Quasiconformal mappings $u : \Omega \to \Omega'$ between open domains in $\mathbb{R}^n$, are $W^{1,n}$ homeomorphisms whose dilation $K = |du|/(\det du)^1/n$ is in L^∞. A classical problem in geometric function theory consists in finding QC minimizers for the dilation within a given homotopy class or with prescribed boundary data. In a joint work with A. Raich we study C^2 extremal quasiconformal mappings in space and establish necessary and sufficient conditions for a 'localized' form of extremality in the spirit of the work of G. Aronsson on absolutely minimizing Lipschitz extensions. We also prove short time existence for smooth solutions of a gradient flow of QC diffeomorphisms associated to the extremal problem.