Proposal Review 1 : 2053714

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Agency Name:	National Science Foundation
Agency Tracking Number:	**2053714**
Organization:	
NSF Program:	CDS&E-MSS
PI/PD:	Hickernell, Fred
Application Title:	Collaborative Research: Quasi-Monte Carlo Community Software
Rating:	Fair

Review

Summary

In the context of the five review elements, please
evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

Brief Summary of the project:

The aim of the project is to develop a library of quasi Monte Carlo (QMC) Python software that is adopted by the QMC community as a platform and repository of software. The effort seeks to integrate the contributions of different research groups into a cutting edge package available to other researchers and practitioners. The proposal includes two PIs from two different institutions and one senior personnel.

Intellectual Merit

Strengths

The proposal seeks to provide a software platform for the implementation of

QMC methods. QMC is surging as a potential alternative to more traditional Monte Carlo methods that provide high efficiency and fast convergence rates for the estimation of functionals of a multivariate probability distribution. By making available a common environment for QMC, the project aims at creating a focal point for the community, fostering links between research groups, and between researchers and practitioners. This will enhance the growth of QMC.

Weaknesses

The narrative of the proposal is very focused on engineering a software to enable fitting models that use QMC. The narrative highlights the need for implementation of QMC approaches, rather than development of new QMC methodologies. In fact, the aims of the project are described in Section 3 with a list of subsections that describe different components that will be part of the proposed platform. Each subsection concludes with a sentence indicating the algorithm that will be implemented. QMC is not a very mainstream part of computational statistics research, and, unfortunately, the narrative fails to convey its advantages and potential. But most importantly, the project puts the emphasis in the software development, rather than in the development and study of QMC methods and the exploration of their theoretical properties. The narrative vaguely indicates that the availability of a platform and the ability of the community to tackle interesting applications will spur the needs for better methods and theory.

In the context of the five review elements, please
evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

Broader Impacts

Strengths

The proposal has a strong potential to impact the development of QMC methods by providing a focus point for the QMC community.

Weaknesses

The narrative does not make a strong case to illustrate the potential of the proposed platform to have a broad impact in the area of computational statistics. Beyond the fact that the existence of a good platform for QMC will facilitate the use of such methods, there are no solid examples of the power of the methods that the project aims to implement.

Please evaluate the strengths and
weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

Summary Statement

The project proposes the implementation of methods that correspond to some of the goals of CDSE. It is not clear that the project will produce substantial methodological innovations. It is not clear if the project will have an impact outside the community dedicated to QMC.

This proposal ranks at the bottom 33% of the ones I reviewed.