1153-60-245 **Jerome Goldstein*** (jgmathnerd@icloud.com). *Instantaneous blowup (IBU): Old and new results.*

Consider $\partial u/\partial t = \Delta u + cu/(\|x\|^2) + f(x,t)$ where $x \in R^N, t \geq 0, u(x,0) = u_0(x)$ where $f \geq 0, u_0 \geq 0$ and $(f, u_0) \neq 0$. Assume u_0 and f are such that a unique positive solution exists for all $t \geq 0$ if c =0. Then for $c \leq C^*(N) = [(N-2)/2]^2$, many global (in time) solutions exists, but for $c > C^*(N)$, no positive solution in the sense of distributions exists. If $V(x) = c/(\|x\|^2)$ is replaced by $V_n(x) = min\{V(x), n\}$ and if $f(x,t)$ is replaced by $f_n(x,t) = min\{f(x,t), n\}$, and if u_n is the corresponding unique positive solution, then $u_n(x,t) \to \infty$ as $n \to \infty$ for all $x \epsilon R^N, t \geq 0$. This is instantaneous blowup. This 1984 theorem of P. Baras & J. Goldstein led to more research on singular linear & nonlinear parabolic PDE. We discuss new proofs & new theorems, including IBU when R^N is replaced by the Heisenberg group H^N, nonexistence of positive solutions for certain nonlinear parabolic problems, & topics, involving the Ornstein-Uhlenbeck equation & others. This is joint work with many coauthors. (Received August 29, 2019)