1163-70-1278 **Lorenzo Sala***, 180 Queen's Gate, London, SW7 2AZ, United Kingdom, and **Pierre Degond**, **Angelika Manhart**, **Sara Merino-Aceituno** and **Diane Peurichard**. *Sperm motility pattern formation study via a swimmer-obstacle-fluid interactions model.* Preliminary report.

Roughly 15% of UK couples has difficulty conceiving, and in about one quarter of these cases, the cause of infertility cannot be identified. One of the main challenges is the lack of information in the processes involved in the reproduction of mammalians, in particular in the sperm selection operated by the female reproductive tract. One important element involved in this mechanism is mucus, the complex hydrogel composed of a protein called mucin arranged in a network structure and immersed in water through which the sperm cells must swim. We propose a mathematical framework that captures the discrete interactions between swimming sperm and the mucin network within water and use this model to understand the physical mechanisms of sperm selection in the female tract through large-scale simulation and multiscale analysis. We propose a preliminary sensitivity analysis, which led to the uncovering of different swimmer patterns forming. Although it is still unclear exactly how the mucin network differentiates the healthy, viable sperm from the abnormal cells, experiments have provided clear evidence that active selection is occurring. Thus, this is a first step to understand these underlying mechanisms of sperm selection, in order to better diagnose infertility going forwards. (Received September 15, 2020)