



# WHO'S DRIVING INNOVATION?

NEW TECHNOLOGIES AND  
THE COLLABORATIVE STATE

PALGRAVE POLICY ESSENTIALS

**Jack Stilgoe**



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## CHAPTER 1

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# Who Killed Elaine Herzberg?

Elaine Herzberg did not know that she was part of an experiment. She was walking her bicycle across the road at 10 p.m. on a dark desert night in Tempe, Arizona. Having crossed three lanes of a four-lane highway, Herzberg was run down by a Volvo SUV travelling at 38 miles per hour. She was pronounced dead at 10:30 p.m.

The next day, the officer in charge of the investigation rushed to blame the pedestrian. Police Chief Sylvia Moir told a local newspaper, 'It's very clear it would have been difficult to avoid this collision... she came from the shadows right into the roadway... the driver said it was like a flash.'<sup>1</sup> According to the rules of the road, Herzberg should not have been there. Had she been at the crosswalk just down the road, things would probably have turned out differently.

Rafaela Vasquez was behind the wheel of the Volvo, but she wasn't driving. The car, operated by Uber, was in 'autonomous' mode. Vasquez's job was to monitor the computer that was doing the driving and take over if anything went wrong. A few days after the crash, the police released a video from a camera on the rear-view mirror. It showed Vasquez looking down at her knees in the seconds before the crash and for almost a third of the 21-minute journey that led up to it. Data taken from her phone suggested that she had been watching an episode of 'The Voice' rather than the road. Embarrassingly for the police chief, her colleagues' investigation calculated that, had Vasquez been looking at the road, she would have seen Herzberg and been able to stop more than 40 feet before impact.<sup>2</sup>

Drivers and pedestrians make mistakes all the time. A regularly repeated statistic is that more than 90% of crashes are caused by human error. The Tempe Police report concluded that the crash had been caused by human frailties on both sides: Herzberg should not have been in the road; Vasquez for her part should have seen the pedestrian, she should have taken control of the car and she should have been paying attention to her job. In the crash investigation business, these factors are known as ‘proximate causes’. But if we focus only on proximate causes, we fail to learn from the novelty of the situation. Herzberg was the first pedestrian to be killed by a self-driving car. The Uber crash was not just a case of human error. It was also a failure of technology.

Here was a car on a public road in which the driving had been delegated to a computer. A thing that had very recently seemed impossible had become, on the streets of Arizona, mundane—so mundane that the person who was supposed to be monitoring the system had, in effect, switched off.<sup>3</sup> The car’s sensors—360-degree radar, short- and long-range cameras, a lidar laser scanner on the roof and a GPS system—were supposed to provide superhuman awareness of the surroundings. The car’s software was designed to interpret this information based on thousands of hours of similar experiences, identifying objects, predicting what they were going to do next and plotting a safe route. This was artificial intelligence in the wild: not playing chess or translating text but steering two tonnes of metal.

When high-profile transport disasters happen in the US, the National Transportation Safety Board is called in. The NTSB are less interested in blame than in learning from mistakes to make things safer. Their investigations are part of the reason why air travel is so astonishingly safe. In 2017, for the first time, a whole year passed in which not a single person died in a commercial passenger jet crash. If self-driving cars are going to be as safe as aeroplanes, regulators need to listen to the NTSB. The Board’s report on the Uber crash concluded that the car’s sensors had detected an object in the road six seconds before the crash, but the software ‘did not include a consideration for jaywalking pedestrians’.<sup>4</sup> The AI could not work out what Herzberg was and the car continued on its path. A second before the car hit Herzberg, the driver took the wheel but swerved only slightly. Vasquez only applied the brakes after the crash.

In addition to the proximate causes, Elaine Herzberg’s death was the result of a set of more distant choices about technology and how it should be developed. Claiming that they were in a race against other manufacturers, Uber chose to test their system quickly and cheaply. Other self-driving