

Abstract Submitted
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A Micro-PIV Study of the Pulsed Micro-Flows Driven by an Insulin Pump BING WANG, Aerospace Engineering Dept., Iowa State University, AYODEJI DEMUREN, Mechanical Engineering Dept., Old Dominion University, ERIC GYURICKO, Children's Hospital of The King's Daughters, Eastern Virginia Medical School, HUI HU, Aerospace Engineering Dept., Iowa State University — In recent years, there is a surge in the popularity of using insulin pump or continuous subcutaneous insulin infusion therapy, as opposed to multiple daily injections by insulin syringe or an insulin pen. Some case studies have suggested that insulin delivery failure may be caused by precipitation of insulin within the infusion set. Speculation also exists that the flow of insulin through an insulin infusion set may be reduced or inhibited by air bubbles entrained into the micro-sized tubing system since there are chances that air be introduced into the insulin reservoir during the filling process. In the present study, a microscopic Particle Image Velocimetry (micro-PIV) system was used to characterize the transient behavior of the pulsed micro-flows inside the micro-sized tubing system of an insulin infusion set with insulin pump operating in basal mode (i.e., pulsed insulin pumping). The effects of the air bubbles entrained into the micro-sized tubing system on the insulin delivery process were assessed based on the micro-PIV measurements.

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