State of the School Address  
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September 24, 2019

Thank you very much, Paul. Let’s thank again Keith and Jennifer for their outstanding work the last two years, and Elizabeth and Ted for assuming these positions of leadership and service in the Good Neighbors Campaign program for the next year. Leadership and service are synonymous: We serve by leading, and we lead by serving. It is our fundamental mission to serve all our constituents: students, faculty and staff, and society at-large. In fact, service is the highest form in Maslow’s hierarchy for organizations. And this is what we do with the Good Neighbors Campaign. Once again, our goal is to lead the university in funds raised for GNC, thereby serving our community, as we have done for several years in a row now!

USC Engineering was founded in 1905. So, this Fall, we are celebrating 114 years of the school’s history. 114 may not sound like a historical milestone- but the mathematician in me disagrees:

You see, if we divide 114 by the number of our TT faculty (which is about 200), we get 0.57. As everyone knows, 0.57 is Euler’s gamma constant! A fantastic coincidence? Not if you knew that earlier this summer I proposed to our Alumni team to use Euler’s constant’s first two digits (5/7, namely May 7), instead of pi’s two digits (3/14, namely March 14) as the day for worldwide Viterbi giving. So, I think that all makes perfect sense! Hence, this Fall is an important milestone! You see, with mathematics you can explain- and celebrate- anything… But, as you will see throughout my speech, this year is indeed a special year, replete with real historic milestones.

During the past 114 years of the School of Engineering existence, tens of thousands received their engineering degrees from USC. Today, we count more than 77,000 living engineering alumni. They have built the world of the last century and that of the beginning of the 21st. But the academic year 2019-2020 marks another, different and historic milestone. Because Fall 2019 marks the year when the entering engineering undergraduate class reached, for the first time in our history, gender parity!

On August 22, 2019, we announced at the new student convocation, that the entering freshman class was exactly of 50% women (206 out of 412)! This is a historic record, one that will not be broken again. One due to the collective work of all of you. And one that distinguishes us among many engineering schools. It is a record worth treasuring, worth cherishing, worth celebrating. It reverberates loudly the message that we are constantly changing the conversation about engineering (who we are, what we do and what we look like).

This stellar class has many other strong distinctions as well: 171 students, or nearly 42%, are University Scholars, 62 are National Merit Scholars, 19% are from underrepresented minorities, 17% are first-generation students: they come from 30 different countries and from 39 different states. It is a class that will engineer a better world for all humanity.
But amidst this exhilaration comes a heavy responsibility: we must live to the trust that these talented students have extended to us. And to help them thrive in an inspiring and uplifting environment of positive change. And this theme of trust I will weave in today’s State of the School.

Today’s world of exponential changes, exerts significant strains on what we collectively call organizational “culture”. These demand constant agility, growth and adaptation. The schematic in your postcard, one that you have seen before (and also attached at the end), shows two schematics, the fast changing world (one that I denote as one of a “mindsets of growth”), and one that adapts slowly (the straight line- one that I denote as one of a “fixed mindset”). The two curves apply to individuals- but also to organizations. The distance between these two mindsets also increases exponentially fast. Thus, for us as an organization to remain agile and nimble, to adapt and lead, requires us to “hug the exponential” collectively. It is only then that we can remain true to our students, our faculty, our staff, our constituents, namely all those we serve, and to the promises we have made.

But such agility to change collectively, to constantly transform and innovate can only be accomplished if there is a strong organizational culture of trust. Why? Because lack of trust creates friction, which can slow us down, disable adapting, make us indecisive and suspicious, prevent us from growing: in the words of Stephen Covey, in his book “The Speed of Trust”, “we pay a tax when trust is absent”. Trust is an essential and required ingredient to move fast in our fast changing times.

How do we define trust? Covey cites four Cores of Credibility:

1. Integrity (humility, courage)
2. Intent (motive, agenda, behavior)

These two reflect “character”. And

3. Capabilities (talent, attitude, skills, knowledge)
4. Results (performance- past, current, anticipated)

These two reflect “competence”. On your table (and at the end of this), you will find a handout with the four cores: Character and competence- heart and brain- ethics and smarts. For our organization to move and react with agility and wisdom, to serve and to lead, these four cores must characterize us all and all our interactions. But I will also argue that these ingredients are not only fully compatible with, but they already exist in, our vision and values in the Viterbi School, and in our aspiration for a Viterbi engineer. They must also characterize our collective response to our constituents, who gave us their trust and they expect us to reciprocate.

Now, I must hurry and state that I am not advocating blind trust (or, of course, its opposite, distrust). Rather, I am advocating smart trust, namely “to trust wisely” and to look for strong evidence of character and competence. These themes will resonate through my talk today.
This year, we are celebrating another milestone (this time on a decimal scale). It is the 10th anniversary of the NAE Grand Challenges Scholars Program, conceived and pioneered in 2009 by the Pratt School of Duke University, Olin College and USC Viterbi. This program, now adopted by more than 120 schools globally and growing fast, has become an NAE (National Academy of Engineering) signature program. In the last few years, about 50 or so Viterbi seniors have graduated each year with such a distinction (which also comes with an NAE certificate). The GCSP is essentially summarized in the five mindsets shown on your post-card, from interdisciplinary research and innovation to cultural understanding and to service learning.

I summarize these attributes (mindsets of growth) in the postcard in your table:

1. **Hug the exponential**: Acquiring superb technical skills to lead the exponentially changing technology. Our graduates must be the masters of the technological evolution and have the skills and knowledge to shape it and lead it.

2. **Engineering +**: The empowering and convergent nature of engineering for all segments of our population (and one that eliminates various emergent divides) ask us to enlarge our view of engineering. Engineering, at the center of advances in many disciplines (read Engineering + X, with X being increasingly human-centric), spells out what we do; and by extension who we are, and what we look like.

3. **Innovation in its broadest sense**: To help create new ideas, new markets, new jobs, new best practices, and to re-design oneself. All of which are crucial ingredients to thrive in a constantly changing world.

4. **A cultural mind**: Strong cultural awareness, with culture broadly interpreted (spanning from local to global, past to present and present to future), in today’s world where society, humanity and technology are as interwoven as never before.

5. **Heroic engineering**: To reflect the beneficial impact of engineering to society (including the importance of technology ethics, where one needs not only worry about what is smart and legal, but also by what is right).

These mindsets encompass the *brain*, and they encompass the *heart*; they encompass *competence* and *character*; in short, they are fundamentally attributes of trust, that must characterize the 21st century engineer. One who must be: Exceptionally skilled technically, immersed in convergence and multidisciplinarity, capable and confident for constant innovation and re-invention, having a deep understanding of human cultures and their behavioral drivers, and steeped with the ethical attributes in decision-making and the societal impact of engineering. These are people one can trust. And this is a fundamental part of our effort to change the conversation about engineering. I believe that it is this overarching, appealing and compelling message that attracts talented students to engineering and to USC Viterbi, from all segments of our population, thus leading to the new heights we are witnessing.

In 2004 the National Academy of Engineering published its report *the Engineer of 2020*. It painted a picture of an engineer who is technically excellent, but also multidisciplinary, innovative and societally involved. As we approach 2020, I believe that the GCSP is the true embodiment of that report. Therefore,
it is our aspiration to make GCSP the blueprint for the education of all our engineering students, not only those who are part of the GCSP. Actually, we have an even higher aspiration, to extend the program across the entire university (in fact, there is a current effort underway in the area of sustainability and the new USC Center for Sustainability Solutions). More deeply, to also inspire competence and character across our entire Viterbi organization, so that we can always hug the exponential, as an organization, frictionlessly, seamlessly.

The GCSP is informed by the fact that fast evolving, convergent technology allows us to set, now achievable, Goals for All Humanity. To set and achieve such goals is an intrinsic societal trust that society at-large expects from all of us in engineering schools. It is a moral imperative. It makes us the indispensable discipline to Engineer a Better World for All Humanity (through the solution of Grand Challenge-like problems). What are these problems? They could be the 14 National Academy of Engineering Grand Challenges; or the 18 United Nations Sustainable Development Goals (SDG); or other Grand Challenges, present or likely to emerge in the future; for example, grand challenges in sustainability or in our own community in Los Angeles, or in Southern California, as President Folt is aspiring for USC; and many others.

Last week, the Royal Academy of Engineering hosted the 4th bi-annual Global Summit on Grand Challenges for Engineering. This Summit involves the three national engineering academies from the UK, the US and China, the RAE, NAE and CAE. Many of you may be unaware, but the roots of this (and the previous Summits) were planted back in 2009 at Durham, and then in 2010 right here on the USC Campus, at Bovard Auditorium, when we hosted a nationwide summit on the NAE Grand Challenges for Engineering. Since then, USC Viterbi has been a key driving force, a key organizer and a key convener of these global summits.

This year’s Summit’s theme was Engineering in an Unpredictable World, with specific subthemes: (1) the role of AI, and (2) how to feed 10 billion people. None of these two were explicitly stated in the NAE 14 Grand Challenges. But they fall in the more general four buckets of Maslow’s hierarchy (Sustainability, Security, Health and Life Enrichment), while they also resonate with the UN Sustainable Development Goals, which find more significant resonance overseas. The London event was attended by more than 300 UG engineering students, from many countries, and by about an equal number of other attendees (including many from Africa). It was immensely humbling and gratifying for those Viterbi participants, to see a movement, in which, and from its onset, USC Viterbi played a pivotal role, thrive and flourish at the most global of scales.

An important part of each Summit is the engineering student plan competition. This year 15 teams worldwide (5 each from the US, the UK and China) competed. They were selected by prior qualifying national competitions. More than 30 such teams participated in the US playoffs. I am pleased to report that one of the 5 teams representing the US was a USC Viterbi team (Marlink). This team of rising seniors, working on underwater robots, and led by EE major Roxanna Pakkar, was an all-female team, and the only such in the Global Summit. It marked another historic and global first for Global Summits, contributing to the changing of the conversation about engineering and loudly declaring that we are staying true to our promise.
Last year, the Astani Department of Civil and Environmental Engineering offered a new course, *CEE 499: Innovation in Engineering Design for Global Challenges*. This course aims to teach engineering students how to design products, services and technologies by using a human-centered approach that helps solve the needs of real people in the middle of serious human crises. Its motto: *Lives not Grades*. The course, led by CEE Professor Burcin Becerik-Gerber, along with a talented team of faculty and staff, focused on the plight of war refugees in the Greek island of Lesvos. (The choice of Greece was Burcin’s very own—honestly, I had no input in that decision!) It was supported by the Provost office, and by a number of Viterbi alumni and supporters. The course had one of the most diverse enrollments for an engineering course, with students from as many as 13 disciplines and six USC schools. It also formed the theme of the Min Family Challenge last year.

This course was the perfect embodiment of the five mindsets of growth: Technical competence, Engineering+, Innovation (with a social responsibility angle), Cultural Awareness, Heroic Engineering: Five mindsets in competence and character, five mindsets exuding trust. It was transformative to the students, faculty, and the people in distress involved. It demonstrated the power of engineering and technology in solving real human problems. It uplifted the recipients of our outreach, the inhabitants of the camps, and the local residents of the island. Moreover, the course helped restore trust to the mission of universities, trust to its engineering students, and charted a new transformative path for engineering in solving real people’s problems. Kudos to Burcin and her team who helped pull this historic course together!

In 1966, USC Viterbi alumnus Andrew Viterbi had an ingenuous idea for data transmission, the Viterbi Algorithm. We celebrated its 50th anniversary three years ago. Of course, Andy Viterbi graduated from USC 57 years ago, which as we all know by now is 100 times Euler’s gamma constant! The Viterbi algorithm is the fundamental cornerstone for digital communications. It has made possible unparalleled technological achievements, such as space exploration, to which topic we will return later. But it is also much, much more than that. I do not know if it has been noted before (although the *Flat World* of Tom Friedman comes to mind) but in my view, arguably the most important impact of the Viterbi algorithm is that it eliminated distances: distances in space, and distances in time, thus distances in cultures, distances in inclusiveness, and distances in opportunity. Andy Viterbi made the world one big human neighborhood.

It is natural then, that the Viterbi School (the home of the Viterbi algorithm that has brought people closer together) has an unparalleled global reach. It is also not an accident that we fiercely embody such values in this school, where distances are eliminated: distances in hearts and in minds. A clear evidence of this commitment, this Fall, and despite global tensions, tariff wars and other uncertainties, the entering graduate class is as strong and as international, as any in recent memory. Thanks to that strength our enrollments are equally strong. And it is comprised of a graduate student body leading the nation in the number of women engineering graduate students, another point of pride for all of us.

As part of such commitment to Equity, Diversity and Inclusion, we led in 2015 a national initiative to increase the diversity of engineering schools: spawned in June 2015 and completed in 2017 this has now become an ASEE (American Society for Engineering Education) initiative, accepted by more than 230 engineering schools, nationwide. The initiative commits engineering schools to four tasks: Creating a comprehensive diversity plan; outreach to K-12; outreach to Community Colleges and 4-year degree institutions; and increasing faculty diversity. The Viterbi School, having established in 2016 the office of
Vice Dean for Diversity and Strategic Initiatives, has been a national leader in the pursuit of these goals. And earlier this year, Viterbi was singled out among a handful of other engineering schools as an exemplary school for its pursuit of Equity, Diversity and Inclusion. We consider this another milestone for Viterbi this year.

As extraordinary forces continue reshaping the environment of engineering education and research, we rely on the following four fundamental pillars.

1. Be a Global Attractor of Talent (Students, Faculty, and Staff) from anywhere in the world and Provide the Culture and a Diverse and Inclusive Environment for them to Flourish.

2. Continuously Add Value to Curriculum, Programs, and Infrastructure, in our Fast-Changing World.

3. Provide Global Thought Leadership to Solve Global Challenges: from Energy and Sustainability to Security and Infrastructure, to Health and Medicine, to Life Enrichment and to the Scientific and Technological Discovery.

4. Use Engineering and Technology as the Catalyst for Innovation, Best Practices and Active Outreach, including through STEM K-12, to Fuel the Economic Growth of Los Angeles, Southern California, the United States, and the World.

Now, these pillars are not only applicable to the school overall, but also to each of our individual departments or units. They demand excellence in People, creativity in new Programs, leading through new ideas and the generation of new knowledge, and impacting our community, region and spheres of influence meaningfully and in innovative ways.

A resounding reminder of the strength of our first pillar was the announcement earlier this year that two of our distinguished faculty, Mahta Moghaddam of ECE and Behrok Koshnevis of ISE, were elected to the National Academy of Engineering. While two others in our faculty, Ellis Meng of BmE and Mike Waterman, with a joint appointment in CS, were elected to the National Academy of Inventors. These crowning achievements are a testament to our faculty quality and ingenuity. These elections continue a long trend: Since 2008, 12 of USC faculty were elected to the NAE and 14 Viterbi faculty to the NAI. I look forward to Mahta’s and Behrok’s NAE induction next week in Washington, DC. The quality of our faculty ranks has been further strengthened with the arrival at USC of many new faculty, including two other NAE members: Ret. Gen. Ellen Pawlikowski, PhD in ChE, who is joining USC as Judge Widney Professor, and new Provost Chip Zukoski, also a ChE PhD. I must say that we have the right chemistry! We also welcome yet another distinguished new Viterbi faculty member, USC new President Carol Folt, with a joint appointment in CEE (thus indirectly reporting to Lucio Soibelman!). Did you know that the past four USC Presidents had or have faculty appointments in Viterbi?

I should also single out some other important faculty distinctions, all since April 2019: Lucio Soibelman was elected in the National Academy of Construction, Jong-Shi Pang won the 2019 von Neuman Prize, Paul Rosenbloom won the Herbert A. Simon Prize for Advances in Cognitive Systems, Costas Synolakis was the recipient of the 2019 International Coastal Engineering Award, Salman Avestimehr won the IEEE Information Theory Society James L. Massey Research & Teaching Award, Azad Madni won the
INCOSE Founder’s Award, as well as the ASEE/AIAA John Leland Atwood Award, and Eun Ji Chung and Paul Bogdan were invited participants to the NAE Frontiers of Engineering Symposium (FOE), considered as a “junior NAE”.

Our exponentially changing times demand that we keep innovating, every day, to strengthen our educational programs; one such effort is integrating data sciences across the engineering curriculum. Many now view engineering and technology as indispensable as a liberal arts education. USC Viterbi is responding by offerings a new array of MS degrees in Informatics, by supplementing the degree of any Dornsife student with a strong technology and engineering segment, in the area of data sciences, as well as with the many programs in our Information Technology Program (ITP), now led by Jeff Miller. Engineering and technology’s convergent and ubiquitous nature has led to its becoming quintessential to the education of practically every student and professional, regardless of background or major.

As you know, in the pursuit of our mission, we use a definition for Engineering and Technology that transcends traditional stereotypes:

*Technology is leveraging phenomena (and systems, devices and tools, and combinations thereof) for useful purposes (including discovering of new phenomena)*

I cannot but remark that implicit in the definition above are again the two themes of trust: competence (through leveraging of phenomena) and character (through useful purposes).

Historically, and in increasing order of complexity, the phenomena of interest to engineers included physical, chemical, and geological, phenomena. In recent years, the increasing power of technology has allowed us to engage with higher complexity, associated with biological phenomena, and more recently, through the unprecedented advances in computational power and data sciences, with fast emerging couplings with social and behavioral phenomena as well. I believe that this new expansion to behavioral and social phenomena is a natural extension of the enabling power of engineering and technology. And just as we get our students versed in the natural sciences, we might consider expanding those offerings to social sciences as well.

It is in this spirit that we envision, and already have developed in some areas, multiple strong partnerships between USC Viterbi and other USC schools. As well as within the various disciplines of engineering within the Viterbi School. Such initiatives include the possible creation of virtual academic entities, for example between Viterbi and Keck, in Biomedical Engineering, between Viterbi and Price in Civil and Environmental Engineering (including the recent Center on Sustainability), or Viterbi and Gould, in the CS areas of government and law, privacy and security. Earlier this year we established a successful such program in the nation-leading Games program by creating a virtual department between Viterbi and the School of Cinematic Arts.

Of course, we also need to continue advancing our own individual fields. Artificial Intelligence, encompassing machine learning and robotics, is one such powerful area. Data science, encompassing not only data analytics but also addressing privacy and security, is yet another. The seeming end of Moore's law offers tremendous opportunities for new impactful tools to sustain the exponential growth of computing via, for example, quantum computing. Advanced engineering technologies, such as smart sensing, robotics, resilient infrastructure design and emergency response systems, new materials, among
others, are key to addressing many of the challenges in building safe and inclusive communities. While advances in health can be supported with technologies in precision medicine; human-machine interaction for personalized care; and so many other tools. The list is endless, and it is exhilarating.

I will also make a parenthesis to stress two most important and unique differentiator for USC Viterbi, absent from many other universities: The Information Sciences Institute (ISI) and the Institute for Creative Technologies (ICT). Combined with the Department of Computer Science, they create a triad of excellence in computer science (CS@SC), unparalleled in the nation. More importantly, they contribute to national needs, including defense, while their versatility in research projects from basic to applied to systems, allows for a wide spectrum of partnerships with many departments and schools. These two centers are essential and indispensable components of USC Viterbi.

The very definition of Technology leveraging phenomena for useful purposes encompasses unintended consequences, which are increasingly powerful. This urgently calls for Technology Ethics- the development of character. Which brings up again the issues of trust to engineering and technology. Ethical decision-making lies at the intersection of smart, legal and ethical. But this is also the intersection of competence and character, the two cores of trust. Today, the extraordinary growth of technology brings up unprecedented new problems with deep ethical concerns. It has become imperative, therefore, for us to embark in significant efforts to help our students understand their responsibility in the development and stewardship of their increasingly potent technologies. This calls for the creation of new dimensions in our curricula and along with it the re-invention, rebranding and refocusing of the Engineering Writing Program.

Achieving technology goals is ultimately based on innovation and entrepreneurship and the dissemination and adaptation of best practices. Cultivating a thriving environment for innovation and entrepreneurship, with its underlying mindsets of the freedom for experimentation, the launching of bold new initiatives, and of grit and perseverance, continues being an important and fundamental tenet of the Viterbi School. Vice Dean Ellis Meng, appointed to succeed Dr. Andrea Belz, who is now on assignment at the NSF, will continue expanding all aspects of the Viterbi startup and technology ecosystem, including the establishment of incubation processes and facilities (such as the Viterbi Startup Garage). We continue to aspire to be the leading educational institution in Silicon Beach in shaping technology innovation and entrepreneurship.

At the London Summit two weeks ago, Sir Mark Walport, director of the UK Research and Innovation, and one of the keynote speakers, said: “The Industrial Revolution was powered by the steam engine. Today’s technological revolution will be powered by the STEAM engine”. Increasingly, this imperative dictates the substantial outreach to K-12 schools. This effort, underway at USC for several decades, is now further supported by additional resources in the Center for Engineering Diversity and the newly created K-12 STEM Center. Merging the up to now two separate offices on K-12 outreach into one, the K-12 STEM Center, under Vice Dean Maja Mataric, will help us focus and intensify our efforts in this important area. It is only through such engagement that we can help create an equitable and powerful engineering force to empower this nation and the world. This engagement becomes another fundamental component of the trust society has bestowed upon us.
Like any other engineering school, implementing our vision is not possible without excellence in human resources, infrastructure, fundraising, and communications outreach. We look forward to our staff, in partnership with our faculty, to guide, enable and nurture the daily implementation of our strategy. Their excellence and commitment are inseparable from our success. This summer we were able to make important and seamless transitions in two key administrative offices: 1. Recruiting Chris James, as our new CFO. 2. Integrating Undergraduate and Graduate Student Admissions and Engagement in VASE, under Sr. Associate Dean Kelly Goulis.

Technology is rapidly becoming an essential enabler of many administrative functions. To this effect, we created the Office of Chief Technology Officer to supervise all technological aspects of the Viterbi School, including DEN, our home-grown instructional technology, now nearing a half-century of existence. In-house technological expertise is invaluable for continuing improvements in services and the creation of a variety of agile new programs. The latter include improvements on our own i-Podia program, a platform for intra-university collaborations across many institutions worldwide, and due for its 2.0 version. As well as to continuing education, a necessity for professionals in today’s rapidly changing skill set needs.

I started my speech by stressing historical milestones and the importance of trust. Perhaps none of these is better manifested than in philanthropy. As many of you probably know, at the end of June 2019, USC Viterbi successfully reached its $500M campaign target, likely the largest ever for an engineering school, and another historic milestone this year. The advancement team, led by Sr. Associate Dean Mary Ann Schwartz, raised an annual average of about $55.5M, just south of $57M (which as you all know by now is 100 times the Euler’s gamma constant!) I am proud of the effort and focus that helped us reach this very ambitious goal, particularly because USC Viterbi had successfully completed a prior fundraising initiative between 2001-2008. The recipients of such extraordinary philanthropy, faculty and students, current and in the future, with 19 new chairs and 59 new scholarships established, stand to benefit greatly from the fruits of this campaign. External fundraising is essential to acquiring the means for success, in today’s rapidly changing landscape of higher education, and the societal expectation on the affordability of higher education. But philanthropy is entirely contingent on the trust bestowed upon the institution. To help advance our vision, our focus must continue, relentlessly, to be on fundraising for a number of priorities, from scholarships to chairs to new facilities to new initiatives.

In his “We choose to go to the Moon" speech at Rice University Stadium, in 1962, President Kennedy announced the goal to land a human on the moon by the end of the 1960s. (Of course this was 57 years ago, which any astute observer will tell you is 100 times the Euler’s constant!). 50 years ago in July 1969, Neil Armstrong and Buzz Aldrin were the first men to land on the moon. I was on the Greek island of Rhodes (my hometown) the day of the Apollo moon landing. (Of course, Apollo is a Greek word- the god sun- you wouldn’t expect otherwise. And Rhodes is known as the island of the god sun! All was pre-ordained…) It was late in the evening and we were glued to the radio transistors – not much TV in the Greek islands those days (but plenty of imagination!). We had all turned our eyes to the bright moon trying to imagine what would be like having a human land there.

The Greek word for human is άνθρωπος. It means “to look high up.” The moon landing was a literal manifestation of that definition. Human ingenuity always “looks higher up”- engineering and technology are the means to accomplishing it. The Apollo spectacular success opened a truly new dimension and demonstrated to the world the remarkable power of technological innovation, developed in the United
States, by many for the benefit of all worldwide. The human quest to transcend our planetary boundaries made us also realize how precious life is on earth, and the special responsibility we have as engineers to use technology to make a better world and to sustain this planet in peace- to *engineer for good.*

On July 20, 1969, Neil Armstrong became the first person to walk on the moon during the Apollo 11 mission. After he returned to earth, he realized that he was missing something: a master’s degree from USC Viterbi! This, he earned indeed a year later from our Aerospace Engineering Department. We celebrate Neil Armstrong and his relation to the school, through his statue at the Epstein Family Engineering Plaza.

50 years later, a group of USC engineering students continued the late Armstrong’s legacy. In April 2019, the USC Rocket Propulsion Lab became the *first undergraduate student team in history* to design, build and successfully launch a rocket *past the Karman line* – the recognized boundary between Earth’s atmosphere and space. Their rocket, Traveler IV, reached a height of 339,800 feet, more than doubling the previous record set just two years earlier by another USC RPL team. Our students’ success was the culmination of many years of hard work. It personified their grit, ingenuity, perseverance and teamwork, all important attributes to thrive in today’s world. This is another historic milestone for the school this year.

This good story has another happy ending. Motivated by the success of our student teams, Jim Baum, former parent, and long-time chair of our Board of Councilors, realized that we needed space (physical space that is) to help better support experimental teams, such as RPL, the Race Car, the Concrete Canoe, and many of our other extracurricular student groups. Jim proceeded with donating the funds needed to create a Maker Space (the Baum Family Maker Space), a 10,000 sq. ft. experimental facility on the first floor of the Science and Engineering Library. It is slated to open in January. Jim and his family were inspired by our vision and our commitment, and they bestowed their trust in us. It is one that we proudly carry and cherish.

I must add that as Viterbi grows, physical space becomes a challenge that we must collectively meet. Last year we leased about 30,000 sq. ft. of space off-campus. Important new efforts underway include renovating OHE and RRB and relocating AME in OHE; the buildout of MCB (with the second floor underway and with the first floor next); and the pursuit of a new building that if it becomes a reality will help us accommodate many current and future needs. I hope that we will have good news to share in the very near future in that respect. Trust me!

I will close with one final reference to culture and trust. The traditional academic settings of disciplines trace their origin to several centuries ago when things changed very slowly (the term “glacial pace” for academia is well-known!). Think of the straight line in your handout. Today’s world of exponential changes, however, is challenging us as never before. Such challenges exist within one’s own narrower academic discipline as well. It has been said that culture “wants to be enduring and prevailing”- it thrives in silos. It is an objective of USC Viterbi to work towards reducing, even eliminating such barriers and silos, both internal and external. As I mentioned before, establishing a culture of trust, therefore, is essential to rapid progress.
Covey provides specific examples of 13 behaviors that help enhance trust. These expand on the competence and character cores, and are shown in the handout on your table:

1. Talk Straight
2. Demonstrate Respect
3. Create Transparency (including being transparent when you cannot be)
4. Right Wrongs
5. Show Loyalty (by keeping confidence if such was intended)
6. Deliver Results
7. Get Better (continuous improving)
8. Confront Reality
9. Clarify Expectations (and communicate clearly)
10. Practice Accountability (Requires Measurement, Responsiveness)
11. Listen First
12. Keep Commitments
13. Extend Trust

Now, universities have distinct communities—students, faculty, staff. These communities interact constantly—such interactions can benefit tremendously by incorporating the above 13 attributes. This is particularly important in academia because our communities can be stratified because of hierarchies, and the corresponding emergence of power differentials, and power asymmetries. Consider: Undergraduate students are graded by faculty, graduate students have their theses or examinations assessed by faculty, junior faculty are judged in promotions by more senior ones, staff advise students or help them through their careers, administrators propose raises, or assign tasks, etc. These power differentials are intrinsic to hierarchies. And they will likely exist at least until we discover novel organizational methods.

However, we should strive that all such relationships, regardless of one’s position across the hierarchical divide, are characterized by trust. Let me be more specific: power differentials must never lead to behavior differentials. In terms of behavior, everyone in our organization (faculty, students, staff) must be viewed as our colleague, namely as someone in the same league and in the same community, regardless of status or rank. Behaviors that follow the previous 13 examples. Thus creating cultures of trust that eliminate any tax and friction that slows us down and that can help all the Viterbi community thrive in today’s rapidly changing world.
As the university embarks in a new chapter, with a new leadership with President Folt and Provost Zukoski, the Viterbi School will be an indispensable partner school to help advance the university vision in a quest for continuing excellence. Having reached many historic milestones this year, the school aims to keep reaching higher, to help educate the new engineer, to advance *Engineering a Better World for All Humanity*. This constant is as immutable and as enduring as Euler’s gamma constant!

Quantum Physicist David Deutsch said: *Problems are inevitable. But all problems are solvable.*

I fully endorse this aspirational mindset, one that reflects *competence* and *character*.

And I invite you to join me in this commitment of trust. Thank you, and Fight On!
USC Viterbi Engineering in the era of exponential changes and constant accelerations.
THE EXPONENTIAL PACE OF TECHNOLOGY BRINGS CONSTANT DISRUPTION. THIS REQUIRES AGILITY AND ADAPTABLE - AND NEW MINDSETS

EXPONENTIAL CHANGES
There are no longer steady states or even steady states in growth
MUST REINVENT OURSELVES EVERY YEAR

THE FIVE MINDSETS OF CHANGE TO THRIVE IN TODAY'S WORLD

1. HUG THE EXPONENTIAL
   Superb Technical Skills and Knowledge to Lead the Exponentially Changing Technology

2. ENGINEERING +: CHANGE THE CONVERSATION ABOUT ENGINEERING
   Engineering + X where X is anything (particularly, human-centric)
   Who we are, what we do and what we look like.

3. INNOVATION IN THE BROADEST SENSE
   Innovation and Entrepreneurship, to help create the new markets, the new jobs and to design the new self.

4. THE CULTURAL MIND
   Cultural Awareness (with culture broadly interpreted), to help thrive in today’s fast changing world.

5. HEROIC ENGINEERING
   Awareness of the Impact of Engineering to Society (and the importance of technology ethics).
Behaviors

1. Talk Straight
2. Demonstrate Respect
3. Create Transparency
4. Right Wrongs
5. Show Loyalty (keep confidences)
6. Deliver Results
7. Get Better (continuous improving)
8. Confront Reality
9. Clarify Expectations
10. Practice Accountability (responsiveness)
11. Listen First
12. Keep Commitments
13. Extend Trust

From S. Covey, “The Speed of Trust”, 2006
Cores of Credibility

Character
1. Integrity (humility, courage, congruence)
2. Intent (motive, agenda, behavior)

Competence
3. Capabilities (talent, attitude, skills, knowledge, mindset)
4. Results (performance - past, current, anticipated)

From S. Covey, “The Speed of Trust”, 2006