Brisha Borden was running late picking up her little sister from school. On her way, Brisha spotted an unlocked bike. She stole it. Her intentions were good, but she was ultimately charged with burglary and petty theft. Around the same time, Vernon Prater shoplifted eighty-six dollars worth of goods from Home Depot, then faced the same charges. **ProPublica on May 23rd, 2016** furthers the severity of the crimes they committed were nearly identical, with just one main difference: race. To determine their risk of recidivism, or likelihood of committing another crime, the court turned to an algorithm called COMPAS, or Correctional Offender Management Profiling for Alternative Sanctions, to help choose their punishment. On a scale of 1 to 10, these were the scores COMPAS gave Brisha and Prater. Prater, on the left, had been to jail four times prior, while Brisha had only ever received juvenile misdemeanors.

The Washington Post on October 17th, 2016 reassures us, COMPAS meets software company Northpointe's definition of judicial fairness. The only problem: Northpointe built COMPAS. The company selling this algorithm to our courts is the same service that sets its standards. While Northpointe makes it clear they don't explicitly take race into account, they ask if the individual has gang affiliations, if their friends are criminals, or if their neighborhood has a history of crime.

We are blindly relying on for-profit companies like Northpointe to develop unbiased risk-assessment algorithms. Considering the millions of human inmates whose future is in the hands of a machine, we must examine the problems, causes, and solutions to what **The New York Times on June 25th, 2016** says is building a bridge between race and criminality.

Algorithms are only as good as we are. And sometimes, we're not that good. Though Northpointe denies it, its algorithm is biased because the people that built it *have biases.* This sets the stage for two problems: unfair sentencing, and codifying stereotypes.

First, prejudiced algorithms like COMPAS are leading to longer sentences for many who don't deserve it. COMPAS is a 137-point test that covers criminal history, age, sex, and so on. And the test is consistently kicking out higher scores for black defendants. Take Bernard Parker for example. **According to Raw Story, May 23rd, 2016**, Parker was arrested for drug possession. He had only one prior conviction for non-violent resisting arrest. But Parker scored a ten, wildly inconsistent with similarly white conviction records. According to the previously mentioned ProPublica article, black defendants are four times more likely than their white counterparts to receive a risk score of ten, the highest possible score. This can mean increasing their sentences by years, and with over twenty states already using, the software is spreading like a plague through our judicial system.

Second, programmers are codifying their stereotypes. Bias is *learned*, so in theory, computers should be immune. But **The New Yorker on January 18th, 2016** furthers codifying stereotypes literally means teaching computers to be biased. By building software around an arbitrary and undisclosed definition of fairness, programmers are ingraining these stereotypes into a medium that seemed like the perfect solution. **The Silicon Angle on December 23rd, 2016** explains *machine learning* is a relatively new concept, but it shatters the belief that computers cannot learn biases. Through machine learning, programmers can literally teach an algorithm what to look for based on what that person deems fair. But our judicial system should be punishing criminals for what they did, not what they *might* do.

In my home state, Eric Loomis pleaded guilty to driving a stolen car and evading police. A smart move, as it normally would land him just two years in prison. But **The Atlantic on June 30th, 2016** continues: the court used COMPAS to help determine his sentence, and he's currently serving year four of six. Take a wild guess what his race is. The programmers behind COMPAS are not at fault for having implicit biases. We all do. But it falls on Northpointe to ensure their biases are left out of risk-assessment software. Northpointe's failure to address this fatal flaw is the result of two causes: lack of accountability, and programmer bias.

Initially, COMPAS contributing to unfair sentencing is the direct result of Northpointe's lack of accountability. **The aforementioned ProPublica article** explains in addition to setting its definition of fairness, Northpointe also set a threshold for how accurate its software should be. 70% was the magic number they decided on. Interestingly, COMPAS is accurate only 63% of the time. They don't even meet their own standards, a scary prospect for the millions of Americans it threatens to impact. **Business Insider on June 16th, 2016** furthers Northpointe's lack of accountability is reflected in the test itself. Whether explicitly or implicitly, the test takes into account factors like sex, age, and race. None of which the individual has control over, meaning, COMPAS is judging people based on what was handed to them at birth.

Furthermore, biased programmers are threatening the integrity of our court system. **BBC on August 27th, 2016** points to Facebook's "Trending" feature to exemplify this. This section of Facebook's website allows users to keep up with popular news stories, and was maintained by actual people. Then lovable organizations like Breitbart felt human influence was giving it too much of a left-leaning bias. Maybe they were right. So Breitbart, among others, insisted an algorithm be used instead. But this ultimately changed nothing because the algorithm was built by those same Facebook employees. **Gizmodo on May 9th, 2016** translates this idea to the implicit biases of the COMPAS programmers. With no independent accountability, these programmers' biases, to little fault of their own, are allowed to influence the very real future for millions of Americans.

I'm a computer science major. The idea of using technology to make people's lives better is why I love what I do. But COMPAS makes me question that. And it's a shame because aspiring programmers will see biased software as "the new norm". Given the uncertain future of this software, we must look to some solutions on both a governmental and educational level.

First, we need to call for increased accountability for risk-assessment software. **The Guardian on December 19th, 2016** gives us a good starting point. Google is currently developing a test to determine if an algorithm is biased. This is the accountability our courts desperately need, but it has to *actually* be implemented. Talking about it isn't enough. I've already reached out to the court system in my home state, asking them to use Google's program once it's completed. They agreed to check it out. I can not encourage you enough to do the same. I've put together a list of phone numbers you can call for your home state, see me after the round and I'd be happy to give you one. Because talking about it in this room, simply isn't enough.

Finally, programmer bias must be addressed at its roots: education. Cathy O'Neil, a mathematician from Harvard University explores the role of education in **her book "Weapons of Math Destruction"**. In it, she argues it is essential for us to implement ethics courses at all universities with a computer science program. **The LA Times on December 30th, 2016** points

to the University of Massachusetts, who just made ethics a graduation requirement for computer science majors. I've followed their example at my own university by proposing a computer science ethics course for my department. But that isn't enough. If your school has a computer science program, please see me after the round to add your school to this list. I'll personally reach out to each of their departments to propose an ethics course. Northpointe's motto is "Advancing Justice". Now let's make that a reality.

Today, looking at the problems, causes, and solutions of racist risk-assessment software has helped shed light on the dark side of our justice system. For too long there has been a lack of accountability in risk-assessment software. It's time to change that. So where are these two today? Brisha has continued as a law-abiding citizen. Prater is now serving an eight-year sentence for grand theft. Brisha's sentencing was not justice. No one is perfect, but when it comes to deciding the future of millions of Americans, any margin of error is too large.