

# Multiple benefits of the Cell EXPLORERS programme a STEM public engagement model in Ireland



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STEM EDUCATION 22<sup>nd</sup> March – 2.30 to 4.30pm room B

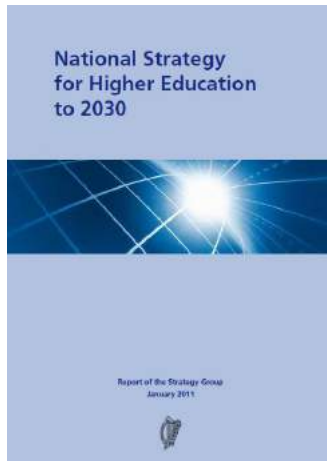
# National Context to public engagement in Science

## National Strategy for Higher Education to 2030 report:



**CampusEngage**

Network for the Promotion of Civic Engagement in Irish Higher Education



A mutually beneficial knowledge-based collaboration between the higher education institution, its staff and students, with the wider community, through community-campus partnerships and including the activities of Service Learning/Community based Learning, Community engaged research, Volunteering, Community/Economic regeneration, Capacity-building and Access/Widening participation



## Ireland Knowledge economy



- Increase access to higher level education in the area of Science, Technology, Engineering and Mathematics (STEM)
- To **generate a science literate citizen who can participate in society decisions**

# Issue with institutional participation

1. No unified vision & sustainable systems in place
2. Either marketing focused or dependent on individuals
3. Neither facilitated nor rewarded
4. Community engagement and service learning not used to the benefit of Science communication



# Inform, Inspire, Involve



cell  
EXPLORERS



YouTube @cellexplorers



[www.cellexplorers.com](http://www.cellexplorers.com)

# Cell EXPLORERS

## public engagement objectives

1. To promote modern biology, biomedical sciences and research
2. To combat the stereotypical image of scientist
3. To change perception on science and inform on scientific career
4. To contribute to addressing the national shortfall of science graduates in Ireland

# Specific activity set up



**Hands on : Every child does each activity**



**Small demonstrators to pupil ratios**



**Real science role models**



**Real Science: providing an authentic scientific experience**



**Involve the whole family**

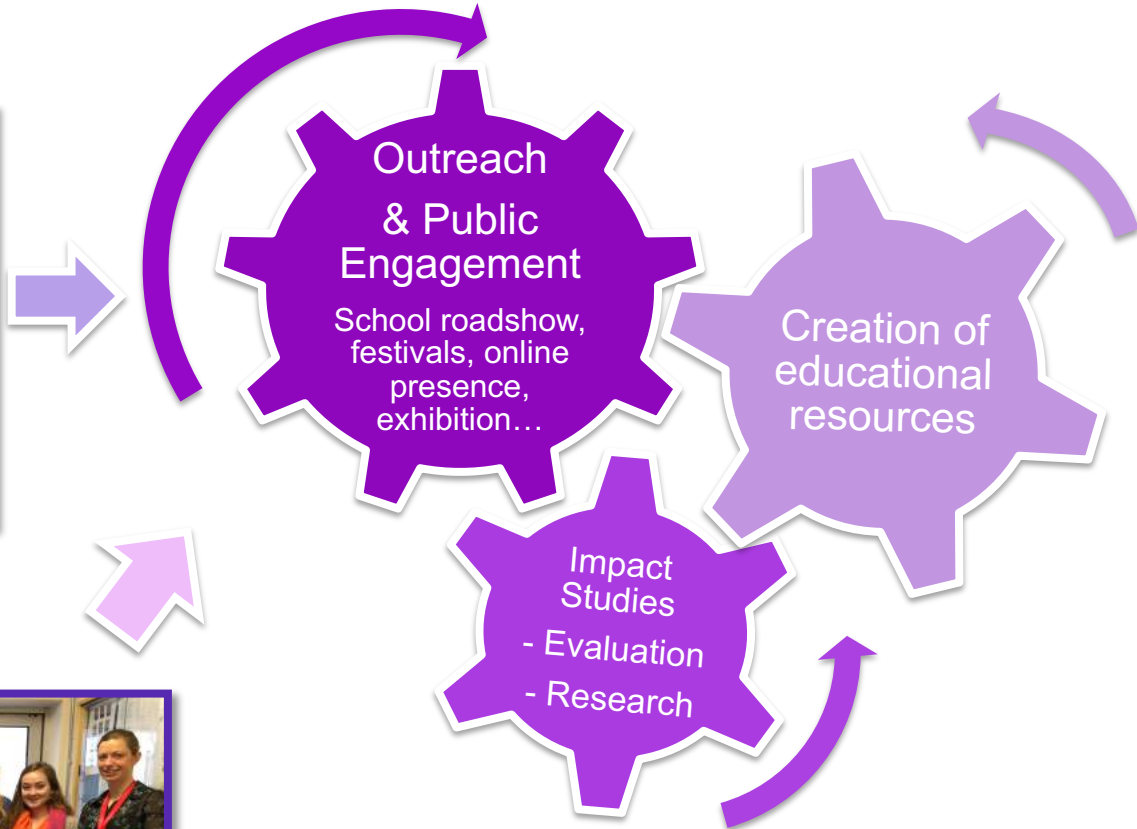


**Remaining informal, engaging & fun**



# Cell EXPLORERS working model

**Volunteers**  
Students / Staff



**Project students**  
Curricular based



## Benefits

- Society
- University
- Students

# Multiple benefits of the programme

**Community & Society**  
(Public, schools, Civic Society, Industry, workforce)

**Higher Education Institutions**

**Higher Education Students**



- Teaching
- Research
- International visibility
- Staff development
- Community engagement
- Funding



**Engage local community**

**HEI mission**

**Train workforce and STEM advocates**



# Our Research

- **Key directions**
  - **Investigate most sustainable ways** for volunteer teams to deliver public engagement in science to their local communities & impact it has.
  - **Establish third level teaching and learning solutions** by embedding some of its components in the student curriculum.
- **Methodology:** Action Research
- **Tools and data collection**
  - Online surveys (survey monkeys) or printed questionnaires
  - Anonymous, independent of researcher
- **When?**
  - Pre- and post-involvement for team members
  - Post-involvement for partners & participants
- **Developing research questions** to address specific aspects of the programme

# The programme is expanding...

2012

2017



Team members

10

253

Direct Reach

30

6700



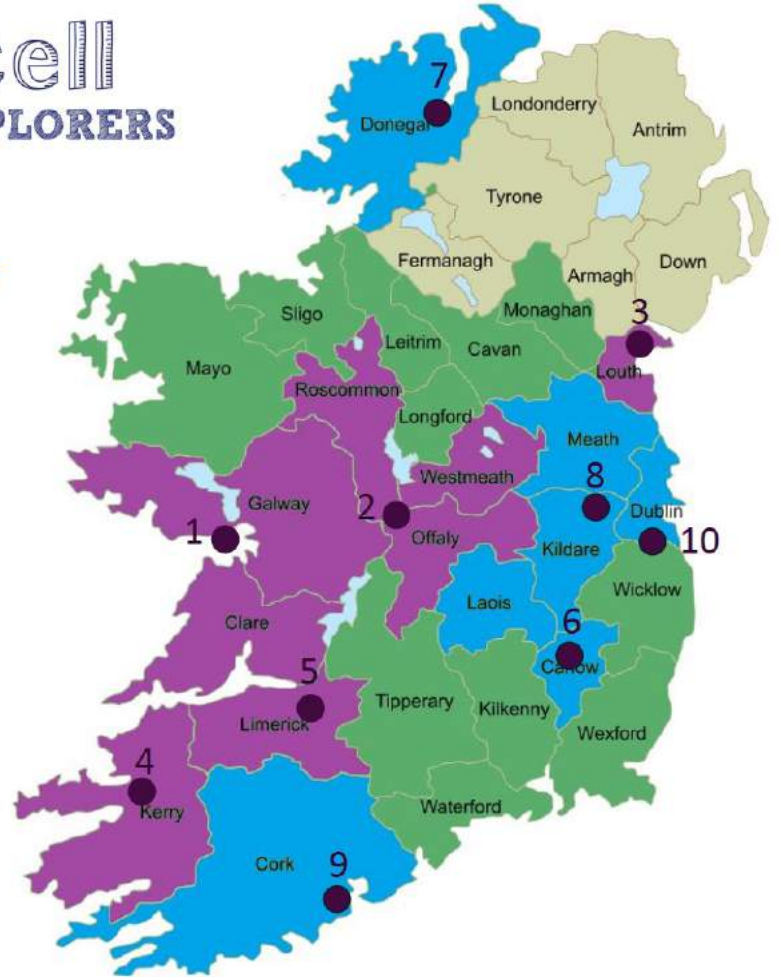
# Volunteering national team network

10 teams based in 3<sup>rd</sup> level higher education institutions



Existing reach 2015-16    Additional reach 2017-18

● Team Locations





# The “Fantastic DNA” session



- Public targeted: 10-14 years old.
  - Perception of science
  - Decide if science is for them
  - Consider science as career
- Modern Biology: an introduction to DNA
- Engagement: real experiment, Hands on, small group teaching
- Break stereotype about scientist: Science role model in the classroom
- Change perception of science: talk about nature of science and careers and all of the above.

# School Roadshow 2017



**10 Teams**  
**253 Volunteers**  
**62 Schools**  
**110 Classes**  
**2752 children visited**  
**2448 children visits in classroom**

**Fantastic DNA**

**57 schools**  
**12 counties, including 9 having low levels of STEM intervention**  
**16 DEIS schools**  
**40% of school in rural area**  
**943 Children Feedback**  
**23 Teacher Feedback**

- School visit
- FDNA research school visit
- 2<sup>nd</sup>ary school visit
- Regional Science Festival Workshops
- Final year undergraduate projects

# Fantastic DNA is well received in the classroom

- Both children and teachers agree that the session is well designed and delivered. Consistent feedback since 2012.
- Children and teachers prefer the hands on nature of the session best

## Top 3 answers From children



Using the lab equipment (535)



Doing the experiment myself (519)



Fishing the DNA (411)

## Top 2 characteristics ranked most beneficial by teachers

1. The opportunity for each child to do an experiment – (47%)
2. Interactions between the children & local 3<sup>rd</sup> level science demonstrators (26%)



# Meeting with a scientist is a positive experience

“They were brilliant at explaining and it was all fun experiments”  
 Had you met a scientist before the Cell EXPLORERS?

“We were like mini scientists helping them”

“I have never met a scientist but I always wanted to”

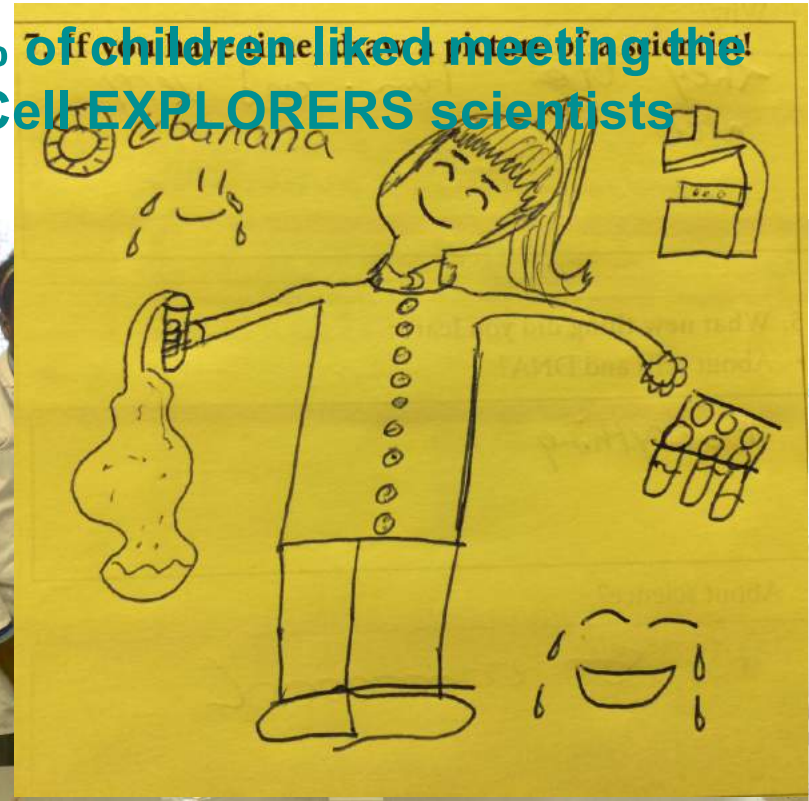
“They have fun in their job”

“I liked meeting them because they taught me stuff I never did before”

“I liked meeting the Cell EXPLORERS because I never seen a scientist girl before”



95% of children liked meeting the Cell EXPLORERS scientists



# Volunteers : does the programme and its organization suit team members?

100% agree that the Programme is worthwhile



**93%** agree  
Sufficient Training

**93%** agree  
Sufficient support during activities

**95%** agree  
Activities well organised



**88%** agree  
My opinion asked for and listened to

**100%** agree  
Felt part of a team

**100%** agree  
"My time made a worthwhile contribution"

# Volunteers - favourite aspects & Gain



## 2 Favorite Aspects

1. Work with children
2. Bring excitement of science to the public

## Personal development

*'I'm so much more confident in **my self-esteem** and I have **benefited hugely from it!***

*'I have developed confidence and communication skills that I think will be **very beneficial in the workplace.**'*

*'It is a really **good insight as to the type of work I might possibly want to do** going forward when I finish my degree.'*

## Top3 Reported gains

1. Communication skills 90%
2. Skills of working with children 82%
3. Working in a team 79%

**84%** think their experience will help them in their studies/career.

**90%** would volunteer again with Cell EXPLORERS in the future.

**98%** would recommend  
To a friend



# Science educational outreach projects: demand for curricular component

**Cell EXPLORERS  
resources development**



**Increased student  
numbers**



**Precedent for these types  
of projects in the UK**

University of  
**Kent**



University  
of Glasgow

**MANCHESTER**  
1824

The University of Manchester

**Diversity of career aspirations**



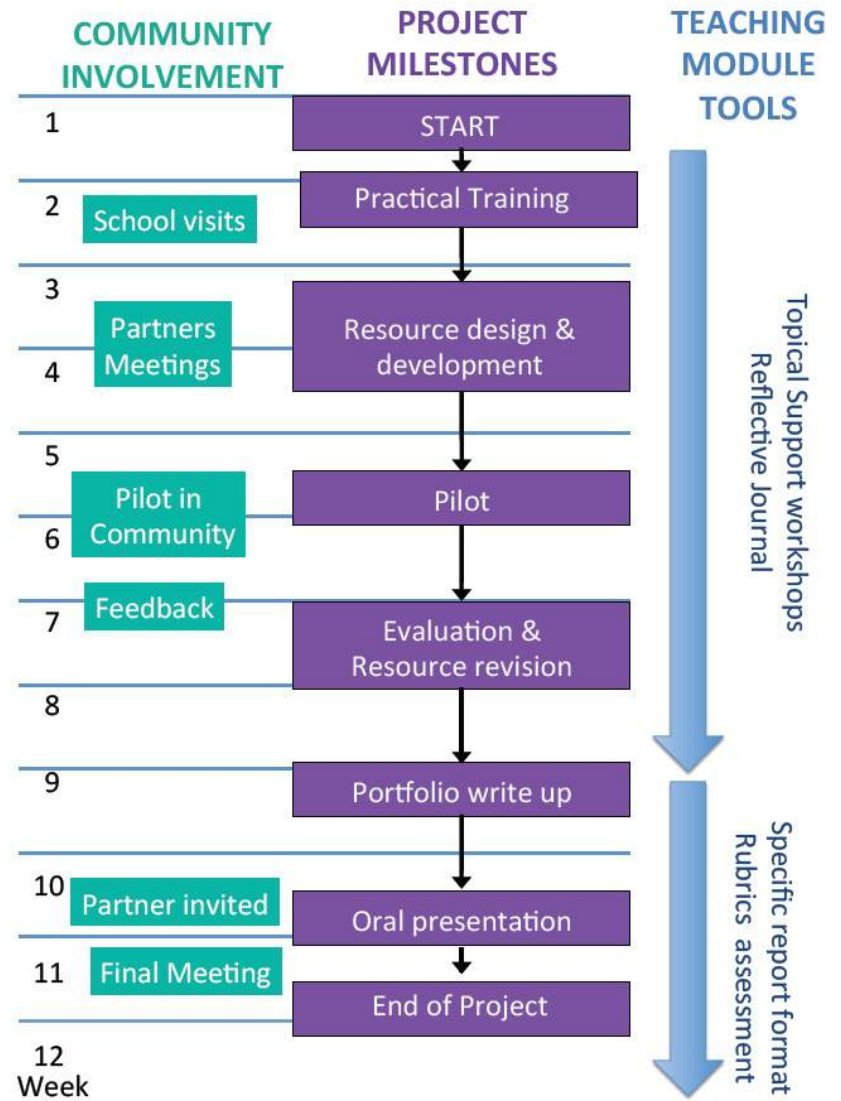
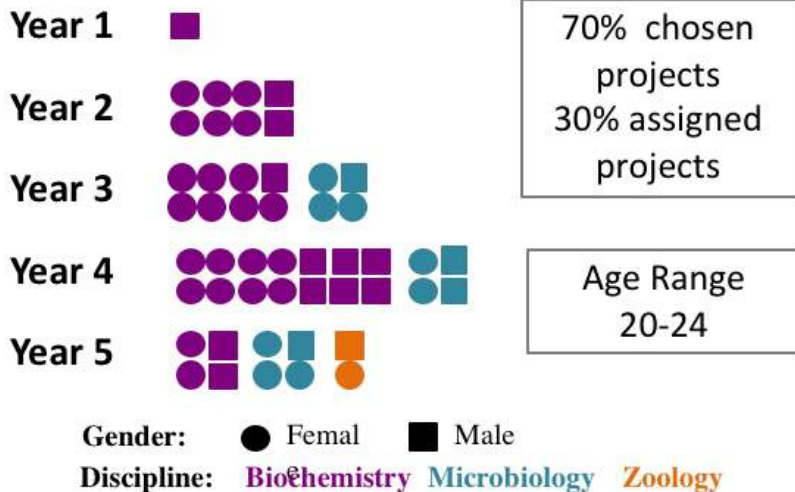
**Lack of science outreach &  
communication training in  
curriculum**

Science  
Foundation  
Ireland **sfi**  
For what's next

# Development of science educational outreach final year projects

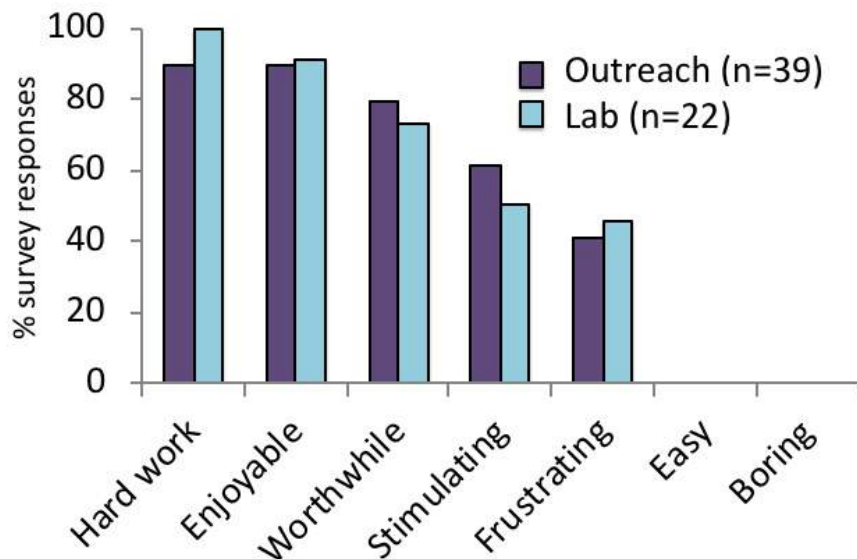


## Students repartition

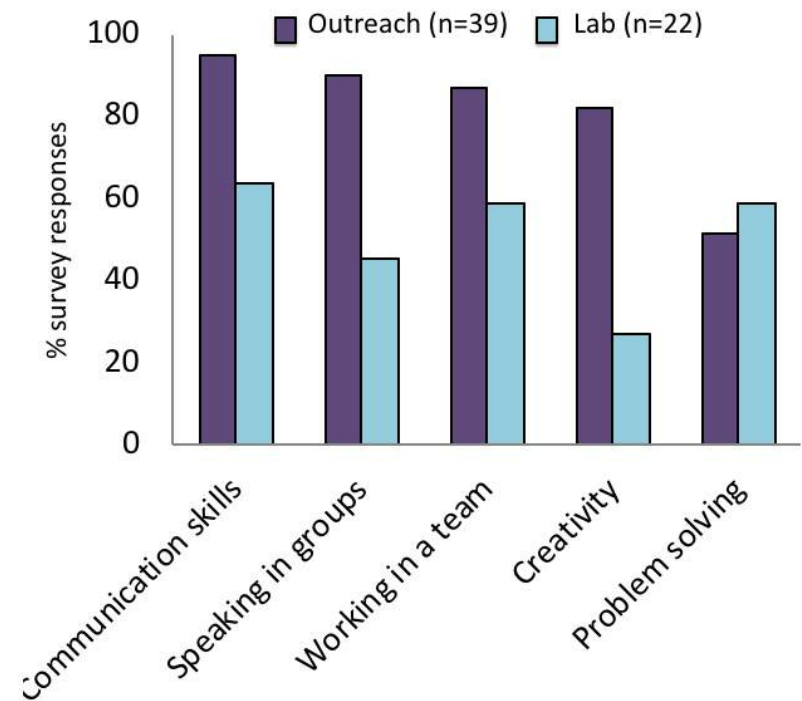


# Reported benefits to the final year undergraduate science students

*Words matching student's experience of the project*



*Students develop 'desirable graduate attributes'*



# Benefits to the community

## **Institutional partners:**

- *Have an outreach need that forms the basis for a project*
- Benefits reported:
  1. Development of outreach material to benefit the public
  2. Idea exchange
  3. Helps researchers to engage in outreach by providing tested activities

## **Partner Schools:**

- *Allow the pilot of material, provide feedback on activities*
- Benefits reported:
  1. Connection with university
  2. Changing science perceptions
  3. Students meet science role models



# Conclusion & Perspectives

## Conclusion:

*Success in using the combination of volunteering and curricular involvement of students to deliver public engagement in science*

## Future work:

- Volunteering aspect: *How to adapt it to ensure sustainability for HEIs?*
- Curricular component: *Develop a module and more curricular solutions*

## Developing research in specific directions:

1. Impact on children's self-efficacy in science and their perception of science and scientists. *Sarah Carroll's presentation Educational strategies Friday Room C 10.55am.*
2. impacts on volunteer team members' motivation for participation,
3. institutional values, support and commitment to outreach and public engagement



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Science  
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Ireland **sfi**  
For what's next

# Thank You!



- Funders
- Current and past team members and coordinators
- All children & Teachers
- All partners:
  - ✓ Research Centers
  - ✓ Outreach Collaborators
  - ✓ Biochemistry, Microbiology
  - ✓ College of Science
  - ✓ School of Education
  - ✓ CELT
  - ✓ CKI
  - ✓ Schools & Teachers



NUI Galway  
OÉ Gaillimh



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