

Storming the Frontiers of Health and Medicine

USC's Medical Enterprise Charges Forward

When C. L. Max Nikias delivered his first formal address as president, on August 25, 2010, the venue was USC's Health Sciences Campus, before hundreds of assembled faculty and staff. The setting was not incidental. USC's leadership had chosen that location in order to make a point indisputably clear: Health and medicine would take center stage in the life of the great universities of the 21st century, and USC would adjust its financial priorities accordingly. The purchase of two hospitals from Tenet Healthcare in 2009 represented something of a down payment on that investment, Nikias said in his address.

"Given USC's location and our international heritage and our academic strengths," Nikias told the audience, "this university can hope to embody the intersection of the Pacific century and the biological century. This is an unimaginable opportunity, in which we can help shape the very fabric of this age."

Repositioning the University to Serve a New Queen

What was the urgency attached to this shift in focus? Nikias had come to USC as a renowned expert in digital signal processing and a passionate champion of the Greco-Roman classical canon. Lesser known was his background at the intersection of biomedicine and technology. That expertise proved providential as the university's leaders began to consider how much it should invest in its medical and healthcare enterprise.

Academic headwinds were moving in a medically oriented direction, and at first glance this trend did not seem favorable to USC's ambitious goals of increasing its influence and impact. As Nikias explained to the academic community, the university had ridden in the forefront of various revolutions over the past 130 years—including those in aerospace, digital media, and wireless communications. But the next revolution was poised to happen at the frontiers





The plaza of USC's medical center proudly displays its new name. The W. M. Keck Foundation pledged a historic \$150 million naming gift in 2011 to accelerate innovations in medical, clinical, and translational research and education. This was the

foundation's second nine-figure gift to advance the health sciences at USC; the first was a \$110 million donation in 1999. In recognition, the university renamed its medical enterprise Keck Medicine of USC in perpetuity.



of biology and medicine. Just as top research institutions of the past half century were home to the best engineering schools, the leaders of the future would be those with the best medical centers. And in this area, USC needed to make up academic ground quickly or risk becoming marginalized.

While USC had a solid, respected healthcare enterprise, its faculty had few of the advantages of their peers at other leading institutions, in terms of conducting research, offering education, and delivering services. At some point, the university would have to make a decision: Would it be content to be



The Keck Foundation's \$150 million naming gift, along with enabling a host of academic and infrastructure improvements to USC's Health Sciences Campus, represented a major milestone in the university's quest to become the premier healthcare destination for patients across Southern California and around the Pacific Rim.



USC celebrates the Keck Foundation's gift in 2011. At the event are (from left): then-Provost Elizabeth Garrett; Edward P. Roski Jr., then chair of the Board of Trustees; Keck Foundation chair Robert A. Day; and President Nikias.

a minor player in healthcare and instead build on its other existing strengths, such as digital media, informatics, and the arts? Or would it make a risky gamble to increase its positioning in health and medicine—and commit to the corresponding investments?

In his 2010 address on the Health Sciences Campus, Nikias spoke in terms of the USC academic community recognizing a “new queen” in the royal court of higher education:

The queen of the sciences in the 20th century was physics—and, as a result, electronics. At USC, we believe electronics will continue to be important. But she will give up her crown to another queen in the 21st century.

The very laws of physics limit the growth of conventional electronics. But because of electronics, forces are gathering in such a way that this century is poised to be the age of medicine and biology. We can hope for breakthroughs in these areas—which will open up entire new sectors of the global economy. It is here that we will see the fastest-growing industries of this century. New technology can reshape medicine with applications in drug delivery and patient care. We can see new therapeutic products



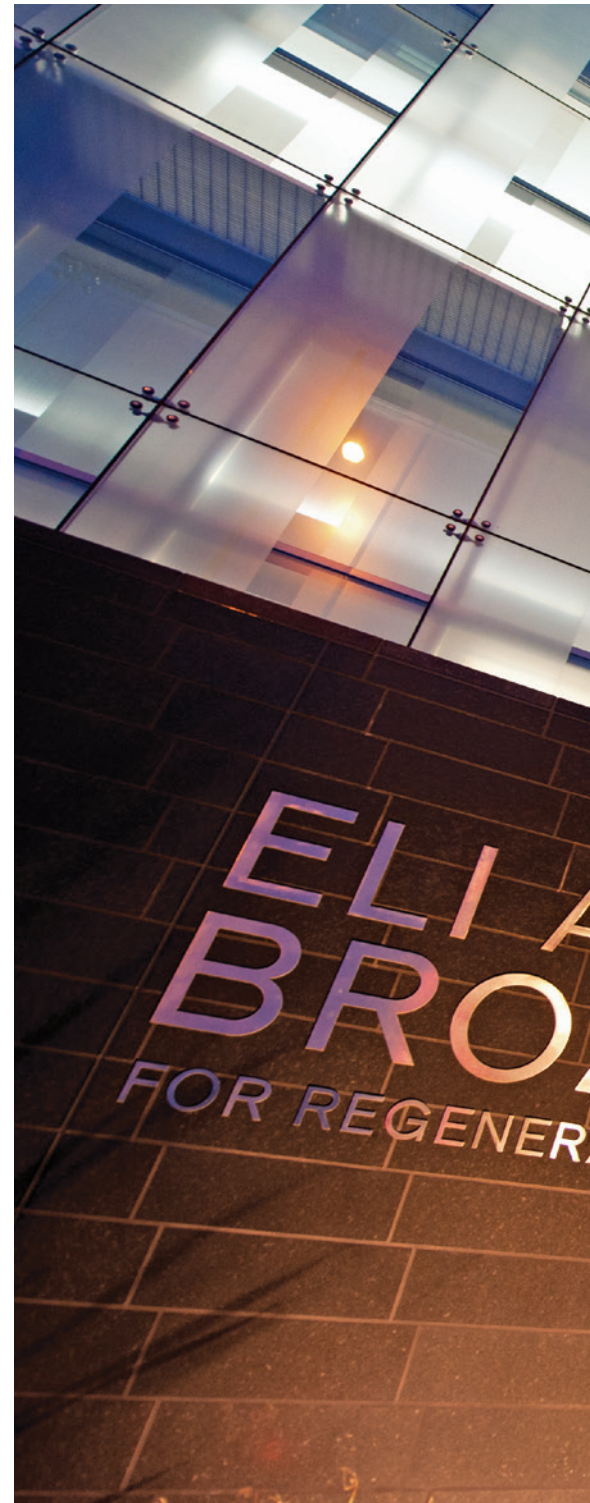
The recruitment of Andrew P. McMahon from Harvard University was a major boost for the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at USC. At a ceremony honoring his arrival are (from left): Keck School dean Carmen Puliafito; President Nikias; key benefactor Eli Broad; and Professor McMahon.

unlike anything to date. And we can see new ideas move from the bench to the bedside—faster and more intelligently than ever.

USC's leadership also pointed to other realities, including population trends, the passage of the Affordable Care Act (and the resulting shuffle and expansion of American citizens' medical coverage), and the limited latitude of budget-strapped public universities to meet emerging needs.

While many premier academic medical centers found it difficult to move in new directions, USC was able to pivot toward whatever emerging pathways were most promising. The recession of 2008 had put many universities in a position in which they had to borrow simply to meet payroll, while USC—by contrast a fiscally prudent institution—had stockpiled \$500 million in working capital.

That cash reserve allowed the university to take the first major step in its reinvention as a powerhouse in health and medicine, through the purchase of USC University Hospital and USC Norris Cancer Hospital in 2009. These acquisitions would pave the way for the institution to build a medical enterprise that could integrate research, education, and patient care on its own ambitious terms.



The Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research opened its doors in the fall of 2010. Partnering with the California Institute for Regenerative Medicine, USC has been able to, in the words of Professor Andrew McMahon, build “powerful, cross-institutional teams that have united research around the goals of regenerative medicine to treat a host of diseases affecting humanity.”



In an instant, the portion of the overall budget dedicated to medical endeavors had rocketed from 14 percent to 45 percent. “Overnight, USC had become a different kind of animal,” Nikias observed.

Next came a coordinated effort to incorporate the two vast healthcare organizations quickly and smoothly into the fiber of the larger university. Within less than a year, USC had successfully integrated all 19 faculty practice plans at the two hospitals, along with 520 clinical doctors. Nikias would later say that Senior Vice President Tom Jackiewicz, Keck School dean Carmen Puliafito, and then-Provost Elizabeth Garrett had brought “energy, wisdom, and persistence to this astonishing metamorphosis.”



In another major upgrade of its clinical efforts, USC broke ground in 2013 on the Norris Healthcare Consultation Center. From left: President Nikias; Harlyne J. Norris, a trustee of both USC and the Norris Foundation; Lisa Hansen, chair of the board of trustees for the Norris Foundation; and Tom Jackiewicz, senior vice president at USC.

Examining a Rapid March Forward

In October 2014, President Nikias reconvened the Health Sciences Campus community to revisit the goals the university had set out four years earlier and to take measure of recent progress and future challenges.

The university's medical ambitions required money. He reported that USC had by that point already raised \$3.7 billion of its historic \$6 billion goal in the *Fas Regna Trojae* campaign—and that a third of that funding was dedicated to medicine, the biological sciences, and health professions. Included in that amount were several major endorsements of USC's efforts:

- A \$150 million gift from the Keck Foundation in 2011 (in addition to its landmark \$110 million gift in 1999) to support and name the entire medical enterprise;
- A \$50 million gift from Trustee Ming Hsieh to spark innovation across medicine and engineering, including the dramatic emerging realm of nanotechnology;
- A \$50 million gift from the renowned spinal surgeon Gary K. Michelson to establish the USC Michelson Center for Convergent Bioscience, paving the way for breakthroughs at the crossroads of science and technology;
- And more than 1,200 donations from grateful patients who now considered themselves full and committed members of the Trojan Family.

To accomplish its goals, a leading medical enterprise would require an undisputed reputation for excellence along prominent frontiers. For USC, this meant bringing in outside partners in research and education, a strategy in line with



The Norris Healthcare Consultation Center was taking shape in the fall of 2015, with completion scheduled for the following year. The building was made possible by a lead gift from the Kenneth T. and Eileen L. Norris Foundation.

the larger, university-wide priority of establishing a critical mass of outstanding faculty who would draw attention and funding. In pursuit of this ambitious objective, Nikias later said, “We aimed for the stars—and we reached them.”

The recruitment efforts yielded a new generation of medical leadership, including 12 new faculty chairs in the Keck School of Medicine and six new directors of research centers and institutes. Since the acquisition of the two hospitals in 2009, USC has brought more than 70 major faculty recruits to the Keck School, including world-renowned talent from Caltech, the Cleveland Clinic, Johns Hopkins, Stanford, Cedars-Sinai Medical Center, University of Michigan, UCSF, UCLA, Vanderbilt, and Northwestern.

Outside observers marveled at how some of the world’s top researchers in health and medicine were streaming into USC from institutions that were more established in those fields. In key emerging disciplines like neuroscience, the university was becoming what Nikias called an “intellectual magnet.”

Among the recruits were several elite research groups, ranging from a dozen to more than a hundred strong. One triumph that drew considerable attention in the scientific and higher education communities came in 2013, when the brain-science researchers Arthur Toga and Paul Thompson moved their globally renowned Laboratory of Neuro Imaging from UCLA to USC—with a complement of 110 faculty, researchers, and graduate students.

The pattern was repeated the next year, when internationally famous pioneers in molecular biology Raymond Stevens and Peter Kuhn left the



prestigious Scripps Research Institute in the San Diego area and relocated to USC. They brought with them an acclaimed, 50-person research team. Like biomedical engineer Scott Fraser, who came from Caltech, and stem-cell expert Andrew P. McMahon, who moved from Harvard, these researchers were drawn to the USC approach, which was more entrepreneurial and flexible than those of most other institutions, and they believed it would enable them to make more rapid academic progress.

As with many of USC's high-profile hires, these teams were brought in to accelerate progress at the intersection of a number of key academic disciplines.



Between 2010 and 2015, the university rapidly and dramatically expanded its healthcare footprint across Southern California by opening new offices and establishing partnerships. The Beverly Hills location of Keck Medicine of USC opened its doors in 2011.



Carol Mauch Amir, senior vice president of the university, has been instrumental in coordinating the expansion and integration of USC's academic medical center.

The recruits represented new partnerships for the university's current faculty, bringing with them fresh perspectives and ideas—along with a whopping \$140 million in funding from the National Institutes of Health.

“These were shots heard around the country and around the world,” Nikias would tell the Health Sciences Campus community in his 2014 address. “These showed that we have reached the point where, finally, we can recruit anyone we want. Not just excellent talent, but rare, better-than-excellent talent, game-changing talent, and we will continue to do so.”

The university achieved many academic victories during these important transitional years. A host of USC schools, institutes, and centers for medicine, life sciences, engineering, pharmacy, and dentistry together made an extraordinary commitment to convergent bioscience. They paved the way for Gary Michelson's \$50 million gift in January 2014 to create the USC Michelson Center for Convergent Bioscience.

Children's Hospital Los Angeles, often mentioned as USC's “third campus,” strengthened its position as a top-five leader nationally and also bolstered its work in key areas including personalized medicine. The university and CHLA recruited a number of new stars, and established the Institute for the Developing Mind and the Translational Biomedical Imaging Laboratory.



President Nikias, Trustee Mark Stevens, and his wife, Mary, participate in an October 2015 ceremony honoring their \$50 million gift to name the USC Mark and Mary Stevens Neuroimaging and Informatics Institute. Seated on the left are institute heads Arthur Toga and Paul Thompson and Keck School dean Carmen Puliafito.

And in 2015, Toga and Thompson's institute received a major boost when benefactors Mark Stevens and his wife, Mary, donated \$50 million to endow it as the USC Mark and Mary Stevens Neuroimaging and Informatics Institute. The funding would advance the research collective's work in treating and preventing brain injury and disease, including Alzheimer's, schizophrenia, and related ailments.

A Distinct Leadership Role for a Private Academic Medical Enterprise

Characteristically, when Nikias delivered his 2014 special address, the mood wasn't one of complacent satisfaction with the university's progress in the health sciences. Rather, it was one of determination—to raise the bar (and the stakes) still higher. Could USC truly move past the entrenched old guard, and build an academic medical enterprise that would provide direction and inspiration to its elite peers? In his speech to the Trojan healthcare community, Nikias offered four reasons it could do just that.

First, he noted that USC's status as a fully private independent university with a long entrepreneurial streak gave it a particular nimbleness. It could quickly move in new directions along emerging frontiers in a way that its



The university community celebrates USC's acquisition of the Verdugo Hills Hospital in 2013. The healthcare facility provides faculty and clinicians with an important base from which to serve the San Gabriel Valley area.



bureaucracy-burdened competitors could only envy.

Second, he noted that medical innovation would necessarily be across multiple fields, and that USC is “uniquely broad and interdisciplinary” in ways that others aspire to but could not easily achieve.

Third, he returned to the idea that USC stood at a providential intersection of time and place. “This is indeed the century of the Pacific, and this is the century of the human health revolution,” Nikias said. “Our university stands at the nexus of both of these, here in the Los Angeles basin, this amazing, 14-million-people-strong microcosm of our new world.” Southern California, he said, was the “greatest living laboratory for the health challenges of the 21st century,” and the university needed to be in a position to make full use of that vast resource.



Nikias, noting that USC was one of only two large private American research universities west of Chicago, suggested to the Trojan community that it had an opportunity—even a “duty”—to shape the future of global health-care. “All of the other 25 private competitors of ours are east of Chicago,” he said, observing that this gave them latitude to lead. “After 135 years since our founding,” he told faculty, “finally our geographic location works to our advantage” in a world now tilting toward the Pacific.

And fourth, he argued that even though USC was proudly private and independent, it was in the school’s DNA to achieve a level of service that exceeded that of any private university, and more than perhaps any public research institution. This commitment included service to the local community; to the Los Angeles County+USC Medical Center; to its partner, Children’s Hospital Los Angeles; and increasingly, to citizens on a global scale, at a moment when the Trojan Family was now 350,000 strong across all continents.

Nikias went on to reaffirm a goal he had announced at the outset of his presidency: that the university should seek to establish the premier academic medical center for the Pacific Rim. While that overall objective may have seemed lofty and almost vague, he proposed a key benchmark along the way that was both tangible and formidable: The university should, he said, claim Southern California for itself and be satisfied with nothing less than being the single market leader in regional healthcare.

USC's reputation in the health sciences received a boost from the work of its star faculty. Clockwise from top left: Vaughn Starnes is chair of the department of cardiothoracic surgery and director of the USC Cardiovascular Thoracic Institute; Rohit Varma serves as chair of the department of ophthalmology and director of the USC Gayle and Edward Roski Eye Institute; and Inderbir S. Gill is associate dean for clinical innovation at the Keck School and founding executive director of the USC Institute of Urology.

Given the dominance of more established rivals in this arena, Nikias acknowledged the odds could seem insurmountable. But he pointed again to USC's recent progress in medicine—the swift expansion of its health-care footprint, the dramatic rise in revenue, and the recruiting of the world's best faculty in major medical specialties—as well as the restrictions facing the university's competitors, and suggested that it was time to press on for maximum advantage.

USC needed to grow the Keck medical enterprise in size and academic quality “by every means available,” he said. This would be achieved through recruiting more top-notch faculty in both basic sciences and clinical programs; new alliances and partnerships with research institutes, hospitals, and physician groups; strategic acquisitions; and expanding research collaborations between medical and biological sciences, engineering, and the health professions.

Nikias then announced a plan to double the size of USC's physician network to more than 1,200 clinical doctors and expand the university health system's footprint to triple its current size, “while ensuring that patient safety and experience always remain in the forefront, never to be compromised.”

He concluded that USC needed to seize a moment in which ongoing market consolidation in healthcare—and the expansion of coverage to 9 million more Californians—could allow the university to set a new standard.

USC's Clinical Care Enterprise Comes of Age

USC's progress in research and education had be married to the best work in clinical care, in order to establish true leadership in medicine and achieve the goals that had been set out by the president. The university needed to make fast progress along that front, and by 2015 several statistics showed that those advances were quickly being made:

- USC's hospital earnings had grown from being in the red to \$50 million.
- Most of the clinical service lines at the Keck Medical Center (including urology, cancer, cardiovascular, neurosciences, and spine, among others) were two years ahead of their targets.
- Inpatient discharges had grown by more than 30 percent, even as state-wide discharges had contracted by 7 percent.



W. M. Keck Foundation chair Robert A. Day and President Nikias celebrate the announcement of the Keck Foundation's landmark naming gift to USC's medical enterprise.

- Keck Medicine's total revenue had increased by 150 percent, to \$1.2 billion by the fall of 2014. (Prior to the purchase of the two hospitals, it had never exceeded \$390 million.)

USC was also making dramatic gains in patient safety grades and acuity rates, a measurement that represents the difficulty of cases handled. The university's clinical faculty showed the highest acuity rate west of the Mississippi, a telling indicator of its ability to treat the most high-risk patients.

During these years, USC established new partners in clinical care, strategically expanding its healthcare footprint across Southern California. It acquired and integrated the Verdugo Hills Hospital in the La Cañada/Glendale area, as well as a premier oncology and hematology group in Orange County. USC and Keck also created a presence across Beverly Hills, downtown Los Angeles, the South Bay, and Pasadena, and expanded services on the University Park Campus.

The burgeoning of excellence was mirrored in physical improvements and beautification under way throughout the Health Sciences Campus. A 120,000-square-foot building on Soto Street opened in 2011, offering crucial additional space to house the Keck School of Medicine's department of preventive medicine—as well as laboratories, classrooms, administrative offices, and a café and fitness center for students and faculty. USC also began construction on a top-flight 200-room hotel; and the entire campus received a makeover to match the beloved architectural signature of the core of the University Park Campus.

Making Southern California a Global Biotechnology Hub

In his 2014 address, Nikias announced that USC would be “relentless in working with the county and the city to establish a biotech park on the Health Sciences Campus where the county yards are currently located.”

USC's efforts in healthcare extend beyond its campuses and satellite locations, drawing together a range of partners in academia, industry, and government to help establish Los Angeles as a leading hub of the biomedical revolution.

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A constellation of faculty stars is bringing attention to USC's medical enterprise. Clockwise from top left: Jay Lieberman, chair of the Department of Orthopaedic Surgery; Larissa Rodríguez, professor of urology and director of USC Female Pelvic Medicine and Reconstructive Surgery; and John Niparko, chair of the Caruso Department of Otolaryngology-Head and Neck Surgery.

By late February 2015, the president and USC had already managed to convene a regional summit to begin the endeavor of creating a local biotechnology ecosystem that would generate new businesses and jobs, attract venture capital, and spark tangible forms of innovation in health and medicine. Los Angeles City Council members and officials, along with representatives of other academic and medical institutions, gathered to discuss how best to expedite the building of a park that could accomplish such goals and turn the region into a true global hub of the still-nascent health revolution.

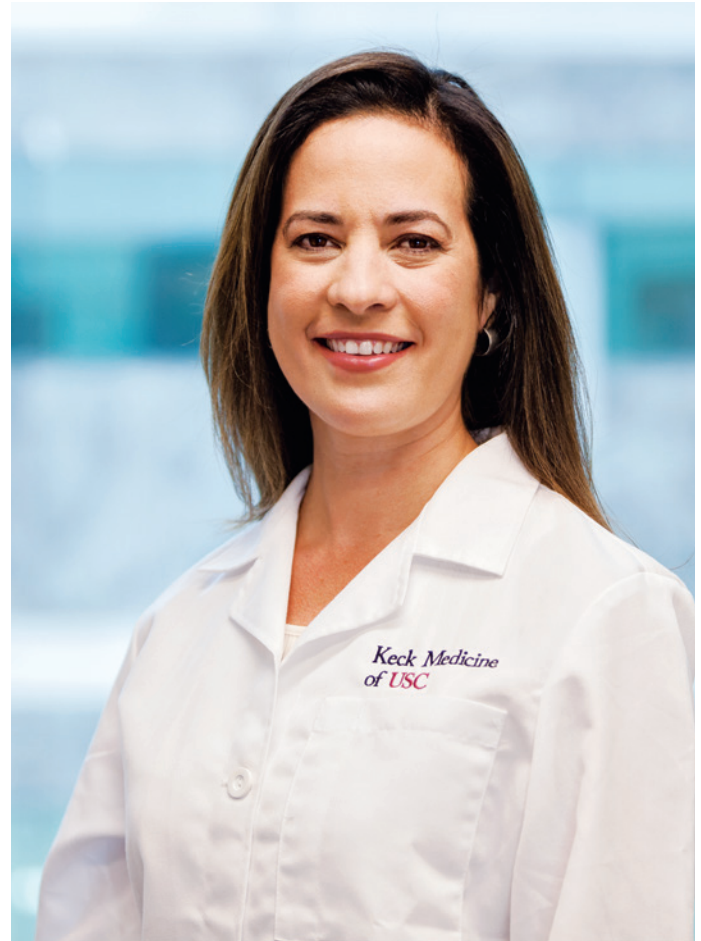
In a *Los Angeles Times* op-ed in February 2015, Nikias argued that Southern California could play a primary rather than secondary role in this important field:

California is home to two major biotechnology hubs—San Francisco and San Diego—but Los Angeles has been left behind. The paradox is that universities in Los Angeles County produce more than 5,000 graduates in biotechnology-related fields each year, compared with 2,800 in San Francisco-Oakland-Fremont. However, it's San Francisco that attracted \$1.15 billion in biotechnology investment in 2013, compared with a paltry \$45 million here. No wonder, then, that so many of our graduates head north.

To reverse this trend, Los Angeles requires an ecosystem that fosters business, venture capital investment, and access to academic medical centers for research and clinical trials. My university, USC, hopes to spark this change by building a Biotechnology Park adjacent to our Health Sciences Campus in Boyle Heights.

With the cooperation of Caltech, community colleges, the L.A. Unified School District, and other institutions, this will represent the first step in a plan for a robust biotechnology corridor in the surrounding area. The corridor will provide space for established companies, training for entry-level jobs, and incubators for start-up firms.

Pharmaceutical, biotechnology, and biomedical companies have already expressed interest. Such companies rely on university partners for research and development, and our Biotechnology Park would give them the infrastructure to flourish.



All of the ingredients for Los Angeles to capture growth in this booming field are already here. With the right alignment between government, academia, and industry, we can harness the region's existing strengths—including our science graduates—to create lasting economic growth.

On the March

Nikias, known as a Greek classicist, harked back in his 2014 address to an ancient tale of beating the odds to reaffirm USC's ambitious healthcare goals. The story involved how the troops of a Greek general, Epaminondas, had managed to turn long-standing history on its head by boldly taking on a challenge that others shrank from. Said Nikias:

There is a story from antiquity that seems relevant to where we are today, and where we aspire to go next. Go back some 2,400 years to when the men and women of Thebes were in conflict with Sparta. In 371 BC, the Spartan army invaded Boeotia, and they were close to taking over Thebes. The entire Greek world of antiquity had feared Sparta. No one dared take them head-on. But a Theban general by the name of Epaminondas and his army faced down the Spartans at Leuctra, even though they were outnumbered two to one.



The Thebans crushed the Spartan army. Suddenly the Spartan aura of invincibility evaporated. Suddenly their expanding empire was vulnerable. But it wasn't enough for the Thebans to simply protect their own turf. Eighteen months later, General Epaminondas surprised the ancient Greek world again by rejecting conventional military tactics. For 400 years, no army had ever dared to cross the Isthmus of Corinth and march south toward Sparta.

So, against all expectations, Epaminondas and his troops marched south during wintertime. In that era, conventional wisdom held that you simply don't attempt that kind of attack during the winter. But the Thebans were determined. They marched 200 miles, through the bitter cold and rain. They crossed the isthmus, then moved confidently into the den of the Spartan lion, in Laconia. As a result, the Thebans not only pushed over the



The Soto Building on USC's Health Sciences Campus opened in 2011. The three-story, mixed-use building houses administrative and academic units, classrooms, a café, and a 10,000-square-foot fitness center.



Construction on the Malcolm and Barbara Currie Residence Hall began in 2014, with a target completion date of 2016. Currie Hall represents a milestone in the establishment of a residential learning community on USC's Health Sciences Campus.

invincible Spartans; they humiliated them. They shook Spartan dominance to its core. The Thebans reshaped the 400-year political map of Greece in just two years.

Nikias suggested that in the healthcare arena, USC need not fear any invincible, older rivals as long as its academic community remained bold enough to march into the heart of the challenge. After all, its recent victories were a foretaste of the “sort of reshaping of the medical sciences and healthcare map of Southern California that you have been doing in just the past four years. The aura of invincibility of other medical centers in the region evaporated because of you.” With that, he asked the faculty to “pledge together today to keep reshaping it in the future.”

Reaction to the president's charge was enthusiastic and emphatic, both in the academic and broader communities. A *Los Angeles Magazine* feature on Nikias acknowledged how “USC has strengthened its ‘brand’ in healthcare.” And new and existing faculty moved forward with creative health-related endeavors spanning the university's various campuses and research centers.

By the fall of 2015, USC had made rapid gains across Southern California, spanning from Orange County to northern Los Angeles. Epaminondas's troops were on the march.