



# Modelling Pulsatile Flows in Artificial Kidneys

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June 2023

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- Dialysis is a procedure to remove waste products and excess fluid from the blood when the kidneys stop working properly. Almost 30,000 people are permanently on haemodialysis in the UK which requires 3 visits per week to hospital for 4 hours. Globally, the number is approaching 2.5 million.
- During a therapy session, blood is recirculated by a machine through an artificial kidney (dialyser) which flows past a membrane, against which on the other side an isotonic fluid, known as dialysate, flows in the opposite direction. Classically, these flows are constant velocity and mathematical models exist for this condition and the motion of small molecular weight molecules moving across the membrane.
- Quanta has developed a compact dialysis machine, which develops a highly pulsatile dialysate flow in either direction thereby disrupting the formation of boundary layers and tunneling phenomena.
- A quantitative understanding of this fluidic motion and how it promotes movement across the membrane across a broader range of molecular weights would allow optimization of the pulsatility and an understanding about alternative dialyser designs.



# References

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