- S. Hamanaka, Type of finite time singularities of the Ricci flow with bounded scalar curvature, arXiv:2105.08250 (2021). **(Not peer-reviewed)**

  In this paper, I showed that the shape of finite-time singularities of a Ricci flow on a closed manifold with bounded scalar curvature are restricted in some sense.

- S. Hamanaka, Limit theorems for the total scalar curvature (old version: C^0, C^1-limit theorems for total scalar curvatures), arXiv:2208.01865 (2022). **(Submitted)**

  In this paper, I particulary proved the following: Let $\mathcal{M}$ be the space of all Riemannian metrics on a closed n-manifold M ($n \geq 3$). Then, for any nonnegative continuous function σ and constant κ, the space

  $$\left\{ g \in \mathcal{M} \;\middle|\; \int_M R(g)\, d\mathrm{vol}_g \geq \kappa,\ R(g) \geq \sigma \right\}$$

  is closed in $\mathcal{M}$ with respect to $W^{1,p}$ ($p > n$)-topology.

  In the same paper, I also proved that the lower bound of the weighted total scalar curvature

  $$\int_M R(g) e^{-f}\, d\mathrm{vol}_g$$

  is preserved under certain convergences of metrics and weight functions. Here, f is some weight function on the manifold M. As a corollary of this weighted version, we can also obtain that the scalar curvature lower bound in the distributional sense (which was defined by Lee–LeFloch) is preserved under $W^{1,p}$ ($p > n^2/2$)-convergence of metrics provided that the limiting metric is C^2.

- S. Hamanaka, Upper bound preservation of the total scalar curvature in a conformal class, in preparation. **(Not peer-reviewed)**

  In this paper, I particulary proved the following: Let $g_0 \in \mathcal{M}$. Then, for any continuous function σ and constant κ, when the conformal class $[g_0]$ of g_0 is Yamabe positive or nonpositive respectively,

  $$\left\{ g \in [g_0] \;\middle|\; \int_M R(g)\, d\mathrm{vol}_g \leq \kappa,\ R(g) \geq \sigma \right\},\quad \left\{ g \in [g_0] \;\middle|\; \int_M R(g)\, d\mathrm{vol}_g \leq \kappa \right\}$$

  are closed in $\mathcal{M}$ with respect to C^0-topology respectively.