

## **Simulation of flow field around a gill filament of filter-feeding invertebrate**

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### **Abstract**

Filter-feeding process involves complex fluid mechanical motions that arise due to different functional sets of cilia (frontal/lateral cilia and latero-frontal cirri) on the gill filament of an invertebrate, *Mytilus Edulis*. A numerical calculation procedure is presented for complex moving geometries like cilia around a gill filament of filter-feeding invertebrate. The time-dependent simulations model the geometric details and motions of various moving components on the gill through the immersed boundary method approach. The computed flow field revealed a comprehensive and detailed view of the flow path in the inter-filament canal of the invertebrate. In particular, fluid recirculation regions around the compound latero-frontal cirri (LFC) are proposed as the “particle-trapping” sites. Results of time-dependent calculations also address the apparent paradox among different experimental observations about the role of LFC in the seston capture during the feeding process.