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

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

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

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

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