1116-51-1385 **Catrice Chong*** (cachong@smith.edu), **Cheryl Holmes** (cholmes@smith.edu), **MyVan Vo** (mvo@smith.edu) and **Lauren White** (lmwhite@smith.edu). *Pinpointing unknown objects by their reflected light rays.* Preliminary report.

Suppose a square S of a known size $s = 1/n$, $n > 1$, is inside a bounding unit square B at an unknown location. We shoot a light ray into B and notice where it emerges, reflecting off S (if it hits it) with perfect reflection. We prove that $n + 1$ light-ray probes are sufficient and sometimes necessary to locate S. We then generalize this result to more general situations, with special attention to multiple objects, all mirrored, so there may be complex inner reflections before the ray emerges. (Received September 19, 2015)