ADVANCE AMERICA! LONG LIVE THE CAUSE OF INNOVATION!
¡AVANCE AMÉRICA! ¡QUE VIVA LA CAUSA DE INOVACIÓN!
前进吧，亚美利加！创新的事业万岁！

THE PRAYER OF SAINT FRANCIS OF ASSISI

Lord, make me an instrument of Your peace;
Where there is hatred, let me sow love;
Where there is injury, pardon;
Where there is discord, harmony;
Where there is error, truth;
Where there is doubt, faith;
Where there is despair, hope;
Where there is darkness, light;
And where there is sadness, joy.
O Divine Master, Grant that I may not so much seek
To be consoled as to console;
To be understood as to understand;
To be loved as to love.
For it is in giving that we receive;
It is in pardoning that we are pardoned;
And it is in dying that we are born to eternal life.

This prayer offers great spiritual and ethical values for all people of good intentions seeking the improvement of human conditions, including the existing conditions in K12 STEAM education in the United States.

As everyone knows, in the most recent decades, the United States is facing a chronic shortage of domestic graduates from engineering programs (less than 10,000 per year or 25%-50% shortage). The dropout rate could go as high as 50%. This website is intended to find a meaningful solution to the above problem.

STATEMENT OF PHILOSOPHY

FROM ECONOMIC AND ETHNO-GENDER AFFIRMATIVE ACTIONS TO ACADEMIC AFFIRMATIVE ACTION: MOVING TOWARDS AN INNOVATION DEAL USA IN THE 21ST CENTURY

by Edward Locke (Gosingga-Daicin Mergen-Dasan Sakda)

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Back on July 4, 1776, the Continental Congress adopted a statement titled the Declaration of Independence, which starts with this revolutionary statement, radical and provocative at the time:

"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness."

Since then, the American people has engaged in a long process of social, cultural, economic, and political changes to define and redefine the meaning of equality. For the past 238 years (1776-2014), the American people, by self-regulated personal, corporate or community behaviors, or through government legislations and regulations that either grant new entitlements to certain or all groups of citizens or impose new restrictions on other groups, have frequently redefined and redistributed the scope of personal freedom and responsibilities, so that all groups in the society could live together in a peaceful and democratic way. This process of achieving a more advanced stage of social equality could be interpreted as two types of affirmative actions.

Economic Affirmative Actions

The first type of affirmative action is economic. It started with the Progressive Movement and ended with the enactment of Obama Care. At the time of the American Revolution, American society was based on small scale economics, mostly agriculture, without the type of giant and monopolistic corporations that emerged much later with the development of a capitalistic industrial economy. Thus, the type of equality Americans were fighting for meant political representation and did not touch the sphere of economics. The merge of monopolistic corporations that often threatened the survival of small-scale businesses caused the American people to perceive the need for government regulations on corporate economic behaviors. Thus, the Progressive Era (1890s-1920s) passed antitrust laws which took away certain degrees of economic freedom from corporate tycoons to protect the right of small business people to survive. Later, the New Deal, the Fair Deal, the War on Poverty, the New Frontiers, the Great Society and the Obama Care programs, all imposed new taxation and regulations to the "haves" (citizens on the upper-middle and upper income brackets) so as to give citizens on the lower economic ladder entitlements to social welfare benefits. Not only do working poor in the United States enjoy welfare, there are welfare programs for corporations as well (in terms of direct or indirect subsidies, economic stimulus programs, investment in education and research, etc.). The enactment of the Obama Care program has made the United States a fully developed welfare state such that, henceforth, there is no more major social conflict between the haves and the have-nots in the United States at qualitative level (or "what should be done?"), although at quantitative level (or "who pays how much and who gets the benefits?"), small-scale clashes will continue between the Democratic and Republican Parties. Thus, the American people can now entertain new ideas to make America a better place from a more innovative perspective, which might have greater impact on the progressive evolution of the humankind.

All of the above welfare programs, it doesn't matter whether it is Food Stamps or Housing Voucher for the poor, or Agricultural Subsidies and Economic Stimulus Plan for the rich and the big corporations, constitutes what we could call a government-implemented and tax-supported package of "Economic Affirmative Action" to affirm the rights or entitlements or American citizens or institutions to survive within a framework of collective security. These "Economic Affirmative Actions" are to some degree based on the idea of Freedom from Want, one of the Four Freedoms advocated by the four-time United States President Franklin Delano Roosevelt on January 6, 1941, when he delivered the Four Freedoms Speech, which include (1) freedom of speech and expression, (2) freedom of every person to worship God in his own way, (3) freedom from want (economic understandings which will secure to every nation a healthy peacetime life for its inhabitants), and (4) freedom from fear - which, translated into world terms, a world-wide reduction of armaments to such a point and in such a thorough fashion that no nation will be in a position to commit an act of physical aggression against any neighbor.

The "Economic Affirmative Actions," due to their role in the redistribution of social wealth and financial resources from the "haves" to the "have-nots" (social assistance to the poor) and from the successful corporate citizens to the failing ones (in terms of corporate rescue mission called "stimulus plans"), have to a large degree reduced if not removed social conflicts in the United States, preemptively preventing outbursts of large-scale social upheavals, and consolidated the capitalist economic system by the injection of some socialistic and even communistic elements.

The "Economic Affirmative Actions," due to their Robin Hood nature (the government takes away certain amount of wealth from the "haves" and gives it to the "have-nots"), is not without controversy; in fact, their enactment and preservation are often achieved after and through prolonged periods of "class warfare" during which the Left (or Liberals, usually Democrats) and the Right (or Conservatives, usually Republicans) fight each other on behave of their constituencies.

In addition to government-operated "Economic Affirmative Actions," there are private charities operated by religious and community groups or corporations, which are based on American tradition of volunteer good works; and they are usually supported by people of all political spectrums, including those from the Right. In addition to voluntary redistribution of wealth through charities, many corporations have adopted employee stock-ownership plans, which have fundamentally changed the capital-labor relationship and promoted social harmony in the United States.

The "Economic Affirmative Actions," either operated by the government using tax dollars or by private charities, do play a positive role in removing the likelihood of social instability due to the conflict between poor and rich, in creating a more balanced model of consumption for everyone, and in promoting a more harmonious and tolerant society in the United States. However, except for a few programs related to education and research in science, engineering, technology and mathematics, it is simply a mechanism of redistributing social wealth, and does not directly contribute to the creation of new social wealth (although indirectly, it does help maintaining social peace, a precondition for the continuous operation of the capitalistic free enterprise system). Widely accepted by the majority of the American people from all social classes, there is still resistance against it from some conservatives. This resistance is probably due to the fact that, when abused, welfare or entitlements could sometimes reduce individual incentives to work.

Gender and Ethnic/Racial Affirmative Actions

Like all countries in the world, the American Nation has gone through a prolonged and tortuous process of social change to reach the goals of gender and racial or ethnic equality. The endeavors of all people of good intention during the Women's Suffrage, the Civil Rights Movement, and others have brought about greater degree of social equality between men and women, and between people of different skin colors. The Affirmative Action programs enforced by the United States Government at federal, state and municipal levels, and implemented by corporations, schools and governmental institutions, in terms of employment, college admissions, and others, have historically contributed to remedy of past discriminations suffered by women and some ethnic minorities.

However, like the above-mentioned "Economic Affirmative Actions," Affirmative Action Programs dealing with gender and ethnic or racial issues, have their shortcomings as well. In terms of college admissions, it merely guarantees that some groups of minorities who suffered the most in the past from institutionalized discrimination, notably African-American and Latino-American students, will have some percentage in college student population; but it fails to

guarantee that the disadvantaged groups of minority students are well prepared to succeed. In STEM (science, technology, engineering, and mathematics) majors and careers, women of all ethnic groups (white as well as minorities), Latino- and African-Americans, are still under-represented.

In addition, it is heard that forty years ago, the United States educated great numbers of American engineers, which constituted about 25% of all engineers in the world, and nowadays, this figure has dropped to less than 5%. It is also heard that for the whole United States, there is generally a shortage of college graduates from undergraduate engineering majors (about 25% for the whole Nation, and as high as 50% for some states). American employers simply fill up the gap by hiring foreign students who graduate from American universities' undergraduate engineering majors. Foreign students also constitute a large portion of graduate students in master's and doctoral engineering programs. A large percentage of these foreign students are from India and the People's Republic of China. With the rapid growth of their own economy, India and China are increasingly offering better compensation packages to their own engineering talents. Thus, the United States has a practical need to increase the number of domestic engineering students. This applies to science, technology and mathematics as well.

Similar to the above-mentioned "Economic Affirmative Actions," the Gender and Ethnic/Racial Affirmative Action is simply a governmental instrument to redistribute education and employment opportunities with quotas, so that members of particular groups of people who suffered from institutionalized discrimination in the past could be guaranteed some representation. It does not, however, create new opportunities for the American society as a whole, or guarantee that the economic, educational and cultural conditions of these historically marginalized and still disadvantaged groups are substantially improved.

Why American students do not enroll in engineering programs in greater numbers? The causes are numerous and complicated. They could be

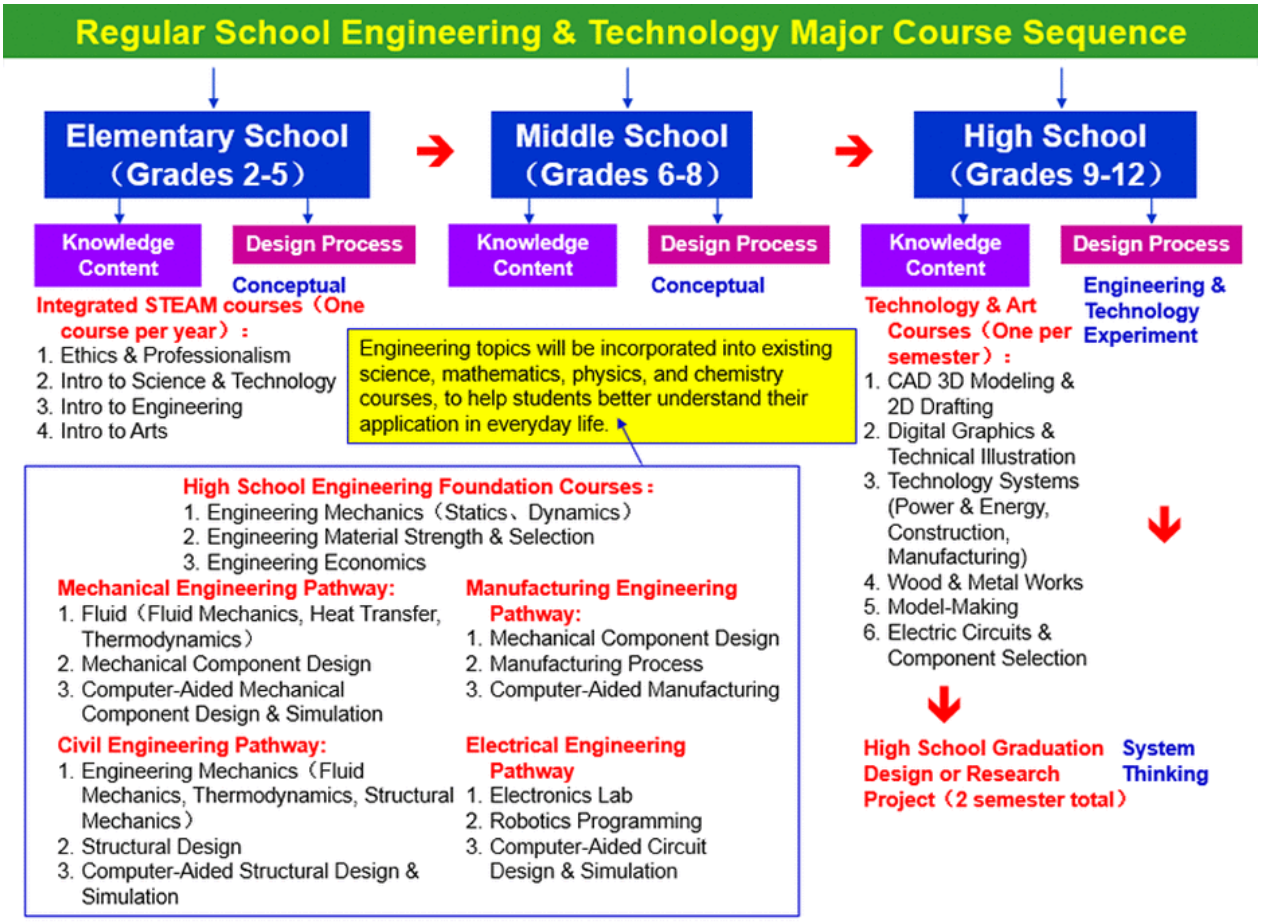
- **Economic:** Students of all races from some low-income neighborhoods are disadvantaged due to lack of highly qualified teachers or inadequate equipment; this might negatively decrease their chances to engage in STEM careers. There are assistance programs from federal and state governments to remedy this problem, with various degrees of success.

- **Cultural:** Some female high school graduates are still told by their mothers that STEM are not for women, This mistaken assumption is still deeply entrenched across all ethnic and economic groups, from white to colored, and from well-to-do to the economically disadvantaged. People need to change their mindset; but unfortunately, the old mindset cannot be changed by government mandates on gender or race-based "Affirmative Action" programs. People need to make this change by their own initiative.

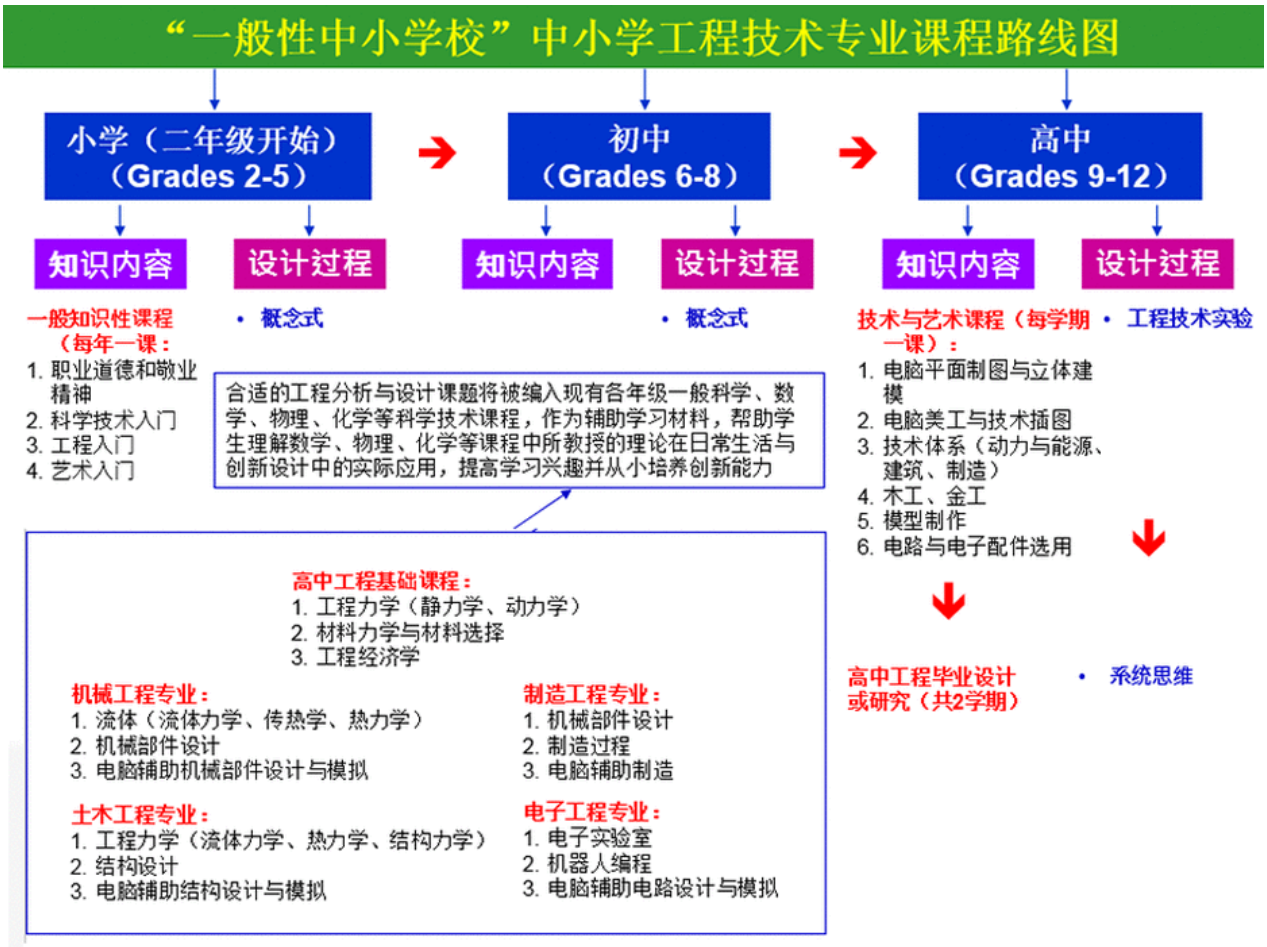
- **Academic:** The academic issue could involve students from all ethnic and economic groups. For example, K-12 students living in low-income communities might have limited opportunities to after-school tutoring in mathematics and sciences, their working parents in low-income bracket usually cannot afford additional tutoring services; and their schools usually cannot afford expensive STEM enrichment programs unless they get state or federal

assistance or grants from private foundations. For well-to-do school districts, lab facilities might be better equipped and after-school STEM enrichment programs might be more widely available; in addition, parents in high income brackets could afford expensive after-school private tutors; however, even well-to-do parents themselves might not have backgrounds in STEM and might not be able to directly provide inspiration or assistance to their children who want to pursue STEM majors. In addition, for engineering, as discussed in the authoritative report issued on September 8, 2009, by the Committee on K-12 Engineering Education established by the National Academy of Engineering and the National Research Council, titled Engineering in K-12 Education: Understanding the Status and Improving the Prospects, the weakness of currently available K-12 engineering packages include the absence of cohesive K-12 engineering curriculum and the lack of well-developed standards; even well-to-do districts cannot help their students much in preparing them for academic success in college engineering majors.

The most serious issues regarding K-12 engineering curriculum explored in Committee on K-12 Engineering Education report have been already addressed in my Vision Paper. The guiding philosophy of the Vision Paper is to offer all American K-12 students, regardless of social classes, ethnicity, race, gender, or the profession of their parents, a real opportunity to study a substantial portion of real-world engineering knowledge content (scientific principles and formula-based predictive computational skills) and to apply these skills in age-appropriate design projects. This offer is aimed at making sure that all K-12 students in the future could have access to high-quality K-12 age-appropriate engineering curriculum. This could be called an "Academic or Scholarly Affirmative Action." Although the Vision Paper is addressing the specific issue of K-12 engineering curriculum, the basic principles explored could apply to science, technology and mathematics as well. The futuristic but realistic model for the future American K-12 STEM programs cover two types of school settings: (1) "Regular Schools," and (2) "Specialized Schools," and could be illustrated in the figures below.



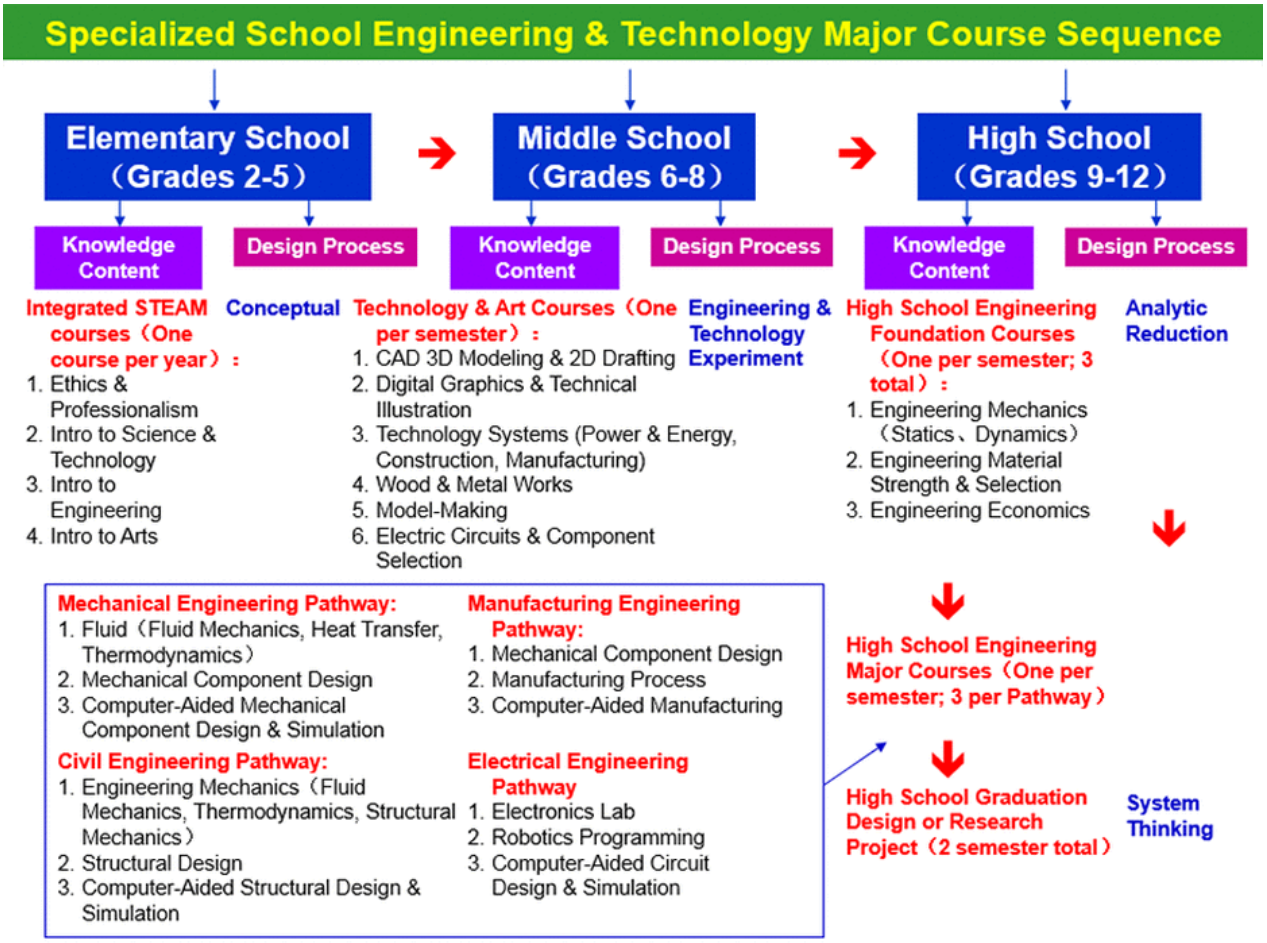
The road map for the futuristic model of K12 engineering and technology education in the regular K12 schools.



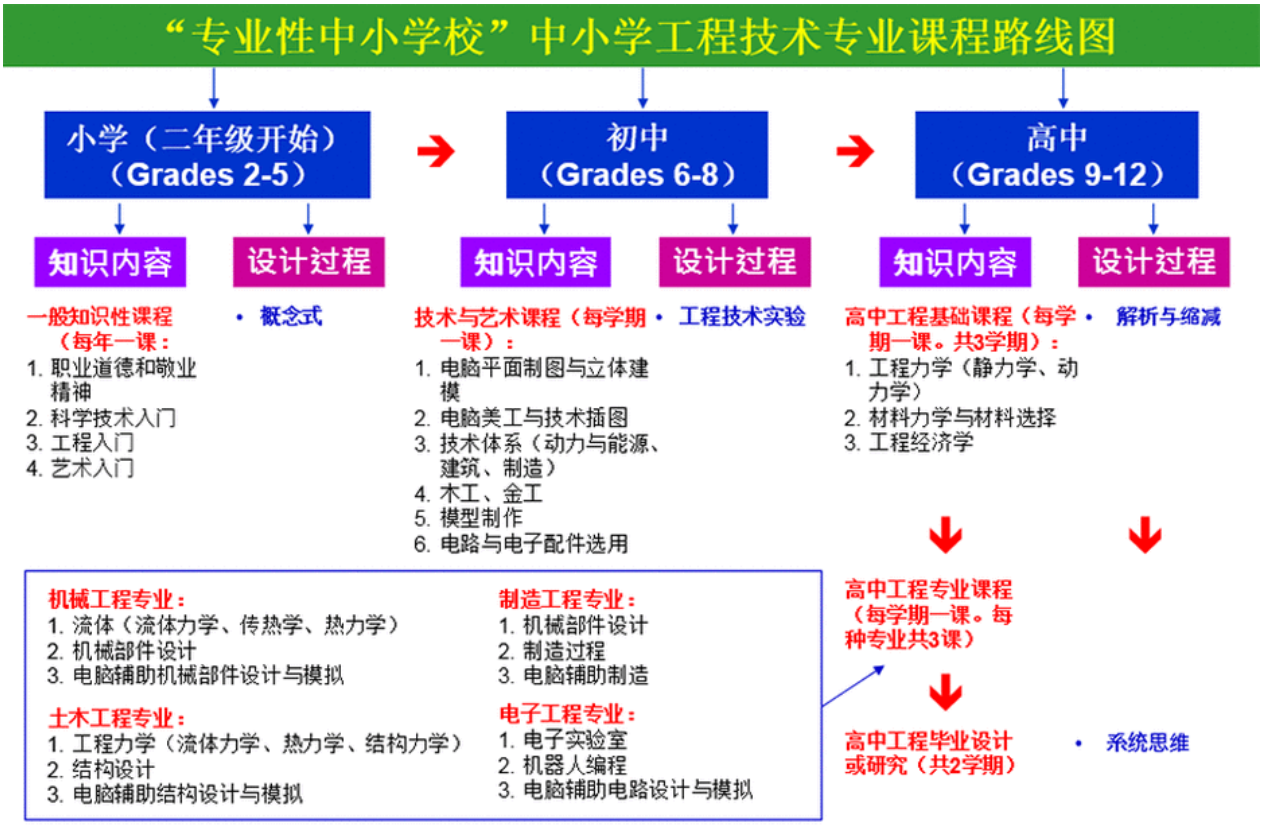
Mandarin translation of the road map for the futuristic model of K12 engineering and technology education in the regular K12 schools.

In the “Regular Schools,” students will take regular mathematics, physics and chemistry courses which selectively incorporate some relevant engineering topics with formula-based computational skills (“Engineering Corner”) as required or extra-credit learning materials and homework assignments, throughout all grades; at elementary school level, students will take elective courses that introduce them to STEAM careers. At high school level, students will take relevant engineering technology courses that prepare them for college-level engineering or technology majors. The high school elective courses, such as CAD 3D Modeling and 2D Drafting, Digital Graphics and Technical Illustration, Technology Systems (Power and Energy, Construction, Manufacturing), Wood and Metal Works, Model-Making, Electric Circuits and Component Selection, will allow students graduating from high schools to design simple everyday consumer products ready for prototyping and manufacturing, or technology systems at conceptual and graphical presentation level, mastering some useful skills for future engineering and technology careers. At the end of the program, there will be two semesters of High School Graduation Design and Research Projects. The “Regular Schools” will offer all students basic preparations for innovative careers, and are aimed at (1) providing all K12 students with basic STEAM literacy, and (2) educating the next generations of STEAM professionals including leaders at grass-root level with adequate qualifications for the job markets.

In the "Specialized Schools," which could also be called "chartered schools" or "magnet schools," students will take regular mathematics, physics and chemistry courses which selectively incorporate some relevant engineering topics with formula-based computational skills ("Engineering Corner") as required or extra-credit learning materials and homework assignments, throughout all grades; at elementary school level, students will take mandatory courses that introduce them to STEAM careers. At middle school level, students will take relevant engineering technology courses that prepare them for high school and college-level engineering or technology majors. The middle school mandatory courses, such as CAD 3D Modeling and 2D Drafting, Digital Graphics and Technical Illustration, Technology Systems (Power and Energy, Construction, Manufacturing), Wood and Metal Works, Model-Making, Electric Circuits and Component Selection, will allow students graduating from middle schools to design simple everyday consumer products ready for prototyping and manufacturing, or technology systems at conceptual and graphical presentation level, mastering some useful skills for future engineering and technology careers. At high school level, students will take mandatory courses in Engineering Foundation such as Engineering Mechanics (Statics and Dynamics), Engineering Material Strength and Selection, and Engineering Economics, for the first three semesters; then they will be branched out to four different career pathways: (1) Mechanical Engineering, (2) Manufacturing Engineering, (3) Civil Engineering, and (4) Electrical Engineering. Each pathway will include three courses to be covered in three semesters. At the end of the program, there will be two semesters of High School Graduation Design and Research Projects. The "Specialized Schools" will offer middle to high performing students extensive preparations for innovative careers, and are aimed at (1) providing middle to high performing K12 students with extensive STEAM training, and (2) educating the next generations of middle and top level leaders in STEAM fields with best qualifications for the institutions of higher education and research, and for high technology industry.



The road map for the futuristic model of K12 engineering and technology education in the specialized K12 schools ("magnet schools").



Mandarin translation of the road map for the futuristic model of K12 engineering and technology education in the specialized K12 schools (“magnet schools”).

As shown in the above illustrations, the next generations of American STEAM talents will be trained starting at grades 2-5 (the primary school), introduced to the subjects of ethics and professionalism, setting career goals, learning the basic knowledge about science, technology, engineering, arts, and mathematics, as well as associate ethical, ecological, social and economic issues; this is basically a minor adjustment of the current practice in K12 systems. At grades 6-12 (middle and high schools), they will take courses on basic technologies to prepare themselves for science, engineering and technology majors at college level, while intensifying study of mathematics, at “Regular Schools,” or they will in addition, take high school age-appropriate engineering courses, at “Specialized Schools;” this is a more substantial adjustment of the current practice in K-12 systems but is NOT impossible. In either case, students will be better prepared for rewarding science, engineering and technology careers.

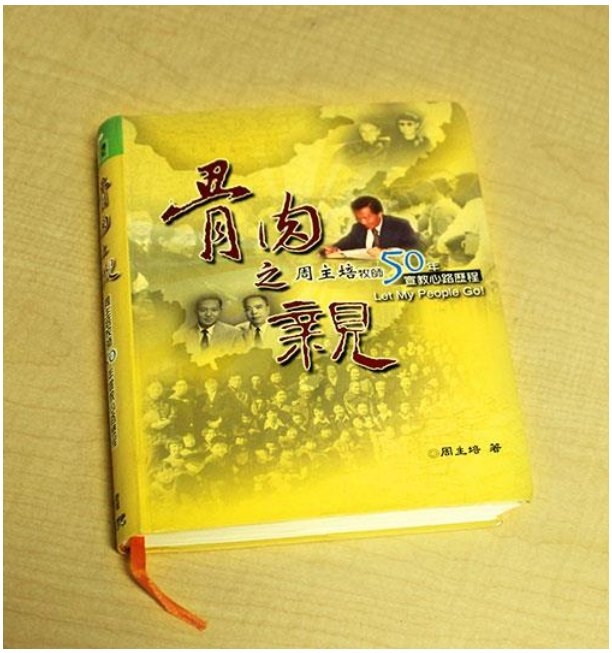
Academic or Scholarly Affirmative Action

Public education in the United States: Academic or Scholarly Affirmative Action is by no means a new invention. As a matter of fact, the United States is among the first countries in the world to offer free and compulsory K-12 education to all children. The establishment of a comprehensive network of community colleges after World War Two affirmed the rights of the American people (including legally residing but non-citizen aliens or “Green Card” holders) to higher education. This is a great revolutionary change in the history of higher education in the

whole world. In terms of spending on education and scientific research, the United States is number one among all nations. According to statistics from the American Association of Community Colleges (AACC), there are nowadays 1,132 community colleges in the United States, and about 50% of all America college students are currently enrolled at community colleges; about 20% of all students at the University of California system come from community colleges as transferred students; and Ivy League and other well-known universities are also recruiting more and more students from two-year community colleges across the United States. For equivalent quality of education with full transfer credits, courses taken at community colleges are much cheaper. For example, for lower-division courses, a full-time student in California with in-state residency status and enrolled for 12 units pays only the registration fee of less than $500, versus over $1,000 for public four-year universities. In addition, due to the fact that at community colleges, professors, not graduate assistants, teach courses exclusively without other duties such as research projects, students usually get more student-centered education.

Civil Rights debates in academia: According to news report (June - September, 2014), law-maker and other community leaders in the State of New York is considering to implement Affirmative Action at "Elite" Specialized High Schools to recruit more students from disadvantaged Latino-American and African-American students, using a more inclusive approach to recruit talented students with real academic and career potential, instead of relying soling on a single test, which tends to favor students from higher-income families able to afford private tutoring services and learn how to score high in standardized testing instead of participating in real-world like activities to gain problem-solving abilities. According to English Professor Joel Shatzky, "In a recent report by the Civil Rights Commission, the New York City Department of Education was criticized for relying exclusively on a single test, to determine the eligibility of a prospective student to be enrolled in Bronx Science -which has produced more Nobel Laureates than any other public school, including the most recent in Chemistry - Stuyvesant and Brooklyn Tech as well as several more public high schools that use such tests. The complaint states: For decades, a single factor has been used to determine access to these Specialized High Schools - a student's rank-order score on a 2.5 hour multiple choice test called the Specialized High School Admissions Test (SHSAT). Under this admissions policy, regardless of whether a student has achieved straight As from kindergarten through eighth grade or whether he or she demonstrates other signs of high academic potential, the only factor that matters for admission is his or her score on a single test. Because there is a limit to what any single factor can predict about a person's academic promise, let alone his or her potential to succeed and thrive in life, admissions decisions based solely on a high-stakes test have been roundly criticized by educational experts and social scientists. They also defy common sense. By relying upon a test as the sole criterion, the admissions policy for the Specialized High Schools does not fully capture any student's academic merit or his or her potential." Professor Joel Shatzky further states that "If colleges look at other factors besides a single test in order to determine a student's eligibility for admission, why can't these specialized high schools do so, too? I administered the Honors Program at SUNY, Cortland in the early 1990s and always looked at a variety of factors besides grades to determine the likelihood of success for an applicant. Personal essays, recommendations from teachers, course choice, location of the high school from which the student graduated, extracurricular activities and civic involvement were all considered in my decision. Some of the students with the higher grade point averages who came from privileged backgrounds were often not able to fulfill the requirements for the program

while a significant number of students who worked after school, relied on themselves and who had to work hard to keep up their grades were among the greatest successes. The term "grit" is now being used to describe these students and that is what they had." In my personal opinion, a more holistic approach in determining and predicting the future career success of K-12 students, as well as greater efforts at solving the problems of academic underrepresentation of Latino-American, African-American students, as well as female students of all racial and ethnic groups (including Caucasian) in STEM fields, is well justified in order to solve America's chronic shortage in STEM talents, which varies around 25% for most states and could be as high as 50% for some states.



Let My People Go, written by the late Reverend Moses Chow, a veteran Chinese-American pastor（周主培《骨肉之亲–周主培牧师50年宣教心路历程》）, and published by Ambassadors for Christ Inc. （基督使徒协会， 2007 (ISBN 978-1-882324-50-7)

ABOUT THE LATE REVEREND MOSES CHOW（周主培牧师）

The late Reverend Moses Chow（周主培牧师） is a well-known Chinese-American pastor who have served many churches in the United States and abroad, including Indonesia. His book provides some enlightenment for understanding the appropriate role ethnic Chinese could play in the Overseas Communities in order to live in peace with other groups of people. In his book titled *Let My People Go*（周主培《骨肉之亲–周主培牧师50年宣教心路历程》）, he testified about how a lot of ethnic Chinese in Indonesia made a fortune during the Dutch colonial rule but failed to give back to the Native communities, to identify with the recipient country (Indonesia) but engage in China's internal politics, and thus, causing grievances among the Natives. The book also talked about how 150 years ago, wealthy Europeans settled in Shanghai, China, engaged in opium trades, lived in large mansions, and finally everything is over.

QUOTATIONS FROM THE BOOK THAT MIGHT BE HELPFUL FOR CHINESE-AMERICANS TO THINK ABOUT ACA-5 AND RELEVANT ISSUES ABOUT AFFIRMATIVE ACTIONS IN CALIFORNIA …

About well-to-do ethnic Chinese in Indonesia, a self-examination: The Reverend Moses Chaw described about the social responsibilities of the well-to-do ethnic Chinese Overseas as follows: "When I arrived in Indonesia for the first time, the Dutch were still the rulers; during that period of time, there were three classes of people: the colonialists (the Dutch) who sat up high in a domineering position, far removed from the masses, at the grass-roots were the Natives of Indonesia, and the ethnic Chinese were in the middle. Some people would describe this situation by saying that whatever food left on the table by the Dutch, the ethnic Chinese would

eat, and whatever left by the ethnic Chinese, the Native Indonesians would eat. Therefore, the Native Indonesians are extremely hostile to the ethnic Chinese. The Dutch not only possessed the sovereign of Indonesia but also controlled Indonesia's mineral resources, forestry, agricultural production and sales. In commercial life, the Dutch and the ethnic Chinese used each other under a mutually beneficial arrangement and got what both sides wanted; the ethnic Chinese relied on the political power of the Dutch to operate businesses and make a living; the Dutch used the ethnic Chinese to do business for them as middlemen so that the Dutch only needed to be in charge at high positions. The Dutch were very smart in administering the affairs of the people. They selected a few local elites with prestige and gave them the titles of Majors, or for lower-rank officers with less power, the titles of Captain, granting them the power to administer the local people; they called this the policy of "Using Chinese to Govern Chinese." The grandfather of a large family clan who participated in the church service served as a Mayor during the period of Dutch domination, and their house is a completely Chinese-style luxurious mansion called "the Mayor's Mansion." (page 79) "The majority of ethnic Chinese in Indonesia worked in prosperous metropolitan areas; the ethnic Chinese worked hard and were entrepreneurial; event in poverty-stricken countryside, there were ethnic Chinese merchants; thus, most of ethnic Chinese were well-to-do. But in the eyes of the Native Indonesians, when they saw ethnic Chinese arriving in Indonesia with both hands empty but later on drove deluxe cars and live in luxurious houses like the Dutch, they started to engage in anti-Chinese riots and such social disturbances were hard to control. Whenever there was a chance, I would, in my Sunday Sermons, called on fellow ethnic Chinese believers to think about this problem in a spirit of self-examination. Why the ethnic Chinese loved to become Americans, Dutch, but not Indonesians? We must first love the Natives of Indonesia; we cannot unilaterally enjoy the blessings given by the Almighty God to this land in a selfish manner without any return to this society, or any concern for the needs of the Natives. We cannot singularly complain against the anti-Chinese attitudes of the Native Indonesians without examining our own conduct. […] the local Chinese schools were divided into leftist and rightest camps; some of them raised the Five Star Red Flags on October 1st each year, while others raised the White Sun in Blue Sky Red Flags; the Indonesian Government did not have any restrictions on these activities; but later on, when the People's Republic of China got the upper hand, the number of ethnic Chinese raising the Five Star Red Flags increased. There was a period of time when anti-Chinese riots erupted violently in Indonesia; a lot of people then sold their properties and returned to China, […] When I was in Hong Kong, I met some families who later on left China; because when they left Indonesia, they were required to sign documents to indicate their desire not to return so that they were allowed to return to China with a lot of belongings, they could not return to Indonesia but had to settle in other countries." (pages 84-85).

About well-to-do Europeans in Shanghai, China, a tragic history: When describing what he saw in Shanghai, China, in 1979, on his return to China several decades after the founding of the People's Republic of China, the late Reverend Moses Chow stated as follows: "Shanghai is located by the estuary of the Huangpu River; but it is not until 1843 that Shanghai gradually became an international commercial port and an important metropolitan city trading with foreign countries. Since then, foreign powers coercively imported opium into China against the will of the Chinese Emperors and of the Chinese people. By 1850, opium trade constituted 54% of all imports to Shanghai. […] Wealthy European merchants used to own very large luxurious mansions; some of the big houses belonged to local wealthy elites, high-ranking government

officers, or chieftains of secret societies. The structures of the big mansions are typical of traditional European styles, with high walls, watchtowers, balconies, ceilings covered with colorful ceramic bricks, and chimneys built with bricks. Their sizes are astonishingly large amidst very small living spaces in the surrounding areas. They usually boasted about their wealth in their private gardens with magnificent parties attended by many servants. The Europeans, when they built the above dwellings, planned to stay there for a long period of time but did not think about the time when they would be forced to leave. How did these luxurious houses look now? All foreigners have left; I saw ordinary people living in their former dwellings; when Shanghai was 'liberated' on May 28, 1949, the Government took over these large mansions, divided them up into smaller apartment units. The once beautiful lawns have become vegetable fields, or sites for newly built apartments to house increased number of people. Some of the luxurious mansions have become school campuses while others house the headquarters of the Neighborhood Revolutionary Committees, or even factory plants" (pages 268 and 272-273).

THREE REASONS WHY CHINESE-AMERICANS SHOULD SUPPORT SCA-5 …

The SCA-5 and the split Chinese-American position on the issue: The California Senate Constitutional Amendment No.5 (SCA-5), introduced by California State Senator Edward Hernandez to the California State Senate on December 3, 2012, is also intended to address the problem of academic underrepresentation of Latino-, African-, Asian-American students (except Chinese-American, including Taiwanese-American) in admission into public universities. According to Wikipedia, "Comparing the data in 1996 and 2013: Black students' population increased from 4% to 4.3% out of 6.6% of the California population, Chicanos and Latinos increased from 14.3% to 27.8% out of 38.2% population, Asian increased from 32% to 35.9% out of 13.9% population. The only race group with decreased student population is whites (decreased from 41% to 27.9%, out of 39.4% population)." How do we interpret these data? Well, we can all agree that (1) the representation of all racial and ethnic minority groups have increased but at an unbalanced rate, (2) Black and Latino students' rate of college admission is still far below their proportion in California's total population, (3) Asian students' rate of college admission far surpasses their proportion in California's total population, and (4) Caucasian students' rate of college admission now is far below their proportion in California's total population. Further studies points out that among Asian-American students who got admitted in public universities, the relatively large portion are from Chinese (including Chinese from Mainland China, Taiwan, Hong Kong and Overseas) and Japan, other Asians (such as Vietnamese-, Cambodian-, Filipino-, and Hmong-Americans, actually enjoy very little academic representation. A featured article titled *The Dilemma of Chinese-Americans among Ethnic Minorities* （《华人在少数族裔中的尴尬》） written by Yixian (一娴) and published by The Chinese Press (《侨报》，September 22, 2014), there is, among minorities, sharp conflict on the issues involving SCA-5; Latino-American, African-American, Vietnamese-American, and Cambodian-Americans are mostly in favor of SCA-5, while Chinese-Americans are in a dilemma. Based on information from Wikipedia, the Chinese-American community is split on the issues of SCA5 along social class divide; on the one hand, well-to-do Chinese-American communities in wealthy cities such as Walnut and Silicon Valley are for most part opposed to SCA-5, while some Chinese-Americans from low-income communities are in favor of it. Asian American (including Chinese-American) organizations supporting SCA 5 include Asian Americans Advancing Justice/Asian Law Caucus, UC Asian American & Pacific Islander Policy Multi-campus Research Program (AAPI Policy MRP), National Commission on Asian American

and Pacific Islander Research in Education (CARE), Chinese for Affirmative Action, Asian Pacific Americans for Higher Education (APAHE), Southeast Asia Resource Center (SEARAC), Hmong Innovating Politics (HIP). Chinese-American organizations representing high-income and upper-class Chinese-American communities and opposing SCA-5 include 80-20 National Asian American PAC, the Committee of 100, Asian Americans for Political Advancement PAC, Silicon Valley Chinese Association, and the World Association of Chinese Elites. Many woman, teacher, professional, civil rights and social justice groups support SCA5, including American Association of University Women, California Teachers Association, California Medical Association, and Western Center on Law and Poverty.

Inequality in K-12 school funding and a practical need for solution: My previous research at the University of Georgia as a National Center for Engineering and Technology Education Center Fellow taught me that education performance of each student is not depending on personal efforts alone, but instead, it involves a lot of social factors, a lot of them outside of the control of the student herself or himself. In my personal understanding of available facts and data, some root causes of unbalanced representation in college admission is economic. Due to our system of property tax based financing scheme for K-12 schools, students from low-income communities do not enjoy the same academic and physical conditions (such as lab facilities, teacher training, after school tutoring programs, etc.) as those from well-to-do, high income communities. This factor could partially explain why several decades after the Civil Rights Movement, Latino-American, African-American, and Native-American students are still working hard to achieve racial and ethnic parity in college admissions. This factor could also explain why historically, some Caucasian-American students from low-income communities also suffer from lower academic performance and representation. Another factor is connected to the historical conditions involving the national origins of the ethnic and racial groups. A large portion of Latino-Americans are from impoverished Latin-American countries, including a large number of first generation new immigrants, some of them "undocumented" and are struggling to make ends meet. African-Americans are historically oppressed by slavery and institutionalized racism, with a fairly large portion of population still living in poverty. Native-Americans historically suffered from the some problems of racism plus cultural deprivation.

Reason One: Spiritual Imperative

It is more blessed to start giving than to fight to get more: The above quotation from the late Reverend Moses Chow should be sufficient to persuade those Chinese-American groups from a few well-to-do communities to rethink about all issues involving SCA-5. Instead of calling for resistance against SCA-5, what the well-to-do Chinese-Americans should do is to make voluntary contributions to public universities to create more opportunities for the expansion of public education, just like what a lot of well-to-do Caucasians- and Jewish-Americans have done for centuries. So far, voluntary contributions to public education or any other charitable causes from well-to-do Chinese-Americans are disproportionately small compared to the total amount of wealth the later possess in the United States. Corruption in Chinese-American educational institutions is on the rise as well. As a matter of fact, there are only a few private Chinese-American operated colleges; but some of them are diploma mills. For example, as reported by the Daily News, Susan Xiao-ping Su, originally from the Qinghua University, one of top universities in China, and the founder of a phony university that bilked millions of dollars from

India's students and filed fraudulent visas recently got 16 years in prison. Another Chinese-American operated private university, Herguan University, is currently under investigation for similar problems. All of these have been seriously damaging to the reputation of the Chinese-American communities as a whole. For all of the above reasons, it is morally more imperative for the Chinese-American communities to clean up the above internal problems rather than trying to resist SCA-5.

The impact of the Civil Rights Movement: Before the Civil Rights Movement, Chinese-Americans did suffer from racial discrimination and under-representation in some areas of American public life, and thus, had legitimate reasons to fight for rights and entitlement and to get support from other groups of Americans. Nowadays, with over-representation in public universities in California, it is more difficult to get support from other groups of people either in the resistance against SCA-5 or in any campaign to fight the Glass Ceiling. It would be spiritually healthier to think about making contribution to the society and becoming a genuinely Model Minority instead.

Reasons Two: Political Reality and Past Experience

Complicated factors in the status of ethnic Chinese in the United States: For the Chinese-Americans, the picture on the civil rights issue is much more complicated. On the one hand, Chinese-Americans historically were victims of Chinese Exclusion Act; on the other hand, during World War Two, and the Cold War, the ruling Nationalist Party now exiled in Taiwan has received substantial amount of foreign aid from the United States Government, which has been estimated as five times as large per resident of recipient political entity as European nations under the Marshall Plan, resulting in Taiwan becoming an economic powerhouse of Asia; in addition, in order to defeat the Soviet Union, Presidents Richard Nixon and Jimmy Carter led the United States to reconcile with the People's Republic of China, paving the way for Deng Xiaoping's economic reform that has made China the second largest economic entity today; in addition, during the colonial rule of Southeastern Asian countries, such as the Philippines, Malaysia, Singapore, Burma, Indonesia, Viet Nam and Cambodia, the economic policies of the Western colonial powers tended to favor Overseas Chinese elites as kind of "lieutenant colonialists," resulting in the formation of a large middle-class and well-to-do Overseas Chinese commercial and intellectual elites in these countries. All of these factors might translate into the fact that Chinese-Americans today are for most part, in a better position than other minority groups in the United States. In addition to the economic factors, some people, especially conservative Chinese-Americans, tend to argue that Chinese-American families tend to have "strong" parents like "Tiger Mothers" to discipline their children; this is true but does not deny that other factors exist. In fact, a lot of Chinese-Americans, especially those from new immigrant families arriving in the United States from the People's Republic of China in the recent decades, are living in low-income communities and like a lot of Latino-Americans, are still trying to make ends meet (I personally know a lot of them who even cannot afford to take advantage of all benefits offered by the community college system. This might be one of the reasons why there is a split in Chinese-American attitudes towards the Affirmative Action and SCA-5.

Ethnic-Chinese practice of affirmative action in Southeast Asia: In fact, Affirmative Action based on racial quota is NOT new to Chinese. In Malaysia and Singapore, after independence

from Great Britain, the Ethnic Chinese political and commercial elites took a "democratic socialist" approach of economic and academic quotas, to allow the Native Malay people to have a fairly large piece of the pie; this allow the three principal racial groups, i.e., Native Malays, Ethnic Chinese and Ethnic Indians to live in peace. In Indonesia, on the other hand, the commercial elites of Ethnic Chinese communities choose a totally different rout, refusing to share wealth with the majority of Native Indonesian population (most of them Malays), resulting in cyclic outbursts of anti-Chinese riots which cause a lot of losses in life and properties. This tragedy has been explained in the above-mentioned book by the Chinese-American paster, the late Reverend Moses Chow. In China, since the 17th Century, the Government of the Great Qing Empire of China led by the Manchus, a small minority ethnic group (0.5% of total population of China), practiced ethnic policies similar to affirmative actions and a balanced economic policy promoting extensive welfare systems for the poor at grass-root level with encouragement from the Imperial House but minimal control from the central government, and has successively governed China's more than 50 ethnic groups for over 300 years, without any group demanding independence from China. In 1911, the Chinese Nationalist Party overthrew the Qing Government and started to increase tax burdens on China's peasants while providing the elites more privileges and discriminate against China's ethnic minorities, resulting in the overthrow of the regime in 1949, barely 38 years after the founding of the "Republic of China," the shortest-surviving regime in China's over 5,000 years of history, in Outer Mongolia leaving China in the 1920s, and racial tensions in Eastern Turkistan that almost ended up in territorial separation in the 1940s. After 1949, the Government of the People's Republic of China started to change the policies of the Nationalist Party and gave disadvantaged minority ethnic groups some representation in the political process as well as economic assistance, and have so far maintained Chinese territorial integrity.

Resistance against SCA-5 a risky business: Based on these facts, it would be highly advisable for those Chinese-American groups representing the economic interests of the well-to-do and high-income communities to stop resisting SCA-5, but instead, learning from the good example of the Jewish-American communities, which have historically restricted their own college admission rate at prestigious American universities to make room for other groups of people. Public universities are developed to be primarily open to students from low- and middle-income families, and are by no means intended for well-to-do families to save money on education and still living and investing in pricy homes. This is common sense; and if a few Chinese-American groups representing the interests of well-to-do elites continue to resist SCA-5, they will not be able to win the support of the majority of Chinese-Americans, let alone Cambodian-Americans, Vietnamese-Americans, low-income Caucasian-Americans. They will simply damage their own image plus the good reputation of Chinese-American communities in the United States as a fairly-minded and hard-working Model Minority.

Internal conflicts among diverse Chinese-American groups and need for new ideas: Instead of resisting SCA-5 and fighting the so-called "glass ceiling" (or "under-representation" of Chinese-Americans, or to be more accurate, Chinese-Americans of high-income bracket, in the top positions at United States Government or big corporations), I would like to advise well-to-do Chinese-Americans to (1) think about taking care of the needs of less-fortunate Chinese-Americans; (2) think about taking care of the needs of less-privileged Americans of all other ethnic groups; (3) say Goodbye to Han-Chinese Nationalism, Sino-centrism, and Greater China

Chauvinism, and become a genuine Model Minority fully integrated into America's Mainstream society, not only in possession of wealth and in academic achievement, but also in charity, social service, ecologic stewardship, and in responsible and law-abiding global citizenship. As a matter of fact, as a disastrous consequences of over 38 years of Civil Wars in China during the "Republic of China" Period (1911-1949) and later of the political chaos of the 10 years of Cultural Revolution Period (1966-1976), Chinese-American communities are plagued with serious problems of internal conflicts due to confrontational differences in ideological orientations (support for the People's Republic of China versus support for Taiwan), in regional cultures and languages or dialects (speakers of Mandarin, the official language of China including Taiwan versus speakers of Cantonese dialect), in social-economic status (the wealthy living in million-dollar pricy homes versus the poor working in sweatshops). Unless all of these mutually hostile groups could reach some degree of healthy compromise and reconciliation in a meaningful way, any advocacies made by middle-class Chinese-American elites for resistance against SCA-5 or the Glass Ceiling would be totally meaningless and out-of-touch with political realities at the grass-roots. In fact, political events organized by Chinese-American groups in the recent two decades usually attract less than 1,000 people, reflecting the very fragmented nature of the Chinese-American communities, which is sharply divided into four major camps: (1) supporters of the People's Republic of China (the "Red Camp," around 10%-15% of Chinese-Americans in the Greater Los Angeles Area, based on the number of participants in annual celebration of the National Day of the People's Republic of China, on October 1, around 10,000 people out of close to 120,000 Chinese-Americans in the Greater Los Angeles Area), (2) supporters of the Nationalist Party of China in Taiwan (the "Blue Camp," around 5%, or less than 5,000 participants in the annual celebration of the 1911 anti-Manchu Rebellion), supporters of the Taiwan Progressive Democratic Party (the "Green Camp," around 2%, or less than 2,000 participants commemorating the February 28 Taiwanese Insurrection against the Chinese Nationalist Party), and the Americanized Mainstream Chinese (around 80% of Chinese-Americans, many of them descendants of the political or economic refugees during the 38 years of Civil Wars in China, including a lot of Manchus and Han-Chinese loyal to the Manchu-led Great Qing Government or its successor the Beijing Government of the Republic of China under President Yuan Shi-kai, which has been overthrown by the 1924-1927 Nationalist Revolution, which was led by Mr. Sun Yat-sen and General Chiang Kai-sheck and supported by the Soviet Union and the Communist International; due to historical grievances, they are hostile to the Chinese Nationalist Party and usually take a realistic attitude towards the People's Republic of China based on the principle that "my enemy's enemy is my friend;" these people could be classified as the "Golden Camp" since gold is the color of the Manchu Qing Imperial House. The Americanized Mainstream Chinese-Americans are usually indifferent to internal affairs in China, such as political conflicts between the Chinese Nationalists and the Chinese Communists, and generally speaking, in the American politics, they behave just like Anglo-Americans, either as liberals or as conservatives, but rarely align themselves with either end of China's political spectrum. A lot of them even do not speak Chinese at all).

Healthy voice within the Chinese-American communities in California: As a matter of fact, a large portion of Chinese-Americans do support SCA5. According to a news report titled *Do Voters Support Affirmative Action? SCA5 Might Come Back* (《选民支持高教平权？SCA5或卷土重来》), on the Chinese-language version of The Epoch Times (《大纪元时报》, October 8, 2014, B2), a conservative daily previously opposed to SCA5, the Pasadena Star News conducted

public opinion survey on the issue and published the results on September 25, 2014, showing that around 60% of Chinese-American voters support SCA-5.

Practice of affirmative action at prestigious private universities: Another fact worth consideration in the debates on the issue of SCA5 is that, many prestigious private universities, including Harvard University, implement Affirmative Action policies with provisions of quotas and racial balance in the student admission process. As reported by the Epoch Times (《大纪元时报》, a conservative Chinese-language newspaper, in a news article titled *Asian-American Students Sued Harvard University for Discrimination in the Student Admission Process* (《招生涉歧视亚裔生起诉哈佛》, Wednesday November 19, 2014, A3), it is reported that at Harvard University, the required SAT scores for Asian-, Caucasian, Latino- and African-American students are 1,460, 1,320, 1,190, and 1,010 respectively. Mr. Robert Iuliano, Legal Advisor for Harvard University defended the policies of Affirmative Action with quotas and racial balance provisions as completely legal, in a statement delivered to the Fox News. The United States is a nation with diverse racial and ethnic groups; American corporations are operating in a globalized economy dealing with many nations with diverse racial and ethnic backgrounds; thus, nowadays, in order to ensure a diversified workforce, affirmative action with quotas, instead of purely mechanical measurement of individual qualifications, has been accepted as a normal practice in hiring decisions.

Change in global economic relations and its potential impact on affirmative action: While China is becoming an international economic powerhouse, cost of life and wages are rising, and corporate profit margins are decreasing. As reported by news media, a lot of American corporations are moving their production projects out of China into Mexico and other developing nations in Asia and Africa. This trend will continue and thus, corporate workplaces are increasingly in need of a more culturally and linguistically diversified human resource, such that racial or ethnic-based quota in hiring is likely to become a more acceptable practice. Universities, either public or private, are reflective of the social-economic realities of the civic or corporate world. In other words, traditional mechanism of distribution of employment opportunities based on individual merits alone is becoming more integrated with new necessities based on the principle of collective well-being and a more balanced distribution of benefits and interests. Therefore, it looks like that affirmative action will continue in private universities or even restored in public universities in California. Nobody in the world could stop the evolution of history; thus, Chinese-American communities need to change the age-old pattern of thought to make progress with the passage of the time.

Reason Three: Economic Affordability

Horse betting or investment in education: Instead to spending money resisting SCA-5, a futile action that has little chance to succeed and will cause problems between Chinese-American and other minority groups in the United States, and also ruin the good reputation of Chinese-American communities, it would be more economical to find other solutions. As reported by Chinese-language news media before, well-to-do Chinese each year spend about 100 billion dollars per year in gambling activities, as reported by the Chinese-language newspaper China Press (《侨报》，October 17, 2014), in a news report titled *Mainland China Removed Ban on Horse Betting and One Hundred Billion USC Dollars May Return from Offshore* (《 大陆解禁

赌马千亿境外博彩资金有望回流》); this amount is enough to give a $20,000 scholarship each year to 5 million Chinese-American graduate students, and certainly enough to establish a few private universities recruiting Chinese-American students alone! As a matter of fact, as reported by the same newspaper on September 29, 2014, A3, many wealthy Chinese family sent their kids to expansive private universities in the United States; many of these wealthy kids showed of their wealth by driving deluxe cars at high speed in the neighborhood, causing a lot of problems, including grievances from some impoverished residents, and killing of well-to-do Chinese students at expansive private university campus such as the University of Southern California; and tragically, due to social conflict between the Nouveau Rich and the poor in China, whenever wealthy Chinese students are killed in American university campuses, ordinary Chinese back home do not show any sympathy but instead celebrate. These shocking news should cause those within the Chinese-American communities, especially in the well-to-do cities such as Silicone Valley and Walnut, to think about SCA-5 in a more transcendental manner, with a spirit of self-examination as advocated by the late Reverend Moses Chow, and to find a better solution for their long-term interests, as well as the long-term interests of the Chinese-American communities as a whole in a more strategic perspective.

It would be more enlightened for the Chinese-American elites to think about establishing a few successful Chinese-American operated private universities to educate Chinese-American students from well-to-do families instead to having them compete with other ethnic groups in public university admissions. This would be a more economical solution in the long run.

For the above three reasons, Chinese-Americans should support SCA-5.

My position on the SCA-5 legislation

My position on the SCA-5 legislation is simple: (1) for the time being, as a temporary measure, SCA-5 is ABSOLUTELY needed to achieve a more reasonable representation of all racial and ethnic groups in California in terms of admissions at public universities; (2) better mechanisms involving reform in school financing and promotion of a more education-friendly cultural pattern across all ethnic and racial groups should be entertained as a long term strategy for leveling the ground for academic performance among all ethnic groups, so as to achieve a genuinely color-blind academia. These are the realistic approaches to solve the problem.

A NEW MODEL OF AFFIRMATIVE ACTION …

A new model of Academic Affirmative Action: The primary objective of the Proposed Model for K-12 STEM Education, which has been explored in my Vision Paper, is to make sure that all students, regardless of race or ethnicity, gender, social class, parental profession, have equal access to quality STEM preparations at K-12 level. This is the continuation of the previous endeavors of the American people for a better education system that offers greatest possible opportunity for all students to learn and master the essential skill for life-long success and to broaden their perspectives for a more innovative career life. This is the reason that I call it an "Academic or Scholarly Affirmative Action," one that could offer future generations of American people an Innovation Deal in the 21st Century, which could still be a New American

Century if we act now to substantially improve our K12 STEM education.

Unlike the Economic Affirmative Action and the Gender and Ethnic or Racial Affirmative Actions, all of which are based on the idea that the government play the role of Robin Hood and Big Brother redistributing wealth, power and social positions, taking away the privileges from certain groups of citizens to give them to some disadvantaged groups in order to achieve the great ideal of social equality or the appearance thereof, the Academic and Scholarly Affirmative Action is proposed for all residents of the United States, with neither preferential nor discriminatory treatment to any group. It is a win-win solution for all groups of students: (1) for the low-performing students from economically disadvantaged school districts, opportunities for STEAM preparation will be offered so that students could have a real chance to enter high-paying STEAM careers of their own choices; and (2) for the high-performing students from all school districts, especially the well-to-do ones, more rigorous and real world like STEAM preparation will be offered so that the students could explore their STEAM careers at an earlier age, to the highest extent of their talents. Therefore, it is a win-win deal, a new type of game with no losers and no Robin Hood.

The Academic or Scholarly Affirmative Action is NOT aimed at replacing the previous types of Affirmative Actions; instead, it is supplemental to them but could help the American people to reduce their dependencies on them in a realistic and meaningful way. Therefore, it is within the logical continuum of American people's heritage of middle-of-the-road, gradualist social change for the benefits of all.

A practical implementation: It could be gradually implemented, starting as a non-profit social enterprise, with the concept of servant leadership as the guiding principle for its organizational management. At the very beginning, the conceptual framework for the selection of K-12 age-possible engineering topics, described in my Vision Paper (pp. 28-27), could be used to preliminarily determine what topics in each relevant engineering course could be tried in K-12 classroom; next, some K-12 schools from disadvantaged districts could be selected for the pedagogic experiment as an after-school engineering enrichment program; next, the K-12 students participating in the program could be tested on the same topics as a selected group of community college engineering students; next, the comparative outcomes could be analyzed to determine the feasibility of further pedagogic experiment and to plan for remedy or improvement of pedagogy. The reason for selecting K-12 students from disadvantaged districts is very simple. If selected engineering topics with scientific principles and formula-based predictive computational skills could succeed among disadvantaged students, we could make a reasonable assumption that they have a better chance to succeed among better-off students from well-to-do districts; therefore, such pedagogic experiment could have wider application among all students in the United States.

The implementation of the Proposed Model for a Streamlined, Cohesive, and Optimized K-12 STEM Curriculum with a Focus on Engineering, after the completion of the research to determine K-12 age-possible engineering topics, could take three basic formats:

(1) **The STEM-Integrative Format: Incorporation into existing K-12 mathematics and science (physics and chemistry) curriculum**, (a) by K12 school teachers of mathematics at all

grades in the inclusion of engineering application problems as homework assignment to show students how mathematics skills work in the real world of design; everyone knows that without real world application, mathematics problems are "boring;" (b) by high school teachers of physics and chemistry to show how relevant scientific principles are applied in the solution of real world engineering design problems. This is another part of the most recent and immediate goal of this research, which could help K-12 mathematics and science teachers to connect students to real-world problems.

(2) **The Project-Selective Format: Adoption as reference resource for existing "project-based-learning" K12 engineering curriculum packages**, by other K12 engineering and technology curriculum developers as references in the inclusion of formula-based engineering computational skills into their existing "project-based-learning" curriculum and instructional materials. This is the most immediate and recent goal of this research, which could help to solve the problems in the current practice of K-12 engineering education, as discussed in the authoritative report issued on September 8, 2009, by the Committee on K-12 Engineering Education established by the National Academy of Engineering and the National Research Council, titled Engineering in K-12 Education: Understanding the Status and Improving the Prospects, which included the absence of cohesive K-12 engineering curriculum and the lack of well-developed standards, issues that have been already addressed in the Vision Paper.

(3) **The SCHOLAR STEAM K12 Plus Format: The formation of a highly practical and innovative platform, within the existing American K-12 school system, for the training of next generation of STEAM talents**, by supporting teachers, school administrators and community leaders, in pedagogic experiments leading towards the eventual development and publication of a comprehensive set of FREE online K12 engineering and technology textbooks or instructional modules, as "public domain" educational resources, to be used by K12 students in the United States. This is the ultimate goal of the outcomes of this research, which could be gradually implemented through experiments and improvements, step-by-step, taking into consideration the pedagogic traditions of America's K-12 school systems, while pragmatically promoting meaningful changes that could help to maintain the leading position of the United States in STEAM education. Two possible options could be entertained as viable strategies for the implementation of the SCHOLAR STEAM K12 Plus model in the engineering and technology pathways: (i) In the initial stage of the formation of the SCHOLAR STEAM K12 Plus Model, carefully selected courses or subjects that might have greater chances to succeed, such as Introduction to STEAM for K12, Engineering Materials for K12, Engineering Economics for K12, Engineering Graphics, CADD and Product Design for K12, Engineering Programming for K12, Introduction to Global Positioning System and Land Surveying for K12, and Introduction to Robotics and Programming for K12, could be taught to middle and high school students as stand-alone elective courses to try out their age-appropriateness, and if successful, they could be made transferable to college level engineering programs with full credits; and (ii) carefully selected topics from all proposed subjects or courses listed in this website under the Research Outcomes tab could be cohesively integrated into a few elective courses, taught to middle and high school students to try out the age-appropriateness of the topics; and if successful, they could help graduates from K12 systems better prepared for the challenging college engineering programs, by decreasing the dropout rate in the freshman and sophomore years. The above strategies are based on the advice from the engineering faculty at

East Los Angeles College.

We do Not, SHOULD NOT and CANNOT expect all future Americans to become STEAM professionals; however, we could try our best to provide all future Americans interested in STEAM careers a highly streamlined and cohesive path leading towards their chosen career objectives, starting at K-12 years, going through community colleges, four-year universities, graduate schools, field practice and life-long training in new technologies.

WHY ACADEMIC AND SCHOLARLY AFFIRMATIVE ACTION? FROM TWO PERSPECTIVES ...

Previous types of Affirmative Actions, either economic or Gender and Ethnic/Racial, despite of their shortcomings, limitations, controversies, or even some real or perceived negative consequences, are the inevitable outcomes of the gradual evolution of the American society towards a more democratic, egalitarian, harmonious and peaceful future. They cannot be abolished without causing further problems in American society; however, we could continuously work towards their improvement so that any negative side effects could be minimized while their remedying benefits. John Dewey, the great American educator, used to say that the remedy for the ills of democracy is more democracy. We could think in a positive way that the cure for the ills of the past models of Affirmative Actions is NOT the abolition thereof, but instead, better instrument of Affirmative Actions. The Academic and Scholarly Affirmative Action is proposed, NOT as a substitute, but as a supplement to the Economic and/or Gender and Ethnic/Racial Affirmative Actions, which could possibly reduce dependencies on welfare and quotas, by educating a greater number of future American talents in STEAM, and thus, promote sustainable economic growth and opportunities for employment and entrepreneurship. As mentioned before, Academic and Scholarly Affirmative Action is a win-win deal with winner, loser and Robin Hood; therefore, it is a better type of Affirmative Actions.

FROM THE SOCIAL-ECONOMIC PERSPECTIVE …

FOR THE FINANCIALLY DISADVANTAGED COMMUNITIES (THE "MASSES") …

Academic and Scholarly Affirmative Action could help more children to engage themselves in high-paying jobs or high-tech entrepreneurship, with better K12 curriculum. A Streamlined, Cohesive, Holistic, Optimized, Life-long, Adaptive and Re-adjustable (SCHOLAR) Model with a focus on engineering could help more children currently living in poverty to become financially successful professionals in science, technology, engineering, arts and mathematics in the near future. Think about this scenario: You are born into a single-mother family living on welfare, you want to become a Lewis Latimer, a better school with a better STEAM curriculum will help you with necessary tools and settings, and more importantly, a much smoother learning curve, and more student-centered pedagogy, for your eventual success in academia, career, and business.

FOR THE FINANCIALLY ADVANTAGED COMMUNITIES (THE "ELITES") …

Academic and Scholarly Affirmative Action could help providing sufficient number of high-tech workforce and thus, increase corporate profit margins. A Streamlined, Cohesive, Holistic, Optimized, Life-long, Adaptive and Re-adjustable (SCHOLAR) Model with a focus on engineering could help more children to become top leaders in science, technology, engineering, arts and mathematics in the near future, with greater impact on American society and the international community. Consider this scenario: You are born into a wealthy family in Beverly Hills, you are very talented and you want to be a Henry Ford, but your parents' skills are at business management and have little to do with calculus stuff, physics or engineering; an engineering curriculum starting at elementary school will help you became a genius from early childhood; therefore, an Academic and Scholarly Affirmative Action will make your Big Dream a reality sooner.

FROM THE COGNITIVE AND PEDAGOGIC PERSPECTIVE, A NEW DIMENSION OF STUDENT-CENTERED PEDAGOGY IN K12 ENGINEERING AND TECHNOLOGY EDUCATION IN THE AGE OF DIGITAL REVOLUTION AND EDUTAINMENT …

Science and engineering are challenging majors for college students. Although on the paper, a Bachelor of Science degree is considered a four-year program, in reality, it takes an average of six years to complete one. In addition, compared with any majors in the humanities, such as law, psychology, arts, music, and many others (the "soft majors"), science and engineering majors (the "hard majors") are about twice as difficult and more complicated in terms of higher mathematics skills needed, the time and efforts spent in textbook reading and homework assignments. Shortage in domestic engineering graduates in the United States has been reported by many scholars and business leaders. For example, Dr. Robert Wicklein, Professor at the University of Georgia College of Education, indicated in a journal article titled *Five Reasons for Engineering Design as the Focus for Technology Education*, published in *Technology Teacher* (65(7), pp. 25-29), in 2006, that "currently, engineering education has close to a 50% attrition rate for students. Georgia currently seeks 50% of the engineering workforce from out-of-state sources." From what I have heard, in the United States, among all graduates from engineering

programs each year from ABET -accredited engineering programs, the number of domestic American students hovers around 80,000; and this is alarmingly a very small number compared with close to a population close to 300 millions; furthermore, it is believed that 30 years ago, American engineers constituted around 25% of the total number world-wide. The reasons for this decline are complicated. Nevertheless, one reason is obvious: engineering programs are more difficult to pursue than others; they require four calculus courses (calculus 1, 2, 3, plus differential equations), plus four physics courses based on calculus mathematics. Students are already overburdened with all science, mathematics, major and General Education mandates; therefore, imposing more mandates will not work to reverse the declining trend, it simply will make things much worse; loosening up on existing mandates will not help to improve the quality of American engineering education either. In addition, as a matter of fact, due to explosion of knowledge and technology, college engineering professors sometimes have to cut off some chapters in the textbooks in order to focus on the most important topics and to allow students to complete the courses.

Therefore, a realistic solution would be to streamline the engineering education process, by developing a K12 engineering curriculum that would allow students to study and master appropriate portions of engineering content knowledge and skills at K12 level, which should be suitable to their degree of cognitive development at each of the grades, especially at middle and high school levels, as measured by their mastery of mathematics skills and their knowledge about sciences (i.e., physics, chemistry and relevant others), and directly transferable to college engineering courses. This cannot be accomplished by a "trial-and-error" approach, it needs to be based on a carefully organized sequence of topics incorporating (1) descriptive and informational knowledge and (2) analytic and predictive computational abilities. Doing so is emancipatory to graduates from American K12 schools in terms of getting them well prepared for challenging engineering majors at college level; and this student-centered approach might work to reverse the declining trend. We also know that success in engineering education requires, beyond the exterior social-economic conditions such as investment in lab equipment and facilities, spending on scholarships and other forms of financial aid to students, or hiring of competent professors, something more metal-physical and mysterious that we might call "talent" or "genius," which more often than not, has no direct correlation with the students' backgrounds (social class, gender or race/ethnicity). Students could be born into poverty and be very talented to handle complicated engineering topics; students could be born in wealth but do not have enough IQ to handle calculus; perseverance can help average students to overcome shortage in IQ but a more streamlined learning process would be of greater help. The Academic and Scholarly Affirmative Action is proposed to help students of all IQ levels to achieve their engineering dream, regardless of economic status, gender, race/ethnicity or even the educational level of their parents or their own IQ.

In this Age of Digital Revolution and Edutainment, engineering major is competing with the others in student recruitment and retention. Application of new technology is important to increase the competitiveness of engineering programs. The gradual implementation of a streamlined model of K12 engineering curriculum will get help from new instructional technologies.

FOR STUDENTS WITH AVERAGE IQ (THE "DUMMIES") …

A streamlined learning process will help students of average cognitive aptitude to succeed in engineering majors and to become competent professionals in a more realistic way; it could help under-achievers to become high achievers.

FOR STUDENTS WITH HIGH IQ (THE "GENIUSES") …

A streamlined learning process will help students of above-average cognitive aptitude to succeed much faster in engineering majors and to become leading professionals in a more effective way; it could help high-achievers to become top achievers.

WHO BENEFIT FROM AFFIRMATIVE ACTIONS?

For the Economic Affirmative Actions: The beneficiaries are private corporations of all scales (large, medium, and small) in times of economic crises, the elderly of all social classes and ethnic groups, the lower-middle and low-income families of all ethnic groups. In terms of absolute numbers, the White or Caucasian-Americans constitutes the largest number; but in terms of ratio per population, some traditionally disadvantaged ethnic groups have higher proportion of families supported by various welfare programs.

For the Gender and Ethnic/Racial Affirmative Actions: The beneficiaries are women of all ethnic groups and disproportionately under-represented minorities, the White or Caucasian-American women constitutes the largest number; but in terms of ratio per population, some traditionally disadvantaged ethnic groups have higher proportion of beneficiaries per population from programs associated with Affirmative Action - Equal Opportunity Programs.

For the Futuristic Academic and Scholarly Affirmative Actions: The beneficiaries will be all Americans, regardless of parental financial status, gender or race/ethnicity. Obviously, in terms of absolute numbers, the largest number of beneficiaries will come from financially disadvantaged school districts regardless of race/ethnicity or gender; however, in terms of creating an enlarged team of top leaders in science, technology, engineering, arts and mathematics, with greater impact on the progressive evolution of the mankind, children from the financially advantaged school districts might be the largest group of beneficiaries. To be frank and straightforward, the Academic and Scholarly Affirmative Action is not intended to guarantee absolute equality in STEAM education for all Americans; however, it does promise to (1) create the necessary conditions for the disadvantaged to succeed; and (2) enhance the conditions for the advantaged to succeed much further. Thus, it is an Innovation Deal USA for the 21st Century, a win-win deal for all.

Let the Innovation Dream become a reality!

We shall overcome!

Venceremos!

EXPECTED QUALITIES OF THE NEXT GENERATIONS OF AMERICAN STEAM TALENTS

At the start of my graduate studies at the University of Georgia, back in 2007, my dream of promoting a Streamlined, Cohesive, Holistic, Optimized, Life-long, Adaptive and Re-adjustable (SCHOLAR) Model with a focus on engineering for the next generations of American students was, in term of its purposes, objectives and goals, restricted to increasing the number of domestic graduates from engineering majors so that, we the American people could maintain and consolidate our leading positions in both civilian and military technology, developing better-selling equipment and products at home, sending more engineers to Asia, Africa, and Latin-America to help our trans-national corporations to explore more natural resources, built more factories to produce more consumer products for domestic consumption and export to international market, and defend American financial assets abroad and free trade world-wide with a more powerful and high tech-equipped United States Armed Forces; in other words, they are restricted to practical economic considerations alone. I discussed my dream with one of my professors at the University of Georgia and one of my fellow scholars, they advised me to think about ethical and other issues as well, otherwise, "people will say that this is imperialism, colonialism, colonization; this is what we have been doing in the last several decades; people will say that you are a greedy capitalist; do not go to the Third World just to exploit people! Otherwise, people will go to street to protest, and you will be dangerously provoking a revolution!" After a painful process of soul searching and a more open-minded review of publications critical to my mainstream understanding of Globalization, I have reached a new understanding about progress, an interpretation of progress as the outcome of ethical and appropriate application of appropriate technology, which naturally go beyond simple economic calculations to include considerations for such important values as human rights, social justice, environmental protection, and sustainable economic development. This shift of paradigm is fundamental in light of a new understanding of American patriotism from the one based on pure materialistic and economic calculations to the one based on multiple dimensions incorporating both ethical and ecological concerns. In light of this new understanding, the qualities of the next generations of American STEAM talents could include the following:

Ethical standards: The next generations of American engineering and technology talents could be educated in elementary schools' introduction to STEAM courses, on the vital issues of social justice, environmental protection and professional ethics, which are appropriate to their age, through team-work projects, recycling activities, video demonstrations, and other age-appropriate activities. This could help them to be well prepared for the challenging future positions as ethical and talented leaders in their respective professional practices and social life, at local, national and international levels. In their future engineering and technology careers, they could creatively use their talents to better serve the real needs of the mankind, integrating short-term profit motives with long-term sustainable development objectives, promoting free enterprise within the framework of ethical social enterprise, by developing socially responsible and environmentally sustainable products and systems, using ethically and ecologically appropriate technology and materials.

Professional skills: The next generations of American engineering and technology talents could

be extensively trained at middle schools in hands-on and digital technologies associated with product engineering and design, and thus, getting ready for real-world like engineering and technology courses at pre-calculus level at high schools. During their life-long career practices, they could return to community colleges to learn new digital skills in engineering design and simulation, in the institution that so far has been proven as the best for offering new courses in this area. The next generations of American engineering and technology talents could possess three fundamental skills: (1) **"pencil-on"** skills for predictive computations using formulas with pencil and paper; (2) **"mouse-on"** skills for design simulation with engineering software; and (3) **"hands-on"** skills making design prototypes with relevant lab tools and equipment.

Entrepreneurship: The next generations of American engineering and technology talents could be introduced to the basic concepts of business organization and management through engineering design team projects at high school graduation year, getting prepared for corporate management tasks, leadership in governmental, civic, educational, research and charitable institutions, as well as for starting up new high-tech business with socially responsible and ecologically sustainable economic growth, both in the United States and globally. They will be equipped with the basics of leadership skills such as team building, social outreach, and e-commerce.

STUDENT-CENTERED K-12 STEAM EDUCATION: JUST SAY GOODBYE TO "TIGER MOTHERS"

Around 2011, *The Battle Hymn of the Tiger Mother*, a book related to child development issues was published by Amy Chua, a Chinese-American lawyer, writer, and legal scholar with parental backgrounds in the Philippines, and a John M. Duff, Jr. Professor of Law at Yale Law School. According to Wikipedia, the Free Encyclopedia, an article published under the headline "Why Chinese Mothers Are Superior" in the *Wall Street Journal* on January 8, 2011, contained excerpts from her book, in which Chua describes her efforts to give her children what she describes as a traditional, strict "Chinese" upbringing. The book has caused controversial debates among scholars and parents at grass-roots. Some believe that Amy Chua's methods of parenting are good for American parents, while others criticize them as unnecessarily harsh. After some positive reports on the book in 2013, China Press （《侨报》）reported on October 6, 2014, C1, in a news article titled *Questioning "Tiger Mother Education" Expets Have Something to Say* （《质疑"虎妈教育"专家有话说》）. In the article, it has been reported that Professor Cixing Wang （王慈欣）also a Chinese-American, at California State University Riverside, together with several scholars from across the United States, including Yan Xia （夏炎）at the University of Nebraska - Lincoln, Wenzhen Li （李文贞）at the University of Nevada, Stephen M. Wilson at Oklahoma State University, and Gary Peterson at the University of Miami, have jointly published a research paper on the January 2014 issue of the *Family Issues*, in which the concepts of controlling and punishing children for not excelling in schools, instead of encouraging and helping, have been criticized with case studies that indicated that such harsh methods often lead children to mental depression and other types of psychological problems, instead of academic success. Professor Cixin Wang indicated that "Tiger Mother" style parenting relies on negative high pressure control instead of positive encouragement, and is not a good method of parenting; and rather than trying to be "Tiger Mothers," parents need to learn how to

be affirmative of their children's achievements, to be loving and supporting. In my personal opinion, although I do believe that American parents need to teach kids more disciplines, "Tiger Mother" style "traditional strict Chinese" parenting methods are simply too autocratic, restrictive, coercive and thus out-of-dated to fit America's modern, democratic, and post-industrial society. What we need the most is actually more student-centered K-12 STEAM education, making the learning process more streamlined and more entertaining, so that students could master the essentials in a more convenient and effective way, while growing in their abilities to analyze and solve real-world problems in a real-world fashion, and to imagine and innovate according to their levels of cognitive maturity at each grade of K-12 education. This requires a more holistic integration of traditional essentialist pedagogy (or the "strict" with "pencil-on"), which is still widely used in the teaching of mathematics, physics and chemistry, with modern digital technology including CADD and design simulation (the "fun" with "hands-on" and "mouse-on").

Therefore, let us just say Goodbye to "Tiger Mothers!"

A MIDDLE-OF-THE-ROAD APPROACH IN K-12 STEAM EDUCATION REFORM : "JUST SAY NO TO LEFT OR RIGHT RADICALISM! JUST SAY GOODBYE TO REVOLUTION!"

The Vision Paper with a Proposed Model for a Streamlined, Cohesive, and Optimized K-12 STEM Curriculum with a Focus on Engineering is based on the philosophical foundation of non-partisan, eclectic, moderate, dialectic, non-metaphysical, and incremental progressive-conservatism and idealistic-pragmatism, taking into consideration the fundamental interests of all stakeholders in K-12 education reform, including those from corporations, labor unions, teachers unions, conservationists, religious organizations, and civil libertarians, while looking into the future with a well thought-out strategy, and many well-defined methodologies at tactical levels.

Idealistic-pragmatism: At philosophical level, the Proposed Model is aimed at providing all future K-12 students in the United States an opportunity to choose their future career pathways in STEAM with all necessary hardware and software supportive of a modern teaching and learning environment; thus, it is definitely an idealistic model. However, it does not attempt to make all future K-12 students STEAM talents with the same professional status, which is neither possible nor necessary; it merely attempt to: (1) provide the best possible conditions for those who choose STEAM as their future innovative careers: and (2) allow those who do not an opportunity to selectively engage in a few STEAM courses as a way to enhance their innovative abilities; thus, it is also a pragmatic model.

Conservative-progressivism: At pedagogic level, it is aimed at applying the traditional pedagogy still used in mathematics, physics and chemistry, i.e., a teaching and learning process based on textbook reading, classroom lecture and presentation, home works, quizzes and exams, in K-12 engineering and technology education, in a step-by-step sequence moving from one topic to another in an appropriate pre-requisite order; thus, it is a conservative model. However, taking into account that engineering and technology are more "hands-on" and are actually the

real-world applications of mathematics, physics and chemistry, which are more "theoretical," a mechanical application of the traditional essentialist pedagogy used in mathematics, physics and chemistry is not necessarily the best; therefore, based on some successful experience of the Project-based Learning K-12 engineering and technology curriculum which have been tried across the United States with various degrees of success, the Proposed Model advocates the inclusion of mini engineering and technology design projects within each K-12 engineering and technology major course, and graduation year (grade 12) "capstone Design" project; thus, it is also a progressive model. The Proposed Model is an eclectic and dialectic integration of both traditional and modern pedagogies.

Middle-of-the-road non-partisanship: At political and ideological levels, the Proposed Model maintains a strict balance between the left-leaning and right-leaning tendencies in the debates on K-12 education reform in the United States. The left tends to demand an end to inequalities in learning opportunities and conditions as well as an increase in public spending on education, but generally speaking, do not address the issue of accountability. The right, on the other hand, tend to focus on a so-called "market solution" through "vouchers" for attending private schools and to demand more regulations on teacher qualifications and performance, but generally speaking, fails to address the issue of under-funding in K-12 education. Both tendencies offer some interesting ideas but have fundamental shortcomings due to partisanships based on entrenched special interests. The Proposed Model intends to take consideration of all legitimate concerns from both left and right while rejecting those partisanship-based advocacies that are apparently beyond the common sense based on the collective experience of the education community. It is focused on reforming K-12 STEAM education at both strategic and technical levels, with due respect for (1) the established pedagogy in mathematics, physics and chemistry, the foundation for engineering and technology; (2) the legitimate interests of all stakeholders in K-12 STEAM education, including teachers, administrators, corporate and civic communities. It respects the basic framework of American K-12 educational system where both public and private institutions co-exist so far in a balanced manner, and does not intend to support any proposal to challenges this balance. Furthermore, the Proposed Model is designed to be working within the current system of K-12 STEAM education, with minimal disruption to the established pedagogic practice. Therefore, it is an incrementalist model. This incrementalism could be expressed as:

"Just say No to Left or Right Radicalism! Just Say Goodbye to Revolution!"

Freedom and opportunities! You will have the right to a high quality K12 science, technology, engineering, arts and mathematics (STEAM) education!

¡Libertad y oportunitades! ¡Usted va a tener el derecho a una K12 educación de alta calidad en ciencia, tecnología, ingenería, artes y matematica (CTIAM)!

自由和机会！你们将拥有接受高质量的、贯穿幼儿园到中小学阶段的科学、技术、工程、艺术和数学教育的权利！