Cell EXPLORERS

ACTIVITY REPORT
VISUAL SUMMARY
2020

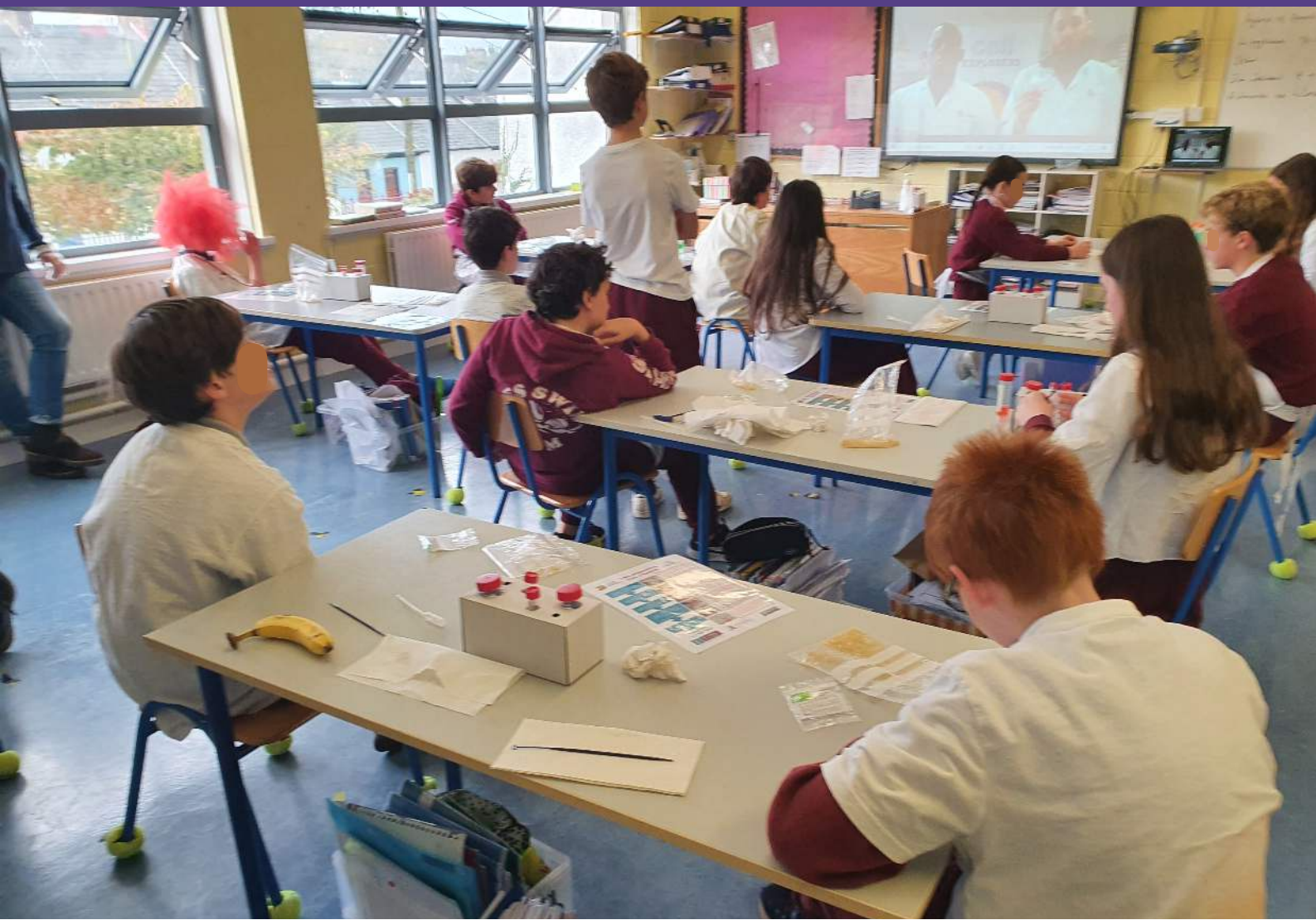
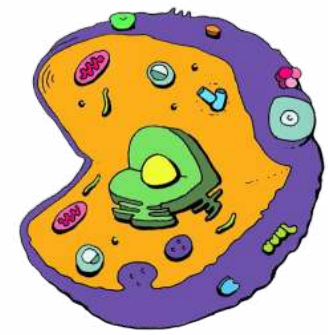


TABLE OF CONTENTS

AIMS & OBJECTIVES

Cell EXPLORERS is an Education & Public Engagement programme which primarily aims to **inspire, inform and involve** the general public in modern molecular biology, whilst facilitating authentic interactions with real scientists.



The programme uses a **dual benefit** model, where young people are given the opportunity to engage in hands-on science experiments, whilst guided by trained and enthusiastic science explainers - our Cell EXPLORERS volunteers.

PROVIDE YOUNG PEOPLE THE OPPORTUNITY TO ENGAGE IN HANDS-ON SCIENCE

Young people have the opportunity to individually complete an authentic science experiment - extracting DNA from bananas. This positive experience can contribute towards improving young peoples' attitudes towards science, and help to build their confidence in science

FACILITATE INTERACTIONS WITH REAL SCIENTISTS

Many young people with low science-related aspirations hold stereotypical assumptions about scientists, or what kind of people can become scientists. Meeting real scientists, and being able to interact with them in a positive setting, can contribute towards addressing these misconceptions and increase the chance of young people seeing themselves as someone who can also do science.

TRAIN THE NEXT GENERATION OF SCIENTISTS

Public engagement in science is become an increasingly important, and expected, priority for scientists. Being part of the Cell EXPLORERS programme provides volunteers with the training in science communication, public engagement and best practices in interacting with children.

HOW WE DO THINGS

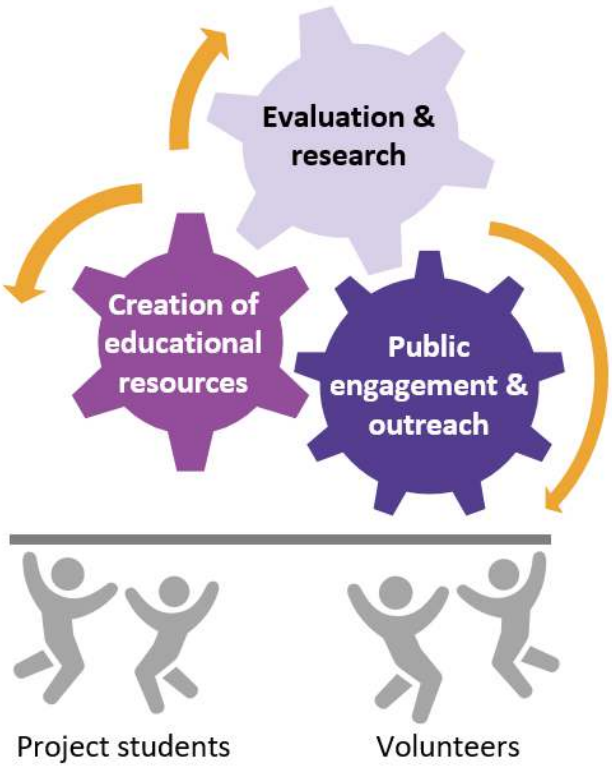
OUR ETHOS

Our ethos is drawn from a mixture of **Social Constructivist** pedagogies, **Humanistic philosophies**, social justice model the **Science Capital Teaching Approach**, and best practices in public engagement in science.

We believe that **science is for everyone**, and our ethos helps us to achieve that in an equitable manner, informed by research.

The Cell EXPLORERS way of doing things has been informed by <u>9 years</u> **of doing hands-on engagement** in science with young people.

OUR WORKING MODEL



Multiple benefits

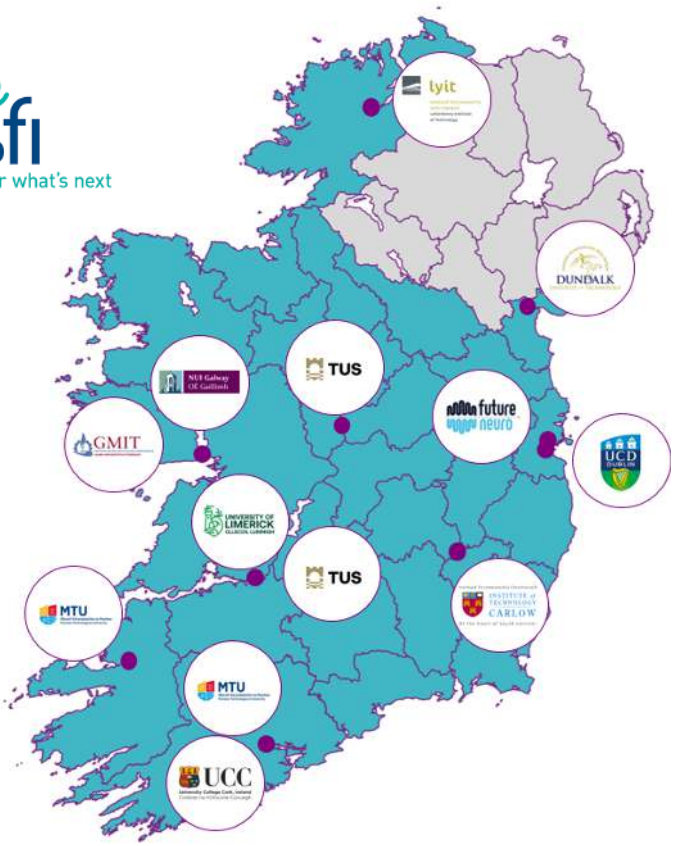
Engage local communities
- Raise interest & awareness in STEM
- Contribute towards science capital

Align with HEI missions
- Teaching
- Research
- Staff development
- Community engagement

Train STEM advocates
- Gain transferable skills
- Develop graduate attributes
- Personal development

NATIONAL NETWORK

Science Foundation Ireland For what's next



13 national teams

The Cell EXPLORERS programme is delivered by a national network comprising 13 teams based in 11 institutions across Ireland. The network is funded by Science Foundation Ireland.

Partner team in South Africa

The first international partner team is run by Dr. Doras Sibanda in the University of Kwatzulu-Natal in Durban, South Africa. The team piloted their first visit in 2019. This collaboration is supported by NUI Galway.

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

An internationally-recognised programme

Cell EXPLORERS is part of Scientix, the community for science education in Europe and member of the European Science Education Association (EUSEA).

SCIENTIX The community for science education in Europe

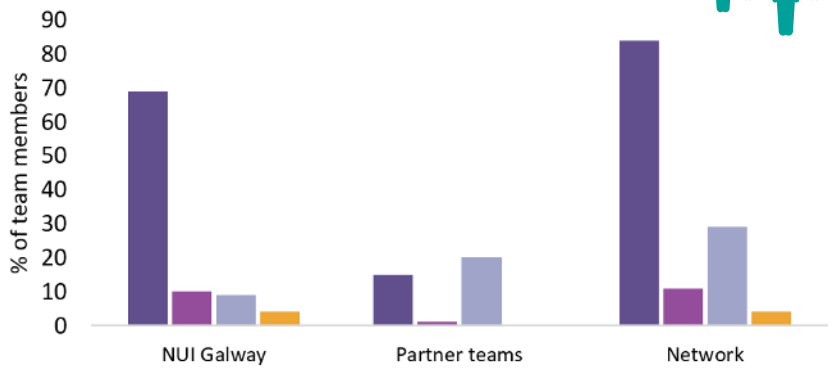
EUSEA European Science Engagement Association

EXPANSION, REACH & FUNDING HISTORY

NETWORK ACTIVITY 2020

Team composition

128 team members



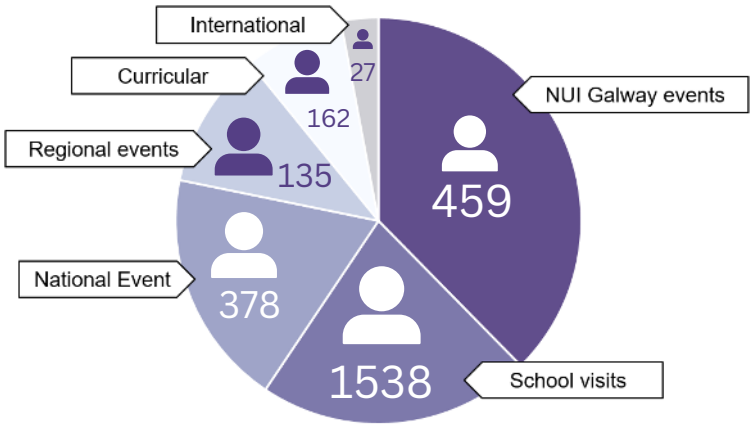
- Undergraduate students
- Postgraduate students
- Staff (e.g. Postdocs, lecturers, tech officer)
- Collaborators

Events delivered & people reached

2,826

MEMBERS OF THE PUBLIC REACHED DIRECTLY

57% of events were Online



Graph = % of events, Number = people reached

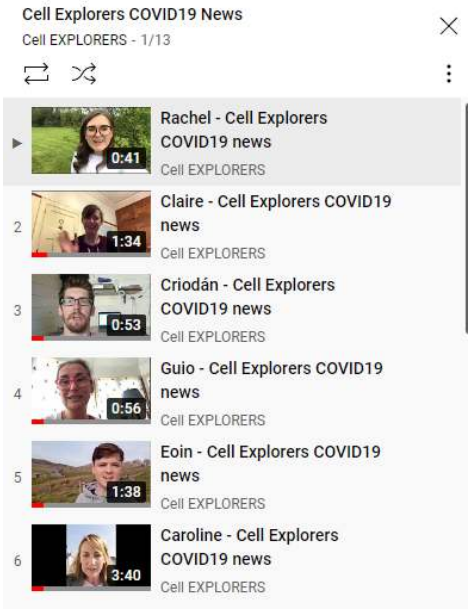
Novel activities created

Fantastic DNA in a Box

Fantastic DNA at Home

I'm a CE scientist online chat

FDNA Zoom practical for Undergraduate Students

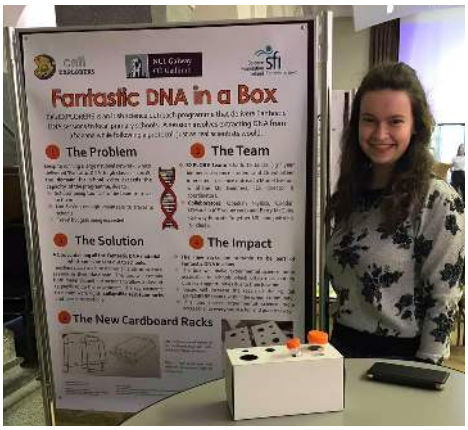


COVID-19 team member video series

FANTASTIC DNA 2020

Creation of Fantastic DNA in a Box

- Online solution for Fantastic DNA
- Enabled by a classroom science kit delivered in advance
- Built on work started by student volunteer and NUI Galway **Blacktone Launchpad intern** Charlotte Lucas, who first created the foldable cardboard racks in 2019. The racks were produced as part of an **Explore Innovation Student & Staff collaboration project**.
- Pupils still have the opportunity to complete a hands-on experiment and extract DNA from a banana, whilst using real science equipment and materials.
- Teachers can deliver the session independently, guided by specifically-tailored resources
- Option to connect online to Cell EXPLORERS explainers via an online video-call



Charlotte Lucas presenting the cardboard racks at the Explore Innovation Showcase in 2019

National Coordinator Janic Schulte demonstrating a FDIAB visit online

Delivery of Fantastic DNA visits 2020

In-person Fantastic DNA visits

- **7** Schools visited
- **9** Classes
- **197** Children reached
- NUIG in-person visits
- LyIT in-person visits

Fantastic DNA in a box (remote) visits

- **34** Schools visited
- **46** Boxes delivered
- **44** Classes
- **26** Zoom sessions
- **1080** Children reached
- NUIG FDIAB visit
- GMIT FDIAB visit
- UL FDIAB visit
- LyIT FDIAB visit
- DkIT FDIAB visit
- Carlow IT prepped box, NUIG delivered visit

IMPACT OF FANTASTIC DNA ON YOUNG PEOPLE

The novel and hands-on aspects of the session are liked best

What pupils like best:

N = 582 pupils

- I used real lab equipment — 26%
- I learnt what kind of job I could do if I were to study science — 22%
- I learnt something new that we don't talk about at school — 18%
- I got to bring the DNA home — 15%
- Other — 13%
- I did the experiment myself — 12%

I don't usually do science

We don't do this kind of thing in school

I think it was really cool and I always wanted to use real laboratory equipment

I was thinking of one day being a scientist but now I'm sure it's on the list

What teachers like best:

N= 16 teachers

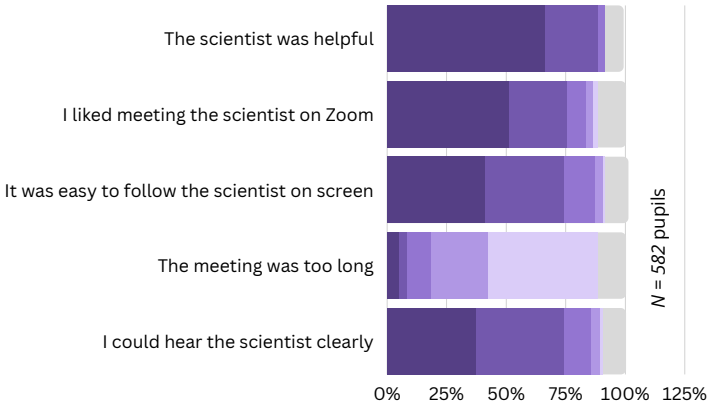
1st — Opportunity for each child to do an experiment

2nd — Positive experience of successfully completing an experiment

3rd — Introduction to new science equipment and terms

Pupils liked meeting the scientists on Zoom

Pupils perceptions of the Zoom meeting



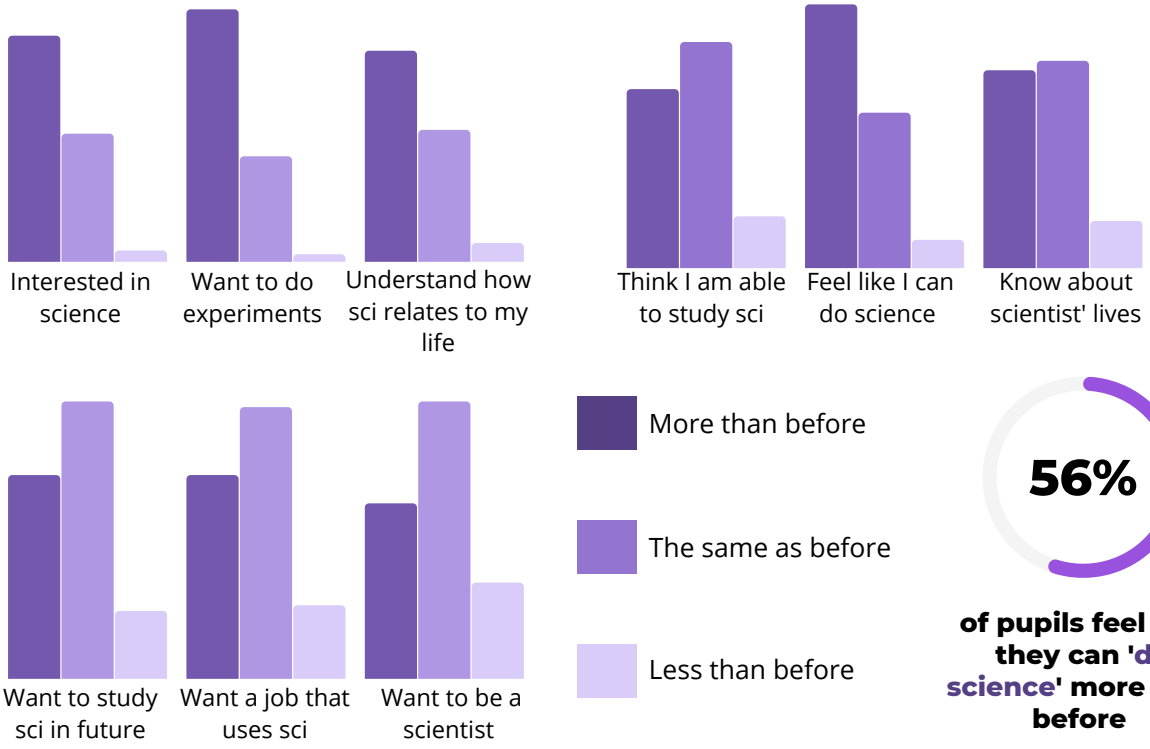
Top 3 words used to describe a scientist

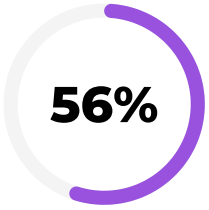
Clever (14%)
Interesting (13%)
Hard-working (11%)

They were real scientists and it was great fun with them

Fantastic DNA session has a positive impact on those participating

The feedback questionnaire asks pupils (N = 531) how they feel about nine different statements related to their science-related attitudes after participating in the Fantastic DNA in a Box.





of pupils feel like they can 'do science' more than before

Teachers praise kit quality & benefit of doing an experiment the kit provides

*"It made them realise that they can **conduct an experiment themselves** at such a level that they are extracting DNA. They had thought that this would be too technical for them"*

*"It gave the children the **confidence** to carry out 'proper' experiments using laboratory grade chemicals and a deep understanding of science"*

*"I think it impacted them very positively and gave them a real life hands-on experience that they could relate to and understand that **science is something that they can participate** in"*

session was well organised & presented

feel confident to run the session alone

would request the FDIAB kit again

RESEARCH HIGHLIGHTS

Embedded in the Cell EXPLORERS programme is an Informal Science Education research group, based in NUI Galway.

FINAL YEAR PROJECTS - 10 STUDENTS IN 2020

Evaluation of CE activities

Remote FDNA for UG lab practicals

Laura O'Connell

Analysis of pupils' FDIAB & FDNA feedback forms

Nicole O'Shea, Tara Greene, Saoirse Doherty

I'm a CE scientist chat activity and volunteer training

Aoife Kilker & Abigail Ralph

Creation & evaluation of new activities/resources:

COVID-19 videos

Deirdre McDaid

Meet the Scientist Q&A

Katie Hynes

CE Escape Room puzzles

Katie Sexton & Sean O'Sullivan

NUI GALWAY RESEARCH TEAM ACTIVITY

Analysis of children's perceptions of scientists (CATTS study) - Led by Dr Tereza Brumovska

RQ: What are Irish children (aged 10-13 years old) perceptions of scientists?

105 surveys

105 drawings of scientists

30 Zoom interviews

Research article with findings coming soon!

Successful *viva voce* of CE PhD student Sarah Carroll

Thesis title:
Science self-efficacy beliefs of upper primary pupils in Ireland and the short-term effect of a scientist-facilitated informal education workshop

Facilitated workshop at the EUSEA 2020 conference

- SCarroll & MGrenon
- 45 min workshop on tips for increasing children's science self-efficacy.
- 26 attendants.

ACTIVITY HIGHLIGHTS

Nb. public reached

BTYSTE 2020

4th year projects Sem 2

CKI project

CEER launch

Youth academy spring 22

Youth
Academy

FDNA roadshow

COVID-19 lockdown videos

CE online network meeting

Creation of CE videos by Big Bang Science

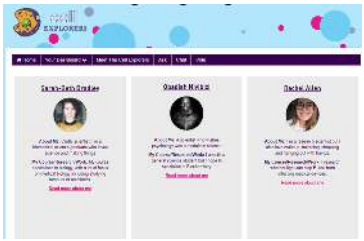
Development of FDIAB

Development of FDNA at Home

Cork science festival 22

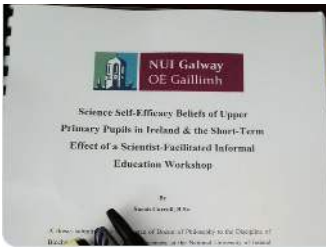
UG Zoom practicals

I'm a CE scientist online chat activity



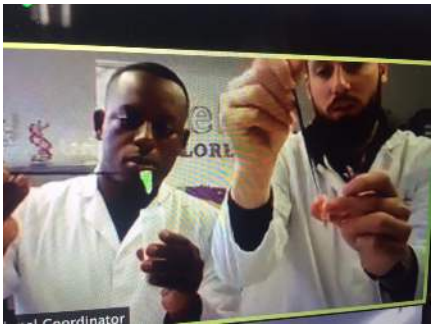
FDNA at Home sessions

Sarah PhD award



4th year projects Sem 1

FDIAB roadshow



ACKNOWLEDGEMENTS

The Cell EXPLORERS programme, network and dissemination of hands-on science engagement activities would not be possible without the passion, commitment and support from many different sources.
We would like to take this opportunity to sincerely thank everyone involved in making 2020 a success and showcasing the idea that science is for everyone. This includes our funders, supporters, network partner coordinators, teams and institutions, volunteers, and participating schools, teachers, pupils, youth groups, young people and their families! Thank you!

FUnded by **Science Foundation Ireland** under its **Discover programme**

Cell EXPLORERS network coordinators and teams:

Muriel Grenon, Janic Schulte, Tereza Brumovska, Sarah Carroll (NUI Galway and national coordination team), Caroline Gilleran-Stephens and Suzanne Linanne (Dundalk IT), Ciara Courtney (Future Neuro), Anthonia O'Donovan and Karen Finn (GMIT), Guío Garcia-Cabellos (IT Carlow), Mary Carr (Letterkenny IT), Fiona O'Halloran and Máire Begley (MTU Cork), Niall Burke (MTU Kerry), Bianca Simonassi-Paiva and Mark Lynch (TUS MidLands), Marie Walsh and Siobhain Curtin (TUS MidWest), Eoin Fleming and Kellie Dean (UCC), Karen McGibney (UCD-NVRL), Audrey O'Grady (UL).

Inform **Inspire** **Involve**

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Visual summary prepared by Sarah Carroll