

# *Printers for Patients*

Through a partnership with

**East Tennessee Children's Hospital**

And

**The Department of Materials Sciences and  
Engineering**



## *Our Goal:*

We aim to establish a lasting, service-learning focused relationship between East Tennessee Children's Hospital and The Department of Materials Science at the University of Tennessee. This partnership will aspire to three objectives: serving those whom are with need in our community, developing real-world skills application experience for our students, and caringly bring joy to those in a temporary slump. These pursuits will act to continue our initiative of communicating and serving the local community through inspiring engineering and learning in future students.

## *Our Plan:*

This will be achieved with a combination of educational presentation opportunities and the opportunity to create a small item using 3D printing that was designed by the patients and their families. Manufacture may take place in hospital and be used as an real world example of many engineering processes such as software use, design limitation consideration, material selection, and creativity.

A small self-contained cart (minus power supply) has been developed by our department to serve as a mobile printing station. It is wirelessly connected to a Microsoft Surface, on which the patients will work with a student to personalize a small printable item. The student will be the judge of scale of the object and printability. The item will then be printed on-site, so that the patient may observe the process. Upon completion of the print, the item will be sanitized and presented to the patient to keep. The cart will then be unplugged, cleaned, and transported to the next room or patient area.

## *The Benefits:*

The benefits of this project are hard to describe, as there are so many unpredictable reactions. This project is a people based proposition the good we do is entirely focused on the community reception. That being said, this project appeals to a higher purpose of community service. University students all have a bit of the 'save the world' philosophy in them- that's why they are educating themselves with a degree. This project appeals to that, because sometimes we get so bogged down in the workings of our lives we forget that our purpose. There is little doubt that seeing the awe, the spark of imagination in a child's eye as they watch a small toy or their name on a screen being printed into reality will bring back that sense of beautiful purpose. The small amazements in life, those little things that take only a couple hours to help those whose lives are threatened before they even begin, are the things that drive not only purpose, but that make all the difference in the world to a child. Perhaps it will give them encouragement, knowing that someone cares enough to teach them about this cool new technology, perhaps it will inspire them to become an engineer. Perhaps a student in University will be inspired to medicine, or develop a taste for volunteering. All being made possible because the University of Tennessee decided that the potential benefits of investing in the well-being of our community was worth the cost. All being made possible because the University decided to give back to the community, to earn their respect and admiration; moving toward a more a better Knoxville for all. Thus, the benefits are endlessly imaginative and forever unpredictable.

## *Promoting and Marketing:*

Promotion of this project will be within the department and within the college. Weekly updates are possible, and perhaps even a page on the MSE website. The possibilities are endless, and the branding will pay homage to the great partnership between East Tennessee Children's Hospital and The University of Tennessee. We also hope to include this program in the new service-learning initiative that the College of Engineering is proposing, adding to the prestige of both the college and the program.

## *If Not Funded:*

If this program is not funded, our ability to reach kids will be limited. Funding might be sought elsewhere, however this application is the best fit for funding we have. Without enough printers, plastic, and tablets, we will not be able to reach even a portion of the patients we want to. The program is set so that time spent with each child is personal and quality; thus the more systems we have, the more patients we can reach in the limited time we have at the hospital.

## *Where the Money Goes:*

The funds will be used to purchase a dedicated LUzbot Mini 3D Printer, a Microsoft Surface, 4 spools of PLA plastic in gray, orange, white, and blue, a small metal cart, and a plexiglass cover for the printer. This constitutes what is required for one full self-contained system.

## *Safety*

- ❖ The printers will be operated by a student or Professor at all times. No operating printer is to be touched by a patient or staff.
- ❖ The printer is to be covered by the developed plastic housing, unless an item is being removed or an issue must be resolved.
- ❖ The housing is only to be removed OUTSIDE patient rooms.
- ❖ After every use, each printer will be unplugged and the housing cleaned using isopropyl alcohol. Gloves will be worn by every patient, staff and student handling the system and changed per hospital codes.
- ❖ After a student uses a Surface Computer to design their product, each surface will be sanitized with isopropyl alcohol and the operator will wash their hands thoroughly.
- ❖ Each printable product will be cleaned and sanitized with soapy water, then isopropyl alcohol before it is presented to the patient and/or their families.
- ❖ NO LATEX will be used in any of the printers or equipment. The risk of small particle atmospheric dispersion is very low, so masks are not required.