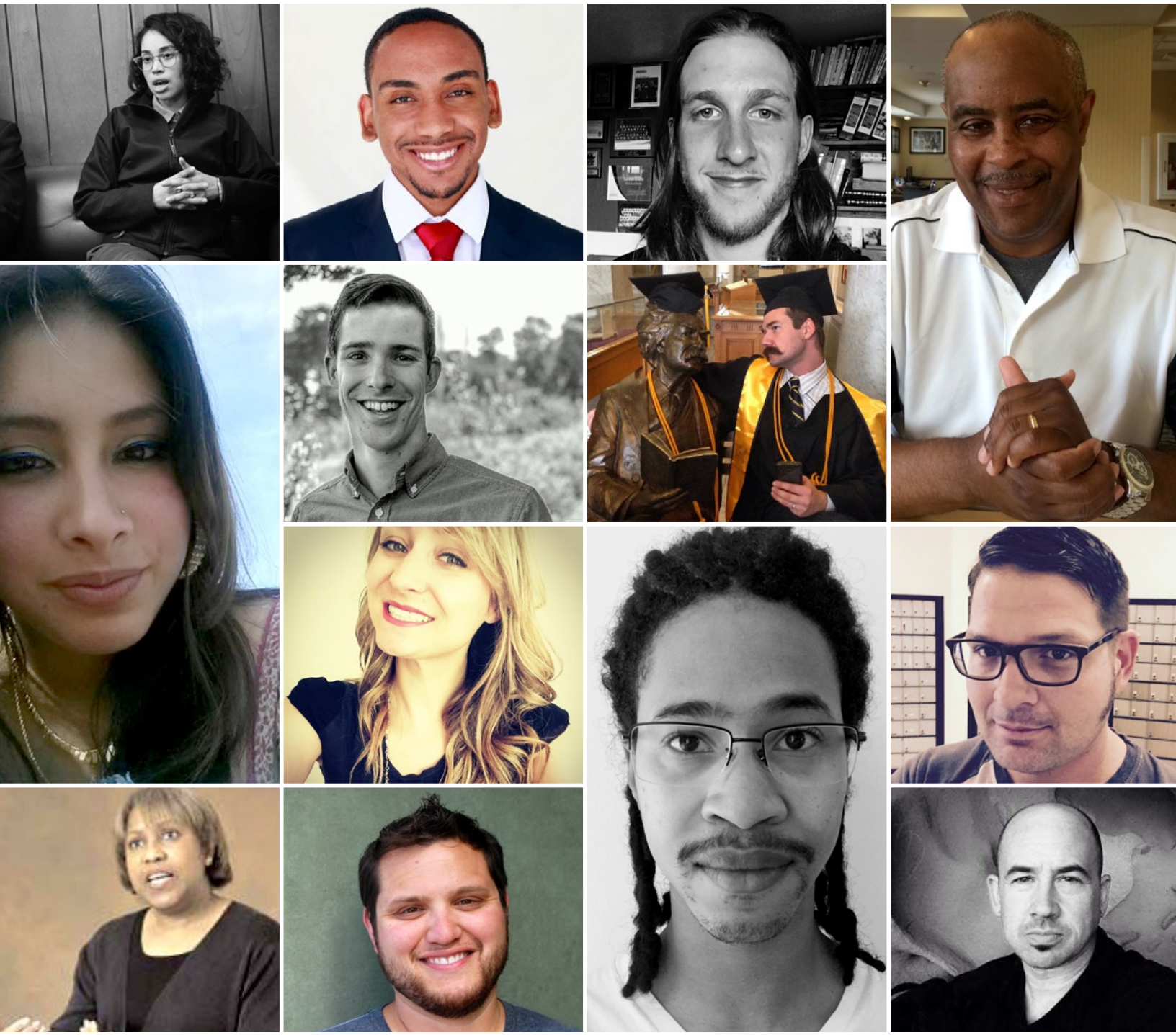
Capacity Unleashed

The Faces of Community College Math Pathways



THE CALIFORNIA ACCELERATION PROJECT

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Preface

Each year, over 140,000 students take their first remedial math course in a California community college. More than 100,000 of them will never complete the math required to earn a bachelor's degree.[i]

Statewide, over half of African-American and Hispanic students in remediation are required to start in the lowest levels of the curriculum. From this starting point, only about 6% go on to complete a math course that transfers to a four-year university.[ii]

These are the unacceptable results of traditional remediation. Students spend up to two years repeating K-12 math content, and most fall away to attrition before earning college-level credit in math.

Fortunately, some colleges are making changes that significantly improve student outcomes. And these changes are changing lives.

In this publication you will meet community college students who likely would have left college without a degree if not for the work of faculty participating in the California Acceleration Project.

These students have compelling individual stories, but they also represent thousands of others in the community college system. Like most of their peers, these students are interested in fields that are not math intensive – the humanities, social sciences, arts, and other majors requiring little to no algebra preparation. And like over 70% of California community college freshmen, these students were assigned to algebra remediation.

But unlike their peers, these students were lucky enough to have access to an alternative to traditional math remediation, an accelerated statistics pathway that streamlined their route through lower division math requirements and cleared the way for all they went on to accomplish.[iii]

These stories put a human face on data from the RP Group's award-winning quasi-experimental study of the first 8 colleges offering new statistics pathways with the California Acceleration Project. The study found that students' odds of completing a transferable math course were 4.5 times higher in accelerated statistics pathways than in traditional remediation.[iv] In addition, African Americans' completion of transfer-level math quadrupled, and the achievement gap between African American and Asian students – the largest gap in traditional remediation – was eliminated.[v]

These stories also speak to the debate surrounding statistics pathways. Critics worry that bypassing algebra remediation will leave students unprepared for the rigors of quantitative reasoning across the general education curriculum. Yet, despite their previous difficulties in math, the students in these stories successfully completed all lower division undergraduate requirements, including a rigorous transferable math course and quantitatively demanding courses in the sciences. In this, the students are not isolated examples. Preliminary studies at three colleges show high pass rates in science courses for students who chose a statistics path instead of algebra.[vi]

In the end, these stories are compelling because they are stories of struggle and accomplishment. Through them we get a glimpse of the human capacity that can be unleashed when colleges do the hard work of transforming remediation.

With hope for the future,

Katie Hern and Myra Snell
Co-Founders of the California Acceleration Project

Christopher Rogers

Christopher Rogers enrolled at College of the Canyons in 2012 to become a nurse. Despite what he calls "extreme math anxiety," he studied hard for the placement test and was placed into a class one level below a transferable math course. From this starting point, the odds of his completing the math requirements were a little over 50%.

> "Wow. This is possible. I can do math. Why was I sitting in a math hole for years?"

Christopher put off taking math until his last semester before graduation, when he had only one option left: an accelerated pre-statistics course combined with college-level statistics in a single semester. He had heard good things about the course, but he was anxious enough that his wife had to step in and register him.

Once in pre-statistics, math opened up for Christopher. "The problems were real world. The contexts really helped me understand the concepts and tied ideas together that never made sense before," he recalls. "Numbers had meaning that I could find for myself." Christopher was surprised when the teacher asked him to mentor other students in the class.

Christopher earned an A in both pre-statistics and college-level statistics. Today, he studies public health and epidemiology at the California State University, Northridge, where he's earning a 3.97 GPA and has been named to the dean's list. Christopher works as an adjunct instructor at College of the Canyons. He also studies tuberculosis for the Los Angeles County Department of Health, where he has built a statistical database on TB in L.A. county and has presented and published his work nationally.

"I'm now a lab instructor and tutor in advanced biostatistics," he says, amazed. "It's hard to imagine where I was with math and where I am now. I thought math was not applicable to my life. Now math is a huge part of almost every day."

Lulu Matute

City College of San Francisco student Lulu Matute was born in Chicago to Honduran immigrant parents. Though she had passed all her high school math requirements, she took a year off after graduating and her math skills got rusty. She didn't realize the stakes of the placement test, didn't prepare for it, and was assigned to the lowest remedial level. When she met with a counselor to create an education plan, Lulu saw that this placement meant she'd have to be at CCSF for three to three and a half years. Enrolling in the first course left her further demoralized.

"A lot of the problems were very grade school," she recalls. "I remember my professor told us it was OK if we needed to draw dots to help us count. In high school, I had taken trigonometry, I had taken algebra and geometry, but here I was in college counting dots."

Lulu was thrilled to discover the accelerated statistics pathway at CCSF. It was a perfect fit for her major, political science, and it not only reduced her time in remediation, it enabled her to finish her transfer requirements in two and a half years. She graduated CCSF with a GPA of 3.9.

Lulu was accepted into the University of California at Santa Cruz, Santa Barbara, Los Angeles, and Berkeley. She enrolled at UC Berkeley in fall 2015 and plans to go on to law school or graduate work in public policy. Ultimately, she sees herself running for public office.

> "It's not that we're not able to learn, not that we're not smart enough. The problem is the path."

Reflecting on her experience, Lulu remembers sitting in that lowest level math class and looking around the room. "All the students in the class were students of color, students that looked like me."

Alexander Kraft

Alexander Kraft always struggled with math. He worked hard and usually managed passing grades in math classes, yet he was frustrated that he didn't "truly understand. I wanted to retain the knowledge and apply it to subsequent classes from semester to semester. And that wasn't happening."

After dropping out of high school, Alexander attended community college sporadically for a decade, until he encountered Cuyamaca College's new accelerated statistics program. The program, as he puts it, "didn't just hustle me through the minimum math requirements to transfer. Instead, it employed pedagogical techniques that emphasized reasoning, understanding, and discovery over memorization and repetition. I found myself looking forward to math class the same way that I had always looked forward to my classes in the Humanities."

In 2015 Alexander graduated from UC Berkeley's English department with a 3.98 GPA, highest distinction from the university, and highest honors in the department. While there he received a number of prestigious awards and undergraduate research fellowships, and the department selected his honors thesis as the best of his graduating class. He is looking forward to graduate school and a career in academia.

> "College math requirements formed a barrier for me, but once I surmounted that barrier, I have been successful in my academic career. It is no exaggeration to say that I simply would not have transferred – let alone graduated – had it not been for the accelerated statistics pathway."

Emily Frias

Emily Frias is the daughter of Mexican immigrants. Her father left the family early in Emily's life, and her mother raised her and her twin brothers mostly alone, working long days as a housekeeper while going to school. When Emily was 14, her stepfather, whom she thought of as her father, was murdered. By 15, Emily moved out of her mother's house and became an alcoholic, skipping school most days. At 19, she had a GED and an infant son.

> "I never felt like I belonged in school. But in accelerated math class I began to feel more confident. I started to take leadership in class. I started to feel like, yes, I belong in school, like I could graduate, like I could get a good job."

At 21, Emily decided she needed a college degree and enrolled at City College of San Francisco. When she took the math placement test, she learned she'd have to take a year of remedial math. Emily dreaded the long road ahead of her.

Luckily, she was attending a college that offers an alternative to traditional remediation. CCSF's statistics pathway allowed Emily to reduce her time in remediation by a semester and provided the momentum that she needed to continue her education. She says the pre-statistics class changed her attitude toward not just math but her entire education.

"The numbers were more meaningful. I started to pay better attention in class and realized that the ideas made sense. I could understand and see things in the numbers. I could even help other students. I had no idea school could be like this. I felt smart."

Emily earned a B in that class and a B the next semester in college-level statistics. She graduated from San Francisco State University in May 2016 with a bachelor's degree in international relations. She is now an intern with a community-based organization, helping low income families find housing and considering job offers from several employers. Looking ahead, Emily sees herself attending graduate school for law or public policy.

Jennifer Cummings-Martin

Jennifer Cummings-Martin had completed high school and started college in her native, Guyana, but when she came to the United States, she was told her college credits wouldn't count. Faced with starting over, she got a job and, over the years, worked her way up to a position as director of human resources.

> "Even though I had a successful corporate career, I had never finished college. I wanted to go back, but math was a barrier. I had struggled with it before. All that rise over run stuff – what was the point?"

When she enrolled at College of the Canyons, Jennifer was required to take two years of math. From this starting point, her chances of completing her math requirements were less than 20%. Between frustrations with the first remedial class and an illness in her family, it took Jennifer three attempts to pass the first course.

When Jennifer heard about the accelerated statistics pathway, she was hopeful because people talked about working together in groups. "Together we worked through problems, became puzzled, asked questions. The instructor walked us through the issues, identifying mistakes, and then allowed for reanalyzing and deeper learning." The class was a community where "each of us was invested in each other's success as much as our own."

And the work itself inspired Jennifer. "It focused on real-world dynamics," she said, and she leveraged her learning almost immediately in a research project for another class. "For me, traditional math classes were a deterrent to completing a degree," while the pre-statistics class was "designed to ensure completion through the structure."

After earning an A in pre-statistics and a B in college-level statistics, Jennifer graduated with a degree in social science from Brandman University in fall 2015. Today she consults with non-profit organizations, helping them develop long-range plans and budgets.

DonnaRose Garrett

DonnaRose Garrett was working as an event planner when her boss encouraged her to go to college. At 29, she worried that she was too old to be in classes with 18 and 19 year olds, but she enrolled at Berkeley City College and began taking one or two classes at a time while working 12- to 16-hour-days at her job.

The problem was math. When DonnaRose took the placement test, she learned that she would have to take four remedial classes before a transferable course. Her dream of a bachelor's degree in sociology seemed impossibly far away.

DonnaRose was glad to learn about the college's accelerated statistics pathway, which reduced her time in remediation by a semester. The class was difficult and she had to study a lot – "I had notes and diagrams all over my walls at home" – but one day during class, "I realized I was teaching my group how to do something. For once, I understood something other people didn't. It was a brand new experience."

For their final project, DonnaRose and her partners explored the factors that influence whether people have tattoos, carefully collecting and analyzing survey data from 100 Berkeley City students. They found that smoking did not appear to influence tattoo rates. Higher incomes, full-time work, and motorcycle riding were all associated with tattoos, while financial support from parents lessened the probability of having tattoos.

> "Math doesn't have to hold people back."

"It wasn't just formulas and memorization," she says. "I was looking at data and understanding what to look at, how to determine if a study was accurate, how true it was." DonnaRose earned an A in the pre-statistics course and a B in statistics. She says she uses what she learned in those classes during her everyday life, "reading the newspaper, in other classes, talking to people."

DonnaRose is moving to Southern California to finish her associate's degree before enrolling at the California State University, Long Beach. She plans to work with formerly incarcerated people. "They face a lot of barriers to their success, like I did," she says. "I'd like to help reduce those obstacles."

Mark Johnson

In 1991 Mark Johnson dropped out of tenth grade and left his family home. He worked at a series of jobs, losing them almost as fast as he got them, and took a few classes at Laney and Merritt colleges. Mark started math in pre-algebra and made it through two of the three required remedial classes before leaving college without completing a course that would count for a degree or transfer. Drug addiction took over. Eventually he landed in county jail.

Mark started at Berkeley City College in 2012. During this time, two things made a big difference for him. "I met someone I knew from the streets, a guy I knew was formerly incarcerated like me, and now he was at UC Berkeley. We only talked for ten minutes, but it opened up a new world of possibility for me."

The other thing that made a difference was hearing about the accelerated statistics pathway at Berkeley City. Mark enjoyed its focus on things he could relate to. "We did a study on the effects of listening to music on test taking. Half of us took the test with headphones on, listening to music. The other half didn't, and we compared the results."

He also appreciated the use of technology. "We got to enter points and have the computer make the graphs. In algebra, I spent a long time making graphs by hand. Now instead, we got to spend the time understanding the way the graph changed when you put in different numbers." He earned an A in both pre-statistics and the college-level statistics course. He also retook the placement test, this time placing into college-level math, even though he hadn't taken any algebra since 1996.

> "I was at a standstill in math. Pre-statistics helped me forward when I was stuck."

Today Mark is a senior at the University of California, Berkeley, studying anthropology and working as a transfer coordinator in a program for the formerly incarcerated. His straight A's have him thinking about a doctorate and a job as a professor. He's also considering graduate school in public health and a career in drug rehabilitation or anti-recidivism at the clinical or policy level. He is acutely aware that almost no one with his background ends up at Berkeley. "I don't want to waste this rare opportunity. I want to show others like me what is possible."

Kevin Brown

Kevin Brown is majoring African-American studies at the University of California, Los Angeles, with a minor in public affairs. He is an honors student, a member of the national honor society, and UCLA college fellow. He works as a student researcher in the communications department and participated in a summer institute in public policy and international affairs at Princeton University.

> "I learned to create a survey and collect the data. I was looking at and creating my own numbers and using the information to make change, to do something."

It wasn't always this way. Kevin grew up in San Francisco, the oldest of five kids raised by a single mom. He attended three different high schools and was working a full time retail job at 17. When he started college at City College San Francisco, Kevin took the placement test with no preparation, after a full day of work. Like most students, he was not aware that this test could mean he would have to spend up to two additional years taking remedial math before being allowed to take a math course that would count for transfer. He placed into the lowest level, the same arithmetic he'd taken in grade school. Passing that class improved his confidence somewhat, but he still had at least another year of remediation ahead of him. When a counselor told him about accelerated statistics pathway, he jumped at the opportunity for "a faster way to achieve my goals. I didn't feel stuck."

The statistics pathway "improved my ability to think outside of the box," Kevin says. "My thinking skills got better." And as he learned how to construct and analyze statistical arguments, math became accessible to him. His says that his confidence also improved as he learned about Carol Dweck's research on growth and fixed mindsets, and his leadership and teamwork skills grew in the collaborative classroom environment.

Kevin is part of a program on campus that supports Black community college students when they transfer to UCLA, the same program that helped him make the transition from CCSF. He's considering graduate school in public policy or law, with a goal of using policy to improve our society.

Ed Fitzgerald

Ed Fitzgerald is a high school dropout and six and half year army veteran. He entered Berkeley City College in fall 2014 to study political science. Unfortunately, he placed into pre-algebra, which meant four semesters of math before he would be eligible to transfer to a university. He didn't want to take all that time, and his previous experience in math class "was not positive."

Ed was excited when he discovered the accelerated statistics pathway at Berkeley City. Right from the start he saw that "this was the math I needed for my major." The class emphasized "looking at the data" and "sound methodology for establishing causation and making accurate predictions." The activities in class helped him understand means and medians, quartiles and outliers. "I learned how to read a scatterplot and what a correlation coefficient is. I learned about linear regression. And the best part for me was that I put my new knowledge right to work in my political science courses."

Today, Ed has transferred to the University of California, Berkeley to continue working toward his goal of increasing and improving "the political efficacy of all people." Ed says he is motivated by the "poverty and disenfranchisement" caused by military conflict and wants to "study and predict conflict in order to prevent it as a matter of social justice and global conscience."

> "I feel lucky I got to take the math I really needed."

Ed sees math more and more in his studies at UC Berkeley. He envisions himself working at the policy level and "doing research that provides positive outcomes for regular people. No matter where I end up, I will be glad to be able to look at global conflicts using a positivist and scientific approach."

Tim Lizotte

Growing up in San Leandro, California, Tim Lizotte's experience of the public school system was mostly good. After struggling in Algebra 1, he went on to take algebra II and trigonometry, then opted not to take math his senior year of high school.

By the time he took the placement test at Berkeley City College, Tim says that math "was not fresh in my mind." The test put him in elementary algebra, which meant a year of remedial math. But when he got into the first course, "it was way too easy. It was stuff I'd studied long before. I didn't want to waste my time with work that was irrelevant to me and unengaging."

His counselor showed him a flyer for the college's accelerated statistics pathway. It was perfect for his major, psychology, and saving a semester of math meant he could "focus more on transferring and less on passing classes I'd already taken."

At first, Tim was daunted by the amount of work in the pre-statistics course. Class met for three hours at a time, two days a week. Our teacher was very helpful, but also held us accountable for the work. As time went on, he was surprised to realize that "it was all coming together. I was working in class one day and I thought, 'I know how to do this!'"

"All the time we asked, 'What does this mean?' We had to apply statistics to things we cared about," Tim explains. "We really had to think about what we were doing. The material was more mature, not just plug numbers in and get other numbers for answers."

> "I didn't realize it at the time, but during the class I was building a book. All the activities and my notes – it turned out to be almost 2 inches of paper – became a book that I kept and still refer to."

Today, Tim has transferred to the California State University, East Bay and is headed toward graduate school and a career as a high school or university psychologist. Drawing on his own experience, he wants to treat young people like they are adults. He believes youth will respond better to that kind of respect.

Lionel Hill

Lionel Hill grew up in the Bayview/ Hunter's Point neighborhood of San Francisco and, aside from seven years in the United States army, he's lived there his whole life. He had a successful career in the San Francisco Department of Elections, but he decided to pursue a college degree to do more for his community. He also wanted to be an effective advocate for his nephew, whom Lionel had raised since infancy and who was beginning grade school.

In 2013 Lionel entered City College of San Francisco aiming for a degree in library science and hoping to become a teacher. He says the placement process was daunting and he tested into the lowest level of math. When an instructor recommended the accelerated statistics pathway, Lionel jumped at the chance to save an extra semester at community college.

"It was frustrating sometimes," he says of the pre-statistics course. "It's a serious class. But I worked hard and learned a lot. Everything I did in the class – the graphs, the percentages, the calculations, everything – helped me with the next class."

> "I'm not as young as I used to be. Time is not on my side. If I hadn't taken pre-statistics, I would still be at community college instead of where I want to be."

Lionel went on to become a statistics tutor and has now transferred to San Francisco State University. He continues to advocate for students that, in his words, "have not received the education that they should have."

Kieran Calavan

As a student at Calaveras High School in San Andreas, California, Keiran Calavan knew he wanted to study psychology – "I loved science, especially anatomy, but I wasn't so good at math." Psychology was a good compromise. After graduating and taking a couple years off from school, Kieran entered Berkeley City College.

It had been a while since he had thought about math, and, like a lot of community college students, Kieran didn't realize the high stakes of the placement test and didn't prepare for it. "I did well on English, but pretty bad on math. I was going to have to take extra classes, and I worried that I was already off-track for graduating on time."

In the accelerated statistics pathway, Kieran says the active, collaborative pedagogy really engaged him. The class was designed around "looking at real data in a community of learners. We taught each other a lot. I wasn't afraid to make mistakes. We all made them, and we all helped each other when we did."

The course culminated in a group project that included creating a survey, collecting the data, analyzing it, and presenting it to the rest of the class. Kieran's group explored the potential connections between religion, family support, and study habits for students at Berkeley City. They found that strong religious beliefs were associated with living at home and that students with financial support from parents tended to study more and have somewhat higher grade point averages.

> "In pre-statistics you really learn the material. It's not just something you learn for the test. It stays with you."

Kieran calls the A he earned in pre-statistics "redemption – it was a great opportunity to turn myself around." He earned a B in college-level statistics and then, after transferring to the California State University, East Bay, he continued to use "the fundamentals and foundations we got in pre-stats" in another statistics class, as well as courses in his major. "We are constantly collecting and analyzing data, and I know what to do."

Today, Kieran works at a health company and plans to become a naturopath. "I want to create spaces where people can be taken care of holistically. My parents taught me to think about how I can make the world better. I think that's the reason I want to help people heal."

Terrell Hawkins

Terrell Hawkins says he "struggled tremendously" in high school math, repeating algebra 1 twice, then barely passing algebra 2 and geometry. When he took his placement test at College of the Canyons, he was expecting the worst. Terrell qualified for pre-algebra, three levels below college level, and worked hard to earn a B in the course. He enrolled in elementary algebra the following term, only to rediscover the frustrations he'd encountered in high school algebra. After three months of struggle, he withdrew.

> "I believe it is my calling to serve others."

Once he decided on political science as his major, Terrell was ready to try again and knew the accelerated statistics pathway was for him. Those decisions launched him on his way. He earned an A in college statistics and a cumulative GPA of 3.60 in college-level Statistics. He worked as a peer advisor and program advisor, served as vice president in the local chapter of the Phi Theta Kappa honor society, and became a delegate to the Model United Nations.

Terrell has now transferred to Howard University to complete his bachelor's degree and eventually pursue a doctorate. His goal is, as he puts it, "to improve our education system through reform." From the beginning, Terrell felt the legacy of past Howard graduates like Thurgood Marshall and Zora Neale Hurston. And only a couple of months into his studies at Howard, Terrell feels "empowered and motivated by being around people who look like me and share the same goals of changing the world. For the first time in my life I feel comfortable in my own skin."

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The California Acceleration Project

In California, more than 70% of community college students are classified "unprepared" for college and required to take remedial courses in English and/or math. Though remediation is intended to help students be more successful, research of the last ten years has made clear that the more remedial courses students are required to take, the less likely they are to ever reach their college goals.[vii]

Being placed into remediation cuts a student's chances of transferring or earning a degree or certificate nearly in half. Statewide, just 40% of community college students classified "unprepared" complete these goals in six years, compared to 70% for students classified "prepared." [viii]

The unintended consequences of remediation hit students of color especially hard, because Black and Hispanic students are much more likely than white students to be required to take multiple remedial courses.[ix] One recent study estimated that 50-60% of the racial disparities in long-term college completion are driven by students' initial course placement in English and math.[x]

The California Acceleration Project was founded in 2010 by two community college faculty members who wanted to do something about the poor outcomes of students placed into remediation. CAP is a faculty-led professional development network that supports the state's 113 community colleges to transform remediation to increase student completion and equity.

Between 2010 and 2016, all 113 California community colleges participated in CAP outreach workshops, and 84 colleges began implementing accelerated approaches to placement and remediation with CAP's extended professional development programs, including 35 colleges offering redesigned statistics pathways.