1063-60-212 **Amber L Puha*** (apuha@csusm.edu), 333 S. Twin Oaks Valley Road, San Marcos, CA 92096-0001, and **H Chrsitian Gromoll** and **Douglas G Down**. *Fluid Limits for Shortest Remaining Processing Time Queues.*

We consider a single server queue with renewal arrivals and i.i.d. service times, in which the server employs the shortest remaining processing time policy. To describe the evolution of this queue, we use a measure-valued process that keeps track of the residual service times of all buffered jobs. We propose a fluid model (or formal law of large numbers approximation) for this system. Under mild assumptions, prove existence and uniqueness of fluid model solutions. In addition, we prove a scaling limit theorem that justifies the fluid model as a first-order approximation of the stochastic model. The fluid model state descriptor is a measure-valued function whose dynamics are governed by certain inequalities together with the standard workload equation. These dynamics determine the evolution of the left edge (infimum) of the state descriptor's support, which in turn yields conclusions about response times. In particular, we are able to determine the exact manner in which the growth rate of the left edge depends on the service time distribution. By considering various examples, it is shown that this rate can vary from logarithmic to polynomial. This suggests that for heavier tailed service time distributions, shortest remaining processing time is not as unfair to the large jobs. (Received August 16, 2010)