

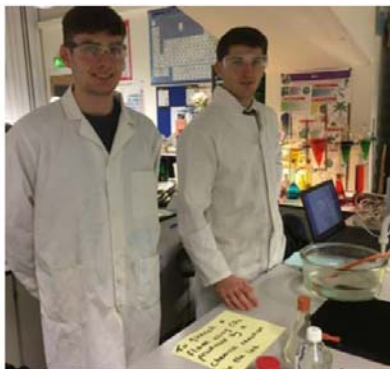


Eureka Centre  
for Inquiry Based Education  
in Science and Mathematics

## The Eureka Centre Facilities UCC

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## 1. What is the Eureka Centre?

The Eureka Centre was set up to provide facilities to train science teachers in UCC. The two driving forces behind the setting up of the Eureka Centre were Professor Patrick Fitzpatrick, Head of College of SEFS, and Professor Áine Hyland, Head of Education and Vice-President UCC. Professor Hyland was responsible for appointing the first full-time lecturer in Science Education in UCC in 1998 in order to increase the number of qualified science teachers graduating from UCC. At the time, UCC had no dedicated facilities for training science teachers. The BEd Science Education degree was set up in 2000 as a joint collaboration between the colleges of CACSSS and SEFS. Professor Aine Hyland (Education), Professor Paul Brint (Chemistry), Professor Colm O'Sullivan (Physics) and Professor John O'Halloran (Zoology) gave the degree programme their full support. Professor Hyland ensured that the need for dedicated facilities for science education students was written into the strategic plan of the School of Education and all efforts were directed towards setting up a centre for use by science education students.

Professor Patrick Fitzpatrick played an outstanding role in driving forward the project. Words cannot express my admiration for the genuine interest he showed in developing science education in SEFS. In 2006 a joint application for Strategic Innovative Funding (SIF) was successfully made by SEFS in collaboration with the School of Education UCC. Prof Fitzpatrick, Ms Mairead Loughman, SEFS administrator, and Dr Declan Kennedy, School of Education, travelled to the University of York to view the facilities of the Science Education Centre there. The Eureka Centre is modelled on the Science Education Centre at the University of York. In addition to the SIF funding, funding was obtained from various sponsors such as Pharmaceutical Ireland. Work began on the construction of the Eureka Centre in 2009 and was completed in 2011. The setting up of the Eureka Centre proved to be instrumental in increasing the numbers of students undertaking the BEd Science Education degree. From an initial intake of 10 student teachers there are now approximately 100 student teachers registered for the programme.

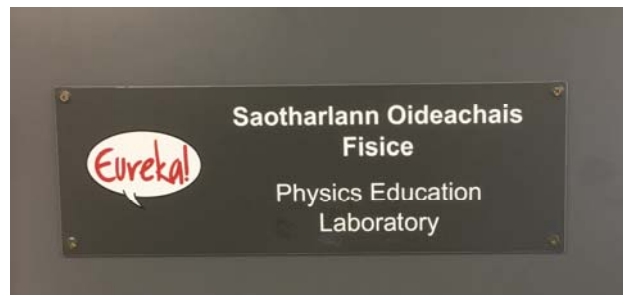


**Figure 1** Professor Patrick Fitzpatrick welcoming Professor David Waddington, Professor of Science Education, University of York, to the Eureka Centre. Prof. Waddington assisted in designing the Eureka Centre which is modelled on the Science Education Centre in York.

## 2. What facilities are in the Eureka Centre?

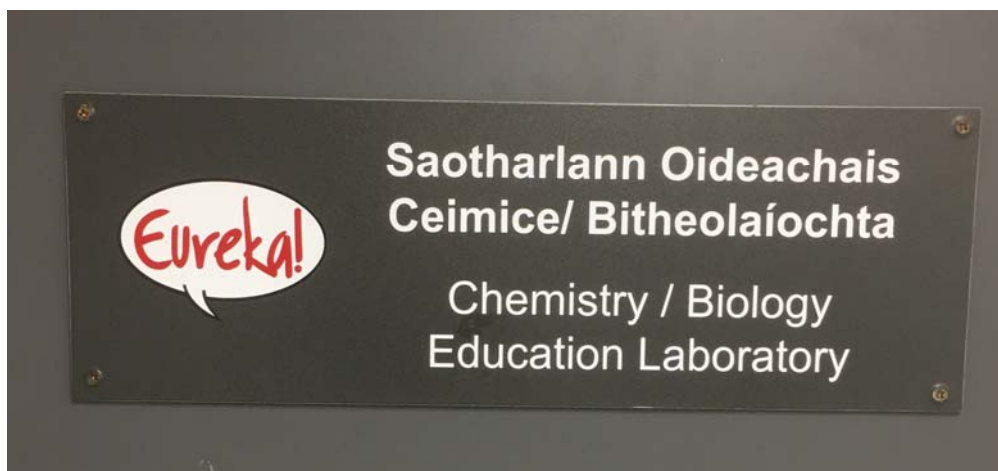
The Eureka Centre is the home of Science Education in UCC. It is located in the Kane Building in space that became available when the Computer Science Department moved to the Western Gateway building. The Eureka Centre is where Science and Education meet in a very tangible and visible way and consists of four components:

1. **Science education laboratories.** These two laboratories are modelled on laboratories typically found in secondary schools and are thus ideal for training science teachers to carry out all the laboratory practical work associated with the teaching of Junior Cycle Science and Leaving Certificate Biology, Chemistry, Physics and Agricultural Science.





**Fig. 2** The Eureka Physics Education Lab.







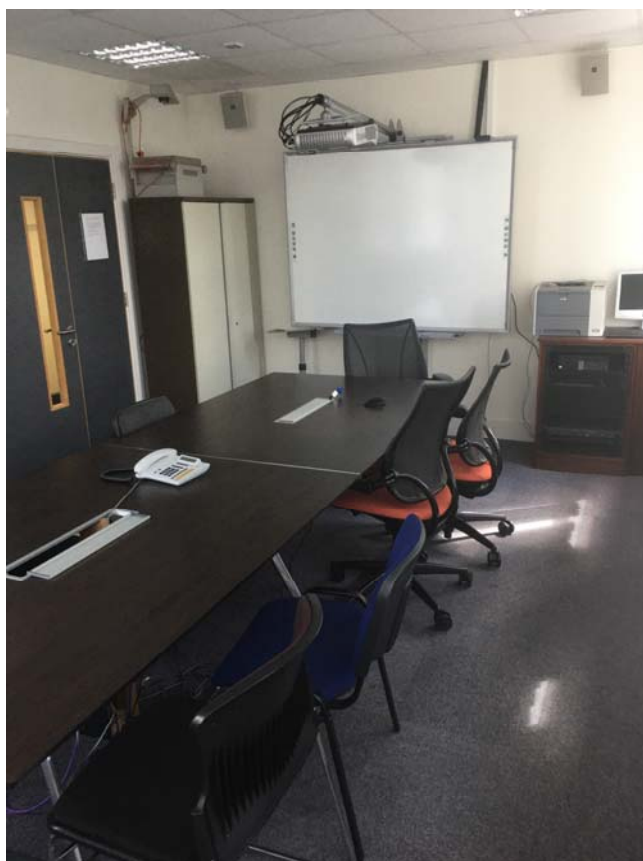
**Fig. 3** The Eureka Chemistry / Biology Education Laboratory.

**2. Eureka Office.** When the Eureka Centre was designed, this office was used by the Eureka Centre Manager who was involved mainly in outreach activities. The Eureka Centre Manager was the link person between UCC and local schools and organised visits to the Eureka Centre by local schools where they received presentations about the various science and science education courses being offered by UCC. In addition, the Eureka Centre Manager liaised with groups of science teachers to provide continuing professional development opportunities for these teachers. The first Eureka Centre Manager was Mr Noel Brett, a highly experienced physics teacher. Unfortunately, when Mr Brett retired in 2013, he was not replaced.



**Figure 4** The Eureka Office

**3. Eureka meeting room.** This room is used mainly for meetings by various groups not necessarily related to the Eureka Centre. It is a moderate sized room (6 m x 4.3 m approximately) and comfortably seats 10 people. It also contains a wide range of audio-visual equipment and video conferencing facilities that were installed when the Eureka Centre was designed. It is also used for small group tutorials for BEd Science Education students and Peer Assisted Learning activities run at evening time by the School of Chemistry and Department of Physics.



**Fig. 5** The Eureka meeting room

### 3. The Eureka Resource Room

The Eureka Resource Room is the busiest room in the Eureka Centre and is at the very heart of the Eureka Centre. It is a good sized room (7 m x 4 m) and contains all the fundamental resources required by student science teachers to prepare lessons for the pupils that they teach. Items such as school textbooks, school workbooks, teachers' handbooks, teachers' guides to the second-level curricula, school laboratory manuals and school science syllabi are all located there. These items would not be found in university libraries. Every experienced science teacher would have these items in their study at home but trainee science teachers would not even be aware of many of these resources. Science Education Resource Rooms are an integral part of science education centres throughout the world. The Resource Room in the Eureka Centre is very similar to the Resource Room in the University of York and other universities with a high reputation in the area of science education.

Since our science education graduates also teach at international level, the Eureka Resource Room also contains school textbooks related to the International Baccalaureate, European Baccalaureate, International GCSE, A level and GCSE UK, etc. Members of the science inspectorate of the Department of Education who have interviewed our graduates for positions in the European School system have been loud in their praise of the fact that UCC graduates have competed so successfully for teaching positions in these schools.

A view of the Eureka Resource Room is shown in Figures 6 -8.



**Figure 6.** Eureka Resource Room .





**Figure 7.** Eureka Resource Room



**Figure 8.** Some BEdSc students in the Eureka Resource Room.



## 4. Why is the Eureka Resource Room an essential part of the Eureka Centre?

A key aspect of training science teachers is teaching them how to design lesson plans that contain lots of good teaching ideas and are aligned to the syllabus being taught to their pupils when teaching in our local schools.

Science education students are the only trainee teachers that are required to teach three subjects (Physics, Chemistry and Biology) up to Transition Year level. All science education students specialise in only one of these areas at university. Hence, teaching three subjects is a very daunting task for trainee teachers. Therefore, they are very reliant on schools textbooks and the accompanying Teacher's Guides to these textbooks. In addition to teaching Junior Cycle science, due to the difficulty of recruiting science teacher to cover classes for absent teachers, our student teachers are often asked by school principals to act as substitute teachers in Leaving Cert subjects such as Physics, Chemistry, Biology, Agricultural Science, Mathematics and Computer Science. This can be very daunting for our student teachers but, thanks to the resources in the Resource Centre, the School of Education has received outstanding feedback from school on the help given to schools by our student science teachers.

Student teachers do not have the financial resources to purchase a wide range of textbooks for their own use. For example, there are seven textbooks available at Junior Cycle science level. All of these textbooks, accompanying workbooks, lab manuals Teachers' Guides and syllabi are available in the one location in the Eureka Resource Room for consultation by students.

These resources could not be placed in the Boole library as they would be dispersed to different areas on different floors. The school textbooks would be catalogued according to their subjects (physics, chemistry, biology, Agricultural science, Mathematics and Computer Science), the teachers' guides would be placed in the Education section of the library, the workbooks in another section, the laboratory notebooks in a different section and the syllabi categorised with government publications.

## 5. Who uses the Eureka Resource Room?

The Eureka Resource Room is used by a wide variety of stakeholders in science education.

- **Student teachers** – approximately 100 BEdSc students and 10 PME (Professional Masters of Education) use the room. The Eureka Resource Room is available to students seven days per week from 9 a.m. to 10 p.m. each evening. Registered students are given the code to the locked door. Students comply with the "honour code" to only consult with the resources and not to remove any resources from the room. Students may borrow modern datalogging equipment which is stored in a metal press in the Resource Room. Borrowing of this datalogging equipment takes place at fixed times each week and this is administered by student helpers paid by the School of Education.

- **UCC Plus students.** Secondary school students from disadvantaged backgrounds who participate in the UCC Plus activities use the resources in the Eureka Centre. This is an important outreach activity of the Eureka Centre and underlines the important role that UCC plays in encouraging students from disadvantaged backgrounds to undertake science and science-related courses in UCC. These students have no access to the UCC library but have access to the Eureka Resource Room under supervised conditions for study and consulting school textbooks to help them prepare for the Leaving Certificate examinations in Physics, Chemistry, Biology, Agricultural Science, Mathematics and Computer Science.
- **Research students.** Over the past 20 years a total of 136 students have graduated with a Master of Science Education degree. Some of these students have been international students coming from places such as USA, Indonesia and Spain. In addition, many students have graduated with PhD degrees in science education. The resources in the Eureka Resource Room have provided invaluable to these researchers (Figure 9) in developing resources for use in their research in school classrooms and in accessing historical documentation that is not available online.



**Figure 9.** Staff of the School of Education and science teachers from local schools who participated in the EU funded PROFILES project on Inquiry-Based Science Education. The resources in the Eureka Centre were invaluable in helping these teachers develop the teaching modules for this project.

- **Teachers attending CPD events.** The Eureka Centre hosts monthly meeting of the Irish Science Teachers' Association. These meetings are attended by local practising science teachers – many of whom act as mentors to our student science teachers. This is UCC's way of thanking them for all the help and support that they freely give to our student teachers. It is also an excellent opportunity for our student science teachers to meet qualified and experienced teachers from various schools and learn about various aspects of science education through the presentations given by these teachers and by guest lecturers.



**Figure 10.** Our student science teachers demonstrating their project work to local science teachers attending a monthly meeting of the Irish Science Teachers' Association in the Eureka Centre. All of the resources to help students with their project work are available in the Eureka Resource Room.

- **Direct Entry students.** Great praise about the Eureka Resource Room has been received from the Direct Entry student teachers who join the BEdSc programme in third year. These graduates work in industries such as the pharmaceutical industry, electronics industry and food industry. On deciding to change career to one of science teaching, the flexibility of being able to use the resources in the Eureka Resource Room in the evening and at weekends is ideal for these graduates. Many of them may not have been in secondary school for over 20 years and hence need to familiarise themselves with syllabus changes and resources. UCC is the only university in Ireland to offer this type of “career conversion” course. The resources in the Eureka Resource Room provide essential support to these graduates.
- **Visiting professors.** From time to time we receive requests for visiting professors to spend some time in the Eureka Centre to learn about science education in Ireland and our system of training science teachers. They are also interested in learning how the Eureka Centre achieved international accreditation by ICASE. For example, Professor Andrew McConney, Professor of Science Education, Murdoch University, Australia, spent three months with us in 2019 and was based in the Eureka Resource Room where he



had the use of the office desk in this room and interacted with our student teachers on a daily basis.

- **Part-time science education staff.** Meetings of part-time science education staff are held in the Eureka Resource Room to update themselves on the latest resources published a. At present there are six part-time lecturers in science education who supervise the teaching placement of our student science teachers and provide tutorials to them. None of these part-time staff has access to an office in UCC so the Resource Room is an ideal place for them to meet with their students and with each other.
- **Peer Assisted Learning** activities are run on some evenings in the Eureka Centre by the School of Chemistry and Department of Physics. A whiteboard on the wall of the Resource Room allows small group teaching to take place there.
- **Visiting secondary school students.** From time to time we are approached by students from local secondary schools to assist them with projects for the Young Scientist Exhibition, Scifest Competition and the annual International Youth Science Forum in Imperial College London. These students have made great use of the resources in the Eureka Resource Room.

## 6. What was the source of funding for the Eureka Centre?

- Mr David Burke and his colleagues in Buildings and Estates UCC gave enormous help and support to all of us involved in developing the Eureka Centre. The first priority was to get the laboratories up and running for our student teachers. On completion of these laboratories, there was no funding available within the capital budget to equip the Eureka Resource Room. Therefore, all of the furniture and science education resources for the Eureka Resource Room were purchased by the School of Education. Ms Hannah Joyce, Manager School of Education, and Stephanie Larkin, School of Education, provided all the purchase orders to cover the equipping the room. Advice on the design of the room was obtained from Mr David Burke and his colleagues in Buildings and Estates UCC.
- Additional funding for the purchase of books and resources was obtained from Pharmaceutical Ireland. In addition, the Royal Society of Chemistry, the Institute of Physics, Department of Education and Skills, the Professional Development Service for Teachers (PDST) and the Irish Science Teachers' Association donated various resources developed by these organisations. The presentation of one set of resources is shown in Figure 11.



**Figure 11.** In attendance at the presentation of a set of bound volumes of *Chemistry In Action* to the Eureka Resource Room were (from left) Mr Brendan Duane, National Chemistry Coordinator Professional Development Service for Teachers, Dr Peter Childs, Editor, *Chemistry In Action*, Dr Declan Kennedy, UCC and Ms Miriam Horgan, Chemistry Inspector, Department of Education and Skills.

- The datalogging equipment that is stored in the Eureka Resource Room (Figure 12) and borrowed by the student teachers was purchased from a Feasibility Study research grant obtained by the School of Education from the Department of Education and Skills. Additional funding was provided by the National Academy for the Integration of Research, Teaching and Learning (NAIRTL) to purchase new equipment and software. This datalogging equipment cannot be stored in the laboratories as student teachers do not have access to the laboratories to borrow equipment outside of teaching hours unless a member of staff is present.
- Initially, an old photocopier was donated by the SEFS office to the Eureka Resource Room. However, this is no longer functioning and has been removed. For Health and Safety purposes, all students carrying out laboratory practical work are given written instructions. The photocopying is now carried out in the School of Education.
- All running costs of the Eureka Centre (laboratory consumables, replacing equipment, purchasing new resources, paper for the photocopier, etc) are paid by the School of Education.
- From 2023 the range of subjects available to BEdSc student teachers is being expanded to include Computer Science and Mathematics. This will mean the purchase of additional resources to cater for students studying these subjects.



**Figure 12.** Modern datalogging equipment is stored in this metal cabinet and is borrowed by student teachers for use in teaching lessons during teaching placement in local schools.

Additional resources sponsored by Science Foundation Ireland, Pharmaceutical Ireland, the Irish Science Teachers' Association and UCC Plus (for use by UCC Plus students when using the Resource Room) are stored in the three filing cabinets shown in Figure 12.



**Figure 12.** Resources sponsored by Science Foundation Ireland, the Irish Science Teachers' Association and UCC Plus are stored in these filing cabinets.



## **7. Why are the Colleges of both CACSSS and SEFS so closely involved in the Eureka Centre?**

The need for close collaboration that has always existed may be summarised as follows:

- The BEd Science Education degree is the main route to qualifying as a science teacher in UCC.
- The School of Education is the lead department in the BEd Science Education degree.
- Of the 240 credits in the BEdSc programme, 120 credits are taught in CACSSS and 120 credits are taught in SEFS.

In addition, as mentioned above, the purchase of lab equipment in the Eureka labs and all of the running costs of the Eureka Centre labs and Resource Room are paid by the School of Education.

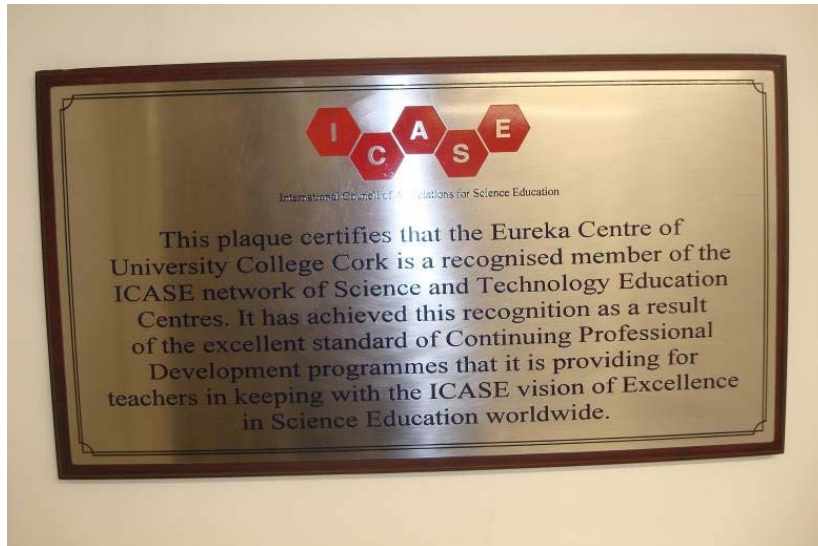
## **8. Social interaction in Eureka Resource Room – The UCC Experience**

The COVID-19 pandemic has shown the importance of the "UCC experience" and the need for students to meet each other face-to-face, discuss progress, share good teaching ideas and support each other. The Eureka Resource Room is the only place in UCC which student science teachers can identify as their "home" in UCC and enables them to:

- Meet each other to discuss lessons plans and progress being made in their teaching and compare experiences of teaching in different types of schools and at different levels in secondary school. These informal interactions help the student teachers to share experience and to provide mutual support for each other – particularly in the case of more experienced student teachers providing informal mentoring to beginning student teachers.
- Hold informal face-to-face meetings and discussions. This is particularly important for our Direct Entry student teachers. As already mentioned, these are typically mature graduates working in the pharmaceutical and electronics industries who decide on a career change and enter the BEdSc programme through the Direct Entry system into third year.

## **9. Accreditation of Eureka Centre by ICASE**

UCC is the only university in Ireland which has received accreditation from the International Council of Associations for Science Education (ICASE) for the high quality of its teacher training and continuing professional development programmes for science teachers, Figure 13.



**Figure 13.** Prof. Jack Holbrook, University of Tartu, Estonia, President of ICASE presenting the ICASE accreditation plaque to Prof. Patrick Fitzpatrick, Head of College of SEFS. Also in the photograph are (left to right) Noel Brett, Manager Eureka Centre, Jill Haynes, SEFS Office, Prof. Teresa Kennedy, University of Texas, USA, President Elect of ICASE, Dr Declan Kennedy, School of Education UCC, John Lucey, School of Education UCC.

The Eureka Centre received this accreditation in 2013. This accreditation is very helpful to our student science teachers when applying for teaching positions in international schools. The fact that the Eureka Centre is one of the recognised ICASE Science and Technology Centres at international level is one of the factors leading to the selection of UCC to host the ICASE World Conference on Science Education in 2026.

## **10. Accreditation of BEd Science Education programme by Teaching Council**

At the time of writing, the BEd Science Education degree is undergoing re-accreditation by the Teaching Council. This programme received accreditation in 2013 and in the Teaching Council's accreditation report, the visiting accreditation panel wrote in glowing terms of the facilities available for training science teachers. The report specifically mentioned the excellent laboratory facilities and the Science Resource Room with its "wide variety of teaching resources to aid in the preparation of lesson plans" (p. 10).

The School of Education UCC strives to give its BEdSc and PME student science teachers the best possible training in the Eureka Centre. We are very grateful to have the support of successive Heads of the School of Education in UCC and also successive Heads of Colleges of CACSSS and SEFS in our work.



Figure 14. Science education students and staff of the School of Education UCC.

Sincere thanks to all of you for the help and support that you give to the Eureka Centre!