Humanities for the 21st Century:
Innovation and the Fourth Industrial Revolution

2019 Council of Graduate Schools Summer Workshop
President Mary A. Papazian
July 15, 2019

Program abstract: *The study of humanities is under attack by pundits, policy makers, and others. Yet, a closer examination of the evolving innovation economy reveals a need for the benefits of a liberal arts education. Dr. Papazian will reflect on the importance of the humanities in a world that more than ever requires empathy, leadership, and tolerance, as well as the so-called "soft skills" of communication, collaboration, creativity, and critical thinking.*

Introduction and setting the stage

Thank you for that introduction, Marc.

It is so great to be here with all of you. My roots and upbringing were in Los Angeles, so I always love traveling to the southern part of the state. San Diego's Gaslamp Quarter reminds me a bit of downtown San Jose and everything that we are striving for there in terms of vitality and growth. So I am delighted to be here.

I must say, I was honored to be invited to lead this particular plenary session. My colleagues back at San Jose State, and others who have worked closely with me over the years, know that the humanities are near and dear to my heart.

I say that not only because I happen to be a scholar of English Renaissance literature, but also because I feel very strongly that the liberal arts need to be a vital part of the higher education spectrum.

Yet, as you can see in the Program abstract, I would assert that the study of humanities and liberal arts in higher education remains under attack—from employers, pundits, policy makers and parents who want their children to have careers that will pay the bills over their entire life and believe that the Humanities deter from, rather than enable, those goals.

The number of students enrolling in the liberal arts continues to plunge, college programs and departments devoted to the study of history, art, and literature are declining and even vanishing, and classrooms are crowded with future coders and programmers.

Frankly, some might believe that a liberal arts degree is the fastest route to a career as a Starbucks barista, or worse yet, to the unemployment line.

One leading venture capitalist has said that little of the material taught in liberal arts programs today is at all relevant to the future, and famed Netscape founder Marc Andreesen remarked that those who learn the "soft skills" of the liberal arts in college, rather than the "hard skills" of science and technology, will likely end up selling shoes for a living. Even the great Bill Gates is on record as saying that state funding of liberal arts education should be cut in favor of more STEM fields, and former President Obama once famously questioned the value of an art history degree.

But a closer examination of both the evolving job market and the skills that derive from the arts, humanities and social sciences reveals that the role of a liberal arts education, both in undergraduate and graduate studies alike, is much more valuable in the 21st century than the skeptics would have us believe.

Now, it may seem ironic that a professor of English literature and a student of the late-16th/early-17th century poet John Donne—and I am proud to be both of those things!—has come to lead Silicon Valley's Public University, one perhaps best known for its stellar programs in science, technology, engineering and mathematics.

And indeed, it is absolutely true that San Jose State supplies more employees to Silicon Valley companies such as Apple and Google than any other. Yet here I am, dare I say, thriving in my role as SJSU President! And as we do a deep dive into this morning's topic, it should become clear that my liberal arts background actually *prepared* me for this role at San Jose State in ways many might not have imagined. Certainly not my skeptical father many years ago!

I would like to start out with some context surrounding the current tech revolution we are in, how it compares to and even mirrors previous eras of historic change, and how my own academic background in the liberal arts has helped shaped me as a higher education leader who now leads Silicon Valley's public university, San Jose State.

Then, I think, we can start to see what a mistake it would be for higher education institutions to dismiss the humanities as frivolous or unnecessary.

The Fourth Industrial Revolution

Today—and I certainly don't need to tell you this!—we are in the midst of a major period of transformative change.

The columnist and author Thomas Friedman calls the present day **"….one of the greatest inflection points in history."**

His premise is that the greatest forces around us—technology, globalization, and climate change—are accelerating simultaneously. In just a few generations, we have witnessed the invention of the personal computer, followed by the introduction and ubiquitous nature of the Internet. We now have vast quantities of information available right at our fingertips (with a little

help from Google). We can connect with peers and friends and colleagues from anywhere around the globe, leading to what Friedman famously called a "flat" world.

So as a result of all of this transformative change, society itself is turning on its axis. Everything is up for re-examination and re-imagination. And while clearly these influences are global in scope, this revolution—a second Renaissance, if you will— is happening right here, all around us, in our own backyard.

The executive chairman of the World Economic Forum, Klaus Schwab, called this modern era the **Fourth Industrial Revolution**. He talks about advances in communication and connectivity and predicts that we will continue to see massive breakthroughs in areas like robotics, artificial intelligence, nanotechnology, quantum computing, biotechnology, and fully autonomous vehicles, among other game-changers.

Mobile technology and social media, of course, have accelerated all of these changes at an even faster pace. The introduction of the iPhone and Google's Android operating system, followed by the creation of social platforms like Facebook, Twitter, and Instagram, christened an even more explosive era that has given consumers more power at their fingertips than ever before. We might call this the **Post-2007 era, or Tech Revolution 2.0.**

Where these technology innovations stop or just slow down, no one can know.

In the context of higher education and workforce development, there continue to be calls for further enhancement of foundational digital skills so that our students are equipped to continue this tech wave and become the next generation of digital innovators and true lifelong learners.

Just a few weeks ago, I attended the Summer Member Meeting of the Business-Higher Education Forum in Boston, and the conference theme was about "Re-skilling: A Digital Skills-Gap Solution." B-H-E-F alone has formed more than three dozen partnerships between business and higher education institutions that have created over 50 new digital credentials in areas such as cybersecurity, data science, AI, and machine learning.

This is but one example of the tremendous work being done to help ensure today's students are mastering foundational digital skills to prepare them for the 21st century economy. Similar things are happening at San Jose State, and I suspect they are happening at your schools and colleges as well. And to be clear, this is a good thing, not a bad thing!

Rewind: an earlier Renaissance Era

So that is where we are at today.

But, as is often the case, a good way to understand the present, or even the future, is to look back at the past. So I would like to take you back for a moment to the late 16th and early 17th centuries.

The Renaissance poet John Donne lived and wrote during this time, a period of great unrest in Western Europe, what I like to call the last great era of innovation.

When I was a student at UCLA, I was inspired in part by a faculty member who was a specialist in the English Renaissance and both Donne and Milton in particular. Though I fell in love with Milton, it was Donne who would become the primary object of my academic scholarship.

This faculty member who introduced me to Donne became a mentor. His teaching method focused on the nexus of the Renaissance which brought together different disciplines and cultures to create the modern world. The world fundamentally changed from the medieval period to the early modern period then, and nobody seemed to understand that better than writers like Milton and Donne and Shakespeare.

The Renaissance (or early modern) period, which encompassed Donne's life, bridged the Middle Ages to the modern age. It was truly a period of awakening and an expansion of our understanding of ourselves and our world. What happened in the Renaissance changed the course of history, as the understandings that made possible the modern world emerged—in learning, theology, geography, science, astronomy, medicine, literature, theater, and so much more.

About a century before Donne's time, Johannes Gutenberg invented the printing press, something that would become one of the most influential and important innovations in world history. This truly was a disruptive technology…perhaps the first since the invention of the wheel centuries prior! It opened up writing and reading to the masses, and this had profound implications on politics, education, social discourse, and science, among other things.

There was Sir Francis Bacon, known as the "father of the scientific method." Interestingly, Bacon was, first and foremost, a philosopher and statesman—a humanist, perhaps?—rather than a traditional scientist. But his ideas around science and how it could be best studied through the use of a methodical and skeptical approach has had long-lasting influence.

There was Leonardo da Vinci, who dabbled in a few things, like drawing, painting, sculpting, architecture, neuroscience, music, mathematics, engineering…….(PAUSE, AS THOUGH YOU'RE EXHAUSTED READING SUCH A LONG LIST)… literature, anatomy, geology, astronomy, botany, writing, history, and cartography. Oh, and when he got bored he would also invent a few things, like the parachute, the armored vehicle, and scuba gear, just to name a few. Leonardo was sort of an antsy fellow who couldn't sit still, apparently. He would fit in well in our current era of innovation!

All joking aside, it was during this incredibly transformational period in history that our understanding of the universe vastly expanded.

The author Walter Isaacson, of course, has written a lot about Da Vinci and what he sees as the parallels between Da Vinci and modern innovators like Steve Jobs. Essentially, Isaacson has pointed out how both of those men were great believers in connecting art with science, beauty with design, engineering with aesthetics. De Vinci and Jobs felt these things were all one and the same.

Connecting the dots: The Renaissance and Today

So, just as the Renaissance opened mankind's eyes to the reality that we did not sit at the center of the universe with the heavens revolving around us (think the Copernican Revolution!), the technology age has opened our eyes to other stunning realities, including quantum physics, or Moore's Law, yet another Silicon Valley-based discovery that asserts that the number of transistors in an integrated circuit doubles about every two years and leads to more and more powerful computers. [fun fact: Gordon Moore began his educational journey at San Jose State!] Tech and engineering innovations like these are the underpinning discoveries that have led to so many of the consumer-driven tech products and networks we see and enjoy today.

But what else has the Renaissance period to do with early-21st century society, or Silicon Valley, or the future direction of higher education and graduate schools like those we all lead?

To be frank with you, I have heard such questions before. Early in my tenure at San Jose State, I was often asked, "Why are they hiring an English professor specializing in the Renaissance? It makes no sense for a university located in the center of technology and innovation."

So I challenged people to think more broadly than that. When was the last great age of innovation, of real change? I would ask them. And I would remind them that it was the Renaissance Era!

When I was in Michigan teaching English earlier in my career, I had many engineering students in my class because, of course, the auto industry was right there in our backyard. They were always a bit tentative when I taught them Milton because they were trying to figure out "the answer." I used to say, "No, no, it's not just about having a black and white answer to a question. It's about thinking about our place in the world." It was a different way of thinking for them, an ability to live in ambiguity and see multiple sides of a question. Many of these budding auto engineers grew to really enjoy this part of their studies.

One cannot read Donne's poetry without seeing all the references to the new sciences. This speaks to the element of innovation and creativity that was so present during that era, and when I think about our modern times — especially in Silicon Valley — we can see that we are at another point where that kind of creativity is happening.

So in today's world, in the **Fourth Industrial Revolution**, we will need more than technical skills. We will need diverse perspectives. We will need the ability to ask penetrating questions from different angles. We will need the ability to see the human impact of things. So for all of the emerging technologies truly to succeed, there will need to be a strong intersection between *creativity* and innovation and tech skills.

The author Scott Hartley published a wonderful book in 2017 called "*The Fuzzy and the Techie,*" and I will make several references to it throughout this presentation. To give you a rather transparent idea of what it is about, I will simply recite the book's sub-heading, which is, **"Why the Liberal Arts Will Rule the Digital World."** Note that he does not say that the liberal arts will "support" the digital world – it will *rule* it.

Hartley was one of the first to point out that there are a number of tech CEOs and startup founders who actually have backgrounds in humanities, liberal arts, and social sciences.

The founder of LinkedIn, for example, **Reid Hoffman**, earned a master's degree in philosophy at Oxford University.

Peter Thiel, the famed venture capitalist and cofounder of PayPal, studied both philosophy and law.

The founder of Pinterest, **Ben Silbermann**, studied political science. Airbnb founders **Joe Gebbia** and **Brian Chesky** both attended the Rhode Island School of Design and earned bachelor of fine arts degrees.

Former Hewlitt-Packard chief executive **Carly Fiorina** majored in medieval history and philosophy.

YouTube CEO **Susan Wojcicki** studied history and literature at Harvard.

Even perhaps the most celebrated technology leader in modern history, **Steve Jobs**, spent his one semester of college at the liberal arts school Reed College in Oregon. In Isaacson's biography, Jobs said he chose Reed over colleges like Stanford or Berkeley because he "wanted something that was more artistic and interesting." I'm sure the heads of both those two fine institutions just loved learning that about Jobs!

Speaking of Steve Jobs, he gave a commencement address at Stanford several years ago and talked a bit about typography and a course in calligraphy he took during his time at Reed College. It clearly had an impact on him, and in that commencement speech he called typography "beautiful, historical" and "artistically subtle in a way that science can't capture."

Another tech leader, **Michael Litt**, wrote an interesting piece for *Fast Company*. Now, to be fair, he acknowledges right up front that he could not have started his company without an engineering background. He says he relies every day on skilled coders and developers and engineers to build his company's product. He even talks about how students in STEM fields may be one strategy for minimizing the impact of AI-driven job loss.

But then he goes on to explain why he is hiring more humanities majors than STEM grads, and that he does not see that changing any time soon!

He explained that his sales team needed to be experts on human relationships.

His marketing people needed to understand what customers get excited about, and why.

His human resources staff needed to be adept at building a strong culture so that the company could continue to thrive.

So it would have been foolish, Litt wrote, for his company to hire only people with STEM backgrounds.

This important, often under-appreciated, point was buttressed in a recent study by the **Strada Institute for the Future of Work** that they called "Robot Ready."

In that study, the researchers point out that, in recent years, the growth of liberal arts graduates entering the tech workforce has outstripped growth in computer science and engineering graduates who do so. Let that sink in for a moment!

One thing I suspect that tech leaders like Michael Litt, Steve Jobs, Reid Hoffman, Susan Wojcicki and others have in common is an ability to step back, ask good questions, and empathize with their customers, making them more effective than those leaders who merely possess great tech skills (think Facebook's Mark Zuckerberg).

I should add that, in my role as president of San Jose State, I have spoken to some of Silicon Valley's finest leaders, and they consistently point out the need to recruit employees that embody these characteristics. Even more broadly, we know those are the kind of employees and community members who are needed for sound civic and community health.

Embracing the Liberal Arts

So the Renaissance was a transformative moment in human history. And we are in the midst of a similarly transformative era.

Now, like then, humanists and artists are every bit as essential as scientists and technologists to comprehending fully the world around us.

In an influential article he wrote for *The New Republic* a few years ago, Steven Pinker made several eloquent observations:

Educated people, he wrote, should know something about the 13-billion-year prehistory of our species and the basic laws governing the physical and living world, including our bodies and brains.

Today's students, he argued, should be exposed to the diversity of human cultures, and the major systems of belief and value with which they have made sense of their lives.

They should know about the formative events in human history, including the mistakes and errors we do not wish to repeat. They should understand the principles behind democratic governance and the rule of law [here, I would add, and the importance of individual privacy and community engagement]. They should know how to appreciate works of fiction and art as sources of aesthetic pleasure that prod us to reflect on the human condition.

On top of this knowledge, Pinker continued, a liberal education should make certain habits of rationality second nature. Educated people should be able to express complex ideas in clear writing and speech. They should appreciate that objective knowledge is a precious commodity, and know how to distinguish vetted fact from superstition, rumor, and unexamined conventional wisdom.

They should know how to reason logically and statistically, avoiding the fallacies and biases to which the untutored human mind is vulnerable. They should think causally rather than magically, and know what it takes to distinguish causation from correlation and coincidence.

And finally, they should be acutely aware of human fallibility, most notably their own, and appreciate that people who disagree with them are not stupid or evil. Accordingly, they should appreciate the value of trying to change minds by persuasion rather than intimidation or demagoguery.

Collectively, these things are the hallmark of a liberal arts education.

Our challenge—and our opportunity—is to seize the moment to influence and shape history meaningfully in this, our present Renaissance. This means shaping the lives of our students while actively and thoughtfully engaging in the affairs of our city and region.

While all of the emerging areas of technology that I identified earlier will clearly require engineering and technical skills, preparing college students at both undergraduate and the graduate levels for careers in today's **Fourth Industrial Revolution** demands that we offer more of the "three R's"—reading, writing and arithmetic—as well as more of the "three C's"— creativity, collaboration, and communication.

And anywhere we turn today, not just the high-tech world—from healthcare, to agriculture, financial services, telecommunications, retail, and education—we see the convergence of technology and human interaction.

Google has spent a considerable amount of time, effort, and resources to study the human aspects of what makes an effective company. I was particularly intrigued with its Project Aristotle, which of course is a tribute to the Greek philosopher's quotation, "The whole is greater than the sum of its parts."

The researchers examined the various elements that are found in great innovation teams, and let me tell you, they ended up doing what was essentially a deep dive into the Humanities: Problem-solving. Group dynamics. Emotional intelligence. Personality traits. Dependability. Psychological safety.

Is it really any wonder that Google is, arguably, one of the top two or three companies in the world? They know that there are skilled coders and engineers to be found all over, and they likely recruit the best of the bunch. But they also invest in the human aspects of what makes a great company tick.

In *The Fuzzy and the Techie*, Scott Hartley points out that an important but often-forgotten feature of a liberal arts education is that the humanities and social sciences are actually **devoted** to the study of human nature and the nature of our communities and broader societies. That is what we humanists and champions of the liberal arts *do*!

So we need constantly to reflect on the opportunities, value, and importance of humanities in a world of fast-changing employment that more than ever needs the human skills of empathy, leadership, and tolerance, and the so-called "soft skills" of communication, collaboration, creativity, and critical thinking.

Creativity, I should add, is not only a characteristic we rightly associate with a liberal arts education, but it is a vital component of what my colleague Northeastern University president Joseph Aoun calls a "Robot-Proof" education.
We hear a lot these days about automation and artificial intelligence and the threat they pose to longstanding jobs and careers, and these threats are real. In fact, McKinsey & Company just released this past week a sobering study on the Future of Work and its impact on our economy and society.

In this report, "The Future of Work in America: People and Places, Today and Tomorrow," the researchers not only point out the profound changes currently underway in our society, but they also assert that as automation changes, the world of work, governments, businesses, and members of the workforce can take action and adapt. Clearly, higher education, too, has an important role to play! While some jobs will be lost, others will be gained.

What is a "robot-proof" education? As President Aoun argues, it is one that synthesizes fact-based learning and skills with a creative mindset and mental elasticity that will allow our students to discover, invent, or create something of value for society. I couldn't agree more!

In his book on this topic, he coins a new term, "Humanics," which he offers as a new academic discipline that prepares students to compete in a labor market in which smart machines work alongside human professionals.

So yes, the hard skills learned from STEM programs are essential, but employers are actually are desperate for candidates who have balanced their personal portfolios with both digital capabilities and human understanding.

This balance, this *partnering* of STEM disciplines with the liberal arts, is absolutely vital. It is not a "one or the other" proposition —it must be both, working together. Think about the impact for true inter-disciplinary education and experiences at both the graduate and undergraduate levels!

Coders who are not aware of the ethical consequences of their creations can lead to loss and ruin for enterprises; liberal arts grads without technical skills will be left behind. Both poles need resilience and the capacity for reinvention and continuous learning that will benefit them and their employers over the course of their careers.

Our students—your students—will work in groups all their professional lives, and they must be able to collaborate effectively with people from a broad array of backgrounds and working styles. Where better to learn this than at our colleges and universities?

They must be able to communicate in a variety of ways, using digital tools that we know are evolving with stunning rapidity. Where better to learn this capacity than in our classrooms and our community-based projects?

And they will be required to be creative and confident. Where better to learn this than in our labs and studios on our campuses?

Other benefits of a liberal arts education

I also wanted to make mention of a pair of other benefits of a liberal arts education that often get lost in the discussion but that I believe are crucial to our long-term personal and community fulfillment, and those are **life enrichment**, and **public service**.

Higher education needs to be more about overall quality of life, not merely about developing specific workplace skills.

The retired president of Missouri State University, **Michael Nietzel**, recently wrote an article for Forbes magazine entitled "New Evidence for the Broad Benefits of Higher Education."

We all are well aware of the wage premium that is enjoyed by those with college degrees. But, as cited by President Nietzel in his Forbes piece, the results of the 2018 General Social Survey make abundantly clear that Americans with a college education also are happier, healthier, and enjoying a higher quality of life overall than those with a high school education or less. College graduates also are much more likely to be active in civic and political affairs.

Like many of your institutions, San Jose State offers campus clubs and organizations for just about any activity or interest students might have—more than 450 student clubs and organizations in all. There are academic clubs, club sports, cultural and religious groups, Fraternity and Sorority organizations, and a wide variety of special interest groups.

I often remind our faculty that students who connect to our campus and to their fellow students through one or more student organizations will be the same ones who will connect most effectively to their own communities, to their academic work, to our industry partners and eventually to their own workplaces.

Active participation in such clubs can help build camaraderie among students, teach them the value of teamwork, and hone their self-discipline and concentration. All of these things are central to a liberal arts education, and they add up and help make for a well-rounded, engaged student who will be ready for future success.

The point I mentioned a moment ago about students becoming active in civic and political affairs is an important one for us at San Jose State. Like so many higher education institutions, we believe that the more effective we are in re-examining our curricular pathways and at creating a tight-knit community for the students who live and study on our campus, the more effective we will be in creating a successful, more civic-minded student population ready to engage and succeed in the world around us. What is true for undergraduate students is also true for graduate students.

I would encourage all of us here today to embrace our role as public educators. This means we must rethink our design of our academic programs, both undergraduate and graduate programs, with particular focus on the intersection between liberal arts and the STEM disciplines, while looking at ways to frame student and community engagement as a part of the academic curriculum.

As part of our core educational mission, we educators must strive to prepare and develop students who are encouraged and equipped to ask questions, form views based on the truth and on their values, and engage actively in some kind of public service, whether that be at the national, local, or even neighborhood level. We can do this successfully only by retaining and strengthening the liberal arts in both our undergraduate and graduate programs.

I like to think of this as the "public good" aspect of public education and a way to challenge our students as they prepare for the future. At San Jose State, this is an important dimension of our quest to become an engaged university that serves as a resource for Silicon Valley and our broader community.

A core thrust of our new strategic plan at San Jose State, *Transformation 2030*, is the importance of developing an innovative approach to teaching and learning, one that connects well to these efforts to strengthen our partnerships in our local community and throughout the business community. This, too, must involve our liberal arts programs.

Conclusion

As I begin to wind down my presentation and engage in Q&A, I feel the need to address how the ideas and principles I have discussed can be applied to graduate school programs, not just undergraduate studies.

Admittedly, most of the research to date seems to be focused on undergraduate education.

But what kinds of graduate programs will need to come forward? How do we need to prepare future discipline-based faculty members to educate students for this new reality? What mechanisms are needed to connect graduate-level teaching with the humanities and liberal arts? Should they be intentional connections, new programs altogether, or both?

Are there shared projects that can be developed to strengthen the bond between liberal arts and STEM programs? Are completely new models of research necessary? Think about the National Science Foundation's new approach to the "Big Ideas" and the interdisciplinary teams it will take

to address the truly profound and big questions of our time. How can our approach to graduate education prepare future researchers, scholars and teachers to address these big ideas in truly interdisciplinary teams?

There are even more questions we need to keep asking ourselves, as educators.

What is the optimal relationship between liberal arts and professional education? How are they best "braided" together, regardless of the specific discipline each student pursues? And how does our enhanced focus on research—and especially interdisciplinary research—foster the dynamic intellectual environment so important to supporting an engaged faculty and student body?

Occasionally, we academics end up working in silos and instead need to remind ourselves to work collaboratively as we think about the kinds of experiences we want our students to have and to ensure they have the skills and understanding needed to solve not only today's but tomorrow's big problems.

I do not pretend to have all of the answers, but I do know that there are plenty of excellent resources for higher education leaders who wish to strengthen the intersection between the liberal arts and professional preparation at their institutions.

For instance, I am using my involvement in the Association of American Colleges and Universities, with its dedication to advancing the vitality and public standing of liberal education, to bring new ideas to our campus for consideration and in support of our academic mission and student success initiatives

My engagement with the Business-Higher Education Forum also continues to be a valued resource. The Forum's membership is quite diverse, and though it is currently focused on undergraduate programs, we are working together to create programs to increase baccalaureate attainment, particularly amongst underrepresented students, in emerging areas of need such as cybersecurity, data analytics, and artificial intelligence. In order to be effective, we know that we must improve the alignment between higher education and talent development, and prepare diverse, highly skilled graduates ready to meet industry demand and able to engage in true lifelong learning.

I am very grateful and honored to have been able to share with you some ideas about the liberal arts and humanities that are emerging in the national conversation about how best to serve our students and communities.

If nothing else, I hope to encourage you to explore ways to implement the most promising ideas for your campuses and your communities, as we are working hard to do at San Jose State.

All of us involved in higher education hold immense power to make meaningful change in the way our country views our responsibilities toward our fellow citizens and neighbors.

Colleges and universities and those who lead them are uniquely positioned to accomplish things that government or business cannot.

We are a resource, a pipeline for talent, a reservoir of creativity, a diverse community of innovators and game-changers, a force for change.

We know that the world is changing all around us, and that the employers of both today and tomorrow will require a variety of skills and approaches among members of their workforce, many of which can only be learned through the liberal arts.

Thank you.

(Q&A)