



ALUMINIUM DUFFEL
mind over metal

Internship for

Materials Science/Chemical Engineers

What is so special about aluminum?

Aluminum is strong, light, durable, flexible, extremely versatile, impermeable, corrosion resistant, an excellent conductor of electricity, non-magnetic, non-flammable, an abundant element in the earth's crust and infinitely recyclable.
Aluminum has unlimited potential to be part of solutions that move society forward.
Its freedom enables people and businesses to create a better future by innovatively using the versatility that aluminum offers.

Your field of work

Since the innovation center is linked to the factory, there is a close collaboration between R&D and production. We can already offer you an insight into different positions where an engineer can end up in industry (R&D, quality service, technical customer support, process technology, etc.).

We can offer you interesting research topics that will help us make our products even better.

Some examples include corrosion studies coupled with electrochemical measurements, MSA analysis of certain measuring equipment, mapping of influence factors on color and gloss of anodized material, effect of method of quenching after annealing on mechanical properties, etc.

Your duties and requirements

- Gather information, both from literature and through collaborators, usually coupled with lab tests or attending industrial trials.
- Analytical mindset and able to work systematically in a team environment.
- Good knowledge of Dutch and English.

Interested?

Then send your CV attn.
Els Verboom (Manager R&D),
els.verboom@aluminiumduffel.com

Aluminium Duffel B.V.

is a European leader in manufacturing and marketing aluminum rolling products for a wide variety of markets (automotive, architectural, construction, consumer products, etc.) worldwide. It has state-of-the-art technology, including the widest cold rolling mill in the whole of Europe and a CALP (Continuous Annealing Line with Pre-Treatment) production line.

The Innovation Center in Duffel, Belgium, therefore focuses on segments such as the automotive and industrial sectors.

Application of Artificial Intelligence for Microstructural Quantification of Aluminium Rolled Products

Internship for student in Master level

Location: Aluminium Duffel, Duffel, Belgium

The quantitative characterisation of microstructure is a key activity in the development and optimisation of aluminium rolled products. Metallographic analysis is used to assess features such as average grain size, grain shape and morphology, intermetallic phases, precipitates and porosity, which are known to have a strong influence on the product quality. Traditionally, these analyses rely on manual or semi-automatic image analysis methods, which can be time consuming and operator dependent.

In recent years, artificial intelligence (AI) techniques, and in particular machine learning–based image analysis methods, have become increasingly powerful tools for the automated quantification of microstructural features in metallographic images. When properly trained and validated, such tools can offer improved robustness, consistency and efficiency compared with conventional approaches. However, their implementation in an industrial R&D and quality control environment must be carried out with care.

At Aluminium Duffel, AI based image analysis tools are currently being developed and evaluated for the quantification of metallographic features at different stages of the aluminium rolling and heat treatment processes.

The objective of this internship is to further develop, implement and apply artificial intelligence tools for the quantitative analysis of the microstructure of aluminium rolled products. The activities during the internship are:

- Understand, adapt and optimise existing AI based image analysis tools used within the R&D department for specific metallographic quantification relevant to aluminium sheets and plates.
- Apply the developed tools to multiple R&D projects related to new and existing aluminium products, ranging from thin automotive sheet to thicker plate materials and for different end use markets. In addition to using existing metallographic image datasets, new samples taken at different stages of the fabrication process will be prepared for metallographic observation and digital micrographs will be taken.
- The performance of the AI tools will be validated by comparison with conventional image analysis methods and expert assessments.
- The effect of differences in sample preparation procedures and quality of the digital images on the generated results to be assessed.
- Establish clear, documented procedures for the reliable use of AI based microstructural quantification in an industrial context.
- The results will be used to relate the processing parameters to the evolution of the microstructure and the final properties of the aluminium rolled products.