In this talk we will discuss an arithmetic analogue of the gonality of a curve over a number field: the smallest positive integer $e$ such that the points of residue degree bounded by $e$ are infinite. By work of Faltings, Harris–Silverman and Abramovich–Harris, it is well-understood when this invariant is 1, 2, or 3; by work of Debarre–Fahlaoui these criteria do not generalize to $e$ at least 4. We will devote particular attention to scenarios under which we can guarantee that this invariant is actually equal to the gonality using the auxiliary geometry of a surface containing the curve. (Received January 15, 2019)