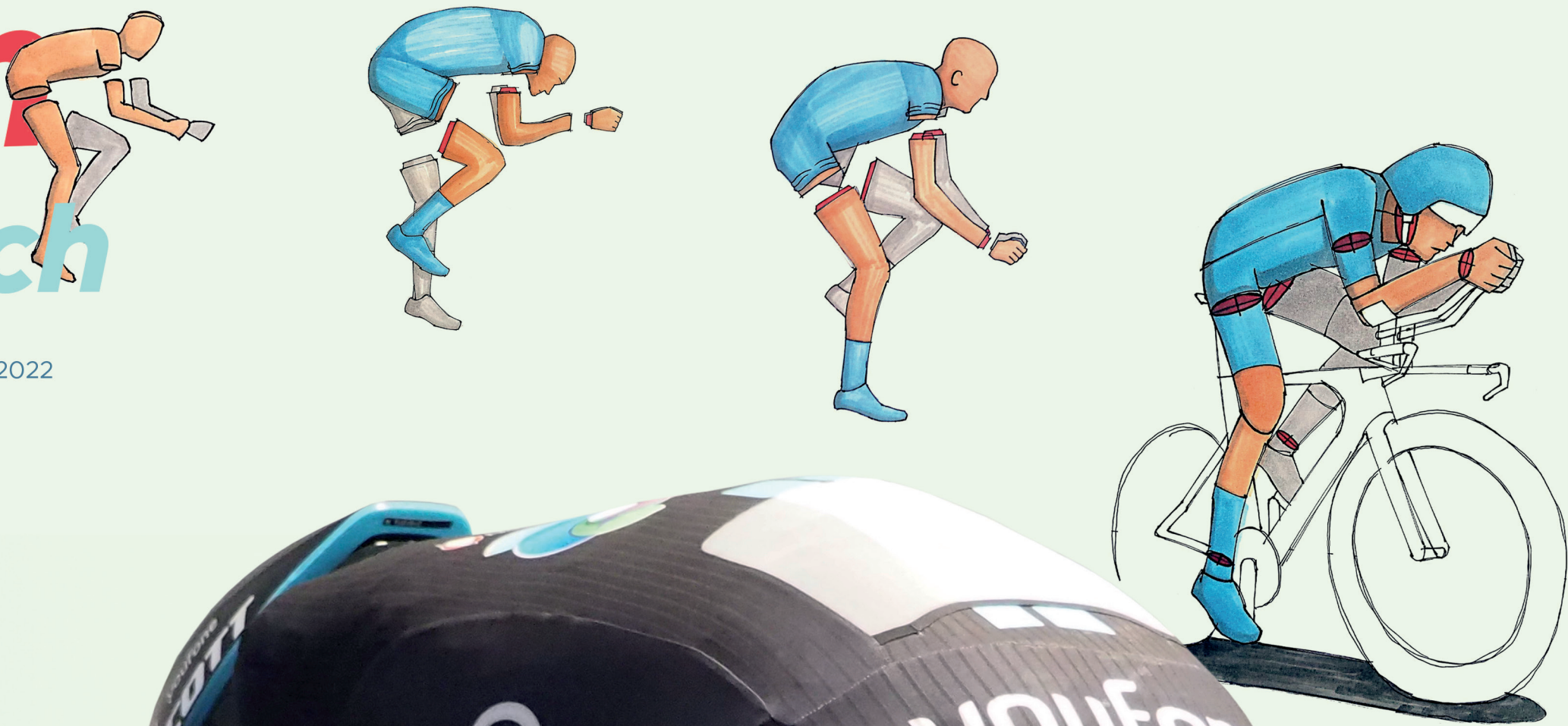


# Cyclist Mannequin

## For Aerodynamics Research

TU Delft - MSc Integrated Product Design - Thesis by Siward Vloemans - July 2022



3D Scanned professional cyclist

Segmented legs, arms & hands

Magnetic, form-fit attachment interfaces

Bicycle mounts with bottom, hands & feet

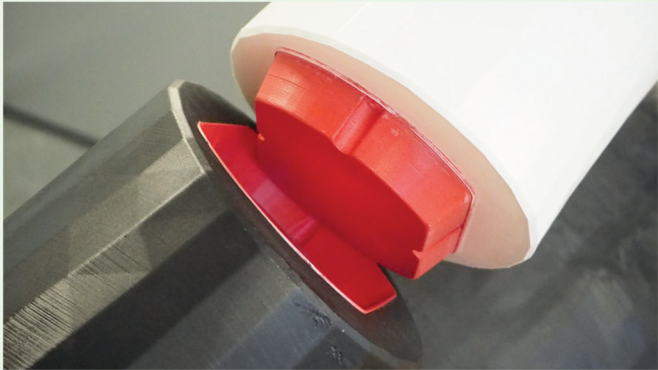
CNC Milled, high density polyurethane



Flexible hands are applied to the arms for accurate attachment to the handlebars.



Colour-coded interfaces effortlessly attach limbs with a magnetic form-fit.



Any cycling gear can be applied to the mannequin to test for aerodynamics.



The aim of this research is to increase the speed of cyclists by reducing aerodynamic drag. Common research methods are digital and physical simulations. The first goal of this research is to create a generic cyclist model for research organisations around the world. The Generic Model is an average of ten male, professional cyclists in both road and time trial pose. The DINED Mannequin approach is used to divide the method into four steps: Capture, Process, Correspond & Average.

The second goal of this research is to design a personalized cyclist mannequin for aerodynamics researchers. The Personalized Mannequin is the physical representation of an individual cyclist's anthropometry in time trial pose. The 3D anthropometric data of one of the riders captured for the Generic Model is used. The Centre of Design for Advanced Manufacturing Approach is used to divide the process into four steps: Digitalization, Design Automation, Digital Fabrication & Production.

