

Title: Wasserstein Diffusion on Multidimensional Spaces

Abstract: Given any closed Riemannian manifold  $M$ , we construct a reversible diffusion process on the space  $\mathcal{P}(M)$  of probability measures on  $M$  that is

- reversible w.r.t. the entropic measure  $\mathbb{P}^\beta$  on  $\mathcal{P}(M)$ , heuristically given as

$$d\mathbb{P}^\beta(\mu) = \frac{1}{Z} e^{-\beta \text{Ent}(\mu|m)} d\mathbb{P}^0(\mu);$$

- associated with a regular Dirichlet form with carré du champ derived from the Wasserstein gradient in the sense of Otto calculus

$$\mathcal{E}_W(f) = \liminf_{\tilde{f} \rightarrow f} \frac{1}{2} \int_{\mathcal{P}(M)} \|\nabla_W \tilde{f}\|^2(\mu) d\mathbb{P}^\beta(\mu);$$

- non-degenerate, at least in the case of the  $n$ -sphere and the  $n$ -torus.