

# One World ABC Seminars - Season 5

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**Abstract** In order for ABC to give accurate results and be efficient, we need summary statistics that retain most of the parameter-related information and cancel out most of the noise, respectively. For many scientific applications, we need strictly more summary statistics than model parameters to reach a satisfactory approximation of the posterior. Therefore, we propose to use a latent representation of deep neural networks based on Autoencoders as summary statistics. To create an incentive for the encoder to encode all the parameter-related information but not the noise, we give the decoder access to explicit or implicit information on the noise that has been used to generate the training data. We validate the approach empirically on two types of stochastic models, one being a member of the exponential family, the other one not.

## References

- [1] C. Albert, S. Ulzega, F. Ozdemir, F. Perez-Cruz, A. Mira. Learning Summary Statistics for Bayesian Inference with Autoencoders. Preprint at [ArXiv:2201.12059](https://arxiv.org/abs/2201.12059) (2022)