

EPSRC & NERC InDustrial CDT for Offshore Renewable Energy

Project Case Studies







Engineering and Physical Sciences **Research Council**



Page

| 1 | -4 |
|---|----|
| | |

Introduction with case study from Wini Obande - IDCORE

2021 Cohort

| 5-6 | Ailsa McMillan |
|-------|------------------------|
| 7-8 | Bryn Townley |
| 9-10 | Demitri Moros |
| 11-12 | Eve Andrews |
| 13-14 | Hannah Mitchell |
| 15-16 | Ione Smith |
| 17-18 | Jonathan Glaspool |
| 19-20 | Katie Smith |
| 21-22 | Nian Liu |
| 23-24 | Prokopis Vlachogiannis |
| 25-26 | Tara Alkubaisi |
| 27-28 | Tom Summers |

FloWave HydroWing EDF Energy SSE Renewables Frazer-Nash Consultancy FastBlade Mainstream Renewable Power FloWave Mocean Energy EDF Energy Scottish Power Energy Networks

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www.idcore.ac.uk

HydroWing

2020 Cohort

29-30

Simon McLaughlin

Seiche Marine Acoustic Solutions

Introduction

The Industrial CDT for Offshore Renewable Energy (IDCORE) is a collaboration between the Universities of Edinburgh, Strathclyde and Exeter: a Centre for Doctoral Training, that delivers a unique training model – one year of in-depth courses that prepare all the students to deliver a three-year company-based research project directly for the offshore renewable industry partners who sponsor them.



This document brings together a series of individual case studies of the students primarily in IDCORE's 2021 cohort. It follows on from a similar document produced last year covering the 2019 and 2020 cohorts and draws on interviews with each of the students but also with a wide cross-section of their academic and industrial sponsors.

Rationale

A sector with the level of diversity found in offshore renewables really lends itself to commercially focussed research, and IDCORE's unique approach has been shown to deliver significant industry-relevant outcomes.

The fast-moving nature of the sector puts the students on the 'cutting edge' of developments. They can exploit opportunities, taking advantage of the freedom and flexibility offered by a research project, whilst delivering outputs that add considerable value to their sponsors by responding to their needs.

Seeing the results of their work implemented in a commercial environment is an object lesson in how to achieve impact. It also exposes the students to the commercial risk in the sector but in a way that keeps them safe – having first-hand experience of a sponsoring company failing (as has happened to more than one IDCORE student) is invaluable life experience.

Training

Students, sponsors and academic supervisors alike all emphasise the value delivered by the initial training that the students receive. It is an intense experience, but the breadth and depth of knowledge the students gain is unrivalled. It is undertaken before the students are matched with their sponsoring company, and for many this has led to very different decisions about the project they have ultimately undertaken.

The risk with more standard approaches to PhD level training is that they provide detailed skill but lack context or impact and do not provide the educational experience that IDCORE delivers.

Support

IDCORE is a team effort with a clear emphasis on care and nurture. The initial training is designed to create strong bonds between the members of each student cohort, building a mutual support network that is seen as vital by the students as they join their sponsoring companies and throughout their research projects. This approach is valued by the sponsoring companies, who benefit from the knowledge and experience the students share with each other.

The sponsors also benefit from the joint approach to supervision between the three academic institutions involved, as do the students and the supervisors themselves. This multi-disciplinary approach to the provision of academic support ensures that the students and their sponsors can access a wide range of research competencies. It builds networks, supports the development of new supervisors, and is a very effective route for increasing engagement and knowledge exchange between the industrial and academic partners in IDCORE.

Destinations

The success of IDCORE means that it has been able to recruit a high calibre of students from diverse backgrounds. Because they undertake their research whilst also being actively engaged in the day-to-day processes within a company, they learn more than just the subject area, and graduate ready to take on more and greater challenges. They also graduate with a strong network of industry contacts developed through their projects and their work together as IDCORE cohorts. Many have gone straight into roles within their sponsoring companies, and most have gone on to have successful careers in the sector. Some have even come back to IDCORE as industrial or academic supervisors.

Benefits

Both the academic supervisors and the industry sponsors identified a range of other benefits they had derived from their engagements with IDCORE. In many cases the projects themselves have initiated new relationships and led to larger collaborations. They have demonstrated the industrial relevance of certain areas of research and in some cases have even kicked off whole new areas of application.

For some sponsors the relationship with IDCORE is being used to promote internal engagement with low carbon energy solutions. For others the engagement with IDCORE is a crucial part of their business strategy. The projects are seen as effective ways of filling knowledge gaps, using research to solve problems, and providing flexibility that enables new industry questions to be answered. In a number of cases IDCORE students have built models and developed tools that have proved invaluable and have even become new commercial products. IDCORE provides high calibre students who can come into the business, ring-fenced from day-to-day operations, allowing them to focus on delivering innovation.

There are also personal benefits. Supervisors from both academia and industry spoke of being energised and motivated by their relationships with the students. Their aptitude and enthusiasm is inspiring, and it brings a lot of job satisfaction to watch their journey to becoming research engineers and everything that goes with this – management capability, decision making, confidence, results and recognition.

Future

All the academic and industrial supervisors interviewed as part of this case study project said that they wanted to see IDCORE continue. There is a recognition, particularly within the academic community, that it will need to evolve and change to reflect the massive changes that are going on in the industry. However, it is making a difference - the needs within the industry that led to its creation haven't gone away. By breaking down barriers between industry and academia and demonstrating the value of academic led research focussed on industry needs, IDCORE is helping to accelerate progress towards the UK's net zero target.



Wini Obande

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About Wini

Wini is an early career researcher and an Elizabeth Georgeson Fellow in Sustainable, Multi- Functional Composites at the University of Edinburgh, where she is currently building a portfolio of advanced composites research focussed on industrial applications that support the circular economy. She has a particular emphasis on low-cost, lightweight composite materials derived from bio-based and recycled feedstocks and aims to reduce the reliance on virgin resources and minimise waste streams headed for landfills by adding value to end-of-life composite wastes.

Wini only recently joined the IDCORE supervision team in response to a specific request from one of the researchers who had a gap in her supervision team and recognised Wini's work as having direct relevance to her own project.

As I continue to build my own research career, I am keen to work with talented postgraduate research candidates and postdoctoral researchers from various engineering disciplines looking to work on sustainable composite materials and manufacturing, especially for energy-related applications. I was delighted when lone approached me and asked me to join her supervision team as it presented an opportunity to engage with closely aligned research within IDCORE. By creating a postgraduate research route that appeals to diverse cohorts who are as interested in working with industry as they are in an academic career, I believe IDCORE attracts high-quality, resilient and self-motivated candidates. I am delighted to be part of the team and it is having a positive influence on my own research.

Background

Wini started her engineering career at the University of Limerick in Ireland, where she obtained both BEng and MRes degrees, finishing her time there as a researcher in advanced polymer and composite materials at the Irish Composites Centre. She then moved to the University of Edinburgh where she completed a PhD in Mechanical Engineering and continued to build her experience as a postdoctoral researcher through a Supergen project that extended the research outputs of her PhD to tidal turbine blade applications. Alongside this, she delivered an industry-funded project exploring energy-efficient manufacturing processes that convert bio-based and recycled feedstocks into valuable processing materials.

Since securing the Fellowship, Wini has continued to build her research interests, focussing on circular material design and production across a range of industrial applications including a number that are related to the energy industry. It was her work on in-situ polymerisation of thermoplastic-matrix composites, and in particular her use of novel polymer blends, that made her such a good fit for the IDCORE project that she is now supervising.

Benefits of IDCORE

Wini is already seeing the benefit of engaging with IDCORE. The project is directly relevant to her knowledge and experience, and provides crucial research leadership experience. Not only that, but it is also helping to build the collaborations that are so important to someone seeking to deliver applied research in such a specialised field. The engagement is extending her network of industrial partners and also providing opportunities for collaboration with other leading academic institutions, which will be invaluable as she develops other funding proposals in the future.

Wini Obande

The drive to meet the UK's 2050 decarbonisation targets means a greater and greater reliance on offshore renewable energy. This reliance is not only creating tens of thousands of jobs but is creating a demand for the next generation of thought leaders in the sector. The IDCORE programme trains highly motivated STEM graduates and works with industry to deliver significant impact as well as building a community of research engineers. Broad multi-disciplinary training gives them the tools to tackle some of the toughest problems facing the sector. Consequently, I am immensely proud of the achievements of the IDCORE Research Engineers, whose projects are described in these case studies.

David Ingram, Director of IDCORE and Academic Supervisor, The University of Edinburgh

IDCORE is unique in the way that is sends whole cohorts out into the organisations that are leading the drive to deliver offshore renewable energy. Our researchers are making a difference, they are changing things. Perhaps the most satisfying part of my role is supporting their development in response to this significant inter-disciplinary challenge. There's nothing better than watching someone enter IDCORE saying "I am a biologist" and leaving saying "I am a research engineer, working in the offshore renewable energy sector".

Julia Race, IDCORE Co-Investigator and Academic Supervisor, The University of Strathclyde

Working with IDCORE gives us the opportunity to do something different, to carry out a programme of research that it is difficult to achieve as part of the normal operations of a consultancy business like Frazer-Nash. The applied research capabilities this partnership is unlocking are helping us to develop our strategy for engaging with the booming offshore renewable energy sector. We believe we have something unique to offer, but working with IDCORE allows us to research this properly, building the strength and credibility of the products we can bring to this market.

Nigel Pready, Frazer-Nash

I love the way that IDCORE brings a very necessary focus on outcomes for everyone involved – students, academics and sponsors like ourselves. The success of offshore renewable energy is having a significant impact on the shape and scale of our operations. We need to rise to that challenge with a response that is sustainable, embedding carbon accounting in all aspects of our business. What better way is there of doing this than by engaging with leading academic institutions in a process that gives us direct access to the pool of talent we desperately need to build a workforce that can deliver a net zero future.

Eric Leavy, Scottish Power Energy Networks





About Ailsa

After graduating, Ailsa had planned to take a year out to go travelling, but the COVID pandemic put an end to those plans. Instead, she spent the year working in a distillery alongside a group of engineers who were commissioning an anaerobic digestor. It was this, combined with her passion for mitigating climate change, and her experience on a final year undergraduate project on solar cells, that developed her interest in the renewables sector.

Along with providing a steady supply of highly effective members of our team, our relationship with IDCORE gives us the time and space to investigate issues of interest that we couldn't address otherwise. It is helping to improve our offer to clients, improvements which would normally be difficult to make in such a busy environment.

> *Tom Davey, Principal Experimental Officer, FloWave*

Working at FloWave

Ailsa's project is exploring how to extend the tank testing capability at FloWave to incorporate floating offshore wind, seeking to understand how tower stiffness can be scaled and the level of accuracy needed for effective testing. The project is currently focused on the application of hydrodynamic loads and the impact this has on nacelle accelerations. This links to the work of Anita Nunes Leite from the 2020 cohort who is looking at wind interactions. Ailsa is also going to be looking at other nacelle interactions, and ultimately her thesis will be made up of multiple areas of study rather than answering just one research question.

Ailsa is a Chemistry graduate from the Isle of Arran. She obtained her first degree from the University of Glasgow and applied to IDCORE as she wanted to use her science-based background in order to help accelerate renewables in line with Net Zero ambitions. She wasn't sure whether she wanted to do a PhD or to continue working in industry. IDCORE allowed her to do both, plus the training in the first year helped her to convert from Chemistry to Engineering without the need to take a Masters.

Ailsa also volunteers with a sustainability charity whose target audience is 18-30 year olds with little knowledge of climate change issues. She previously helped run a programme of 6 modules for the charity, organising events, securing speakers, and supporting action from the participants. She is currently involved in a strategic review of the organisation's aims and delivery approach.

Page **05**

Ailsa spends around 3 days a week at the FloWave facility, which is a supportive environment to work in. Everyone 'mucks in' to keep the facility operating, and she enjoys helping out with instrumentation calibration and supporting test programmes going through the facility. There is flexibility in the IDCORE agreement, which allows IDCORE researchers to spend up to six hours per week working on other projects for their project sponsors, creating real opportunities to learn more about the sector.

Tank testing is a skilled activity and initially relies on the support of others, but Ailsa is looking forward to being able to work independently in the curve tank. Her project is progressing well and she has already presented at a conference. She will soon be able to start collecting data from the physical model she is constructing. Delivering these results and presenting them at conferences will help to build the reputation of FloWave as a unique and versatile facility.

The IDCORE Community

There is a risk of undertaking a PhD becoming a lonely experience, but that's not an accusation you could make of being an IDCORE research engineer. The twelve people in Ailsa's cohort have become good friends and this has been one of the most positive aspects of being part of IDCORE. It helped with settling into Edinburgh in the first year, creating a ready-made network, and continues to provide important mutual support now that everyone is with their sponsoring companies, through a monthly on-line chat session and other ad-hoc engagements.

As part of her work, Ailsa has had to become well versed in the use of Open Fast, an open-source numerical code developed by NREL in the US. Others in her cohort are also using this code and Ailsa has been able to assist them as they have hit problems with it. Similarly, she has benefitted from being able to draw on their knowledge and experience of other areas relevant to her work.

As well as providing relevant qualifications, the first year of the IDCORE programme has helped me to understand the broader context for offshore renewables. It was a challenging year, but it has provided me with a toolbox of resources to refer back to. Coming from a non-engineering background can sometimes feel a bit overwhelming, however, the FloWave team are really supportive, and this experience has extended my knowledge further. Testing devices is developing my understanding of drive trains, towers, platforms, and even moorings – a breadth of knowledge that I know will increase my employability at the end of the programme.

Ailsa McMillan



Bryn Townley

HYDR WING

Why IDCORE?

Bryn first started to explore renewable energy during his first degree, an MEng in Mechanical Engineering at Swansea University. There is interest in the potential development of a tidal lagoon in the Swansea Bay area, and this meant that Bryn was able to study modules on both lagoon and tidal energy, as well as computational fluid dynamics (CFD) as part of his first degree. Coming to IDCORE allowed him to continue to pursue these interests to a deeper level but within the commercial context provided by an EngD.

It was a good choice. The teaching in the first year is well thought through, covering a useful range of topics, including a very interesting course in marine biology which takes place in Oban. The diversity of IDCORE's engagement with the offshore renewables industry has also meant that Bryn has been able to continue to develop his interest in wave and tidal energy systems. He is now working with HydroWing in Falmouth.

Time is flying by - it will not be long before my project will be finished and I'm not looking forward to that - I have been enjoying it so much. The initial scoping phase was difficult. I was given lots of freedom, but I soon realised that this also creates a risk of being too ambitious and taking on too much. I have had to learn to manage my own expectations alongside those of both the company and my academic supervisors. They have all been great, as have the others in my cohort, helping me to strike a good work-life balance, and I now divide my time between Edinburgh (where my partner lives) and Cornwall.

Bryn Townley

Why HydroWing?

As a relatively new developer, working to disrupt the sector and its more established incumbents with a new approach to tidal energy, HydroWing is an exciting place to work. It's a small company with great people, where everybody's work has impact and contributes to the company's development. Working there is providing Bryn invaluable experience of what it's like to work in a start-up. Doing this as part of IDCORE has reduced the personal risk of being part of an entrepreneurial enterprise at such an early stage in his career.

Page **07**

HydroWing are developing a multi-rotor tidal-stream energy device, and the opportunity to work on this technology was another attraction for Bryn. The emphasis of their design is on reducing operation and maintenance costs by simplifying installation and increasing reliability. This is a recognised strength of their parent-company Inyanga, who have deployed around 60% of all tidal turbines since installing the sector's first large scale device for Marine Current Turbines in 2008.

One of the simplifications used in the design is that the turbines have no 'yaw' mechanism. Instead, the turbine design is bi-directional and consequently the turbines have to operate in both 'clean' and 'dirty' flow conditions depending on the direction of the tide and whether the turbines are upstream or downstream of the support structure.

Bryn's project is exploring the impact this design feature might have on performance, turbine-blade loadings and fatigue life, and ultimately on the life-cycle cost of energy from the device. HydroWing want to characterise the performance of their device under more realistic conditions, to understand what to expect and use this knowledge to improve the design. Bryn's work is using his knowledge of CFD to support this process, studying the interactions between the turbine rotors and the support structure of the device – a niche application of commercial software and the wealth of academic studies of turbulence.

The great thing about working with IDCORE Research Engineers is that we are able to establish and cost effectively grow new expertise in critical areas for our technology/company whilst being supported by a wealth of leading expertise from supervisors at all three partner universities. Bryn is plugging a genuine gap in our expertise, helping us to develop an in-house capability that will assist us as we move in the demonstration phase and begin to experience the complex interactions that will occur on site. We don't believe we would have achieved this in the same way by sponsoring a standard PhD.

Working with IDCORE is also a great recruitment tool – a three-year interview that works in both directions. Through the placement we are able to impart our broader experience and knowledge in the other areas of marine/tidal energy to help expand the research engineer's knowledge and value, way beyond that of a standard PhD. In doing so, we hope these researchers will ultimately become key team members and even take on company leadership roles in their respective areas of expertise, allowing our team to grow and driving our technology towards success.

Bevan Wray, Project Engineer,



Demitri Moros



About Demitri

After graduating in 2018 from a degree in Mechanical and Aeronautical Engineering at the University of Cambridge, Demitri joined a strategy consultancy in London. However, this work didn't allow him to pursue his interest in sustainable energy and he started to look for ways into the renewables industry.

Like several others who have joined IDCORE and gone on to very successful careers in the sector, Demitri initially found it hard to access jobs in renewables. He had too much experience to join a graduate scheme but didn't have the specific experience that companies look for when recruiting people into direct entry roles.

IDCORE seemed liked the perfect solution to this predicament. Not only was there relevance in the technical training provided, but also the industry-based research projects were clearly impactful for the sponsoring companies. The range of previous partners in these projects gave the centre credibility, increasing the employability of the participants.

Demitri's Project

Demitri is now working within the renewables R&D team at EDF Energy working on tools to support the operations and maintenance (O&M) of offshore wind plant. Preventative maintenance on offshore wind turbines is often carried out on a conservative basis, so the question underpinning Demitri's project is, 'Can costs be reduced by improved scheduling of maintenance based on our knowledge of past failures and some form of reliability model?'.

The project is split into two parts. In the first part he is investigating wind turbine data and using machine learning to develop models of the remaining useful life of components. This information is then being used alongside known failure times and other operational factors to optimise scheduling of O&M and further reduce costs.

I was attracted to taking on the supervision of an IDCORE project because of the excellent reputation the scheme has with colleagues. We have many academic relationships and engage with a wide range of PhD level research, but we particularly appreciate the flexibility of the IDCORE approach, its rich and comprehensive teaching, and the quality and versatility of the research engineers coming through the programme.

Nassif Berrabah – Lead Research Engineer, EDF

Benefits of IDCORE

The sense of community within IDCORE definitely enhances the experience of being a research engineer. It made the first year of training fun, and Demitri is looking forward to the additional courses that will bring his cohort together again, particularly the second part of the course delivered by SAMS at Oban. It has also been great to meet and get to know the other cohorts through events like the trip to the University of Edinburgh's Firbush Outdoor Centre.

As a whole, the IDCORE training helps create a holistic perspective on the knowledge needed to operate in the renewables sector, covering issues as diverse as environmental impact assessments, how the UK grid works, and the economics of offshore development. It even included a visit on a support vessel to the Seagreen construction site.

It feels like I am now making good progress, although, as you would expect, this hasn't been the case all the way through. I now have a clear plan in place for the project and, with the foundational work complete, I am starting to deliver some tangible results. I have identified the benefits that can be derived from more effective scheduling of O&M, and I am starting to present these to relevant stakeholders. Their responses to this work are helping me to understand their multiple perspectives and competing drivers. This is all useful data that will help me to develop an effective model and deliver my ultimate aim of creating an appropriate benchmark by the end of the project.

Demitri Moros

Industry Benefits

EDF have an established relationship with IDCORE which they value. The research engineers bring ideas from their courses and other students working on similar projects, and it is a very effective way of connecting to the academic community working in this area. They also see significant value in having a student working with them for three years on a project that they define, providing some continuity and stability in a sector where staff are very mobile.

When choosing a sponsor, Demitri saw that EDF could give him access to broader expertise and the opportunity to work on other projects alongside his own research. He has been able to see various stages of wind farm development and been involved in a study of ports around the Celtic Sea. He has also been able to make site visits to Teesside and Hinckley Point, extending his knowledge of the energy system. The knowledge he has gained from being part of IDCORE has been invaluable in building rapport with colleagues in EDF and increasing their level of engagement with his work. He has even participated in EDF's internal Technical Committees process, presenting his work to colleagues





Eve Andrews

Why IDCORE

Eve is a trustee of a sustainability education charity and a Chemical Engineering graduate from the University of Hull.

She came to IDCORE from a role within an Engineering Consultancy company where she worked as a process design engineer often delivering projects for the oil and gas sector. She was looking for something different, something that built on her commitment to sustainability but also her industrial experience both in the consultancy and prior to that through a Year in Industry placement at Rotherham steel works. **SSE** Renewables



Having said that, Eve didn't find the first year easy, it took her well out of her comfort zone as a chemical engineer, although her experience of writing technical reports certainly helped, as did the incredible sense of community within the cohort. It was a group of ready-made friends in a new city. Their wide range of experience and knowledge has enhanced the IDCORE experience and they have become an important support network for each other now that they are all working in their sponsoring companies.

Riades

Foundations

IDCORE seemed a good way into a new career within the renewables sector. The training programme is varied - not just focussed on technology but providing an understanding of the broader context for the sector, how the industry is structured and how it engages with international energy markets. She was particularly interested in the marine biology and sociology elements, in which she has a personal interest but had never had the opportunity to study.

I am really enjoying the opportunities that IDCORE has opened up for me. The first year of the programme wasn't easy - it assumed quite a high level of knowledge of mechanical and electrical engineering, which I didn't have, and at times this was frustrating. However, the IDCORE community is very supportive and my project is going well - I feel like I am making a real contribution to the sustainability journey that SSE are on.

Eve Andrews

Eve's Project

Eve is now working with SSE Renewables (SSER), looking at how to apply circular economy principles to offshore wind projects. She is working as part of the SSE Renewables Procurement & Commercial Directorate with a particular focus on the Berwick Bank Offshore Wind Farm development. She is enjoying being a part of this team, where she gets to engage with engineers, procurement leads and project managers for Berwick Bank. She is also working closely with the Sustainability team, who have a strong interest in her work in circular economy.

The circular economy is a massive topic, and getting on top of the project has required a lot of reading. In a short space of time, Eve has become enough of an authority on the topic that SSER have been using her to assist in the development of plans for a range of projects where sustainability and supply chain research and development are requirements of being eligible for bidding into the Contract for Difference Allocation Rounds.

To support her work, Eve has undertaken a survey involving over 80 respondents, seeking to understand the sector's current approach to circularity and is currently working on the metrics and performance indicators used to assess circularity, with the ultimate aim of building these into a decision support tool. Being part of SSER has provided excellent leverage when garnering responses to the survey which has revealed that, in general, within the sector there is a lot of interest in circularity but insufficient knowledge for effective implementation and a lack of joined up thinking. In contrast, SSER have a well-established sustainability team with an active interest in circularity.

There are real advantages to working in a large company – there is always someone to discuss issues with and it is also giving Eve a range of other opportunities from STEM visits and podcasts through to involvement in initiatives like the Coalition for Wind Industry Circularity.

Eve's past experience and the research she is now undertaking have proven the benefits of engaging with IDCORE. She is adding value to SSER both through the project she is undertaking, which is moving our capability forward, but also in the way that she has so quickly become part of the team. Her skills and knowledge have already been invaluable in helping us to hit some key deadlines.

Chris Stewart, Procurement & Commercial Directorate, SSER





Hannah Mitchell

IDCORE as a Career Step

Hannah already had an established career in the renewables sector when she joined IDCORE, having spent more than two and a half years working for a wind turbine certification company in Germany. Her previous work had involved turbine type and project certification, along with lifetime extension work for onshore turbines and structural assessment of wind turbine components both onshore and offshore, as part of which she had become fully trained in safety procedures for offshore operations.

Although Hannah was enjoying the work, and particularly the opportunity to work in the renewables sector, she was starting to look for the next step in her career. She started looking for an opening that would allow her to gain a broader understanding of the offshore renewables sector, and in a research setting where there is more potential for personal control of your work rather than it being solely defined by specific client requirements. Having studied for her first degree at the University of Edinburgh, an MEng in mechanical engineering, she was also looking to move back to the UK and spend some more time in that city.

IDCORE seemed like the perfect opportunity. Studying for an EngD with its focus on industrial needs seemed a good compromise between Hannah's industrial experience and a more purely academic PhD, and the training offered in the first year of the course looked like it would provide effective broader grounding in the industry.

Hannah's Project

Hannah's project is sponsored by the Frazer-Nash Consultancy and she is now based in Bristol, where she has become an integral member of their structural design and analysis team. She is helping them to explore the potential for delivering a probabilistic approach to structural integrity and component life assessment into the offshore wind sector, with a particular focus on lifetime extension of turbine blades.

I am really enjoying working for Frazer-Nash. Their breadth of experience across a range of industries is unrivalled, and I believe that the offshore wind sector can only benefit from this. As a consultancy they have to work collaboratively with other organisations and I am learning a lot from this and from drawing on the skills and expertise of colleagues in my team. I also feel privileged to be part of such a great cohort of fellow research engineers within IDCORE – there is always someone you can talk to when things get tough and everyone understands the challenges. I do not feel at all isolated, which was one of my fears of doing a PhD.

Hannah Mitchell

Page 13

The project is an excellent fit to Hannah's previous experience in the industry, and it was this rather than the company or location that attracted her to the project. However, at the project selection day, she also liked the people she met and the way that they wanted her to move to Bristol and become fully integrated into the team.

Hannah is extending an existing Frazer-Nash 'Bayesian Network' methodology to analysis of the structural integrity of offshore wind turbines. She is building a framework that can be applied to data from operational turbine blades and will then use inference to analyse the remaining life of these components. This approach takes uncertainties into account and provides a continually updated model. It is also allowing Hannah to gain a more detailed understanding of the level of conservatism in the safety factors that have historically been used by the industry. She has already submitted a paper on this work to a conference that will take place in December 2023, starting the process of promoting this new capability for Frazer-Nash.

Hannah is really good at what she does and is making some significant impact with her research – we are learning things together. For us, value is delivered through our knowledge, skills and competency rather than discrete products and our relationship with IDCORE is certainly helping with this. The primary objective for the project has been to translate our knowledge from other sectors into engagements with the offshore wind sector and in doing so to create new knowledge that we can transfer back in the other direction. Participating in an EngD project has been a new experience for us and one that we are definitely looking to repeat, especially if Hannah is representative of the quality of the researchers we can work with.

Nigel Pready, Group Leader, Frazer-Nash Consultancy

IDCORE Highlights

Like many of the students who go through the course, a real highlight from the first year of training was the Marine Energy and Environment Course with the Scottish Association for Marine Science (SAMS) in Oban. It exposed Hannah to an understanding of marine biology that she had not previously received despite having worked in the industry for some time. It has also helped with some voluntary work she is doing on a nature positive wind farm initiative.

There have been additional opportunities to visit operational sites including a trip offshore to the Seagreen Wind Farm. All of this training has been enhanced by undertaking alongside others in a cohort that has become an important support network now that Hannah is working with her sponsoring company.



Ione Smith



A New Direction

Ione came to IDCORE thinking that she would like to work on a project in offshore wind. However, as happens for many participants in the programme, her ideas changed during the first year as she started to learn more about the sector as a whole. She is now working at FastBlade investigating the potential for manufacturing tidal turbine blades from recyclable materials.

Background

Ione is a Chartered Mechanical Engineer who spent five years in the automotive sector before applying for IDCORE. After graduating from an MEng in Mechanical Design Engineering at the University of Nottingham she joined Jaguar Land Rover where she delivered a number of roles but kept coming back to issues of sustainability and how this could be delivered.

During the COVID pandemic lone started reflecting on what this meant for her personally and ultimately decided to retrain, applying for IDCORE which had been recommended to her by a friend a programme that offered high-quality training and the opportunity to undertake research with real-world application in industry. The holistic nature of this training means that alongside insights into the engineering challenges of offshore renewables you also get to study modules on subjects like marine wildlife and gain a deeper understanding of the environment you're designing for.

FastBlade

lone's project is sponsored by FastBlade, a test facility set up by the University of Edinburgh in Rosyth, which offers fatigue testing of tidal turbine blades and other composite structures. She is looking at the suitability of applying recyclable thermoplastic resins in the design of tidal turbine blades – exploring both the quality of the composites produced and their water absorption. In order to replicate the service life of a turbine under water, accelerated test regimes will be applied in which material samples will be immersed in salt water at high temperatures for 18 months.

Having spent several years in industry I am now undertaking a project that is perhaps closer to a standard PhD than others in my cohort. I have the amazing opportunity to be part of a group of academic researchers investigating alternative materials where I can apply the learning to industrial settings. The tidal energy industry is still in its infancy and I am enjoying the opportunity to play my part in supporting its development while undertaking some hands-on testing. This sector faces unique engineering challenges, and I feel incredibly fortunate to be where I am, doing what I'm doing.

Ione Smith



FastBlade is a first-of-a-kind test facility set up to support a nascent industry that has significant potential in the waters around Scotland. There is significant variability in turbine designs between developers and the facility has been designed to accommodate these variations and provide long-term testing that is energy efficient. Ione's work is just one element of the offering they are developing for the industry, but she has been given lots of freedom to develop the scope of work which has been liberating as well as challenging.

Benefits of IDCORE

Being in a new test facility in a new industry has created provided a number of opportunities to meet different developers and to work with the university to bridge the gap between industry and academia. Ione has even met Princess Anne, attended a Royal Garden Party, and through the network she has developed, received an invitation from MayGen to visit their tidal turbine installation.

Ione was looking for a challenge when she came to IDCORE and she hasn't been disappointed. Returning to a learning environment after so many years in industry was tough, but the support, knowledge and sharing of experience within the cohort made this so much easier than it could have been. The colleagues on the course have become good friends – a diverse group and yet one with similar interests, ambitions and values – people who ask the questions that you haven't.

I have only recently joined Ione's supervision team, but I am really impressed as I have found her to be extremely resilient, driven, and self-motivated in response to the changes in her project and supervision team. I'm delighted to be a part of Ione's journey as she is investigating timely, unexplored possibilities with materials that I have studied extensively, providing key insights for their application as sustainable materials within the tidal energy industry. Another example of IDCORE pushing the boundaries and supporting the development of the sector.

> *Wini Obande, Academic Supervisor, University of Edinburgh*

Jonathan Glaspool



Career Development

Jonathan joined IDCORE in 2021 to enter the offshore renewables industry and kick start his career in that sector. The IDCORE programme provides structured training and the opportunity to undertake research on projects with leading industry companies.

After graduating from the University of Edinburgh in 2019 with a master's degree in Mechanical Engineering, Jonathan completed a two-year graduate training contract with Bosch Rexroth, a company that manufactures hydraulic motors for mobile machinery in Fife. At the end of this programme, he wanted to find a new direction, and the chance to work on solutions for the energy crisis and climate change. As a keen sailor, he was particularly aware of the potential for growth within the offshore wind industry and saw the sector as an opportunity to apply his mechanical engineering skills in a meaningful way.

He did consider a more traditional PhD route, but didn't want an academic career, so IDCORE's blend of training and industrial experience was very appealing. The academic training has proved invaluable, delivering a breadth of learning which doesn't answer every question but does show you where to go for the answers, and provides the resources for reaching them. Meanwhile, the industrial element has given him competencies and experiences that help him progress towards Chartered Engineer status with the IMechE.

Project Sponsor

Mainstream Renewable Power, the company sponsoring Jonathan's project are a developer of 'green field' wind sites both onshore and offshore. Mainstream has a track record of de-risking projects through the development process and creating investment-ready projects for construction. They see floating offshore wind as an important growth area and were awarded an option agreement through the ScotWind clearing process for the 1.8GW Arven site, which is being developed as a floating project with joint venture partner Ocean Winds.

Jonathan was attracted to them as they are an exciting company with an impressive rate of growth, and the project they had identified for IDCORE was broadly defined and flexible, giving him control of the detail of his research.



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Page **17**

The process of selecting my project was an intense one, although it was one through which I learned a lot. We were offered some amazing opportunities, though the short timeframe in which we had to make a decision combined with their geographical dispersion was a challenge, particularly with a partner's needs to think of, too. I felt very fortunate to secure a project with Mainstream Renewable Power, who have provided me with the freedom to define my own project, the support to make it possible, and the flexibility to work in the best way for me and my project.

Jonathan Glasspool

Supporting Commercial Development

To help position Mainstream for the future, Jonathan is exploring mooring systems for floating offshore wind. He is using the Orca Flex code to create dynamic models of two different systems to assess the probability and costs of failure. He will be bringing this analysis together in a lifetime cost model. Jonathan's project is focusing on a semi-submersible platform design that has been modelled extensively by the academic community, with the ultimate aim of developing a methodology that can be applied more broadly to the varied projects that Mainstream are working on.

The first year of the research provided the opportunity to dive into the academic literature, process new information, and compare different methods for the analysis of mooring lines. This was a process in which Jonathan encountered rabbit holes and dead-ends, but guided by the supervision team, he has emerged with a clear plan ahead and has integrated with the growing Mainstream team while building his professional network.

Mainstream have recently merged with Aker Offshore Wind. This has brought in significant technical competencies in floating offshore structures from the Aker group of companies. Following the merger, Jonathan has built strong links with the technical team in Oslo and is working with them on technical studies for Mainstream's projects.

The projects we are developing now will be coming into operation in the early 2030s – we are expecting a lot of things to change in the offshore wind market between now and then.

As an organisation we are focussed on commercial delivery, but we also need to keep ourselves ahead of the changes that are coming. This is where Jonathan's project comes in. Floating offshore wind is on the cusp of commercial deployment and the systems used for mooring them are a key area of risk that we need to manage. With Jonathan we get access to a resource with enough time to address these issues effectively. He has come to us with the right experience and skills to deliver the work, he is enthusiastic and resourceful and through his academic supervisors he gives access to some of the leading academic expertise in this area.

Chris Morris, Bid Manager, Mainstream Renewable Power



Katie Smith

FloWave

About Katie

Katie has been sponsored by the FloWave Ocean Energy Research Facility (FloWave), a wave and current simulation tank which is a part of the University of Edinburgh. FloWave offers hydrodynamic testing services that support the development of offshore renewable energy technologies. Her project combines aspects of both numerical modelling and tank testing.

The design standards recommend tank testing as a way to validate numerical models and investigate hydrodynamic phenomena that are difficult to simulate. Katie's work is focussed on mooring system design and testing of floating devices. She is seeking to understand the tank results required to create a strong case for validation of numerical models of these systems, and to streamline the test programmes that deliver the validation data, making them more efficient and accurate. She is currently using the industry standard software OrcaFlex to create a fully coupled hydrodynamic numerical model of a case-study system and will soon be starting some tank testing as part of an iterative cycle of design, modelling and testing.

Going into the IDCORE process for matching researchers to projects, I knew I wanted to work with a smaller, innovative company that was involved in the early stages of technology design and development. Instead, I was matched with FloWave, an organisation that's based in academia, however, as more than half of our clients are industrial companies I am getting to work with a far wider range of industry players with different approaches to device development. I have found the perfect niche, playing a role in bridging the gap between the numerical modelling being undertaken in both industry and academia, and the practical testing that is required to validate those models.

Katie Smith

Page 19

One of the clients Katie has been working with is Wave Energy Scotland, who are investigating a multi wave energy absorber platform as part of a project looking at the technology and economic case for future hybrid wind and wave energy systems. I am currently running the numerical modelling package within the Wave Energy Scotland project. Working with Katie has helped massively with my understanding of moorings and expanded my horizons. The standards for station keeping of wave energy devices are not well developed and my interactions with Katie have, I believe, been mutually beneficial, as we both work at extending the boundaries in this fast-moving sector.

David Forehand, Academic Supervisor, University of Edinburgh

In FloWave, Katie is seeing the benefits of being part of a small industry-focussed team. In small organisations, you always have to be ready to deal with the unexpected, especially when working with novel technologies and a range of different clients, and there are always opportunities to fill in when extra hands are needed or for safety.

As well as developing her experimental skills, this experience is giving Katie an appreciation of the communications streams between different entities and the work needed to manage expectations and establish systems when developing new collaborations.

Why IDCORE?

Katie found IDCORE when applying for graduate jobs in the renewables sector. The concept of an EngD was new to her, but she found it appealing. She had enjoyed university and the opportunities this provided for learning and gaining knowledge, but she wanted the next step in her career to be about practical application of that knowledge.

Katie came to IDCORE from an integrated Master's degree in Mechanical Engineering with Aeronautics at the University of Strathclyde. She had originally wanted to work in aerospace, but following an internship in her 4th year, realised that she wasn't comfortable with the close links between aerospace and defence and chose instead to focus on renewables in the final year of her undergraduate studies.

The first year of training at IDCORE is intense, but this just meant that Katie's cohort bonded quickly. Along with cohorts from other years, they are now an important support network for one another. This is even more apparent at FloWave which is now sponsoring three IDCORE researchers, and supporting the work of a number of other current and former IDCORE researchers who are working on behalf of their industry sponsors to test devices in the tank.



Nian Liu



An Unexpected New Direction

Nian wasn't looking for a career in renewables, it found her. During the COVID pandemic she had been reflecting on her options with the careers service at her university who suggested an EngD as a good compromise between pursuing a research post and seeking a role in industry. It was in looking for an EngD in a suitable location that suited her skill set that she discovered IDCORE.

Nian came straight into IDCORE after graduating from the integrated Master's in Aero-Mechanical Engineering at the University of Strathclyde in 2021. It was the only EngD programme that she applied for, and it was a good decision. Because she didn't have a background in renewables, the first year of the programme provided her with an excellent overview of how the industry works and assisted with understanding key issues like the levelized cost of energy when comparing different renewable energy technologies.

I'm so glad I took the decision to join IDCORE, I have learnt a lot and I am really enjoying working with Mocean which is a very relaxed, friendly and supportive working environment. The support of others in my cohort has also been invaluable. Those of us based in Edinburgh still meet up on a regular basis. I think a normal PhD can be a lonely experience but that's certainly not been a problem in IDCORE, and the friendly rivalry helps to keep you going even when things get tough.

Why Mocean?

Mocean Energy is a wave energy device developer based in Scotland, and Nian chose to work with them because they were offering a technical project which would draw on the training she received in her first degree. There has not yet been any technology convergence in the wave energy sector and this attracted Nian because it offers greater opportunity to be creative.

The work that Nian is doing is core to the way in which the company is seeking to develop their wave energy converter which is centred around the development of novel geometries to maximise energy capture by the device. The breadth of this challenge meant that this has taken time to find a specific focus for the project, but Nian is now concentrating on how to change the shape of the device's wave channel to improve resonance in the system. Her approach is using numerical modelling to run a series of optimisation cases and select designs that can be validated with higher fidelity CFD models. This is introducing a new capability to Mocean who haven't previously had in-house CFD capabilities, which has been greatly helped by the access Nian has to computing facilities at the University of Edinburgh.



Benefits to Mocean

The relationship with IDCORE with is clearly working for Mocean. Nian is the third IDCORE Research Engineer they have taken on and they are looking to sponsor more projects in the future. Developing effective relationships with academia can take a long time, but initiatives like IDCORE help to accelerate that process which is really important for an organisation like Mocean who are working at the cutting edge of technology.

The WAMIT frequency domain modelling approach that Nian is using is one that I am very familiar with. However, she is applying it to a very complex geometry which makes it hard to validate the results. This is an excellent opportunity to apply state-of-the-art academic research to a challenging commercial development environment. It has also allowed me to re-engage with Mocean and I am hoping this will lead to further mutually beneficial collaborations in the future.

David Forehand, Academic Supervisor, University of Edinburgh



Case Study Prokopis Vlachogiannis



EDF as a Sponsor

As members of the former Energy Technologies Institute, which funded the first phase of IDCORE, EDF has been the most consistent sponsor of IDCORE Research Engineers. The advantage of this for Prokopis is that he is able to build on the work of other IDCORE projects that have gone before.

There are pros and cons of being sponsored by a large company, but it does provide opportunities to be part of large projects and to draw on a wide range of specialisms, particularly in a company like EDF which places so much value on research. And EDF certainly appears to value its relationship with IDCORE as a source of well-trained, high-quality researchers, for the connection it provides to leading academic renewables capability in the UK, and for the way it links them in to UK state of the art research.

New Experiences

The whole IDCORE journey has been one of adaptation for Prokopis. He grew up in Greece where he studied for his first degree, a Masters in Mechanical Engineering, at the National Technical University of Athens. He then came to Edinburgh for the first year of IDCORE, and he is now based in Paris working at EDF's R&D Dept in both Chatou and Saclay.

His project is to develop a numerical prototype, an aero-hydro-servo elastic simulation of a semi-submersible floating offshore wind turbine. This uses a large number of simulations on a computing cluster, to model the performance of the device over its whole life. The work has made him highly conversant with some of the proprietary numerical modelling tools that EDF uses, and alongside his project he has been able to get involved in the benchmarking of different numerical codes.

Page 23

Working with an organisation like EDF gives you access to high level expertise. My industrial supervisor is really committed to working with IDCORE and I am part of a great team with access to unrivalled in-house tools, facilities, data and projects. It is a real privilege to have this opportunity.

Prokopis Vlachogiannis

Prokopis is a very capable researcher. He is going to be very busy, as there is lots of work to be done on his project, but he grasps complexity quickly and is very proactive. He is fortunate to be working with EDF. They have a unique approach to research in the areas in which they operate, with a level of knowledge and capability that you rarely see outside of the oil and gas sector.

Maurizio Collu, Academic Supervisor, University of Strathclyde

Benefits of IDCORE

When Prokopis decided to pursue a postgraduate qualification rather than going straight into industry it felt like he was taking a risk, but that risk is paying off. But then the EngD model used by IDCORE isn't like other PhD-level qualifications – it creates an excellent balance between a high-quality academic qualification and delivering applied research that meets the needs of industry. It provides some autonomy and freedom to pursue your own line of research, whilst providing a focus on outcomes that will deliver impact in a broader industry context.

The first year of IDCORE allowed him to specialise further in renewable energy technologies while being paid, which helps financially given the higher costs of studying in the UK now as an EU citizen. It also gave him a new set of friendships that he knows will outlast his time with IDCORE, as well as providing a group of highly supportive and motivational colleagues.





Tara Alkubaisi



Diverse Experience

Unique Entry Route

IDCORE has always offered sponsoring companies the opportunity to bring their own staff into the programme, but Tara is the first example of this happening. After graduating from a five-year integrated Masters programme in Mechanical Engineering at Heriot Watt University, during which she was sponsored by Scottish Power Energy Networks (SPEN), Tara secured a graduate role with the company. She then persuaded them to support her through an EngD. It was the industrially focussed nature of the IDCORE programme (and the case studies of previous cohorts) that persuaded both Tara and SPEN that they would derive value from this process. Tara spent years 2, 4 & 5 of her degree course at Heriot Watt's campus in Malaysia, where in addition to studying for her degree, she taught English. She first became involved with SPEN as part of an internship programme delivered through the IET Power Academy. SPEN recruits from a wide range of backgrounds including mechanical engineering, and this relationship has given Tara some excellent exposure to industry, providing opportunities to engage with the practical aspects of running an electricity network, including site visits with operational staff, helping her to understand where technical work can have impact, the constraints created by issues like system regulation and the importance of communication, particularly how, when and where to present information. All of this is now paying dividends with her IDCORE project.

My project is directly helping SPEN as they seek to understand future markets for hydrogen as an energy supply vector. I am making a comparison between electrical transmission and chemical transmission for both onshore and offshore wind developments. I am investigating the costs of electrical transmission infrastructure and different cable land-fall options and substation locations, alongside a range of chemical carrier options including ammonia and methanol as well as hydrogen. I am aiming to develop a techno-economic model of the options which will assist in the planning of network re-enforcement to support the connection of future generation assets, helping to establish at what point the economics move from electricity transmission to other vectors. But this isn't just about economics, it's also about environmental impact and the lifetime management of assets, understanding the costs of doing things in a very different way - all issues that are important to SPEN as they plan for the future.

Tara Alkubaisi

During her first degree she also worked with the venture arm of a world leading energy company in which she delivered a market landscape of the European start-up space in sustainability covering topics such as hydrogen, CCUS and energy storage. She has since provided support to them with technical reviews of the investor pitches and data rooms of different companies, in preparation for subsequent due diligence exercises during which she has also provided competitive analysis of technical issues.

Delivering net zero is a big challenge for SPEN, not least because we have to work out how to move more than 50 GW of offshore renewable electricity production through our system to supply the rest of the UK. If we are going to do this successfully, we will need to continue to recruit and retain people of the quality of Tara from across a range of disciplines. Her story is one of the many shining examples we want to create to encourage others to follow in her footsteps.

Eric Leavy, Head of Design, SPEN

IDCORE Benefits

The first year of IDCORE is an intense but well-structured programme providing good overall breadth of knowledge in areas that aren't core to SPEN. Tara found the problem-based approach to learning particularly effective, building on the teamwork and communication skills that IDCORE encourage in each cohort. This network of support has proved really valuable. The cohort is small enough to facilitate the development of strong friendships, learning together and from each other, but large enough for the group to include diverse experiences and perspectives. Tara was living in Glasgow during the first year. The daily commute was a challenge, and it meant that she missed out on some social aspects of the cohort (although she was never excluded). Monthly on-line catch-ups mean that they are continuing to provide support to one another now that they are all working with their sponsors.



Case Study Tom Summers HYDR WING

Returning to Engineering

Immediately prior to joining IDCORE Tom had spent four years teaching science and maths in the South Wales Valleys. He had gone there after graduating from an aerospace engineering degree at the University of Bristol in 2016. Although he enjoyed life as a teacher, he didn't feel that it was making the best use of his engineering skills. He could see the potential for making a difference in the energy sector in an industry like offshore renewables.

IDCORE seemed to provide an excellent route into the sector. It would refresh his skills, having been out of engineering for four years, and update them with knowledge that hadn't been covered as part of aerospace engineering. He thought this would teach him more than he would learn on a graduate scheme.

This has proved to be the case, the baseline knowledge that IDCORE has taught him has given him a head start with his project for a tidal energy device developer, HydroWing. He has found the teaching on tidal energy resources particularly useful, along with the appreciation IDCORE provides of wider system integration in renewable energy devices. He now has an understanding of important issues like electrical system interfaces that he wouldn't have picked up just from working on his project.

Added to all this, the first year of IDCORE was based in Edinburgh, a city he wanted to spend some time in.

Skills Application

Tom really is getting the opportunity to apply his aerospace engineering skills in the project he is undertaking - developing a passive pitch mechanism to reduce load in high flows on HydroWing's tidal turbine. It is the sort of well-defined project that Tom was looking for, working on something that the company cares about.

This is a great project, working with a company based in a beautiful location in Cornwall, who are doing really interesting things. I am valuing the opportunity to work in a start-up and to gain first-hand experience of the device development process. HydroWing know what they want, and they are providing clear direction and a great deal of support for my project. It is also good to be working in the same location as another researcher from my cohort – this definitely helps given that we are such a long way from everyone else.

Tom Summers



HydroWing want to develop a passive system, as they expect it to be cheaper, more robust and responsive, with greater reliability than an active system. Tom is currently designing the mechanics of the passive system and modelling the loads and response of the mechanism. He will subsequently be going on to build and test a scale model of the design in IDCORE connected facilities – an added benefit of IDCORE for the company, since the costs of some of this testing will be covered by the programme.

When they proposed the project, HydroWing hadn't expected that it would get this far. They are delighted with the progress made by Tom, as well as the expected performance results from the innovation.

Tom's project is actively pursuing an important innovation for us, something that is making a real difference to our development, but which was too early stage for us to have been able to dedicate resources to ourselves at the current stage of our development pathway. In this sense, both IDCORE and Tom have enabled us to accelerate the process and bring it onto our development pathway several years ahead of our original plans. When we conceived the project, we never expected that it would progress as far as trialling a prototype within IDCORE. This is taking it from a medium- to long-term concept to something that we are looking to implement in the short- to medium-term. The competition for IDCORE students is stiff and we were really disappointed when we didn't manage to secure a further project this year – we will be back!

Bevan Wray, Project Engineer, HydroWing



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Case Study Simon McLaughlin



Getting to the point I'm at now with my project hasn't been straightforward – I had a few false starts along the way and working in a small organisation with limited resources isn't easy. However, I have finished up with a really interesting project that has the potential to make a significant difference to my sponsors' business, and the support from IDCORE has been immense throughout.

Simon McLaughlin

Unique problem

Simon has a fairly unique project from an IDCORE perspective. His sponsors are Seiche Marine Acoustic Solutions. He is working with them to create a new sensing system that will help them to further develop their offering into the renewables sector.

During construction of offshore renewables installations, processes like piling and removal of unexploded ordnance create high amplitude acoustic signals which are a threat to marine life. Traditionally, it is the sound pressure levels (SPL) associated with these processes that have been measured, however, for fish and marine invertebrates particle motion in the acoustic field is also important, but it has not been possible to measure this on a commercial basis previously. Effective measurement of these signals in the near field of offshore construction sites will help to mitigate the impact of such operations on the marine environment. Simon's project is helping Seiche to develop and deliver these measurement services on a commercial basis. He has designed and developed a prototype measurement device that has undergone tank testing and is about to go into field trials with one of Seiche's clients.



Simon's project is successfully getting a prototype vector sensor to work for us – it's a very early-stage development, but his work is going to be fundamental to us being able to take the approach forward. Our next step will be to run field trials, comparing it against other more expensive and complex measurement approaches. If we can prove this methodology and get it accepted by the industry, we will be able to offer an important new service that improves protection of the marine environment and broadens our mitigation capabilities. Simon is extremely self-reliant and as a result the project has progressed well with limited input from us, but with knowledgeable support from leading academics who understand the renewables sector – a very cost-effective solution for a small company like ours.

Martin Hutton, Engineering Manager, Seiche Marine Acoustic Solutions

Challenges

Being a member of the cohort for whom their first year was most affected by COVID, did not make it as easy to become part of the wider IDCORE community and build the relationships within and between cohorts that have proved so important to others on the programme. Joining other cohorts at the University of Edinburgh's Firbush Outdoor Centre last year helped to start to address that – it was a great experience, an opportunity to talk with others in the same situation and, for Simon, a break from worrying about his project when he had been going through a particularly difficult patch.

IDCORE makes a difference

Simon feels that IDCORE has made him a more well-rounded engineer, building on what he had learnt as an undergraduate in Chemical Engineering at the University of Strathclyde. The exposure to industry, particularly the challenges of working in a small organisation, has been invaluable, as has IDCORE's approach to training its cohorts. He has learnt a lot from the breadth of study, and the input and discussion have helped him to develop a more open perspective, taking different views into account before finding solutions.

This has all put him in a position to be a useful asset to his sponsoring company, but it does come with a warning - gaining industrial experience is not gift-wrapped or easy, you have to be careful with your choices and to be willing to keep asking questions. It forces you to develop the ability to use your own initiative and to learn what and who to ask. You can learn a lot even when there are problems. Overall, the experience has been positive, and Simon would still make the same decisions if he were starting out on the IDCORE journey again today.

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