

URL: <https://stvp.stanford.edu/clips/get-inside-the-problem>

In building and testing autonomous vehicles, Stanford mechanical engineer Chris Gerdes discusses a truism that holds on the racetrack, in the lab and in life: Problems that seem difficult turn out to be easy, and the ones we think are no-brainers aren't. He describes how the task of making a self-driving DeLorean "drift" on a racetrack is relatively easy compared to programming it to do the "right thing" in some everyday situations.



## Transcript

- If you think about automated vehicles going out into the world in fact many of us will have our first interactions with them not actually driving in the car but being a pedestrian.. Or being a bicyclist.. Or being a car in the lane next to these other vehicles.. And the way they drive with us will have really strong impacts on traffic flow, on public acceptance, on all of these other issues.. So what seems like a trivial problem, something that we solve as humans every day.. You know, approaching cross walks and figuring out do I slow down and if so how much? When I start to actually put that into automated vehicles I end up with a whole host of questions.. And every question I answer or possible answer I come up with opens up a few more.. You can say for instance well why don't I just learn what humans do? We've solved this problem so we'll just look at a bunch of humans and we'll program the automated vehicle to do exactly what humans do.. That could work in some ways.. But the challenge is, is don't we want automated vehicles to be better? Don't we want them to have fewer accidents than humans? And what do we do about the fact that humans have some negative aspects of the way they approach intersections? People have found age biases in whether or not people will slow down..

People have found racial differences in whether or not people stop at intersections.. Do we wanna encode automated vehicles with the worst aspects of humanity? Or do we in fact want to be better in some ways? If so, how do we do that? So the sort of take away message that I found from working on all of these things is that sometimes the problems that seem easy are actually really really hard.. They go outside of engineering and touch on many other issues of society.. Often times things that we don't train our engineers to be able to understand and handle.. And sometimes problems that seem hard are actually very very easy.. Now some of you may be better at judging these than I am but I found throughout my career that I'm often at the beginning of a project a very bad judge of whether something is going to be hard or easy.. I find myself continually surprised by this.. And the only way that I learn is to get right into the middle of the problem.. And so as you think about this, as you think about ventures that you want to launch, as you think about things that you wanna do in your life, I suspect you may find this to be similar.. You can plan all you want, you can think about what's gonna be hard and what's gonna be easy, but when you're right in the middle of it I suspect it's gonna look very different..

Things that really seemed like it would be hard to do like our drifting DeLorean were things that we were able to actually do in a few years.. Things that seem really trivial like how do I approach a crosswalk and how do I have respect for other road users in this environment are actually really difficult to come up with a common answer for...