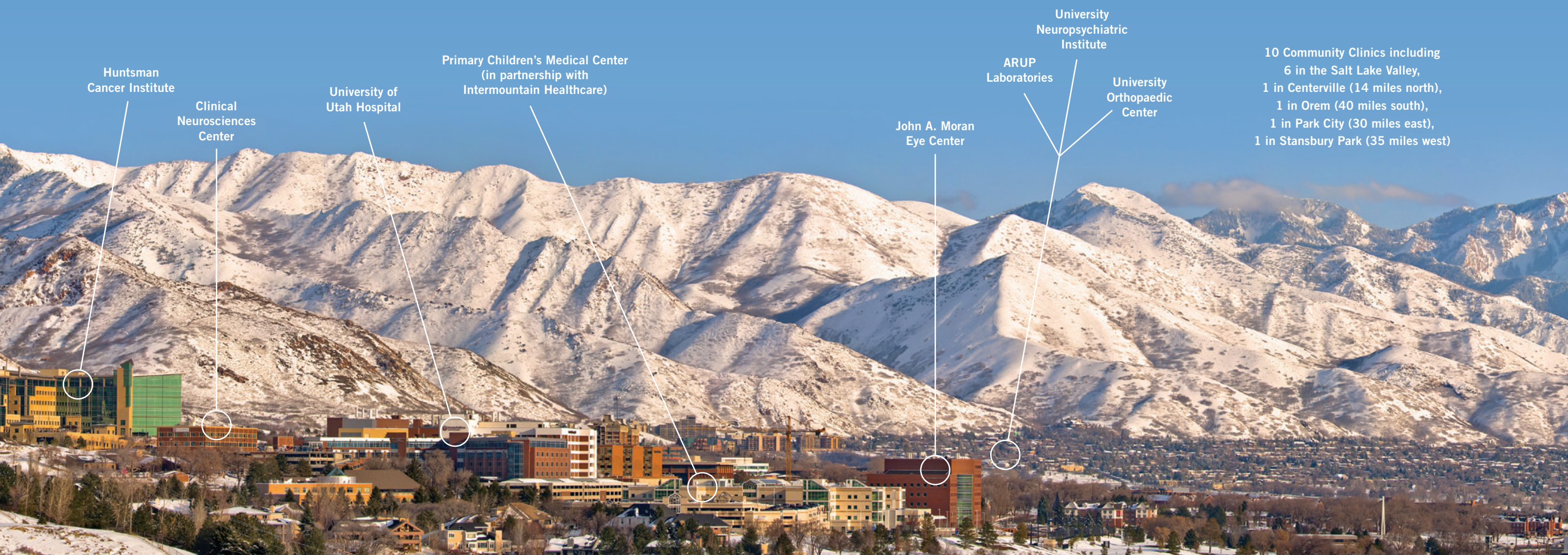
More than

1,000,000

Patient Visits

10%

Our referral area covers 10 percent of the continental U.S.



why *UtΔh*?

TO FIND NATURAL INSPIRATION

“When you’re in a place surrounded by so much beauty, it recalibrates your thinking on a daily basis. Utah is a land of contrasts. There are snowy mountains and stark deserts. It puts things in relief and helps define who you are and what you’re thinking about. The University of Utah fits into the landscape and places a high value on creativity. There are not a lot of constraints here, and I like the openness that’s built into the community. The most important things I’m working on now are things I had no idea about just three years ago.”

Nels C. Elde, Ph.D., assistant professor of human genetics, joined the University of Utah following a postdoctoral fellowship at the Fred Hutchinson Cancer Research Center in Seattle. In June, he was named a 2012 Pew Scholar in the Biomedical Sciences.



TO TRANSCEND RESEARCH BARRIERS

“At every other place I’ve worked, there have been considerable barriers of resources and leadership to bring molecular pathology forward, and I never felt I had the wherewithal to accomplish my dreams. This place has broken down these barriers, so we can focus on doing things that really matter. ARUP is a bright, shiny piece of the University of Utah with an enormous molecular pathology lab. I’m like a little kid in a candy shop, and I couldn’t be happier. The future is just as bright as I always dreamed it would be.”

Mary Bronner, M.D., division chief of Anatomic Pathology and director of the Anatomic Pathology and Oncology divisions at ARUP. Bronner came to the University of Utah from the Cleveland Clinic.



TO COLLABORATE FOR BETTER PATIENT CARE

“The collegiality and the cooperativeness at the University of Utah outshines any place I’ve ever been by leaps and bounds. That makes it easy to do large scale, in-depth cooperative research throughout the university, across the campus and within the community. As a result, we have the opportunity to bring about a revolution in health care that focuses on the individual. The environment here replaces competition with ‘How can we do things better?’ There’s just a sense that anything can be done. Nothing is too hard; nothing is beyond us.”

Michael G. Spigarelli, M.D., Ph.D., division chief of Adolescent Medicine and division chief of Clinical Pharmacology, came to the University of Utah from the University of Cincinnati and Children’s Hospital Medical Center.



The stunning natural beauty. The remarkable core facilities. The incredibly collegial environment. The perfect size. Those were just a few of the reasons that 116 researchers and providers from top academic medical centers across the nation joined us at the University of Utah in 2011. They came to explore new questions, take their research to a higher level and improve patient care in a number of different ways . . . and we’re so glad they did. “Why Utah?” We asked six of our newest faculty members to tell you in their own words.

TO DEVELOP BREAKTHROUGH IDEAS

“You can do innovative science at other universities, but the temptation to follow the crowd at these larger institutions is strong. The supportive environment here gives me the confidence to take on high-risk/high-reward projects that will make a real impact on human health. Innovative research develops ideas that others have never considered before, and that’s what we’re doing here. We’re working toward breakthroughs that will become textbook knowledge. That fits my type of science.”

Christopher Gregg, Ph.D., assistant professor of neurobiology and anatomy, joined the University of Utah following a postdoctoral fellowship at Harvard University. He was named a 2011 New York Stem Cell Foundation Investigator.



TO DEVELOP I.T. TOOLS THAT SAVE THE COUNTRY MONEY

“There’s no bigger challenge in health care right now than figuring out how we can continue to provide excellent care without bankrupting the whole country. For me, Utah is the natural place to do that. Not only does it have the top program and oldest department of biomedical informatics in the country, we also have great support from leaders who have vision and want to do something meaningful. There are no excuses, just an attitude of ‘let’s get it done,’ which is very cool, because what we discover here can help patients throughout the country.”

Kensaku Kawamoto, M.D., Ph.D., assistant professor of biomedical informatics and director of the Knowledge Management and Mobilization Initiative, came to the University of Utah from Duke University.



TO LEVERAGE GENOMIC RESOURCES

“Utah has some profound scientific opportunities to understand the genetic basis of disease. This place has really spectacular genomic resources. In the next five years, we’ll be able to leverage those resources to make significant contributions to treat congenital heart disease, especially in children. With Utah’s great talent and collaborative environment, we’re creating a new patient-centered model so we can take better care of these kids.”

Peter Gruber, M.D., Ph.D., associate professor of pediatric surgery, came to the University of Utah from the Children’s Hospital of Philadelphia.



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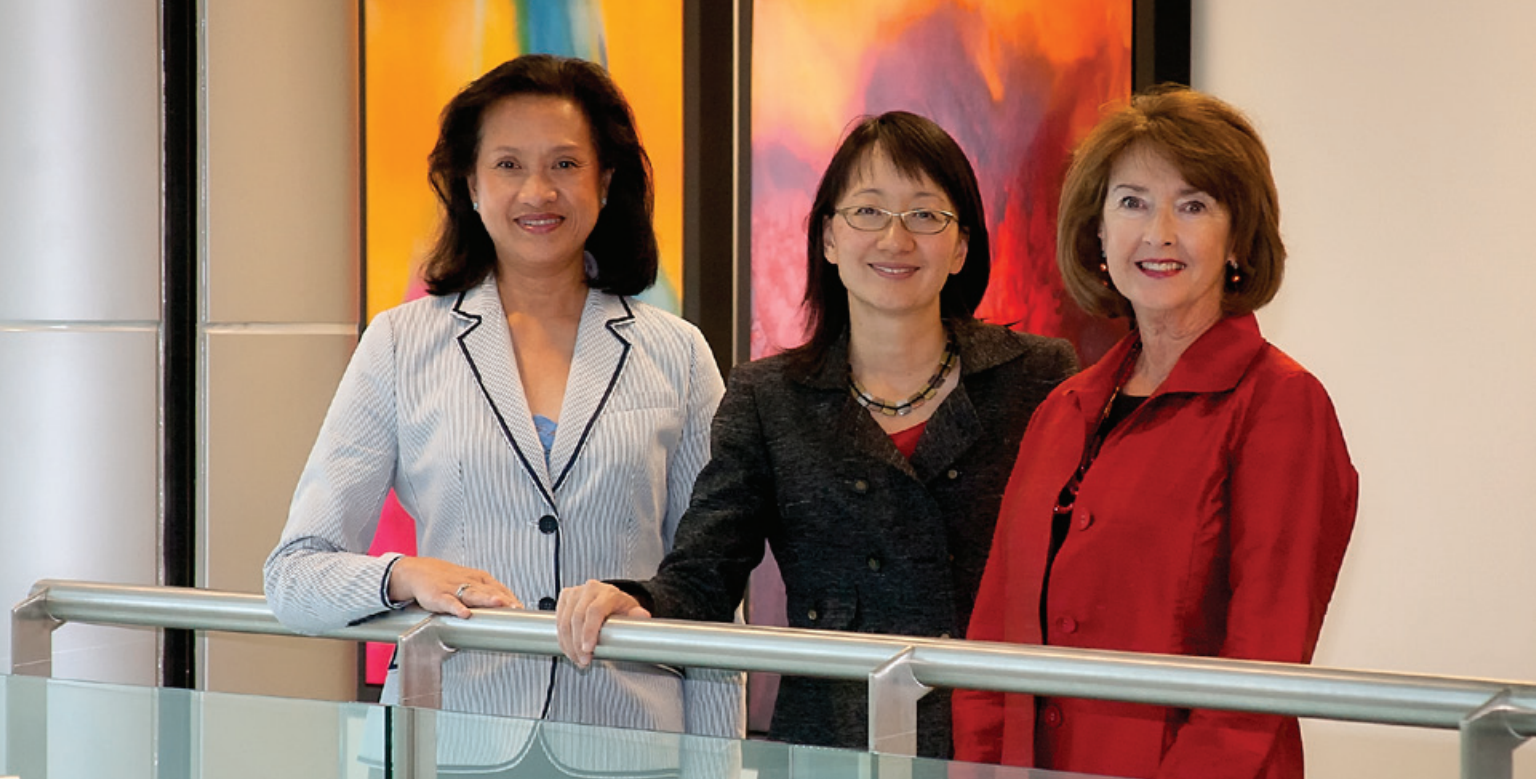
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\$83,295,465 TOTAL DONATIONS FOR 2011

7,991 total number of donors

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— Thomas A. Edison

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