

# Note: Research Thesis

This is a thesis topic that is designed as an opportunity for excellent students who are interested in getting a first dive into research.

**For this topic, there is a very high risk of failure!!!**

Please note that this only make sense if

- a) you understand the topic presented in the slides,
- b) you are willing to work yourself into the topic and to read some background material,
- c) you have excellent theoretical skills, and
- d) you are willing and capable to work independently on a challenging topic.

As a **reward**, there is a **high likelihood** that a **scientific publication** is the outcome.

# Underwater Image Enhancement with Sea-Thru

## Context:

- underwater image formation is affected by multiple effects, e.g., wave-length dependent attenuation
- Sea-Thru is a physics based approach for underwater image enhancement
- it is to be tested whether
  - it only generates nicer looking images or
  - it can also improve vision based methods like object-recognition, mapping, etc.
- by checking feature (SIFT, SURF, ...) correspondences



# Underwater Image Enhancement with Sea-Thru

information on Sea-Thru:

<https://www.deryaakkaynak.com/sea-thru>

<https://towardsdatascience.com/sea-thru-removing-water-from-underwater-images-935288e13f7d>

code:

<https://github.com/hainh/sea-thru>



# Underwater Image Enhancement with Sea-Thru

## Tasks:

- understand the theory behind Sea-Thru
- get the code running and apply it to test-datasets
- evaluate the potential of Sea-Thru for underwater machine vision, i.e.,
- test how many correct(!) correspondences of visual features (SIFT, SURF, ...) can be found in pairs of consecutive frames in underwater videos



# Underwater Image Enhancement with Sea-Thru

## Topics for the Literature Survey (State of the Art) Part

- Underwater Image Formation
- Underwater Vision and its Applications

video data that can be used for generating data-sets:

<http://robotics.jacobs-university.de/TMP/BScTheses/data/Underwater-Valentin3D/>

<http://www.caddian.eu//CADDY-Underwater-Gestures-Dataset.html>