It’s great to be here and talk to you guys. At first glance you are probably thinking "Oh this is basic research, and how does this apply to what we're doing". I hope by the end of the talk, I can get some sort of relationship with you how pathways in the cell respond to the damage that environmental hazards would cause to a human cell. I'll also talk about how stem cells respond very finicky to different damages, oxygen levels, and other things. Won't get into too much of details of it, but I overall think that even though I am going to be talking about epigenetics, and the bottom state, a lot of it has to do with signals that were triggered by damaged cells, which could come from the environment. Also this can be very informal, please feel free to stop me. It's a new field, so if I'm saying things that don't seem to make sense or whatever, just raise your hand and feel free to stop me at any time. But basically what my lab is excited about understanding in a sort of global sense, was best posited by Shakespeare over hundreds of years ago, where he said his famous quote "to be, or not to be." Well the genome has to ask the question "what to be, or not to be." Is the oglar to stay an undifferentiated cell and differentiate down the vast trajectories to become a brain, liver, kidney, or heart cell? This is actually quite a profound question that, we think about it, the exact same genome is present in every single cell in your body. Yet it's the alternate confirmations are epigenetic landscapes it takes on that will manifest these different cellular physiologies. And we now know with a lot of work from the road maps sponsored by NIEHS and others, we have essentially discovered these barcodes of the genome that will tell us what type of cell it is. And this is markers that are lying on top of the genome or epigenetic markers such as the histone code, where you can say a region is on, given a black bar or off, a white bar. This one, zero, on, off code can tell you whether it's a liver cell, brain cell, or heart cell. Which brings up a conundrum of how do these barcodes get put there in the first place, and also how are these barcodes maintained as cells divide and repair during our lifetime? And I am a little biased, but I think non-coding RNA is a sort of emerging as one of these tools that can rearrange barcodes. So as a cell differentiates, RNA seemingly play a role in how to guide these fates. It's also quite remarkable that all the hundreds of different cell types in your body, are usually these barcodes are established by on the order of a dozen proteins that are pretty much present in every single cell. So the exact same genome, the exact same machinery, how do they manifest all these different cell types?