

Abstract Submitted  
for the TSS21 Meeting of  
The American Physical Society

**ParaMonte::ParaDRAM - A Parallel Adaptive Markov Chain Monte Carlo Sampler in C, C++, Fortran, MATLAB, Python and R**  
SHASHANK KUMBHARE, JOSHUA OSBORNE, FATEMEH BAGHERI, AMIR SHAHMORADI, University of Texas at Arlington — Markov Chain Monte Carlo algorithms, especially the Metropolis-Hastings algorithm, are widely used for stochastic optimization, sampling, and integration of mathematical objective functions, in the context of Machine Learning, Bayesian inverse problems, and parameter estimation. An advancement over the MH algorithm is the Delayed Rejection Adaptive Metropolis (DRAM) algorithm. Here, we present the ParaMonte software, a suite of parallel Monte Carlo optimization, sampling, and integration algorithms for Bayesian inference problems based on the concept of DRAM algorithm. The primary goal of the ParaMonte library is to streamline scientific inference by full automation and by providing runtime dynamic directions to the user. It also offers fully deterministic reproducible restart functionality of all simulations and a unified API accessible from several major scientific and Data Science programming languages, including C, C++, Fortran, MATLAB, Python, and R. Comprehensive automated post-processing tools integrated with the ParaMonte library also enable seamless analysis and visualization of the simulation results.

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Date submitted: 16 Mar 2021

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