

# The power of random information for function approximation on manifolds

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Suppose a function is sampled at a point set in order to reconstruct from the function values an approximant to the original function with the error being measured in an  $L_q$ -norm. For this task, point sets with good covering properties are often used. We show that on a compact Riemannian manifold one may as well use uniform random points, provided that suitable conditions on the Sobolev space containing the function hold. For this purpose we present a criterion of (asymptotic) optimality of point sets for this problem. We also discuss the related approximation of the integral using uniform random points.

**Joint work with:** David Krieg

## References

- [1] D. Krieg and M. Sonnleitner. Random points are optimal for the approximation of Sobolev functions. *arXiv e-prints*, arXiv:2009.11275 [math.NA], <https://arxiv.org/abs/2009.11275>, 2020.
- [2] D. Krieg and M. Sonnleitner. Function recovery on manifolds using scattered data. *arXiv e-prints*, arXiv:2109.04106 [math.NA], <https://arxiv.org/abs/2109.04106>, 2021.