Dr. Ciaran Frost

53 Bathampton Street, Swindon, SN1 5EG
07919235036
ciaranjfrost@gmail.com

Bio

I am a Senior Consultant with over six years of experience in the renewable energy sector. I work for BVG Associates (BVGA), a renewable energy consultancy who specialise in strategic consulting, economic modelling and technology assessment for wind and marine energy technologies.

I specialise in techno-economic modelling and have strong programming skills. The models that I create are used to estimate wind farm performance, costs and levelized cost of energy (LCOE) for clients, both for present day projects and for future markets. I develop the models using sophisticated tools and programming approaches, including Python, VBA, SQL and Microsoft Excel. They also include extensive geospatial analysis using GIS software, which I am responsible for as technical lead at BVGA.

Before this role I was a Research Engineer, studying for an Engineering Doctorate (EngD) at the Industrial Doctoral Centre for Offshore Renewable Energy (IDCORE). My research project, entitled *Mapping the Economic Potential of Wave Energy: Grid connected and Off-grid Systems*, included a three-year long project working in industry. I worked full-time for a wave energy developer, creating a fully functional techno-economic model to geospatially map energy yield, costs and LCOE for wave energy systems.

Education

Industrial Doctoral Centre for Offshore Renewable Energy (IDCORE) – Engineering Doctorate

Sept 2013 – April 2019

- Doctoral Training Centre, centred at The University of Edinburgh, with research focussed on offshore renewable energy: tidal stream, wave and offshore wind.
- First year: Intense block modules assessed with report writing and presentations in front of academics and peers, developing team working and communication skills.
- First year module: tidal stream device design project. For this two-week group project I worked as part of a team to design a tidal stream device. This included design of the physical structure, cost modelling and a feasibility study which we presented to academics and peers. The module was tutored by Peter Fraenkel (founder of Marine Current Turbines)
- Other modules included tidal stream resource assessment, economics and policy, environmental and societal impacts of offshore renewables and electricity networks.
- Project management knowledge gained from interactive distance learning courses (Health and Safety; Management of the Project Lifecycle; Innovation Design and Manufacturing Management).

Research project – Economic Mapping of Wave Energy

June 2014 – Sept 2017

- Based full time at Albatern Ltd, a wave energy developer and the project sponsor.
- Techno-economic modelling and mapping of LCOE for wave energy projects.
- I built a fully functional, object-orientated Python model from scratch to perform geospatial calculations of energy yield, costs and LCOE. Results were exported in GIS formats.
- Model also included geospatial hybrid system economic analyses (wave-battery-diesel), for off-grid aquaculture applications.

University of Warwick – Master of Physics MPhys (hons)

Sept 2009 – June 2013

Upper second class honours (68.2%)

Fourth year research project: *Schlieren Imaging of Acoustic Waves* (72%)

- Designed and constructed a system capable of imaging ultrasound in Perspex and water.
- Experience of planning and conducting original research to meet time and cost constraints.
- Experience working and communicating as a member of a research team, interacting with a diverse group of university employees.

Final year modules: *Renewable Energy Systems* (82%), *Weather and the Environment* (75%)

Employment and Work Experience

BVG Associates, Cricklade, Wiltshire – Senior Consultant

April 2019 – present

- I specialise in techno-economic analysis. My day to day job involves numerical modelling and data analysis of wind and marine energy systems, to examine costs and market trends and answer key questions from industry.
- I create complex and bespoke numerical, techno-economic models for clients and internal analyses, using Python, SQL, VBA and Microsoft Excel. I document these models and write internal company standards. I analyse data and models from clients, to perform validation or to use them within our in-house models.
- I lead development of an in-house geospatial LCOE model, which I created from scratch. This model calculates the costs, yield and LCOE for offshore wind farms at different locations. An Excel front-end interfaces with an object-orientated Python back-end, where the main analysis is performed.
- My work frequently includes analysis of innovations and disruptive technologies. One example is airborne wind, where I presented findings from a leading industry study in 2019.
- I am an advanced Excel user, and use it every day. I regularly assist colleagues with Excel queries and am proficient at building macros.
- I lead the GIS team at BVGA, responsible for managing GIS work, data storage, GIS analysis, formulating company GIS strategy, creating internal standards and mentoring colleagues.
- Other day to day aspects of my job include report writing, project management, business development, liaising with clients, giving internal and external presentations.

BVG Associates, Cricklade, Wiltshire – Consultant

October 2017 – April 2019

As above

Albatern Ltd, Roslin, Scotland – Research Engineer

June 2014 – Jan 2017

- In addition to my research project, as previously mentioned, my work included identification of global salmon markets for wave energy, design of a novel offshore floating fish farm cage and hybrid energy system analysis for fish farms using real electricity load data.
- Experience working as part of a diverse team, communicating with different colleagues on various project deliverables.
- Technical report writing experience for successful funding applications.

May Gurney PLC, Bury St. Edmunds, Suffolk – Railway Signalling Intern

July – Sept 2012

- Organised and archived important business documentation and personally responsible for relocation or destruction.
- Created and organised a spreadsheet database of documentation using Microsoft Excel.

Muntons PLC, Stowmarket, Suffolk – Intake Operator

July – Sept, 2009 – 2011

- Tested and analysed the malting properties of barley to specification.
- Responsible for identifying possible health hazards to the consumer.
- Managed Excel spreadsheet database of grain samples from clients and liaised with them via telephone.
- Supervised the training of new colleagues in the department.

Action 21, Leamington Spa, West Midlands – Portable Appliance Tester

Jan 2012 – March 2013

- Personally responsible for making sure that electrical goods were safe for the consumer.
- Developed leadership by training and supervising new volunteers for the job.

Additional Skills

- Advanced user of Python (5 years experience) and Microsoft Excel
- Advanced user of GIS software (ArcGIS and QGIS, 3 years experience),
- Proficient user of MATLAB, VBA, Mercurial (version control) and LATEX.
- Basic user of Microsoft Power BI, SQL Server and MongoDB (NoSQL database software). Completed seven week online course: *M101P: MongoDB for Developers* (grade: 92%, Feb 2016).
- Member of the IET (MIET).
- Full clean UK driving license.

Publications and Conferences

- C. Frost, *Where to build offshore wind? Optimising the cost, connection and supply chain challenge* (presentation), Global Offshore Wind (2020)
- C. Frost et al. *Our energy, our future: How offshore wind will help Europe go carbon-neutral,* report for WindEurope (2019) https://windeurope.org/about-wind/reports/our-energy-our-future/
- C. Frost et al. *Global Prospects for Airborne Wind Onshore* (presentation), Airborne Wind Energy Conference 2019 (Glasgow)
- C. Frost, D. Findlay, E. Macpherson, P. Sayer, & L. Johanning, *A model to map levelised cost of energy for wave energy projects*, Ocean Engineering, vol. 149, pp. 438-451, 2018.
- C. Frost, D. Findlay, E. Macpherson, P. Sayer & L. Johanning, *Mapped economic modelling of wave energy*, 2nd International Conference on Renewable Energy Offshore, Lisbon, 24-26th Oct 2016, RENEW2016
- C. Frost, *Global Market Potential for Small Scale Wave Energy* (presentation), International Conference for Ocean Energy 2016 (https://www.icoe-conference.com/publication/a12-global-market-potential-for-small-scale-wave-energy/).