

EPSRC & NERC InDustrial CDT for Offshore Renewable Energy

Student Project Case Studies



















Engineering and Physical Sciences Research Council



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Introduction

The Industrial CDT in 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 2022 cohort. It follows on from similar documents produced in previous years covering the 2019, 2020 and 2021 cohorts and draws on interviews with each of the students and also their 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 identify a range of other benefits they have 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 speak 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 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.

We now have two IDCORE research engineers working at GDG and we are really pleased with the impact they are having on our business. The structure of the training and support they receive means that they are well informed about the sector and are able to take a very active role in the organisation from an early stage. The involvement of multiple institutions with joint academic supervision teams also gives us unrivalled access to world-leading research. A number of our staff are undertaking PhDs, and our parent company, Venterra, has a long history of working with the academic sector. In our experience you just don't get the sort of access that IDCORE provides with other programmes.

Mohammed Almoghayer, Senior Offshore Project Manager, GDG

I am a graduate of the IDCORE programme myself, so I know the value of these projects and was delighted to become Daria's industrial supervisor. She is keen, enthusiastic and takes the initiative. She is making an important contribution to the development of our carbon footprinting capabilities, particularly in the areas of uncertainty and estimating emissions from support vessels.

Mairi Dorward, Environment Specialist, Xodus

Our involvement in IDCORE has helped us to develop a far more agile relationship with academia which is vital in such a fast-moving industry. Beth Dickens, Director, Quoceant

I have worked with Andrew Aveyard in the IDCORE team for many years. I have been really impressed by the impact that their researchers have been making in the team at HydroWing, so when we started looking for someone to support the development of our utility-scale turbine, IDCORE was a natural choice. We are very fortunate to have access to this resource with our HQ based in Edinburgh. We have had other engagements with academic research and none come close for comparison with the quality and value of the IDCORE programme. I always look for passion in the people in my team and Fred has that in spades – he is making a real difference to our work.

Jeremy Smith, Founder and Managing Director, QED Naval





Ayse Yilmaz



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Background

Ayse graduated from a Masters in Chemical Engineering at UCL in 2021 during the COVID pandemic. She wanted to stay in London, so spent a year working part time in a café while looking for her next step. She received an offer for a software engineering job which just didn't feel right, and then she found IDCORE...

IDCORE

Although Ayse had undertaken a 4th year module on energy engineering as part of her first degree, she knew little about the offshore renewables sector when she applied. The research she undertook for her interview really piqued her interest, particularly the potential role for green hydrogen in the sector.

The first year of the programme was a steep learning curve for someone with a Chemical Engineering background, but the course is well designed, adjusting expectations based on who you are, and with the support of others in her cohort she made it through. Everything was new, particularly learning about electrical machines, but it all provided really helpful context that has since given her credibility within her sponsoring company.

She has really enjoyed the interdisciplinary aspects of the course that give an appreciation for the wider system and help understand the contexts that others are working in, and a group project looking at energy systems in other countries pushes you to take interest in what happens in the rest of the world compared to the UK.

The highlight of my time at IDCORE so far was the trip out to see the Seagreen offshore windfarm at Nigg. We got to see the size and scale of the jacket foundations they are using. It was great see the physical scale of the industry I am engaged with. The COVID pandemic meant that I missed the opportunity to do this during my first degree.

I've also enjoyed being part of a cohort – it has become a 'safe space'. There's always someone who knows how to solve a problem, and there are always listening ears when you need to have a rant. I really value their support.

Ayse Yilmaz

Project

Ayse's project is with SSE Thermal, working within the project development team on the Aldbrough Hydrogen Pathfinder project, a joint venture with Equinor. The project is still in the development phase, which creates a number of uncertainties. If it receives financial approval, construction will not begin until after Ayse has completed her EngD.

As a result, Ayse's project has a very broad scope. While this provides freedom, it also presents challenges in defining a clear project direction. She does not anticipate that a digital twin will be the project's final outcome. Instead, her work focuses on bridging the gap between the development and practical implementation of adoption strategies for digital twins in the green hydrogen sector.

The biggest challenge Ayse faced during her first year with SSE was integrating academic research into a corporate setting and fostering engagement. However, this has been greatly eased by the supportive and friendly people at SSE, as well as the excellent support she has received from IDCORE, particularly from Katrina, the Centre Administrator.

Ayse's project has become one that is helping us to understand what kind of digital capabilities we need for the future. Whilst she is part of one specific project team, the real benefit of her work is going to be in understanding projects as 'archetypes' - learning lessons in specific contexts and then applying them more generically. Examples of this include modelling emissions and how these feed into permitting processes, or trading forecasts of when and where you would want to supply hydrogen.

There's always a need for academia to support industry, but there is a disjoint between academic findings and their application in practice, particularly in a digital context. This needs collaboration, something which IDCORE is good at creating. Ayse's project is a case in point. Supervising her is also helping me to extend my network of trusted relationships with academia.

Sally O'Brien, Senior Project Manager, SSE Thermal



Case Study DRBITAL Ben Thomas MARINE POWER

Ben's Background

Having studied Mechanical Engineering at the University of Exeter, where he was also a member of the Formula Student team, after graduating Ben was keen to apply the practical engineering skills he had learnt. Initially, he joined Babcock International's graduate scheme in Devonport. This provided an excellent grounding in the skills needed as an engineer working in industry, but he realised that he was looking for opportunities to work more directly on detailed technical challenges.

One of his lecturers at Exeter had an EngD, and whilst Ben knew that he didn't want an academic career, the mix of industry relevant skills and practical 'hands-on' engineering offered by this training route seemed a perfect fit ...and then he found IDCORE.

Having grown up in Penzance, the sea had always been part of Ben's life, as had the renewables industry – his father was even part of the film crew who captured the deployment of Wave Hub off the Cornish coast. An opportunity to work in the marine offshore renewables industry was a 'dream come true'.

Training

Both Ben and his project sponsor, Orbital Marine Power, have been impressed by the training he received in the first year of the IDCORE Programme. It provided a lot of specific knowledge within a context that was very relevant to the sector. It meant that he very quickly became an effective member of the team once he joined Orbital. I'm really impressed with how Ben has been driving things forward since he has been with us – this is delivering direct benefits to Orbital. We see engagement with programmes like IDCORE as a great way of maintaining links with the cutting-edge academic research that underpins our technology development.

Perhaps one of the most satisfying elements of my personal involvement in the project is seeing an engineer like Ben develop, build his confidence and become actively involved in the company to a level where he is now able to contribute directly to difficult decisions in important strategic design meetings.

> *Tim Baker, Technical Director, Orbital Marine Power*



Project

Ben is supporting Orbital's contribution to an EU-funded project, MAXBlade, which is developing the next generation of blades for tidal turbines. The project is working through a staged process of advanced blade design utilising novel structural testing techniques, and ultimately aiming to manufacture and test a full-scale blade at the University of Edinburgh's FastBlade facility. The laboratory-based manufacture and test work that Ben is doing will de-risk the design of the full-scale prototype. However, the outputs of the work are already feeding into commercial decision making within the company.

It is not just the technical work that Ben is enjoying. His involvement with Orbital has allowed him to spend time with the team running their commercial operation in Orkney.

Working with Orbital has given me exactly what I wanted. I have felt needed – my research is clearly adding value to the company and I have been able to extend my skills by project managing packages of research and development activity which have allowed me to learn about manufacturing processes and procurement from external supply chains.

Taking on this role through IDCORE has given me a great insight into the ways that industry can work with academia.

Ben Thomas

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Benefits of IDCORE

Participation in IDCORE has been core to Ben being able to make the most of this opportunity. Not only has he benefitted from the breadth of knowledge provided by the IDCORE team, but also the understanding the course provided of the different roles needed within a technology developer. It has helped him to take a more reflective approach to his time with Orbital and consequently gain a deeper understanding of all aspects of the company. As a result, he is taking opportunities to engage with some of the more commercial aspects of the business, invaluable experience that you would be unlikely to gain as part of a standard PhD.

And then there's the IDCORE cohort – being part of a supportive group of like-minded individuals has been an overwhelmingly positive experience.

Daria Cislo



Sponsor

Daria's project is sponsored by Xodus Group, an international consultancy that encompasses all aspects of offshore engineering, including renewables, oil and gas, hydrogen and CCUS. She is working within their Environmental Impact Assessment Team, helping augment standardised approaches to carbon and climate assessment for projects that align with recognised best practices.

I am a graduate of the IDCORE programme myself, so I know the value of these projects and was delighted to become Daria's industrial supervisor. She is keen, enthusiastic and takes the initiative. She is making an important contribution to the development of our carbon footprinting capabilities, particularly in the areas of uncertainty and estimating emissions from support vessels.

We are seeing increasing demand from clients for both climate and carbon assessments, and we wanted to standardise our approach to these assessments using a digital tool. Equally important to our clients is understanding the physical risks that climate change creates through, for example, changes in wind intensity and sea level rise, and the implications these have on site selection and plant design.

Through her project, Daria has the opportunity to explore these issues and test assumptions in more detail. With the additional academic methodologies and contacts she can provide, she is furthering our analysis and helping us enhance our products.

Mairi Dorward, Environment Specialist, Xodus

Project

Daria's carbon footprinting work has been her initial priority, since it is delivering changes to a service already provided by Xodus. The work has required her to review methods and look for improvements, particularly around how to upgrade accounting methods, make the assessments modular and account for potential future design changes. The commercial requirement for this work and the regulatory aspects of it make it very different from a purely academic investigation, significantly increasing its potential impact.

> Daria also continues to progress on the second part of the project exploring the impacts of climate change on offshore windfarms. This is using climate model outputs to investigate the implications for windfarm operation and how these vary with geography. This would be a new product for Xodus who currently only offer qualitative assessments in this area. She is currently focussed on developing accessible and user-friendly methods for processing of high-resolution global climate model outputs. This would not be possible without establishing contacts with climate modelling specialists to identify precisely what output data from the models would be needed. These capabilities are not available in the project partner institutions, but this is the benefit of having three academic supervisors – their networks are extensive.



Background

Daria came to IDCORE from her undergraduate studies at the University of Southampton – a four-year Integrated Masters in Marine Biology and Oceanography. Throughout this first degree she focussed on microbiology and the associated large-scale processes that are impacted by climate change.

It was the learning from this course that influenced her choice to pursue a place on the IDCORE Programme with its greater focus on engineering solutions that address climate change. She saw it as an opportunity to continue to work in research, but also to have a more direct impact on climate change.



My colleagues in Southampton were surprised by my decision to pursue an engineering focussed doctorate. It was a big move, but for me IDCORE was an obvious choice with a strong connection to the offshore aspects of my first degree.

I really enjoyed the first year of training, which gave me an opportunity to gain so many new skills with great support from the rest of the cohort. The interdisciplinary nature of the programme meant that we all found a module we were 'expert' in, and we became very reliant on that sharing of knowledge which also brought us together as a social network.

Delivering my project in a consultancy environment has also been enlightening, I am gaining lots of different experiences and support from colleagues to develop my engineering knowledge alongside the other interdisciplinary skills I am able to apply.

Although Xodus is an international company, I am based in a small office in Edinburgh where I have got to know people well. However, one of my supervisors is based in London and I have even been working with colleagues in Australia and the US. I find it very insightful to participate in projects beyond the UK.

<image>

Daria Cislo

Eoghan Summers



IDCORE doesn't just focus on offshore renewable energy technologies, it delivers a wide range of research relevant to the successful future development of the sector.

Eoghan's project is a case in point – he is working on hydrogen, looking at all aspects of how it can be produced, stored and utilised as an alternative or complementary energy vector to electricity. In particular, he is looking at the impacts of variable supply and demand for energy and the materials issues this can create when transporting hydrogen via pipeline. He is currently building a model using software developed in the oil and gas industry of a potential hydrogen network for Northeast Scotland. He is hoping that he will also be able to go on and explore the options for geological storage of hydrogen – a key aspect of any future system that uses hydrogen to address variations in renewable energy availability.

Sponsor

GDG, the sponsor of Eoghan's project, is a specialist offshore engineering and design consultancy, with a particular focus in the offshore wind sector. They see hydrogen as a likely important component of any future energy system, and building their capabilities in what could be a very demanding area will help them to enter a new and important market for their services.

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We now have two IDCORE research engineers working at GDG and we are really pleased with the impact they are having on our business. The structure of the training and support they receive means that they are well informed about the sector and are able to take a very active role in the organisation from an early stage.

The involvement of multiple institutions with joint academic supervision teams also gives us unrivalled access to world-leading research. A number of our staff are undertaking PhDs, and our parent company, Venterra, has a long history of working with the academic sector. In our experience you just don't get the sort of access that IDCORE provides with other programmes.

> Mohammed Almoghayer, Senior Offshore Project Manager, GDG

Eoghan has drawn heavily on the first-year IDCORE modules as he has been developing his project. So far, he has been focussed on reviewing the relevant literature but to such a level that he has a paper on the work accepted for presentation at an ASME conference – this has really impressed GDG.

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GDG have provided me with support and expertise whilst allowing me to shape my own project relating to green hydrogen. This has allowed me to build a research project I'm very excited to work on, whilst also building up expertise in the area of green hydrogen for GDG. They are using me as their 'hydrogen guy' in tendering exercises, and they have even had me delivering training on hydrogen to other professionals working in the renewables sector in Ireland. It feels great to be playing an important role in building a bridge between the needs of the sector and the knowledge and capabilities available in academia.

Eoghan Summers

Eoghan's Background

Eoghan came to IDCORE after spending two years working as a surf instructor in Southwest Portugal. This was only ever going to be a temporary career break, since he had trained as a Mechanical Engineer, previously completing the five-year integrated Masters course at the University of Strathclyde and an internship with Scottish Power Transmission.

On returning to the UK he had wanted to build a career working in renewables as part of his personal commitment to tackling climate change and had started looking for both PhDs and jobs in the sector. IDCORE seemed like an excellent option, combining both industrial experience, research, and his love of the sea. It also provided him with a way back into engineering after two years out.

Eoghan values the flexible working environment that GDG offer to their staff, and often splits his work hours between GDG's Edinburgh office, and the IDCORE office at the University. This has allowed him to build on the close relationships in his own cohort by meeting and working with others from across the IDCORE community. GDG's main office is in Ireland, so Eoghan does most of his work remotely, and he has enjoyed the additional networking opportunities this has provided, an added advantage of working with an international company.



Fred Gibbs



QEDNAVAL

Being part of IDCORE has been almost too good to be true. The first year of the programme was one of the best years of my life, and now, working for QED Naval, I am in a place I want to be, doing what I want to do. The work is challenging but the project is really well defined and I know that the outcome will make a difference to the company and potentially the tidal sector.

QED is a fascinating company, they are applying a unique approach to the tidal turbine sector and they are achieving results – it is very rewarding to be able to make an active contribution to their success.

Fred Gibbs

Sponsor

Set up as a naval architecture consultancy, early in its life QED Naval took the decision to focus on the marine renewables sector working with Scottish Enterprise before concentrating on tidal turbines which led to the investment in their JV partnership company Tocardo with HydroWing. They are bringing key, operationally focussed design skills into the sector, supporting the development of turbine technologies that will operate at much lower cost by minimising marine operations.

The partnership has made very effective use of the potential offered by engaging with IDCORE. There are now two IDCORE researchers working at QED in addition to the two that had already been taken on by HydroWing. I have worked with Andrew Aveyard in the IDCORE team for many years. I have been really impressed by the impact that their researchers have been making in the team at HydroWing, so when we started looking for someone to support the development of our utility-scale turbine, IDCORE was a natural choice.

We are very fortunate to have access to this resource with our HQ based in Edinburgh. We have had other engagements with academic research and none come close for comparison with the quality and value of the IDCORE programme.

I always look for passion in the people in my team and Fred has that in spades – he is making a real difference to our work.

Jeremy Smith, Founder and Managing Director, QED Naval



Project

Fred's project is working on the electrical generation aspects of a utility-scale turbine, where the key challenge is matching the turbine design to the available tidal energy resources. He is exploring the thermal signature of the generator within well-characterised but highly variable flow regimes. Ultimately, they are looking to optimise the turbine performance and efficiency by better understanding for how long it can be 'overdriven' and what the implications of this are for the overall design process.

Fred came to IDCORE from a five-year integrated Masters course in Physics at the University of St Andrews. As part of this course he had undertaken two internships with a large defence company, specialising in radar. This taught him a lot about systems engineering and also commercial skills that are proving very useful now that he is with QED, where he is finding it an interesting contrast to be working within a much smaller organisation.

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IDCORE

The one thing Fred knew when he finished his first degree was that he didn't want to stay in the defence industry. This is something he shares with QED's founder, but it took Jeremy over a decade to get to this point. To be respected as an engineer/physicist your work needs to touch society, and Fred had always seen renewable energy as a way to do this. Hence, it was an area that matched his ambitions and skill set, and would allow him to do something meaningful, but also a sector that had quite significant barriers to entry for a physicist.

He came across the idea of an engineering doctorate, and IDCORE in particular, when looking for internships. As well as providing an entry point to the offshore renewables sector, Fred liked the combination of the taught year, learning to apply relevant skills without commercial pressures, followed by a research project based in industry.

From Fred's perspective, the other great thing about QED is that they are based in Edinburgh. It means that he has been able to carry on living in a location where he has developed some strong friendships, not least with the other members of his IDCORE cohort, and yet he can go into the office every day. This has allowed him to become very well integrated into the company, taking full advantage of the opportunity provided by being an EngD researcher.





Achieving a good work-life balance is an important part of being an effective engineer and leader and IDCORE encourages and supports all its researchers to find this balance.

For Leigh, this is about having the space to participate in synchronised ice-skating – she is part of a team that competes at a high level and she has been encouraged to keep this going both by IDCORE and her project sponsor.

Background

Leigh came to IDCORE as an established engineer with Doosan Babcock in Renfrew. She had a Year in Industry placement with them before starting her first degree, she worked for them each summer while studying, and she returned to them after graduating with a Masters in Electrical and Mechanical Engineering from the University of Strathclyde in 2018.

Working at Doosan Babcock gave her an excellent grounding in engineering with spells in fatigue testing, aerospace, oil and gas infrastructure, structural integrity and, most recently, nuclear power plant outage support. She enjoyed the work but not the focus the company had on fossil fuels.

After volunteering at COP26 she became even more certain that renewable energy was the area she wanted to move into. She found IDCORE while looking for new opportunities, and was attracted by the taught modules and the industry focus of the centre. Not having to apply for a specific project from the start, but being given the chance to find out more about the industry before choosing a sponsor was appealing, as were modules like the ones at Oban that provide wider sectoral context.

Leigh is now working with Quoceant, a marine energy innovation consultancy based in Edinburgh. She was attracted to them by the company culture and the opportunity they provided for 'hands-on' involvement in a smaller enterprise than her previous role. They were very supportive of her continuing to ice skate competitively, a reflection of their positive attitude towards work-life balance. Leigh is not the first IDCORE researcher I have supervised. My previous experience, when I worked for PELAMIS, left me knowing that it was something I wanted to do again. It's been exciting to engage with Leigh and support her as she has developed her project. Our involvement in IDCORE has helped us to develop a far more agile relationship with academia which is vital in such a fast-moving industry.

> Beth Dickens, Director, Quoceant

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Project

Leigh is working on Quoceant's Q-Connect - a modular and adaptable 'quick connection system' for the rapid and safe connection and disconnection of moorings and electrical cables to marine renewable devices in a single operation. It was originally developed for wave and tidal devices but they are currently scaling it up for the floating offshore wind market.

Specifically, Leigh is using JBA Consulting's ForeCoast Marine software (a simulation tool which was originally developed by previous IDCORE researchers) to quantify the potential for Q-Connect to reduce downtime associated with issues like weather conditions. She is modelling a base case with current installation processes and then exploring the added benefits of Q-Connect.

Some floating offshore wind developers are considering 'tow-to-port' maintenance regimes. Q-Connect will clearly provide benefits in these situations, but Quoceant also expect it to be beneficial in other contexts and Leigh's work is helping them to develop the evidence for this.

The experience I have gained while working with Quoceant and their clients has been invaluable. It has provided unrivalled practical knowledge of what does and doesn't work, and access to industry know-how that you just wouldn't get in a traditional PhD. It's great to be working in a small company with such a range of knowledge and skills working so closely together.

I'm glad that I made the move to IDCORE. I'm really enjoying being part of the renewables industry, and the IDCORE community... and it's great to feel supported in continuing with ice skating, the other great passion in my life.

Leigh Baxter



Ota Dvorak



Project

Ota's project is focussed on evaluating the impact of government policy on floating offshore wind markets, particularly those policies that require a minimum level of local content in developer supply chains. He is evaluating the impact of such policies on employment, economy, society and the environment.

Shaping this into an effective project that both meets the needs of his sponsors and requirements of an EngD continues to be challenging. However, he is currently developing a tool that can be used to evaluate future policy changes and to support his sponsor's input to work packages on an IEA programme – 'IEA Wind Task 49'. He also plans to use it to support in-house cost models designed to analyse operational costs and establish the link between policy and life cycle costs of energy for different projects. In this way they will better understand when and where floating offshore wind is likely to deploy commercially.

We are currently sponsoring two IDCORE students in the team I work in, and they are both making a valuable contribution to our work. They have come to us with strong background knowledge and skills, and their enthusiasm helps to keep us curious.

GDG originated from a PhD project by founder Paul Doherty, so we have always been focussed on innovation and have supported a number of PhD projects in the past. The key benefit of IDCORE is that the researchers come ready to contribute, and the input Ota has already made to our work demonstrates that.

> Greg Bohan, Senior Offshore Consultant, GDG

Sponsor

Gavin & Doherty Geosolutions (GDG), Ota's sponsor, offer specialist design and consultancy services across a wide range of offshore and onshore infrastructure and construction sectors. They were recently purchased by Venterra, a group that strengthens the offering GDG had already developed around pre-construction in the offshore renewables sector.

Ota chose to work with them because of their involvement in IEA Wind Task 49, which he saw as a great opportunity to engage in the process of bringing floating offshore wind to market. At the time he was interested in ultimately working in the US market where floating offshore wind is likely to be the only solution for many applications.



Background

Ota grew up in Prague and then went to the University of Edinburgh where he graduated from the five-year Integrated Masters programme in Mechanical Engineering in 2022, so his undergraduate years were quite severely affected by the COVID pandemic. Despite his planned industrial placement being cancelled, he did manage to secure three months with a company and an internship post-degree, providing an industrial context for his studies.

Ota is also a sailing instructor, and he was able to bring this and his interest in hydrodynamics together in a final year project exploring the potential of hydrofoils for yachts, supervised by David Ingram, Director of IDCORE.

During my first degree I developed an interest in both renewables and hydrodynamics. When working on my final year project with David, he encouraged me to think about IDCORE as a good way of pursuing these interests, undertaking research but in an industrial context that avoided some of the issues that I had seen friends struggle with on PhD programmes.

The first year on IDCORE was excellent, I've never learnt so much in such a short space of time. The background knowledge I had from the Masters at Edinburgh definitely helped with this, but there were modules that were completely outside of my experience and these were just as enjoyable. The material is delivered by people who are actively engaged with their subjects and the learning is really well structured.

Ota Dvorak

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IDCORE

Ota hasn't finished up working in hydrodynamics, and the start of his project wasn't straightforward, but overall his IDCORE experience has been worthwhile. He has learnt a lot from it, not least developing his mental resilience which he knows will benefit him in the future. All of this has been helped by the ten good, supportive friendships created by being part of a cohort who embarked on this journey together.

Peach Phurappa



Availability of resources is one of the key challenges we face as we seek to deliver net zero. In particular, the UK is short of power systems expertise, especially engineers with knowledge of renewables.

Undergraduate programmes are not currently addressing this need. IDCORE, on the other hand, is delivering a very effective response. Not only is our engagement with them delivering short-term benefits for our research programme, it is also helping us to build both capability and capacity. I have been really impressed by Peach and the impact she has had so early in her project. PhD level supervision takes time, but in this case it's adding significant additional value to my work.

Dong Chen, Senior HVDC Simulation Engineer, SSEN Transmission

Background

Peach came to IDCORE from working as a graduate with HydroWing as part of a Knowledge Transfer Partnership (KTP). The move was suggested to her by Lars Johanning (former IDCORE co-director) as a natural progression after graduating from an Integrated Masters in Renewable Energy at the University of Exeter and building on the experience she had gained through the KTP role.

Peach had originally come to the UK on a scholarship scheme funded by the Thai Government before going on to study at the University of Exeter's Penryn campus as a personal response to the challenge of climate change. She was older than many of her contemporaries, so had not wanted to pursue the more academically-based training offered by a standard PhD, preferring instead the opportunity IDCORE provides to work in industry whilst pursuing a research degree.

IDCORE

Peach was attracted to IDCORE by the in-depth knowledge the course provides, creating a broad understanding of the renewables sector, not just specific technologies, and preparing successful candidates for a wider range of roles. The intensity of the course forces the cohort to work together and rely on each other's strengths, building a set of relationships that are invaluable during the research phase of the programme. The cohort can become an important support network not only technically but also emotionally. Comparing experiences can be a great confidence boost and it also provides for continuous mutual learning, as the range of projects the researchers undertake is so diverse.



My experience in the KTP confirmed my view of the potential for working in offshore renewables as a way to pursue my interests in heavy electrical equipment and in particular control system design. Although my project is more about integration of renewables into the wider electricity system, it is giving me the opportunity to apply much of the knowledge I gained during my first year with IDCORE, along with the industrial skills I developed while I was with the KTP.

Peach Phurappa

Project

High voltage direct current (HVDC) transmission is becoming an enabling technology to achieve the UK target of net-zero by utilising the massive potential for offshore wind power. HVDC systems enable transmission over longer distances which is useful both in the context of offshore renewables energy developments, facilitating installations that are further from the shore, but also in the context of the grid re-enforcement that is needed to support increasing renewable generation and the greater use of decarbonised electricity within the energy system.

Peach's project is focussing on the de-risking of 'multi-terminal control' an important precursor to the successful operation of a multi-vendor grid that can connect multiple sites with a single HVDC system. The majority of her time is currently spent running real-time and off-line simulations of HVDC systems, using digital simulators to model and plan future systems.

Peach is doing this work at The National HVDC Centre in Cumbernauld, an Ofgem-funded collaboration between Scottish & Southern Electricity Networks Transmission (SSEN Transmission), Scottish Power Energy Networks (SPEN) and National Energy System Operator (NESO). Her work is being supervised by the team within the Centre who did an excellent job of bringing her into the project and making her feel part of the operation. Although she has the option of hybrid working, she prefers to spend her days in the office even when she's not running simulations that require her to be there.

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She has found being part of a team to be a very beneficial part

of the experience, aided by the accessibility of her industrial supervisor and her technical manager who are both experts in their fields.





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