1067-33-223 **David H Bailey** and **Jonathan M Borwein*** (jon.borwein@gmail.com). *Exploratory Experimentation and Computation.*

The mathematical research community is facing a great challenge to re-evaluate the role of proof in light of the growing power of cloud computing, of current computer systems, of modern mathematical computing packages, and of the growing capacity to data-mine on the Internet. Add to that the enormous complexity of many modern capstone results such as the Poincaré conjecture, Fermat's last theorem, and the Classification of finite simple groups.

As the need and prospects for inductive mathematics blossom, the requirement to ensure the role of proof is properly founded remains undiminished. I shall look at the philosophical context with examples and then offer some of five bench-marking examples of the opportunities and challenges we face.

This is based on joint work with David Bailey in a paper to appear in the Notices of the AMS http://www.carma.newcastle.edu.au/~jb616/expexp.pdf. (Received August 09, 2010)