Impact Story
Bridging the gap between physical and digital

The Turing’s data-centric engineering programme and its collaborators are unlocking insights into the world-first 3D-printed steel bridge, using innovative data science techniques and ‘digital twin’ technology.

- Dutch 3D-printing company MX3D in conjunction with a huge number of industrial and academic collaborators, unveiled the bridge at October 2018 Dutch Design Week.
- Bridge is a living laboratory for data scientists. Turing and collaborators have been developing a ‘digital twin’ of the bridge to help analyse data from sensors fixed to it.
- Collaborators at Imperial College have conducted extensive material tests and compared the results to those predicted by the digital twin. Culminated with successful 10+ ton load test on the completed bridge.
- Also developing a long-term structural health monitoring network to ensure that the bridge remains safe during its lifetime.
- Testing has been supplemented by Turing researchers using statistical approaches to understand the “intrinsically random” properties of printed steel.
- Bridge will be installed over a canal in Amsterdam in 2019. Turing and collaborators will be involved in key long-term assessment of data from the bridge sensor system, to better understand and improve 3D-printed infrastructure solutions.

Impact
- Aided the development and analysis of the first 3D-printed steel bridge
- Fostered new collaborations between fields and researchers
- Allowing City of Amsterdam to monitor traffic, noise, CO₂, more
- Helping MX3D better characterise other 3D-printed materials

“The digital twin concept is highly complex… it only made sense to do it [with] the Turing”

Gijs van der Velden, CEO, MX3D