We obtain a new relation between the distributions $\mu_t$ at different times $t \geq 0$ of the continuous-time TASEP (Totally Asymmetric Simple Exclusion Process) started from the step initial configuration. Namely, we present a continuous-time Markov process with local interactions and particle-dependent rates which maps the TASEP distributions $\mu_t$ backwards in time. Under the backwards process, particles jump to the left, and the dynamics can be viewed as a version of the discrete-space Hammersley process. Combined with the forward TASEP evolution, this leads to a stationary Markov dynamics preserving $\mu_t$ which in turn brings new identities for expectations with respect to $\mu_t$. Based on a joint work with Axel Saenz. (Received July 21, 2019)