When you get your first look at a Tucson sunset, it is just spectacular.” ~ Raymond B. Nagle, MD, PhD

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This publication features only a sampling of the countless groundbreaking research projects and inspiring patient care stories that have taken place at the University of Arizona Cancer Center. To contribute your own story, please visit azcc.arizona.edu/submit-your-story.
Cancer. It’s a disease that exists simply to create chaos and destroy anything that crosses its path — biologically, mentally, physically and spiritually.

Statistically speaking, cancer impacts almost everybody at some point. According to the American Cancer Society, one out of every two men and one out of every three women will be diagnosed with cancer in his or her lifetime. Those fortunate enough to avoid a cancer diagnosis will almost certainly see a family member or close friend deal with the disease.

On Dec. 23, 1971, President Richard Nixon and Congress took serious action against this formidable foe, putting Senate Bill 1828: The National Cancer Act into effect. This bill gave the National Institutes of Health a previously unprecedented amount of financial and administrative support in hopes of finding a cure for cancer.

Shortly after The National Cancer Act went into effect, the foundation was laid for what would become the cornerstones of the international cancer research community in New York, Los Angeles, Houston, London, Baltimore, Washington, DC, Boston, Zurich and, yes, Tucson, Ariz.

Founded in 1976 as a division of the University of Arizona College of Medicine, the University of Arizona Cancer Center is a Center of Excellence in the Arizona Health Sciences Center. In 1990, The University of Arizona Cancer Center was designated as one of the first comprehensive cancer centers by the National Cancer Institute (NCI) and is still the only comprehensive cancer center headquartered in Arizona.

This is the story of a group of ambitious, creative thinkers who were brought to the Sonoran Desert through a mutual admiration of breathtaking sunsets, Mexican food and the idea that they could all accomplish much more working together than by chasing individual accolades.

This is the story of the University of Arizona Cancer Center.

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A Look Back

“If you stay on the cutting edge and continue to offer something new to patients, there is no limit to what you can achieve.”

~ Thomas P. Miller, MD
The University of Arizona Cancer Center didn’t become one of the nation’s premier cancer research and treatment facilities overnight. It took years of planning and forethought to lay the foundation for what this institution would eventually become.

In 1972, the University of Arizona College of Medicine established the Cancer Center Activities Committee. Its first order of business was to recruit a bright, young doctor to lead the hematology/oncology section.

Even though he was only 36 years old at the time, Sydney E. Salmon, MD, had already compiled an awfully impressive résumé. In 1962, he enlisted in the United States Public Health Service, and in 1964, he was assigned to the cancer research service at the organization’s hospital in Boston. From there, Dr. Salmon served as the National Institutes of Health’s special fellow in hematology/immunology at the University of California, San Francisco, eventually earning a position as an assistant professor of medicine.

Dr. Salmon made a name for himself among cancer researchers in the Bay Area, thanks in large part to his creativity and innate leadership abilities. But while some famous crooners leave their hearts in San Francisco, Dr. Salmon left his in the Southwestern desert.

The Staten Island native moved to Tucson at age 12. The Tucson High School graduate attended the University of Arizona, graduating with a bachelor’s degree in philosophy, with a minor in psychology. Whether he was attending medical school in St. Louis, interning in Rochester, NY, or working in Boston or San Francisco, Dr. Salmon always identified as an Arizona Wildcat.

So when Dr. Salmon returned to Tucson in 1972, things began to fall into place – both for him and the program. The National Cancer Institute awarded the University of Arizona a planning grant, which helped initiate the first wave of clinical cancer programs. Two years later, the Southwest Oncology Group (now called SWOG) formed, which allowed the university to participate in larger clinical trials. This paved the way for the first two NCI-funded program project grants (1975) and the subsequent approval of the Arizona Cancer Center as a division within the UA College of Medicine (1976).

In 1978, the cancer center received its first NCI Support Grant for $1 million, designating it as an official cancer research and treatment center. This core grant has been competitively renewed in each renewal period through to the present.
The University of Arizona Cancer Center began its operations on the sixth floor of University Medical Center in 1976, then moved to the fourth floor in 1980. While the Salmon Building was being built, clinical headquarters took residence in the “Redwood Trailer,” pictured above, for 18 months, until the Salmon Building opened in 1986.

While successful cancer research requires an analytical, detail-oriented mind, the truly transcendent work in the field comes as a result of an adventurous spirit and a flair for the dramatic.

“Syd originally wanted to go to art school and become a cartoonist,” Robert Dorr, PhD, RPH, said.

That artistic sensibility influenced much of Dr. Salmon’s research, as well as the environment he helped cultivate at Cancer Center director.

This was a thrilling time to come of age as a young research scientist or oncologist looking to make a real difference in the way cancer was approached and treated. Imagination and innovation took center stage, as the brightest scientific minds of a generation each tried to find unique solutions for a complex, constantly evolving set of questions.

There was no idea too big nor hypothesis too wild. Researchers were encouraged to take risks and test the limits of conventional thought—and to do it together.

“In our heyday, people weren’t over-burdened with all the responsibilities or restrictions that can stand in the way of groundbreaking research,” Raymond Nagle, MD, PhD, said. “People had the freedom to work together and use their respective strengths to help push the envelope.”

Dr. Salmon’s first UA-based clinical team included Steve Jones, MD; Brian Durie, MD; and David Alberts, MD. These four individuals laid the foundation for the pioneering research that would eventually define the UA Cancer Center.

During this era, Dr. Salmon’s close-knit group of researchers truly bought into his dynamic, forward-thinking approach. That feeling of camaraderie was further solidified when the team moved from the sixth floor of the University of Arizona Medical Center building to a free-standing redwood trailer in the early 1980s, located where the Radiation Oncology facility currently stands. This newfound sense of independence and autonomy led to some of the boldest, most innovative research not only in Arizona’s history, but in the history of cancer research as a whole.

This work attracted some top-notch post-doctorate fellows, including Jeffrey Trent, PhD; Thomas Miller, MD; Frank Meyssman, MD; Daniel Von Hoff, MD, FACP, and countless other transformational figures in the field of cancer research. The folks who came through the UA Cancer Center at this time would become pillars in academia and/or industry over the next four decades.

The world took notice of what was happening in Tucson, as well. Dr. Salmon had established himself as a luminary in the cancer research field, allowing him to put together a series of conferences, beginning in 1979, which brought the world’s top oncologists to Tucson for a week to exchange ideas and debate their merits.

“You cannot overemphasize the importance of these conferences,” Thomas Miller, MD, said. “They were exceptionally well attended by the people who would eventually become the fathers of modern oncology. These events really put us on the map.”

These conferences weren’t simply a series of polite, tepid lectures and slideshow presentations, either. These presentations often morphed into passionate, fierce, occasionally tense debates between presenters and audience members, with the best ideas ultimately prevailing.

“Every March, it was like the Olympics of cancer research,” Baldassare “Dino” Stea, MD, PhD, FASTRO, said.
Dr. Salmon was at the center of it all. He commanded the respect of the world’s elite cancer researchers, yet provided an environment where they were all comfortable enough to let their imaginations run wild.

The atmosphere was vibrant and electric. Arizona-based research was consistently featured in major medical journals. Everyone on Dr. Salmon’s team felt personally invested in the work that was taking place here, thanks in large part to the collaborative, team-first mentality that came to define the Cancer Center.

Physicians learned what made for top-notch research projects. Basic scientists learned what projects would have the most impactful presence in the clinics. Everyone learned from each other — the essence of translational research.

“Syd wanted his physicians to be physician scientists. He was ahead of his time in this respect,” Dr. Dorr said. “He had this tremendous gift for coalescing a variety of ideas and presenting them as a clear, direct, unified message.”

The field of cancer research was still in its “Wild West” phase, with dozens of bright minds and bold thinkers scattered across the globe, each taking a different path toward the same goal. The team at the University of Arizona Cancer Center had established its identity, its mission and its direction — forward.
Early in the 21st century, the National Cancer Institute hoped to establish personalized, individually tailored treatment as the standard of care for all cancer patients. With the human genome successfully sequenced in 2003, researchers were given the key that would go toward identifying an individual’s susceptibility for specific forms of cancer, along with the treatment options that would give each patient the best chance of success.

The team at the University of Arizona Cancer Center began exploring the concept of “personalized cancer care” in the mid-1970s — long before most researchers were even prepared to entertain the idea as a possibility.

“We laid the foundation for what would become personalized or precision medicine,” David Alberts, MD, said. “We did some of the first work in the field, and we had a visionary in Syd Salmon who was certain that this was going to become the standard of care one day.”

In fact, it was Dr. Salmon’s groundbreaking work in multiple myeloma that helped set the stage for personalized treatment. Dr. Salmon, along with Anne W. Hamburger, PhD, pioneered a research approach that involved attempts to clone these myeloma cells and test various anticancer drug interventions on these “stem cells” to reduce patient risk, while developing the best possible treatment plan.

These findings were first published in the New England Journal of Medicine in 1978. Cancer researchers across the globe were blown away.

“It was that paper that originally made me want to come to the University of Arizona,” Dr. Stea said. “You got the sense that this was the perfect environment for an academic career and to pursue major cutting-edge research projects.”

Drs. Salmon and Hamburger filed a patent for the “Primary Bioassay of Human Tumor Stem Cells,” which was granted in 1983. Their work was featured on the cover of Time, and, according to the April 1985 edition of the American Association for Cancer Research Journal, would be applied “to various studies of basic cancer biology, pathology, cellular interaction, and cytogenetics, as well as for cancer diagnosis and testing of Phase II agents and preclinical drug screening of new compounds.”

This cloning procedure led to countless breakthroughs, particularly for Dr. Salmon’s longtime collaborator and friend, Dr. Alberts. This was around the time when Dr. Alberts established himself as a pioneer in the field of translational cancer prevention, stopping the disease in its tracks before it could wreak havoc.

(continued on page 12)
During the late 1970s, ovarian cancer was one of the most difficult forms of the disease to successfully treat. Screening techniques hadn’t advanced to the point where ovarian cancer could be found in its earliest stages, and treatment options were limited, at best. Dr. Alberts developed a way for ovarian cancer therapies to be administered directly into the abdomen or pelvis through a tube, targeting the unhealthy cancer cells, while leaving the healthy surrounding tissue unharmed. This procedure, known as intraperitoneal therapy, has become the safest, most reliable, and most successful form of ovarian cancer treatment currently available.

Dr. Alberts has published dozens of papers on the topic, as well as a book, “Intraperitoneal Therapy for Ovarian Cancer,” in 2010. In order for this kind of research to take place, however, advances would need to be made in the field of cell and tissue testing. The ideas and theories were happening so fast that the technology of the era struggled to keep pace.

There is, of course, one — and only one — foolproof cancer treatment method, and that’s to do everything in one’s power not to get cancer in the first place.

For the vast majority of NCI-designated cancer centers, the drug/therapeutic development program is the biggest, in terms of staffing, resources and available funding opportunities. For others, it’s the cancer biology program.

The University of Arizona Cancer Center is one of a very small number of NCI-designated cancer centers where prevention receives the largest spotlight.

“From the very beginning, it was our mission to do everything in our power to stop cancer in its tracks so it couldn’t even have the opportunity to impact a person’s life,” said Dr. Alberts.

From the groundbreaking colon-cancer-preventing drug combinations developed by Eugene Gerner, PhD, to the use of Melanotan in the field of skin cancer prevention, to Cynthia Thomson, PhD, RD, CSO, and her world-renowned work in health and nutrition, the UA Cancer Center has hosted many researchers who have spearheaded some of the most innovative pre-cancer work in the science world.

“Cancer prevention has been a major strength for us for many years,” said G. Timothy Bowden, PhD. “We’ve led the way in developing new, exciting chemopreventative agents, along with peer-reviewed studies related to obesity and its relationship to various cancers.”

The future of cancer treatment continues to evolve, but every expert in the field agrees that a healthy diet and a regular exercise routine can do more to rid the world of cancer than anything else.
Thomas Grogan, MD, spearheaded one of the most important technological advances in the field of cancer research and diagnosis to combat this problem.

Prior to this innovation, doctors relied on manual tissue preparation to do their research. This was a difficult, time-consuming procedure, which made personalized care next to impossible. Dr. Grogan, a world-renowned researcher and pathologist, knew that an automated process would lead to faster, more precise analysis.

His goal was to take this inexact, labor-intensive process and turn it into an automated assembly line, which would lead to better data and more time for researchers to test their theories.

Dr. Grogan founded Immunodiagnostics Inc. in 1985, which changed its name to Ventana Medical Systems in 1992. The UA Cancer Center spinoff launched its first commercially marketed product in 1991 — the Ventana 320. This machine could process 40 slides per run for eight runs per day, drastically improving both the accuracy and the expediency of these vital tissue tests.

This automation and standardization of basic science research helped make the UA Cancer Center’s vision of “personalized cancer care” an achievable goal.

Meanwhile, Ventana Medical Systems has established itself as one of the nation’s most successful and influential bioscience companies. What began as a small startup struggling to turn a profit in the late 1980s has developed into a global industrial giant. Swiss pharmaceutical company Roche purchased Ventana in 2008 for $3.4 billion.

While Dr. Grogan was in the process of redefining tissue analysis, he teamed up with a clinical oncologist who arrived in Tucson in 1977 to see how they could effectively turn their lymphoma-based research into life-saving therapies.

“We had lunch together every day for 25 years or so,” Dr. Miller said. “We bounced ideas off of each other and tried to figure out ways to take all the envelope-pushing research that was happening around us and use it to help people.”

This was the birth of translational research. Together, Drs. Miller and Grogan tested biopsies with newly created antibodies and correlated patient outcome with the laboratory results.

In 1979, Dr. Miller authored a paper in The Lancet that discussed the use of treatment on what seemed to be less aggressive lymphoma subtypes at first glance, only to see that this type of therapy would develop into the standard of care for lymphoma patients. That simple shift from treating a visible mass to treating microscopic metastases has saved tens of thousands of lives worldwide. •
Researchers and clinicians at the University of Arizona Cancer Center are responsible for countless scientific breakthroughs, while helping to improve the standard of care for cancer patients throughout the world. These advances, however, are just the first steps toward achieving the ultimate goal — to prevent and cure cancer.

The concept of personalized medicine, spearheaded by the UA Cancer Center’s founding faculty, is becoming a reality, thanks in large part to a collaborative, multispecialty approach that acts as the thread that runs through each research project.

“When we start a new project, we ask ourselves ‘How could this change the standard of care?’” said Steven Stratton, PhD. “The great thing about this place is how we have so many brilliant thinkers in so many different areas who are trying to push the envelope every single day.”

Many up-and-coming physician scientists are picking up where the founding faculty left off, combining the visionary approach that put the UA Cancer Center on the map with the exciting technological innovations that continue to break down barriers.

In the cancer biology program, Gregory Rogers, PhD, and his lab is exploring cancer at the molecular level. In imaging, Mark “Marty” Pagel, PhD, is redefining how we look at cancer and how it can be treated.

In therapeutics, Bernard Futscher, PhD, is among the forward-thinking drug developers responsible for more precise, targeted intervention, with George Watts, PhD, establishing himself as an expert in the field of genomics. As the director of the UA Cancer Center’s breast cancer program, Alison Stopeck, MD, is one of our many physician scientists responsible for turning promising lab results into successful patient care.

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Your Impact

With your support, the University of Arizona Cancer Center (UACC) can fund new research initiatives as they emerge and accelerate our ability to prevent, detect and treat cancer.

Giving to the UACC provides opportunities for discovery, promotes education and enables our scientists and physicians to expand hope. Help us achieve these essential goals by choosing to become a partner. Together, we can save and change lives.

For more information, please contact (800) 327-2873 or send an e-mail to development@uacc.arizona.edu.