April Armstrong was lauded for being a highly valued author in dermatology. Read more on page 2.

USC, NASA tracking impact of fungi in space on astronauts

By Michele Koller

Could microbes found on the International Space Station affect astronauts’ health in long-term space travel? At NASA sharpen its focus on Mars, USC School of Pharmacy researchers are working with the NASA Jet Propulsion Laboratory to provide answers to that question.

NASA’s six-part “Microbial Tracking” investigation seeks to identify and characterize microorganisms found in the air and on surfaces of the International Space Station. Astronauts on the station collect samples and send them back to Earth, allowing scientists to better understand how the stresses of microgravity and the enhanced radiation conditions in space affect the microbial flora on the International Space Station.

“NASA is trying to see whether we can go to Mars and beyond,” explained Jet Propulsion Laboratory senior research scientist Kasun “Venkat” Venkateswaran, PhD, principal investigator for the experiment. “In a closed environment, people have to inhale and exhale what they breathe. We need to know what we are dealing with, so we can come up with an appropriate countermeasure to mitigate problems. We need to know all of this because you don’t have 9-1-1 to call to get them back.”

USC has been involved in the project since 2015. Clay C. C. Wang, PhD, professor of pharmacology and pharmaceutical sciences and chemistry at the USC School of Pharmacy and the USC Dornsife College of Letters, Arts and Sciences, originally collaborated with Venkateswaran on the launch of the project to see what organisms caught in the astronauts’ breath might be.

By Sherri Smelling

Mark S. Humayun, MD, PhD, co-director of the USC Gayle and Edward Roski Eye Institute and director of the USC Institute for Biomedical Therapeutics, has been elected to the National Academy of Inventors (NAI) 2016 Fellows Program, the highest professional distinction accorded solely to academic inventors. Humayun will attend the NAI Fellow induction ceremony at the John F. Kennedy Presidential Library and Museum in Boston next April.

Founded in 2010, NAI Fellows are nominated by their peers and chosen based on their prolific contribution in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society.

Humayun merges medicine and engineering to focus on vision. In his work, he uses a combination of microscope lenses and the human eye on a computer monitor to help people see.

By Mary Dacuma

Thomson Reuters generates an annual Highly Cited Researchers list to fully assess those who have made the most foundational contributions to their field. To do this, they first pull the most highly cited papers in each scientific field, then count the number of these papers attributed to each author. In total, there are 3,000 authors across 21 different scientific fields.

“This acknowledgement of the Keck School of Medicine’s excellence in research is particularly significant as this research is vital to new disease and treatment discoveries, which ultimately give our patients — and patients around the world — hope for improved outcomes and cures for disease,” said Robert Varma, MD, MPH, dean of the Keck School of Medicine and director of the USC Gayle and Edward Roski Eye Institute. “It is a testament to the Keck School’s growing prominence as a research-intensive academic medical center and I am delighted for my colleagues who have made this important list.”

The list includes: Arthur Toga, PhD, Provost Professor of Ophthalmology — Toga currently is not a USC employee.

By Zen Vuong

Scientists at the Alzheimer’s Therapeutic Research Institute (ATRI) of the Keck School of Medicine of USC have enrolled more than 1,000 people in their international clinical trials and are still seeking more participants.

Staff at the San Diego-based neurological diseases hub and their partner sites are screening thousands of people for eligibility in one of six clinical trials, and preparing to enroll individuals in two new studies.

Paul Aisen, MD, director of ATRI and a professor of neurology at the Keck School of Medicine, said his team is working to accelerate progress toward finding an effective therapy for Alzheimer’s.

He shares his thoughts on a disease that affects more than 5 million Americans.

Research from the Department of Preventive Medicine was cited in a recent Surgeon General report on e-cigarettes. Read more on page 3.

Distinguished Professor Jonathan Samet, MD, MS, director of the USC Institute for Global Health, Flora L. Thornton Chair of Preventive Medicine, received the 2016 Fries Prize for Improving Health at the Centers for Disease Control and Prevention Nov. 17 for his pioneering research and decades of advocacy on the negative impacts of air pollution on health.

Tained in internal medicine, pulmonary medicine and epidemiology, Samet has applied his broad background to identify and address the effects of indoor and outdoor air pollution on the health of children and adults. He is recognized for his research on the health risks of inhaled pollutants — particles and ozone in outdoor air and indoor pollutants including secondhand smoke and radon — and his significant contributions to improve the environment.

“Dr. Samet has dedicated his career to protecting people from the dangers of air pollutants and for that we owe him
Neurological health addressed

By Hope Hamashige

C hile Petzing, MD, associate professor of neurology (clinical scholar) at the Keck School of Medicine of USC, recently organized a non-pharmacological interventions for Parkinson’s disease.

One of the initiative’s goals has been to share the results of Petzing’s research, which it continues to support through the USC Parkinson’s Research Fund, with the medical community in Mexico.

Noting that there are few top scholars at USC conduct research on the links between lifestyle choices and neurodegenerative diseases, Petzing said that breaking Parkinson’s disease further than the subject had broad appeal in Mexico.

The symposium, which drew far more attention and attendance than the organizers had anticipated, created new opportunities for collaboration between USC’s researchers and their counterparts in Mexico.

“The wonderful experience and I think it will open up important collaborations in the future,” Petzing said.

Angela McCracken, director of the USC Mexico office, added that the subject had broad appeal in Mexico, bringing a large crowd of the top academics from throughout the country.

USC scientists supported for brain health and the DRGB Foundation’s vision, USC has been able to accomplish the single largest academic event between USC and Mexico, McCracken said.

“When we look forward with great excitement to this latest chapter in the ongoing story of USC, Mexico City and the power of collaboration,” Jackiewicz said.

The number of degree-seeking students at USC from Mexico has more than doubled in the past five years, while new partnerships with leading Mexican universities have enriched academic scholarship at USC and in Mexico.

USC’s academic partnerships with Mexican institutions have addressed several issues, including drug abuse in Mexico City, aging and health among Mexico’s senior citizens and the alleviation of poverty in Yucatán.
The United States Surgeon General on Dec. 8 released a new report calling e-cigarettes a “major public health concern,” which included input from a professor at the Keck School of Medicine of USC.

“E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General” is the first comprehensive review on this public health challenge facing the nation’s highest public-health authority.

The report provides insights into youth e-cigarette use, which has more than tripled since 2011, and outlines dangers to young people who are uniquely vulnerable.

While recognizing the need for further research, the report finds that the aerosol inhaled by e-cigarette smokers may cause mood disorders, deficits in attention and cognition, and addiction to nicotine — and may also be harmful secondhand to non-users.

USC’s Jonathan Samet, MD, MSc, senior investigator and professor of medicine and chair of preventive medicine and director of the USC Institute for Global Public Health, contributed to the development of the chapter on e-cigarette policy. Samet is an expert in tobacco and public health whose research on the risks of environmental pollution has led to changes in public policy responsible for improved air quality standards that will lead to better health for millions of people around the world.

“I am deeply honored to receive the 2016 Fries Prize,” Samet said. “My work to improve health has been based on the premise that researchers and their findings can make a difference. Looking back over the past several decades of my career, I am proud to say that, along with my many colleagues, our research on the risks of environmental pollution has led to enhanced gains in environmental quality and health.

“So I am also honored to join an incredible list of prior winners, including such illustrious leaders as the former Surgeon General of the United States, C. Everett Koop.”

The Fries Prize for Improving Health recognizes the work of an individual who has made major accomplishments in health improve¬ment with emphasis on recent contribu¬tions. The 2016 winner is a scientist, with and the general criteria of the greatest good for the greatest number. It is intended for a scientist under the age of 80 to do the most to improve health. The Fries Prize for Improving Health award is $60,000.

By Larissa Puro

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HSC Newsmakers
A roundup of news items related to Keck Medicine of USC, which may include philanthropic donations, research grants, publication in academic journals and mentions in the news media:

**Study: Small cell lung cancer immunotherapy possible**

A study published in the *Journal of Neuroradiology* and led by Ite Laird-Offringa, PhD, associate professor of surgery of biochemistry and molecular medicine and associate dean of graduate affairs, suggests that the human body can detect and create an immune response to small cell lung cancer, which may be helpful in developing new therapeutic and detection methods.

The key lies in isoaapptation, a process that damages amino acids and changes the shape of neuronal ELAVL proteins expressed in the tumor. The immune response of patients to this isoaapptation spans the gamut from no response to such a strong immune response that patients develop severe and lethal autoimmune disease. About one-fifth of patients develop a moderate immune response to isoaapptation and have better overall survival to small cell lung cancer. “If we can use isoaapptlated ELAVL proteins to elicit an ideal immune response that can fight small cell lung cancer, we may be able to offer a new therapy for this disease. Who knows … one day we may be able to prevent it in people who are most at risk, including current and former smokers,” Laird-Offringa said. — Mary Dacuma

**Older mothers are mentally sharper in old age, study finds**

A *new study has found that women have better brainpower after menopause if they had their last baby after age 35, used hormonal contraceptives for more than 10 years or began their menstral cycle before turning 13. This is the first study to investigate the association between age at last pregnancy, which can be a marker of a later surge of pregnancy-related hormones, and cognitive function in later life, said Roksana Karim, MD, PhD, lead author of the study and assistant professor of clinical preventive medicine at the Keck School of Medicine of USC. Postmenopausal women who had their last pregnancy after 35 had better verbal memory. Those who had their first pregnancy when they were 24 or older had significantly better executive function, which includes attention control, working memory, reasoning and problem solving. The study, published recently in the *Journal of the American Geriatrics Society*, includes 810 women who, on average, were 60 years old. The data was adjusted for age, race and ethnicity, income and education. — Zen Vuong

**Treatment reduces children’s chemo-induced hearing loss**

*Investigators from Children’s Hospital Los Angeles and 37 other Children’s Oncology Group hospitals in the U.S. and Canada have determined that sodium thiosulfate prevents cisplatin-induced hearing loss in children and adolescents with cancer. Results of this randomized, controlled trial, called ACCL0431, have been published in the early online edition of *Lancet Oncology*. Federally-funded, cooperative group study is the first to show sodium thiosulfate prevents cisplatin-induced hearing loss in children and adolescents being treated for cancer,” said David Freyer, DO, MS, professor of clinical pediatrics at the Keck School of Medicine of USC and director of the Survivorship & Supportive Care Program in the Children’s Center for Cancer and Blood Diseases at Children’s Hospital Los Angeles. “It is an important step toward developing a safe and effective strategy that will greatly improve quality of life for cancer survivors.” Freyer was lead author and chair of the study. — Ellin Kavanagh

**USC Stem Cell duo earns Doerr grant**

By Christy Lytal

Although it’s not the type of challenge that involves an ice bucket, this year’s Doerr Stem Cell Challenge Grant has brought together two young scientists from different USC labs to tackle ALS.

“These $10,000 grants make it possible for our students and postdocs to connect and collaborate on one-year interdisciplinary projects spanning different labs,” said Andy McMahon, PhD, chair of the executive committee of USC Stem Cell, W.M. Keck Provost Professor of Stem Cell Biology and Regenerative Medicine and Biological Sciences; Chair of Stem Cell Biology and Regenerative Medicine; director, Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at USC.

“The students and postdocs initiate and propose the projects themselves — thus developing their creativity and independence.”

The winning project was conceived on a typical Friday in the seminar rooms of the Eli and Edythe Broad CIRM Center for Regenerative Medicine and Stem Cell Research at USC. Hauore (Vincent) Yu, a graduate student studying hearing loss in the laboratory of Neil Segil, PhD, was delivering a talk about his latest discovery: a new technique for identifying gene regulatory regions. A lightbulb went off for Kate Galloway, PhD, a postdoctoral fellow in the laboratory of Justin Ichida, PhD, who studies motor neurons derived from ALS patients.

Even though Galloway and Yu study different organ systems in two different labs, they now are working together. Their collaborative project will tackle a fundamental mystery surrounding ALS: although scientists have identified gene mutations that can cause ALS, more than 80 percent of patients with the disease do not actually have these known mutations. This suggests that something else underlies the disease — such as a problem not with the genes themselves, but with the section of the genome that regulates the genes.

“Through their experiments, Galloway and Yu will confirm that the gene regulatory networks of the motor neurons created in the lab resemble naturally occurring motor neurons at specific stages of embryonic development. A positive finding would further validate lab-created motor neurons in neural disease modeling in the lab.”

**Speaker kicks off lecture series**

By Melissa Masatani

Kerrick School of Medicine of USC Dean Rohit Varma, MD, MPH, welcomed Gianluca Lazzi, PhD, MBA, recently as the guest speaker for the Dean’s Distinguished Lecturer Series. Lazzi, chair of the Department of Electrical and Computer Engineering at the University of Utah, gave a lecture titled, “Bioelectronics for Neuroimplants: From Wireless Power and Data Transfer to Direct Neurostimulation,” Dec. 12 on the Health Sciences Campus.

The lecture covered the history of research in bioelectromagnetics and neuroimplants, discussing the trajectory of information gathering, over the past 30 years.

“We need to think about where we were and where we are now, in order to understand where we might be,” Lazzi said.

Creating predictive simulations, for example, was a science-fiction-type idea when scientists were looking at very low-resolution renderings decades ago. Now, Lazzi said, every two days, scientists create as much data as was created from the beginning of mankind until 2003. Lazzi also discussed advancements in liquid electronics, which are used to create wearable devices as well as adaptive neuroimplants.