More donor hearts rejected despite need

By Tracie White

Surgeons and transplant centers nationwide increasingly have rejected hearts donated for transplantation despite a growing need for them, according to a new study by researchers at the School of Medicine. The study also found that the rejection of “marginal” donor hearts — those with undesirable qualities, such as being small or coming from an older donor — varied significantly across geographical regions. In other words, some hearts rejected in one region would be accepted in another.

“We’ve become more conservative over the past 15-20 years in terms of acceptance, which is particularly troubling because of the national shortage of donor hearts and the growing number of critically ill patients awaiting heart transplantation,” said Kiran Khush, MD, assistant professor of cardiovascular medicine. Khush, who treats heart transplant patients, is lead author of the study, which was published online Feb. 18 in the American Journal of Transplantation.

Estimates show that more than 20,000 patients in the United States could benefit from heart transplant surgery each year. Yet only 1,949 patients received transplants in 2011, according to the study.

The findings point to a pressing need for a set of consistent, scientifically based guidelines to provide surgeons and transplant centers with a standardized method of determining whether a marginal donor heart should be used for transplantation.

National trends

“There is likely a significant number of suitable donor hearts that are not getting used,” said John Nguyen, a co-author of the study who is trained as a nurse and works as part of a clinical team at the Oakland-based California Transplant Donor Network. “There is still this huge percentage of marginal donors that could be used for transplantation. It could affect the rest of their careers,” said Mitchell Lunn, MD, a co-author of both papers and co-founder of the Stanford Lesbian, Gay, Bisexual & Transgender Medical Education Research Group. “We are supposed to be a field that is accepting of people and one that takes care of people regardless of differences, and yet we can’t even do that for people who are part of our own community.”

To collect data for the study, the researchers distributed

Discrimination fears remain for LGBT medical students

By Tracie White

About a third of medical students in a sexual minority choose not to disclose their sexual identity or orientation during medical school, according to a study by School of Medicine researchers. In addition, 40 percent of medical students who identify themselves as “not heterosexual” reported they were afraid of discrimination in medical school, they found. The study results were published online Feb. 18 in Academic Medicine.

A commentary written by three of the study’s authors and published Feb. 3 on the journal’s website stressed the need for physicians to lead the way in fostering a higher level of diversity and inclusion in the field of medicine. The two articles will appear together later this year in a print issue of the journal focusing on lesbian, gay, bisexual and transgender issues.

“"There is still this huge percentage of medical students who are afraid of discrimination in medical school and how
Researchers measure concussion forces in the greatest detail yet

By Bjorn Carey

More than 40 million people worldwide suffer from concussions each year, but scientists are just beginning to understand the traumatic forces that cause the injury. A decade ago, engineers and physicians at Stanford University’s School of Medicine have discovered that the forces imparted on the brain during a concussion can be measured to provide the clearest-ever picture of the injury site. The current work, however, has helped identify a brain structure that bears closer scrutiny for its potential role in concussion symptoms. While the two concussion impacts inflicted very different magnitude and directional forces on the head, computer models suggest that they both strain a particular part of the brain, the corpus callosum. Previous concussion studies have identified the corpus callosum as a potential early injury site. 

“One of the things the corpus callosum does is manage depth perception and visual judgment by communicating and integrating information from each eye across the left and right hemispheres of the brain,” said lead author Fidel Hernandez, a mechanical engineering graduate student in Camarillo’s lab. “If your eyes can’t communicate, your ability to perceive objects in three dimensions may be impaired, and you may feel out of balance, which is a classic concussion symptom.”

New standard sought

The industry standard for evaluating helmet effectiveness involves measuring only the three translational degrees of freedom. By continuing to suggest the strong connection between the rotational forces and incidence of injury, the Stanford group hopes it can influence industry to apply rotational tests to evaluate existing gear, or to even design helmets that minimize rotational rotational forces.

Real-time monitoring of head accelerations could also help limit the frequency and severity of injuries in sports. Sustaining a second injury shortly after the first can exacerbate the trauma and lengthen recovery time, but athletes often don’t realize — or report — the initial injury. If future research can identify a minimum force required for injury, medical professionals could remotely monitor a player’s head impacts throughout a game and pull the player to the sidelines before he or she sustains greater injury.

An ongoing complexity involved in this line of studying concussions, Camarillo said, is that many injuries go unreported by players. For instance, members of Camarillo’s research group had expected that by measuring head rotation, they would see a clear threshold between concussive and nonconcussive impacts, which has eluded previous studies. But even among the few concussions they measured, there were other impacts with higher rotational acceleration but with no clinically diagnosed concussion.

Camarillo said that other factors could account for this discrepancy, such as variations in individuals’ tolerance to concussions or the player’s bit affecting the mouthguard’s measurements, but he believes underreporting is the main culprit.

“Stanford has careful clinical surveillance and player education, so we thought anyone with symptoms would be detected,” Camarillo said. “We’re only reporting the concussion, its function unknown. Now, still very early results with only the sample size of the current study could lead to better injury detection, or toward developing safer protective gear.

Clearest picture yet

The mouthguard was originally developed by the Stanford football players, local boxers and mixed martial artists fighters with sensor-laden mouthguards that can measure rotational accelerations of the head — roll, pitch and yaw — as well as the translational forces. This gives researchers six degrees of freedom to measure.

Scientists have long believed that rotational accelerations play a prominent role in the injury.

The mouthguard was originally developed by the Se- arabased company X2 Biosystems for consumer use, but Camarillo’s lab has customized the device, allowing the researchers to create the clearest-ever picture of the forces imparted on the head during an impact.

Altogether, the mouthguards recorded more than 500 impacts sustained during regular sporting events. Two of these impacts resulted in diagnosed concussions, and are believed to be the first-ever concussion events to be recorded with six degrees of freedom.

Statistical analysis of the impacts revealed that measurements with six degrees of freedom were more predictive of injury than those made with just the standard three degrees of freedom — the translational forces — typically recorded in this line of research. They also found that rotational accelerations were a stronger predictor of injury than translational forces.

The results put the researchers one step closer toward identifying a novel combination of accelerations that indicate a brain injury, but Camarillo said that the small sample size of the current study means much more research is needed to do so.

“I should stress that these are still very early results with only a few concussions, so we still don’t know what causes concussion,” Camarillo said. “The data does support the rotational acceleration hypothesis, but not overwhelmingly. But the data is compelling enough to suggest we continue to collect this data and see how our results hold for a wider variety of concussions.”

Comparative search engine helps predict human gene function

By Kimberlee D’Ardenne

The Human Genome Project wrapped up over a decade ago, yet around one-third of the genome remains mysterious, its function unknown. Now, School of Medicine researchers have developed a comparative search engine that uses evolutionary correlations between humans and other species’ genes to help identify human gene function.

“After the human genome was sequenced, scientists thought it would be a very short time before we knew what all the genes are doing,” said Tobias Meyer, PhD, professor and chair of chemical and systems biology at Stanford. “But it’s been much more difficult than we expected to do so easily, and we are currently in a holding pattern before we can really make use of all the genomic information.”

Mapping how the human genome functions is like completing a giant jigsaw puzzle. Such a map has been called the “interactome,” and having some idea about what a gene does helps identify where that gene fits in the puzzle.

“Identifying gene function is important for medicine because how genes interact with each other affects disease,” said graduate student Gautam Dey.

Where to begin?

The search engine relies on “big data,” drawing from an international database that contains genomic sequences of hundreds of species, and is accessible via a Web page that is free and available to the public. The Web page went live Feb. 12, the same day that the paper describing the researchers’ method for gene-function mapping was published online in Cell Biology. Dey is the lead author of the paper, and Meyer is the senior author.

The search engine is at http://web. stanford.edu/group/meyerlab/s0P- MAPServer/index.html.

About 6,000 of the human genome’s roughly 20,000 genes have unknown or poorly characterized function. “The reason we don’t know much about these genes is because they do not have an obvious starting point for investigation,” Dey said.

To computationally identify the function of a gene, scientists have a few options. The easiest is finding another gene with a similar sequence for comparison. Another option is searching for genes with shared ancestry for comparison. But sometimes there is no human gene available for comparison, and scientists have to compare human genes to those from other species.

About 567 of the human genome’s roughly 20,000 genes have unknown or poorly characterized function. “The reason we don’t know much about these genes is because they do not have an obvious starting point for investigation,” Dey said.

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Three Stanford alumni to be honored with Dean’s Medal

By Ruthann Richter

Three individuals who have made a significant impact on Stanford Medicine will be honored Feb. 28 with the Dean’s Medal, one of the highest honors bestowed by the School of Medicine. The 2015 recipients, all Stanford alumni, are John Scully, MBA, who is on the board of directors of Stanford Health Care and of Lucile Packard Children’s Hospital Stanford; and Lloyd Minor, MD, dean of the medical school, who, over the last 30 years, has significantly advanced the mission of Stanford Medicine.

“John Scully is a visionary individual who has worked tirelessly on behalf of Stanford Medicine, helping provide the resources and energy necessary to bring new faculty to lead the enterprise,” said Lloyd Minor, MD, dean of the medical school. “John has been a true innovator in the field of imaging and has made significant contributions to advancing academic medicine and support for translational, clinical and patient care. John Scully has brought his natural leadership, passion for cutting-edge science and philanthropic prowess to significantly advancing the field of stem cell medicine and helping to expand the possibilities of what we can accomplish at Stanford Medicine.”

Mariani Byerwalter

Byerwalter, who earned her bachelor’s degree from Stanford in 1982, has interwoven her career in business, as a banker and entrepreneur, over the last 30 years with her volunteer service at the university. As a Stanford senior, she received the Wallace Sterling Award for achieving academic achievement, beginning a longstanding connection to Sterling, the university’s former chancellor, whom she encouraged to remain involved, she said. She was elected to the university Board of Trustees in the early 1990s and shortly after joined the board of the children’s hospital.

“That was my first involvement with Stanford Medicine, and it really touched my heart,” she said. Former university President Ger- hard Casper had tapped her to serve as the university’s chief financial officer and vice president for business affairs in 1996, a position she held for 12 years. After stepping down as CFO, she joined the board of Stanford Hospital, now Stanford Health Care, which she chaired for eight years. She is now a leader of the Campaign for Stanford Medicine.

“To be recognized by the school and the dean and my colleagues is very hum-bling, as my work with Stanford Uni- versity and Stanford Medicine has been the most rewarding and fulfilling of my entire professional career,” Byerwalter said. “The lifelong friendships I’ve made have been the most treasured and I take from that experience.”

William Brody

Brody, a radiologist and 1970 gradu- ate of the medical school, said he chose to come to Stanford after he realized he could easily meld his long-standing interests in both medicine and engineer- ing at the university. For his electrical engineering PhD project, he worked with renowned heart surgeon Norman Shumway, MD, and James Meindl, PhD, director of the Integrated Circuits Laboratory at Stanford, on a method that used ultrasound to measure blood flow during heart rejection. He went on to do his fellowship and residency in cardiology at Stanford.

“Being recognized by the school and the dean and my colleagues is very humbling, as my work with Stanford University and Stanford Medicine has been the most rewarding and fulfilling of my entire professional career,” Byerwalter said. “The lifelong friendships I’ve made have been the most treasured and I take from that experience.”

By constraining the possibilities of gene function, the phylogenetic profil- ing method starts to demystify those parts of the human genome that are poorly understood. Dey estimates that their technique is capable of making useful predictions about function for about 600 genes with unknown func- tion. Of those, 4% are of the 6,000 human genes with unknown function.

Tobias Meyer

Phylogenetic profiles are not just aesthetically pleasing; it helps researchers position single genes among genes across 176 different contexts, in species ranging from birds and fish to plants and single-celled algae.

Other species studied have two dif- ferent human genes whiteness down the gene’s likelihood functions, which means researchers can map out how these genes interact. An initial laboratory experiment, if successful, would make an important next step because it shows that the technol- ogy, if developed, could be used to create a new class of potential drugs.

Kimberlee D’Ariente is a science-writing intern for the medical school’s Office of Communication & Public Affairs.
Tiny African fish makes big splash in aging research

By Krista Conger

“Live fast, die old” maybe isn’t the catchiest motto. But, for the African turquoise killifish, it’s apt. The life span of the tiny fish can be measured in months, not years, and it does everything quickly: hatch, mature, breed and even age. It’s an example of life on extreme fast-forward.

This accelerated life cycle is a necessity when one makes one’s home in seasonal ponds that regularly evaporate, and the fact that the fish shares many biological characteristics with humans makes it a promising candidate for the study of aging and longevity. But until now, scientists didn’t have the necessary tools and information with which to conduct genetic studies.

Now, researchers at the School of Medicine have mapped the location of specific genes involved in aging and age-related diseases along the killifish’s chromosomes. They’ve studied patterns of gene expression in its various tissues, and used genome-editing technology to mutate 13 genes thought to be associated with the aging process.

One gene in particular, a component of an aging-associated enzyme called telomerase, causes fish to develop a constellation of traits similar to those seen in humans lacking the enzyme.

This new biological tool kit, which researchers have made publicly available, will make it possible to trace the effect of specific genetic changes on aging and the diseases that accompany it. Eventually, it may lead to ways to slow or perhaps even reverse human aging.

‘Best of both worlds’

Although the similarities between fish and humans may not be immediately evident, people have much more in common with the tiny, minnowlike creature than with other short-lived laboratory animals.

“This fish gives us the best of both worlds,” said postdoctoral scholar Itamar Harel, PhD. “As a vertebrate, it shares many critical attributes with humans, including an adaptive immune system, real blood and similar stem cell biology. At the same time, its very short life span mimics those of the laboratory worms, including an adaptive immune system, real blood and similar stem cell biology. At the same time, its very short life span mimics those of the laboratory worms, including an adaptive immune system, real blood and similar stem cell biology.

“This is the only animal that has been shown to have functional telomeres,” said Anne Brunet, PhD, professor of genetics. “It’s the only animal that has been shown to have functional telomeres.”

‘Rapid results’

The killifish’s rapid life cycle meant that Harel was able to generate fish carrying the mutations within 30-40 days, and stable lines — that is, fish with the mutation stably integrated into all of their cells, which they will then pass on to all their progeny — within about two to three months.

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The killifish is one of the world’s shortest-lived vertebrates, with some varieties living only four months. Old killifish display many characteristics of aging humans: declining fertility and cognitive function, a loss of muscle mass and an increasing likelihood to develop cancerous tumors.

“Very quickly we began to see an effect on rapidly dividing tissues such as the blood, gut and sperm,” said Harel. “The fish rapidly become sterile, their intestines began to atrophy and they made fewer types of blood cells than their peers.”

The researchers conclude that the killifish is currently the fastest way to study diseases of telomere shortening in vertebrates. They are hopeful that the other mutant strains will be equally useful in their lab and in other labs worldwide.

“Tamar has generated a range of tools necessary to study how genetic changes affect physical characteristics of the killifish,” said Brunet. “It’s true genotype to phenotype platform, and is likely to be transformative. Now we have what is essentially a high-throughput vertebrate model for aging research.”

Other Stanford authors are postdoctoral scholars Param Priya Singh, PhD, and Chi-Kuo Hsu, PhD; former postdoctoral scholar Dario Ruccaro Valenzano, PhD; graduate student Matthew Pech; undergraduate Elisa Zhang; research assistant Ben Machado; technician Sabrina Sharp; and professor of medicine and of biochemistry Steven Arrand, MD, PhD.

The work was supported by the National Institutes of Health; the Glenn Laboratories for the Biology of Aging; Damon Runyon Cancer Research Foundation, Rohsch bald and the Human Frontier Science Program fellowships; and a Stanford Dean’s Fellowship.

Stanford’s Department of Genetics also supported the work.
Research
ded from page 3

A tumor growth history can be thought of like a slide show at a graduation party, which starts when a baby picture is taken and ends with images of the young adult.


deeply embedded within the tumor cells and likely drive tumor progression.

and treatment. Those with the rank of clinical assistant professor and above may request waives so they can lead trials focused on the patient population that they serve at Stanford Health Care, Stanford Children’s Health, the Veterans Affairs Palo Alto Health Care System, Santa Clara Valley Medical Center and other Stanford-affiliated medical centers. PI waivers are not granted for research on basic science mechanisms or studies that require laboratory mice.

Once a waiver is approved, a clinician educator can be listed as a principal investigator on a grant application submitted to private foundations, industry or government funding agencies, such as the National Institutes of Health, the Agency for Healthcare Research and Quality, or the Patient-Centered Outcomes Research Institute. This policy change, which took effect Feb. 21, 2013, was based on recommendations by Mark Cullen, MD, professor of medicine and chief of the Division of General Medical Disciplines; Harry Greenberg, MD, senior associate dean for research; Ann Arvin, MD, the university’s vice provost and dean of research; and Minor.

“As biomedical research becomes more patient-centered, the demand for more clinician investigators increases — not merely people who once trained as physicians, but investigators who remain at the forefront of medical education,” Cullen said. “In my role as chief of general medical disciplines, meeting this need has been one of my highest priorities. This new policy achieves precisely that.”

“I am very pleased that this new process has worked so smoothly and that a substantial number of clinical educators have stepped up to the challenge of moving medical advances into mainstream patient care here at Stanford,” said Greenberg, who also directs Spectrum, the Stanford Center for Clinical and Translational Research and Education.

For more information on PI waivers, visit the school’s Research Management Group website: http://med.stanford.edu/piwaiver.html.

Kira Newby is the communications manager for Spectrum, the Stanford Center for Clinical and Translational Research and Education.

"Big Bang" model of colon cancer identifies importance of time

By Kimberly D’Ardenne

A “Big Bang” model of colon cancer is challenging current thinking about how tumors grow.

Natural selection is thought to gov-
ern tumor growth, which means that the cells present in a tumor are the most evolutionarily fit, or likely to survive. But the Big Bang model asserts that when a mutation occurs it is more im-
portant than its evolutionary fitness in determining its prev-
lence among and within tumors present.

"Yet the origins of these differences are poorly understood,” Curtis said.

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Also in the issue:
• A Q&A with bestselling author and physician Abraham Verghese, MD, on the timeless rituals of medicine. (The digital edition includes audio of an interview with Verghese.)
• A blow-by-blow account of the air-ambulance rescue of an injured toddler.
• A report on the limits of life spans.
• An essay about the nature of time from a young neurosurgeon who is now living with an advanced form of lung cancer. (The digital edition includes audio of an interview with the surgeon, Paul Kalanithi, MD, and a video featuring him.)

The issue also includes a story about the danger of frightening birth of an unusual set of triplets and an excerpt from the new biography of Nobel Prize-winning Stanford biochemist Paul Berg, PhD, describing his sticky situation he found himself in graduate school. The magazine is available online at http://stamed.stanford.edu. Print copies are being sent to subscribers.

Others can request a copy by calling 723-6911 or by sending an email to medmag@stanford.edu.
an online survey to all medical students in the United States and Canada during the 2009-10 academic year. Of the 912 respondents who indicated they were sexual minorities, 269 (about 30 percent) reported that they concealed their sexual identity in medical school. The survey included both multiple-choice questions and free-response questions.

**Discrimination fears**
The most common reasons given for remaining "in the closet" was a fear that their sexuality and gender identity was nobody's business, a fear of discrimi- nation from peers, faculty members, support from peers or family, and pressure from social norms. “Fear of discrimination was the most common theme — discrimination from peers, from your evaluators and faculty members, also from students,” said Math- shawn, lead author of the study and a fourth-year medical student. 

**“Fear of discrimination was the most common theme.”**

Broad Institute, and continued it after joining the Stan- ford University School of Medicine in 2009. He is the primary com- ponent of the epigenome that give rise to different cell types in a data-driven manner,” said Kundaje. “Now we can understand relationships among a massive collection of cell types in a vast resource for re- searchers who study the epigenome.”

**Better recruitment efforts**
The commentary recommended that the medical community both start rou- tinely collecting statistical information on LGBT medical students and improve recruitment efforts. The fields of busi- ness and law are aware, when it comes to medi- cine in both these areas, the authors said. Law and business are particular fields that actually make a concerted ef- fort to recruit LGBT individuals, said Lunn, a clinical fellow at UC-San Francisco who gradua- ted from Stanford medical school. “We don’t col- lect sexual and gender identity information. We don’t even know how many LGBT people there are in the country, much less in medicine.”

### Heart

Kundaje points out that although re- searchers have not studied the effect of these associations, it’s not always clear in which cell types in the body the muta- tions are expressed, and that some patients may have to be seen by a specialist to determine which might be involved in specific traits and diseases.

For example, a beta cell of the pancreas, which senses blood sugar levels, must know when and how to churn out a perfect batch of insulin. This exquisite control requires the coordinated expression of hundreds of genes, a skin cell that makes keratin to provide a protective layer against germs and melanin to give skin its color and protect it from the sun’s rays. But surprisingly, most of the variations in the epigenome in health and disease come from changes in the accessibility of the DNA sequences, said Kundaje. “Until now, it’s been very difficult to perform functional genomic experiments for disease studies be- cause we can’t tell how much DNA is available for use, or to keep them inaccessible. Other epigenetic modifications, many of which affect proteins called his- tones which keep DNA in the nucleus tightly bunched. Chemical tags called methyl or acetyl groups bind to histones to signal whether a regulatory region or gene is available for use, or to keep them inaccessible. Other epigenetic modifications like DNA methylation and histone modifications act like light switches for genes. They turn on or off the expression of genes. But we haven’t found a way to do this in a programmable way.”

Now researchers can begin to peek behind the cur- tain into the inner workings of the cell by mapping and comparing the exact patterns of histone modification, DNA accessibility and gene expression in each tissue.
Thirty-two biomedical teams at Stanford have received about $1.1 million in research funding through Spectrum pilot grant programs. Spectrum, the Stanford Center for Clinical and Translational Research and Education, is focused on accelerating the translation of medical research from bench to bedside to improve patient care. The investigators were awarded grants from the Stanford Health Care Innovation Challenge, a new subcategory under population health, went to projects that improve the health of patients served by Stanford Health Care. The projects in this subcategory were funded by Stanford Health Care in partnership with Spectrum.

The investigators and projects receiving funds are as follows:

### Community engagement

- “The EARN-Health trial: Improving social deter- minants of health among low-income, community-based savings and debt-reduction program.” Sanjay Basu, MD, PhD, assistant professor of medicine; Mark Cullen, MD, professor of medicine; David Rehkopf, ScD, MPH, assistant professor of medicine; Sepideh Modrek, MD, PhD, instructor of medicine; Justin White, PhD, postdoctoral scholar in pediatrics.
- “Early psychosis outreach and education in San Mateo and Santa Clara counties: A community-engaged, public health initiative.” Steven Adelsheim, MD, clinical professor of psychiatry and behavioral sciences; Nev Jones, PhD, postdoctoral scholar; Kate Hardy, ClinPsyD, assistant clinical professor of psychia- try and behavioral sciences.
- “Developing a novel clinical intervention to re- duce substance use among detained youth.” Bonnie Haffajee, PhD, associate professor of psychology; Anoushavan, MD, MPH, clinical assistant professor of pediatrics; Maria Rodiris, PhD, postdoctoral scholar in adolescent medicine.

### Medical technologies

- “Development of a novel monitoring system to prevent unnecessary blood product wastage.” Barrett Larson, MD, resident in anesthesiology, perioperative and pain medicine; Alex Macario, MD, MBA, professor of anesthesiology; Neil Shah, MD, clinical assistant professor of pathology.
- “Study to evaluate a new, non-treatment for vulvovaginal atrophy in cancer survivors.” Shannon MacLaughlin, MD, clinical assistant professor of obstetrics and gynecology; Doug Blaney, MD, professor of obstetrics and gynecology.
- “High-field, ultrasound-guided biopsy in the peripheral lung.” Arthur Sung, MD, clinical associate professor of medicine; Ryan Van Werr, MD, clinical instructor of medicine; Ben Cohn, graduate student in electrical engineering; Vidya Bhat, graduate student in business.
- “Predicting clinical pregnancy with embryo me- chanics after in vitro fertilization.” David Camarillo, PhD, associate professor of bioengineering; Albert Norman, PhD, director of bioengineering; Barry Belz, PhD, professor of obstetrics and gynecology.
- “A novel device for treating chronic wound infec- tions.” Peter Lorenz, MD, professor of plastic and reconstructive surgery; San Rivas-Davila, MD, PhD, assistant professor of electrical engineering; Johan Andreasson, PhD, postdoctoral scholar in genomics; Julie Saiki, MS, SPADA, statistician; Luke Raymond, graduate student in electrical engineering; Michael Hu, MD, postdoctoral scholar in plastic and reconstructive surgery.

### Predictives and diagnostics

- “Microendoscopy sarcomere visualization for the diagnosis, prognosis and monitoring of ALS.” Scott Delp, PhD, professor of bioengineering and of me- chanical engineering; Mark Schriner, PhD, associate professor of biology and of applied physics.
- “Multiplex detection and sequencing of the viral repertoire in clinical samples.” Curt Scharfe, senior scientist in biochemistry; Justin Odegaard, MD, PhD, instructor of pathology; Benjamim Pinsky, MD, PhD, assistant professor of pathology and of medicine; Maria Teterova, MD, PhD, clinical pathology resident.
- “Closing the learning-health-care system loop: Production and usability testing of a clinical decision support interface powered by expert data-mined from electronic medical records.” Jonathan Chen, MD, PhD, postdoctoral scholar in medical informatics; Russ Alman, MD, PhD, professor of bioengineering, of ge- netics and of medicine; Mary Goldstein, MD, profes- sor of medicine; Steven Ashch, MD, MPH, professor of medicine.

### Nominations open for Spirit, inspiring change Leadership awards

Nominations are now being accepted for the School of Medicine Spirit Award and Inspiring Change Leadership awards.

The Spirit Award is given each year to two eli- gible staff members. Winners of the award will be selected based on their leadership award, innovation, motivation, positive attitude and customer service.

The Inspiring Change Leadership Award is given to up to two eligible staff members. Nominations should be outstanding performers who have served at least two years at the medical school and who have initiated or led change and innovation — e.g., im- plementing new processes, systems, organizational strategies or organizational models; Launched transformative improvements in service, efficiency, value, effectiveness, outcome or satisfaction.

Nominations must include a detailed letter, letter of support, resume and a confidential letter and $3,000.

For more information or to make a nomination, visit http://med.stanford.edu/employeerecognition/ awards.

The nomination deadline is March 2.
Stanford developmental biologist Lucy Shapiro, PhD, whose unique worldview has revolutionized the understanding of the bacterial cell as an engineering paradigm, will be the commencement speaker for the School of Medicine Class of 2015. The diploma ceremony will be held June 13 from 11 a.m. to 1 p.m. on Alumni Green, followed by a luncheon at 1 p.m. on the Dean’s Lawn.

Shapiro, the Virginia and D. K. Kang Professor, has spent her career on the leading edge of developmental biology. She is the recipient of numerous awards, including the National Medal of Science in 2012 and the 2014 Pearl Meisser Green- gard Prize, which celebrates the achievements of outstanding women in science.

Shapiro, director of the Beckman Center for Molecular and Genetic Medicine, has been a faculty member since 1989, when she founded the medical school’s Department of Developmental Biology. A painter who studied both biology and the fine arts as an undergraduate, Shapiro said that she sees science as part of the world of art. She began her career as a scientist focused on finding new ways of looking at and understanding living things, much as an artist does. She started by hunting for the simplest organism she could find—a bacterial cell—and then studying its molecular mechanisms. Her research has contributed to the general understanding of the way for new antibiotics. Her use of the microorganism as a model also set the stage for the emerging field of systems biology.

She has served in advisory roles in both the Clinton and George W. Bush administrations on the use of infectious disease preparedness and biosecurity.

Deisseroth is a member of the National Academy of Sciences, the Institute of Medicine, Stanford Bio- medical Sciences. The $100,000 prize will be presented to Deisseroth in a May 20 ceremony in Washington, D.C.

Deisseroth, the D.H. Chen Professor and practicing psychiatrist, is being honored for his contributions to the field of neurobiology. His laboratory is the first to develop a method for controlling neural activity in intact brains with a high degree of precision. The technique, which allows for precise pinpointing of brain circuitry and the delivery of neurotransmitters involved in normal behavior, as well as in diseases like Parkinson’s, schizophrenia and depression.

In addition, Deisseroth’s team also developed ChR2-iPTT, a chimeric engineering method for delivering biological tissues, such as the brain, both opti- mally transparent and accessible to molecular probes, enabling scientists to observe intricate, molecular-level details within intact brains.

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He pioneered the field of optogenetics, which combines generic manipulation and optics to activate or deactivate precisely targeted brain cells at the flick of a switch. This allows for the precise pinpointing of brain circuitry and the delivery of neurotransmitters involved in normal behavior, as well as in diseases like Parkinson’s, schizophrenia and depression.

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Deisseroth is a member of the National Academy of Sciences, the Institute of Medicine, Stanford Bio- medical Sciences. The $100,000 prize will be presented to Deisseroth in a May 20 ceremony in Washington, D.C.

The event, which is free and open to the public, will begin at 4 p.m. in room 120 of the Li Ka Shing Center for Learning and Knowledge. A frequent policy adviser to international ministers of economic, political, environmental and cultural issues, on children’s health and well-being.

Featured guests will include Alan Guttmacher, MD, head of the University of California San Francisco Institute of Child Health and Human Develop- ment; Martin Andrews, who leads Glaxo Smith Kline’s research into new antibiotics; Angela Rosenhal, PhD, founding director of the Australian Regenerative Medicine Institute; Harvard’s Matthew Gillman, MD, who is co-director of an early childhood infectious disease; and Jeanna Jorey, PhD, a neuroscientist at the University of Toronto and the Hospital for Sick Children, who studies molecular processes behind learning and memory.

Lucy Shapiro

Karl Deisseroth

Stem cell ‘tool’ grants awarded to five researchers

Five Stanford researchers were awarded grants of be- tween $1 million and $2 million each by the state stem cell agency in its most competitive funding cycle to date.

The awards were given through the agency’s “tools and technology” program, which encourages research- ers to develop new methods and techniques to overcome stumbling blocks in the field. The agency, known as the California Institute for Regenerative Medicine, distrib- uted a total of nearly $30 million dollars during the Jan. 29 meeting.

Following are the Stanford recipients:

• Sarah Heilshorn, PhD, associate professor of materi- als science and engineering, who together with co-princi- pal investigator Gisela Crist, PhD, associate professor of neurosurgery, received $1.2 million to develop an inject- able scaffold to support the growth and development of transplantable stem cells.

• Anthony Oro, MD, PhD, professor of dermatology, who together with principal investigator Martin Cooper, MD, associate professor of pathology, received $1.4 million to identify epigenomic signatures that can be used to select induced pluripotent stem cell lines for differen- tiation into a variety of tissues.

• Joseph Wu, MD, PhD, professor of medicine and of physiology, who together with principal investigator Shashank Joshi, MD, PhD, associate professor of radiology and director of the Stanford Cardiovas- cular Institute, received $1.9 million to develop a large-animal model in which to test the transplantation of heart muscle tissue derived from induced pluripotent stem cells.

• Irving Weissman, MD, professor of pathology and of developmental biology and director of the Stanford Institute for Stem Cell Biology and Regenerative Medi- cine, who together with co-principal investigator Judith Shizuru, MD, associate professor of medicine, received $1.4 million to develop ways to generate better-tolerated, transplantable, blood-forming stem cells from induced pluripotent stem cells and to test new ways to prepare recipients for the transplantation of the cells.

• Fan Yang, PhD, assistant professor of orthopedic sur- gery and of bioengineering, who received $1.4 million to develop microfluid-based hydrogels to enhance the en- graftment and survival of transplanted stem cells.

With these awards, Stanford has received a total of around $296 million from CIRM.

Conversations in Global Health to feature UCSF’s Gavin Yamey on March 4

Gavin Yamey, MPH, an associate professor of epidemiology and biostatistics at the University of California, San Francisco, will discuss some of the most timely and pressing issues in global health March 4 in a conversa- tion with Paul Conde, Stanford Medicine’s chief commu- nications officer.

The event, which is free and open to the public, will begin at 4 p.m. in room 120 of the Li Ka Shing Center for Learning and Knowledge.

A frequent policy adviser to international ministers of health, Yamey was one of the founding editors of PLOS Medicine and PLOS Neglected Tropical Diseases, the first open-access journal devoted specifically to neglected dis- eases. His research interests include underserved youth, economic, political, environmental and cultural issues on children’s health and well-being.

Featured guests will include Alan Guttmacher, MD, head of the University of California San Francisco Institute of Child Health and Human Develop- ment; Martin Andrews, who leads Glaxo Smith Kline’s research into new antibiotics; Angela Rosenhal, PhD, founding director of the Australian Regenerative Medicine Institute; Harvard’s Matthew Gillman, MD, who is co-director of an early childhood infectious disease; and Jeanna Jorey, PhD, a neuroscientist at the University of Toronto and the Hospital for Sick Children, who studies molecular processes behind learning and memory.