SciFest 2016

National Final

Project Abstracts

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November 2016

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SciFest@CIT 2016
STAND 1

Title of Project: Multipurpose House Safety Alarm

Students: Harold Ibarlin, Filip Gajda, Elvis Nzekwe

School: North Monastery Secondary School, North Monastery Road, Cork

Teacher Mentoring Project: Frank Murphy

Project Category: Technology

ABSTRACT

Have you ever gone out of your home with an awful feeling that you left something turned on that might cause a fire or that your family might be harmed by dangerous gases leaking in your home?

We have created a multipurpose house safety alarm that will send a text if it detects high temperature or harmful gases such as carbon monoxide, LPG or smoke. Furthermore, to make our device much safer and more eco-friendly our way of detecting smoke is different from most ordinary smoke alarms that use a harmful radioactive isotope called americium 241 that is poisonous to the human body when either inhaled or swallowed.

Our device detects smoke using an LED and a tsl2561 light sensor and operates on the principle that smoke interferes with the light path. When a sensor reads a dangerous level that we have set through multiple calibrations it will sound a buzzer, light an escape light and, most importantly, it will alert the homeowner by sending a text.

We hope that in the future everyone will have the peace of mind that their home is always safe from fire and gas related incidents. This could also save insurance companies in pay outs and ultimately bring the price of home insurance down. Having conducted multiple tests, we conclude that our device works and could one day be sold as a commercial product.

SciFest@AIT 2016
STAND 2

Title of Project: The Digitalisation of Farming

Student: Will Dennigan

School: Lanesborough Community College, Lanesborough, Co. Longford

Teacher Mentoring Project: Michael Lyons

Project Category: Technology

ABSTRACT

I chose this project as I grew up on a farm and naturally have a farming background; however, computer science has always intrigued me. I decided I would try to use technology to bring farming into the modern era. To do this I had to figure out the parts of farming which were still tedious as ever. Upon investigation I noticed that feeding livestock was still lacking in modern terms. It also became clear to me that keeping up to date information about your herd at hand was progressively getting more difficult. So I thought to myself, "How can I tackle these issues?"

The solution to these problems were the "HerdChecker" (patent pending) and the Automated Feeder. The "HerdChecker" is a simple web app written using basic HTML which allows the user to input information about their herd at any time. The information will then be kept up to date automatically if there is already data present, such as medical history. With the implementation of QR codes on the livestock tags, the farmer can find any information about a specific animal in their herd with no hassle at all.

The Automated Feeder was even more in line with my interest in technology. I built it using the Raspberry Pi - "The $5 computer". Using Python I was able to create scripts which allowed the Raspberry Pi to rotate the servos "X" amount of times depending on how much meal the farmer would like it to dispense at a given time.

SciFest@NorthWest(NI) 2016
STAND 3

Title of Project: Distance Diagnostics

Students: Stephen Emerson, Sean Martin

School: St Killian's College, Carnlough, Co. Antrim, BT440JS

Teacher Mentoring Project: Sean Connolly

Project Category: Technology

ABSTRACT

When watching the news I heard about the shortage of GPs in Northern Ireland to go out to visit patients in their homes in order to diagnose and monitor them. 'If only there was something that would stop GPs having to make house visits', I thought; that was when the Distance Diagnostics first came into focus. Its function would have to allow GPs to interview, diagnose and monitor house bound patients.

Distance Diagnostics is a device controlled by a Raspberry Pi combined with an Arduino board that reads sensors which can test for heart rate, temperature and oxygen levels, along with the possibility of other specialist medical sensors being connected to it. Distance Diagnostics is equipped with a display screen so the patient can see their own results and also send data via the internet to a doctor. Live data and pictures can be displayed on a web page or monitored on a phone app.

We calibrated our device on a visit to Dr Brian Mc Crossan at the Royal Victoria Hospital, Belfast. We were also told that our method for viewing the patient was great because it comforts the patient knowing the doctor is monitoring them.

Our device is currently able to monitor five out of the six scores for the NEWS system used by the NI Health Service. This is more than ample to allow patients home early from hospital, reducing hospital bed time and giving patients and carers confidence that they are still under hospital care.

SciFest@DIT 2016
STAND 4

Title of Project: Designing A Multi Role Stealth Aircraft and Testing its Viability

Student: Omar Salem

School: Sutton Park School, St Fintan's Road, Sutton, Dublin 13

Teacher Mentoring Project: Catherine Tattersall

Project Category: Technology

ABSTRACT

The objective of my project was to design and test a heavy, multi-role, low-observable aircraft. The project took a year to complete.

The aircraft has many different applications, including strategic and tactical airlifting, aerial refuelling and airborne early warning and control.

My design incorporates two systems that are on no other aircraft in the world: a system that prevents the engine exhaust from radiating heat and a system that enables the aircraft to manoeuvre efficiently without compromising its low observability or stress the airframe.

The design prevents it from being detected by advanced military detection methods including RADAR, sight, sound and thermographic imaging. The shape of the aircraft is designed to cause the absolute minimum drag possible which increases speed and fuel efficiency and reduces emissions. The brakes on the landing gear include a kinetic energy recovery system.

For the design I used SolidWorks software. I tested the completed model for how it would behave aerodynamically. I obtained a 3D printed prototype of my aircraft scaled 1:250 for testing whether or not the stealth technologies incorporated on my plane functioned properly.

I devised an experiment to show that the shape of the aircraft works and that the aircraft cannot be detected by radar.

SCIFEST@DKIT 2016
STAND 5

Title of Project: The Healthy Alternatives to the High Calorific Ingredients in Food for Young Children

Students: Alison McDonnell, Simone Clerkin

School: St Louis Secondary School, Glen Road, Monaghan

Teacher Mentoring Project: Joanne Myers

Project Category: Life Sciences

ABSTRACT

11-12% of Irish children are obese and 48% of Irish people snack, indicating the need for a nutritious, low-calorie snack. Our aim was to create a novel nutritious recipe highlighting the ease of smart substitution.

"Trial and Error" was a major factor in altering the cupcake recipe. Pure fruit juices, peanut butter, eggs with the yolk removed, yeast, avocado, bananas, applesauce and Greek yoghurt are a few of the substitutes tried.

A sugar-free recipe was created with almost half the calories and increased potassium and vitamin C levels. A bomb calorimeter was used to quantify the calorific value. This was tested on a number of foods with published calorific content. In a blind survey a group of 11-13 year-olds tested the taste, texture and appearance compared with the original cupcakes. They also completed our healthy lifestyle survey. An application was created to enable worldwide access to "A Smart Child's Health".

Overall the children preferred the taste, texture and appearance of the substituted cupcake. They said the most difficult part of living a healthy lifestyle was avoiding sweet treats and the most important element in food was the taste.

A low-calorie, tasty recipe was created to demonstrate substitution. An application was constructed to support healthy eating in young children worldwide.

We will substitute a savoury recipe and make the application available to iPhone devices. We will verify the experimental results for the cupcakes using another method for estimating calories, e.g. fat by Soxhlet and carbohydrate by difference.

SciFest@ITB 2016
STAND 6

Title of Project: **Can We Improve the Protective Qualities of Camogie or Hurling Gloves?**

Student: Katie Byrne

School: Loreto Secondary School, St Michael's, Navan, Co. Meath

Teacher Mentoring Project: Dr Lisa Darley

Project Category: Physical Sciences

ABSTRACT

Through my own experiences playing camogie and football I noticed I received a lot of injuries to my hands, particularly around the joint areas. Curious about my observations I consulted the Gaelic Athletic Association's annual report 2015 which stated that there were 461 hand and finger related injuries claimed for via their injury benefit fund, an increase of 9% on the 2014 figures.

In response to my research I decided to design and test a reinforced glove that would protect the joints in players' hands and fingers but maintain flexibility.

I achieved this via incorporation of non-Newtonian fluids into specially designed pouches placed at the main joints inside a standard GAA glove. The wrist protection of the glove was enhanced in a similar way.

To test the effectiveness of my glove I conducted impact studies using a Vernier dual range force meter which would enable me to measure the time it takes for the force to act on the object. My aim was to increase the time taken, thus decreasing the impact. My results showed that the glove I designed does in fact provide increased protection by increasing the time taken for impact by approximately 200% at the wrist and fingers. Flexibility studies also show that this increased protection does not come at any cost to performance.

I am hoping my glove will provide camogie, hurling and football players with protection against common sporting injuries which have been linked to the development of arthritis in former GAA players.

SciFest@LIT 2016
STAND 7

Title of Project: To Design and Manufacture a Wireless Trailer Device

Students: Kalin Foy, Ciara Coyle

School: Coláiste Chiaráin, Croom, Co. Limerick

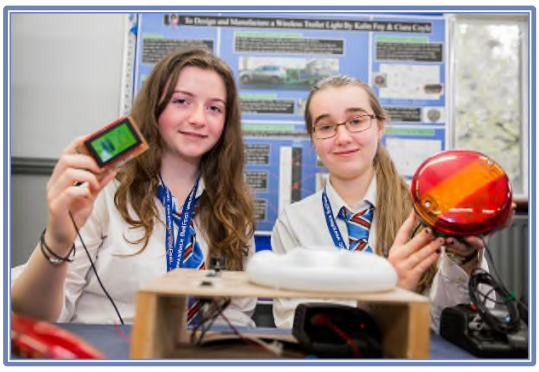
Teacher Mentoring Project: Edel Farrell

Project Category: Technology

ABSTRACT

Introduction
We have constructed a wireless trailer light system to replace the 7-pin connector that is used to conduct signals from the car to the trailer. These signals control and power the lights on the trailer. We chose this project as many trailer lights do not work properly and this is a safety concern.

Description



Initially we used the Arduino Uno and XBee RF wireless communicators. We used a PC fan wired as an alternator to generate power for the lights. The alternator produced current which was used to charge a re-chargeable battery. This system worked but was not very robust. We decided to make the device low power and more durable. We used the Arduino Pro Mini and the RF69CW wireless communicators which are smaller and more power efficient. To make the system robust we changed the layout of the boards to fit inside the base of the trailer lights beside the battery. We added a cable to connect to mains power to charge the battery.

We then added a parking system. By using two ultrasonic sensors we were able to make a proximity sensor to aid parking and reversing. We used a GLCD screen on the sun visor for the display and a beeper. The display also shows battery life.

Conclusions
The system runs for 32 hours on a fully charged battery. It is compact and durable. The driver is constantly informed of the battery life and is assisted in parking by the proximity sensors.

SciFest@GMIT 2016
STAND 8

Title of Project: **Applying Real-Time Physiological Responses to eLearning and Workplace Stress Management**

Student: Maghnus Hartigan

School: Mary Immaculate Secondary School, Lisdoonvarna, Co. Clare

Teacher Mentoring Project: John Sims

Project Category: Technology

ABSTRACT

In this project I am developing a computer mouse with heart rate and perspiration sensors, an algorithm to deduce the mood state of the user and software that utilises this technology to provide a quality user experience, integrating the user's mood into a decision making process.

For the hardware, I am using 3D printing to create the mouse "shell", and am integrating sensors attached to an Arduino.

The mood-state algorithm is based on research I conducted into how stress and other emotions affect a user's physiological response.

I am developing two software applications that utilise the technology. The first is a computer-based learning environment aimed at improving students' computer-based education. It uses the sensory data to deduce what topics a user enjoys and what causes them stress. The aim is to deliver a personalised learning experience, playing to a user's strengths and working on their weaknesses. The second, a workplace stress management program, monitors a user's stress level and recommends to them when they need to take a break from work. This is aimed towards those working in office environments. It would give them a helpful reminder to avoid a build-up of stress and should result in improved user wellbeing and productivity.

SciFest@WIT 2016
STAND 9

Title of Project: Eco Dishes

Students: Marie Keogh, Grace Hanneffy, Roisin McEvoy

School: Mountrath Community School, Dysartbeigh, Mountrath, Co. Laois

Teacher Mentoring Project: Dr Mary Kelly

Project Category: Life Sciences

ABSTRACT

The purpose of this project was to investigate the possibility of making a dishwasher tablet that contained all natural ingredients and cleaned the dishes equally as well as commercial products but did not cause health problems and were friendly to the environment.

Since May we have been focusing on expanding our project. We have done this by creating an all-natural washing up liquid to use in sinks. We have also worked on making a new eco-friendly floor cleaner.

In this study three different formulations of tablets were prepared using different methods of preparation. On the newer products we have tried them at a broader range of temperatures.

The dishes and cutlery from each cycle were swabbed and tested for cleanness on a petri dish at room temperature and at 37 °C over a 24-hour period. A biuret test for protein and a starch test were also carried out to check for any food residues. Analysis of the data from the three different formulations were compared to results from two commercial dishwasher tablets. We also carried out these same experiments on our two new products.

Comparison of the results showed that the dishes cleaned with formulation 2 were equally as clean as the commercial tablet and had the added advantage of being environmentally friendly, cheaper and safer for human health. The newer products will also be assessed in terms of their economic marketability.

This current research shows that this project has commercial viability and addresses a very real pollution problem.

SciFest@ITC 2016
STAND 10

Title of Project: The Ugly Side of Beauty: An Investigation into Toxic Chemicals used in Cosmetics

Student: Seán Byrne

School: Avondale Community College, Rathdrum, Co. Wicklow

Teacher Mentoring Project: Aoife Sullivan

Project Category: Physical Sciences

ABSTRACT

My project investigated worker exposure limits for toxic chemicals contained in nail polishes. My main aims were:

- To identify solutions to improve worker safety in nail salons
- To design a low cost safety enclosure to protect beauticians from exposure to toxic chemicals in nail polishes
- To investigate if chemicals banned from cosmetics are still in use

I developed a survey to check levels of awareness of toxic chemicals in nail polishes. I completed another survey to assess availability of safety information for nail products. I used workplace exposure monitoring equipment to measure levels of VOCs in nail salons.

I designed a safety enclosure to protect beauticians from exposure to toxic nail polish vapours. This enclosure is connected to an extractor fan and carbon filter to remove toxic vapours, thus preventing them from being inhaled by users. I researched and tested samples of nail polish using gas chromatography-mass spectrometry to check if any contained banned substances, including formaldehyde, toluene, and dibutyl phthalate.

My main findings are:

- Survey results show good levels of awareness, but inadequate availability/use of MSDS safety data, in relation to nail products
- Workplace monitoring indicated good levels of controls for worker protection
- Testing of the safety enclosure demonstrated that it was very effective in preventing toxic vapours from nail polish being inhaled
- GC-MS analysis found that two of the 17 nail polish samples tested contained toluene, which is a banned cosmetic substance in the EU

The safety enclosure could also be used in other environments, such as pharmacies.

SciFest@LIT Thurles 2016
STAND 11

Title of Project: The Mechanics of Pencil Holding

Students: Katie Kinane, Ali Ryan

School: St Anne's Secondary School, Rosanna Road, Tipperary

Teacher Mentoring Project: Jeanne Dowling

Project Category: Life Sciences

ABSTRACT

Our project set out to examine pencil holding technique and hand writing. Research identified the three most common grips: the tripod, the quadropod and the bear grip. The tripod is identified as the 'correct' technique, causing minimal stress on the hand, allowing the writer the most control. Having identified the correct technique, we aimed to correct technique and develop a simple, inexpensive way of correcting or developing the correct technique.

Initial research was carried out in playschools in Tipperary. 59% of the ECCE children surveyed had incorrect pencil holding technique. The children were given a 'glove' developed for the project to correct their technique. Using the glove over 60% of children with incorrect technique improved, meaning reduced muscle strain, less pressure placed on the tip of the pencil and increased control of the pencil.

The project progressed looking at other age groups and their technique. It emerged that current teenagers were one of the largest groups with incorrect technique. We then decided to look at the technique of 14/15-year-old girls, furnishing those with incorrect technique with a 'glove' to wear to compare with ECCE children. The teenagers were far less compliant; many removed the glove and reverted to their original technique. Resulting improvements if any in handwriting were minimal.

From the research done it is evident that the development of correct technique at a young age is vital as 'correction' of same at later stages did not yield the same success. It is advised that wearing of the 'glove' in the ECCE years to develop correct pencil holding technique would be of significant benefit.

SciFest@ITT Dublin 2016
STAND 12

Title of Project: Hum Your Way to Better Health

Student: Caolann Brady

School: St Wolstan's Community School, Clane Road, Celbridge, Co. Kildare

Teacher Mentoring Project: Karen O'Callaghan

Project Category: Life Sciences

ABSTRACT

Introduction: Previously documented research indicates that nasal breathing is the preferred method of respiration for a myriad of physiological reasons, one of which relates to nitric oxide (NO) production in the paranasal sinuses. The Karolinska Institute found that ventilation of the paranasal sinuses increases greatly when a person practised specifically defined humming techniques, proven to be attributable to the increase of NO production in the nose. This work links respiratory biochemical understanding with that of well-known Vedic eastern medical practices. With this in mind I developed a research project to measure the effects of humming on lung function.

Hypothesis: Humming improves lung function and may be used as a natural treatment for asthma and other respiratory conditions.

Method: Looking at various demographic sub-populations and asthma sufferer subgroupings, a series of controlled experiments were carried out, measuring lung function using a peak flow meter. The test subject hums in a paper bag at a precise pitch for a specified length of time, 45 seconds, which yielded significant post peak expiratory flow readings.

Results: Test result analysis from this project has shown that the prescribed humming technique improves lung function across the range of ages, genders and breathing capabilities by an average of 10% with 99.9% statistical confidence. This positive impact on the respiratory system also lasts on average for 45 minutes.

Conclusion: Humming combined with nasal breathing improves the general lung function of sufferers and non-sufferers alike, providing an alternative solution to commercial, pharma-intervention treatments for breathing disorders, thus validating ancient Vedic science.

SCIFEST@LYIT 2016
STAND 13

Title of Project: To Investigate if Egg Size/Breed Affects the Hatch Rate in Chicken Eggs

Students: Dylan Mc Bride, Conor Bradley

School: Mulroy College, Milford, Co. Donegal

Teachers Mentoring Project: Aisling Mc Ateer and Susan Mc Kelvey

Project Category: Life Sciences

ABSTRACT

There are 87 breeds of chickens recognised by the Poultry Club of Great Britain. All these breeds lay eggs of different colours, shapes and sizes.

We decided to complete a comparative study "To investigate if egg size/breed affects the hatch rate in chicken eggs".

Under controlled conditions, we incubated 112 eggs. In order to ensure a fair test we hatched the 60 large fowl and 52 bantam eggs during 3 different seasons - before (January) during (March) and after breeding season (July.)

The eggs were weighed and candled weekly to monitor the embryos development.

All eggs were labelled and data was recorded weekly. From the 112 eggs, 81 eggs hatched.

The controlled conditions included chickens being fed the same food type and living in the same environment. There were also extraneous variables such as the amount of food each chicken consumed which was on an ad-lib basis.

Upon analysis, our data revealed that the smaller eggs are more likely to hatch i.e. more viable, although the larger eggs proved to have a higher fertility rate. From the 56 fertile large fowl eggs 43 hatched. Out of 42 fertile bantam eggs, 38 hatched. This indicated to us that the bantam eggs are more likely to hatch (more viable).

This research leads us to believe that smaller breeds of chickens produce more viable eggs for hatching. We feel that if productivity increases price should decrease.

SciFest@IT Sligo 2016
STAND 14

Title of Project: Eye Opener: Helping Drowsy Drivers Stay Safe

Student: Aoife Kearins

School: Ursuline College, Finisklin, Sligo

Teacher Mentoring Project: Anthony Carolan

Project Category: Technology

ABSTRACT

Purpose: Road accidents are identified by the World Health Organisation as one of the top 10 leading causes of death worldwide. Within this statistic, approximately 20% of Irish road deaths, 20% of UK road accidents and 72,000 crashes in the USA each year are due to drowsy driving. After 18 hours awake a person is as impaired for driving as if he or she were legally drunk. This major problem has no cost-effective, scientifically-sound solution, and this project aims to tackle this issue. My aim was to design, produce and test a device to prevent drowsy driving accidents on our roads.

Description: Twenty to thirty minutes prior to sleep occurring the pineal gland in the brain begins to produce a hormone called melatonin which regulates the body's sleep cycle. The production of melatonin causes physiological changes in the body. A hardware device wirelessly monitors the driver and sends a constant stream of data to an app on the driver's phone. The app is programmed using algebraic inequalities and works by notifying the driver 20-30 minutes before they fall asleep by identifying the physiological changes.

Result: I designed, produced and tested this device. It has been successful in all tests to date, and thus fulfils my aim by solving the problem of drowsy driving. Drivers are notified well in advance so they have time to pull over and rest, and are still alert enough at this moment to not be a danger. It has the potential to save many lives worldwide.

SciFest@DCU 2016
STAND 15

Title of Project: Sound Absorbing Paint

Students: Heather Murphy, Naoise Tobin

School: Sutton Park School, St Fintan's Rd, Sutton, Dublin 13

Teacher Mentoring Project: Catherine Tattersall

Project Category: Physical Sciences

ABSTRACT

Introduction

Our interest in this project began when we noticed an annoying increase in sound levels in many indoor public and private areas, such as coffee shops and apartments. Our background research showed that this is caused by sound reflection from many smooth surfaces such as tiled floors, marble tabletops and glass windows. Having chosen the sound insulation experiment for coursework B for the Junior Certificate, our research showed there was a lack of sound insulating materials which are effective, cost efficient and aesthetically pleasing.

Description

We decided to investigate whether we could make a paint which could absorb the sound. Our hypothesis was that a dense porous material could work like an anechoic chamber and a recording studio lead lining to absorb the sound. We chose activated carbon as the material to add to the paint as it is porous whilst also being rigid. We tested our paint on tiles in identical boxes firstly in our school lab and later in DCU's anechoic chamber. We measured sound intensity and decibel levels using microphones and data loggers.

Conclusion

Our experiments proved that our carbon sound absorbing paint is significantly more effective in reducing decibel levels and echoes (up to 32% reduction). We also proved that we can manufacture this solution as an affordable product (€66.67 per 5 litres).

SciFest@IT Tralee 2016
STAND 16

Title of Project: Does Playing Board Games Help People with Dyslexia?

Student: Natasha Myers

School: Killorglin Community College, Langford Street, Killorglin, Co. Kerry

Teacher Mentoring Project: Donal O'Reilly

Project Category: Life Sciences

ABSTRACT

People with dyslexia find memory, numeracy, spelling and reading a lot more difficult. People with dyslexia can sometimes be insecure telling other people about their condition. My project concentrates on two board games that will help people with these difficulties. The board games will add to the resources already available to help people with dyslexia.

Using card, computer, board or thinking games to help young people understand how to overcome the symptoms of dyslexia is supported by every major dyslexia group. Studies from the Dyslexia Association and the National Institute of Human Development have shown that a multi-sensory approach to learning is best suited to overcoming the problems dyslexia causes. My games meet these criteria.

Games can involve movement, visual learning, hand gestures, speaking, solving problems, writing, taking notes and repeating answers. Card games involve recognizing letters, making sounds and spelling without the pressures of having to learn or the burden of "dyslexia" or other "label" on the player's mind. Young people are able to process information faster and for longer periods. When they play the games the young person learns to work through the problems, in the process helping their reading and visual memory. Young people are taught how jotting down key facts or notes also helps in solving problems – young people taught to mind map at an early stage are helped enormously and seem to retain information more effectively.

SciFest@ITB 2016
STAND 17

Title of Project: Poison at Street Level: Ambient and Kerbside Nitrogen Dioxide Levels

Students: Mathilde Lyons, Isabel Browne

School: St Louis High School, Charleville Road, Rathmines, Dublin 6

Teacher Mentoring Project: Zachary Lyons

Project Category: Physical Sciences

ABSTRACT

This was an ambitious project whose main concerns were to:

1. undertake accurate measurements of NO2 levels at peak traffic flow under different atmospheric conditions, and
2. compare ambient and kerbside readings of NO2.

Building upon an exploratory pilot study in 2014-2015 we evaluated hourly, diurnal, weekly, monthly and quasi-seasonal variations in NO2 levels. Furthermore, we analysed the effects of traffic volume, air temperature, humidity, air pressure, wind speed and wind direction on NO2 levels. In total, 11,418 ambient readings were taken and analysed from both the project's fixed monitoring station and from Dublin City Council's permanent stations from October 2015 to January 2016. Some 47 hours of kerbside NO2 measurements were also made during this time period but only 33 hours were deemed useable due to technical issues.

Finding No. 1
27 hourly exceedances during this period which is in breach of the EPA guidelines of 18 hourly exceedances per year. This has significant implications for Ireland and its relationship with the EU's Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC).

Finding No. 2
Direct correlation between traffic volume and NO2. This may seem intuitive but this is the first research in Ireland (that we could find) which explicitly shows this relationship at kerbside.

Finding No. 3
Direct correlation between wind speed/direction and NO2. This has significant implications for urban street design and features such as traffic flow direction and location of bus shelters, outdoor cafes, crèches, etc.

Finding No. 4
Only moderate correlation between NO2 levels, temperature, pressure and humidity.

SciFest@CIT 2016
STAND 18

Title of Project: Does Strongyloides Ransomi Exist on Irish Pig Farms?

Student: Cora Twomey

School: Davis College, Summerhill, Mallow, Co. Cork

Teacher Mentoring Project: Carol O'Sullivan

Project Category: Life Sciences

ABSTRACT

The aim and purpose of my project was to research and scientifically prove if the parasite Strongyloides ransomi was present on our home pig farm and thus existed on Irish pig farms, outlining the problems and effects the parasite may have on a pig herd through its complicated life cycle. If Strongyloides ransomi was present I also intended to highlight the potential loss to the industry and the national pig herd and to outline methods of control and complete eradication.

After observing slurry samples microscopically, I noticed that live nematodes were present. In University College Dublin I used the 'McMaster Technique' to test for the presence of eggs. No eggs were present in the samples, but from research on Strongyloides ransomi I know that the hatching period is very short (4-12 hours).

In University College Cork I carried out a PCR to identify the nematodes. The results stated the nematodes were Rhabditella axei and not Strongyloides ransomi. After researching both parasites, I found out that they are very similar and are often misdiagnosed as each other.

In conclusion Strongyloides ransomi is not present on our pig unit, but Rhabditella axei is present. This diagnosis has been the first one documented in Ireland. Very little information is available worldwide on Rhabditella axei and questions remain whether or not it is parasitic. From my home experiments I have proven that it is parasitic. Much more study is required on Rhabditella axei and its parasitic nature.

SciFest@WIT 2016
STAND 19

Title of Project: **Sound's OK – A Unique Device to Lessen Distress of ASD Related Sound Sensitivity**

Students: Alice Carew, Evgenia Melnikova

School: Mountrath Community School, Dysartbeigh, Mountrath, Co. Laois

Teacher Mentoring Project: Dr Mary Kelly

Project Category: Technology

ABSTRACT

Sound sensitivity is one of the lesser-known challenges faced by children with Autism. The fear of hurtful sounds can make an autistic child fearful of certain situations, leading to problematic avoidance of places and events which might otherwise be enjoyable.

We had first-hand experience of this while helping at an ASD preschool. We set out to design a device to lessen the negative impact on the lives of children with ASD.

Through surveys with parents and teachers we confirmed and defined the need. We drew up preliminary designs. Keeping in mind budgetary and time constraints we opted for the most feasible design. Using Arduino boards and open source software we created a wearable device, made up of headphones and a music player containing four calming tracks. Two tracks are pre-recorded and two are put onto a memory card by parents, to correspond with the child's favourite sounds or songs. Each of the four tracks is activated when the child pushes a chunky colourful button, leading to a sense of independence for the child.

A lengthy design/ trial/ redesign/ retrial process was undertaken thanks to the co-operation of three students, their parents and teachers, bringing us to the current but far from final iteration of "**Sound's OK**".

Trials have proven that "**Sound's OK**" provides an effective way to lessen the negative impact of sound sensitivity for autistic children. We look forward to the day when our product will be stocked on shelves and in catalogues throughout the world.

SciFest@ITC 2016
STAND 20

Title of Project: Tick Tack Tuberculosis

Students: David Fleming, Conor Windsor

School: Avondale Community College, Rathdrum, Co. Wicklow

Teacher Mentoring Project: Aoife Sullivan

Project Category: Life Sciences

ABSTRACT

In this project we propose that there is a direct link between worm concentration and badger concentration which then indirectly affects the sum of bovine tuberculosis (BTB) cases in Ireland.

The conditions necessary for the spread of bovine tuberculosis in cattle and other related animals were investigated. Through soil variations and soil boring insects (worms) we tried to establish a link between the conditions found in the soil and the current animals on the land.

The project was divided into two parts. Part 1 consisted of extensive research and experimentation on the conditions necessary for the spread of tuberculosis in cattle and investigated if there is a link between the concentration of worms in the soil and the number of badgers that are on the land under investigation.

Part 2 involved experimentation with the concentration of fertiliser and type of fertiliser. The aim of Part 2 was to examine if changing the concentration and type of fertiliser used reduces, increases or has any effect on worm concentration in soil.

SciFest@IT Sligo 2016
STAND 21

Title of Project: The Education and Promotion of Breastfeeding to Children, Adolescents and Adults

Students: Clodagh Hegarty, Aoife Parsons

School: Davitt College, Springfield, Castlebar, Co. Mayo

Teacher Mentoring Project: Fiona O'Connor

Project Category: Life Sciences

ABSTRACT

In Ireland 12% of women breastfeed up to six weeks; this drops to 1% after six months. We created a questionnaire, which was completed by over a thousand mothers, and the following were found to have major impacts on why mothers chose not to breastfeed: education, work, hungry babies, formula top-ups being offered, painful latch, felt they didn't have enough milk and social stigma.

To combat the above issues, we put up posters welcoming mothers to breastfeed in coffee shops, launched "meet & greets" for breastfeeding mothers and created a leaflet to educate expectant mothers. Our Facebook page acts as a "go to" for inexperienced mothers for advice. Through this we were contacted by "Friends of Breastfeeding" in relation to a grant being awarded by the HSE in buddy system training. To educate young children we created a board game which can be played by children as young as five. A "Who wants to be a Millionaire" quiz targets older children and adolescents. We created a teaching module based around pregnancy and breastfeeding which was launched at Sligo/Leitrim HSE's breastfeeding conference during National breastfeeding week and was taught to all secondary schools in the region in conjunction with a debate on breastfeeding.

Minister Dara Calleary, TD, raised questions in the Dáil on our behalf in relation to expenditure allocation on formula versus breastfeeding support. We established a number of recommendations for change within the HSE to help alter Ireland's mindset on breastfeeding and these were forwarded to the Minister for Health.

SciFest@DCU 2016
STAND 22

Title of Project: Think Fast: Analysing the Visual Reaction Times of GAA Athletes versus Non-GAA Athletes

Students: Aisling Ní Dhonnabháin, Meadhbh Ní Cheallacháin, Aoife Nic an Tuile

School: Scoil Chaitríona, Bóthar Mobhí, Glasnaíon, Baile Áth Cliath 9

Teacher Mentoring Project: Brian Gallagher

Project Category: Life Sciences

ABSTRACT

Our hypothesis is that the reason why athletes within the GAA disciplines have better hand-eye coordination and superior reaction times, compared to athletes within other sporting disciplines, and non-sport playing individuals, is because GAA athletes use specific hand eye coordination drills in their training to improve their reaction times.

We sent out surveys to GAA mentors asking them which drills they think help to improve athletes' reaction times/hand eye coordination, and why they think it helps to improve them. Some of the drills included two players striking a ball from hand to helmet level for the other to catch. We ourselves then tested these drills.

We sent out surveys to all of the classes in our school to see who played GAA sports, who played other sports, and who did not play any sports. From these surveys we selected people from each of the following groups to carry out the tests. We have two age categories: 12-15 years and 16-18 years. We tested both playing and non-playing teachers. We also surveyed some students' parents.

We surveyed playing members of our GAA club and their non-playing parents, between the ages of 19-40 years and 40+ years.

We had four tests to carry out on these groups:
'Alternate Hand Wall Toss Test'
'Plate Tapping Test'
'Button Press Visual Reaction Test'

We recorded each result and put the data into charts. Preliminary analysis of the data indicates that GAA athletes do indeed have better reaction times than non-GAA athletes.

SciFest 2016

SEAI INESPO

Award Finalists

SciFest 2016 SEAI INESPO Award Finalists

SciFest@AIT 2016

STAND 23

Title of Project: Caonach Cliste

Students: Ciara Mac Carthy, Claire Lemass

School: Our Lady's Bower, Retreat Rd., Athlone, Co. Westmeath

Teacher Mentoring Project: Ciaran Mac Carthy

SciFest@NorthWest(NI) 2016

STAND 24

Title of Project: The GreenHouse

Students: James Kerr, Sean McCrory, Tristan Kelly

School: Omagh CBS, Kevlin Road, Omagh, Co. Tyrone

Teacher Mentoring Project: Martin Morris

SciFest@IT Sligo 2016

STAND 25

Title of Project: What is the Best Insulator?

Students: Lisa O`Rourke, Cora Sharkey

School: Castlerea Community School, Castlerea, Co. Roscommon

Teacher Mentoring Project: Joan Farrell

SciFest@ITT Dublin 2016

STAND 26

Title of Project: Testing Different Ways to Improve the Amount of Energy Produced Inside a Salt Water Generator

Student: Tom Armstrong

School: The Kings Hospital, Palmerstown, Dublin 20

Teacher Mentoring Project: Ciaran O'Connor

SciFest@LIT 2016

STAND 27

Title of Project: The Internet of Green Things

Students: Liam Mulcahy, Neil Heffernan

School: Ardscoil Rís, North Circular Rd, Limerick

Teacher Mentoring Project: Diane Condon

SciFest 2016

BOSTON SCIENTIFIC MEDICAL DEVICES

Award Finalists

SciFest 2016 Boston Scientific Medical Devices Award Finalists

SciFest@AIT 2016

STAND 28

Title of Project: Investigating the Difference in Bacterial Contamination when Handling and Using a Device to Insert Contact Lenses

Students: Lucy Leonard, Michele Mann

School: Tullamore College, Riverside, Tullamore, Co. Offaly

Teacher Mentoring Project: Elaine Howlin

SciFest@CIT 2016

STAND 29

Title of Project: Learning with Hearing Aids: The Influence of Environmental Factors in a Classroom

Student: Nicole Marinos

School: Christ King Girls Secondary School, South Douglas Road, Cork

Teachers Mentoring Project: Lucy O'Farrell and Denise Quilter

SciFest@NorthWest(NI) 2016

STAND 3

Title of Project: Distance Diagnostics

Students: Stephen Emerson, Sean Martin

School: St Killian's College, Carnlough, Co. Antrim, BT440JS

Teacher Mentoring Project: Sean Connolly

SciFest@GMIT 2016

STAND 30

Title of Project: Device to Increase Early Detection of Testicular Cancer

Students: Tiernan Walsh, Seán Gallagher

School: St Gerald's College, Newport Road, Castlebar, Co. Mayo

Teacher Mentoring Project: Cathy Freeley

SciFest@WIT 2016

STAND 31

Title of Project: Diabetic Application

Students: Caoímhe Woods, Aoibhín Foley

School: Presentation Secondary School, Clonmel, Co. Tipperary

Teacher Mentoring Project: Tracey O'Leary

SciFest 2016 Award Winners

SciFest 2016 Grand Award Winner-Intel ISEF 2017 Finalist	
Student	Caolann Brady
School	St Wolstan's Community School, Celbridge, Co. Kildare
Project	Hum Your Way to Better Health
Teacher	Karen O'Callaghan

Berlin Long Night of Science Award	
Students	Heather Murphy, Naoise Tobin
School	Sutton Park School, Sutton, Dublin 13
Project	Sound Absorbing Paint
Teacher	Catherine Tattersall

SEAI INESPO Award-INESPO 2017 Finalist	
Students	Ciara Mac Carthy, Claire Lemass
School	Our Lady's Bower, Athlone, Co. Westmeath
Project	Caonach Cliste
Teacher	Ciaran Mac Carthy

Boston Scientific Medical Devices Grand Award	
Students	Lucy Leonard, Michele Mann
School	Tullamore College, Tullamore, Co. Offaly
Project	Investigating the Difference in Bacterial Contamination when Handling and Using a Device to Insert Contact Lenses
Teacher	Elaine Howlin

THEA Award	
Student	Seán Byrne
School	Avondale Community College, Rathdrum, Co. Wicklow
Project	The Ugly Side of Beauty: An Investigation into Toxic Chemicals used in Cosmetics
Teacher	Aoife Sullivan

ISTA Award	
Student	Cora Twomey
School	Davis College, Summerhill, Mallow, Co. Cork
Project	Does Strongyloides Ransomi Exist on Irish Pig Farms?
Teacher	Carol O'Sullivan

Spirit of SciFest Award	
Student	Marie Keogh, Grace Hanneffy, Roisin McEvoy
School	Mountrath Community School, Mountrath, Co. Laois
Project	Eco Dishes
Teacher	Dr Mary Kelly

The American Psychological Association Award	
Student	Caolann Brady
School	St Wolstan's Community School, Celbridge, Co. Kildare
Project	Hum Your Way to Better Health
Teacher	Karen O'Callaghan

RICOH Sustainable Development Award	
Students	Ciara Mac Carthy, Claire Lemass
School	Our Lady's Bower, Athlone, Co. Westmeath
Project	Caonach Cliste
Teacher	Ciaran Mac Carthy

Yale Science & Engineering Association INC.	
Student	Aoife Kearins
School	Ursuline College Sligo, Finisklin Road, Sligo
Project	Eye Opener – Helping Drowsy Drivers Stay Safe
Teacher	Anthony Carolan