UNIVERSITY OF LIVERPOOL

# ARION8







## University of Liverpool Velocipede Team

# Foreword

The University of Liverpool Velocipede Team (ULV Team) has once again set out to challenge itself by taking part in the incredibly ambitious project of breaking even more land speed records for a human powered vehicle.

ARION8 is the 6th physical iteration of the University of Liverpool's Velocipede project with ARION6 and 7 being virtual designs due to the global pandemic. This time the team is revisiting a previous concept by designing a vehicle capable of competing in the male and female Hand Cycle category at the World Human Powered Speed Challenge (WHPSC) competition in Battle Mountain, Nevada 2025.

The team is currently finalising the design of the Velocipede, with manufacturing beginning at the end of 2024. By using the knowledge and skills developed in previous projects, and applying serious dedication and commitment, the team is confident of achieving some amazing results!

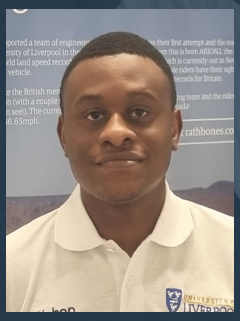
KAREN DARKE

KEN TALBOT

Looking forward to the WHPSC competition in 2025, the team is again striving to break even more records, revisiting the hand bike record to improve the female and male records further, pushing them out of our competitors reach.

# The Team

**This project is led by a team of eight University of Liverpool Engineering students.**

Philip Chavinda

Michael Cobley

Thomas Riley

Izzy Wray

Oli Tometzki

Yoshino Murayama

Bailey Maughan


Aidan Sale

# History

The University of Liverpool was the first UK University to attempt to beat the world record for the human powered land speed record with its entry ARION1.

Members of the ULV Team, founded in 2013, worked non-stop over the course of two years to turn a dream into reality, eventually creating a recumbent bike capable of challenging the best. The Team then travelled to Nevada in September 2015 to attend the annual WHPSC competition, hosted by the International Human Powered Vehicle Association (IHPVA), with the aim of breaking the men's 200m flying start speed trial record achieving great success setting a new British land speed record of 75.03 mph.

Thanks to skilled engineering at the University of Liverpool and the excellent resources of our partners, this record was subsequently beaten twice by the ARION2 project in the summer of 2016, raising the British Men's record to 76.59 mph, whilst also setting the British Women's record at 71.05 mph.

ARION3 attempted the same feat one year later, however unforeseen environmental factors meant the promising run times they were posting could not stand.

Due to the unfortunate events that unfolded in 2020, the COVID-19 pandemic prevented the WHPSC from taking place and further ARION bikes were put on hold.

In 2018, the ARION4 hand bike broke four world records, two for Karen Darke MBE, and two for Ken Talbot. Karen raised the overall Women's arm powered record to 46.54 mph, and Ken increased the Men's record to 51.58 mph. Karen and Ken also broke the two additional acceleration world records during the event.

Through more hard work and persistence, in September 2019 the ARION5 team added yet another World Record to the already impressive list of achievements. The ARION5 trike broke the Women's World Record for a multi-track vehicle, with a speed of 56.42 mph.

| ARION Model Number | Male Rider Fastest Time (MPH) | Female Rider Fastest Time (MPH) |
|---|---|---|
| 1 (Bicycle) 2015 | 75.03 | - |
| 2 (Bicycle) 2016 | 76.59 (British Record) | 71.05 (British Record) |
| 3 (Bicycle) 2017 | 77.40* | 71.49* |
| 4 (Hand-cycle) 2018 | 51.58 (World Record—200m Flying Start) | 46.54 (World Record—200m Flying Start) |
| | 33.81 (World Record—600m Acceleration ) | 30.30 (World Record—600m Acceleration) |
| 5 (Tricycle) 2019 | 60.84 | 56.42 (World Record-200m Flying Start) |

* Under Illegal headwind

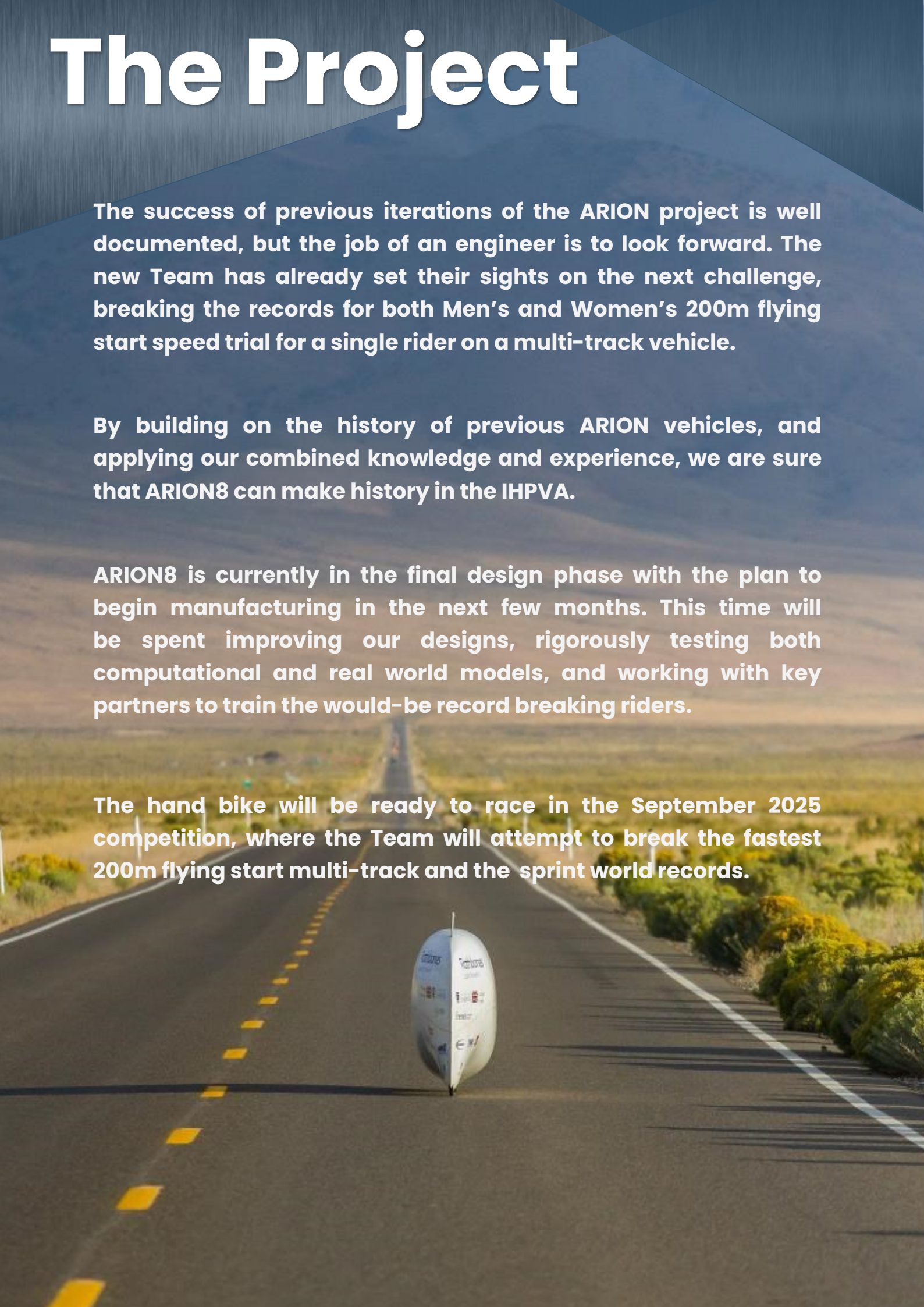
# The Project

The success of previous iterations of the ARION project is well documented, but the job of an engineer is to look forward. The new Team has already set their sights on the next challenge, breaking the records for both Men's and Women's 200m flying start speed trial for a single rider on a multi-track vehicle.

By building on the history of previous ARION vehicles, and applying our combined knowledge and experience, we are sure that ARION8 can make history in the IHPVA.

ARION8 is currently in the final design phase with the plan to begin manufacturing in the next few months. This time will be spent improving our designs, rigorously testing both computational and real world models, and working with key partners to train the would-be record breaking riders.

The hand bike will be ready to race in the September 2025 competition, where the Team will attempt to break the fastest 200m flying start multi-track and the sprint world records.



Once again The University of Liverpool Velocipede Team has set high targets, however through the hard work and dedication of the engineering students and the enormous support of our sponsors, these targets will surely be met.

The Team is currently in the process of a sponsorship drive. To make this project possible, financial support, component procurement, and logistical expertise are vital to the Team. If you or your company would like to be part of this exciting project, please get involved by contacting the Team using the details below. Potential sponsors would get their name on the bike, on all team merchandise and be tagged in all related social media posts. There would also be the opportunity for the Team to give presentations about the project within your company alongside many other perks in accordance with the level of support provided.


## Team Leaders

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## Heads of sponsorship

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# Previous Sponsors

ARION8

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the ALUMNI and FRIENDS fund

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BHPC

KMC

NTN

easycomposites
share the knowledge

talking headsets
safety through communication

HOBSON CYCLES

FUCHS

HAGUE

OLYMPIC

# Media Coverage since the project started

| Publication | Type | Headline/Article |
|---|---|---|
| BBC News | Online | World hand cycle speeds broken by Liverpool team in US |
| BBC Breakfast | Broadcast | - |
| BBC North West | Broadcast | - |
| BBC Radio 4 | Broadcast | Today Show with Justin Webb |
| CNN | Broadcast | - |
| Aljazeera | Broadcast | https://www.youtube.com/watch?v=II2K4OBK5qg |
| The Herald | Online | Meet Scotland's newest world record holders who cycled in "an egg" in the Nevada desert |
| Renishaw Ltd. | Online | Renishaw helps hand-powered cyclists make history<br>Video — https://youtu.be/DZeIA1RS5hI |
| iMechE | Presentation | Display with a talk from ARION5 team members at the iMechE Merseyside and North Wales Annual Meeting. |
| Renishaw Ltd. | Tradeshow | Had ARION4 on display at Formnext in Germany and IMTS in Chicago |
| Manufacturing Technology Centre | Online | Press Release about ARION4 |
| Schwalbe | Publication | ARION4 Press Release sent to 2500 retailers |
| The Financial | Online | Engineering students set sights on hand cycle land speed record |
| TCT Magazine | Online | ULV Team sets sights on hand-cycle land speed record using 3D printing |
| Production Engineering Solutions | Online | Renishaw additive manufacturing aids hand cycle land speed record |
| 3D Printing Industry | Online | Creating the fastest human-powered bikes with additive manufacturing |