1018-11-74   **Kiran S. Kedlaya*** (`kedlaya@mit.edu`), Department of Mathematics, Room 2-165, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, MA 02139, and **Timothy G. Abbott** and **David Roe**. *Computing zeta functions of surfaces using p-adic cohomology.*

We describe an algorithm for computing the zeta function of a smooth hypersurface in projective space over a finite field of small characteristic. The approach uses the Griffiths-Dwork reduction method for computing in the de Rham cohomology of the hypersurface (or more precisely, of its affine complement) and the Monsky-Washnitzer description of the Frobenius action on said cohomology; it should generalize to nondegenerate hypersurfaces in other toric varieties. We may also mention some examples of zeta functions of surfaces over small finite fields computed using this technique and/or an application (via the bounding of Picard numbers) to the theory of error-correcting codes, suggested by Voloch and Zarzar. (Received February 26, 2006)