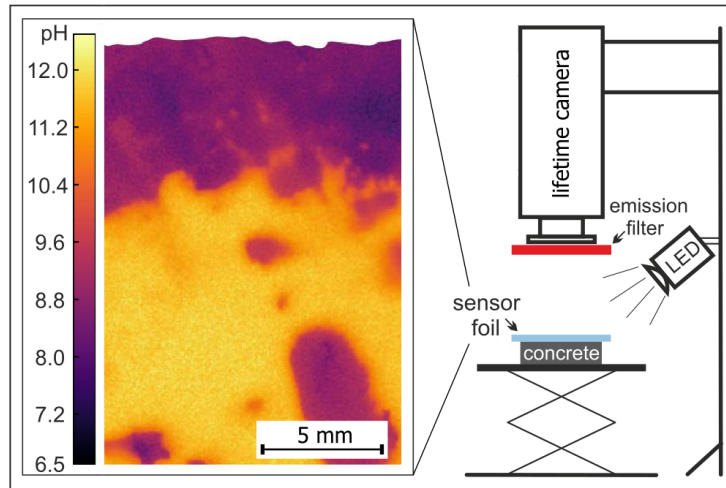


# Concrete Durability Meets Image Processing



**Background:** Concrete durability refers to the resistance of structures and materials to withstand environmental conditions during service life without performance losses. Steel corrosion is the main cause of deterioration in reinforced concrete and it can be initiated, among others, through the reaction of atmospheric CO<sub>2</sub> with concrete. This reaction, called carbonation, produces a pH decrease in the concrete, leading to destabilization of the passive layer that protects the steel within the concrete, and making it prone to corrosion. To assess the risk of deterioration, pH changes in concrete are measured. The pH-value correlates to the level of carbonation.

**Goal:** Given an optical sensor-based system (see figure), develop a system that conducts image analysis using machine learning components. The system should allow the estimation of pH maps from the surface of the concrete samples.

The project will be carried out in collaboration with the Institute of Material Testing and Building Materials Technology (IMBT-TVFA) and the Institute of Analytical Chemistry and Food Chemistry (ACFC).

## Goals & Tasks

- Create a UI to process image data
  - Web application with backend
  - Free choice of frameworks
- Develop an image analysis pipeline
- Evaluate the performance of the pipeline

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## Qualifications

- Interest in interdisciplinary work
- Experience with data science and machine learning
- Registered to one of the following:
  - ☐ Bachelor Thesis
  - ✓ Seminar Project
  - ✓ Master Thesis