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*Publication date:*
2018

*Document Version*
Publisher's PDF, also known as Version of record

# STUDY OF SPECIES IDENTIFICATION CAPABILITIES OF OPTICAL DETECTION SYSTEM FOR *LEPEOPHTHEIRUS SALMONIS* COPEPODITES

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We are working towards an optical instrument capable of doing real-time in-situ detection of salmon lice, *Lepeophtheirus salmonis*. We have developed a light detection and ranging (lidar) instrument, designed for detection of individual animals remotely over a range of 3 meters. Shining a laser beam into the water, back scattered light from animals in the beam is detected using a receiving lens and a line array detector. The detected backscattered signal holds information about the animal as well as its distance from the detector.

The main challenge lies in developing an instrument that is very specific to *L. salmonis.* To study the instrument's capability to distinguish *L. salmonis* from other copepods, we use *Acartia tonsa* as a test species. This species is chosen because it is approximately the same size as the *L. salmonis*. Further *A. tonsa* belongs to one of the most abundant orders of copepods in the North Sea, the calanoid copepods, so it is a good indicator for the instrument's classification capability.

The instrument will be used to measure the signal from copepodites of both species, to investigate its identification performance. Results of a pilot study using a fluorescence microscope and a high-speed camera will be presented that indicate several possibilities for identification such as presence of chlorophyll in the gut content, and movement patterns. We will present results of the LIDAR instrument that are the first step towards remote identification and we will discuss the future classification capabilities of the system.