

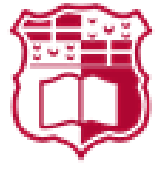



# THE DEVELOPMENT OF THE ANDROMEDA MICROPLASTICS SMART PHONE APP: A COMBINATION OF CITIZEN SCIENCE AND AI TO MOBILIZE PUBLIC ENGAGEMENT ALONG EUROPEAN COASTLINES


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**ANDROMEDA**

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Faculty of Science

**Department of Geosciences**

**Xjenza**

**The Malta Council for Science & Technology**

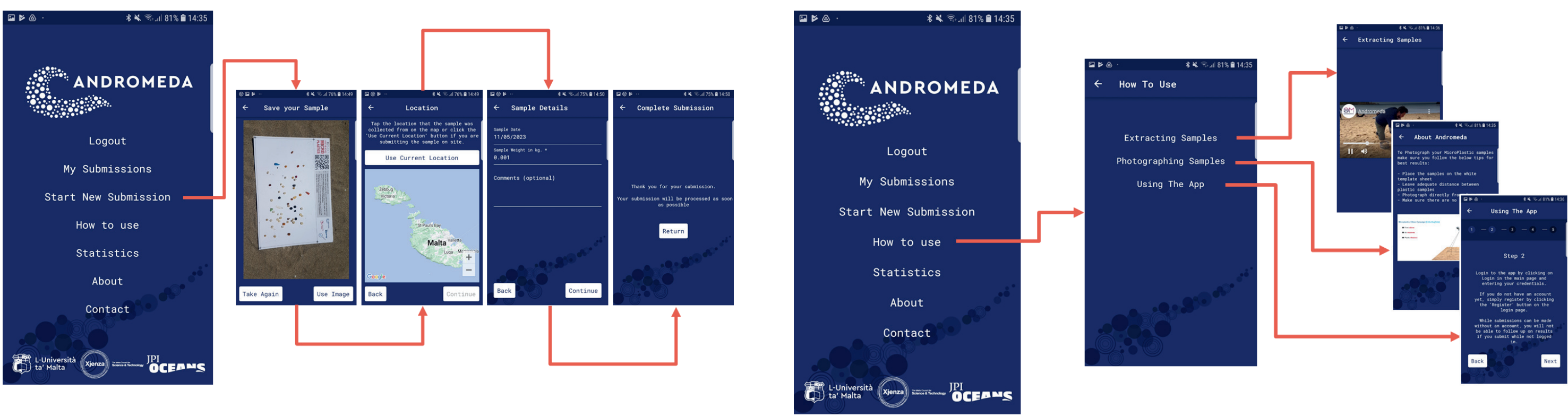
## INTRODUCTION

ANDROMEDA, a JPI Oceans-funded research project, brought together 15 international partners dedicated to research on microplastic and nanoplastic collection, analysis, identification, and monitoring. The project aimed to improve current methods of collecting microplastic samples from marine environments, and developed new methods and tools to analyse microplastics found in order to better understand the source, locations and characteristics of these plastic particles.

## THE SMARTPHONE APP

A new smartphone app was developed to help members increase their awareness of the microplastic problem and help scientists collect valuable information on microplastics from different beaches and also help researchers build a European-wide microplastics database.

The app uses artificial intelligence to analyse photos of microplastics taken by the app user, and learns to identify these over time.



Images sent through the app are automatically uploaded to a server at the University of Malta. There, a smart computer program, powered by Artificial Intelligence, takes over.

First, the software scans the image to identify the QR code and the crosshairs on the corners of scanned page. These help the program figure out the size of each tiny pixel in the picture. Then, the software adjusts the image to make sure it looks like it was taken from the front, even if the camera was a bit tilted when the photo was snapped.

Next, the program tries to fit a perfect oval shape around each particle to figure out how smooth it is. If the fit is perfect, it means that the LMP is smooth, but if there are lots of gaps, the LMP is considered rough. The program also measures the length and width of the LMPs. Finally, it looks at all the pixels that make up the picture to figure out the overall colour. It does this by comparing the colours of all the pixels to a list of known colours.

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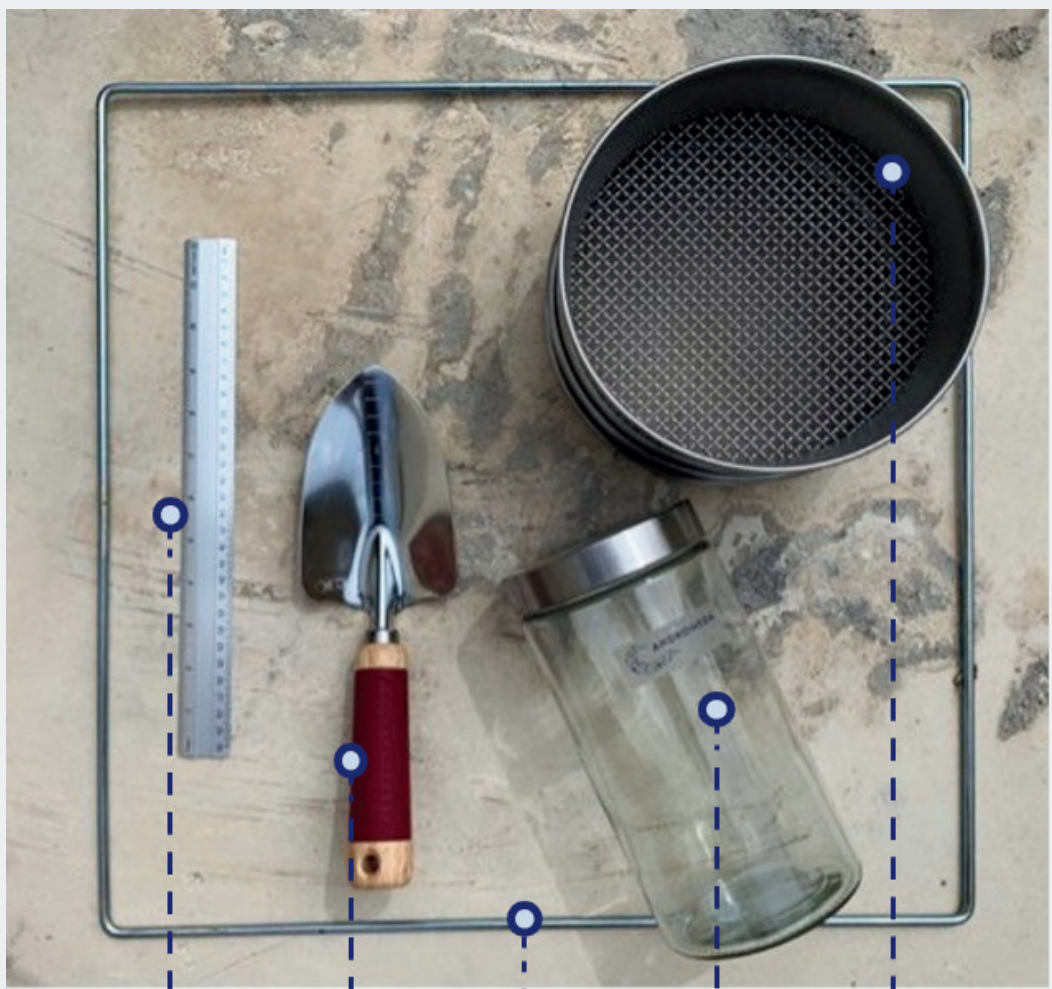
The ANDROMEDA app can be downloaded from this QR code:

- Ensure that the mobile phone location is switched ‘on’
- Exercise cannot be conducted in windy weather



To participate one needs the following:

- 0.5 mm sieve
- Trowel
- 0.5 m x 0.5 m quadrat and a ruler
- A microplastics photo template
- Glass collection jar



Ruler  
Trowel  
Quadrat  
Collection Jar  
0.5 mm Sieve

1. The quadrat is placed onto the sand surface (this ensures that the same volume of sand is being sieved each time.)
2. The sand inside the quadrat is scooped out to a depth of 15 cm and placed into the sieves.
3. Sieves are shaken from side to side so that the small sand particles pass through and larger particles, such as the microplastic particles we are looking for, are retained.
4. The small plastic particles left in the sieve are placed onto the ANDROMEDA photo template.
5. A photograph of the collected microplastics is inputted in the app.



- Non-reflective to minimize glare
- White (for white balancing)
- QR code links to ocean.mt/andromeda
- Size of QR code is 28mm × 28mm
- Size of nurdle area is 204mm × 112mm

