

## Dune change mapping using crowd-sourced smartphone images

### Advancing UU's coastal citizen science activities

Department: Physical Geography  
Research group: Coastal Morphodynamics  
Supervisor: Timothy Price, Valérie Reijers & Gerben Ruessink  
Email address: [t.d.price@uu.nl](mailto:t.d.price@uu.nl) , [v.c.reijers@uu.nl](mailto:v.c.reijers@uu.nl) , [b.g.ruessink@uu.nl](mailto:b.g.ruessink@uu.nl)

### Project description

Coastal areas are recreational hotspots where people actively engage with their environment. Monitoring and assessment of coastal dynamics relies on high-frequency observations, which are time-consuming or costly. Engaging the public in the collection of such observations provides a cost-effective method to acquire observational data, an approach also known as “citizen science”. We recently started collecting crowd-sourced images of shoreline positions at several sites along the Dutch coast to engage the general public in our research and, at the same time, to improve the temporal resolution of our quantitative observations of coastal change. At these sites, people take a picture of the beach with their smartphone camera at fixed points and share the image with our research group (see <https://www.coastsnap.nl>). This effort is part of the well-established international citizen science network CoastSnap (<https://www.coastsnap.com/>), initiated by the UNSW, Australia.

With this Bright Minds project we aim to advance the CoastSnap approach to include citizens' observations of dune vegetation cover. Changes in grass establishment patterns indicate the biophysical interactions underlying dune formation and provide information on dune development. For this project, you will focus on two dune areas: (1) the inner dune, landward of a blowout, and (2) the foredune, which is the part of the dune exposed directly to the sea. A database of images of the inner dune will be supplied by PWN, who manages the dune area of Noord-Holland and has a photo point in place (<https://www.pwn.nl/citizen-science-bij-pwn>). For the collection of images of the foredune, you are expected to set up a photo point on the beach, looking landward. To process and analyse the images you will adapt the CoastSnap algorithm, now designed for the detection of shorelines, to make it suited for the detection of dune vegetation cover. To do so, you will have access to existing techniques for the quantification of vegetation cover from satellite and UAV imagery, and you will be guided in making it applicable to smartphone images. You will also have the opportunity to come up with insightful figures or animations that communicate the results of the image analyses to the general public.

### Job requirements

You are interested in coastal morphodynamics and science communication, and have a hands-on mentality. Experience with programming in Python is required for this project (and Matlab experience will come in handy).