

Building telescopes for mathematicians.  
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Computers have a long history as research tools for mathematicians. With the advent of cloud computing, massively parallel computational resources are now available at an unprecedented scale, allowing mathematicians to explore previously inaccessible regions of the mathematical universe. I will describe some recent computations in arithmetic geometry that used over a million CPUs to complete a 1000 year computation in less than a day of elapsed time. This work was part of an effort to build a database of mathematical objects that lie on one side of the conjectured “Langlands correspondence,” and to explore analogs of the (now proven) Sato-Tate conjecture in higher dimension.