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SAGE is a project that the PI launched in January 2005 to create a software environment for research and experimentation in algebra, geometry, number theory, cryptography, and numerical computation. This involves creating the free open software SAGE, which is a distribution of mathematics software that provides new functionality and is able to create and work with objects defined in a wide range of mathematical software packages, including Axiom, Maple, Mathematica, Macaulay2, Magma, MATLAB, Octave, Maxima, Singular, and PARI/GP.

Intellectual Merit:

SAGE provides powerful tools for advanced research mathematics, and work on SAGE will result in practical implementations of new algorithms, especially for research in number theory and cryptography. The creation of SAGE also requires solving fundamental problems so that numerous mathematics programs can be used together.

Broader Impact:

SAGE features a uniform interface to many different aspects of computation, which may help unify mathematical software, and gives researchers convenient access to a range of different software. Also, instead of researchers having to pay to buy mathematics software, they will in many cases have the option to use SAGE for free. At many institutions, purchasing computer software is a significant burden, and SAGE may help address this problem. Moreover, because SAGE is free, it is available to undergraduates, high school students, and non-mathematicians, all of whom have contributed greatly to SAGE development.