Free Hydro Cells

NEWSLETTER

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Welcome to the second edition of the FreeHydroCells project newsletter!

Foreword from Dr Ailbe Ó Manacháin, FreeHydroCells Project Coordinator, Lead PI, Senior Staff Scientist, University College Cork

FreeHydroCells, designated by the EU as a "high risk / high reward" research and development project, aims to disrupt the green energy landscape. At its core is developing a novel, efficient method of solar-to-chemical energy conversion to produce low-cost renewable fuel in the form of green hydrogen.

The equivalent foreword in our first newsletter set the scene and the context of our desperate need today for new and viable energy sources on Earth to counteract climate change and the depletion of our finite resources. It also described the goals of the project and the early activity objectives in terms of investigating the properties of material building blocks, basic subsystems and advancing design and methodology pathways towards our goals (this is defined below as Part A of the timeline), so we were in the midst of Part A when the first newsletter was released.

In this foreword, I would like firstly to mention the important need to acid test all proposed "green" renewable energy solutions to ensure the project is seen in the correct context, and I will then update the reader in general terms on what the project has been focusing on and what progress has been made at this juncture (we are now in Month-25 of the 40-month project).

If we are to genuinely stop climate change, we need genuinely green and novel hydrogen production energy source solution pathways to be supported and advanced. FreeHydroCells falls within this category, and it is important for us that the project is seen in this correct context, but it is important also that decision-makers and those in the community who want to see our planet environment redeemed from climate change effects are able to acid test proposed hydrogen production solutions to ensure they are genuinely green, as it is increasingly apparent that there is much confusion in this area.

A phrase I like to think of when assessing potential green energy hydrogen production solutions is this: "It must be entirely green (pollutant-free), very lean (highly efficient in energy conversion) and broadly mean (low-cost, sustainable, stable, storable) to enable a novel energy dream (of having the potential to challenge the dominance of pollutant-rich energy conversion processes)". This phrase helps me think about pollutant byproducts or pollutant carriers systems, and about the often not-discussed energy needed as input (which we need to minimise or remove) to

get storage and/or an energy out (which we want to maximise) for a solution, which gives the true measure of efficiency. Also, the predicted product financial cost, both seen and hidden, to get a viable, environmentally benign, long product life green hydrogen production solution.

Until we genuinely target all of these factors in a wholistic manner, we cannot really challenge the dominance of fossil-fuel based energy sources, and hence we will be ineffective in our goal of restraining climate change or reducing the use of our limited natural resources by developing a rapid, benign and climate-neutral energy transition. I hope you find this short discussion useful and thought-provoking. Please keep an eye on our project website for more discussion on this overall issue of genuinely green hydrogen production solutions and the context for the FreeHydroCells objectives.

Regarding the technical activities and objectives of the project, it is useful at this juncture to discuss these in the context of timeline parts or phases:

Part A

- **Investigate basic responses** of small area subsystems and interpreting viable solution pathways for the potential building block materials, integration of materials to form basic subsystems, and the design and methodologies for viable routes towards an overall larger area system setting.

Part B

- **Apply the learnings** achieved and move the focus to materials that permit the formation of more developed small-to-large area subsystem components that could contribute to a viable solution.

Part C

- **Integrate and develop** those small-to-large area subsystem components for a cell-to-system pathway into devices/cells and systems with the best achievable hydrogen production – and applying an iterative optimisation loop throughout - for implementing a proof of concept verification for the science and technology achieved.

Our timeline strategy is to provide a viable stepping-stone approach towards advancing the technology readiness level of our project science and technology across the four technical work packages so that, by the end of the project, we will be able to show what proof of concept verification is achievable and what can be predicted for upscaling and commercialisation in terms of key performance indicators related to solar-to-hydrogen efficiency, predicted cost in production, materials' sustainability and system durability and stability to give as long a product life as possible.

At this timeline juncture we remain more or less on time, so far. Part A has been completed and we are now in a transition phase between ongoing activities in Part B and implementation of Part C. Given the state-of-the-art bottleneck challenges, and the relatively short timeline of the project, the strongly collaborative and interdisciplinary consortium has made very significant progress to reach this stage of a very difficult "high risk / high reward" project on time and with a potential solution for Part C in our vision. Enormous challenges remain of course, and there are no certainties. A single issue could derail our plans, so while we are resolute, we move forward cautiously applying our stepping-stone approach. Some interim advances we can share with you in general terms are:

- Important and decisive understandings of materials building blocks and routes
- Successful identification of a potentially viable substrate TCO and substrate structure
- Development of TCO thin layers for multi pn-junction integration
- Potentially viable surface (electrolyte/ semiconductor interface) capping routes
- Novel doped-TMD investigations and routes for light absorption control
- Successful small-to-large area materials growth for Cell-to-System upscaling transitioning
- Cell-to-System design, implementation and system advancements
- Innovative subsystems integration techniques and methodologies
- All advances fully cognisant of overall objectives, incl. upscaling and commercialisation

While these advances are very encouraging and exciting for the consortium, we have a significant way to go in Parts B/C of the project timeline to see how successful our efforts may be, if successful at all. The many challenges we still face should not be underestimated at this critical period of our activities, but we have a very good strategy in place and an excellent consortium to explore what is possible.

This second newsletter invites you to share into the past two years or so of activity in FreeHydroCells, and aims to give a flavour of both technical and non-technical aspects of the project, including the green hydrogen production context. I hope you enjoy reading it. We welcome your feedback, thoughts, ideas, visions, questions, etc., as we seek not only to advance this important technology, but also to inspire others to join in the search for viable renewable energy sources that protect the planet while serving the energy needs of humanity.

For more information, visit our website *freehydrocells.eu*, connect with us on *Twitter/X* and *LinkedIn*.
You can also get in touch with our team directly via email at *freehydrocells@ucc.ie*.

About the FreeHydroCells project

The FreeHydroCells concept draws inspiration from nature. Much like how a leaf absorbs sunlight to fuel photosynthesis, the FreeHydroCells system aims to absorb solar energy to power a water-splitting reaction that generates hydrogen. This hydrogen, a clean and versatile fuel, can be stored and used to power a wide range of applications, potentially transforming the way society meets its energy needs.

Our concept envisions a system submerged in water, built from thin-film semiconductors layered in many-junction arrays on a transparent, flexible substrate. These materials would absorb solar energy and convert it directly into chemical energy, storing it as molecular hydrogen. The ultimate goal? A solar-to-hydrogen (STH) energy conversion system that is efficient, affordable, and built from sustainable materials, offering a truly green alternative to fossil fuels.

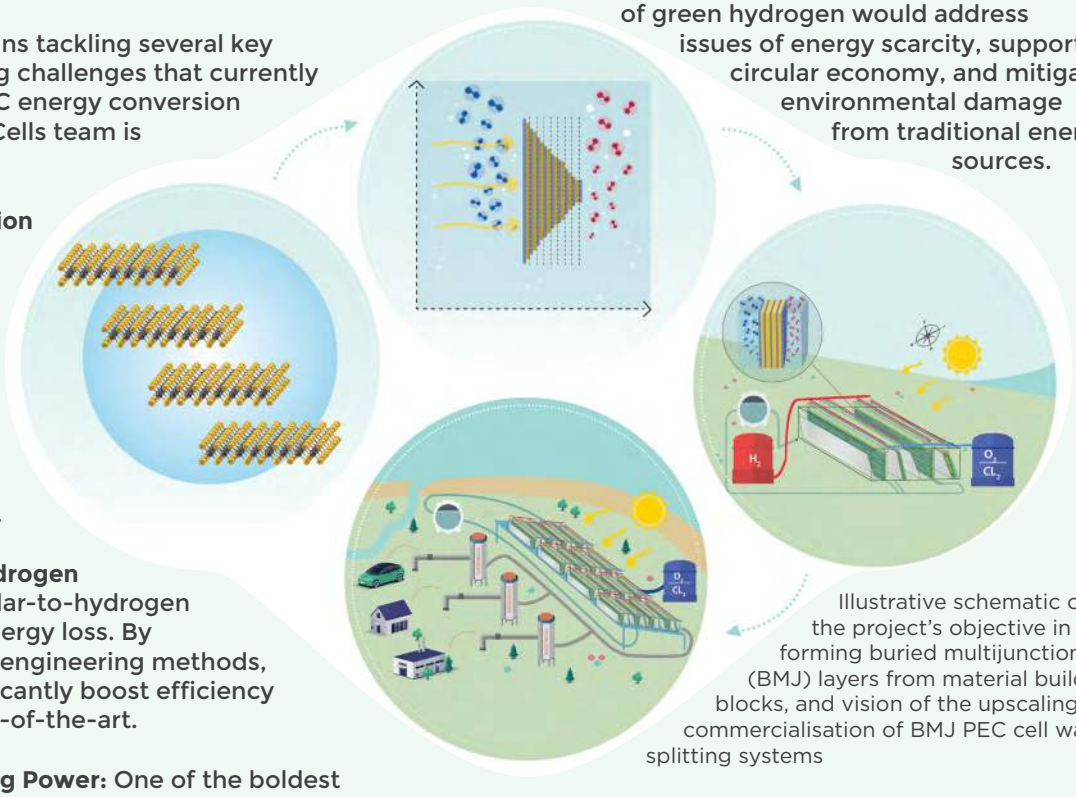
Achieving our vision means tackling several key scientific and engineering challenges that currently limit the efficiency of PEC energy conversion systems. The FreeHydroCells team is working to:

1. Develop Next-Generation Materials: Existing PEC systems often rely on costly or limited materials. We aim to identify abundant and sustainable semiconductor materials that maximise energy absorption and minimise losses during conversion.

2. Maximise Solar-to-Hydrogen Efficiency: Traditional solar-to-hydrogen systems struggle with energy loss. By employing cutting-edge engineering methods, the team hopes to significantly boost efficiency beyond the current state-of-the-art.

3. Achieve Self-Sustaining Power: One of the boldest objectives is to develop a system that drives energy harvesting and hydrogen generation autonomously, without the need for an external power source. Achieving this would mark a major leap forward for green energy technologies.

If successful, FreeHydroCells could pave the way for a modular, eco-friendly hydrogen production system that is easy to scale and implement. The project's impact extends beyond climate action: a clean, reliable source of green hydrogen would address issues of energy scarcity, support a circular economy, and mitigate environmental damage from traditional energy sources.



Illustrative schematic of the project's objective in forming buried multijunction (BMJ) layers from material building blocks, and vision of the upscaling and commercialisation of BMJ PEC cell water splitting systems

Meet the FreeHydroCells Team

The FreeHydroCells consortium is a partnership of seven leading European research organisations. Coordinated by University College Cork (UCC), the FreeHydroCells team leverages expertise in materials science, nanotechnology, and system integration to push the European Union closer to achieving cleaner, renewable energy solutions.

University College Cork (UCC), Ireland

University College Cork **(UCC) is a university located in the city of Cork, County Cork, in the southern province of Munster in Ireland. An award-winning institution with a history stretching back over 170 years, today UCC is ranked in the top 1.1% of universities globally.**

As the coordinating institution, UCC brings together expertise from the *Tyndall National Institute*, Environmental Research Institute and the School of Chemistry, enhancing FreeHydroCells with advanced facilities for material growth, analysis, and PEC cell characterisation.

Leading Work Package 4, and contributing to WPs 1, 2, and 3, UCC's goal is to validate and optimise materials, including novel transition-metal dichalcogenides (TMDs) and transparent conductive oxides (TCOs), for efficient water-splitting systems.

AMO GmbH, Germany

Founded in 1993 in Aachen, Germany, *AMO GmbH* **is a research institute for nanotechnology. Its mission is to bridge the gap between fundamental science, innovation and applications.**

A leader in nanotechnology, AMO GmbH spearheads the early stages of PEC cell design and materials growth. With extensive experience in semiconductor and nanofabrication technologies, AMO leads WP 2, focusing on the integration of TMDs and TCOs into the PEC cells. AMO also supports partners with technical expertise in thin-film and device engineering.

BARDS Acoustic Science Labs

BARDS Acoustic Science Labs (BASL) was established following the development of a pioneering new acoustic spectroscopic instrument.

Broadly speaking, BARDS, or Broadband Acoustic Resonance Dissolution Spectroscopy, is a technology which tracks changes in acoustic sound in solution to characterise drug dissolution, powder blend uniformity, and coating thickness on formulations. Furthermore, BARDS can help to determine Inter Batch Variability, Stability Testing and Counterfeit ID.

BARDS brings its patented acoustic spectroscopy technology to optimise gas bubble detachment on PEC cell surfaces, increasing efficiency. As a key contributor to Work Package 2, BARDS' technology assists in characterising bubble behaviour, which enhances the effectiveness of gas generation and separation within the PEC cells.

CEA-Liten, France

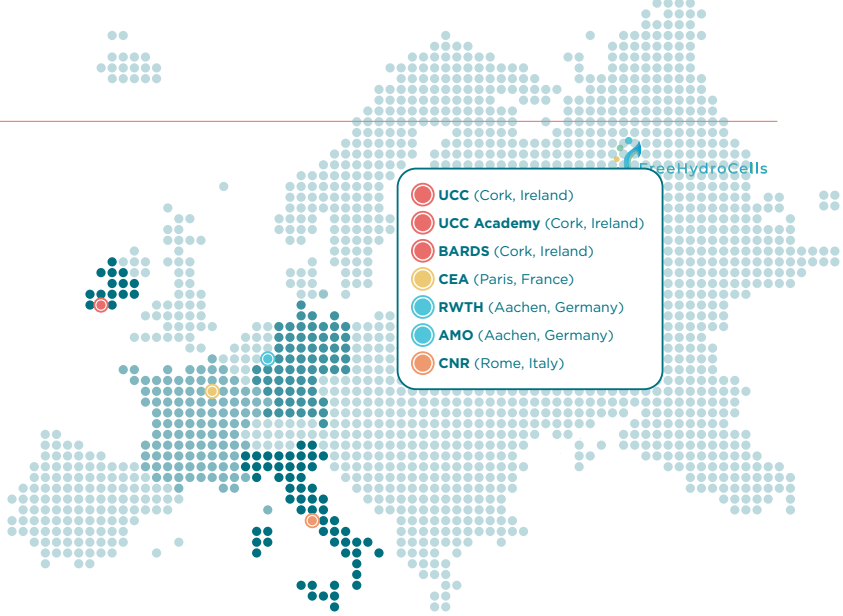
CEA **is a key player in research, development and innovation in four main areas: defense and security, low carbon energies (nuclear and renewable energies), technological research for industry, fundamental research in the physical sciences and life sciences.**

The CEA-Liten labs contribute towards the advanced modelling and prototyping of PEC systems, optimising the structure and efficiency of the PEC cells.
Leading WP 3, CEA's expertise lies in designing the photoelectrochemical subsystems and gas collection units, and it supports scaling efforts through its state-of-the-art solar and hydrogen testing platforms.

Institute for Microelectronics and Microsystems, Consiglio Nazionale delle Ricerche (IMM-CNR), Italy

Consiglio Nazionale delle Ricerche **(National Research Council) is the largest research council in Italy (CNR).**

Based within CNR, the Institute for Microelectronics and



Microsystems (IMM-CNR) leverages its expertise in nano-manufacturing and materials characterisation to conduct critical analyses of the consortium's materials and devices.

Leading WP1, IMM-CNR contributes valuable expertise to the project through optical, electrical, and nanostructural characterisation, aiding in the refinement of material properties and device performance.

RWTH Aachen University (ELD), Germany

RWTH Aachen University **(in German: Rheinisch-Westfälische Technische Hochschule Aachen), is a German public research university located in Aachen, North Rhine-Westphalia, Germany.**

Specialising in two-dimensional materials, RWTH Aachen's Chair of Electronic Devices (ELD) collaborates on the development and characterisation of TMD-based thin films for the PEC cells.

Their contributions are central to WPs 1 and 2, focusing on material quality and optimising device interfaces for enhanced photoelectrochemical activity.

UCC Academy DAC, Ireland

UCC Academy DAC **is the in-house consultancy of University College Cork, based in Cork, Ireland. Established a decade ago, the organisation's purpose is to define, develop, drive and deliver key projects that further the University's strategic goals.**

UCC Academy provides research project management, communications, and impact strategy, ensuring efficient coordination and dissemination of project outcomes. Through WP 5, UCC Academy supports project logistics, regulatory compliance, and stakeholder engagement.

Conferences & Events

MRS Fall Meeting 2023

26th November – 1st December 2023, Boston, USA

The world's foremost international scientific gathering for materials research, the MRS Fall Meeting showcases leading interdisciplinary research in both fundamental and applied areas presented by scientists around the world. Cansu Ilhan (UCC) presented the research outputs of FreeHydroCells in a presentation titled "*Enhanced photoelectrochemical water splitting with doped transition metal dichalcogenide nanofilms*".

9th EuChemS

7th – 11th July 2024, Dublin, Ireland

Hosted by the *Institute of Chemistry of Ireland (ICI)*, the 9th EuChemS Chemistry Congress (ECC9) gathered leading scientists from around the world focused on eight core themes of Synthetic Organic Chemistry, Catalysis, Chemistry for Health, Chemistry Education and Ethics, Energy and Sustainability, Nanochemistry/ Materials, Physical and Computational Chemistry, and Supramolecular Chemistry. As part of FreeHydroCells' representation at ECC9, team member Christopher Kent (BARDS) presented research on *"Green Hydrogen Evolution using Solar Energy at Electrodes of Earth Abundant Material Detected Using Broadband Acoustic Resonance Dissolution Spectroscopy."*

FreeHydroCells presentation at 9th EUChemS Conference, Dublin, Ireland

DGKK Seminar on Growth Kinetics and Layer Transfer of Ultrathin Layers and 2D Materials

16th – 17th September 2024, Aachen, Germany

The Aachen Graphene & 2D Materials Center co-hosted the 2024 DGKK Seminar on "Growth Kinetics and Layer Transfer of Ultrathin Layers and 2D Materials" in partnership with *CST*, *DGKK*, and *AIXTRON SE*. The seminar focused on advanced techniques for 2D layer growth and transfer processes for ultrathin films in semiconductor, dielectric, and metal applications.

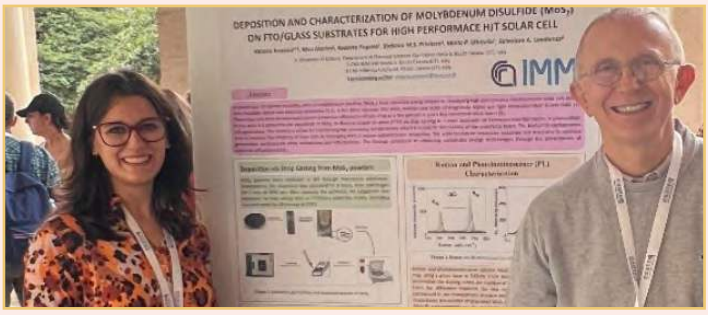
FreeHydroCells team member Vikas Jangra (RWTH) presented his work titled "*Realising growth of MoS2, WS2, and MoxW1-xS2 nanofilms for application in Photoelectrochemical water-splitting reactions*", showcasing our progress in using 2D materials for sustainable energy applications.

FreeHydroCells presentation at DGKK Seminar, Aachen, Germany

7th SHJ International Workshop 2024

7th – 8th November 2024,

Catania, SicilyFreeHydroCells was pleased to participate in the *7th Silicon HeteroJunction International Workshop*, which gathers leading industry and science experts in the field of heterojunction photovoltaic technology. Engaging contributions from project partner CNR included a talk by our WP1 Leader Prof. Salvatore Lombardo, as well as a poster presentation by PhD student Vittoria Anastasi on the topic of "Deposition and Characterization of Molybdenum Disulfide (MoS 2) on FTO/Glass Substrates".



FreeHydroCells poster by CNR (Vittoria Anastasi and Prof. Salvatore Lombardo pictured) at the 7th SHJ International Workshop 2024, Catania, Sicily

Hydrogen Ireland Conference – H2IrL 2024

13th – 14th November 2024, Cork, Ireland

H2IrL brought together industry professionals, academia and policymakers for discussion, assessment and planning for the utilisation, deployment and commercialisation of hydrogen, providing great insights on the role of hydrogen in both the local and global energy transition. The event provided great FreeHydroCells was represented at this year's event by Project Coordinator Dr. Ailbe Ó Manacháin and Project Manager Rebecca Buckley.

Rebecca Buckley, UCC Academy at the Hydrogen Ireland Conference, Cork Ireland

More Highlights

AMBER Centre "Exploring Materials" TY Work Experience Programme

13th December 2023, Cork, Ireland

FreeHydroCells welcomed a group of Transition Year students into its labs at the *Environmental Research Institute* in UCC. The initiative was part of the "Exploring Materials" Transition Year work experience programme, coordinated by *AMBER*, Ireland's leading materials science research centre. This event aimed to give students an insight into pursuing careers in STEM, through practical experience doing experiments in the lab, and learning about a typical day in life of a scientist. *Read more here*.

FreeHydroCells team members and AMBER Coordinator with the TY student group

Presentation to delegation from Minzu University of China

20th March 2024, Cork, Ireland

Project Coordinator Dr. Ailbe Ó Manacháin, and Scientific Researcher Dr. Jun Lin gave a presentation on FreeHydroCells to a visiting delegation from *Minzu University of China*.

In a talk on "*Pathways of Water, Heat and Light to Novel Renewable Energy Sources*", Dr. Ó Manacháin highlighted the potential of cheap and abundant renewable energy sources like sunlight, water and waste heat, and illustrated how these sources are being explored in novel ways at UCC. Dr. Jun Lin gave the group an insight into the labs, equipment and materials used by the team for this important research. *Read more here.*

FreeHydroCells project concept is presented to visiting group from Minzu University of China

Harnessing Renewables for a Sustainable Future: Exploring CCU, Power-to-X and Solar-to-X Innovations

4th - 5th June 2024, Genk, Belgium

FreeHydroCells team members from CEA participated in *this event* which brought together the latest academic research, pathways to scale solar-to-X innovations, and demonstrations of near-commercial solutions.

It took place in the context of the European Innovation Council's *€24 million Challenge to advance solar-to-X technologies*, targeting prototype development, benchmarking metrics, and computational materials science.

FreeHydroCells General Assembly 2024

9th – 10th April 2024, Aachen, Germany

Annual General Assembly meetings are a wonderful opportunity for research projects – particularly those like FreeHydroCells whose teams are dispersed internationally – to meet in person, compare progress, exchange knowledge, discuss the nitty gritty of science, and develop strategic planning for achieving aims and objectives for the year ahead. The goal is to have all partners and consortium members aligned in their research efforts, and aware of potential obstacles or risks.

This year's FreeHydroCells project General Assembly took place recently in Aachen, Germany from 9th - 10th April 2024, hosted by project partner *AMO GmbH*, and attended by representatives from all consortium partners.

The FreeHydroCells General Assembly Meeting 2024 at AMO HQ in Aachen, Germany

Day 1 saw key updates on activities and progress from Work Packages 1, 2 and 3. Discussions centred around TMD / TCO materials, a vital element in the design of the project's core concept of a BMJ PEC cell. Meanwhile, WP3 focused on refining the design, fabrication and testing of the proposed Bath/Flow BMJ PEC cell chamber subsystem.

Discussions on Day 1 of the General Assembly

Day 2 featured the inaugural meeting of the project's External Expert Advisory Board. The EEAB provides strategic, independent advice on FreeHydroCells' direction, practicality, and outputs. It plays a hugely important role in the potential for future successful upscaling and commercialisation of the FreeHydroCells concept.

This was followed by discussion and progress update on technical WP 4, which focuses on refining gas collection,

integration and testing in the proposed BMJ-PEC cell system. Project management and impact activities were also covered in the day's agenda, with a particular focus on the upcoming first project reporting period, and preparations for a crucial first Review Meeting with the project funding authority.

Discussions on Day 2 of the General Assembly

In the afternoon, the group toured the impressive clean lab facilities and equipment at AMO GmbH, which make a vital contribution to the project's operational capabilities, particularly in WP2. With all of the scientific exchange done, the group finished up a successful few days with a walking tour of the historic cathedral city of Aachen.

The team suited up for a tour of the clean lab facilities, equipment and operational capabilities at AMO GmbH

Successful meetings like these are particularly vital to drive progress in a "high risk / high reward" project like FreeHydroCells, which is heavily dependent on robust interconnections and collaborative efforts across institutions.

FreeHydroCells team soaking in the spring sun during a walking tour of the historic Aachen city centre

Showcasing the magic of science at Cork Carnival of Science!

Members of the FreeHydroCells team from UCC and UCC Academy were delighted to share the magic of science with visitors of all ages at the Cork Carnival of Science 2024 on 8th – 9th June.

Cork Carnival of Science is annual festival which brings the magic of science to all the family! Drawing an estimated 75,000 visitors and over 50 exhibitors offering family-friendly experiments, science shows, interactive activities, games, street cuisine and a packed line-up of live entertainment.

FreeHydroCells team at the Carnival of Science

In the run-up to this year's event, FreeHydroCells was delighted to be mentioned in the news:

Cork's Fitzgerald Park to host two-day Carnival of Science extravaganza – echolive.ie

The Cork Carnival of Science is back with a weekend of FREE fun at Fitzgerald Park – Yay Cork

A sunshine filled weekend of fun

The beautiful sunny weekend saw lots of budding scientists and visitors to the FreeHydroCells tent. It was wonderful to see so many intrepid scientists taking on the challenge of our Hydrogen Quiz, and the puzzles in our Activity Workbook. Our team of researchers were

blown away by the enthusiasm and curiosity of our audiences throughout the weekend, especially among our younger visitors! One of the highlights of the day was the hydrogen experiment challenge – where visitors had the opportunity to create hydrogen using just water, salt, pencils and a battery.

↗ Download the FreeHydroCells Activity Workbook for Kids!

↗ Watch our highlights from the Carnival on YouTube

Read more about our participation *here >*

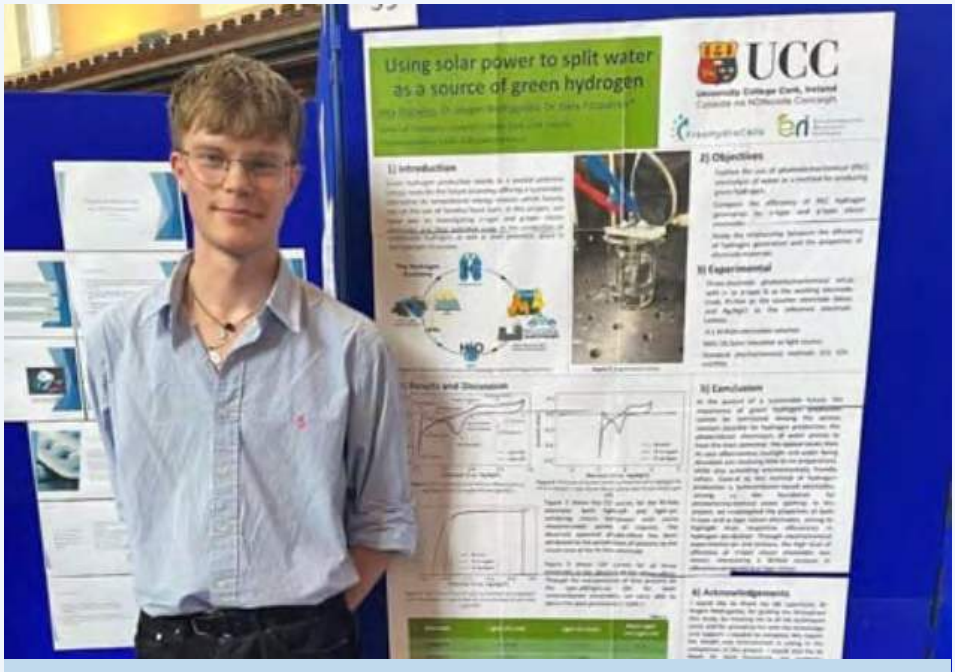
Student Spotlight: **Alex Knowles, Forensic Science & Green Hydrogen**

Meet Alex Knowles, a UCC undergraduate in Forensic Science from the School of Chemistry, whose passion for sustainable energy led him to work on the FreeHydroCells project. In this interview, Alex shares his journey, from studying forensic science to researching solar-powered hydrogen production, and his future ambitions in the field of chemistry.

Hi Alex. Tell us a little bit about your background and interests.

I am originally from Cork and so there wasn't much debate of where I was going to be undergoing my third level education, other than at UCC. I am currently studying for my undergraduate degree in Chemistry with Forensic Science.

I've always had an interest in pursuing a degree with forensics at its core and was fortunate enough that this course was available right at my doorstep. Throughout my time in this course, I have acquired a wide scope of knowledge in chemistry, as well as in molecular biology, toxicology, and genetics.



Alex at his poster presentation for his final year project

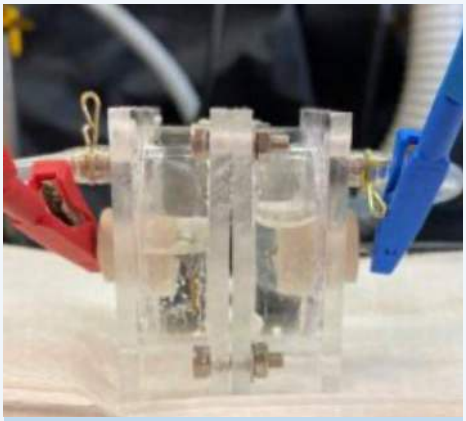
A huge emphasis is placed on analytical chemistry in this degree, and because of this I've had the opportunity to engage in various hands-on experiments and laboratory work. These experiences have not only deepened my understanding of scientific principles but have

also sharpened my practical skills, preparing me for real-world applications in chemical analysis.

What do you study in the course of your undergraduate?

Chemistry with Forensic Science is an interdisciplinary course, with huge focus on analytical chemistry. We are taught a unique blend of forensic science, including forensic psychology, forensic pathology, and legal medicine, along with the fundamentals of chemistry, such as pharmaceutical chemistry, quantum mechanics and electrochemistry.

In addition to learning theoretical concepts, we also delve into practical aspects of analytical chemistry, engaging in labs to develop our skills in chromatography and spectroscopy.



Electrolyser setup, with the Hydrogen Evolution Reaction (HER) taking place on the left and the Oxygen Evolution Reaction (OER) on the right

Are there aspects you particularly enjoy?

I have particularly enjoyed the lab components of my course. These ranged from organic and inorganic labs, to simulated crime scenes and trace analysis.

The college has done a great job at relating what is learned in lectures to what is carried out in labs, as well as preparing us for the world of industry.

Can you tell us about your final year project?

My final year project is titled 'Using Solar Power to Split Water as a Source of Green Hydrogen'. It focuses on investigating n-type and p-type silicon electrodes and their potential usage in the production of sustainable hydrogen, as well as their potential place in the Hydrogen Economy.

Utilizing standard electrochemical methods alongside simulated solar irradiation, including cyclic voltammetry, linear sweep voltammetry, and electrochemical impedance spectroscopy, we examined the performance and efficiencies of these electrodes, using platinum film as a comparison (which have no solar irradiation response).

Can you tell us how you became involved in the FreeHydroCells project?

Dr. Dara Fitzpatrick is my academic supervisor for my final year project, and it was his idea to carry out my project, along with his own work, in association with FreeHydroCells. He had set up a few meetings for me with Dr Ailbe Ó Manacháin and Dr. Ievgen Nedrygailov, and the work began from there!

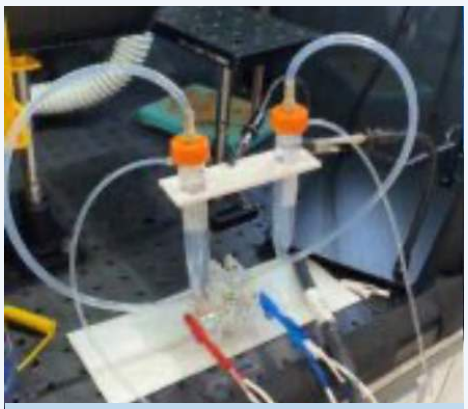
How would you asses your contribution to FreeHydroCells, and did you learn anything new from the experience?

I definitely learned a lot more than I thought I would. I had learned a lot of the theory that this project is based around, such as semiconductors and electrochemistry, in lectures, but it was only when researching these topics myself and carrying out practical experiments that I began to really feel like I knew what I was talking about. I think this knowledge and refined understanding is definitely going to come in handy when exams come around.

Did you have any memorable or challenging experiences during your research?

I think the most challenging aspect of my research was refining the design of my electrolyser. Initially when designing it, we planned to be able to incorporate Broadband Acoustic Resonance Dissolution Spectroscopy (BARDS) into the system so we put a lot of time into coming up with ways it would work, but due to time constraints and impending deadlines, we had to continue without it and focus on what preliminary integration steps would be needed.

Since we weren't going to be incorporating BARDS, our setup became more focused on the electrochemical setup needs for a future BARDS integration, but I don't think that time spent was wasted at all, it was all part of the process of integration, which has not been attempted prior to FreeHydroCells.



Gas assessment setup for the analysis of hydrogen and oxygen produced through the splitting of water

Have you achieved any significant results or conclusions from the research?

Our most significant result obtained was to do with the difference in photocurrent generated by the n-type silicon compared to the p-type. We determined that there was a 30-fold increase in efficiency of hydrogen production for n-type silicon compared to p-type, showing that the use of these silicon semiconductors as photocatalysts is a potentially promising route towards sustainable hydrogen production.

What's next for Alex? Do you have plans in mind for the future?

Final year exams are right around the corner, so most of my time has been devoted to studying. My main plan for the future is to carry out my masters in the Analysis of Pharmaceutical Compounds at UCC, where I'm looking at hopefully carrying out my industry placement and research project in The Netherlands. After that I'm really not sure! Juggling between the options of going into industry or looking at PhDs is definitely something I'm going to have to put a lot more thought into over the next year

A Visit to Ireland's First Science Studio at UCC

FreeHydroCells members from the UCC Academy team paid a visit to the new Kane Science Studio facility in UCC's School of Chemistry, to learn more about the future of science communication. Designed to be both a state-of the-art media studio and a fully working science lab, it offers a dynamic way to share scientific knowledge through technology and media.

Equipped with 4K cameras embedded in ceilings, walls, and workstations, the studio allows viewers to watch experiments from multiple angles for an immersive, interactive experience – "Think MasterChef for Science," remarked studio head Dr. Eric Moore, who has hosted live experiments and TV crews in fields as diverse as Chemistry, Biology, Food Science, and Engineering.

The lab's design encourages accessibility and is soundproofed to reduce background noise, enhancing the recording quality for audiovisual content.

In just a short visit, we glimpsed the potential this studio has for transforming STEM education and research communication.

Read more here!

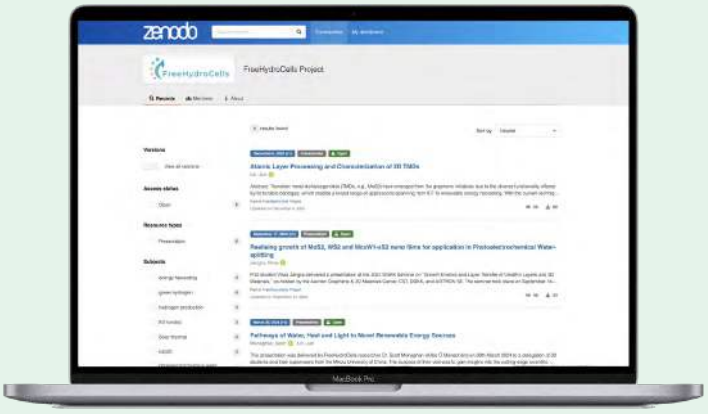
FreeHydroCells members from UCC Academy with Dr Eric Moore (right) at the Kane Science Studio. From left: Rebecca Buckley, Jennifer Browne, Anna Power, Abhisweta Bhattacharjee

Research & Publications

FreeHydroCells is committed to open science, sharing our results and findings with as broad an audience as possible. All our publications are freely accessible and published as open access articles at either gold or green standard.

Check out our Zenodo page, where all our research publications and data are stored in an open-access data repository to enable others to access, exploit, reproduce and disseminate them in the future.

This repository is validated as Open Access by OpenAIRE, with an associated OpenAIRE project page.



Get in touch

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