IT’S ALL COMING INTO FOCUS
Our path forward is clear

The Arizona Health Sciences Center at the University of Arizona will emerge as one of the premier academic health centers in the nation.

With an unwavering commitment to excellence, and the full support of the Arizona Board of Regents, AHSC is poised to accomplish its ambitious goal to improve the health of Arizona.

The many accomplishments presented here are just the beginning...
Message from the UA Senior Vice President for Health Sciences

After completing my initial year as senior vice president for health sciences at the University of Arizona, I remain more convinced than ever that we are poised to become one of the nation’s premier academic health centers.

In that regard, I am proud to present this fiscal year 2014 Annual Report for the Arizona Health Sciences Center (AHSC). Within this report are highlights of our excellent programs and profiles of just a few of our outstanding and talented faculty. The many accomplishments presented here are just the beginning for AHSC as we are poised to deliver on the ambitious goals articulated by the University of Arizona’s Never Settle strategic plan.

With the alignment of our five health sciences colleges, and in partnership with units across the entire University, we have identified four areas of biomedical research excellence on which we will focus our resources:

• Health Disparities
• Population Health and Health Outcomes
• Precision Health
• Neuroscience

These targeted areas of excellence will help accelerate our efforts to positively impact healthcare in our state and across the nation, expand our sponsored research portfolio and improve the quality and diversity of Arizona’s health professions workforce.

The environment at the University of Arizona, and throughout our state, positions AHSC for success. We have world-class education, innovative research and outstanding clinical and outreach programs that take place on our campuses and far beyond. Our aggressive recruitment campaign and efforts to increase partnerships and collaboration are moving the UA health sciences enterprise forward.

For example, the University of Arizona, with strong support from the Arizona Board of Regents, has entered negotiations with Phoenix-based Banner Health that would transition the University of Arizona-Banner Health healthcare delivery organization into the state’s largest provider. The goal of these historic negotiations is to create a statewide healthcare organization and a comprehensive new model for academic medicine. This is a significant step toward realizing our aspiration to become a premier academic health center.

This is a very exciting time at the University of Arizona. I continue to be impressed by the pioneering spirit of our institution, and the willingness of people here to reach out and work across disciplines and geography. The talent, creativity and breadth of activities among our faculty, students and staff are something to showcase to the state and nation.

AHSC is aggressively pursuing excellence with the goal to better care for and serve the people of Arizona and beyond. With a new, comprehensive UA strategic plan and unrelenting focus, we are poised to become one of the nation’s elite academic health centers—and we are determined to reach that goal. I want to thank all the AHSC staff and faculty who are making this goal a reality.

Joe G.N. “Skip” Garcia, MD
Senior Vice President for Health Sciences
Interim Dean, UA College of Medicine – Tucson
The University of Arizona
“Advancing the University of Arizona’s health sciences enterprise is a major component of our Never Settle strategic plan and an important part of our statewide Land Grant mission. Training much-needed healthcare professionals and advancing translational biomedical research, which will lead to better treatments and cures for our most deadly diseases, is critical to the health of the people of Arizona—and is a responsibility we take very seriously.”

Ann Weaver Hart, president of the University of Arizona

Ann Weaver Hart, president of the University of Arizona, is leading the Never Settle strategic plan as well as the accompanying Arizona Now capital campaign, which aims to raise $1.5 billion over the next several years to support the plan’s ambitious goals.

Table of Contents

Introduction ...................................................................1
Message from the UA Senior VP for Health Sciences.....3
Senior Leadership Team .................................................5
AHSC Research Focus Areas ..........................................6
AHSC Advisory Council Chairs .......................................7
Population Health and Health Outcomes ..................... 8
Health Disparities .........................................................18
Precision Health .......................................................... 26
Neuroscience ................................................................38
Partnerships and AHSC Colleges .................................46
Senior Vice President for Health Sciences Leadership Team

Elizabeth Calhoun, PhD, MEd, is the associate vice president for population health sciences and director of the new Center for Population Health Science and Discovery at the Arizona Health Sciences Center; professor at the UA Mel and Enid Zuckerman College of Public Health, with a joint appointment in the Department of Surgery at the UA College of Medicine – Tucson.

Steven Goldschmid, MD, is the associate vice president for clinical affairs at the Arizona Health Sciences Center, vice president of physician services for the University of Arizona Health Network and a UA professor of medicine.

Michael S. Jonen is the senior associate vice president for health sciences at the Arizona Health Sciences Center. He was previously associate vice president for enterprise strategy for the Office of the Vice President for Health Affairs at the University of Illinois Hospital and Health Sciences System.

Andrew S. Kraft, MD, is the associate vice president for oncology programs for the Arizona Health Sciences Center, Sydney E. Salmon endowed chair and director of the UA Cancer Center, tenured professor of medicine and deputy dean for translational research at the UA College of Medicine – Tucson.

Yves A. Lussier, MD, FAMCI, is the associate vice president for health sciences and chief knowledge officer for the Arizona Health Sciences Center; associate director for cancer informatics and precision health for the University of Arizona Cancer Center; associate director, UA BIOS informatics, for the BIOS Institute; and a UA professor of medicine.

Kenneth S. Ramos, MD, PhD, PharmB, is associate vice president for precision health sciences at the Arizona Health Sciences Center; interim director of the Center for Applied Genetic and Genomic Medicine; and a professor of medicine, UA College of Medicine – Tucson, Department of Medicine.

Sally Reel, PhD, RN, FNP, BC, FAAN, FAANP, is the associate vice president for health sciences interprofessional education, collaborative practice and community engagement at the Arizona Health Sciences Center; university distinguished outreach professor and associate dean for academic practice; clinical professor at the University of Arizona College of Nursing and director of Arizona Area Health Education Centers (AzAHEC) program.

Jason X.-J. Yuan, MD, PhD, is associate vice president for translational health sciences at the Arizona Health Sciences Center, chief of the Division of Translational Regenerative Medicine in the Department of Medicine, and a professor of medicine at the UA College of Medicine – Tucson, with a joint appointment as professor of physiology.
Four Areas of AHSC Excellence; Four Areas to Grow Strategically

Double the University of Arizona (UA) research portfolio by 2020. That was the mandate given by the Arizona Board of Regents back in 2008, when it laid out its 2020 Vision. A tall order, but when Senior Vice President for Health Sciences Joe G.N. “Skip” Garcia, MD, took the helm at the Arizona Health Sciences Center (AHSC) in fall 2013, he began working closely with campus leaders to help develop the AHSC portion of Never Settle, a strategic plan charting UA’s academic and research future and responding to the Regents’ challenge.

Health sciences, already among the largest areas of UA research, naturally would play a leading role in reaching this ambitious goal. The changing landscape of healthcare also made it an opportune moment for AHSC to expand and hone its research focus.

Dr. Garcia met with faculty, administrators and other leaders in the health sciences, leading to identification of four key research areas:

- Population Health and Health Outcomes
- Health Disparities
- Precision Health
- Neuroscience

The UA, and AHSC specifically, already had considerable strengths in these areas, but could excel further with a few strategic investments of resources.

To propel the effort forward, advisory councils were convened for each of the four focus areas. Council members were nominated based on their experience, research success and status as thought leaders in their fields.

Drawing faculty members from across the entire Tucson campus and from the Phoenix Biomedical Campus, involving 11 UA colleges, the councils sprang into action, meeting regularly and engaging in vigorous discussion as they each worked to develop a “white paper,” identifying priority investments for growing research and national recognition.

Each council formed subcommittees to focus the discussions and involve additional faculty members and partners from outside the University.

The white papers (completed in March 2014) are only the beginning. After delivering their recommendations, the councils will remain a sustained force at AHSC, advising the senior vice president, helping to implement recommendations from their reports and pursuing future opportunities to advance research in the four areas of excellence.

To view the AHSC Advisory Councils’ white papers, please visit: http://ahsc.arizona.edu/ahsc-advisory-councils or scan this QR code with your smartphone and it will take you directly to this webpage. To download a free QR code scanner, visit getscanlife.com.
UA-Wide Advisory Councils Propel AHSC Research Trajectory

Population Health and Health Outcomes

**Co-Chairs**

**Iman Hakim, MD, PhD, MPH**
Dean, UA Mel and Enid Zuckerman College of Public Health

**Tamsen Bassford, MD**
Immediate Past Chair, Department of Family and Community Medicine
UA College of Medicine – Tucson

---

Health Disparities

**Co-Chairs**

**David Armstrong, DPM, MD, PhD**
Director, Southern Arizona Limb Salvage Alliance (SALSA)
Professor of Surgery,
UA College of Medicine – Tucson

**Chelsea S. Kidwell, MD**
Professor of Neurology and Medical Imaging
Vice Chair of Research, Department of Neurology
UA College of Medicine – Tucson

---

Precision Health

**Co-Chairs**

**Michael Hammer, PhD**
Professor, Departments of Neurology and Anthropology
UA College of Medicine – Tucson and College of Science
Research Scientist, Arizona Research Laboratories, Division of Biotechnology
Member, UA Steele Children’s Research Center

**J. Lyle Bootman, PhD, ScD**
Dean, UA College of Pharmacy
Founding Executive Director, Center for Health Outcomes and PharmacoEconomic Research
Professor of Pharmacy, Medicine and Public Health

---

Neuroscience

**Co-Chairs**

**Carol Barnes, PhD**
Regents’ Professor of Psychology,
Neurology and Neuroscience,
UA College of Medicine – Tucson and College of Science
Evelyn F. McKnight Chair for Learning and Memory in Aging
Director, Evelyn F. McKnight Brain Institute

**Todd Vanderah, PhD**
Professor and Chair, Department of Pharmacology
UA College of Medicine – Tucson

**Leslie P. Tolbert, PhD**
Regents’ Professor, Neuroscience
UA College of Science

---
HIGH-IMPACT OPPORTUNITIES TO ACHIEVE A HEALTHIER STATE
Native Americans, African Americans, Hispanics and Caucasians. The elderly and the young. The immigrant community. All across Arizona, the population is as varied as the health issues facing these individual groups.

A new focus looks at the health of a population as a whole. It’s also vital to consider health outcomes in any measure of whether the appropriate resources are reaching the community. Population health and health outcomes is one of the four areas of research excellence that are a strategic focus at the Arizona Health Sciences Center.
The Arizona Health Sciences Center is uniquely situated to make enormous contributions to the understanding of population health and health outcomes locally, regionally and nationally, particularly in the elderly, Hispanic and Native American communities and in select, disease-specific areas. This is the conclusion reached by the AHSC Advisory Council for Population Health and Health Outcomes. Few other health sciences campuses nationally have AHSC’s unique resources, including:

- A combination of colleges of medicine, nursing, pharmacy and public health together on the University’s Tucson campus
- A burgeoning college of medicine in the heart of downtown Phoenix, one of the fastest-growing metropolitan areas in the nation
- Multiple centers focused on aging, arthritis, border health, cancer, disease prevention, health promotion, integrative medicine, precision health, heart, respiratory diseases, rural health and other diseases/lifestyles
- Populations encompassing urban and rural areas, including seasonal population fluctuations
- Wide-ranging age and socio-economic groups

Although relatively new concepts, population health and health outcomes have been the focus of multidisciplinary cross-campus collaborative and translational research at AHSC for some time.

Population health research seeks to understand the health and disease of a group of people, as specified by geographical, cultural or political guidelines, and it includes defining the health problems and needs of groups, as well as identifying and providing services to address them. Shifting the focus from the individual to the group, population health research examines these factors and measures their impact on the health of different populations.

Health outcomes research studies the results of care that patients receive. It covers a wide spectrum of issues, from evaluating the effectiveness of medical and surgical procedures, to examining economic and environmental change on care outcomes, to measuring groups of people's differing experiences with care.

The ultimate goal of population health and health outcomes research is to support changes that reduce health disparities among population groups, lessen the burden of disease and improve health.

The resources AHSC has to bring to bear on population health include strengths in numerous areas: cardiovascular diseases, obesity and related metabolic diseases, border and environmental health, healthcare delivery, health policy and informatics/biostatistics/technology, to name a few. The advisory council recommended—and efforts also are underway—to target the available talent, expertise and resources for opportunities for funding and capacity-building to position AHSC for high-impact science in these areas.

AHSC already is staking a claim to improve population health and health outcomes. Its numerous centers are providing care for the community, while improving the future of healthcare.

### Notable Awards in AHSC Population Health and Health Outcomes Research

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nikolich-Zugich, Janko</td>
<td>Protective Immunity in Special Populations</td>
<td>R01/NIAID</td>
<td>$13.81 M</td>
</tr>
<tr>
<td>Kwoh, Chiang</td>
<td>Risk of Incident Knee OA &amp; Clinical Outcomes Based on Imaging Biomarkers</td>
<td>R01/NIAMS</td>
<td>$6.18 M</td>
</tr>
<tr>
<td>Chen, Zhao</td>
<td>Biomarkers and Genetic Factors Related to Sarcopenia in Women</td>
<td>R01/NIA</td>
<td>$2.96 M</td>
</tr>
<tr>
<td>Muramoto, Myra L</td>
<td>Tobacco Cessation Training for Acupuncture, Massage and Chiropractic Practitioners</td>
<td>R01/NCI</td>
<td>$2.92 M</td>
</tr>
<tr>
<td>Lopez, Ana Maria</td>
<td>Centers of Excellence - Arizona Telemedicine Program</td>
<td>HRSA</td>
<td>$2.10 M</td>
</tr>
<tr>
<td>Fain, Mindy</td>
<td>Geriatric Education Centers</td>
<td>UB4/HRSA</td>
<td>$2.02 M</td>
</tr>
<tr>
<td>Guerra, Stefano</td>
<td>Serum Biomarkers of COPD: A Population-Based Prospective Study</td>
<td>R01/NHLBI</td>
<td>$1.86 M</td>
</tr>
<tr>
<td>Ernst, Kacey C</td>
<td>On the Edge: Dengue and Climate</td>
<td>R01/NIAID</td>
<td>$1.65 M</td>
</tr>
<tr>
<td>Najafi, Bijan</td>
<td>Portable Device for Telecare Monitoring of Elderly People</td>
<td>R42/Biosensic LLC</td>
<td>$0.49 M</td>
</tr>
</tbody>
</table>
Better Health Outcomes Via Arizona Telemedicine Program

A phone line can be a lifeline for many Arizonans. The Arizona Telemedicine Program (ATP) links 70 Arizona communities and 160 sites by broadband telecommunications, giving patients face-to-face video consultations with leading cardiologists, neurologists, psychiatrists, pediatricians and other medical specialists.

Because of ATP, patients in remote communities can receive immediate access to specialists who can diagnose conditions as rapidly—and as accurately—as if they were together in the same room.

Back in 1993, then-state Rep. Bob Burns suggested creating a pilot telemedicine program to expand healthcare options for people in rural Arizona. Ronald S. Weinstein, MD, then-head of the UA Department of Pathology, and a pioneer in telepathology, was asked to head up the project, and continues as the director of the program today.

In addition to providing a variety of medical care across the state, ATP also offers distance-education opportunities for physicians, nurses and other health professionals. This type of training helps keep these experts up-to-date, benefiting patients.

Recently, the award-winning ATP announced the appointment of the National Advisory Board of the Telemedicine and Telehealth Service Provider Showcase, which includes 24 nationally recognized thought leaders from across the country.

In the 20 years since ATP was established, more than 1 million cases have been handled. ATP brings access to care to residents across the state, which improves health outcomes and the health of Arizona’s population.

The Center for Population Science and Discovery: Designed to Improve Health

A key recommendation from the AHSC Advisory Council for Population Health and Health Outcomes was to establish a Center for Population Science and Discovery to develop practical solutions to improve health outcomes, enhance access to quality healthcare, reduce health inequities, assess cost effectiveness and ensure accountability.

The Center also will serve as a timely, trusted data analysis and policy source for healthcare systems, policy makers and the public.

Elizabeth Calhoun, PhD, MEd, has joined AHSC to develop and lead the Center. She comes to the UA from the University of Illinois at Chicago, where she served as the director of the Center of Excellence in Eliminating Disparities and co-director of the Center for Population Health and Health Disparities. More recently, Dr. Calhoun led the certification process for navigators and enrollment specialists to enroll the uninsured population of Illinois into health insurance options made available through the Affordable Care Act.

The new Center will provide a focus for active efforts to study and improve population health and health outcomes, not only for Arizona, but for the nation as well.

Dr. Calhoun serves as a UA professor of public health policy and management and the AHSC associate vice president for population health.
Reinventing Healthcare – Better Approaches to Population Health Management

Population health ultimately is about improving the health of individuals, families and communities, as well as reducing America’s extraordinary healthcare spending. For example, the United States spends more on healthcare than any other nation in the world, yet fails to reach the health outcomes achieved by other industrialized nations.

The UA College of Nursing and the UA College of Medicine – Tucson are developing team-based, innovative clinical approaches to population health and health outcomes.

Three projects — Healthy Together Care Partnership, Health 360 South and EPICENTER — are striving to improve the population health of targeted groups. Each of these illustrates a new approach to healthcare, called population health, which represents a major paradigm shift for physicians and other health professionals accustomed to focusing on individual patients. Population health asks them to look additionally at categories of patients – the poor, the chronically ill and those with disabilities, among others.

Ten percent of Americans account for 80 percent of the nation’s healthcare spending. Elderly patients who are poor and chronically ill with heart disease, diabetes and other serious illnesses make up 20 percent of the Medicare population, but account for nearly 50 percent of Medicare spending.

Healthy Together has proved its potential for solving this healthcare conundrum. The care team included geriatrician Mindy Fain, MD, co-director of the Arizona Center on Aging and division chief, geriatrics, general internal medicine and palliative medicine; a clinical psychologist; a nurse practitioner; a pharmacist; social workers and a layperson trained as a community health partner. The team provided home-based primary care to high-risk elderly patients.

In just six months, Healthy Together showed dramatic results, decreasing patients’ emergency room visits and hospitalizations. “By helping patients and families manage chronic and complex conditions at home, patients were able to avoid costly and potentially hazardous emergency department visits and hospitalizations,” Dr. Fain says. “Everyone benefits.”

Another promising solution is Health 360 South, a federally funded project headed by the UA College of Nursing and the UA Department of Family and Community Medicine. Based at the Family Medicine Clinic at the UA Medical Center – South Campus in the Pima County Herbert K. Abrams Public Health Center, Health 360 South also targets chronically ill patients who require frequent emergency care and hospitalizations. For each patient, the project creates a multidisciplinary team, which may include a family nurse practitioner, a family medicine physician, a pharmacist and a nurse who serves as patient advocate and health coach. A community health partner can be added for patients who have difficulty adhering to the health regimen prescribed by the team.

“Health 360 South creates an exceptional opportunity to improve patient outcomes and experiences, improve healthcare quality and contain costs for selected populations with chronic illnesses,” says Sally Reel, PhD, RN, AHSC associate vice president for health sciences interprofessional education, collaboration and community engagement.

In the behavioral health arena, AHSC is involved in innovative approaches to population health and health outcomes. For example, the UA Early Psychosis Intervention Center, EPICENTER, is the first of its kind in the state and one of only a few in the Western United States. The Center provides specialized work-ups and phase-specific treatment for individuals early in the course of a psychotic illness. After a high-risk state, or actual mental illness, is diagnosed, EPICENTER oversees the patient’s treatment, which is geared to minimize the brutal neurodegenerative impact of these conditions.

Understanding that people with chronic mental illness die an average of 20 years younger than the general population in Arizona, this program aims to address the medical and psychiatric needs of individuals often under-diagnosed and under-treated in both medical and psychiatric fields, with the goal to improve holistic diagnosis and outcomes and reduce their risk of early death and disability.
Population Health and Health Outcomes

The University of Arizona and AEMRC, in conjunction with the Arizona Department of Health Services, worked together with more than 30 hospitals and 100 emergency medical agencies to develop and launch the SHARE (Save Hearts Arizona Registry and Education) Program, which is dedicated to improving cardiac arrest survival rates in the state.

From 2007 to 2010, the SHARE Program showed a dramatic improvement in patients who suffered sudden cardiac arrest, saving more than 2,200 lives through improved communication, enhanced ambulance routing processes and exceptional care at participating hospitals.

“We knew lives would be saved,” said Daniel Spaite, MD, director of EMS research at the Arizona Emergency Medicine Research Center in Phoenix and Tucson. A recent study, published in the Annals of Emergency Medicine, showed that survival rates increased more than 60 percent over the four-year study.

AEMRC is embedded within the University of Arizona Department of Emergency Medicine, which ranks in the top 20 in National Institutes of Health funding among emergency medicine departments nationally. The faculty of the UA Department of Emergency Medicine and the Center are national leaders in emergency medicine research activity.

AEMRC and the UA Department of Emergency Medicine are headed by Sam Keim, MD, MS, whose research focus is clinical epidemiology, heat stroke and evidence-based emergency medicine.

Notable Awards in Arizona Emergency Medicine Research Center

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spaite, Daniel W</td>
<td>Impact of Implementing the EMS Traumatic Brain Injury Treatment Guidelines</td>
<td>R01/NINDS</td>
<td>$2.73 M</td>
</tr>
<tr>
<td>Denninghoff, Kurt R</td>
<td>Arizona Neurological Emergencies Treatment Trials Network</td>
<td>U01/NINDS</td>
<td>$1.15 M</td>
</tr>
<tr>
<td>Denninghoff, Kurt R</td>
<td>RAMPART, Rapid Anticonvulsant Medications Prior to Arrival Trial</td>
<td>U01/NINDS</td>
<td>$0.79 M</td>
</tr>
<tr>
<td>Tang, Andrew</td>
<td>A Randomized, Double-Blind, Placebo-Controlled, Dose-Escalation Study of NNZ-2566 in Patients with Traumatic Brain Injury (TBI)</td>
<td>DOD</td>
<td>$0.46 M</td>
</tr>
</tbody>
</table>

The University of Arizona and AEMRC, in conjunction with the Arizona Department of Health Services, worked together with more than 30 hospitals and 100 emergency medical agencies to develop and launch the SHARE (Save Hearts Arizona Registry and Education) Program, which is dedicated to improving cardiac arrest survival rates in the state.

The study concluded that implementing similar post-cardiac arrest systems of care around the country potentially could save thousands of lives each year.
Finding New Ways to Treat Arthritis and Joint Disease

Arthritis affects one in three Arizonans. As with other musculo-skeletal diseases, the incidence of arthritis increases as the population ages. The University of Arizona Arthritis Center (UAAC), which was designated by the Arizona Board of Regents as one of AHSC’s first Centers of Excellence, is conducting research seeking breakthroughs in arthritis treatment.

The UAAC was one of the first to employ a multi-disciplinary approach to combat arthritis, rheumatic and bone-related diseases. In conjunction with educating both patients and healthcare professionals, and providing patient care, research is critical in the fight against arthritis. The UAAC is a stand-alone research center serving the state of Arizona and is based at the University of Arizona College of Medicine - Tucson campus. Led by C. Kent Kwoh, MD, the UAAC is the focal point and catalyst for clinical and basic research in rheumatology, immunology and autoimmune disease.

Research areas include basic and translational research on the mechanisms of osteoarthritis, rheumatoid arthritis, vasculitis, systemic lupus erythematosus and scleroderma. In addition, UAAC researchers are investigating tissue engineering techniques to regenerate muscular skeletal tissue, development of artificial joints and innovative surgical techniques. By conducting leading-edge research, participating in clinical trials, empowering patients to take charge of their lifestyles and educating the upcoming generation of clinicians and scientists, the UAAC is focused on finding treatments and potential cures for arthritis and related diseases.

UA Center for Excellence Improves Treatment Options for Valley Fever

Valley Fever, an illness uncommon in most of the nation, is highly concentrated in the state of Arizona. In fact, two-thirds of all infections in the United States occur in Arizona, mostly in the urban areas surrounding Phoenix and Tucson. People become ill with this acute respiratory illness by breathing in microscopic fungal spores from the air.

In the Southwest, Valley Fever causes 30 percent of all community-acquired pneumonia in the Tucson-Phoenix area, and it causes an annual economic impact of more than $300 million. The Valley Fever Center for Excellence, located at the University of Arizona in Tucson, is improving the medical treatment, understanding and research surrounding this “orphaned” disease.

The Center mobilizes resources for the eradication of Valley Fever by developing public awareness and education and promoting high-quality care for patients with Valley Fever. Under the direction of John N. Galgiani, MD, the Center also encourages research into all aspects of the disease and provides support service for healthcare professionals, scientists and researchers.
UA Bringing Healthcare to the Rural Population of Arizona

A large proportion of Arizona consists of rural and remote areas, where the population lacks access to nearby, quality healthcare. The Arizona Center for Rural Health (AzCRH), now part of the UA Mel and Enid Zuckerman College of Public Health, was established more than 40 years ago to improve the health and wellness of Arizona’s rural populations. AzCRH has developed expertise in the areas of border health, community health workers and American Indian communities and sovereign nations.

AzCRH’s combined state, federal and other funding sources are collectively coordinated to positively impact border and rural health. Its many programs focus on community outreach, practice and service. Bringing healthcare to underserved populations makes a huge, positive difference in population health and health outcomes.

Daniel Derksen, MD, director of the Center, completed a Robert Wood Johnson Health Policy Fellowship in 2008 with then-U.S. Sen. Jeff Bingaman. He researched and drafted federal legislative provisions to improve the nation’s supply and distribution of the health workforce that was included in Title V of the “Patient Protection and Affordable Health Care Act.”

Arizona’s rural population is 15 percent American Indian, and AzCRH has collaborated with many of Arizona’s sovereign nations to increase the American Indian health professional pipeline program, offer leadership and grant-writing training and provide technical assistance on health-promotion and disease-prevention interventions and needs assessments.

AzCRH serves rural Arizona by:
• Providing education and technical assistance to rural partners, hospitals and providers
• Training, recruiting and retaining health professionals for rural practice
• Helping community health centers (federally qualified health centers and rural health clinics), critical access hospitals and other private and public providers adapt to the rapidly changing rural health system
• Identifying and addressing the unmet health needs of Arizonans living in rural areas
• Translating data to inform providers, policymakers and stakeholders about legislation and regulation related to rural healthcare access, financing, delivery and quality

At the migrant center, patients receive treatment for multiple ailments, but mainly foot sores from walking, after being deported from Arizona to Nogales, Sonora.

Touring the Hospital General in Nogales, Sonora.
The Focus is Always the Child at UA Steele Children’s Research Center

The UA Steele Children’s Research Center, within the UA College of Medicine – Tucson, is the only facility in Southern Arizona where researchers and physician-scientists are dedicated to advancing medical knowledge through research to improve children’s health. Researchers seek to discover answers to children’s medical mysteries, while physician-scientists provide compassionate care to children hospitalized at the University of Arizona Medical Center – Diamond Children’s and pediatric outpatient clinics throughout Tucson and the state.

The Center’s physicians take care of thousands of children in Southern Arizona and around the state. Pediatric specialists travel to rural areas of the state, including American Indian reservations, to bring specialized care to children in need.

The Steele Children’s Research Center is headed by Fayez K. Ghishan, MD, Horace W. Steele Endowed Professor and chair, UA Department of Pediatrics. He is the physician-in-chief of the University of Arizona Medical Center – Diamond Children’s. Dr. Ghishan, an accomplished academian and clinician, has made extraordinary contributions to the science and practice of pediatric gastroenterology, and has authored more than 400 publications.

In 1996, the NIH granted Dr. Ghishan a prestigious MERIT Award, which provides the opportunity for 10 consecutive years of federal support. This funding mechanism targets researchers who have demonstrated superior competence and outstanding productivity during their previous research endeavors. In 2008, Dr. Ghishan received an unprecedented second MERIT Award, funding his research through 2018.

Each year, the Center trains more than 50 residents. During three years of training, these doctors work side-by-side with faculty members and pediatricians in the community. UA Steele Center faculty also teach medical students, and mentor graduate and undergraduate students who work in the research labs.

The scientists at the UA Steele Children’s Research Center conduct research in many areas—from cancer to lung disease to nutritional problems—but the focus of each project is always the child. The team is passionately dedicated to improving children’s health through research and discovery.

Yi Zeng, MD, PhD, is an assistant professor with a research interest in hematopoietic stem cell transplantation.

Melissa Halpern, PhD, is an associate professor and Steele Center researcher who is working on the first predictive test for necrotizing enterocolitis, the most common GI ailment of premature babies.

Fayez K. Ghishan, MD
Big Data: Innovative Key to Transforming Healthcare

Meet Yves A. Lussier, MD, FAMCI: A physician and engineer internationally renowned as an expert in translational bioinformatics, Dr. Lussier is leading the UA’s efforts to fully develop novel programs in biomedical informatics, computational genomics and precision health. His unique combination of skills—uniting medicine, computer science and the biology of personal genomics—and strong record of diverse achievements make Dr. Lussier a pioneer, at the forefront of translational research that aims to revolutionize and personalize healthcare.

“We're trying to bridge the gap between molecular discovery and clinical care,” says Dr. Lussier, whose particular specialty is making sense of vast amounts of data, using an innovative computational approaches that create the ability to analyze data at different scales. The expertise Dr. Lussier brings in Big Data science will be invaluable for researchers across disciplines, and across the entire Arizona Health Sciences Center.

“Harnessing the power of Big Data has the potential to transform medical treatments by simplifying and reducing effort and time by orders of magnitude when compared to traditional methods,” Dr. Lussier says.

Targeted individualized therapies, using the knowledge of unique personal genetic variations, promise a huge leap in effectiveness over one-size-fits-all treatments. “We’re not as similar to one another as we think,” Dr. Lussier points out, “and this has enormous genomic implications in healthcare. We’re in an exciting time and it falls on this generation of researchers to solve these problems.”

Joe G.N. “Skip” Garcia, MD, UA senior vice president for health sciences and interim dean of the UA College of Medicine – Tucson, began a strategy of recruiting heavily for “superstar” researchers who, like Dr. Lussier, have the potential to transform AHSC, with a keen eye on the future of medicine.

For example, Don Saner, MS, was recruited as executive director for biomedical informatics services and facilitates the development, programming and evaluation of clinical/translational informatics systems, analytical tools and implementation of specialized databases, tools and applications that support clinical and translational research.

“Yves and his team of computational specialists bring much-needed expertise and program capacity in informatics, sequence analysis, genomic annotation and computational biology that will accelerate translational research activity across campus and throughout the state,” Dr. Garcia says.
TACKLING HEALTH DISPARITIES IN ARIZONA... AND THE NATION
Poised to become a national leader in health disparities, the University of Arizona is expanding research, education and clinical service initiatives to promote health equity and wellness within all communities, regardless of race, ethnicity, gender, geography, environment or socioeconomic status.

It’s a startling fact: the quality and frequency of health status that a person or family enjoys, or the healthcare they receive, are strongly influenced by where they live, their ethnic backgrounds and how much money they make, among other factors. Reducing these health disparity gaps is paramount to improving the health of individuals and entire communities.
For the first time in history, more people are dying from non-communicable diseases than from all infectious diseases combined. Closer to home, for the first time in Arizona history, the life expectancy of children is lower than that of their parents. Health disparities play a significant role in these statistics, and many of these individuals are medically underserved by the current healthcare system.

The UA is in an ideal geographical location to partner with diverse underserved populations, “including Hispanic/Latinos, Native Americans and tribal nations, rural and underserved populations and the elderly,” according to the report issued by the AHSC Health Disparities Advisory Council. “The UA has substantial resources and research strengths in health disparities.” The Council proposed the development of an interprofessional center with the mission to improve the health and wellness of communities of all races, ethnicities and genders through innovative research, educational programs, leadership development, improved access to healthcare and community partnerships.

Both the Population Health and Health Disparities Advisory Councils recommended an approach to synergize UA activities that have been historically focused on the U.S.-Mexico border region across a variety of health issues, and to understand the social determinants of disease and disparities. The result is the launching of a new Center for Border Health and Outcomes.

As a leading academic institution, the UA provides education and training that raises public awareness of racial/ethnic disparities in care, improves the capacity and number of healthcare professionals within underserved communities and increases the knowledge base on the causes of, and interventions to reduce, disparities. These various roles will only expand in the future as the UA advances AHSC’s strategic position in health disparities, one of the four identified strategic “areas of research excellence.”

This new focus is timely, for our nation has embarked on a mission to reduce the growing health disparities gap through powerful new initiatives such as the National Partnership for Action to End Health Disparities. This program encourages academic health centers, such as AHSC, to join public-private partnerships working to address the widening gap. Reducing health disparities will have an enormous positive societal impact by driving down cost within the financially bloated U.S. healthcare system. The total cost attributed to health disparities in the United States is approximately $1 trillion over a three-year period.

AHSC continues to solidly address health disparities with innovative and broad-reaching initiatives and is deeply committed to impacting national models in increasing health equity.

Notable Awards in AHSC Health Disparities Research

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberts, David S</td>
<td>The Partnership for Native American Cancer Prevention (2 of 2)</td>
<td>U54/NCI</td>
<td>$6.80 M</td>
</tr>
<tr>
<td>Moreno, Francisco</td>
<td>Health Careers Opportunity Program</td>
<td>HRSA</td>
<td>$2.33 M</td>
</tr>
<tr>
<td>McEwen, Marylyn M</td>
<td>Decreasing Diabetes Disparities: Building Mexican American Family Social Capital</td>
<td>R01/NCMHHDD</td>
<td>$1.5 M</td>
</tr>
<tr>
<td>Reel, Sally J</td>
<td>Model State-Supported AHEC Program</td>
<td>HRSA</td>
<td>$1 M</td>
</tr>
<tr>
<td>Witte, Marlys H</td>
<td>Short-Term Training to Increase the Diversity Pipeline in Heart/Lung/Blood Research</td>
<td>R25/NHLBI</td>
<td>$1 M</td>
</tr>
</tbody>
</table>
Reducing Health Disparities a Life Mission for UA Physician

Health disparities are more than an academic field of study for Ana María López, MD, MPH, FACP. For her, reducing disparities in care reflects a deeply personal, lifelong ambition to provide the best-quality care to populations who otherwise would be without access to clinical care or health education.

“It’s not just delays in treatment or diagnosis,” Dr. López explains. “People are actually dying due to health disparities. When you see it firsthand and witness the grief people endure, it’s clear that we all have a responsibility to do more.”

Reducing health disparities to provide the best quality care to populations who otherwise would be without access to clinical care or health education is a lifelong ambition for Dr. López. The National Cancer Institute defines “cancer health disparities” as “differences in the incidence, prevalence, mortality and burden of cancer and related adverse health conditions that exist among specific population groups in the United States.”

Dr. López, UA College of Medicine – Tucson professor of medicine and pathology, founding medical director of the Arizona Telemedicine Program and member of the UA Cancer Center, has been among the nation’s leaders in reducing health disparities.

To bring breast health educational resources to those who need them, Dr. López developed the ¡Vida! Mujer Latina Breast Cancer Conference Series, which is a bilingual, collaborative conference with community-directed content, entering its ninth year. “One of the main tenets of cancer prevention is that you go where the people are,” Dr. López says. “We bring our expertise to them.”

Based on prior work documenting disparities in access to care and education for breast cancer survivors and their primary care clinical teams, Dr. López was awarded a grant to establish the series, which develops, disseminates and evaluates a curriculum for patients and health professionals in rural Arizona. ¡Vida! – “life” in Spanish – is a grassroots community effort providing free monthly breast health education in English and Spanish to patients, their families and primary care clinical teams via statewide teleconferencing.

“Programs like this can only be effective if all parties are invested,” Dr. López says. “People don’t want to be studied. They want to be a part of the solution. As stronger data emerge to engage patients and communities in personalized prevention approaches, health disparities may become a thing of the past.”
The University of Arizona Medical Center – South Campus
Reaches Underserved Populations

The University of Arizona Medical Center – South Campus serves a varied population of patients, including underserved, culturally diverse, rural and inner-city populations. The teaching hospital offers a wide range of programs, including comprehensive diabetes care, psychiatric services and a variety of other medical services.

One such program at UAMC – South Campus is the comprehensive Diabetes Prevention and Education Center where patients and community members have access to free diabetes self-maintenance education. Within the Center is a large demonstration kitchen, classroom and fitness assessment facility. Since eating right is just one way to help improve Type II diabetes, the Center offers healthy cooking classes in both English and Spanish to promote consistent monitoring and treatment for diabetes, as well as making healthful food choices.

Founded in 1976, the UA Mobile Health Program is a “clinic on wheels” that provides healthcare to underserved people of all ages unable to pay for health insurance. With a focus on preventive care, the program provides service opportunities for residents in the UA College of Medicine at South Campus family medicine residency program.
Smart Sensors Provide Innovative, Effective Monitoring to Keep People Healthier

Foot problems can be formidable for people with diabetes: Of the more than 26 million people in the United States with diabetes, about half will develop neuropathy, a loss of feeling in the lower extremities. This nerve damage means an open sore or injury on the foot may go unnoticed until it becomes infected and fails to heal, which eventually can lead to partial or full amputation of the foot or leg.

David G. Armstrong, DPM, MD, PhD, professor of surgery and director of the Southern Arizona Limb Salvage Alliance (SALSA) at the Arizona Health Sciences Center, is creating innovative wound-healing and wound-prevention technologies to reduce the unnecessary amputations performed every 20 seconds in people with diabetes. He and his team of researchers at SALSA and the Interdisciplinary Consortium on Advanced Motion Performance (iCAMP) are developing and incorporating smart technologies into the treatment of diabetes patients.

Currently in development are smart textiles, such as smart socks, with embedded fiber optic sensors that can identify hot spots (high temperature areas on a patient’s foot that can pinpoint where tissue is beginning to break down), high pressure points and areas of strain around joints.

Dr. Armstrong and biomedical engineer Bijan Najafi, PhD, MSc, associate professor of surgery and iCAMP director, are working with a smart sensor attached to the chest that tracks a diabetes patient’s heart rate, respiration and level of activity in real time. The device can alert clinicians and the patient via smartphone if someone is experiencing high levels of stress, which can affect wound healing.

Smart insoles can ping a patient’s smartphone or send a text message to alert them if, for example, a small pebble has found its way into their shoe – a minor annoyance for most of us, but for someone suffering from neuropathy, a significant threat that could result in the loss of a limb.

Dr. Armstrong’s team has a broad interest in how people move through their world. They are developing smart pendants that can be worn to identify if they are about to fall and not be able to get up. “It is like a home security system for the body,” says Dr. Armstrong.

“This is game-changing,” Dr. Armstrong continues. “These smart textiles and technologies allow us to evaluate the individual needs of each patient and more precisely monitor and manage their movement and, therefore, their health.”

He and Joseph Mills, MD, professor and chief of the UA Division of Vascular and Endovascular Surgery, have contributed to foundational work in the taxonomy, classification and treatment of the diabetic foot. They also were among the first to highlight potentially addressable differences in outcomes of the care for high-risk populations, such as Latinos, African Americans and American Indians.

“We envision a future in which we can help people heal and help keep them healed and active as they move through their lives and their world,” Dr. Armstrong says. “We want to help to leave a legacy of improving mobility and stability worldwide.”
Arizona Area Health Education Centers Deliver Care and Reduce Disparities

The Arizona Area Health Education Centers (AzAHEC) works to improve the supply, quality, diversity and distribution of the health professions workforce. Sally Reel, PhD, RN, associate vice president of health sciences interprofessional education, collaboration and community engagement, coordinates the activities of five regional centers that serve all 15 Arizona counties with a focus on academic-community partnerships to reduce health disparities by enhancing access to quality primary and preventive care.

Improving health disparities is fundamental to AzAHEC’s mission. Its five regional centers are at the heart of some of Arizona’s most vulnerable communities—two centers at the U.S.-Mexico border, one in Flagstaff, where the Navajo and Hopi nations are located, one in Apache Junction that serves the highly diverse communities of Maricopa County and one in Globe that serves the communities of Eastern Arizona. Arizona AHEC regional centers help to ensure that Arizona residents have access to quality healthcare by providing health professions students clinical training in medically underserved Arizona communities, including rural, border and urban settings. Community-based training brings health disparities and social determinants of health to life for health professions students who witness these disparities first-hand during training. Arizona AHEC fundamentally seeks opportunities to show students the rewards of working with underserved, high-need populations, as well as opportunities to influence graduates’ career decisions to practice in underserved communities.

AzAHEC’s health professions training impact through the Arizona AHEC system last year included placing 870 health professions student trainees in community-based clinical training. Of these trainees, 41 were medical residents from the University of Arizona College of Medicine – Tucson South Campus residency program. The AzAHEC system also supported 152 medical students, 107 nurse practitioner students, 47 pharmacy students and 27 public health students from our state universities to have community-based clinical training in Arizona’s medically underserved communities in 2013.

Improving health disparities is fundamental to AzAHEC’S mission. Its five regional centers are at the heart of some of Arizona’s most vulnerable communities.

The Arizona AHEC program provides training and continuing education programs on topics that are locally responsive with 186 professional continuing education courses for 8,006 participants, including physicians, dentists, public health professionals, pharmacists, nurse practitioners and physician assistants.

The Arizona AHEC has a 30-year history of serving Arizona’s border communities. The Southeast AzAHEC Regional Center in Nogales is an integral provider of health professions education and health promotion since 1984. The Western AzAHEC center in Somerton also is a leading border partner since 1989. As the new Center for Border Health unfolds, AzAHEC is a leading partner to foster border research, interprofessional border health education and health promotion.

Rita Yazzie and her father, Woody, who live on the Navajo Reservation, participate in a combined Northern AzAHEC, UA Arizona Telemedicine Program and Flagstaff Medical Center’s Care Beyond Walls and Wires program, which provides home health monitoring of patients with congestive heart failure. This program has reduced hospital readmissions for many patients with congestive heart failure, which results in reduced healthcare costs.

Photo courtesy of: Northern Arizona Healthcare/Flagstaff Medical Center
UA Medical Students Bring Care to Underserved Populations

One way to combat health disparities is to have medical students provide community service directly to people who encounter barriers to receiving healthcare. The Commitment to Underserved People (CUP) program at the UA College of Medicine – Tucson and the Community Health Initiative – Phoenix (CHIP) program at the College of Medicine – Phoenix are student-developed and directed service-learning initiatives. CUP and CHIP are comprised of various opportunities that allow medical students to serve the community through provision of clinical and preventive care, health education/promotion, mentoring and advocacy. Services focus primarily on medically uninsured and underserved populations, providing students the opportunity to learn about community service, gain insight into how socioeconomic factors impact healthcare, and inspire students to pursue similar service careers.

Partnership for Native American Cancer Prevention Investigates and Combats Disparities

It began with a letter conveying a simple message: “We need your help.” The letter, concerning the incidence of cancer among Native Americans, was written from a former Tohono O’odham Nation chairman to then-University of Arizona Cancer Center Director David Alberts, MD. Specifically, unique circumstances of culture, history, location and healthcare produce unique patterns of cancer occurrence among Native Americans. That letter led to the development of the National Cancer Institute-funded Partnership for Native American Cancer Prevention (NACP), a collaboration between Northern Arizona University and the University of Arizona NCI-designated Cancer Center. The mission is to alleviate the unequal burden of cancer among American Indians of the Southwest through research, training and community outreach programs in collaboration with the communities served. The NACP works to alleviate disparities in cancer in Native American communities and trains Native American students for careers in cancer-related research and healthcare, among other aims.

Summer Internship Program Fights Disparities in Border Region

AHSC is committed to creating a healthcare workforce representative of the state. The Frontera Summer Research Internship program, a part of the University of Arizona College of Medicine – Tucson and its Office of Diversity and Inclusion, is working to increase those numbers. This summer, the college selected 10 students for the Frontera Summer Internship Program. Frontera (Focusing Research on the Border Area), which is Spanish for border, provides undergraduate and graduate students opportunities to prepare for medical school with a hands-on research experience and an increased understanding of public health disparities in the U.S.-Mexico border region.
LAUNCHING INITIATIVES TO DEVELOP, DELIVER PRECISION HEALTH SOLUTIONS
In healthcare, the notion that one size fits all is over. Targeted therapies tailored to individual patients are becoming the new reality.

The past few decades have seen the completion of the Human Genome Project, the development of handheld sensors to monitor individual health factors from blood pressure to sleep habits and the use of high-powered computing systems to “crunch” data on previously unimagined scales. These advances have given rise to a new paradigm for healthcare called precision health.
LAUNCHING INITIATIVES TO DEVELOP, DELIVER PRECISION HEALTH SOLUTIONS

By combining the power of individual genetic information with large clinical data sets, researchers and clinicians can now gain a deeper understanding of an individual’s health and better recognize and classify nuanced aspects of disease. This new level of precision promises treatments that are more closely tailored to patients’ needs—and as a result, are more effective.

A number of faculty and departments at the University of Arizona are already engaged in precision health research and practice. The Arizona Health Sciences Center, with its five colleges, close relationship to the University of Arizona Medical Center and dozens of specialized research centers, offers an outstanding environment for research, training and clinical practice.

UA researchers and health professionals have access to state-of-the-art technology and a Clinical Laboratory Improvement Amendments (CLIA)-certified lab through the UA Genetics Core Facility. Collaborations with the Translational Genomics Research Institute (TGen), the UA BIO5 Institute and Tech Launch Arizona offer opportunities to work across disciplines and take discoveries to the commercial marketplace. The unique demographics of Arizona present unparalleled opportunities for research related to aging, Hispanic and Native American populations and the health impacts of living in an arid environment. These strengths are complemented by UA’s nationally regarded programs in bioengineering, optical sciences, environmental science, speech and hearing and cognitive and behavioral science.

The field of precision health is growing rapidly, and the UA is seizing the opportunity. In March, AHSC named its first associate vice president for precision health sciences: Kenneth S. Ramos, MD, PhD, PharmB, a world-renowned researcher in genomics and predictive biology, environmental and molecular medicine and toxicology (see sidebar on page 29).

In its report, the AHSC Precision Health Advisory Council recommended enhancing the UA’s infrastructure in five key areas: clinical genomics and molecular diagnostics, informatics, biobanking and stem cell technologies, genetic counseling and digital health. With strategic investments in these areas and enhanced support for “team science,” the council predicts “the UA will be recognized as a regional leader in precision health,” which will “benefit all citizens of Arizona and the Southwest in tangible and visible ways.”

The Center for Applied Genetics and Genomic Medicine recently was created to serve as the primary home for campus-wide applied clinical genetics and genomic services. The Center has seven divisions that support healthcare providers, genetic counselors and researchers in their efforts to advance the implementation of precision health approaches for the diagnosis, prediction and treatment of disease, improvement in patient care and outcomes and reduction of healthcare costs.

Notable Awards in AHSC Precision Health Research

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meuillet, Emmanuelle J</td>
<td>Inhibition of Novel Molecular Targets of Prostaglandin Formation for Antitumor Activity</td>
<td>R01/NCI</td>
<td>$1.61 M</td>
</tr>
<tr>
<td>Jacobs, Elizabeth T</td>
<td>Vitamin D Status, Genetic Variation in Vitamin D Signaling and Metabolism and Risk for Colorectal Neoplasia</td>
<td>R01/NCI</td>
<td>$1.50 M</td>
</tr>
<tr>
<td>Vercelli, Donata</td>
<td>Human IL-13 Gene Regulation and Impact of Polymorphisms</td>
<td>R01/NHLBI</td>
<td>$1.48 M</td>
</tr>
<tr>
<td>Boitano, Scott A</td>
<td>PAR2 Targeted Drug Discovery for the Treatment of Pain</td>
<td>R01/NINDS</td>
<td>$1.29 M</td>
</tr>
<tr>
<td>Cherrington, Nathan J</td>
<td>Pediatric Adverse Drug Reactions in NASH</td>
<td>R01/NICHHD</td>
<td>$1.26 M</td>
</tr>
<tr>
<td>Zhang, Donna D</td>
<td>Investigation of An Anti-Cancer Phytocchemical Targeting Nrf2</td>
<td>R01/NCI</td>
<td>$1.20 M</td>
</tr>
<tr>
<td>Yang, Danzhou</td>
<td>Targeting DNA Secondary Structures for Bcl-2 Gene Regulation</td>
<td>R01/NIGMS</td>
<td>$1.17 M</td>
</tr>
<tr>
<td>Tardiff, Jil C</td>
<td>A Molecular Study Linking cTN T Dynamics to Genetic Cardiomyopathy</td>
<td>R01/NHLBI</td>
<td>$1.09 M</td>
</tr>
</tbody>
</table>
Kenneth S. Ramos, MD, PhD, PharmB, internationally recognized in genomics and predictive biology, environmental and molecular medicine and toxicology, is associate vice president for precision health sciences at the Arizona Health Sciences Center (AHSC), where he is responsible for developing precision health strategies and approaches to health outcomes and healthcare delivery.

Dr. Ramos also will serve as the interim director of the Center for Applied Genetics and Genomic Medicine, which was established as a collaborative effort across multiple UA centers and departments, including the NCI-designated UA Cancer Center and the UA health network. He will lead development of personal diagnostics and therapeutics for complex diseases, including cancer, cardiopulmonary disorders and diabetes.

“I am privileged to join the UA and Dr. Garcia’s senior leadership team to advance personalized, predictive and preventive approaches for healthcare delivery for the citizens of Arizona,” explains Dr. Ramos, who reports to Joe G.N. “Skip” Garcia, MD, UA senior vice president for health sciences and interim dean of the UA College of Medicine – Tucson. “Together, we will ensure that every single patient in Arizona receives the best possible care known to contemporary science.”

Arizona Center for the Biology of Complex Diseases: A New Paradigm for Multi-Field Research

Asthma. Cancer. Cardiovascular and metabolic disorders. Neurodegenerative and neurodevelopment diseases. These complex diseases are major biomedical challenges because they are common but difficult to decipher. The complexity of these diseases likely reflects intricate interactions among genetic, environmental and developmental factors that modify disease susceptibility and severity.

The Arizona Center for the Biology of Complex Diseases (ABCD), a division of the Arizona Research Laboratories, was launched to support the creation of a community of basic and translational scientists interested in complex diseases, and to implement a new paradigm of integrated, multi-field research.

Donata Vercelli, MD, professor of cellular and molecular medicine, is the director of the ABCD.

Understanding complex diseases is extremely important, because these conditions impose a burden on society. Yet this understanding cannot be achieved by isolated research disciplines. Rather, it requires a new paradigm that successfully integrates research across multiple fields. The ABCD is making this concept a reality by identifying the mechanistic architecture of complex diseases as a group by focusing on the biological components shared by seemingly distinct diseases (for instance, asthma, neurodegenerative and cardiovascular diseases). The goal: to provide a platform that catalyzes expert discussions on foundational topics, thereby fostering the emergence of a new experimental and conceptual paradigm in complex disease biology.
Center for Applied Genetics and Genomic Medicine will Drive Precision Health

The Center for Applied Genetics and Genomic Medicine recently was established to serve as the primary home for campus-wide applied clinical genomic services. The Center houses seven divisions focused on cardiovascular genetics, cancer genetics, diabetes and related metabolic disorders, genetic consultation and counseling, pharmacogenetics, population genetics and pulmonary precision medicine.

The Center’s mission is to advance precision health approaches for the diagnosis, prediction and treatment of diseases and improvements in patient care.

For example, Rick Kittles, PhD, a national leader in cancer health disparities and the role of genes and environment in disease, is director of the new Division of Population Genetics, part of the new Center for Applied Genetics and Genomic Medicine. Dr. Kittles has also been appointed professor in the Department of Surgery Division of Urology, with a joint appointment in the Division of Health Promotion Sciences in the UA Mel and Enid Zuckerman College of Public Health.

Dr. Kittles is a pioneer in DNA testing to trace the ancestry of African Americans, and his research programs and scientific expertise will support UA Health Sciences strategic initiatives in health disparities and precision health. “We recognize more and more that, in medicine, one size does not fit all,” explains Dr. Kittles. “The Division of Population Genetics will provide important genomic information about the populations AHSC serves.”

In addition, Nathan Ellis, PhD, has joined the UA Cancer Center to lead the Cancer Biology Program. He is a national leader in colon cancer genetics. His career has been devoted to understanding the functional consequences of genetic variation, and his laboratory work focuses on identifying and characterizing genetic risk factors in colorectal cancer. “The field of cancer biology has taken incredible leaps forward in recent years, but these advances are just the first steps toward the ultimate goal of preventing and curing cancer,” Dr. Ellis explains. “It will fall to the next generation of research scientists to turn that goal into reality.”

Joining Drs. Kittles and Ellis at the UA College of Medicine – Tucson, professor of pathology Mark A. Nelson, PhD, focuses his research in the areas of inflammation and tumor progression/metastasis, racial disparities in cancer and molecular diagnosis of cancer and other genetic diseases. His major areas of interest are molecular mechanisms of physical and chemical carcinogenesis, biochemical and molecular pharmacology of cancer chemopreventive drugs, human tumorigenesis (specifically melanoma) and mechanisms of cancer chemopreventive agents.
The long-term goals of his research program are to identify genes involved in the etiology of cancers and to use the information from such studies to develop new and innovative treatments to prevent and cure cancers.

Michael Hammer, PhD, is the director of the UA Genetics Core (UAGC), and is a research scientist dedicated to the study of human evolutionary genetics for the past 25 years. His laboratory was an early adopter of Next Generation Sequencing technology, applying whole genome analysis to the study of humans and related species as evidenced by the Great Ape (GAPE) and Gibbon Genome projects.

His laboratory is also deeply engaged in the investigation of the pathogenic nature of variation, and how it is involved in causing childhood diseases. His professional and personal experiences have endowed him with a passion to translate discoveries in the laboratory to the clinic, and to help children and their families who suffer from early childhood genetic disorders.

Christina Laukaitis, MD, PhD, assistant professor of medicine at the UA College of Medicine – Tucson, looks to provide individual risk assessment and counseling to develop a plan for treating neoplasia before metastatic cancer develops in people at high risk of cancer due to genetic factors. Her training and board certification in medical genetics have provided her with expertise and experience caring for people at high risk for breast cancer due to mutations in BRCA1, BRCA2, APC and mismatch repair genes. She couples this work with her laboratory background to translate advances understanding additional genes influencing cancer risk into new clinical tests for her patients.

Christina Laukaitis, MD, PhD

---

**UA Research Focuses on Molecular Mechanisms of Liver Toxicity**

Precision health—using an individual’s genetic profile to guide decisions regarding prevention, diagnosis and treatment of disease.

The UA has had precision health initiatives underway for many years and new initiatives are building on this foundation. Internationally respected pharmacology and precision health researcher and educator Nathan Cherrington, PhD, of the UA College of Pharmacy’s Department of Pharmacology and Toxicology, was one of only three UA faculty members chosen in 2012 to receive the first-ever 1885 Distinguished Scholars Award. This award was created to acknowledge outstanding mid-career faculty members whose research, scholarship and creative contributions promise to catapult their disciplines to new levels of innovation.

For several years, Dr. Cherrington has investigated the molecular mechanisms of liver toxicity and how liver disease affects the excretion of toxic substances from the body. His recent work looks at variability among individuals that define how drugs are metabolized and how nonalcoholic fatty liver disease (also known as steatohepatitis) affects drug metabolism.

“For example, why do five out of 1,000 people have a bad response to a particular drug? Genetics is only part of the story. Our most recent work shows that patients carrying a genetic defect and with a liver that is compromised by disease, may retain drugs in their blood 10 times longer than patients with just the genetic defect. If your liver isn’t healthy, it makes a big difference in drug therapy.”

But only one percent of the people with chronic liver disease, which demonstrates few or no symptoms, know that they have it, he says. It takes a needle biopsy of the liver to diagnose the condition. Dr. Cherrington is collaborating with a biotechnology company to develop a simpler blood test to identify a compromised liver.

Dr. Cherrington hopes his next study will look at factors to predict the correct dosage of drugs used to treat childhood leukemia, making each patient’s treatment more individualized. He is eager to start the research.

“I am so fortunate to be here at the UA, which for decades has been the standard-setter in toxicology research,” he says. “I believe in the relevance of my work, and that we are making lives better.”

Nathan Cherrington, PhD

---
Bringing Personalized Medicine From the Bench to the Bedside:
The UA Sarver Heart Center

What’s the No. 1 killer of women in America? Surprisingly, it’s also the No. 1 killer of men in America. Heart disease, which will affect almost 80 percent of the U.S. population, will be the cause of death for more than 25 percent of the population nationwide.

Scientists and physicians at University of Arizona Sarver Heart Center have been researching ways to reduce those grim statistics for both men and women since the Center was founded almost 30 years ago. These advances include the development of the first artificial heart. The Sarver Heart Center recently established a research focus identifying and analyzing gender differences in the manifestation and treatment of heart disease. And it is one of the few institutions in the world with an endowed chair dedicated to the study of heart disease in women.

Women at the Heart of the Matter...And at the Helm

Only 15 percent of cardiologists in the nation are women; two of them are leading the way at the Sarver Heart Center at the University of Arizona. Nancy K. Sweitzer, MD, PhD, became the Center’s first female director. “The concentration of female leadership here is incredible and very unusual in medicine. It makes for a very vibrant atmosphere, and helps us attract other exceptional women,” Dr. Sweitzer said.

Poised to become a regional and national destination where patients and physicians can access cutting-edge heart and vascular care, the UA Sarver Heart Center remains steadfast in its commitment to excellence in clinical care, education and research.

Jil C. Tardiff, MD, PhD; Nancy K. Sweitzer, MD, PhD; Carol Gregorio, PhD
Photo courtesy of Amy Haskell
The burgeoning research core at the Center is attracting faculty to engage in clinical studies on new medications and devices to improve outcomes. These trials include the study of advanced heart failure, mechanical circulatory support, heart transplant, heart attack and catheterization-based therapies, as well as genetic and congenital heart disease.

Another impressive Sarver woman is renowned researcher Jil Tardiff, MD, PhD, an international expert in hypertrophic cardiomyopathy (HCM), one of the most frequent causes of sudden cardiac death. HCM is a common and often devastating genetic disease affecting one in 500 individuals of all ages and representing the most common cause of sudden cardiac death. One of Dr. Tardiff's main goals is to develop an HCM Center of Excellence at the University of Arizona, where patients from all over the Southwest will be able to obtain leading-edge medical care for this complex disorder.

The Center has recruited world-class faculty, researchers and clinicians to help in the discovery of scientific advances as part of its Molecular Cardiovascular Research Program, which studies the molecular mechanisms underlying cardiovascular disease. Additionally its muscle cell biology group is considered among the best in the world.

Another woman making enormous strides toward bringing research to the bedside is Carol Gregorio, PhD, director of the Molecular Cardiovascular Research Program at the UA College of Medicine – Tucson. She is also co-director of the UA Sarver Heart Center and heads the Department of Cellular and Molecular Medicine. As a basic scientist, she has a special research interest in the contractile proteins of heart muscle. Not only has Dr. Gregorio’s team made major contributions to the understanding of heart muscle abnormalities, but it also has been an integral part of the UA College of Medicine’s goal to strengthen its translational research. “One thing that is unique is our focus on getting clinicians and basic researchers to collaborate more,” Dr. Gregorio said. Her team’s goal is to figure out why disease occurs, which will allow for screening, therapy and eventually repair of the heart.

Notable Awards in AHSC Sarver Heart Center Research

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tardiff, Jil C</td>
<td>Integrative Approach to Divergent Remodeling in Thin Filament Cardiomyopathies</td>
<td>R01/NHLBI</td>
<td>$1.49M</td>
</tr>
<tr>
<td>Larson, Douglas F</td>
<td>Blocking Hypertension by Regulatory T-Lymphocytes</td>
<td>R01/NHLBI</td>
<td>$1.47M</td>
</tr>
<tr>
<td>Gregorio, Carol C</td>
<td>Deciphering the Role of the RNA-Binding Protein, FXR1, in Cardiac Muscle Assembly</td>
<td>R01/NHLBI</td>
<td>$1.41M</td>
</tr>
<tr>
<td>Granzier, Hendrikus L</td>
<td>Function of Giant Sarcomere Matrix Proteins in Muscle</td>
<td>R01/NHLBI</td>
<td>$1.20M</td>
</tr>
</tbody>
</table>

UA Sarver Heart Center members have collaborated for decades to improve the total artificial heart. From the 450-pound Big Blue hospital driver, the artificial heart now can be powered by a 13.5 pound “Freedom Driver” that fits in a backpack and can allow patients mobility in the hospital or even at home in some cases. Marvin Slepian, MD, is a UA Sarver Heart Center cardiologist and founder and chief scientific officer of Syncardia Systems, Inc., the international company based in Tucson that manufactures the artificial heart.
Arizona Respiratory Center: A Tradition of Excellence

Asthma is reaching epidemic proportions in children. Chronic obstructive pulmonary disease (COPD) affects more than 15 million Americans and is one of the leading causes of death in the United States and the world. Sleep apnea is now recognized as a true health risk and not just an annoyance.

Respiratory diseases do not discriminate. Male or female, old or young; anyone can be affected. These diseases are affecting millions of people across the country, and more are diagnosed every day. Helping patients to breathe easier is just one aspect of care provided by the Arizona Respiratory Center (ARC). One of the first Centers of Excellence on campus, the ARC is an internationally renowned organization of physicians, scientists and scholars seeking to understand and eradicate respiratory diseases.

Since that initial study, the ARC has evolved into a comprehensive Center of Excellence that combines the highest caliber of research, clinical care and teaching. Researchers are leading some of the nation’s most promising studies into the causes, treatments and prevention of debilitating respiratory diseases.

Under the directorship of Fernando D. Martinez, MD, Swift-McNear Professor of Pediatrics, the ARC averaged $7 million in grant funding a year between 2012 and 2013, and nearly $10 million in 2014.

The ARC serves as a clinical center in each of the two major asthma research networks: NHLBI AsthmaNet and the American Lung Association Asthma Clinical Research Centers. Sleep research contributions from the ARC included the largest NHLBI funded community-based epidemiological study for sleep health (Sleep Heart Health Study); a community-based pediatric cohort (Tucson Children’s Assessment of Sleep Apnea Study) and the Apnea Positive Pressure Long-term Efficacy Study (APPLES).

The roots of the Center date back to 1971, when it was created as a small, specialized research effort in respiratory sciences at the University of Arizona College of Medicine. The National Institutes of Health (NIH) awarded a grant to two of its physicians, to support a 25-year interdisciplinary study of obstructive lung disease involving 5,000 Tucson residents. The NIH has called this study a national resource for its contribution to the understanding of COPD.

Notable Awards in Arizona Respiratory Center Research

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martinez, Fernando</td>
<td>Arizona/Duke Clinical Center for AsthmaNet</td>
<td>R01/NHLBI</td>
<td>$4.48 M</td>
</tr>
<tr>
<td>Parthasarathy, Sairam</td>
<td>Peer-Driven Intervention as an Alternate Model of Care Delivery and Coordination for Sleep Apnea</td>
<td>PCCORI/ CMMS</td>
<td>$2.07 M</td>
</tr>
<tr>
<td>Garcia, Joe GN</td>
<td>Differential Role of Sphingosine 1-Phosphate Receptors in Inflammatory Lung Injury</td>
<td>PPG/NHLBI</td>
<td>$1.53 M</td>
</tr>
<tr>
<td>Vercelli, Donata</td>
<td>Functional Impact of IL33 Polymorphisms on Asthma and Other Th2-mediated Diseases</td>
<td>R01/NIH</td>
<td>$1.48 M</td>
</tr>
<tr>
<td>Yuan, Jason</td>
<td>Calcium Signaling in Pulmonary Arterial Hypertension: Role of CaSR and TRPC6</td>
<td>R01/NHLBI</td>
<td>$1.14 M</td>
</tr>
<tr>
<td>Gerald, Lynn B</td>
<td>Asthma Clinical Research Center (ACRC)</td>
<td>U01/ALA</td>
<td>$0.98 M</td>
</tr>
<tr>
<td>Knox, Kenneth S</td>
<td>Genomic Analysis of Immunity and Chronic Lung Inflammation in HIV Infection</td>
<td>U10/NHLBI</td>
<td>$0.14 M</td>
</tr>
</tbody>
</table>

Ken Knox, MD

Sairam Parthasarathy, MD
UA Professor Receives Lifetime Achievement Award

Lynn Gerald, PhD, MSPH, received a Lifetime Achievement Award from the American Thoracic Society for her asthma research. She is a professor of health promotion sciences and the Canyon Ranch Endowed Chair at the UA Mel and Enid Zuckerman College of Public Health.

Dr. Gerald is a nationally recognized expert in the area of school-based asthma, including the implementation of asthma-management programs, school-based asthma case detection and Internet-based asthma monitoring. In addition, she has extensive experience in the areas of clinical, behavioral and epidemiological research in asthma, COPD and tuberculosis.

She heads two clinically focused, school-based asthma programs in the Tucson area and is the principal investigator at the UA Asthma Clinical Research Center.

The Lifetime Achievement Award is given to an individual who has provided outstanding service relevant to the behavioral or social aspects of the prevention or treatment of lung diseases, critical illness or sleep disorders.

This year, an important new study on the role of pulmonary inflammation in the development of HIV-related lung diseases is underway, funded by a collaborative U01 grant from the NHLBI with Kenneth S. Knox, MD, serving as a principal investigator on this multiple center study. Dr. Knox is a UA associate professor of medicine and immunobiology and chief of the Division of Pulmonary, Allergy, Critical Care and Sleep Medicine. He also holds the Murray and Clara Walker Memorial Endowed Research Chair in Emphysema and is a member of the Arizona Respiratory Center.

Educating the next generation of physicians and scientists is part of the mission of the ARC. Faculty members pass on their expertise to all levels of students and other healthcare professionals. Nearly 100 Fellows have completed fellowships here, and now hold positions in hospitals and universities across the world.

The work of the ARC is improving patients’ lives. Working in partnership with the Precision Health Initiative and the UAGC, ARC physician-scientists, including Drs. Garcia, Knox, Martinez, along with Ken Ramos, MD, PhD, PharmB, and Jason X.-J. Yuan, MD, PhD, are developing a panel to study the genomic basis of acute and chronic pulmonary disease. This panel will be used to evaluate patients referred to the precision pulmonary clinic for genetic and genomic evaluation to identify actionable targets for clinical intervention and to elucidate genomic networks of disease etiology for optimal patient stratification. By combining research, clinical care and teaching, the Center is attacking respiratory diseases on all fronts, and is determined to find cures and save lives.

Another accomplished physician-scientist in respiratory disease research is Joe G.N. “Skip” Garcia, MD, UA senior vice president for health sciences, interim dean of the UA College of Medicine – Tucson and elected member of the Institute of Medicine of the National Academies. He is internationally recognized for his genetic-based research on lung disease and for development of novel therapies for critically ill patients with acute inflammatory lung disease.
University of Arizona Cancer Center:
Single-Minded in Its Purpose to Find Novel Cancer Therapies

The statistic speaks for itself: 40 percent of Americans will be diagnosed with some type of invasive cancer in their lifetimes. Physicians and researchers at the University of Arizona’s NCI-designated Comprehensive Cancer Center (UACC) are determined to improve the statistics, prognoses and outcomes for cancer patients.

The National Cancer Institute recognized UACC’s broad expertise in developing and translating scientific knowledge from promising laboratory discoveries into new treatments for cancer patients. Only 41 institutions in the nation have earned this designation, which is reserved for centers focusing not only on patient care, but also on basic and clinical research, prevention, education, training and outreach.

The Center’s 300 physicians and scientists collaborate and strategize to bring the power of research directly to their patients’ bedsides. The physician-scientists from the Center bring their energy and enthusiasm to patients from the entire state and the region, utilizing a multidisciplinary approach which often involves other departments and units, including chemistry, biology, public health and engineering.

The University of Arizona Cancer Center houses more than 70 laboratories, and has primary locations in Tucson and Phoenix, as well as research and education offices throughout the state, and in Mexico and Colorado. The Center has a new, five-story, 220,000-square-foot outpatient clinic and research building on the Phoenix Biomedical Campus that will be completed in 2015.

Andrew S. Kraft, MD, a nationally recognized prostate cancer physician-scientist and cancer center administrator, was named as the new director of the UA Cancer Center and associate vice president for oncology programs at the Arizona Health Sciences Center. An accomplished prostate cancer researcher and developer of novel cancer drugs, Dr. Kraft is the principal investigator for numerous clinical trials aimed at finding new treatments and cures for cancer.

He also will oversee the development and implementation of the clinical research operations at the new UACC facility in Phoenix in collaboration with Dignity Health/St. Joseph’s Hospital and Medical Center.

Among the many highly accomplished UACC investigators is Anne E. Cress, PhD, who focuses her collaborative research on stopping tumor cells “in their tracks” and preventing tumor metastasis. She is examining how cell surface molecules behave abnormally in tumor cells, enabling their transit along vessels and nerves to their final destination in bone, and is helping find new ways for clinicians to determine if a patient’s cancer is likely to spread.

A professor of cellular and molecular medicine and radiation oncology at the UA College of Medicine – Tucson, Dr. Cress most recently served with distinction as the interim director of the UA Cancer Center.

Notable Awards in UA Cancer Center Research

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cress, Anne E</td>
<td>Arizona Cancer Center - Cancer Center Support Grant</td>
<td>P30/NCI</td>
<td>$24.71 M</td>
</tr>
<tr>
<td>Barrett, Harrison H</td>
<td>Center for Gamma-Ray Imaging</td>
<td>P41/NIBIB</td>
<td>$5.73 M</td>
</tr>
<tr>
<td>Alberts, David S</td>
<td>Chemoprevention of Skin Cancer Program Project</td>
<td>P01/NCI</td>
<td>$5.46 M</td>
</tr>
<tr>
<td>Carino, Patricia A</td>
<td>Selenium Colorectal Cancer Chemoprevention Trials</td>
<td>R01/NCI</td>
<td>$4.71 M</td>
</tr>
<tr>
<td>Thomson, Cynthia A</td>
<td>Evaluation of Di-indolylmethane supplementation to modulate tamoxifen efficacy in breast cancer survivors</td>
<td>R01/NCI</td>
<td>$2.46 M</td>
</tr>
<tr>
<td>Chow, Hsiao-Hui</td>
<td>Metformin for Reduction of Obesity-Associated Breast Cancer Risk</td>
<td>R01/NCI</td>
<td>$2.29 M</td>
</tr>
<tr>
<td>Chow, Hsiao-Hui</td>
<td>Cancer Prevention Agent Development Program: Early Phase Clinical Trials</td>
<td>HSSN/NCI</td>
<td>$1.97 M</td>
</tr>
<tr>
<td>Hurley, Laurence</td>
<td>G-Quadruplex-Mediated Transcriptional Regulation of PDGFR</td>
<td>HSSN/NCI</td>
<td>$1.92 M</td>
</tr>
<tr>
<td>Ghosh, Sourav</td>
<td>Apical-basal Polarity Signaling in Glioblastoma</td>
<td>R01/NCI</td>
<td>$1.73 M</td>
</tr>
</tbody>
</table>
Becoming a Leading Lymphoid Cancer Research Center

Collaborative research performed by Center investigators over the last 30 years has been critical in advancing the standard of care for patients with lymphoma and a shared mission of finding a cure for both Hodgkin and Non-Hodgkin lymphomas.

As a result, the University of Arizona Cancer Center is an internationally recognized leader in the study and treatment of lymphoma, and coordinates the largest lymphoma tissue bank in the world, with more than 10,000 specimens.

The UA Lymphoid Malignancies Group covers the full spectrum of bench-to-bedside research, including genomics and molecular target identification, drug discovery and optimization, preclinical disease modeling and therapy evaluation, and translational clinical trial development and implementation.

Leading the UACC lymphoma group is Lisa Rimsza, MD, a professor of pathology and associate chair of research at the UA College of Medicine – Tucson. She is the current principal investigator of the international collaborative group, the Leukemia and Lymphoma Molecular Profiling Project.
THINKING AHEAD: BECOMING A NATIONAL INNOVATOR IN BRAIN SCIENCE
Neurological disorders are major health issues affecting more than a billion people worldwide, according to the World Health Organization. From Alzheimer’s disease to stroke, epilepsy and migraine headaches, there are more than 1,000 different brain disorders, a figure that is staggering in its enormity, with lasting effects on the people they afflict. The University of Arizona is poised to have a significant impact in the fight to maintain brain health, based on existing research strengths that include neurological aging and age-related degenerative diseases, gene/environment interactions, chronic pain, traumatic brain injury and brain imaging.
THINKING AHEAD: BECOMING A NATIONAL INNOVATOR IN BRAIN SCIENCE

Leveraging many highly acclaimed institutional strengths, the long-range vision for neuroscience research at the University of Arizona is to deepen the fundamental understanding of brain function in health and disease and to apply that knowledge to improve patient health and medical care. Essential to the realization of this vision is the creation of a university-wide Center for Innovation in Brain Science, as recommended by the AHSC Neuroscience Advisory Council. This Center will provide a focal point for the application of brain science research across UA colleges, institutes and campuses, to clinical neuroscience medicine. It will serve as a bridge to other institutions with significant neuroscience presence across the region.

Arizona has more than its share of people suffering from brain disorders. This is due in part to the aging population, as the number of people ages 55 to 64 experienced the greatest percentage gains from 2000 to 2010 in Arizona. Fortunately, the UA employs some of the best minds in the nation, who are ready to tackle the biggest questions in neuroscience and train the next generation of brain researchers and clinicians, thereby transforming the UA into one of the foremost centers for brain science in the nation.

Areas of excellence abound among the UA faculty, who are developing interventions to improve quality of life, protect against injury and disease, mitigate developmental disabilities and enhance memory. In its quest to become a national innovator in brain science, UA faculty will use their expertise in the areas of cognitive aging in health and disease, chronic pain and traumatic brain injury, stroke and aphasia and integrative neuroscience.

More than $100 million has been pledged by President Obama as part of the BRAIN (Brain Research Through Advancing Innovative Neurotechnologies) Initiative to fund neuroscience research, and the UA is determined to access this funding to move ahead. The goal: to train the next generation of investigators and to alleviate the suffering and lost productivity caused by brain dysfunction. This will be accomplished by increased and enhanced clinical care for the citizens of Arizona and beyond.

In looking to the future, the UA will develop and support an unparalleled flow of creative new ideas from the neuroscience research lab to the clinical setting.

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvey, Erin M</td>
<td>Amblyopia in Astigmatic Children: Development and Treatment</td>
<td>U10/NEI</td>
<td>$ 3.35 M</td>
</tr>
<tr>
<td>Lane, Richard D</td>
<td>Typical Daily Emotion, Ischemia and Repolarization in Coronary Artery Disease</td>
<td>R01/NHLBI</td>
<td>$ 3.00 M</td>
</tr>
<tr>
<td>Chen, Zhao</td>
<td>Biomarkers and Genetic Factors Related to Sarcopenia in Women</td>
<td>R01/NIA</td>
<td>$ 2.96 M</td>
</tr>
<tr>
<td>Davis, Thomas P</td>
<td>Blood-to-CNS Drug Uptake in Pain</td>
<td>R01/NIDA</td>
<td>$ 2.49 M</td>
</tr>
<tr>
<td>Pettygrove, Sydney D</td>
<td>Enhancing Current Capacity for Surveillance of Autism Spectrum Disorders &amp; Other Developmental Disabili</td>
<td>UR3/CDC</td>
<td>$ 2.44 M</td>
</tr>
<tr>
<td>Davis, Thomas P</td>
<td>Blood Brain Barrier Changed Induced by Pain</td>
<td>R01/NINDS</td>
<td>$ 1.79 M</td>
</tr>
<tr>
<td>Vanderah, Todd W</td>
<td>Cannabinoid CB2 Agonists for Treatment of Breast Cancer-Induced Bone Pain</td>
<td>R01/NCI</td>
<td>$ 1.58 M</td>
</tr>
<tr>
<td>Mantyh, Patrick W</td>
<td>Metastatic Prostate Cancer-Induced Bone Pain</td>
<td>R01/NCI</td>
<td>$ 1.23 M</td>
</tr>
<tr>
<td>Porreca, Frank</td>
<td>Brain Reward Circuits and Relief of Ongoing Pain</td>
<td>R01/NIDA</td>
<td>$ 1.13 M</td>
</tr>
<tr>
<td>Lifshitz, Jonathan</td>
<td>Neural Circuit Disruption by Diffuse Brain Injury: Basis for Morbidity and Therapy</td>
<td>R01/NINDS</td>
<td>$ 1.00 M</td>
</tr>
</tbody>
</table>
UA Center on Aging Ensuring Healthy and Productive Lives for Older Americans

Growing old gracefully—and in good health—isn’t easy. With increased age comes increased susceptibility to illness coupled with significant challenges to independence. The University of Arizona Center on Aging (ACOA) exists to minimize these deficiencies by promoting long and fruitful lives of older adults through coordinated programs in research, education, outreach and patient care.

Established in 1980 as one among a network of Long Term Care Gerontology Centers authorized by the Older Americans Act, the ACOA was approved by the Arizona Board of Regents as a Center of Excellence at the Arizona Health Sciences Center in 1991. Despite the challenges presented by aging, people are getting better at getting older. The population is aging; the U.S. Census Bureau confirms by the year 2040, nearly one-quarter of the U.S. population will be over the age 65. Those who reach 65 have an average life expectancy of an additional 19.2 years. These figures make the task of ensuring the healthy and productive lives for this very large group the top priority for the ACOA. So urgent is this priority that the ACOA has developed the Arizona Geriatric Education Center (AzGEC) and received a prestigious award to launch the Arizona Reynolds Program of Applied Geriatrics (ARPAG) to augment its already comprehensive work in the field of geriatrics.

AzGEC seeks to provide critically important interprofessional education and training throughout the highly rural state of Arizona. This group focuses on Arizona elders living with complex chronic conditions who want to remain safe and independent in their own homes and require skilled healthcare professionals working together to accomplish this goal. Additionally, the ARPAG represents a comprehensive and innovative geriatric educational program for medical students, residents and practicing physicians who are not geriatricians to enable them to meet the unique healthcare needs of older adults.

Medical programs are only as good as the people who comprise them and the ACOA’s co-director Mindy Fain, MD, is no exception. Dr. Fain, professor of medicine and chief of the Division of Geriatrics, General Internal Medicine and Palliative Medicine for the UA College of Medicine – Tucson, is an outstanding clinician dedicated to improving geriatric care at all levels. Her creative vision and commitment to geriatric patient care was recognized in January 2014 with Dr. Fain’s receipt of the Anne and Alden Hart Endowed Chair in Medicine.

Serving as Dr. Fain’s co-director of the ACOA, is basic biomedical scientist Janko Nikolich-Zugich, MD, PhD. Dr. Nikolich’s research focuses on the aging of the immune system, while Dr. Fain focuses on new ways to improve geriatric care at lower costs. Dr. Nikolich says, “we don’t have a single vaccine on the market that’s been formulated with the knowledge of what’s wrong with the immune system in older people.” He hopes to, “reconfigure a flu vaccine for those older adults who have a weakened immune system.”

Aging is the great equalizer among humans, affecting everyone regardless of race, gender or income. It is the promise of the ACOA’s staff, research, education and patient care to work toward allowing people to live their years as fully and capably as possible.

Professor of neurology, psychology, psychiatry, and the Evelyn F. McKnight Brain Institute and medical director of the Behavioral Neuroscience and Alzheimer’s Clinic at the UA Medical Center, Geoffrey L. Ahern, PhD, MD, focuses his research on dementia, Alzheimer’s disease and behavioral neurology.

Janko Nikolich-Zugich, MD, PhD

Mindy Fain, MD
UA Researcher Unlocking the Mysteries of the Aging Brain

Her own grandfather’s struggles with loss of memory first compelled Carol Barnes, PhD, to focus her talents on the field of neuroscience. For the past 25 years, Dr. Barnes has facilitated groundbreaking research on aging and memory at the University of Arizona and has brought more than $35 million in research funding. She is a Regents Professor of psychology, neurology and neuroscience at the UA, where she also serves as the director and endowed chair of the Evelyn F. McKnight Brain Institute, director of the ARL Division of Neural Systems, Memory and Aging and associate director of the UA BIO5 Institute.

Taking a unique approach to the study of the brain, Dr. Barnes was one of the first in her field to investigate how normal aging affects the brain circuitry underlying cognitive processes such as memory. “We cannot possibly understand what's going wrong with the brain if we don’t understand what ‘normal’ looks like,” Dr. Barnes says. “As we begin to understand aging in full depth, we can see what impacts it.”

In addition to her focus on the functioning of a healthy brain, Dr. Barnes also advocates an interdisciplinary approach to her neurological investigation. Consequently, she is engaged in collaborative research on issues concerning aging with colleagues across the UA, the state of Arizona and the country.

Some of the highest honors in the neurological community have been awarded to Dr. Barnes in recognition of her invaluable contributions to the study of the brain. Most recently, she received the 2014 Distinguished Scientific Contribution award from the American Psychological Association. Additionally, Dr. Barnes won the prestigious Gerard Prize in 2013, which marks the highest recognition awarded by the Society for Neuroscience.

The president of the Society for Neuroscience, Larry Swanson, PhD, called Dr. Barnes a pioneer in the field “whose work has made fundamental contributions to understanding the adaptive nature of the aging brain.” Dr. Barnes is constantly looking for new ways to access the myriad mysteries surrounding brain disorders. She says, “We’re poised to do some groundbreaking work, for the UA has world-class scientists working together at the intersection of physics, nanotechnology, imaging, optical sciences, engineering, information technology, genomics and other rapidly emerging fields.”

Evelyn F. McKnight Brain Institute: Working to Achieve a Lifetime of Cognitive Health

The process of aging is daunting to many as the thought of losing cognitive abilities, particularly memory, is devastating. Led by Dr. Barnes, the Evelyn F. McNight Brain Institute is poised to address cognitive health issues. The Institute’s mission is to understand normal changes in the brain as it ages, in the hopes of developing practical lifestyle recommendations and treatments that will lead to better memory, and longer, fuller cognitive lives for all.

Considering the 86 billion neurons and 100 trillion connections in the brain, the mission of the McNight Brain Institute presents the grandest of challenges. Fortunately, its cadre of expert researchers already have developed the technology to conduct large-scale recordings of brain activity, single-cell imaging methods, whole-brain imaging and brain mapping. These tools will help them look at brain circuits for critical behavior patterns and evaluate how and why they change with age.

“We’re poised to do some groundbreaking work, for the UA has world-class scientists working together.”

Carol Barnes, PhD
Director and Endowed Chair
Evelyn F. McKnight Brain Institute
UA Tackling Brain Parasite Involved in Inflammatory Brain Disorders

UA physician-scientist Anita Koshy, MD, is recognized internationally for her clinical and research efforts involving how infections of the brain occur and how we can better understand them on a molecular level to improve treatment. Her research on how the brain parasite Toxoplasma gondii, or Toxo, is able to dampen the healthy brain’s immune response ultimately may help scientists learn how to manipulate the same immune response in designing therapies for brain disorders in which inflammation plays a major role, including Alzheimer’s, multiple sclerosis and stroke.

Studies suggest that more than 30 million Americans, and up to 80 percent of the population of some other nations, are infected with Toxo. Infection can occur from eating undercooked or contaminated meat, drinking contaminated water, or being exposed to cat feces. It can also be transmitted from mother to child.

Once a person is infected, Toxo remains in the brain for life. However, of those infected, very few develop symptoms because a healthy person’s immune system usually keeps the parasite from causing illness. But for infants infected in utero or people with compromised immune systems, the parasite can cause a serious, even fatal, brain infection.

Dr. Koshy’s lab funded by a National Institutes of Health Career Development Award, focuses on how the parasite ensures its own persistence by manipulating the cells of the brain.

“Many researchers are working on how Toxo invades and changes host cells, but we are one of the only groups looking at the molecular interactions of Toxo in the brain at the single-cell level, and very specifically how neurons and astrocytes influence Toxo,” says Dr. Koshy.

An assistant professor in the UA Departments of Neurology and Immunobiology, Dr. Koshy also is a member of the Graduate Interdisciplinary Program in Neuroscience and the UA B105 Institute.

Anita Koshy, MD

Bruce Coull, MD (right) is a professor of neurology and deputy dean for clinical affairs of the UA College of Medicine – Tucson whose expertise includes cerebrovascular disease.

Associate professor at the UA College of Medicine – Phoenix Jonathan Lifshitz, PhD, studies changes in the brain that are the result of head trauma.
UA Pain Research Group is Working to Reduce the Impact of Chronic and Acute Pain

One in three Americans suffer from chronic pain that is a significant burden to patients and brings a staggering price tag—an estimated $635 billion per year in lost productivity and medical treatment. Helping to ease this burden is the pain research group at the UA College of Medicine – Tucson, which studies the underlying causes of acute and chronic pain to promote the discovery of new targets for drug development with the ultimate goal of improved pain management.

In an effort to reduce the economic and personal impact of pain treatments, Frank Porreca, PhD, professor of pharmacology and anesthesiology at the UA College of Medicine – Tucson, and his research group have been evaluating the activation of brain reward circuits as a way to identify new treatments that effectively relieve pain so that new medications can be discovered.

Being in pain is analogous to being hungry, says Dr. Porreca, since both pain and hunger are aversive states that produce motivation. "Relief of the aversive states, including pain, is rewarding. We are studying the reward circuits in the brain and their response to the relief of the aversiveness of pain," Dr. Porreca explains. In 2013, he and his research group in the Department of Pharmacology were awarded a large grant from the National Institute on Drug Abuse, to better understand the multiple dimensions of pain.

"Current medications used for chronic pain are ineffective for many people and have serious side-effects," says Dr. Porreca. Consequently, he and his colleagues are exploring new preclinical measures that better reflect features of the human experience of pain that can be used to find more effective therapies. One-third of Americans hope to make their chronic pain disappear, and the UA Pain Research Group intends to make this dream a reality.
Excessive coffee consumption and unhealthful foods may be more damaging than people think. In addition to hyperactivity and obesity, these behaviors may have longer-lasting, significant neurological consequences. The transdisciplinary research group called “MESH”—Mechanisms of Emotion, Social relationships and Health—is a cross-campus initiative investigating how the social environment and emotional experience influence health and disease through multiple feedback loops. MESH researchers develop and test novel interventions to help people regulate themselves and their own health, while using cutting-edge biomedical methods to discover the neural, endocrine and immune pathways through which these interventions have their effects on health and disease.
PARTNERSHIPS AND COLLABORATION FUEL GROWTH AND SUCCESS
A new era is underway at the Arizona Health Sciences Center. It’s a time of increased collaboration, which is propelling efforts to become an international leader in biomedical research, health education and patient care.

Further, AHSC’s commitment to the citizens of Arizona has led to partnerships with other counties, cities, governmental agencies, industry, health departments and other health organizations, private foundations and programs for underserved populations.
PARTNERSHIPS AND COLLABORATION FUEL GROWTH AND SUCCESS

AHSC’s partnerships and collaborations span from local to global, from closer working relationships with the University of Arizona Main Campus to cross-border initiatives, from teaching hospitals in Phoenix to clinics in the Tohono O’odham and White Mountain Apache communities, among many others.

“Our goals and aspirations as a leading academic health sciences center are linked to the partnership with the UA health network,” says Joe G.N. “Skip” Garcia, MD, UA senior vice president for health sciences and interim dean, UA College of Medicine – Tucson. “Across all of our mission areas, from teaching and training the next generation of health professionals, to bringing bench research to patients in the hospital and clinics, to implementing new health-care policies, we rely on our health network partners as our practice laboratory,” adds Dr. Garcia.

“As Arizona’s only academic medical center, we play a critical role in elevating the quality of healthcare and improving the health of the community we serve,” says Michael Waldrum, MD, president and CEO of UAHN. “Vital to our success is the strong connection to the health sciences research and training programs that differentiate our services.”

“AHSC and the County have a strong and strategic partnership that supports the training of primary care providers and the provision of critical safety net healthcare services for the people in our jurisdiction.”

Francisco Garcia, MD, MPH, director of the Pima County Health Department

Together, Drs. Garcia and Waldrum are pursuing a major new clinical partnership with Banner Health, Arizona’s largest health system. Through this partnership, UA-Banner Health would create a statewide healthcare organization and expand the UA health sciences capacity for health professions training, conducting research and transforming the delivery of healthcare at the state and national level.

The partnership is expected to generate approximately $1 billion in new capital and academic investments and include expanded medical education opportunities at the UA Colleges of Medicine in both Phoenix and Tucson.

UA and Banner Health already have a long history of successful affiliation through Banner Good Samaritan Medical Center in Phoenix, which serves as one of the clinical education sites for the UA College of Medicine – Phoenix.

Pima County is another tremendous partner in AHSC’s growth and development. In 2003, University Physicians Healthcare (UPH) assumed management of all outpatient medical offices at the then-failing Kino Community Hospital, which the county opened in 1977. In 2004, UPH assumed management of the hospital for Pima County, and in 2010 the hospital changed its name to the University of Arizona Medical Center – South Campus. It has been revitalized as a healthcare workforce development hub and much needed full-service hospital on Tucson’s south side.

Francisco Garcia, MD, MPH, is director and chief medical officer of the Pima County Health Department and a UA professor in the College of Public Health.

Photo courtesy of Pima County Health Department
Collaboration has been a central theme at the UA College of Medicine – Phoenix, which has built on more than two decades of relationships with clinical partners in Maricopa County to create a successful “distributed model” of medical education in the community.

The college’s partners include Banner Health, Dignity Health, Phoenix Children’s Hospital, Maricopa Integrated Health System, Scottsdale Healthcare, Phoenix Baptist Hospital, Mayo Clinic and the Phoenix VA Health Care System. The model enables students to benefit from increased clinical exposure and will continue to expand with completion of construction of the University of Arizona Cancer Center at Dignity Health St. Joseph’s, the first clinical facility at the Phoenix Biomedical Campus.

On the UA Main Campus, researchers in the UA BIO5 Institute, the UA Colleges of Optical Sciences and Agriculture and Life Sciences and others are partnering on interdisciplinary discoveries, bringing unique expertise to bear on novel and innovative new research.

Another key partnership involves the UA College of Nursing and the UA Mel and Enid Zuckerman College of Public Health, the UA Cancer Center and Native American Research Training Center who collaborate with the Tohono O’odham Cancer Program to develop education, prevention, screening and early-detection programs, sponsoring wellness and health events across the nation. Nursing faculty are also heavily involved in the White Mountain Apache Tribe Integrative Wellness Community Project.

**Tohono O’odham Cancer Partnership Program**

The vision for the Tohono O’odham Cancer Partnership Program is “Tohono O’odham living long, cancer-free and fulfilling lives through cultural and healthy lifestyle practices.” In addition to the College of Nursing, several University of Arizona entities participate in this program, including the UA Mel and Enid Zuckerman College of Public Health, the UA Cancer Center and the Native American Research Training Center (faculty assigned through the College of Medicine – Tucson, Family and Community Medicine).

**Mary S. Koithan, PhD, RN**, in Sells, Ariz., with the Tohono O’odham Nation.

**Philip J. Schneider, MD**, (left) is clinical professor and associate dean for academic and professional affairs for the UA College of Pharmacy at the Phoenix Biomedical Campus and **Cecilia Rosales, MD, MS**, (right) a veteran of border health issues, is assistant dean of the UA Mel and Enid Zuckerman College of Public Health – Phoenix Campus and an associate professor in the community, environment and policy division.
The University of Arizona College of Medicine – Phoenix, the only four-year allopathic medical school in Phoenix, admitted its inaugural class of first-year medical students in August 2007. It is an expansion to downtown Phoenix of the UA College of Medicine program begun in 1992 that offered third- and fourth-year UA medical students the opportunity to complete their training at Phoenix-area hospitals.

As early as 1983, medical students at the UA College of Medicine were taking required clerkships, as well as clinical electives, in the Phoenix area. In 2012, the UA College of Medicine – Phoenix attained preliminary accreditation to accept a full complement of students (80 students per class) in the fall of 2013 and currently has 301 students training to be physicians, with the eventual goal of admitting 120 students annually. As Maricopa County’s only accredited MD-degree granting medical school, the college is ideally positioned to provide the innovative educational platform that prepares physicians to enter practice in our nation’s rapidly evolving healthcare environment.

Located in downtown Phoenix on the 28-acre Phoenix Biomedical Campus, the UA College of Medicine – Phoenix features numerous state-of-the-art educational and research laboratory facilities, including a multi-modal medical simulation center and high-tech learning studios within the 268,000-square-foot Health Sciences Education Building. In fall 2015, the campus will welcome the addition of the 220,000-square-foot University of Arizona Cancer Center at Dignity Health St. Joseph’s. This outpatient and clinical research facility will bring the latest advances in cancer diagnostic, treatment and prevention to the campus.

**UA Cancer Center at Dignity Health St. Joseph’s**

Located on the Phoenix Biomedical Campus at 625 N. Sixth St., the five-story, 220,000-square-foot cancer facility will offer comprehensive cancer services, including specialized cancer clinics in breast, gynecologic, thoracic, cutaneous oncology and sarcoma, head and neck, gastrointestinal and hepato-pancreato-biliary, and genitourinary cancers. The center also will offer infusion, radiation oncology, diagnostic imaging, endoscopic/interventional radiology, patient wellness and support services, a prevention center, clinical lab space and other related support spaces.

The college has seen a number of honors, including faculty members Frederic Zenhausern, PhD, and Gholam Peyman, MD, being named to the National Academy of Inventors. Dr. Peyman also was named by President Obama as one of 12 eminent researcher recipients of the National Medal of Technology and Innovation, while Dr. Zenhausern is revolutionizing a key law enforcement technique with his development of a cutting-edge technology for rapid DNA fingerprinting for human identification.

The UA College of Medicine – Phoenix continues its mark in the capital city with the majority of its graduates staying in the area for residency training and pursuing primary care specialties. Since its beginning, the college has developed partnerships with clinical providers, business groups, foundations, elected officials and community members. In addition to scientific breakthroughs by faculty members, medical students have earned honors for advancing new technologies and UA-developed initiatives.

**Innovative Faculty Members Receive National Recognition**

Gholam A. Peyman, MD, the inventor of LASIK laser vision correction surgery, and Frederic Zenhausern, PhD, MBA, developer of a rapid DNA micro-processor, both of the University of Arizona College of Medicine – Phoenix, have been named Fellows of the National Academy of Inventors. NAI Fellows are elected based upon outstanding contributions to innovation in areas such as patents and licensing, innovative discovery and technology. In 2013, President Obama also honored Dr. Peyman along with 10 other inventors who received the prestigious National Medal of Technology and Innovation.

To view scholarly journals featuring AHSC faculty authors, please scan the quick response code:
**Partnerships**

**UA Medical Students work with Underserved in Greater Phoenix**

Connecting with the community has become a theme at the UA College of Medicine – Phoenix, with a thriving chapter of the Gold Humanism Honor Society and a commitment to working with underserved populations.

The service-learning program, Community Health Initiative – Phoenix, draws nearly every medical student at the Phoenix Campus to serve in programs ranging from working in a clinic to teaching health issues. The class of 2014 logged more than 5,000 hours in service time during their four years on campus. And subsequent classes have embarked on an ambitious interprofessional project, a clinic for the homeless, joining health students from Arizona State University and Northern Arizona University in the effort.

**Two UA Medical Students among First to Test Google Glass**

Two 2014 graduates of the University of Arizona College of Medicine – Phoenix were among the first medical students in the nation to test a prototype of the wearable computer technology, Google Glass, for its functionality in medical education and first-responder scenarios.

**Top Research Grants/Awards**

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nikulina, Ella M</td>
<td>Social Stress and Psychostimulant Cross-Sensitization</td>
<td>R01/NIDA</td>
<td>$1.54M</td>
</tr>
<tr>
<td>Gallitano-Mendel, Amelia L</td>
<td>Mechanisms of 5HT2AR Regulation by Egr3</td>
<td>R01/NIMH</td>
<td>$1.14M</td>
</tr>
<tr>
<td>Zenhausern, Frederic</td>
<td>Point of Care of High - Throughput Biological Assays for Determining Absorbed Ionized Radiation Dose (Biodosimetry) after Radiologic &amp; Nuclear Events</td>
<td>DHHS</td>
<td>$1.04M</td>
</tr>
<tr>
<td>Qiu, Shenfeng</td>
<td>Met signaling in neural development and circuitry formation</td>
<td>R00/NIMH</td>
<td>$0.71M</td>
</tr>
<tr>
<td>Handa, Robert J</td>
<td>GR-Mediated Epigenetic Regulation of the CRH Gene</td>
<td>R01/NIMH</td>
<td>$0.37M</td>
</tr>
<tr>
<td>Anderson, Trent R</td>
<td>Mechanisms of Neurosteroid Regulation of Migraine</td>
<td>R01/NINDS</td>
<td>$0.33M</td>
</tr>
<tr>
<td>Ferguson, Deveroux</td>
<td>Novel role for sirtuin signaling mechanisms and downstream targets in depression</td>
<td>R00/NIMH</td>
<td>$0.21M</td>
</tr>
<tr>
<td>Sharma, Shalini</td>
<td>Examining role of splicing factor mutations in myelodysplastic syndrome (PD11)</td>
<td>R21/NCI</td>
<td>$0.25M</td>
</tr>
<tr>
<td>Azorsa, David O</td>
<td>Therapeutic targets for viral and non-viral-associated oral neoplasms</td>
<td>R21/NIDCR</td>
<td>$0.18M</td>
</tr>
<tr>
<td>Hastings, Karen Tarasza</td>
<td>GILT and regulation of Treg development in cutaneous autoimmunity</td>
<td>R03/NIAMS</td>
<td>$0.15M</td>
</tr>
<tr>
<td>Lifshitz, Jonathan</td>
<td>Inhibition of Synaptogenesis Mitigates Late-Onset Post-Traumatic Morbidity in Rat</td>
<td>R03/NINDS</td>
<td>$0.14M</td>
</tr>
</tbody>
</table>

**H-Index**

The h-index, or Hirsch index, measures the impact of a particular scientist, rather than a journal. The index is based on the distribution of citations received by a given researcher’s publications. An individual’s h-index may be different in different databases. This is because the databases index different journals and cover different years. The Web of Science database was used to calculate the AHSC researchers’ h-index.

<table>
<thead>
<tr>
<th>Name</th>
<th>H-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gholam A Peyman</td>
<td>50</td>
</tr>
<tr>
<td>Salvatore Oddo</td>
<td>44</td>
</tr>
<tr>
<td>Robert J Handa</td>
<td>44</td>
</tr>
</tbody>
</table>

*Please note that this was a voluntary process and each AHSC college provided the h-index number for its faculty.

**Rankings**

- **2014 U.S. News & World Report**: unranked
- **2013 National Institutes of Health Research Funding**: 61*

*Ranking includes UA Colleges of Medicine in Tucson and Phoenix.
UA Health Sciences Forge Collaborations, Partnerships to Better Serve Greater Phoenix

“The downtown Phoenix landscape has forever changed with the arrival of the University of Arizona College of Medicine – Phoenix. We are now producing the best doctors in the country and the campus and city are growing together to become bioscience leaders.” - Phoenix Mayor Greg Stanton, who led the effort to create the city’s first biomedical campus.

The UA’s Phoenix medical school, which opened its four-year medical education program in 2007, already is providing a steady stream of much-needed healthcare professionals for the state and nation, while embracing technology and innovation as it blazes new ground for the Arizona Health Sciences Center in the state’s largest city. The campus also serves as a major economic engine: At full build-out, the Phoenix Biomedical Campus is anticipated to generate an economic impact of $2.1 billion annually.

The State of Arizona and City of Phoenix continue to be strong supporters of AHSC, intent on developing the Phoenix Biomedical Campus as a major biosciences hub and academic health center. The UA College of Medicine – Phoenix now graduates 48 new physicians per year. The campus has developed quickly, with the Association of American Medical Colleges granting preliminary separate accreditation to the UA’s Phoenix medical school in 2013. Those medical students have excelled: Through the college’s first six years, all eligible students passed national board exams, scoring above the national average. All graduates in Phoenix match with residency programs (more than half will remain in Arizona for residency, while others will be in top programs throughout the nation).

In addition to the education building, construction continues on the UA Cancer Center’s Phoenix expansion, in partnership with Dignity Health/St. Joseph’s Hospital and Medical Center. The Cancer Center construction reached its “topping out” milestone in May 2014 with completion scheduled for mid-2015. The 220,000-square-foot outpatient and research facility represents the first clinical space on the Phoenix Biomedical Campus.

Today, the UA Colleges of Nursing, Pharmacy and Public Health also have established programs at the downtown Phoenix campus. The UA Mel and Enid Zuckerman College of Public Health has master’s students, including several MD/MPH candidates, training at the Phoenix campus; the UA College of Nursing has graduated its first master’s class based in Phoenix; and the UA College of Pharmacy is planning to launch a Phoenix cohort program for PharmD students.

The college continues to strengthen its partnership with the neighboring Translational Genomics Research Institute (TGen), while new relationships are forged. Phoenix Children’s Hospital and Dignity Health’s Barrow Neurological Institute also are partners in the Translational Neurotrauma Program, led by faculty member Jonathan Lifshitz, PhD.

City of Phoenix Master Plan

Educational, clinical and research facilities for the UA College of Medicine – Phoenix and the other health sciences on the Phoenix Biomedical Campus
UA Partnerships to Create a Company that Helps Save Lives

What began as a project in response to the medication therapy management requirement of the Medicare Part D prescription drug benefit turned out to make such significant contributions to achieving better outcomes from medications for patients that it quickly grew beyond the boundaries of the Arizona Health Sciences Center campus.

The medication therapy management (MTM) software and business model developed and used by the UA College of Pharmacy’s award-winning Medication Management Center (MMC) were so successful that in December 2013 they were licensed to SinfoníaRx, a new division of Tucson-based home healthcare company Sinfonía HealthCare Corp.

Under the licensing agreement, SinfoníaRx assumed the center’s current contracts and software system and about a fifth of MMC’s staff left the college and became employees of SinfoníaRx. The College of Pharmacy continues to provide clinical pharmacist support for SinfoníaRx’s MTM services.

The MMC provides medical management services to clients across the United States. During 2013, the MMC had contracts to serve 6 million patients and saved $75 million in avoidable healthcare costs. As of 2014, the UA center is the nation’s largest provider of MTM services.

MMC pharmacists rely on a state-of-the-art software system to help them identify opportunities to lessen the risks of adverse events and drug interactions, improve medication adherence and reduce the cost of medications. To find these opportunities, the software proactively evaluates millions of prescriptions and medical claims per week.

Widely recognized for its achievements, the MMC’s ability to improve lives resulted in a Pinnacle Award from the American Pharmacists Association Foundation in 2013. This national award recognizes significant contributions to the process of medication use through increasing patient adherence, reducing drug errors and adverse events, promoting the use of national treatment guidelines, improving patient outcomes or enhancing communication among the members of the healthcare team.

As College of Pharmacy Dean J. Lyle Bootman, PhD, and Associate Dean John Murphy, PharmD, wrote in recommending the center for the Pinnacle Award:

“We are immensely proud of all the college’s faculty and students, who are known throughout the world for promoting the role of the pharmacist in ensuring optimal medication therapy outcomes and also in providing direct patient care by implementing innovations developed right here at our institution… The role of the pharmacist in addressing the human suffering and financial costs associated with poorly managed pharmacotherapy cannot be overemphasized…”

Business is booming at the College of Pharmacy’s MMC – so much so that the organization has expanded to Phoenix. One of the college’s strategic initiatives is to have a presence in Phoenix, and more space also was needed to expand MTM services to more patients as SinfoníaRx increases its number of contracts with pharmacy benefit management and health insurance companies.
UA College of Pharmacy

Founded in 1947, the University of Arizona College of Pharmacy was the first health sciences college at the UA and today is one of the premier pharmacy schools in the nation. The college boasts an internationally recognized group of faculty members with education, research and pharmaceutical practice interests in important areas of focus, including cancer prevention and treatment, drug discovery, medication use and management, health outcomes, and the environmental impact on human health. Realizing the promise of precision health and integrating it into everyday pharmacy practice is a major focus.

Each year, nearly 400 students are enrolled in the college’s doctor of pharmacy program, learning to become exceptional pharmacists for medical centers, community clinics, government agencies and retail pharmacies. About one-third of the graduating class of pharmacists goes on to additional postgraduate training in clinical specialties. The college also enrolls about 75 students annually in its nationally recognized doctoral programs in pharmacology and toxicology and pharmaceutical sciences.

The UA College of Pharmacy also is known for the scientific research accomplishments and the community outreach efforts of its many centers. These include the Arizona Poison and Drug Information Center, which serves 14 of Arizona’s 15 counties and responds to 50,000 calls a year related to exposures to poison and drugs; the Medication Management Center, which provides medication counseling to millions across the country; the Center for Health Outcomes and PharmacoEconomic Research, which studies how to improve the quality, cost and access to healthcare; and the Center for Toxicology, which investigates the health effects of environmental agents and the hazardous waste problems of the Southwest.

H-Index*

<table>
<thead>
<tr>
<th>Name</th>
<th>H-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laurence Hurley</td>
<td>64</td>
</tr>
<tr>
<td>Samuel Yalkowsky</td>
<td>56</td>
</tr>
<tr>
<td>J. Lyle Bootman</td>
<td>50</td>
</tr>
<tr>
<td>John Regan</td>
<td>45</td>
</tr>
<tr>
<td>Jay A. Gandolfi</td>
<td>42</td>
</tr>
<tr>
<td>Terrence J. Monks</td>
<td>41</td>
</tr>
</tbody>
</table>

*Please note that this was a voluntary process and each AHSC college provided the h-index number for its faculty.

Rankings

2014 U.S. News & World Report: 10
2013 National Institutes of Health Research Funding: 16

To view scholarly journals featuring AHSC faculty authors, please scan the quick response code:

UA Study Shows Pharmacist Makes Big Difference in ER

If you have to go to an emergency department, hope that a pharmacist is part of your healthcare team. Research performed by a team led by Asad Patanwala, PharmD, associate professor in the UA College of Pharmacy, found that if a pharmacist is available at the bedside and is actively consulting with healthcare providers, a majority of medication errors can be prevented.

The study’s findings are so significant that the article Dr. Patanwala and team wrote about their research was selected to receive the 2013 Pharmacy Practice and Research Literature Award from the American Society of Health-System Pharmacists Foundation. The project involved studying more than 16,400 patients at four academic and community emergency departments around the nation.

"Our study went beyond the typical pharmacy practice research that evaluates if the pharmacist has value," says Dr. Patanwala. "What we really should be asking is, 'What should the pharmacist be doing?' This is important for the practice of pharmacy because we need to know how to prioritize our resources, especially in the fast-paced environment of an emergency department."

Asad Patanwala, PharmD

The Pharmacy White Coat Ceremony signals the student pharmacist’s transition from the classroom to concentrated clinical experiences. Dean J. Lyle Bootman and Associate Dean Theodore Tang helped student Michelle Sandberg and her parents celebrate her new status.
UA Research Uncovers Chronic Effects of Arsenic

Arsenic is a poisonous metalloid commonly found in drinking water, soil composites and even common foods, such as rice and certain juices. Most people are exposed to very low levels of arsenic every day and never have any related health issues, but some scientists believe that even at low levels, chronic exposure could lead to certain disease states.

To shed light on this problem, the National Institutes of Health has funded two UA College of Pharmacy chemists, Donna Zhang, PhD, and Eli Chapman, PhD, to investigate arsenic exposure and its biochemical effects on the body. The naturally occurring element is tasteless and odorless and dozens of studies have concluded that chronic exposure is linked to lung, skin and bladder cancers, among many other disease states.

A new UA College of Pharmacy study, titled, “Stress response, p97, and Nrf2 in arsenic-mediated toxicity,” aims to identify the mechanisms by which arsenic causes diseases and to identify the compounds that may help to prevent or alleviate arsenic-induced diseases.

UA Pharmacy Students Learn to Serve in Rural Communities

In Arizona, 15 percent of the population lives in a rural area. Compare that with the fact that 8 percent of physicians and only 6 percent of pharmacists practice in rural areas.

“Research shows that, compared with their urban counterparts, rural residents are more likely to be older, poorer and have chronic conditions or be in poor health. Rural residents are less likely to receive preventive services and are more likely to lack health insurance,” says Elizabeth Hall-Lipsy, JD, MPH, assistant professor in the UA College of Pharmacy and program manager for health disparities initiatives and community outreach. She directs the college’s Rural Health Professions Program.

The Rural Health Professions Program helps provide qualified health-care professionals for rural and underserved populations throughout Arizona. The recent increase in student enrollment in this program and the number of students choosing to practice in underserved areas shows that the goal is attainable. Since 2008, more than 100 UA College of Pharmacy students have completed more than 50,000 rotation hours at rural pharmacy facilities in Arizona, and more than 20 percent have chosen to accept permanent positions in a rural pharmacy where they served a rotation during their participation in the program.

---

**Top Research Grants/Awards**

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maier, Raina Margaret</td>
<td>Hazardous Waste Risk and Remediation in the Southwest</td>
<td>P42/NIEHS</td>
<td>$14.23M</td>
</tr>
<tr>
<td>Lau, Serrine S</td>
<td>Southwest Environmental Health Sciences Center</td>
<td>P30/NIEHS</td>
<td>$5.02M</td>
</tr>
<tr>
<td>Hurley, Laurence</td>
<td>G-Quadruplex-Mediated Transcriptional Regulation of PDGFR</td>
<td>R01/NCI</td>
<td>$1.92M</td>
</tr>
<tr>
<td>Chen, Qin</td>
<td>Training in Environmental Toxicology of Complex Diseases</td>
<td>T32/NIEHS</td>
<td>$1.84M</td>
</tr>
<tr>
<td>Lau, Serrine S</td>
<td>Retinoid Mediated Protection Against Reactive Oxygen Species Induced Cytotoxicity</td>
<td>R01/NIEHS</td>
<td>$1.66M</td>
</tr>
<tr>
<td>Boesen, Keith J</td>
<td>UA Poison Control</td>
<td>Arizona Department of Health Services</td>
<td>$1.45M</td>
</tr>
<tr>
<td>Cherrington, Nathan J</td>
<td>Pediatric Adverse Drug Reactions in NASH</td>
<td>R01/NICHD</td>
<td>$1.26M</td>
</tr>
<tr>
<td>Zhang, Donna D</td>
<td>Investigation of an Anti-Cancer Phytochemical Targeting Nrf2</td>
<td>R01/NCI</td>
<td>$1.1M</td>
</tr>
<tr>
<td>Lau, Serrine S</td>
<td>Team Approach to Translate Novel Biomarkers for Diabetes</td>
<td>R24/NIDDK</td>
<td>$0.93M</td>
</tr>
<tr>
<td>Zhang, Donna D</td>
<td>The protective role of Nrf2 against arsenic-induced toxicity and carcinogenicity</td>
<td>R01/NIEHS</td>
<td>$0.86M</td>
</tr>
<tr>
<td>Hurley, Laurence</td>
<td>NFCR center for targeted cancer therapy at TGen</td>
<td>Translational Genomics Research Institute</td>
<td>$0.82M</td>
</tr>
<tr>
<td>Boesen, Keith J</td>
<td>Poison Control Stabilization and Enhancement Program</td>
<td>Health Resources and Services Administration</td>
<td>$0.8M</td>
</tr>
<tr>
<td>Smith, Catharine L</td>
<td>Lysine Deacetylases as Coactivators in Glucocorticoid Receptor Signaling</td>
<td>National Science Foundation</td>
<td>$0.71M</td>
</tr>
<tr>
<td>Snyder, Eric M</td>
<td>Gene-by-Gene Interactions and Lung Fluid Balance in Patients with Heart Failure</td>
<td>R01/NHLBI</td>
<td>$0.65M</td>
</tr>
</tbody>
</table>
Partnership Leads to Premier Simulation Center at Phoenix Campus; ASTEC in Tucson Achieves National Accreditation

High-tech medical simulation labs are critical to educating medical students and advancing knowledge for experienced surgeons. Both the Colleges of Medicine are developing premier simulation centers, providing sophisticated teaching tools to help in anatomy, physiology and other instruction for medical and other health-related education.

At the University of Arizona College of Medicine – Tucson, the Arizona Simulation Technology and Education Center (ASTEC) provides innovative collaborative learning opportunities for new students and seasoned practitioners alike. The realistically simulated environment offers more than 50 artificial tissue modules, manufactured in-house, so students can rehearse invasive techniques long before they are applied to patients.

ASTEC is leading the effort to transform medical training and reduce medical errors. Computerized mannequins, 3D haptic technology, robotic instrumentation and leading-edge optics are among the new technologies used so that healthcare learning is smarter, safer and kinder.

In 2013, ASTEC achieved national accreditation as a simulation center by the Society for Simulation in Healthcare (SSIH). ASTEC is now one of only 32 centers in the United States with such certification, and joins other renowned institutions such as Yale and the University of Pittsburgh in offering an SSIH accredited facility.

In 2013, the University of Arizona College of Medicine – Phoenix entered into an agreement with Florida-based SynDaver™ Labs, which manufactures the world’s most sophisticated synthetic human tissues and body parts. The College of Medicine – Phoenix Simulation Center is a new, state-of-the-art endeavor that combines technology with healthcare-focused education. The Center prepares students by offering a wide variety of real-world situations and scenarios, allowing them to contend with the everyday challenges and difficulties faced in the delivery of healthcare, no matter how much experience the practitioner has.

The technology is used to replace cadavers and human patients in clinical training and surgical simulation.

“We are bringing SynDaver™ to the forefront of medical education,” said Teresa Wu, MD, an emergency department physician at Maricopa Medical Center and faculty member of the college. “We are developing a team of practitioners that is going to help enhance medical education and improve patient safety.”

AHSC Advancing Interprofessional Education and Practice

AHSC’s Interprofessional Education and Practice (IPEP) program, with participation from the UA Colleges of Medicine, Nursing, Pharmacy and Public Health, as well as students from other disciplines and universities, provides opportunities to learn and practice together in interprofessional teams. The collaborative effort aims to improve the health of patients, families and communities through mini-courses and online learning that make up the core of IPEP’s longitudinal curriculum.

“The Pandemic Flu: An Exercise in Disaster Preparedness” and “Disabilities: An Interprofessional Exercise” are two mini-course examples of the unique, hands-on, interprofessional learning opportunities available to students.

“Health is an issue of equity and fairness. Everyone should have an equal opportunity to live a healthy life, and improving the health literacy of everyone is a proven path toward that goal.”

Richard Carmona, MD, MPH
From Vision to Reality: Arizona Center for Integrative Medicine Builds Partnerships as it Leads Transformation of Healthcare

In 1994, the idea of integrative medicine was in its infancy when Andrew Weil, MD, founded what now is the University of Arizona Center for Integrative Medicine. Integrative medicine (IM) is healing-oriented medicine that takes account of the whole person, including all aspects of lifestyle. It emphasizes the therapeutic relationship between practitioner and patient, is informed by evidence and makes use of all appropriate therapies.

The Arizona Center for Integrative Medicine (AzCIM) at the UA College of Medicine – Tucson has led the transformation of healthcare by embodying the philosophy and practice of healing-oriented medicine that addresses mind, body and spirit. It was built upon the premise that the best way to change a field is to educate the most gifted professionals and place them in settings where they can, in turn, teach others.

AzCIM offers the largest fellowship program in the world, having trained 1,000 fellows in IM from 47 states and 26 countries and territories. And the Integrative Medicine in Residency program now is implemented at 42 primary care residency sites in the United States and Canada, and includes family medicine, internal medicine, preventive medicine, and physical medicine and rehabilitation residencies.

In 2014, AzCIM founded the interdisciplinary UA Institute on Place and Wellbeing (UAIPW) along with the UA College of Medicine – Tucson and the UA College of Architecture, Planning and Landscape Architecture and supporting partner UA Institute of the Environment. The UAIPW is headed by world-renowned mind-body researcher Esther Sternberg, MD, and seeks to redefine human health to fully encompass the role of the built and green environments in health and wellbeing through research, education, practice and policy change. Dr. Sternberg is establishing a collaborative, multidisciplinary translational research program that will explore the science of the mind-body connection from varying perspectives and then translate those findings into integrative medicine practice.

Bringing IM directly to patients, the UA Integrative Health Center (UAIHC) in Phoenix is helping change the model of primary care delivery for patients and healthcare professionals. Launched in 2012 in affiliation with District Medical Group and the UA College of Medicine – Phoenix, the Center is the first in the nation to implement the integrative primary care model developed at AzCIM. Each patient has a personal physician, a health coach and a nutritionist, and can choose to see an integrative chiropractic physician, an acupuncturist or a mind-body specialist.

Victoria Maizes, MD, is the executive director, and also serves as professor of clinical medicine, family and community medicine and public health. World-renowned health expert Andrew Weil, MD, is the founder and director of the Arizona Center for Integrative Medicine, as well as the Jones-Lovell Endowed Chair in Integrative Rheumatology.

As research director for the Arizona Center for Integrative Medicine, Esther Sternberg, MD, is internationally recognized for her discoveries proving the role of the brain’s stress response in arthritis, autoimmune and other debilitating illnesses.
Established in 2000, the University of Arizona Mel and Enid Zuckerman College of Public Health is the first and only nationally accredited college of public health in Arizona. Although relatively new, the college has attained distinction by ranking among the top 25 public health programs nationally.

The college enrolls more than 1,100 students per year across degree-granting programs at the bachelor, master and doctoral levels. With an expanding public health focus among other professional schools, the college has created innovative dual-degree offerings with its Masters in Public Health with the UA Colleges of Medicine (MD/MPH), Law (JD/MPH), Pharmacy (PharmD/MPH), Business (MBA/MPH) and Social Behavioral Sciences (MAS/MPH and LAS/MPH).

The college’s burgeoning research activities have focused on health-promotion interventions, chronic disease prevention in the border region, obesity and diabetes prevention, women’s health and wellness, cancer prevention and control, environmental and occupational health, public health policy and management and infectious diseases.

Since its founding, the college has advanced research, education and community engagement to find solutions to public health problems in Arizona, the desert Southwest and around the world. By pioneering new research, deploying knowledge in the community and educating tomorrow’s public health leaders, the College of Public Health has quickly emerged as an important leader in this rapidly emerging field.

UA-Led School Asthma Program Receives National Recognition
A school-based asthma program led by the UA Mel and Enid Zuckerman College of Public Health has received an Innovations in Health Equality Award from the American Thoracic Society. The program, “Implementation and Evaluation of a Stock Albuterol Policy for a Low-Income Minority School District,” provides standing orders that allow schools to stock albuterol and administer it to students who have asthma but do not have their personal inhalers with them at school. “We expect that the stock albuterol program and standing orders will reduce asthma-related morbidity outcomes, such as 911 calls due to asthma, the number of children sent home due to asthma, asthma-related absences and class time missed due to time spent in the health office for asthma symptoms,” said Lynn B. Gerald, PhD, MSPH.

H-Index*

<table>
<thead>
<tr>
<th>Name</th>
<th>H-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyal Shahar</td>
<td>5.8</td>
</tr>
<tr>
<td>Mary Koss</td>
<td>4.4</td>
</tr>
<tr>
<td>Angelika Gruessner</td>
<td>4.4</td>
</tr>
<tr>
<td>Ron Watson</td>
<td>3.8</td>
</tr>
</tbody>
</table>

*Please note that this was a voluntary process and each AHSC college provided the h-index number for its faculty.

Rankings
2013 National Institutes of Health Research Funding: 32

To view scholarly journals featuring AHSC faculty authors, please scan the quick response code:

The Arizona Sonora Border (ARSOBO) project offers wheelchairs with mountain bike tires in the rear to help users navigate the rocky terrain of northern Mexico.
--- Partnerships ---

**Fast Facts**
Fall 2014: Of the 641 students admitted to the Mel and Enid Zuckerman College of Public Health, 42.7 percent are from U.S. minority groups. The college is home to 25 percent of the University of Arizona’s Peace Corps Fellows. Graduate program alumni number 1,350 and are employed in 46 states, the District of Columbia and Puerto Rico. Internationally, college alumni are working in 33 countries across six continents.

The college is home to seven centers: Arizona Prevention Research Center; Arizona Public Health Training Center; Canyon Ranch Center for Prevention and Health Promotion; Center for American Indian Resilience (CAIR); Center of Excellence in Women’s Health; Center for Rural Health; Mountain West Preparedness and Emergency Response Learning Center.

The college is home to six interprofessional collaborative centers: Arizona Smokers’ Helpline (ASHLine); Asthma Clinical Research Center; Global Health Institute; Healthy Aging Lab; Skin Cancer Institute; and the Western Mining Safety and Health Training Resource Center.

*Top Research Grants/Awards*

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael, Stephen S</td>
<td>Arizona Smokers’ Helpline</td>
<td>Arizona Department of Health Services</td>
<td>$9 M</td>
</tr>
<tr>
<td>Carvajal, Scott C</td>
<td>Canyon Ranch Center for Prevention and Health Promotion</td>
<td>National Center for Chronic Disease Prevention and Health Promotion</td>
<td>$4.85 M</td>
</tr>
<tr>
<td>Driesen, Kevin E</td>
<td>Arizona Rural Hospital Flexibility Program</td>
<td>Health Resources and Services Administration</td>
<td>$2.56 M</td>
</tr>
<tr>
<td>Burgess, Jefferey L</td>
<td>TP10-1001, Preparedness and Emergency Response Learning Center (PERLC)</td>
<td>Centers for Disease Control and Prevention</td>
<td>$2.47 M</td>
</tr>
<tr>
<td>Thomson, Cynthia A</td>
<td>Evaluation of Di-indolylmethane supplementation to modulate tamoxifen efficacy in breast cancer survivors</td>
<td>R01/NCI</td>
<td>$2.46 M</td>
</tr>
<tr>
<td>Taren, Douglas L</td>
<td>Public Health Training Center</td>
<td>Health Resources and Services Administration</td>
<td>$2.05 M</td>
</tr>
<tr>
<td>Garcia, Francisco A</td>
<td>Contract for Funded Research Projects</td>
<td>Patient-Centered Outcomes Research Institute</td>
<td>$1.85 M</td>
</tr>
<tr>
<td>Gerald, Lynn B</td>
<td>Maternal and Child Health Public Health Training Program</td>
<td>Health Resources and Services Administration</td>
<td>$1.81 M</td>
</tr>
<tr>
<td>Gerald, Lynn B</td>
<td>The Cost Effectiveness of School-Based Supervised Asthma Therapy</td>
<td>R18/NHLBI</td>
<td>$1.76 M</td>
</tr>
<tr>
<td>Ernst, Kacey C</td>
<td>On the Edge: Dengue and Climate</td>
<td>R01/NIAID</td>
<td>$1.65 M</td>
</tr>
<tr>
<td>Burgess, Jefferey L</td>
<td>Comparison of Diesel and Biodiesel Emissions and Health Effects in Underground Mining</td>
<td>R01/NIOSH</td>
<td>$1.39 M</td>
</tr>
<tr>
<td>Michael, Stephen S</td>
<td>Ashline Expanded Services</td>
<td>Arizona Department of Health Services</td>
<td>$1.22 M</td>
</tr>
</tbody>
</table>

**Cecilia Rosales, MD, Named Public Health Change Champion**

The Public Health Institute at the Mel & Enid Zuckerman College of Public Health named Cecilia Rosales, MD, the 2014 Public Health Change Champion for her work to improve the health and quality of life for border populations. Dr. Rosales is assistant dean of Phoenix programs, and joined the college in 2005. Dr. Rosales uniquely contributes to the body of knowledge about Hispanic, border and binational health, and conducts community-based participatory research in the Southwest. She understands the context of how the public health infrastructure can be strengthened at the local, state, national and binational levels to eliminate health disparities.

---

Cecilia Rosales, MD, MS
Outstanding faculty, unique education and training experiences and a tradition of clinical practice innovation all contribute to the University of Arizona College of Nursing being ranked as one of the best nursing programs in the nation. Established in 1957, the College of Nursing was Arizona’s first nursing school and, through innovation in learning, research, and clinical practice delivery, graduates are highly skilled professionals who contribute daily to Arizona’s healthcare delivery in community-based clinics and hospitals across the state and beyond.

The UA College of Nursing faculty members provide instruction to more than 1,000 students annually leading to degrees including Bachelor of Science in Nursing (BSN), Master of Science in Nursing (MSN), Doctor of Nursing Practice (DNP) and Doctor of Philosophy (PhD).

The college has been a leading adopter of asynchronous online distance learning and currently offers all of its post-RN licensure degree programs online. Online education is well-suited to the demographics of this student population and the need to retain practicing nurses in the workforce during their education.

Research is focused on discovery and application of new knowledge toward improving human health. Specific research focal areas are:

- Biobehavioral neuroscience and the interaction among biological and behavioral processes in human health
- The advancement of health equity and reduction of health disparities through improved illness self-management
- Population health and wellness, including health-care systems and informatics to promote health and wellbeing

Team-based Collaboration and Connected Care

Health 360 South, a collaboration with the Department of Family and Community Medicine at the UA College of Medicine – Tucson, is a current example of the College of Nursing’s efforts to lead through innovation in clinical practice delivery models. Funded with support from a $1.45 million grant from the U.S. Department of Health and Human Services, Health 360 South is a team-based approach to primary care.

The program creates a core health team for each patient, composed of a faculty nurse practitioner specializing in family, adult, pediatric or geriatric care, or a family medicine or internal medicine physician, and a nurse who serves as patient advocate and health coach. A promotora – community health worker – is assigned to patients who are socioeconomically disadvantaged or health-literacy challenged. This innovative approach to team-based primary care aligns with the growing recognition that interprofessional practice is critical to making patient care safer, more efficient and more effective.

A Health 360 South multi-disciplinary team meeting

UA College of Nursing students

The University of Arizona College of Nursing is ranked by NurseJournal.org as No. 14 among the “Top 50 Most Social Media Friendly Nursing Schools for 2014.” This spring, the college created and produced a video about the first case of “March Madness” being reported in Tucson, which won a Silver Award of Distinction from The Communicator Awards, sanctioned and judged by the International Academy of Visual Arts. The video was also featured as a news story on Tucson’s KGUN-TV 9 for several days during the first week of March Madness.
**UA College of Nursing Dean Inducted into International Nurse Researcher Hall of Fame**

This past summer, at the 25th International Nursing Research Congress, Joan Shaver, PhD, RN, FAAN, professor and dean at the University of Arizona College of Nursing, was inducted into the International Nurse Researcher Hall of Fame.

Dr. Shaver, who has led the UA College of Nursing since 2009, was one of 25 nurse-researchers representing Australia, Taiwan, the United Kingdom and the United States to be honored by Sigma Theta Tau International (STTI), the honor society of nursing. The International Nurse Researcher Hall of Fame recognizes nurse-researchers who have achieved significant and sustained national or international recognition, and whose research has improved the profession and the people it serves.

For more than two decades, Dr. Shaver has conducted extensive research in women’s health and sleep science. She and her team were among the first to study sleep problems as part of the transition into menopause. In particular, her research has focused on insomnia in midlife women and sleep issues in women with debilitating conditions that disproportionately affect women, including fibromyalgia and chronic fatigue syndrome.

---

**Top Research Grants/Awards**

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archbold, Kristen H</td>
<td>Neurobehavioral Effects of PAP Therapy in Children with Obstructive Sleep Apnea</td>
<td>Ros/NHLBI</td>
<td>$1.71 M</td>
</tr>
<tr>
<td>Reel, Sally</td>
<td>Nurse Education, Practice, Quality, and Retention - Interprofessional Collaborative Practice</td>
<td>HRSA</td>
<td>$1.48 M</td>
</tr>
<tr>
<td>McEwen, Marylyn M</td>
<td>Decreasing Diabetes Disparities: Building Mexican American Family Social Capital</td>
<td>Ros/NIMH</td>
<td>$1.45 M</td>
</tr>
<tr>
<td>Brewer, Barbara B</td>
<td>Measuring Network Stability and Fit</td>
<td>Ros/NIGMS</td>
<td>$1.0 M</td>
</tr>
<tr>
<td>Moore, Ida M</td>
<td>Phenotypic-Genotypic Associations with Symptoms During Childhood Leukemia Treatment</td>
<td>Ros/NCI</td>
<td>$0.58 M</td>
</tr>
<tr>
<td>Brewer, Barbara B</td>
<td>Development and Maintenance of the Caritas Patient Score Database</td>
<td>Watson Caring Science Institute</td>
<td>$0.25 M</td>
</tr>
<tr>
<td>Rosenfeld, Anne G</td>
<td>The Influence of Gender on Symptom Characteristics During Acute Coronary Syndrome</td>
<td>Ros/NINR</td>
<td>$0.2 M</td>
</tr>
</tbody>
</table>

**Rankings**

2014 *U.S. News & World Report*: 32
2013 National Institutes of Health Research Funding: 24

To view scholarly journals featuring AHSC faculty authors, please scan the quick response code:
Focused on excellence across the tripartite missions of education, research and patient care, the University of Arizona College of Medicine – Tucson is the cornerstone of the Arizona Health Sciences Center and a key driver of AHSC’s ambitious goal to join the ranks of the nation’s elite academic health centers.

Founded in 1967, the UA College of Medicine – Tucson has been the leader in educating Arizona’s future primary care physicians and residency-trained specialists for almost 50 years. Today, one in three physicians across the state of Arizona received their medical school and/or residency training experience through the college, whose educational programs have attained national recognition for innovation in curriculum delivery, the use of simulation and other advanced technology platforms and interdisciplinary, team-based training and practice experience. With this history, the college is well-positioned to engage future students in a new era of discovery-based scholarship, population-focused healthcare and leadership in solving our state and nation’s complex health issues.

Within the research domain, the UA College of Medicine – Tucson produces new knowledge across the full research spectrum – from laboratory-based basic science to novel early-phase therapeutic clinical trials, to population and observational studies, to implementation of new healthcare delivery models and adoption of new health-practice standards. The UA College of Medicine – Tucson is Arizona’s leader in translational research and the transformation of scientific discoveries into widespread health practice.

**Rankings**

2014 *U.S. News & World Report*: 68
2013 National Institutes of Health Research Funding: 60*

*Ranking includes UA Colleges of Medicine in Tucson and Phoenix

To view scholarly journals featuring AHSC faculty authors, please scan the quick response code:

<table>
<thead>
<tr>
<th>Name</th>
<th>H-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank Porreca</td>
<td>78</td>
</tr>
<tr>
<td>Fernando Martinez</td>
<td>76</td>
</tr>
<tr>
<td>Joe G. N. “Skip” Garcia</td>
<td>71</td>
</tr>
<tr>
<td>Patrick Mantyh</td>
<td>71</td>
</tr>
<tr>
<td>David S. Alberts</td>
<td>68</td>
</tr>
<tr>
<td>Evan M. Hersh</td>
<td>66</td>
</tr>
<tr>
<td>Robert Livingston</td>
<td>63</td>
</tr>
<tr>
<td>Wayne Morgan</td>
<td>63</td>
</tr>
<tr>
<td>Jason X.-J. Yuan</td>
<td>61</td>
</tr>
<tr>
<td>Hendrikus Granzier</td>
<td>60</td>
</tr>
<tr>
<td>Jeffrey Frelinger</td>
<td>56</td>
</tr>
<tr>
<td>Karl Kern</td>
<td>55</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>H-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas P. Miller</td>
<td>53</td>
</tr>
<tr>
<td>David Armstrong</td>
<td>52</td>
</tr>
<tr>
<td>Michael H. Ossipov</td>
<td>52</td>
</tr>
<tr>
<td>John Galgiani</td>
<td>51</td>
</tr>
<tr>
<td>Anne Wright</td>
<td>51</td>
</tr>
<tr>
<td>Todd Vanderah</td>
<td>50</td>
</tr>
<tr>
<td>Thomas P. Davis</td>
<td>50</td>
</tr>
<tr>
<td>Wayne Morgan</td>
<td>47</td>
</tr>
<tr>
<td>Robert T. Dorr</td>
<td>46</td>
</tr>
<tr>
<td>Donata Vercelli</td>
<td>46</td>
</tr>
<tr>
<td>Nathan Ellis</td>
<td>45</td>
</tr>
</tbody>
</table>

*Please note that this was a voluntary process and each AHSC college provided the h-index number for its faculty.
UA First in the Nation to Appoint Female Chiefs of Surgery and Medicine

Leigh A. Neumayer, MD, MS

Leigh A. Neumayer, MD, MS, recently was named head of the UA College of Medicine – Tucson’s Department of Surgery and the Margaret E. and Fenton L. Maynard Endowed Chair in Breast Cancer Research. One of only five women surgery department heads in the nation, Dr. Neumayer is internationally known for her expertise in breast cancer surgery and research, advocacy for women's health issues and leadership in surgical education, as well as participation as lead investigator in numerous national clinical research trials. The UA added another strong physician-scientist to its extensive and growing leadership roster when Monica Kraft, MD, an internationally renowned specialist in translational asthma research was named chair of the Department of Medicine at the UA College of Medicine – Tucson.

An award-winning physician and researcher with a strong track record in program development, mentorship and administration, Dr. Kraft will lead the evolution of the UA Department of Medicine, moving the academic and clinical missions forward to serve the people of Arizona.

New Vice Dean Appointed

Physician-scientist Charles B. Cairns, MD, FACEP, FAHA, a nationally recognized leader in emergency and critical care research, joins AHSC in November as assistant vice president for clinical research and clinical trials and as vice dean of the UA College of Medicine – Tucson.

Dr. Cairns will bring together high-impact collaborations that will serve the people of Arizona by developing and implementing new paradigms of healthcare and by providing a transformational leadership in medical education and research.

Top Research Grants/Awards

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Award Title</th>
<th>Type/Sponsor</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvey, Erin M</td>
<td>Amblyopia in Astigmatic Children: Development and Treatment</td>
<td>U19/NEI</td>
<td>$3.35 M</td>
</tr>
<tr>
<td>Martinez, Fernando</td>
<td>Childhood Predictors of Airway Structure, Function, and Disease in Adult Life</td>
<td>R01/NHLBI</td>
<td>$3.25 M</td>
</tr>
<tr>
<td>Lane, Richard D</td>
<td>Typical Daily Emotion, Ischemia and Repolarization in Coronary Artery Disease</td>
<td>R01/NHLBI</td>
<td>$3.00 M</td>
</tr>
<tr>
<td>Wright, Stephen H</td>
<td>Molecular Organization of the Organic Cation-Proton Exchanger, MATE1</td>
<td>R01/NINDS</td>
<td>$2.47 M</td>
</tr>
<tr>
<td>Porreca, Frank</td>
<td>Mechanism of Medication Overuse Headache and Chronic Migraine Pain</td>
<td>R01/NINDS</td>
<td>$2.32 M</td>
</tr>
<tr>
<td>Yuan, Jason</td>
<td>Molecular Mechanisms of down regulated KV channels in iPAH: Role of MicroRNA</td>
<td>R01/NHLBI</td>
<td>$2.30 M</td>
</tr>
<tr>
<td>Konhilas, John</td>
<td>Impact of AMP-Activated Kinase on Sex Differences in Hypertrophic Cardiomyopathy</td>
<td>R01/NHLBI</td>
<td>$1.91 M</td>
</tr>
<tr>
<td>Yuan, Jason</td>
<td>Calcium Signaling in Pulmonary Arterial Hypertension Role of CaSR and TRPC6</td>
<td>R01/NHLBI</td>
<td>$1.88 M</td>
</tr>
<tr>
<td>Bailey, Elizabeth F</td>
<td>Neuromuscular Control of the Human Tongue</td>
<td>R01/NIDCD</td>
<td>$1.80 M</td>
</tr>
<tr>
<td>Ellis, Nathan</td>
<td>Genetic Risk factors in African American Colorectal Cancer Patients</td>
<td>U01/NCI</td>
<td>$1.92 M</td>
</tr>
<tr>
<td>Frelinger, Jeffrey A</td>
<td>Immune Evasion by F. tularensis</td>
<td>R01/NAID</td>
<td>$1.63 M</td>
</tr>
<tr>
<td>Ellis, Nathan</td>
<td>Regulation of Homologous Recombination in Human Cells</td>
<td>R01/NCI</td>
<td>$1.52 M</td>
</tr>
<tr>
<td>Granzes, Hendrikus L</td>
<td>Role of the Giant Protein Titin in Skeletal Muscle Structure and Function</td>
<td>R01/NIAM</td>
<td>$1.33 M</td>
</tr>
<tr>
<td>Ghitzan, Fayez</td>
<td>Development of Intestinal Transport of Ca++ and Pi</td>
<td>R37/NIDDK</td>
<td>$1.31 M</td>
</tr>
</tbody>
</table>