Abstract Submitted
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Stokeslets in the clinic: biological fluid dynamics applied to human sperm motility[1] DAVID SMITH, MEURIG GALLAGHER, GEMMA CUPPLES, CARA NEAL, ATTICUS HALL-MCNAIR, JACKSON KIRKMAN-BROWN, University of Birmingham — The motility of the male gamete has been central to the development of the theory of very low Reynolds number fluid mechanics, exemplified by Gray & Hancock's classical work in the 1950s on sea urchin spermatozoa. This presentation will focus on translating recent research in biological fluid dynamics back to biology to provide new methods to analyse human sperm motility with the level of scale and automation necessary for the clinical context. Key areas of focus are: (1) automated capture of the flagellar movement from digital images (the FAST software package) and dimensionality reduction of the large datasets, (2) robust, simple and efficient fluid mechanical methods (the NEAREST software package), (3) elastohydrodynamics modelling of the active beating of the flagellum and energetic demands of motility, (4) statistical represention and summary of data from cell populations, and across patients.

[1]Engineering and Physical Sciences Research Council

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