June 2022

3DAssist News

3DAssist Tallaght: Update Summer 2022

Welcome:

Welcome to our second attempt at a newsletter. We had a busy year and we hope to capture all our activities in this newsletter.

As with most people we are still adjusting to opening all our activities , post COVID. So hopefully we'll be back to full strength over the next academic year.

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- Prosthetics Projects:
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3DAssist Related

- The Nuada Project:
- Website

LauraLynn Halloween Costume Project !!

Last October we were delighted to be invited to help out with Halloween costumes in LauraLynn. LauraLynn is Ireland's childrens hospice and every year the parents and children have a great fun making Halloween costumes. For the wheelchair users this can be a little more difficult. So our plan was to help out this year and design and make 12 costumes. We then hope to use what we've learnt from this in a number of related projects that hopefully will help out this October and in future years.

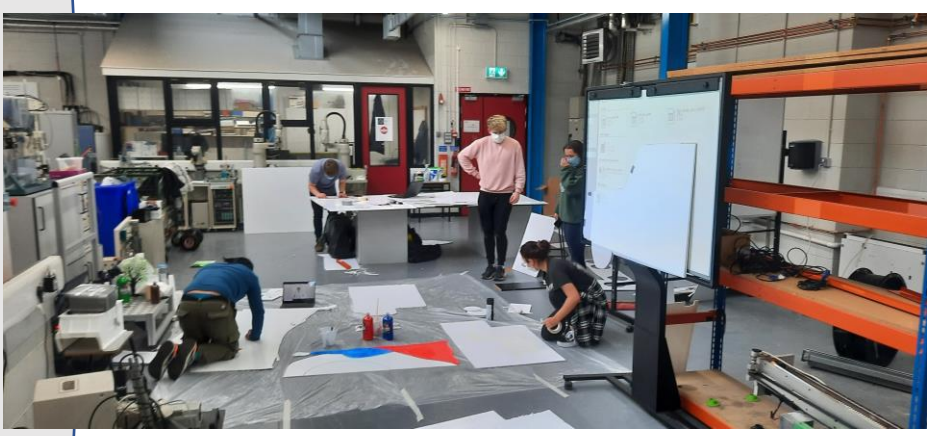
Meeting the Children and Parents in LauraLynn

We had a brilliant 2 days in LauraLynn meeting the children and their parents. We met 12 children and their families.

We had to be particularly careful as we were still under COVID restrictions . So we had to try get as much measuring done with the minimum contact between us and the children. So we tried out some “innovative” methods of measuring ☺

Making sessions in TU Dublin.

We were fortunate to be able to use our labs and a very large temporary marquee outside the Tallaght campus.



Delivering Costumes out to LauraLynn

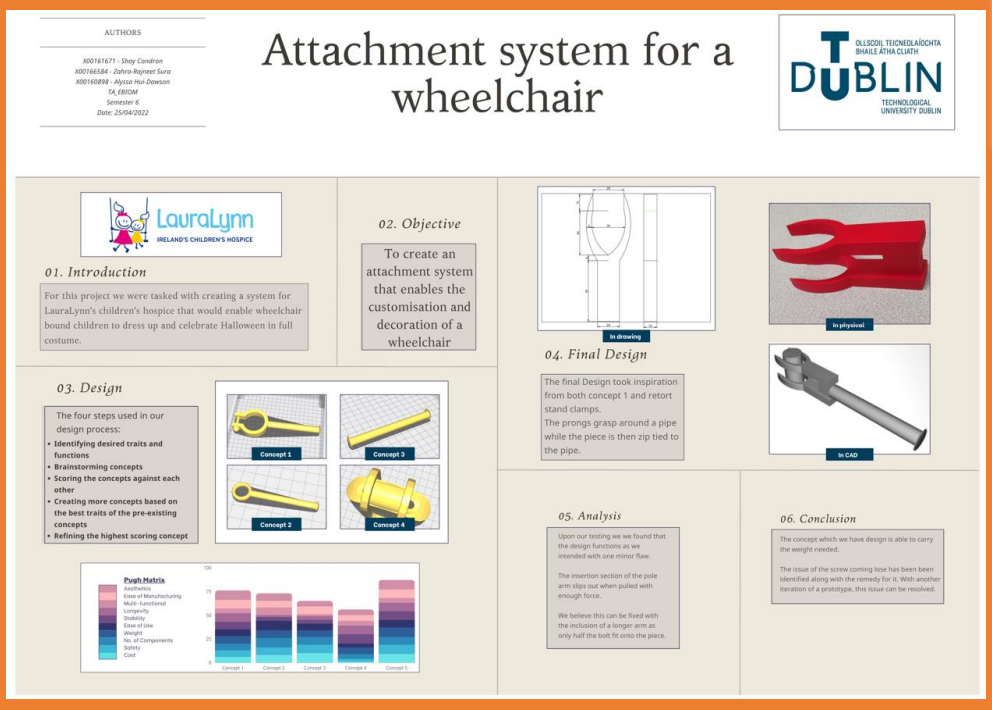
After the making sessions we delivered the costumes out to LauraLynn for them to be collected or delivered to the children and families. We were lucky to meet up with some of the families again.

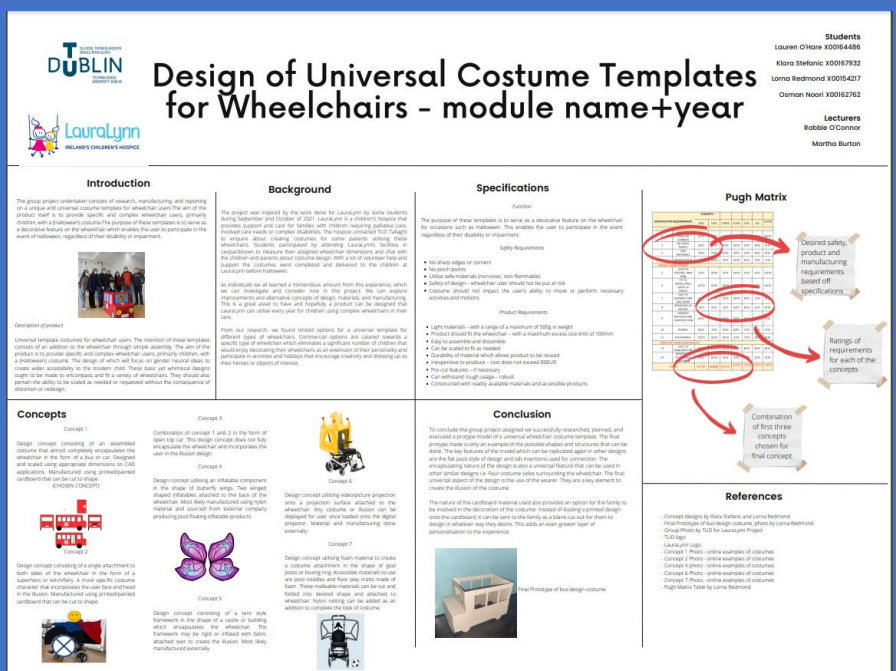
Our digital media students were able to finalise a video that covered our experiences and also included some video footage from the children on Halloween night.

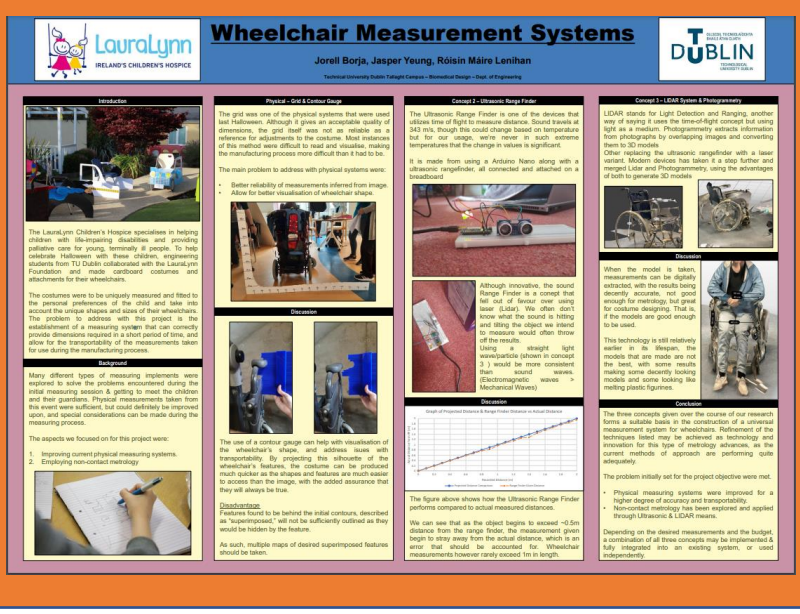
https://www.youtube.com/watch?v=gYMfPaz-DH0

After the Christmas break we were able to continue our work related to the costumes with our 3rd year Biomedical design Engineering students.

3rd year Group projects for LauraLynn







Mentoring by Engineers from Project Management Group.

These projects were run over the summer semester as part of the Bio Medical Design Engineering degree course.

We were delighted to be able to assign each group an industrial mentor from Project Management Group.

PM GROUP

Childvision related Projects:

3D Map.

This project was based around producing a map for the new school campus for visually impaired students attending the Childvision campus in Drumcondra . The challenge for this project was to complete concepts for an easy to navigate map that is accessible and inclusive to those who are blind or visually impaired.

3D Map for Child Vision
3rd Year Final Project

Department of Mechanical Engineering, Technological University Dublin – Tallaght Campus, Tallaght, Dublin

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Mechanical Engineering - Bachelor of Engineering (Honours)
TU828
Year 3
25/04/2022

Introduction

This project is based around producing a map for a school campus for visually impaired students. that is accessible and inclusive to those who are blind or visually impaired.
This project's main aim is to design and manufacture at least three concepts for visually impaired students' three-dimensional school campus map.

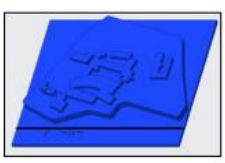
Points of Interest

This investigation has shown that there is a high amount of detail in the type of map required to meet the requirements to achieve this project. Here are some highlighted considerations in my findings:

- Visual impairment is a decreased ability to see, the term blindness is used for those with complete vision loss.
- In Ireland, there are approximately 54,810 who are blind or visually impaired.
- Braille is a tactile writing system used by visually impaired people. It is a code based on six dots, arranged in two columns of three dots. There are 63 combinations.

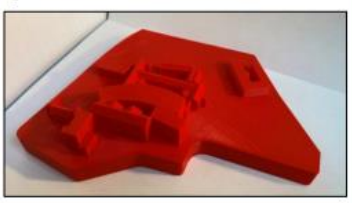
Design Methods

- Selected concepts based on my design specifications
- Developed their features further
- I modelled them in CAD
- Prepared files for manufacturing

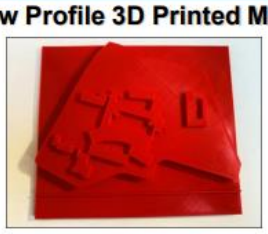


Detailed 3D Printed Map

The detailed 3D printed design was to give the shape of the campus area as well as give the character of the building, more real to life compared to the low-profile design. The detail added to the map gives a better representation of what the campus and architecture will look like, for example, the differences in height of the buildings



Low Profile 3D Printed Map



The lower profile 3D print concept was to give an overall shape of the campus area as well as define the buildings without adding too much unnecessary detail. The low profile allows for less filament to be used and for a flat easily adherable surface for the braille punched sticker to stick to. Its buildings are all uniform in height and the ground is flat which allows for an expected reading and interaction experience. This method is versatile and would allow for the possible addition of texture differences, vibration motors or LEDs.

Low Profile Laser Cut Map

The laser-cut low-profile method is remarkable to the low-profile 3D printer version although it is done on a laser cutter. The heights are still unvarying. The main difference would be that we would be using layering to create the desired height of the buildings and attaching the buildings to the map base and the base plate

Conclusion

- The finish of the 3D printing was the best manufacturing method for its functionality and versatility. It is also safer as you cannot round edges that have been cut with the laser cutter as easily but with CAD drawings for the 3D printer you can add them to the design, this is important as this is a project that is intended to be touched thoroughly. This will overall make a more homogeneous design.
- The low-profile 3D print concept has the most potential as it has the best options for flexibility such as adding a tactile legend, braille legend and uniformity to building heights.
- If the solution needed to be done very quickly using the laser cutter would be the fastest option. From design to manufacturing and assembly the process could be done within a few days depending on the detail required.

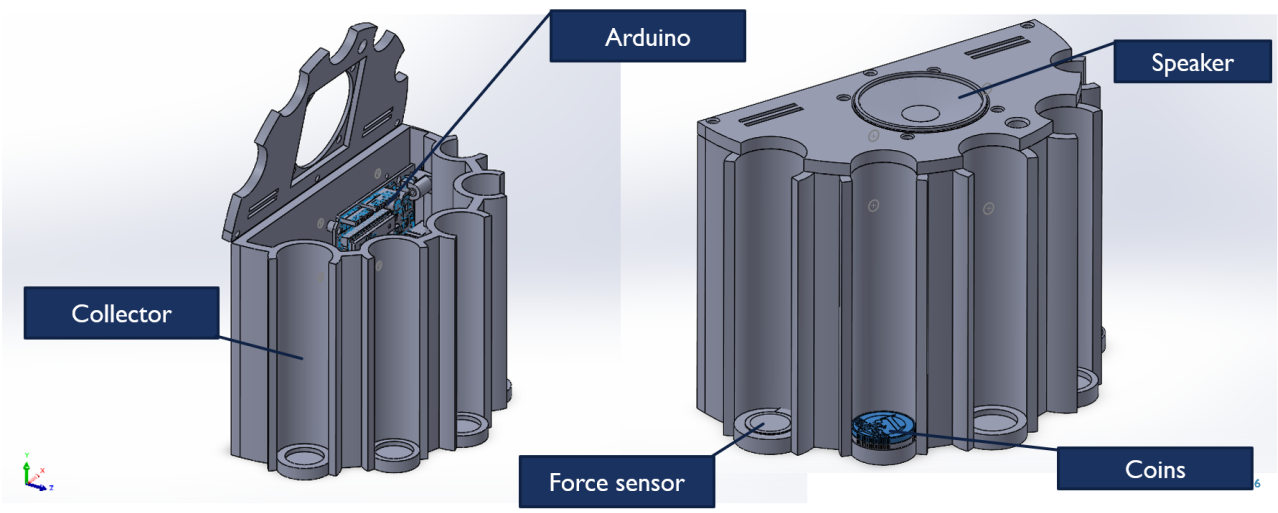
Childvision related Projects:

Coin Dispenser:

This project was concerned with the design and manufacture of a coin dispenser for the visually impaired. This design incorporated a voice activated system that would tell the user how much is contained within the dispenser !! We made great progress on this but will continue it as a project next year.

DESIGN

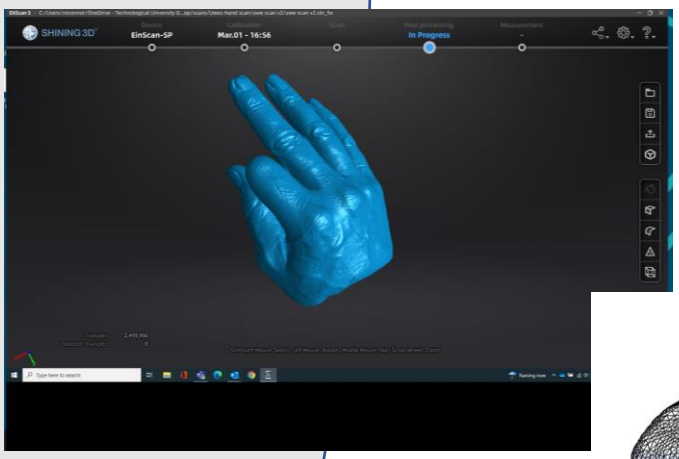
How it works ? Recognized speech will be convert into predefined commands or actions.



New finger design project

We had a 3rd year Mechanical Engineering student work on modifications to a newer design for a single finger prosthetic. This design was completed by a 4th year student last year.

We were able to get the user to cast their hand in plaster and send the cast into us. We could them 3D scan the cast and the student could design / modify the design around the digital scan

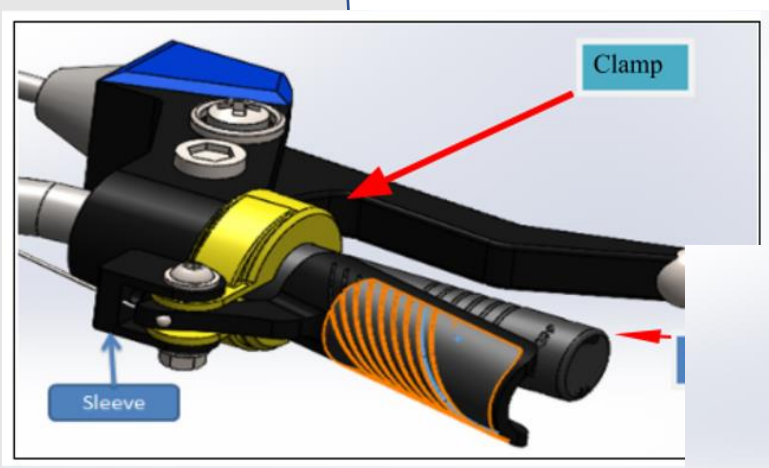


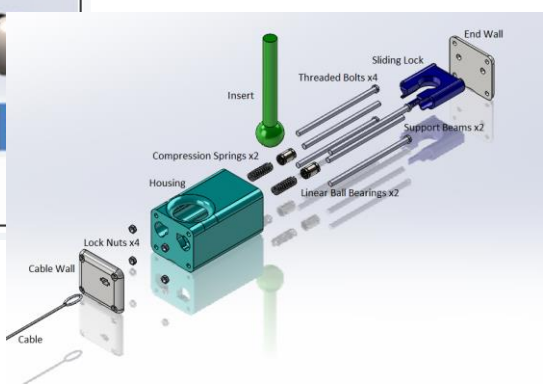
The design is still at an early stage and will need a lot of improvements and modifications but we hope to be able to release it to the other e_NABLE makers in the next year or so.

Bike related project:

We are still making progress on our bike arm projects. Our intended design is to have standard arm/hand that the rider wears.
The bike will have a socket that locks onto the prosthetic arm. The riders will be able to open and close the lock using a special lever on the other side of the handlebar.

So hopefully, the rider can chose when they want to release from the bike or stay securely on.





Last year our student José did a great job on the special reversed lever. This year Shaw designed a prototype clamp for the other side of the handlebar.

The Nuada Project:

You may have noticed that we changed our logo to a little fella who appears to be holding his arm ?

Well, last year we started a project to look at an Irish mythological figure called Nuada !!
Nuada was king of the Tuatha Dé Dannan. He was one of the first kings of Ireland and was very well liked and respected. It is written that during a big battle Nuada had his arm cut off and had a silver prosthetic arm made for him. That's why his full name is sometimes given as Nuada Airgead Lámh (Nuada of the silver arm)

It just so happens that in a town called Tandragee in Armagh they found a 3000 year old sculpture of NUADA !!! And that this sculpture was kept in Armagh Cathedral.

So we got in touch with the Bishop and he gave us permission to go to the Cathedral with some students and 3D Scan the sculpture.

There are loads of different versions of the story of NUADA from other places such as Scotland and Norway !! Sometimes he has a silver sword (like in the Hellboy films ☺ (over 15's only !! ☺))

But we are the only ones with a granite sculpture of him that was carved during the bronze age !!
It was carved before there was even iron chisels or hammers !!!!

So we asked for help from some great people from Boulder Media who came up with a really cool cartoon version of our Nuada

We have great plans to develop this story over the next year.
You can see the videos of us scanning here: (the audio is from an older video !☺)
https://www.youtube.com/watch?v=NA3ngzv47d0

Hurling hand project:

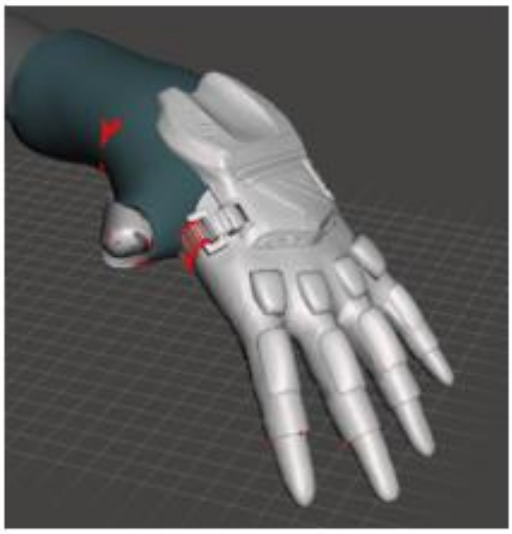


Figure 3.3 (c) backward the palm

Unfortunately Covid has held us up again with this project !! Our project had to be deferred due to sickness but we hope to have something to share by August ☺

We have completd a cast, and have 3D scanned the cast. We have started the process of designing around that 3D scan.

Plans for next September:

We have a number of ongoing projects with groups such as Childvision and LauraLynn so if you have any ideas regarding these please let us know.

- Organise an Open day for March/April 2023.
- We have been asked to look at a special arm/hand design for Communion / Confirmation ☺
- Improve and develop other bike designs.
- Try develop sports related designs..
- Start up school visits again (probably from Jan 2022)
- Etc
- Etc ☺

That's all for now and hopefully that all makes some sense ☺

We're always interested in any ideas / comments from parents and especially kids for how we can try improve the devices, so please email us at Robbie.oconnor@TUDublin.ie