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Research Article

An automated image analysis platform for the study of weakly -adhered cells

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Abstract

Details of the design and implementation of an open-source platform for studying the adhesion of cells attached to solid substrata are provided. The hardware is based on a laser-cut flow channel connected to a programmable syringe pump. The software automates all aspects of the flow rate profile, data acquisition and image analysis. An example of the pelagic diatom *Thalassiosira rotula* adhered to poly(dimethyl siloxane) surfaces is provided. The procedure described enables the shear rate to be converted to drag force for arbitrary-shaped objects, of utility to the study of many cell species, especially ones that are obviously non-spherical. It was determined that 90% of cells are removed with the application of drag forces $< 3 \times 10^{-12}$ N, and that this value is relatively independent of the incubation time on the surface. This result is important to understand how marine species interact with polymer surfaces that are used in electrical insulator applications.

Keywords: Algae polymer surfaces insulator fouling flow cell video processing fluid mechanics

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Additional information

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