

1077-O1-2016      **Rebecca Bamford, Aminul Huq and Wei Wei\*** ([wwei@umn.edu](mailto:wwei@umn.edu)), 300 University Square, 111 S Broadway, Rochester, MN 55904. *Project CAGE: Integrating mathematical and moral imagination through a hands-on learning project.* Preliminary report.

Mathematics students are challenged by applying optimization techniques to real world problems. Introductory courses in applied philosophical ethics involve a similar challenge: students learn and apply theoretical concepts at the same time as taking a case-based approach to ethical problems. We present a project integrating precalculus and calculus with applied ethics in three introductory level courses. Our project combines hands-on learning with conceptual analysis, aiming to support development of learning connections between the abstract and the practical. Students build a cardboard model of an animal cage to be used in laboratory animal research, and produce a report integrating application of optimization concepts from calculus with ethical guidelines for cage construction and ethical analysis of laboratory animal welfare. Students improve their understanding of optimization problems and learn to apply optimization techniques at the same time as they engage critically with ethical problems in health sciences. In addition to analysis of faculty experiences in delivering the project, we present some preliminary analysis of ongoing collection of attitudinal and metacognitive data concerning student learning in and through the project, and proposed modifications. (Received September 21, 2011)