EPQs...

Hills Road Sixth Form College Cambridge

EPQs 2016

This year's issue continues to showcase the range of fascinating topics that our students choose and really demonstrates their capabilities beyond their A level studies.

AID PACK FOR AUTISM

I created an aid pack for individuals in mainstream secondary schools with autism as well as a blog to accompany it where I recorded my progress (harrietsepq.wordpress.com). The pack is called the A.L.L (autistic language levels) pack and is designed to allow students a non-confrontational method of communicating who they are to others. The concept I created involves the individual completing and submitting a supplementary questionnaire called the A.L.L.Q which asks questions corresponding to the sections of the A.L.L pack template. Their answers are then made into the template and the number of A.L.L packs they requested are created and sent to them so they can then give them to whoever they wish. The goal of this concept is to not only create better awareness for autism but also for the unique individuals with the condition themselves, allowing people in education to recognise that everyone on the autism spectrum are different and don't all fit under the same label. I decided to do this for my EPQ initially because I love psychology, making me motivated to complete it to the best of my ability. I also wanted my topic to support my application to university! Autism has always intrigued me and I wanted to see if there was anything I could create which wasn't already out there to offer individuals the awareness and support they need in schools. I have found the process of completing my EPQ thorough rewarding because of the brilliant feedback I have had from all sorts of people involved with autism, including individuals with the condition themselves! I wasn't expecting to have enjoyed it as much as I did and I think this is certainly down to the fact that I chose a topic that I knew would enthuse me.

Harriet Almond

THE BENEFITS & TECHNICAL CHALLENGES OF EXPLORING MARS BY ROBOTIC ROVER

What did I do? For my EP I decided to undertake an extended piece of research culminating in a dissertation: "The Benefits & Technical Challenges of Exploring Mars by Robotic Rover". As part of this I contacted a local trust fund and a Cambridge company to raise funds for research expeditions to space organisations.Afterbeinginterviewedand going through this process I travelled and stayed on my own in numerous locations: Amsterdam to visit the European Space Agency, Stevenage to visit Airbus Defence & Space and Florida to visit NASA and the United Launch Alliance at Cape Canaveral Air Force Base. When visiting these cutting-edge facilities I spoke to, learnt from and interviewed the scientists and engineers who work on exploring our Solar System and beyond. In total, I travelled over 28,000 kilometres by myself - the first experience of me doing so. On completion of my project, I handed in a 7,000+ word research dissertation, travel vlog compilation and website diary.

Why did I do it? Personally I am interested in both Computer Science and the exploration of space. I thought that studying

robotic Mars rovers would give me an excellent chance to blend both of these areas and study in-depth. As I was so passionate about my project, working on my EP was rarely a chore - something I wish could be said for some of my other subjects! I also decided to do this project as it gave me an amazing opportunity to travel and develop a vast array of skills. My Extended Project enabled me to meet some of the most intelligent, interesting and skilled people in the world, all whilst staying in Airbnbs and exploring parts of the world I have never been to. For the days that I was away, I went from viewing Mars rover prototypes, to discussing the difficulties of launching rockets, to then learning about Dutch/ American culture directly from locals.

What have I gained? Out of everything that has happened to me at Hills Road Sixth Form College, my Extended Project has been the activity I have enjoyed most. During the process I have gained a vast array of skills that have furnished my University application and will prove invaluable in later life. These include project management, networking and "getting things done", independence and travelling alone, as well as undergraduate-level dissertation writing skills - to name but a few.

Above: In the ESA ESTEC Test Centre in front of the Large Space Simulator 2

Right: On top of the Vertical Integration Facility of the United Launch Alliance, with a view of Launch Complex 41 and Cape Canaveral.

Matt Timmons Brown

JUST RELAX!

For my EPQ I created a hand illustrated and decorated booklet which contains 7 lesson plans for relaxation workshops. Each workshop includes a combination of basic to advanced meditation, meditation techniques, and a relaxation activity which are all aimed specifically at giving students a chance to reduce their stress and learn how to maintain a peaceful mind through out their daily lives. I created this booklet because I think that student wellbeing is very important and I believe that the huge amount of pressure put on students nowadays is fuelling the growing levels in the number of young people who suffer from a variety of mental health issues (such as depression and anxiety); I wanted to create something that would help combat this. I think I have learnt a great deal about the countless relaxation techniques which are out there and hope that I can now take what I have learnt and use it to run classes in relaxation/ simply to help the people around me reduce their stress.

Vitto Zaina

FLYING CAMERA!

When I was four, I decided to take a photo of the outside of my house by attaching my mum's camera to a parachute and dropping the camera from the upstairs window. I designed the parachute out of a plastic bag with strings attached to the camera. Unfortunately however, my creation was put to a stop before it could be tested. For my EPQ I therefore decided to take my fascination of flying cameras a step further, and send a camera up to the upper atmosphere to photograph space. I designed and constructed a box of sensors and cameras and also a parachute made out of an umbrella. I then attached the payload and parachute to a helium weather balloon. For the launch of my balloon, I contacted a member of the Cambridge University Space Flight Society, who helped me gain permission to launch from the Civil Aviation Authority. During the flight, the balloon's weak radio signals were received, decoded and uploaded by radio enthusiasts across Southern England. This enabled me to track and chase my balloon in real time. The entire flight took around 2 hours, and my high altitude balloon reached an altitude of nearly 30 kilometres. We retrieved the balloon in a field 50 miles north-east of the launch site, and recovered photographs and data. This project has helped me developed communication, research and practical skills. I have also learnt from the data recorded by my balloon that the stratosphere's temperature increases with altitude.

The Earth viewed at an altitude of nearly 30 kilometres. The 7 meter diameter weather balloon, parachute and radar reflector are visible. This photo was taken with the upward facing camera.

Robert Oxford Pope

TB EDUCATION IN PAPUA NEW GUINEA

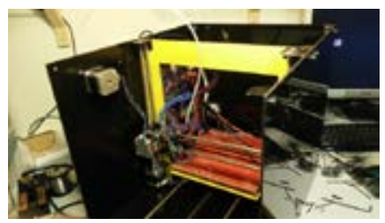
For my EP I illustrated the symptoms, causes and treatment for tuberculosis and put the drawings together to create an educational booklet and posters for people in Papua New Guinea. Working with my sister (who is a doctor in PNG) we produced and published versions in English and Pidgin (their main language). I also created a fund raising video, which I showed to people here in England to raise awareness of and money for the printing of these booklets/posters. Amazingly, I exceeded my £1000 goal and raised £2270 which is now being used to produce hundreds of booklets to be distributed in over 50 different villages in PNG. I chose this topic because it's

medically related and I would like to study medicine at uni. I also visited PNG two years ago so I was able to use my experiences as inspiration for the drawings. I really enjoyed working on a project that will have an impact in saving peoples' lives, so it made it all really worthwhile.

Joanna Lewis

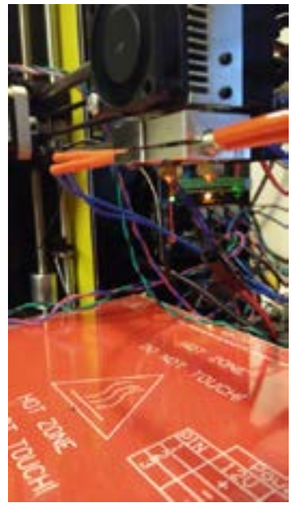
BUILDING A 3D PRINTER

For my Extended Project I designed and built a 3D printer from scratch. My aim was to design everything from the ground up learning skills in CAD, design, programming and electronics. I really enjoyed my EP as it allowed me to explore a wide range of things that I would not have otherwise done such as branding and logo design and other practical skills



such as using machine tools and equipment. EP gives you a great opportunity to explore new interests and to cover topics much more deeply than you do during your A-Levels. It will also be incredibly useful for university as it shows them how you have a passion for the subject and the work you can achieve by yourself outside of the boundaries of exams.

Sam Berry



DESIGNING A SKI RESORT

For EPQ I decided to design a ski resort that would be resilient to the next 100 years of climate change. I decided to do this as I am an avid skier and on my last ski holiday there was a very little snow, so skiing was a challenge. I felt researching into this subject would combine my subjects of PE and Geography as I learnt a lot more about climate

change on snow as well as holistic management when designing and building the model. EPQ has given me lots of skills essential for university, such as short and long term planning. It has also given me the independence and confidence to approach experts for research, for example I corresponded with the Head Ranger at Cairngorms Ski Resort. **Sarah McLaughlin**

ZEUS THE LOOSE

For my project, Zeus the Loose, I wrote a book. I wanted to write a book before I was 18, as a long term personal goal, as I want to become a full time writer in the future. Additionally, I hadn't

had the opportunity to study Classics or Ancient History in my education thus far, so I wanted to have something relevant on my personal statement for when I applied for a Classics Degree. The book was a humorous yet informative guide to the Ancient Greek Gods, inspired by the infamous polygamy of Zeus. At the end of the project, I gained a published book to my name, the experience of writing a book, a valuable asset to my university application, and a great deal of knowledge about myself, what I am capable of physically/mentally, and where my strengths lie with writing.

Nathan Butler

MAKING A VIRTUAL ARM

For my extended project, I designed and built an arm brace that tracks the movement of my arm and relays it into a virtual simulation. It does this by using flex sensors and IMUs (inertial measurement units) to calculate the orientation of different parts of my arm and then apply the orientations to a virtual skeleton. The virtual

arm would then react to my movements in real time and allowed me to interact with rigid body physics objects within the simulation. I decided to do this project as I am interested in virtual reality and finding new ways to interact with virtual systems. I had to learn how to plan large projects, making sure all of the prerequisite tasks had been completed before start on a new one. The project also allowed me to develop a range of engineering skills from circuit design to modelling objects to be 3D printed. **Peter Burton**

PUTTING THE SUN IN A BOX

My EP dissertation, entitled "Putting the Sun in a Box", is about future prospects for nuclear fusion power. The idea came to me when reading a Scientific American article about exciting recent innovations in fusion power. I was captivated by its great potential to transform the world. When Stephen Hawking was asked what he hoped scientists would solve by the end of this century, he replied: "Nuclear fusion because it would provide an inexhaustible supply of energy without pollution or global warming." The trouble is that despite all the best scientific and engineering efforts, nuclear fusion always seems to be 'twenty years away'. I wanted to use my extended project as an opportunity to explore this fascinating topic further, and to find out whether a breakthrough

was imminent. As part of my research, I visited the Joint

European Torus (JET) near Oxford - currently the world's largest fusion reactor - and I arranged to interview engineers and physicists there. I also looked into novel fusion approaches being pursued by several start-up companies in the US; with a lot of luck, they might even overtake the gradual progress being made by large international tokamak projects like JET. I personally found the EP project very useful for developing a wide variety of skills because it involved setting up a long term plan, conducting research on the topic, writing my dissertation, and then working out how to present my project in the EP marketplace, some of which I hadn't done much of before. It also helped me to decide on my future university choices, rekindling my interest in physics.

Edward Shellard

BRING ON THE BIOLOGY

For my EP I decided to make a science kit aimed at kids that are primary school age (5 to 12 year olds) focusing mainly on biology and reinforcing ideas taught in the classroom. This was because I have always enjoyed doing experiments, with exploring more of the world around me, the process of thinking scientifically and making my own ideas on how to interpret data gathered. Undertaking this project has been a challenging and fulfilling experience, from learning the skills involved in better time management like planning time management in making a Gannt chart to using unfamiliar applications to actually produce the science kit, such as a 3D modelling application called Sketchup and a book making application called Blurb and the process of actually crafting the science kit, I feel like the whole process of planning, designing and producing the science kit have taught me important life skills necessary for higher education as well as giving me a sense of pride in being able to create something which can be enjoyed by children and then foster a love of science later on in life. **Ricky Hew**

COLONISING FRENCH CANADA FOR KIDS

For my EPQ, I decided to make a children's book in French about the colonisation of French Canada, primarily Quebec. I saw this topic as a great way of discovering an overlap between two subjects that I studied at AS (History and Geography). It would allow me to discover how History influences people's interaction with the space in which they live, and the development of culture and language patterns alongside. I also saw it as a good opportunity to develop my French skills, as I had not used the tense in my book before. The project enabled me to develop my creative skills too, since I had to illustrate my book and design the cover and pages. Completing the EPQ helped me to become more organised with my time management, and also highlighted the value of different types of research, and the use of a variety of different sources. I have been able to improve my skills associated with appropriate handling of research notes and picking out necessary information when reading around my topic. I also completed practical research out in Canada, which is really useful for my future as I have applied for a Geography degree where fieldwork will be an key element.

Olivia Haste

SMART MIRROR

The aim of my project was to create a way for people to passively acquire relevant information whilst minimising distraction by providing a focused display. The product

is a wall-mounted mirror with a display to show current data such as the weather, time, news, and more. The Smart Mirror is a means to disconnect ourselves from the "distraction economy" of modern society without sacrificing productivity.

From the project I learned key programming concepts and how to apply them. Most importantly, however, I learned how to think like a developer: including code debugging skills and what considerations that need to be made to optimise the end-user experience.

Joon Ho Son

Making a flute

For my project I decided to make a simple system flute, primarily using PVC piping. I'm both a keen musician and very interested in instrument making and repair so it seemed like the natural choice to me – particularly as I hope to study music next year. The process involved quite a bit of physics, and then some DIY skills which I had to develop a lot as I wasn't particularly good at it before!

I ended up making four flutes in total, in a variety of sizes. I really enjoyed the experience and I plan to continue making my own – one day I may even make one that plays in tune!

Dominic O'Sullivan

Back to the 1950s

For my extended project I decided to do something completely separate from my A level studies, and so I decided to make a dress in the style of the 1950s era. This meant that I was learning something new and a practical and useful skill, and although it wasn't relevant to my higher education plans, I thought that it would make me stand out in my application due to showing a wide range of interests. I really enjoyed doing something completely different to what I was learning in classrooms and the project taught me how to research and learn skills for myself without having to be taught them - therefore although I'm not planning on pursuing dress making, the fundamental skills I learnt from it will be very valuable in the future.

Eleanor Smallwood