1108-60-194   **Dan Cheng*** (`cheng@stt.msu.edu`), 2311 Stinson Drive, Campus Box 8203, Raleigh, NC 27695-8203, and **Armin Schwartzman**. *Multiple testing of local maxima for detection of peaks in random fields.*

A topological multiple testing scheme is presented for detecting peaks in images under stationary ergodic Gaussian noise, where tests are performed at local maxima of the smoothed observed signals. Two methods are developed according to two different ways of computing p-values: (i) using the exact distribution of the height of local maxima, available explicitly when the noise field is isotropic; (ii) using an approximation to the overshoot distribution of local maxima above a pre-threshold, applicable when the exact distribution is unknown, such as when the stationary noise field is non-isotropic. The algorithms, combined with the Benjamini-Hochberg procedure for thresholding p-values, provide asymptotic strong control of the False Discovery Rate (FDR) and power consistency as the search space and signal strength get large. Simulations show that FDR levels are maintained in non-asymptotic conditions. The methods are illustrated in an example on brain image. (Received January 12, 2015)