IAHR Cardiff YPN Newsletter

A word from the president

Dear IAHR YPN,

Well it's been a strange year! I don't need to point out the obvious and refer to the unusual conditions we have all found ourselves in but looking back over 2020 I am really proud to see all that we have been able to achieve in this new way of working. There have been online talks and competitions, new starters, VIVA successes, research visits and even a remote internship!

We hope that this issue of our newsletter will help to spread this sense of achievement and bring our network together to share and celebrate each other's successes.

During the past month, the HRC has welcomed some new PhD students and we hope you will join us in wishing them all the best for their time at Cardiff.

While we are happy to welcome a few new students, we are also sad to say goodbye to two of our dearest members.

Our congratulations on successfully defending your theses and all the best for your future!

We are looking forward to welcoming everyone back in 2021 by kicking off the new year with a catch-up meeting and our IAHR YPN committee elections in **January**! If you are interested in joining the committee or would like to learn more about who we are and what we do, please come along, we'll send out a link for the meeting closer to the date.

Thank you to everyone who has been a part of our activities this year, we are very much looking forward to when we can meet again in person! In the meantime, let's stay connected, continue to plug in to our academic and social interactions online and let us know how we can best continue to engage with you in the new year.

We wish you a wonderful Christmas and a happy new year! Stay safe and keep healthy**!**

Your YPN Committee

Contents

Committee

President:

Catherine Leech

Vice-President:

Stephanie Mueller

Secretary:

Giovanni Musolino

Social Secretaries:

Samuel Rowley

Nicolas Hanousek

Ceri Howells

Welcomes and Goodbyes

James Lofty

Project: *Synergy between microplastic and sediments within the aquatic system*

Hi, I'm James, I come from an Environmental Science background largely focused on the impacts of microplastic pollution to marine habitats. My project aims to gain to a fuller understanding of the transport and fate of microplastics in aquatic systems. This includes identifying the physical properties and natural mechanisms which govern behaviour, transport and fate of microplastics in the aquatic environment. This project will use the hydraulic flume facilities and field work to inform the development of numerical models and future environment policies that can reduce the flux of microplastics in the environment.

Fawaz Mohammed Alzabari

Project: *Large Eddy Simulations of leaky barriers for natural flood management*

My name is Fawaz Mohammed Alzabari, I am from Saudi Arabia, I studied my master's degree in Cardiff University in the field of civil and water engineering. Therefore, I found it so interesting to pursue my studying in the same university under the supervision of Dr Pablo Ouro after a brief discussion of some suggested topics. I am now in the first year of my PhD journey working with amazing group under the scope of Natural Flood Management.

Guglielmo Sonnino Sorisio

Project: *Fish swimming dynamics and behaviour around fish exclusion screens*

I obtained an MEng in Mechanical Engineering from Cardiff University and have then gained a studentship with the GW4 FRESH CDT. The main focus of this PhD will be on investigating the effects of fish exclusion screens used in many rivers and the swimming dynamics of the fish. The effects of different types of screens and flow conditions such as velocity and turbulence on the fish will be studied experimentally. It is extremely important to protect these freshwater ecosystems as the number water abstractions and discharges in our rivers is set to increase and to understand how to facilitate the migration of fish to avoid further population declines.

Congratulations!

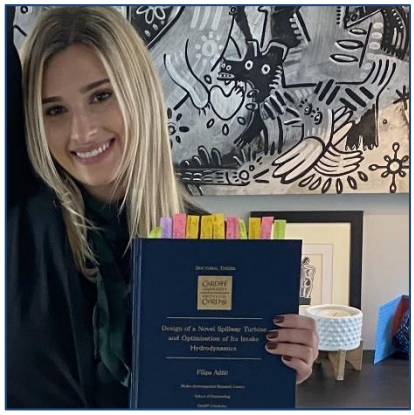
Elizabeth Follett

Congratulations to Elizabeth who has been awarded a prestigious Fellowship! Elizabeth is a Royal Academy of Engineering-Sêr Cymru research fellow investigating the physical processes by which wood jams and vegetation affect flow and particle transport. This year, her research demonstrated that large wood jams composed of many logs, branches and leaves can be modelled as a porous structure, with loss of momentum within the jam described by the scale of individual solid elements and the number of elements per bed area, an adaptation of the model for drag in canopies. This enables prediction of the elevated water depth upstream of the jam and allows representation of logjams in hydraulic models, including jams containing leaves and fine material.

Pablo Ouro

Our sincere congratulations also to Pablo for being awarded a Dame Kathleen Ollerenshaw Fellow at the University of Manchester!

Filipa Adzik



I started my PhD journey in 2016, straight after I completed the MEng Civil Engineering course at Cardiff University. I would describe my PhD course as a wave which is a function of time. Sometimes you are on top and sometimes you are at the bottom of the curve and the important thing is to persevere through the times when nothing is going right. Overall, my PhD was a positive experience, and I am glad that I didn't give up at times I doubted my abilities. Colleagues and friends that I met during my PhD in Cardiff made my time there fun and interesting and I am very thankful for their continuous support. I have passed my viva with minor corrections and started a postdoctoral research assistant job at UCL.

Jingjing Xue

I would say I benefit a lot during the years at HRC Cardiff University. My supervisors delivered me with professional knowledge and learning skills. The staff in the Finance and Research Office supported me with solutions when I met the study-related problems. My lovely colleagues and friends always share with me their experiences and encouragements.

With these skills and confidence in mind, working in the Industry (Intertek) is very smooth and efficient. Transferrable knowledge and capabilities can be fully applied to solve real-life problems. Besides, I just want to share with you that the struggles in writing papers and thesis provided me more confidence and capabilities and helped me understand that it will pay off in the end.

Seminars

IAHR YPN seminar series

With great thanks for the financial support provided by WISE and the CU Doctoral Academy, we were able to begin the new year with our seminar series "*Understanding water issues in a rapidly changing world*". Since the start of the year we have held monthly seminars tackling current water-related issues. We were grateful to host several WISE students as well as guest speakers from NRW, Welsh Water and JBA.

The pandemic meant that the remainder of our 2020 seminar series had to be moved online. In conjunction with the GW4 Water Security Alliance "*Research Rendezvous*" we were really pleased to be able to continue our talks with an even larger audience than usual.

Thanks to everyone who attended and/or spoke at these events. Please get in touch if you have any ideas for topics or speakers for future events, or indeed if you'd like to present yourself!

Seminar 1:

Innovation in Water Quality

The first of our seminar series in 2020, held jointly with WURI, saw representatives from different areas presenting on Water Quality. Claire Scannel from Welsh Water share her experiences working in "Water Regulation" which harmonised with the work of Zara Vasanji who presented her research looking at "Emerging Contaminants". Cardiff University Professors Devin Sapsford and

Rupert Perkins offered perspectives on "Wastewater as a Resource" and "Whole Catchment Management." These talks lead to some really interesting discussions on water quality as a whole system issue and ways in which this can be addressed.

Seminar 2:

Natural Flood Management

Our second seminar discussed the wide range of natural flood management (NFM) techniques. We were happy to welcome two guest speakers from JBA - Steve Rose and Barry Hankin – to deliver a half day seminar in which they presented the different NFM measures applied within the catchment regions and their latest work. Following the seminar, YPN members, Elizabeth, David and Stephanie provided an overview about their research conducted at Cardiff University, showing results from field work conducted at Shropshire as part of the "Slow the Flow Shropshire" project, sediment transport, hydrodynamics and fish behaviour experiments.

Seminar 3:

Water and the Consequences of Climate Change

The first of our "*Research RendezVous*" was a truly interdisciplinary event, with talks from Sam Varvastian (School of Law and Politics), Elspeth Pence (School of Earth Sciences) and Shunqi Pan (School of Engineering). It was really interesting to hear different perspectives of the impact of climate change on the world of water, considering climate change litigation, the effects of ocean acidification and climate projections for sea level rise.

Seminar 4:

Flood Risk: Monitoring and Modelling

For the second of our online seminars we were joined by Simon James from Natural Resource Wales and Lina Stein from Bristol University, to learn about flood hazard modelling and understanding catchment influences on flood generating processes. Unfortunately, technical difficulties meant that we missed out on hearing from our very own Giovanni Musolino but you can find publication of his latest work on "Mapping the danger to life in flash flood events adopting a mechanics based methodology and planning evacuation routes" on research gate.

This session was concluded with a water themed pub quiz! YPN social secretary, Nick, was very narrowly beaten in the final round by James Rand from Bristol University. Bonus points were awarded for comedy answers including the best response to the question: "In Harry Potter, what words are used for the spell to create water?" *Aqau-cadabra!*

Seminar 5: Coastal processes

Before the summer recess we heard from another guest from Natural Resource Wales. This time Nicola Rimington shared with us on the role of coastal processes in sustainable coastal management, a theme that was complemented by research presentations from WISE student Cristina Corti (Exeter) and Ollie Foss (Bath).

Placements and research visits

Research placement

By Nick Hanusek

I am currently undertaking a Researcher role, carrying out a numerical modelling study for the Liverpool City Region. A selection of tidal range scheme proposals for the area are to be modelled, to ascertain project viability and potential impacts. This work is being carried out using a combination of Telemac2D and 0D models, and will run from November 2020 to February 2021.

Short research visit at Warwick University

By Stephanie Mueller

As part of our collaboration on a joint experiment on fish swimming kinematics in the wake of an oscillating hydrofoil, I had the great opportunity to visit Warwick University's School of Engineering to learn how to visualise the flow field using Particle Image velocimetry (PIV).

UKRI Policy Internship – Government Office for Science

By Catherine Leech

The UKRI Policy Internships Scheme offers the chance for doctoral students funded by UKRI funding councils to work for three months in a policy organisation. Having gained a position at GO-Science last year, my actual placement looked much different than how I had imagined it!

In my 3-month internship I worked with the Science Network and Chief Scientific Advisers Capability Team (Team SNaCC!) at the Government Office for Science (GO-Science). Go-Science supports the Government Chief Scientific Adviser (GCSA) in ensuring that the government has access to the best scientific evidence to inform policy. This includes making sure that all departments have access to the right people, resources and scientific infrastructure to support their work.

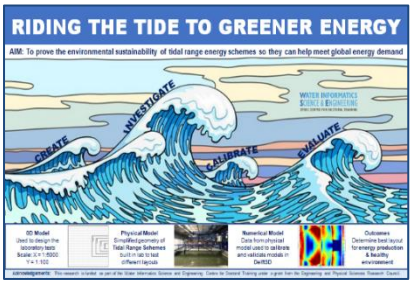
It was an exciting time to be working at GO-Science with my time their coinciding with the conclusion of working groups looking at Areas of Research Interest for Building a Resilient Britain post-Covid, the submission and evaluation of departmental bids for the Government's Spending Review, as well as the ongoing work of SAGE providing evidence and advice in the face of the Coronavirus. I was able to engage in really diverse tasks at a very fast pace and know that my confidence has grown through this work as well as my problem-solving skills and ability to distil key information under tight deadlines.

Although the pandemic meant that I had to work from home for the duration of my placement instead of in Central London, technology meant that I was able to engage effectively with the SNaCC team and I really enjoyed being part of such a dynamic and motivated team. It exceeded all expectations and I would recommend the scheme to anyone who is eligible to take part for providing an opportunity to learn about science in government and offering a different perspective to our work in academia by applying research in a different way.

Conferences & Awards

IWA Twitter Poster Competition – award for best interaction

By Catherine Leech



During the first lockdown it was easy to feel isolated from the rest of the academic community and one way in which I stayed engaged with others was to take part in a number of online competitions! In the IWA YPN poster competition on Twitter, I summarised my research in a single slide to then engage with other academics over a 24-hour period to answer questions about my work.

I was thrilled to win second place, a prize awarded for "Best interaction", communicating with many other participants during the day to ask and answer questions. It was a really fun event to be part of and I met researchers from really diverse disciplines all from the world of water.

General Assembly 2020 of the European Geosciences Union (EGU)

By Nefeli Makrygianni

This year I had the chance to participate in EGU2020. Like many other events EGU became virtual this year. Presenting and explaining your poster in a text box of course was not ideal. As in many other occasions missing the real-life contact and talking to 3-dimensional people, made everyone a bit "awkward". However, presenting my work in such a big event and talk in a (virtual) room full of experts in my area, it was maybe the most exciting thing in this year.

Another positive result due to its virtual form, was that in this year's conference as much people as possible had the chance to participate, from their home universities or institutes. In my opinion the most important outcome of it was that EGU2020 made possible the exchange of scientific ideas and knowledge even during a year that travelling a meeting people was not an easy task!

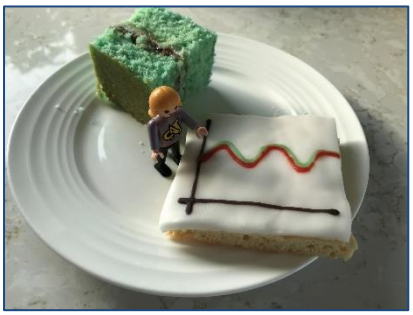
International Workshop of PhDs on Anadromous Salmonids

By Stephanie Mueller

In March 2020 I travelled to Laugarvatn, Iceland to take part at NoWPaS to meet and engage with other PhD students and post-docs working on anadromous salmonids. I presented my work on the "*Impact of anthropogenic structures on fish swimming kinematics and passage*" where I explained my experiments analysing fish response to leaky barriers and vertical axis turbines. It was a great opportunity to meet researchers working in the field of conservation ecology, learn about the latest techniques in fish tracking and current issues related to fisheries management and sciences. It was a beautiful week exploring some of Iceland's greatest sites covered in snow.

WURI Bake your PhD Competition

By Catherine Leech



Another online competition, this time a very tasty one from Cardiff's own Water Research Institute. Participants were asked to present their research in cake! "Bake Your PhD" was a really creative way of sharing research, somewhere between Images of Research and the Great British Bake Off!

I baked a blue vanilla sponge to represent the tidal basin that I use for my experiments and then plotted graphs on shortbread biscuits showing how I calibrate my computational model with my physical results. It was delicious, even if I do say so myself, and took second prize on the day, losing out to an astounding cake of a beaver autopsy!

1st IAHR YPN woman's coffee chat

By Stephanie Mueller

In September, the 1st IAHR young professionals woman's coffee chat was organised by the IHAR task force on strengthening gender equality and Dr Isabella Schalko (MIT) to discuss how to develop sustainable mention relationships and bring together young professionals woman. While guest speaker Prof Heidi Nepf (MIT) and Dr Ellis Penning (Deltares) shared their experience on establishing an academic support network, the small group of participants had the opportunity to ask questions in an informal environment about career development and networking.

PRIMaRE Conference

By Valentine Muhawenimana


PRIMaRE

World-class research and technology transfer in marine energy

Journal of Marine Science and Engineering

Engineering and Physical Sciences Research Council

PRIMaRE 7th CONFERENCE

Plymouth 2020

This certificate is awarded to

VALENTINE MUHAWENIMANA

3rd Place Prize for the Poster

Hydrodynamics of two closely spaced vertical axis turbine wakes

PROFESSOR DEBORAH GREAVES OBE FICE MRINA

24th July 2020

The 7th PRIMaRE Conference took place online on 7-8 July 2020, and was hosted by University of Plymouth and Plymouth Marine Laboratory. Invited speakers and participants from all over the world delivered excellent oral and poster presentations, as well as panel discussions on a variety of research topics on renewable energy and the marine environment.

Our team: V. Muhawenimana, S. Mueller, P. Ouro, and C.A.M.E. Wilson had the opportunity to deliver a poster presentation entitled "*Hydrodynamics of two closely spaced vertical axis turbine wakes*" about our experimental work on vertical axis turbines, and won the third place poster prize.

1st IAHR Young Professionals Networking Congress

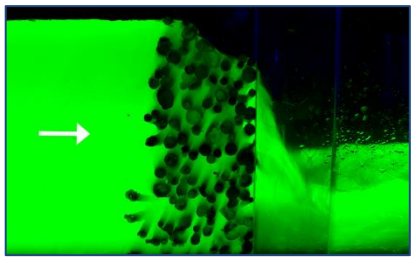
By Stephanie Mueller

This year, the 1st IAHR YPN congress took place, aiming to provide mentoring and networking opportunities with representatives from the different IAHR technical committees and participants from YPNs around the world. In a 2-page extended abstract and 3-5min poster presentation participants had the chance to make their work known and receive feedback and questions from mentors, presenters and attendees. I took the opportunity to present my current work on fish tracking in the wake of vertical axis turbines during the Ecohydraulics sessions chaired by Gregory Pasternack (USA), Goh Hui Wend (Malaysia) and Roser Casas-Mulet (Spain). It was a great way to get to know some of the leading researchers and young professionals in this area. I can really recommend this event and hope to see you at the next congress!

RiverFlow, APS DFD Annual meeting and AGU

By Elizabeth Follett

Elizabeth presented research results at RiverFlow 2020, American Physical Society-Division of Fluid Dynamics Annual Meeting, and the American Geophysical Union Fall Meeting. She is looking forward to developing as a researcher and growing her research group through the opportunities offered by recently successful funding bids, improving understanding of the underlying mechanisms by which large wood and vegetation affect flow and sediment transport in order to improve the design and assessment of natural flood management projects and restoration interventions.



Side view of flow through channel-spanning jam (Follett et al. 2020, *Geophyiscal Research Letters*)

GW4 Water Security Alliance Annual conference

By Stephanie Mueller

In early November, the GW4 WSA annual conference took place online, providing participants the opportunity to learn about the research conducted across the four Universities. Alongside Dr Liz Holcombe (University of Bristol) and Dr Lee Bryant (University of Bath), I had the great opportunity to present our research group's work on leaky barriers used for natural flood management in the session "*Integrated Natural and Engineered Water Systems*" chaired by Thorsten Wagner.

Socials

Research Culture Improvement Project

By Nick Hanusek

Alex Washbourne, a PhD student in Engineering organised multiple social events with the intention of improving interdepartmental links around the school of engineering. The first of these was at the Pipes brewery in Pontcanna, despite a cold Welsh evening around 20 researchers attended and enjoyed local craft brewing with vegan pizzas. A second event was held in February at Blue Honey Local on City Road. This was also well attended, with the proximity to the department allowing people to drop-in on the way home. Both events were attended by multiple members of the IAHR-YPN and we hope to collaborate with Alex in his future events, once lockdown allows.

Severn Bore Trip

By Catherine Leech

It was great to be able to carry out our planned trip to see the Severn Bore in the spring. It was so close to the start of the national lockdown that it was brilliant to have been able to enjoy dinner together and experience the phenomena of the tidal bore on the River Severn even in the rain!

Christmas market meet up

By Stephanie Mueller

After a long break, we were finally able to meet again in person! At the beginning of December some of our members came together and met up at the Cardiff Christmas marked to start (of course in a social distanced manner) into the festive season. After a wander around the light installations inside the Castle, we sat down in one of the numerous huts in front of it with mulled wine and food from different booths. We wish everyone who could not join us a wonderful Christmas and a happy new year!

My View from Lockdown

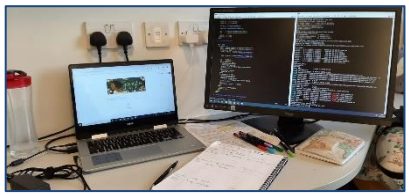
We'd love to hear about what you've been up to during lockdown! Email or tweet us the view from your new working environment!

Nick Hanusek –

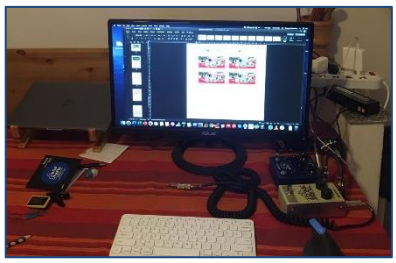
Alongside Bikash Ranabhat, I had been doing some work assessing the performance of the Cardiff Turbine (CarBine). My part of the project was to use Smoothed Particle Hydrodynamics to represent the turbine in both 2D and 3D flume environments, allowing us to assess the impact of various design changes such as number and configuration of blades. This work was accepted for presentation at the IAHR European congress in Warsaw, and the DualSPHysics user workshop in Barcelona. However both have been delayed due to the coronavirus pandemic. I hope to continue this work in the future and to be able to present it when the situation allows.

Catherine Leech – This year I was able to carry out an internship 100% remotely and I've also been working on calibrating my numerical model with the results from my physical experiments from right before lockdown.

Nefeli Makrygianni - I've been making adjustments to my code & compiling plots & I also got to present at EGU online!



Giovanni Musolino – During lockdown I moved back to Italy to be with my family and to write up my thesis. I've started a new job during this time and am really pleased to have my work published in the Journal of Flood Risk Management.



Sam Rowley -

I had hope to go on a 3-month research visit to China this year but in lieu of a trip to China, I did manage a trip to Caerphilly on my bike. In the somewhat more academic realm, I have been able to attend many online seminars and conferences, including the virtual Flood and Coast 2020 series. I was also able to present a short flash talk of my work at the GW4 WSA PhD Conference. In addition to my duties as Social Secretary of the YPN, I have joined the Early Careers team at the Water Research Centre. One of our very successful lockdown projects has been a series of virtual documentary discussions, bringing together experts from across fields and countries to discuss the latest video journalism in hydro-environmental science. My own work on flood modelling and risk analysis has continued to progress over the year. I have rebuilt from the ground up my model of the River Severn, which now includes the Stour river and Dowles Brook, and I am extending the model down to Worcester. My existing results already show good agreement with satellite flood measurements, and I am hoping to repeat this success downstream.

Publications 2020

Dr Reza Ahmadian and Nick Hanousek have co-authored a short section for the British Hydropower Asosciation's Tidal Range Alliance working group newsletter "Spotlight" under the "We're new here" section, introducing the Hydro-environmental Research Centre. We hope that this will expand our network and create research opportunities with other professionals with an interest in tidal range energy projects in the UK and overseas.

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Musolino, G., Ahmadian, R., Xia, J. & Falconer, R. A. (2020) "Mapping the danger to life in flash flood events adopting a mechanics based methodology and planning evacuation routes." *Journal of Flood Risk Management* 13 (4), e12627. Doi: 10.1111/jfr3.12627

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