

Integrating 3D Printing Technology into Arts, Science, and Engineering Subjects

**Forrest Ables^{1*}, Brandon Persaud^{1*}, Laura West²
JB Sharma³, and Redahegn Sileshi³**

^{1*}Undergraduate Researchers and 3D Printing Lab Supervisors, University of North Georgia,
Oakwood, GA

²Department of Visual Arts, University of North Georgia, Oakwood, GA

³Department of Physics, University of North Georgia, Oakwood, GA

Abstract

A strong emphasis on active learning and integration of hands-on activities into course curriculum have been shown to significantly enhance students' conceptual understanding of the course. Three-dimensional (3D) printing, also called additive manufacturing, has been a subject of many academic and industrial research projects. Many higher education institutions across the United States and the world are increasingly incorporating 3D printing technology into their curriculum. 3D printing is a manufacturing method in which solid 3D objects are printed layer by layer from raw materials. Various types of raw materials can be used for 3D printing that include plastics, metal, nylon, ceramic, powders, and liquids. Currently, plastics are the most widely used materials.

The Art Department in collaboration with the Physics Department at the University of North Georgia (UNG) Gainesville opened the 3D Printing Lab, focused on producing physical models from computer-designed, virtual models. The goals are to assist faculty in using 3D printing technology and to develop the curriculum. The UNG 3D Printing Lab, located in Dunlap Mathis Building, provides students and faculty with state-of-the-art lab and collaborative project spaces. The lab is currently equipped with a variety of 3D printers, 3D digital scanners, and slicing software for 3D printers. Currently, students from Art, Physics, and Pre-engineering programs are able to develop and print models individually designed for class projects, design groups, research, or personal use. The Art and Physics departments operate the lab with student supervisors from the two departments, who are available to assist in printing models.

Keywords: 3D printing, 3D digital scanners, and plastics