

## UNEP GEMS/Water Capacity Development Centre Newsletter

January 2022 – June 2022

June 2022

Dear friends and partners of the UNEP GEMS/Water CDC,

Summer is upon us in Ireland, and we are sending you an update of our activities for the first six months of 2022. Like always, it has been a very busy time! Some highlights of the past months include:

- Successful conclusion of the 3<sup>rd</sup> annual global meeting of the World Water Quality Alliance (WWQA), at which the CDC presented updates and contributed to strategic planning and future directions of the Alliance.
- The official launch of the WWQA Capacity Development consortium (CDCm— of which the CDC is currently chair), during the first in-person meeting between GEMS/Water partners since 2020 at the Joint Research Centre in Ispra, Italy, in early May.
- The launch of a range of free courses on the UNEP eLearning platform in January, which has generated a lot of interest.
- The publication of a pamphlet detailing the history of GEMS/Water (covering the first 50 years anyway!) written by a group of people who were directly involved during that time and drove GEMS/Water to the global programme it is today.
- Conclusion of projects including the Erasmus+ water project with a final meeting in Canada.

Our PGDip students are now concluding their first year and are currently in the final stages of completing the third module of their course on water quality data analysis and management. Our current MSc students are approaching their thesis submission deadlines after an intense year, with some incredible projects from across the world.

As usual at this time of year, our Continuous Professional Development (CPD) courses are now open for application (closing the 31<sup>st</sup> of July – so hurry if you are thinking of applying!). Planning and organisation of our annual summer schools is also well underway for this August and October, stay tuned to our website as details will be released there shortly.

During this period, we are also very happy to announce an expanding team, and new staff members have joined the CDC – welcome Clara, Carlos, and Tadgh to the team!

This issue (and future issues) of our newsletter will now also include an update from some of our alumni; this edition features Jeremiah Asumbere. Jeremiah updates us on what has been happening in his part of the world and how things have been going since he completed his training at the CDC.

As always, we hope all is well with you and yours, and may your rivers continue to run deep and clean!

CDC Director Dr Tim Sullivan,  
on behalf of the UNEP GEMS/Water Capacity Development Centre Team.

## Meet the UNEPGEMS/Water Capacity Development Centre Team



**Timothy Sullivan**

**Centre Director:** training and advice in freshwater quality, monitoring and assessment.



**Deborah Chapman**

**UNEP GEMS/Water CDC Ambassador:** honorary position and advisory role.



**Aoife Nagle**

**Project Coordinator:** administration, project, and Analytical Chemistry support for the GEMS/Water CDC.



**Lucía Hermida González**

**Programme Coordinator:** developing and running our training courses, including the on-line CPDs, PG Diploma and MSc in Freshwater Quality Monitoring and Assessment.



**Clara Felberbauer**

**Part-time Research Assistant:** supporting UNEP GEMS/Water CDC project work.



**Carlos Chique**

**Postdoctoral Researcher:** providing advice and support on freshwater monitoring.



**Chinelo Nzekwe**

**PhD candidate:** comparative analysis of heavy metal contamination in freshwater bodies in Europe and Africa using Nigeria and Ireland as case studies. *Supervisors:* Timothy Sullivan & Deborah Chapman.



**Tadhg Moore**

**Research Support Officer:** designing, developing and publishing online training material for GEMS/Water CDC.

The UNEP GEMS/Water Capacity Development Centre Team is based in the Environmental Research Institute, University College Cork, Ireland and works closely with our colleagues in the UNEP GEMS/Water Data Centre at the Federal Institute of Hydrology, Koblenz, Germany and the UNEP, Global Programme Coordination Unit in Nairobi, Kenya.



## New faces: Staff and personnel changes

We are excited to welcome our new members of staff who have joined the CDC team since the start of the year. Tadhg Moore, former UCC Environmental Science graduate, has joined us from Virginia Tech. In his role as a research support officer, he is developing online learning materials for our students. Carlos Chique is supporting the CDC with his strong expertise in Environmental Science, Geography and Aquatic Ecosystems as a postdoctoral researcher. Clara Felberbauer, another UCC Environmental Science graduate, is supporting UCC GEMS/Water as a Research Assistant while completing a Masters programme. We are delighted to welcome our new team members and looking forward to working with them!

## World Water Quality Alliance – 3<sup>rd</sup> Annual Global Meeting – January

The World Water Quality Alliance (WWQA) is a voluntary global multi-stakeholder network advocating for freshwater quality, exploring, prioritizing, and communicating water quality risks and advising solutions. This year's 3<sup>rd</sup> Annual Global Meeting of the WWQA was held under the theme: 'Data to Knowledge, Knowledge to Action'.



The meeting aimed to present ongoing work products contributing towards the World Water Quality Assessment that will be shared on the UNEP World Environment Situation Room (WESR) as the main portal to update UNEP Member States towards the World Water Quality Assessment and WWQA workstreams contributing to this. Other topics discussed include the role and requirements of *in-situ* data from GEMS for WWQA community, as well as identification of emerging topics of environmental and socio-economic concern for water quality and futures strategic planning.

The importance of action for climate, nature and pollution action was highlighted, as well as the role of GEMS/Water for the science-policy intersection and digital transformation as opposed to being solely focussed on data outputs.

Ongoing work on citizen science projects was presented, which is aiming to enhance data quality while also involving local communities. Citizen science, as well as water quality monitoring, modelling and Earth Observation, will also play a role in a series of workshops that are organized as a collaboration of the World Meteorological Organization (WMO) with GEMS/Water, the WWQA and other UN agencies. The establishment of a Water Quality Data Hub as a platform easily operable for all stakeholders and including satellite observation data, modelling and citizen science data was discussed.

2022 is the year of groundwater. GEMS/Water currently hosts data on groundwater and intends on increasing cooperation with experts from the WWQA's Friends of Groundwater (FoG). (Keep an eye out for the upcoming GEMS/Water technical guidance document on monitoring groundwater publication is now imminent!)

A brief update was given on the Capacity Development Consortium (CDCm), the collaboration between UCC GEMS/CDC and the WWQA. UCC efforts towards developing an online platform for demand and supply of capacity development programs were presented.

## Environment Ireland Conference – January

UNEP GEMS/Water CDC Ambassador Dr Debbie Chapman gave a global perspective on "Water Quality Monitoring and the Impacts of Pollution" at the annual Environment Ireland conference, which was again held on-line in January 2022.



## Recommendations to mainstream citizen science in policy – January

[ACTION](#), a participatory science toolkit against pollution program, is dedicated to transforming the way citizen science is conducted from a science-led approach to a more inclusive, citizen-led one. It was implemented through cooperation of third-level institutions with 16 on-the-ground citizen science projects targeting environmental pollution. The program had a duration of 3 years and ended in January 2022.

Dr Debbie Chapman of UNEP/GEMS CDC continued her engagement with the ACTION project by contributing to the development of the report on recommendations to mainstream citizen science in policy. Read the recommendations [here](#).



## Water – ForCE (Water scenarios for Copernicus exploitation) - February

The "Water scenarios For Copernicus Exploitation" (Water-ForCE) consortium aims to improve the accessibility and services of Copernicus satellite data for water related products such as water quantity and quality.

Dr Deborah Chapman, Ambassador and former Director of UNEP GEMS/Water CDC, presented on [SDG6 Clean water and sanitation](#). - approaches to global water monitoring. Watch her webinar presentation [here](#).



## World Water Day – March

To mark the celebration of World Water Day 2022 and draw attention to the importance and issues around water quality and quantity, the UCC Quad was lit up in blue lights during the evening of the 22<sup>nd</sup> of March.





## New free courses on freshwater quality monitoring at UNEP E-learning platform – March

UNEP and GEMS/Water have launched four new Open Access courses on available on UNEP’s eLearning platform (<https://elearning.unep.org>). Topics cover the basic principles of freshwater monitoring and are aimed to make this knowledge more accessible. The following courses are now available:



[Freshwater Quality Monitoring Programme Design](#)



[Quality Assurance for Freshwater Quality Monitoring](#)



[Water Quality Monitoring and Assessment of Groundwater](#)



[Water Quality Monitoring in Rivers and Lakes](#)

The courses are fully online and self-paced, with lessons distributed over 8 weeks. As students progress, they are able to self-evaluate their progress through a series of Multiple-Choice Questions (MCQs). A certificate of completion will be issued for achieving an overall score of at least 80%.

## The role of monitoring and assessment in improving water quality - SEUPB – April

Upon invite to Special EU Programmes Body (SEUPB) virtual workshop on Improving Water Quality in Transitional Waters/Cross-Border River Basins Evaluation, Dr Debbie Chapman gave a presentation on ‘*The Role of Monitoring and Assessment in Improving Water Quality*’.

Outline of presentation

- Definitions: Monitoring and Assessment
- The monitoring and assessment process
- Why monitoring activities fail to meet expectations
- Important considerations for transboundary monitoring activities

Photo credit: Adwoa Panfili, Water Resources Commission, Ghana

Dr Deborah V Chapman SEUPB workshop Improving Water Quality 4<sup>th</sup> April 2022

UCC University College Cork, Ireland  
UN environment programme  
GEMS Water



The partnership of the UNEP GEMS/Water CDC with the Erasmus+ WATER - ‘Work based Learning Paths in Water Management Project’ aims to exchange good practises for efficient and sustainable water resources management approaches and tools. Training visits of the project aim to exchange and innovate the educational programmes of participating countries, bringing in enterprises and research institutes.

The first two meetings of the Erasmus+ funded Water Projects took place in Bari (Italy) 2019 and in Valencia (Spain) 2021. For the final training visit in April 2022, Dr Lucía Hermida, Programme Coordinator of the UNEP GEMS/Water CDC, and Dr Michelle McKeown, lecturer in Environmental Science at the School of Biological, Earth and Environmental Sciences (BEES)/UCC, visited McGill University in Montréal, Canada.



Visit to McGill University, Canada (Photo L. Hermida).

During the visit, they gained in-depth knowledge on the idiosyncrasy of the city of Montréal, Québec. The Integrated Water Resources Management in Québec is extremely complex, with 40 different organizations as stakeholders, each with their own funding and projects. This organizational structure makes the management of Québec's water features – the large Lawrence and Ottawa river, six water treatment plants and several hydroelectric companies – a challenge. Further management challenges include dams, mining operations and lake eutrophication. The drinking water management of the city of Montréal requires the design of Intake Protection Zones (IPZs) to risk maps and repair optimization to avoid water quality deterioration. On an even bigger spatial and political scale, we were introduced to the International Joint Commission (IJC), the bi-national organization between Canada and the USA in the use of trans-boundary watersheds, which is rooted in the Transboundary Treaty of 1909.

Another focal point of the training visit was the relationship between water and people, and the integration of socio-hydrology into risk perception. On the last day of the visit, UCC representatives were introduced to the Water Rangers and their work with citizen science. The organization aims to help Canada’s water quality data deficiency by providing simple water testing kits to members of the public.

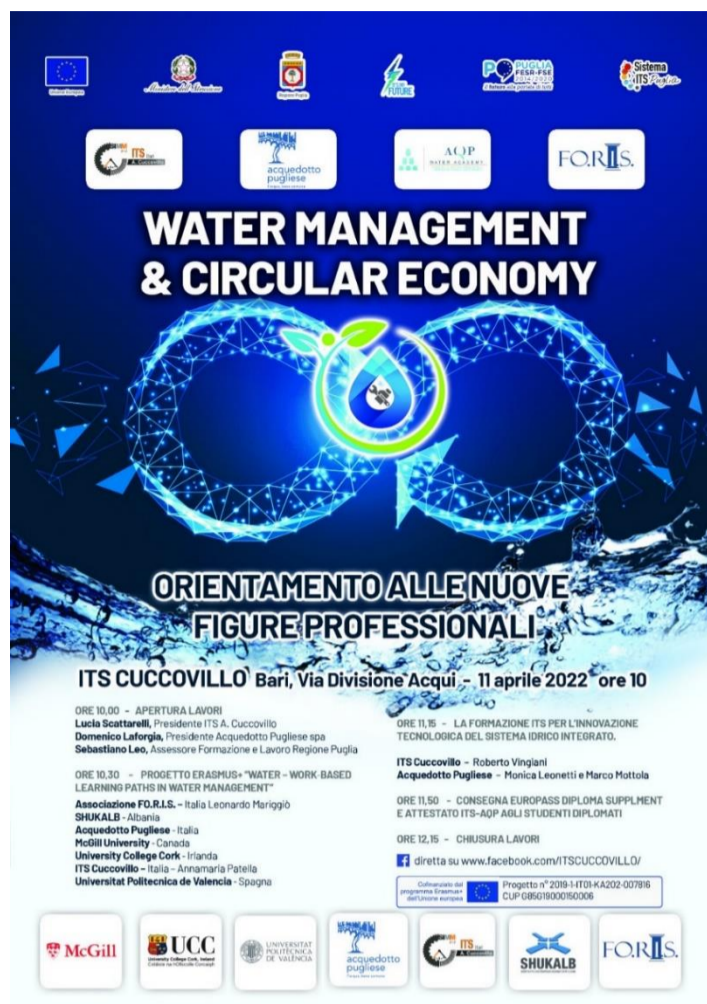


The Water Rangers provide water testing kits to members of the public to gather data on water quality (Photos L. Hermida).



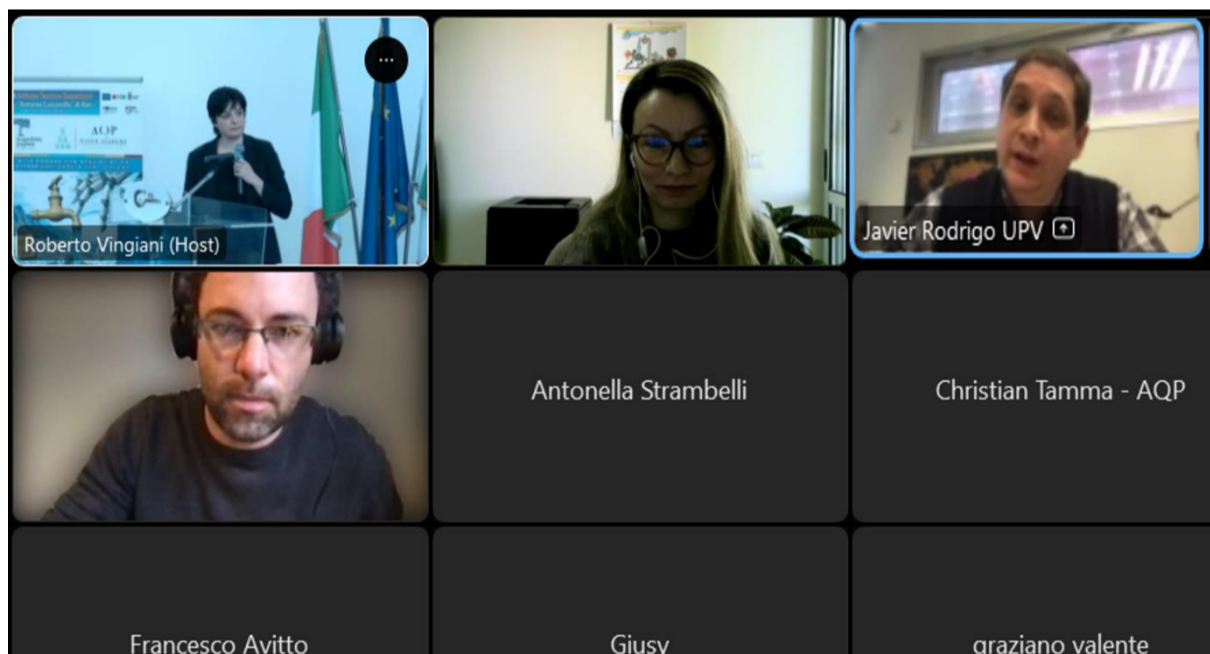
## Water management and circular economy – Erasmus+ Water - April

On the 11<sup>th</sup> of April, UNEP/GEMS Water CDC was invited to participate in the Water Management and Circular Economy conference as part of the Erasmus+ Water project. The hybrid event took place in Bari (Italy), in cooperation with Acquedotto Pugliese (AQP) and Fondazione Cuccovillo. During the event, we had the opportunity to introduce the Centre and its activities to an audience of stakeholders and students.



The conference also served as a platform for the dissemination of the lessons learned during UCCs participation in the Erasmus+ Project, as well as those of all other partners of the project. Apart from new competences required for water professionals, the event drew special attention to cutting-edge technologies for water management and the essential role of innovation in the water sector. Ways to utilize these innovations were discussed, in particular the use of big data to generate and interpret data and transform it into information that will support problem solving in the water sector.

As a result of the cooperation between the partners involved in the project, valuable synergies were developed. This multi-stakeholder approach is essential to understanding the needs of the water sector and increasing capacity development to meet demands and offer collaboration to achieve better and sustainable solutions for water management.



Some participants of the Erasmus+ WATER Project during the dissemination event on the 11<sup>th</sup> of April. From left to right and from top to bottom, Elena Romanii (Centoform, Italy), Elisabeta Poci (Shukalb, Albania), Javier Rodrigo-Illari (Universidad Politécnic de Valencia, Spain), Timothy Sullivan (UNEP GEMS/Water CDC, University College Cork, Ireland).

The UNEP GEMS/Water CDC greatly benefited from the training visits that took place over the duration of the project. Study visits and interaction with our project partners provided first-hand experience around Integrated Water Management, helping identify professional skills needed and knowledge gaps for water quality managers. Hence, new tools such as different software and case studies help closing the gap between third level education, research and industry by transferring this specific knowledge and skills to the courses offered by the UCC Centre.

The project highlighted the importance of a trans-disciplinary approach, the different spatial scales involved, as well as the impacts of climate change in water resources availability, and the connected social and economic impacts. Examples of these interconnected issues include increase in population, agriculture and industrialisation, the reduction of inflows in rivers, hydropower production, water conflicts, the risk of wildfires or loss of biodiversity.

## PhD Defense – May

On May 17<sup>th</sup>, PhD candidate Obaid Alharbi under supervision of Dr Debbie Chapman successfully defended his thesis on Emissions and Transport of Pharmaceutical Residues from three Wastewater Treatment Plants in Saudi Arabia and the Associated Risk for the Aquatic Environment. Hearty congratulations Obaid from all of us at the CDC!

At the time of writing, Irene O’Callaghan, under the supervision of Drs Timothy Sullivan and Dara Fitzpatrick has also successfully submitted her PhD thesis for examination – a huge step! Irene’s thesis is on biological monitoring of nanomaterials using macroinvertebrates in freshwater environments. Congratulations Irene!



**Joint research centre meeting ISPRA, Italy, and launch of WWQA Capacity Development Consortium - May**

The first in-person meeting between various GEMS/Water partners since the start of the Covid-19 pandemic was hosted by the Joint Research Centre (JRC) of the European Commission in Ispra, Italy, in early May. During this week-long meeting, important formal and informal strategic discussions took place on the future directions and priorities of GEMS/Water, including consolidation of the GEMS/Water workplan for 2023, the role of regional hubs in GEMS/Water, user-centric design, and social and societal engagement with water quality issues.

Having so many partners in attendance also provided an opportune moment for the official launch of the WWQA Capacity Development Consortium, which duly took place on Thursday the 12<sup>th</sup> of May 2022. This exciting initiative within the WWQA (an official workstream within the WWQA) aims to transform capacity development around water quality globally by developing a global Consortium of providers offering capacity development related to freshwater quality monitoring and management. The CDCm also provides a platform through which those seeking capacity development in specific topics related to water quality monitoring and management, and/or delivered in a particular style or format, can identify and engage with providers or collaborators. The draft of this platform and website are now well in hand and will be launched soon (stay tuned!). The aim is to provide a truly useful platform for national water agencies, water utilities, local governments, transboundary water bodies, NGOs, aid agencies, educational providers, water training institutes and researchers, etc. to both seek and offer capacity development products and initiatives related to water quality at a global scale.



*Joint research centre meeting ISPRA, Italy*

**GEMS/Water: A 50 year history - June**

At the 1972 UN Conference on the Human Environment in Stockholm, the newly established United Nations Environment Programme and the World Health Organization were commissioned to launch a global health-related water quality monitoring programme as part of UNEP’s Global Environment Monitoring System (GEMS). To mark the role of UNEP in encouraging and supporting global water quality, and as part of the celebration of 50 years of UNEP, a group of colleagues who have been involved since the inception of GEMS/Water got together to produce a brochure describing the history, role, achievements and challenges of the GEMS/Water programme. The brochure was released in early June and can be accessed here: [GEMS/Water: A 50 year history](#).



Since its inception, GEMS/Water, the water quality component of the Global Environment Monitoring System, has uniquely become one of the longest running operational United Nations programmes, initiated by four of its agencies, and supported actively by national partner institutions in their member states.

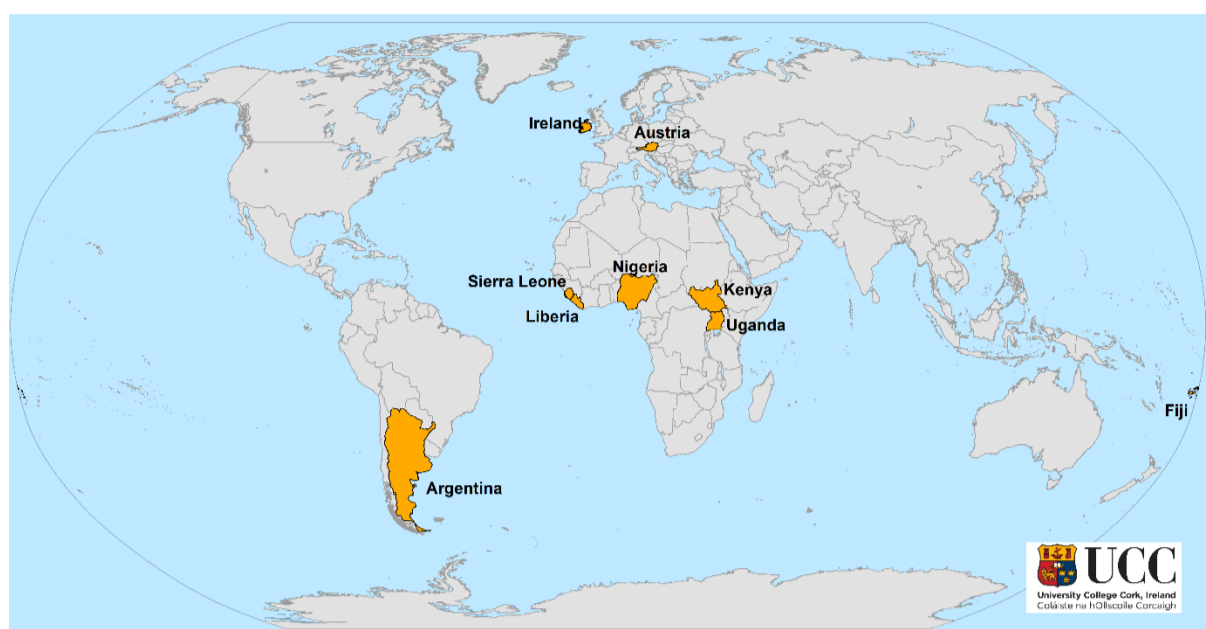




## Postgraduate Diploma (PGDip) and MSc in Freshwater Quality Monitoring and Assessment Continuous Professional Development (CDP) courses

Our new intake of students of the PGDip and MSc in Freshwater Quality Monitoring and Assessment is currently in Semester 3, in which they are learning about Data Handling and Presentation for Freshwater Quality Monitoring Programmes (EV6003). Our third-year students are in the final months before submitting their dissertation.

The students of the new intake of our short online Continuous Professional Development (CDP) courses are from Argentina, Austria, Fiji, Ireland, Sierra Leone, Uganda, Nigeria and Liberia. We are also happy to see former students who are back to continue studying with us.



Students from eight different countries to take CPD course.

The CPD students have finished their 12-week programme and received their certificates.

We are currently open for new applications; the deadline is the 31<sup>st</sup> of July. The new intake of students will start in September.

See below the complete information of the courses available:

- *Freshwater Monitoring Programme Design:*  
<https://www.ucc.ie/en/cpd/options/science/ev6012/>
- *Quality Assurance for Freshwater Quality Monitoring:*  
<https://www.ucc.ie/en/cpd/options/science/ev6013/>
- *Data Handling, Assessment & Presentation for Freshwater Quality Monitoring:*  
<https://www.ucc.ie/en/cpd/options/science/ev6014/>
- *Water Quality Monitoring and Assessment in rivers/lakes/reservoirs:*  
<https://www.ucc.ie/en/cpd/options/science/ev6015/>
- *Water Quality Monitoring and Assessment of Groundwater:*  
<https://www.ucc.ie/en/cpd/options/science/ev6016/>
- *Freshwater Quality Monitoring with Biota and Particulate Matter:*  
<https://www.ucc.ie/en/cpd/options/science/ev6017/>

You can find a link to the brochure for the short on-line, CPD, courses here:

<https://www.ucc.ie/en/media/research/watercapacitydevelopmentcentre/CPDShortCourses.pdf>

Application forms and more information of the courses is available at

<https://www.ucc.ie/en/gemscdc/onlinecourses/>

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### Alumni Stories

We are delighted to feature the work of our PGDip and MSc in Freshwater Quality Monitoring and Assessment graduate Jeremiah Asumbere. Applying the freshwater monitoring skills acquired during the courses, Jeremiah and his team local EPA embarked on an ambitious project to monitor freshwater quality and assess levels of pollution from small-scale mining activities ('galamsey') in Ghana. Their results will provide the necessary information to policy makers to set up the standards for soil and sediments in the area and inform further actions and management options of these freshwaters. You can read Jeremiah's full story [here](#).



Jeremiah Asumbere (CDC Alumni) and his colleagues from the EPA Ghana assessing pollution of freshwater bodies from mining activities (Photo courtesy of J. Asumbere).

## Publications

The CDC is actively involved in the latest research in water quality monitoring and assessment, and actively publishes in wide variety of formats each year. Below is a selection of publications for the current period.

Chapman, D.V. and Sullivan, T., 2022. The role of water quality monitoring in the sustainable use of ambient waters. *One Earth*, 5(2), pp.132-137.

Kenneth Irvine, Stuart Warner and **Deborah V Chapman** 2022. Section introduction: Human Pressures and Management of Inland Waters. In Thomas Mehner and Klement Tockner [Eds] *Encyclopedia of Inland Waters. Second Edition*, Volume 4, Elsevier, 1-8.

<https://www.sciencedirect.com/science/article/pii/B9780128191668002140>

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*With this we come to the end of our July 2022 newsletter.*

*It has been an exceptionally busy couple of months. Busy with students coming in and students finishing their MScs and degrees, busy getting our UNEP e-learning courses operational, busy wrapping up the Erasmus+ project and busy welcoming new members of the team. Not to forget, we have been meeting and making valuable connections with the JRC in Ispra, Italy, with Erasmus+ parties in Canada, with the World Water Alliance and numerous other partners online and in person.*

*And the months coming up surely will not find us bored, here is a couple of things to look forward to: MSc students graduating; the Groundwater Handbook, which is in its final state; our summer school in collaboration with Fiji; as well as the upcoming continuous professional development course (deadline July 31<sup>st</sup>).*

*In this sense we are looking forward to the months ahead and as always thank you for your ongoing support and interest in the GEMS/Water CDC.*



*St Lawrence River, Montréal (Photo L. Hermida).*

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Our website address is:

<https://www.ucc.ie/en/gemscdc/>

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