Testimony of
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Good morning Ranking Member Scott and members of the Committee. My name is Michael Towne. I teach AP physics and engineering for the Val Verde Unified School District at Citrus Hill High School in Mead Valley, California. I have been an enthusiastic member of the National Education Association for the past 14 years.

I welcome this opportunity to testify and help provide an educator's voice as the Committee begins its work shaping the next version of the Elementary and Secondary Education Act—or No Child Left Behind, as it has been called these last 12 years. Parents, teachers, students, and politicians on both sides of the aisle agree the law needs significant repairs. So what do we need to do to fix it?

Based on my experience as a teacher, I deeply believe that instead of labeling and punishing schools, we need to focus on ensuring equal opportunity for all our students—the reason ESEA was passed in the first place. And, as part of ensuring equal opportunity, we need to address the under-representation of racial and ethnic minority students in STEM-related fields like physics and engineering, the subjects I teach.

It is not unusual to find physical science or engineering departments at major universities in California where less than 10% of their students are Hispanic or African American. In a state where over 60% of our K-12 students are students of color, why do university science and engineering programs have so few ethnic minority students?

The answer is complex, yet sometimes I hear simplistic explanations—statements like "their culture doesn't value science education." Sometimes even professional educators slip into the trap of deficit thinking and blame the students or their families for a lack of motivation. I would like to challenge those ideas today: I think the answer lies in lack of opportunity.

Through my research and my personal experience, I have found that "their culture," like that of all people in my experience, values opportunity. And, in America, opportunity often comes in the form of education.

Equal access to the kind of educational opportunities that lead to careers in STEM fields is critical if we are to achieve a truly meritocratic society. If we are serious about reversing racialization in fields like physics and engineering, then we must be willing to hold ourselves accountable to the ideal of equitable access to math, science, and engineering education from an early age for all students. Solving a complex problem like this requires us to create, support, and implement audaciously progressive tools like an "opportunity dashboard."

To fulfill America's promise of equal opportunity, the next version of ESEA should require each state to publish an opportunity dashboard—indicators of school quality—broken down by student subgroup (white, African-American, Latino, students with disabilities, English-language learners, etc.). The indicators could include graduation rates, STEM and other advanced courses, fully qualified teachers, specialized personnel such as counselors, high-quality early education programs, arts and athletic programs, and community services like health and wellness programs.

The next version of ESEA should also require each state to develop an "opportunity and equity plan" that specifies how it will close the gaps the dashboard reveals—and provide financial incentives to do so. At the same time, we must be mindful that equitable does not mean "the same." Equitable means resources based on need—the greater the need, the greater the resources provided.

Unless we are willing to change the way we educate our students—and that means changing the way we envision our educational institutions as well as the preparation and support we offer our professional educators—we are doomed to recreate the social and educational structure we have now.

I believe we have the ability to radically alter the future through education, but only with visionary action in the present. Nearly a decade ago, in a secluded part of one of the most economically depressed counties in Southern California, I told a small group of families in my classroom, "I believe physics can act as an agent of social change in our community." As I left the meeting, I was profoundly moved by their response: they stood and cheered. I was also terrified. What I had just promised those families was nothing short of a life-changing transformation for their students. How could I ever live up to that?

My journey to be a part of the transformation I promised those families has changed me as much as them I believe. Let me share the story with you.

I started my teaching career as an elementary school teacher. Nine years ago, in 2006, I moved to Citrus Hill High School as the first physics teacher in the history of the school. There were 41 physics and zero engineering students in the entire school. What those students lacked in numbers, however, they more than made up for in enthusiasm.

In the first few years, I sensed in my students a pent up desire to learn science, especially physics and engineering. As I came to understand them better, I realized they and their families valued physics as much, if not more, than I did. Their desire to learn and their recognition of the opportunities this education could offer them spurred them to want more—and motivated me to teach them more.

Nearly all of my students will become first-generation college students. About 75% of them are first- or second-generation Mexican American students. They come from predominately working class families who value hard work and view education as a ticket to the American dream. These are the kinds of people that built America.

Nearly a decade has passed since I joined the faculty at Citrus Hill. Nothing could have prepared me for the profound ways the students and their families have affected me. I am deeply privileged to be a part of this community.

Over the past nine years, I have built the physics, applied science, and engineering program at our school with the help of administrators, like Juan Cabral and Lou Randall, and my fellow science teachers, like Debbie Wroblewski and Tyler Watts. Although many adults from our school and our district, like Mike McCormick and Juan Lopez, share my vision for our students, my closest allies have always been my students themselves. The confidence they and their parents display in me as their teacher humbles and inspires me to help them achieve.

From our small beginnings of 41 students, I'm happy to report today, we have over 300 physics students and over 250 engineering or applied science students enrolled in our program—nearly 25% of our student body. In Riverside County, about 13% of high school graduates take any physics course at all. At Citrus Hill, over 75% of our graduates take physics. Perhaps more significantly, we now have over 150 students taking AP physics. To put this in perspective, the average class size for AP physics in California is between 15 and 25 students. Most of our 2,100 high schools do not offer any AP physics courses at all.

This year, over 16% of the freshmen class of physics majors at the nearby University of California came from my classroom. In 2011, 11% of the Mexican-American students who passed California's AP Physics C Mechanics exam came from my class and in 2012, over 26% of those who passed the Electricity and Magnetism AP Physics exam came from Citrus Hill High School. Between 20011 and 2012, 60% of the growth in qualifying scores for Mexican-American students on the AP Physics C exam was attributable to students from Citrus Hill High School.

Positive as these numbers seem, the real story is less upbeat. A single school having such a great impact in a state as large as California means that nearly all the schools in the state produced no Mexican-American students with qualifying scores. There seems to be little equity of opportunity in this area. Surely we need to do more to provide support for students like mine around the state and around the country. I'm convinced that if my students can do it, others could too—if only they got the support they need.

Year after year, dozens of students graduate from our program and are accepted by major universities—like UCLA, Berkeley and Cal Poly—where they major in physics or engineering and have six-figure financial aid packages. Last year, we had the highest number of qualifying scores in AP physics in our school's history. Outsiders are especially perplexed by this statistic: 40% of my recent class of calculus-based AP physics students scored "basic" or "below basic" on the state math exam—not the kind of students traditionally viewed as AP physics material!

How is this possible? The answer is surprisingly simple. With appropriate support, all students can achieve at high levels, regardless of what their backgrounds might suggest. If we support the students who need it most, they will more than repay our efforts with their own.

Statistics are informative in the aggregate, but I think personal stories bring the message home. Consider Elias Fernandez. He came to me as a freshman in engineering. He first told me he was put in the class by mistake, so he needed to transfer out. I convinced him to work on his first project while we waited for his counselor to process his transfer. I must have lost the paperwork on the way to the counseling department, so he finished the semester and year by winning a silver medal in a local engineering contest. The next year, Elias signed up for advanced engineering and won a gold medal at the regional engineering competition. In his junior year, Elias was in my regular physics class, but soon transferred to the AP physics to challenge himself more. In his senior year, he took calculus-based AP physics and received a qualifying score for both courses. Today, Elias is first-year physics major at the University of California, Riverside, with a straight-A average. He serves as a tutor at Citrus Hill for current physics students. Occasionally he'll say something to me like, "These kids really need to work harder on their homework!" Yeah, go figure. Kids these days!

Other former students have moved farther away, such as Adrian Salazar, who attends the University of California, Berkeley; Erica Romero, who attends UCLA; and Anthony Cortez, who attends the University of California, San Diego. All of them have physics scholarships.

Erica came to me in tears a few years ago after she had decided to apply to college as a physics major. It turned out a teacher had told Erica girls like her didn't major in physics. After a long talk, I convinced her to consider the challenge she faced as a test of her resolve. I told her that there will always be those who doubt your ability based on nothing more than your outward appearance. She listened and persevered. She is currently in her second year at one of the top-rated physics programs in the world. I guess girls like her do major in physics after all.

Erica is an inspiration for many of the talented young women currently in my classes. For example, Elia, a senior in calculus-based physics, gives back to her community by volunteering to spend time with middle school girls interested in science and engineering.

Also inspired by successful young women of color in our program is Lela Owens. When first placed in AP physics this year, she informed me she wanted to transfer out because the subject didn't interest her. After a long talk and a longer e-mail to her parents—in which I argued the need for their daughter to be educated in the subject—Lela accepted her parents' decision to keep her in the class. A few months later she told me she intends to major in physics and is looking forward to applying to university programs next fall. So much for "not being interested" in physics. I'm fairly sure Erica would have told Lela, "Girls like us are interested in physics."

Another student to consider is Alejandro Torres. He started in AP physics the first year I implemented it at Citrus Hill. He has his degree in physics now and is working in industry with a high-paying job. When he visits the school, I am proud to call him a colleague and former student. Current students, like Victor Contreras and Sergio Garcia, who have been accepted to several major university physics programs for next year, look to Alejandro as a mentor and example. He sat in the same seat as Victor six years ago and now visits his old school as a professional physicist. He is part of a new legacy at the tender age of 23.

In our community, the football team is well known for its many CIF championships and many people call us "that football school." While our football program has a lot to be proud of, I am proud to say that we are known among universities as "that physics school."

I would like to share 300 stories with you about my former students. Instead, I'll tell you about the 30 middle school students who attended Rocket Camp in my classroom last weekend. They

built and launched their own rockets on Saturday. When they left, each of them said, “I can’t wait to be in physics and engineering.” I would also like you to know about the visionary leadership and support I get from my current principal, Nereyda Gonzalez, and her assistant principal, Dr. Macaraeg, who brought her own son to rocket camp. Without their support, I would not have the resources to attract those middle school rocket makers.

I would also like to tell you about the Mrs. Johnson’s fourth grade class at Mead Valley Elementary school around the corner from our high school. My students and I visit them once a month and help them design and build engineering projects. Many of them can’t wait to get to Citrus to take engineering. I think of Elias, Alejandro, Adrian, Anthony, Erica, Lela, Victor, and all my current and former students with great love and admiration. I will be excited to see Mrs. Johnson’s fourth graders when they get here in five years and those middle school rocketeers when I see them next year.

The future is so promising when students get the support they need. We need to do this as a society because we cannot afford to squander the talent of the students like Erica and Alejandro and Elias. More importantly, we must invest in the future students I don’t know yet—students like those I might have met at Rocket Camp or at Mead Valley Elementary. I know our nation will benefit if we resolve to make meaningful changes in order to provide substantial support for under-represented students in science and engineering. The past decade has taught me physics can act as an agent of social change in our community. That has changed me … and I am so thankful.

I urge you to use ESEA reauthorization as a vehicle to give all our students the education and equal access to opportunity they deserve. Thank you for hearing from an educator today, and please continue to listen to us as reauthorization moves forward.