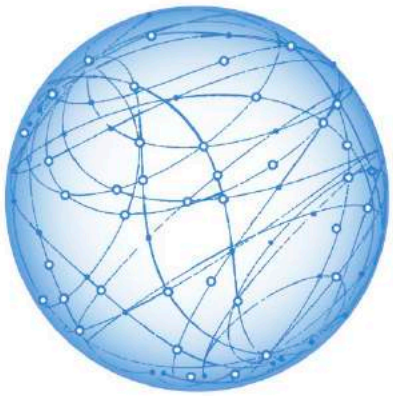

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THE AOTEAROA WAVE AND TIDAL ENERGY ASSOCIATION PRESENTS

10TH ANNUAL CONFERENCE
GLOBAL ADVANCES

THURSDAY 19 MAY 2016
ROYAL SOCIETY OF NZ, WELLINGTON
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ABSTRACTS & BIOGRAPHIES

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Neil Kermode C.Eng, CIWEM, C.Env, FICE

Managing Director

European Marine Energy Centre (EMEC) Ltd

“Marine Energy – A UK Perspective”

Abstract

Neil will provide an update on developments at the European Marine Energy Centre (EMEC), as well as an insight into the current status of the marine energy industry in the UK.

Biography

Neil was appointed in 2005 as Managing Director of EMEC, Orkney. From the original 4-berth wave energy test site, Neil has overseen considerable growth throughout the company, which now features 6 wave berths, a 7-berth tidal energy test site, and two scale test sites for smaller scale device, component and technique testing. EMEC is also beginning work on energy storage and alternative energy vectors to overcome island grid constraints.

Before EMEC, Neil worked as a project developer of a potential tidal scheme to use the Churchill Barriers in Orkney. This followed 6 years at the Environment Agency dealing with regulation and development issues, particularly relating to public participation in decisions on flooding, waste and water resources. He is a Chartered Engineer, Fellow of the Institution of Civil Engineers and Chartered Environmentalist.

Neil has spoken on marine energy extensively in the UK and internationally. He is an active member of assorted advisory groups on the subject and passionate advocate for a sustainable energy future.

Gareth Davies

Managing Director

Aquatera Limited

“Reflections on two decades of marine energy activity around Orkney – the ebb and flow of progress!”

Biography

Based in Scotland, Gareth Davies is a marine biologist and has worked as an environmental consultant for over 20 years specialising in marine issues. He is Managing Director of Aquatera Ltd and is currently Chairman of the Orkney Renewable Energy Forum (OREF). Aquatera has become a global leader in the marine renewables sector and has a prodigious international portfolio of oil & gas projects along with a uniquely broad portfolio of work around northern Scotland. Gareth is also a Director of Orcades Marine Management Consultants, which provides high quality management of marine operations in harsh operating environments. Both these companies are now at the forefront for marine renewables developments in Orkney, Scotland, UK and globally in Chile, USA, Japan, Taiwan, Norway and Portugal.

Dr. Tim Stallard

Senior Lecturer

University of Manchester

"Experimental and numerical study of loading and wakes of tidal stream turbines in arrays"

Abstract

The potential for electricity supply from tidal streams is increasingly recognised. To generate electricity at a commercial scale, individual turbines would be deployed in large arrays, akin to offshore wind farms. Accurate prediction of the loading of individual turbines is essential for accurate prediction of turbine power output prediction and of the aggregate loading over an array, which directly affects the coastal-scale tidal flow. This requires prediction of flow through and around the array and thus incident to each turbine. This is a complex problem dependent on individual rotor wake development and breakdown and including the interactions of devices and wakes, in both inviscid and viscous senses. An overview is provided of recent experimental and numerical studies of this coupled problem. Experimental measurements of wake and loading of groups of up to 12 tidal stream rotors designed for wake generation at reduced scale provide a basis for model evaluation. Comparison is drawn to a RANS-Blade Element CFD models and to superposition of semi-empirical wake models informing the range of validity of these approaches for engineering analysis of turbine arrays

Biography

Tim Stallard is a Senior Lecturer in the School of Mechanical, Aerospace and Civil Engineering, University of Manchester. He joined Manchester in 2006 following completion of a DPhil in the Ocean Engineering and Dynamics group at University of Oxford and two years as a PDRA on the EPSRC Supergen Marine programme. For the last decade his research has addressed loading and energy yield of marine energy devices, principally wave and tidal stream systems, with particular focus on unsteady loading and interactions within arrays. Research on tidal stream systems has included experimental study of individual turbine wakes, variation of wakes and loading within arrays and the influence of waves and turbulence on loading. Related CFD studies have focused on the simulation of channel turbulence and resultant loading. He has led significant components of major marine energy projects including two linked to the UK Centre for Marine Energy research, two industry-academia projects supported by the Energy Technologies Institute and EU and NEWTON fund marine-energy projects. He is author of 25 journal papers and more than 50 peer-reviewed conference papers concerning wave energy systems, tidal stream turbines and offshore wind energy.

Dr. Gregory Payne

Research Engineer

University of Edinburgh

"Experimental investigation of wave and turbulence induced loads on tidal turbines"

Abstract

Tidal energy has seen a rapid development over recent years with several developers now testing full-scale prototypes generating electricity to a grid. Extreme loading and associated survivability are key aspects of tidal turbine design. This study focuses on the experimental investigation of extreme forces due to combine wave and current hydrodynamic loading. The design process for the model, its commissioning, testing and results are described in details.

The tidal device considered is a generic three bladed horizontal axis turbine. The scale of the model is approximately 1/15. The rotor is designed so that the thrust coefficient curve as a function of tip speed ratio is similar to that of a full-scale prototype. Blade design was carried out by combining an in-house blade element momentum (BEM) code with a finite element analysis to assess blade stress and deflection. The BEM results were also used to specify the model load sensors which are measuring torque and thrust for the whole rotor and individual blade root bending moment. Power extraction is simulated using a direct drive brushless servo motor.

The model was tested in incoming flows with two different turbulence intensity (TI) levels (3 and 12%) combined with following waves. Results show that load variations at high TI are an order of magnitude higher that for low TI. Wave associated loads are two further orders of magnitude higher.

Biography

Grégory Payne is a research engineer with more than 15 years' marine renewable experience gained within academic and commercial sectors. He did is PhD at the University of Edinburgh under the supervision of Stephen Salter on the numerical modelling and experimental tank testing of the Sloped IPS buoy wave energy converter (WEC). He then worked for two years for the company Artemis Intelligent Power on the design and testing of a novel high efficiency hydraulic motor for the power take-off of marine energy converters in collaboration with Pelamis. After that he worked for the University of Edinburgh as a research fellow within the SuperGen Marine consortium for five years. During that period, he was involved in several projects including: the development and testing of a novel laser based optical wave gauge, the development of a set of guidance for the experimental tank testing of WECs and the development of a real-time computer based control system for WEC models. He then went on to work for 8 months for the company Aquamarine Power as a wave resource analyst and also on the development of an underwater high speed camera to deliver flow visualisation around WEC models. For the last four years, he has

been working as a research fellow for the University of Edinburgh on tidal energy projects. In that context, he has carried out the mechanical design of a complete solution for the deployment of oceanographic instruments (ADCPs) in very high velocity currents and has configured these ADCPs for non-standard deployments. He has been responsible for the design, manufacturing, instrumentation and testing of a horizontal axis tidal turbine model to investigate extreme loads on tidal rotors. Over the years he has also carried out consultancy work for the UK Carbon Trust and for the companies Aquamarine Power and for Marine Current Turbines.

KEYNOTE SPEAKER

Andrew Dagley

Head of Asia Pacific

Atlantis Resources Limited

"MeyGen: delivering the world's first commercial scale tidal stream array"

Abstract

In his presentation, Andrew will provide some background into the design methodology and work that was required and to bring the 398MW MeyGen project from concept through to the construction of the world's first commercial scale tidal stream array.

The talk will also provide an update on the progress that has been made throughout the construction of the first stage to date as well as providing some insights into the next steps across the MeyGen project and other near-term projects in the Atlantis portfolio.

He will also discuss some of the key requirements for getting a project like MeyGen from concept through to financial close, construction and into operations. What support is required from the local governments and why this is such an exciting time for the tidal energy sector globally.

Biography

Andrew has over 10 years of experience in infrastructure investment, with a keen emphasis on renewable energy having worked on a range of wind, solar, hydro-electric and bio-mass projects in Australia, Brazil, Chile, China, India and the United Kingdom. Andrew joined Atlantis in early 2014 from IFM Investors, a global fund manager with c.A$57 billion under management, having previously worked with a range of superannuation infrastructure investors, renewable energy project developers and Flinders Corporate Finance, the boutique investment bank.

At Atlantis, Andrew is responsible for our business development activities and projects throughout Asia, with a strong focus on China, Japan and Australia.

Dr. Andrea E Copping

Senior Program Manager for Coastal & Marine Waters

Pacific Northwest National Laboratory

"Annex IV State of the Science - sharing what we know about environmental effects of marine renewable energy development internationally"

Abstract

Early deployments of wave and tidal energy projects are providing information on environmental effects of the devices, moorings, and power cables; these data will help inform later deployments and guide regulatory decisions as the industry moves towards the commercial scale. However, there is still considerable uncertainty about many potential interactions of devices and systems with the marine environment that concern regulators and stakeholders.

Through a comprehensive review effort, our team has investigated overall risks to the marine environment from deployment of single marine renewable energy (MRE) devices, and the initiation of larger arrays. Annex IV, an initiative under the Ocean Energy Systems, has produced a report on the State of the Science for Environmental Effects of MRE development. The final report was published in April 2016 and is available online at http://tethys.pnnl.gov/publications/state-of-the-science-2016 . The highlights and significant findings of this study will be discussed, including a look at many of the interactions of MRE devices with marine animals and habitats that are slowing permitting (consenting) processes. This paper will also look at the overall risk from MRE devices, and how we can move forward in the face of considerable scientific uncertainty.

Annex IV is led by the US and is supported through participation by nations with a mutual interest in examining environmental effects of marine renewable energy (MRE). During the second phase of Annex IV (2013-2016), thirteen nations participated in Annex IV, including New Zealand.

Biography

Andrea Copping is the research lead for ocean energy development for Pacific Northwest National Laboratory (PNNL), on behalf of the U.S. Department of Energy. Dr. Copping's projects focus on environmental effects from the development of offshore wind, wave and tidal energy installations, and the role that these effects play in technology development and project initiation across the nation. Using risk-based approaches, the research team lead by Dr. Copping integrates laboratory, field and modeling measurements into a coherent body of evidence to support siting and permitting decisions. Andrea leads international projects on environmental effects of marine energy development (Annex IV) and on offshore wind (WREN) that shares environmental effects information in order to benefit from progress made around the world. Dr. Copping holds a faculty position in the School of Marine and Environmental Affairs at the University of Washington, is Associate Editor of the Coastal Management Journal and on the Editorial Board of the International Journal of Marine Energy.

Although trained as a blue water biological oceanographer, Andrea has spent most of her professional career examining the interactions of humans and the marine environment.

Dr. Louise Kregting

Senior Research Fellow

Queen's University Belfast

"Modelling Environmental Effects of Marine Renewables"

Abstract

There are many environmental concerns associated with the introduction of large infrastructures of marine energy technology in coastal and offshore environments. The concerns relate to the interaction between the technology and the environment as well as the placement of the infrastructure in suitable areas and how this may impact both physical and ecological processes. The potential environmental effects on organisms that may occur during the operation of either small or large arrays of tidal and wave energy devices are diverse (e.g. collision, entanglement, evasion or avoidance). The focus of this talk is on the primary ecological processes that may be influenced by changes in the hydrodynamics as a direct result of the installation of marine energy converters. These processes include sediment transport, organism transport, pollution and biogeochemical processes. Without a large scale array in operation, predicting the environmental effects however is impossible using quantitative field based studies. The most effective approach therefore is to use modelling techniques as predictive tools to ascertain the environmental effects. This talk discusses different modelling approaches that can be used to model potential environmental effects of marine energy converters.

Biography

Dr. Louise Kregting is a Senior Research Fellow in the School of Planning, Architecture and Civil Engineering (SPACE) in Queen's University Belfast (QUB), and a recent recipient of a QUB Research Fellowship with expertise in the Clean Energy research priority theme. She is currently a partner on a Horizon 2020 funded project on marine renewable energy, more specifically her role is researching the environmental effects of the Minesto Deep Green Technology. Her research has strongly focussed on the environmental effects of marine renewables since coming to the UK in 2009 using hydrodynamic and ecological modelling approaches. Her career has primarily investigated the influence of physical processes on the biology and ecology of invertebrates (black coral communities, serpulid reefs and sea urchins) and macroalgae (browns and reds). She has also spent some time in the United States on an NSF funded project assessing the influence of both unidirectional and oscillatory flow on sea urchin fertilization. She has a lot of experience as a scientific diver and has a range of skills from both the marine biological and hydrodynamic disciplines.

David Campbell

Commercial Director

Albatern

"Offshore Mariculture and Wave Energy – A natural match?"

Abstract

Albatern has been developing its WaveNET wave energy converter system since 2007. From initial conceptual designs, models were tested in wave tank and open water trials in 2008 and 2009. In 2010 funding was raised to build the first working prototype device. This was deployed over winter 2011/12 and when fully commissioned with hydraulic and PTO systems reliably produced power for the 8 month testing period in a fetch limited site.

This deployment, coupled with further engineering investigation, led to a revised design. The first v2 units were commissioned in winter 2013/14, with a 3 unit array then deployed in a new open water fish farm site in May 2014 for a 14 week campaign prior to fish arriving on the site, in collaboration with Marine Harvest (Scotland).

Further nearshore deployments then took place in a Scottish sea loch where more extensive deployments including severe weather operation were experienced.

In summer 2015, a 6 unit array was commissioned at Kishorn Port on Scotland's west coast with a full hybrid battery/diesel generator system to replicate operation on a fish farm site.

This 6 unit array is now being prepared for a commercial deployment on an operating fish farm south of the Ardnamurchan peninsula on the west coast of Scotland, again in collaboration with Marine Harvest (Scotland).

The presentation will introduce the WaveNET system and its operation, and chart the journey through recent deployments to a position where payment can be received for electricity produced.

Biography

David Campbell is Commercial Director of Albatern, the Scottish wave energy device developer focused initially on fish farming and other off-grid markets.

After a law degree, David qualified as a Chartered Accountant before moving into computer audit and training for a Big 4 global accounting firm. He then moved into industry where he worked extensively with technology companies in the IT and related sectors from first seed stages through to finance director of an AIM listed battery power pack company on the London AIM market with broadly based European operations. This company, through its customers win electric vehicles, led a a greater interest in renewable energy. This interest coupled with recreational sailing experience came together when he joined Albatern in 2009.

Within Albatern, he leads commercial development - establishing customer connections in the UK and exploring trends in export markets to take the early steps in commercialising wave energy devices now undergoing demonstration in Scottish waters. He sees it as very important to understand what is driving the movement of fish farming companies into stronger wave climates and to understand their timescales.

The move offshore in aquaculture is an emerging trend, and David continues to maintain connection with a number of key overseas markets where wave energy can be applied to offshore fish farming and develop a significant niche market globally.

In the UK, the past year has seen the development of a small number of demonstration projects that can showcase devices working in fish farm sites, and also community projects which can operate outside of the conventional grid.

Dr. Kathleen McInnes

Senior Reseacher

CSIRO Oceans and Atmosphere

"Developments of Ocean Renewable Energy in Australia"

Abstract

Authors: Mark Hemer[1], Graham Symonds[1], Ron Hoeke[1], Uwe Rosebrock[1], Rob Kenyon[1], Stefan Zieger[2], Tom Durrant[2,3], Stephanie Contardo[1], Julian O'Grady[1], Kathy McInnes[1]

[1] CSIRO Oceans and Atmosphere, Hobart, TAS Australia

[2] Bureau of Meteorology, Melbourne, VIC Australia

[3] Now at MetOcean Solutions, New Zealand.

A pre-competitive, query-able and openly available spatio-temporal atlas of Australia's wind-wave energy resource and marine management uses is being developed. The basis of the atlas is a 34+yr numerical hindcast of wave conditions in the Australian region providing both spatial and temporal characteristics of the resource, Considerable in situ and remotely sensed data have been collected to support calibration and validation of the hindcast, resulting in a high-quality characterisation of the available wave resource in the Australian domain. Planning for wave energy projects is also subject to other spatial constraints. Spatial information on alternative uses of the marine domain including, for example, fisheries and aquaculture, oil and gas, shipping, navigation and ports, marine parks and reserves, sub-sea cables and infrastructure, shipwrecks and sites of cultural significance, have been compiled to complement the spatial characterisation of resource and support spatial planning of future wave energy projects. Both resource and spatial constraint information are being disseminated via a state-of-the-art portal, designed to meet the needs of all industry stakeholders.

Another aspect currently impeding the industry in Australia is the limited evidence-base of impacts of wave energy extraction on adjacent marine and coastal environments. To build this evidence base, a network of in situ wave measurement devices have been deployed surrounding the 3 wave energy converters of Carnegie Wave Energy Limited's Perth Wave Energy Project. This data is being used to calibrate and validate numerical simulations of the project site. Early stage results will be presented.

Biography

Kathleen McInnes is a senior researcher and leader of the Sea Level, Waves and Coastal Extremes group in CSIRO Ocean and Atmosphere. Her research focusses on understanding how climate change will affect severe weather events and coastal extreme sea levels through numerical modelling and climate model analysis, particularly in Australia and the South Pacific. She has developed climate projections for impact and adaptation assessments to assist local government manage and adapt to climate change. She has published over 50 refereed publications and over 60

other reports and articles. Her contribution to this work was awarded Eureka awards in 2003 and 2009. She was a contributing author on the IPCC second, third and fourth assessment reports and a lead author on the IPCC Special Report on Extremes and the IPCC Working Group 2 fifth assessment report on Coastal Systems and Low-Lying Areas. She is part of the CSIRO team developing a wave energy atlas for Australian Renewable Energy Australia (ARENA).

Mike Underhill

Chief Executive

Energy Efficiency and Conservation Authority

“Does marine energy fit in New Zealand’s renewable energy vision?”

Abstract

EECA ran a Marine Energy Deployment Fund from 2007-2011 that aimed to support pre-commercial marine energy technology projects. If marine energy is to take advantage of the rapidly changing energy environment, what has to be done differently in future?

Biography

Mike Underhill has been chief executive of the Energy Efficiency and Conservation Authority (EECA) in New Zealand since 2007. EECA is the government agency that promotes energy efficiency and renewables across key parts of the energy sector.

Mike has extensive management and governance experience in the gas and electricity sector in New Zealand and overseas, and has operated as a chief executive for over twenty years.

He has a Bachelor's degree in engineering, a Master's degree in economics, has completed the Advanced Management Program at Harvard, and is a Fellow of the Institution of Professional Engineers (IPENZ).

Dr. Anthony R Bellvé

Chairman

Energy Pacificâ

"Marine Energy: 'Current' Status and Future Prospects"

Abstract

It is incumbent on New Zealand, ethically and economically, to generate more than 100% of our electrical power by harnessing energy from our diverse, renewable resources. We need to build, internationally, on the historic benefits stemming from the wisdom and sensibilities of our forbearers to develop and operate hydroelectric and, latterly, geothermal and wind power, now providing <78% of our electrical requirements.

Today - there is a need for urgency. Earth's atmospheric concentrations of carbon dioxide (CO2) are increasing exponentially; oceanic and land temperatures continue setting records, month-on-month, year-on-year; Arctic, Greenland and Antarctic ice masses are melting at greater rates; and our near neighbours on Pacific islands are being inundated (and lost) by rising seas.

It is imperative, then, that New Zealand implement systems to generate additional electric power from tidal currents and wave resources, particularly the former, because of its absolute reliability and low capital cost per MWh. Commercial marine turbines developed during the past decade, and recently re-designed by Marine Current Turbines (now Atlantis Resources), Siemens Energy and Fraenkel-Wright Limited, with sophiscation. The latter's, 'Super TideGen' offers a new robust and very cost-effective means for harnessing abundant kinetic energy of tidal currents afforded by Cook Strait's resources, to generate highly predictable electrical energy.

Pathways to help mitigate global warming and adapt to prospective environmental changes need to be implemented swiftly. These are four measures:

1) Generate low-cost electricity by harnessing reliable kinetic energy from our abundant, renewable marine resources,
2) Develop long-term power storage facilities for safeguarding security of electricity transmission and distribution, nationally.
3) Encourage and implement transport innovations based on electric- and hydrogen-powered vehicles, vessels and aircraft.
4) Drive new international markets for renewable energy (electricity/hydrogen) for use overseas as primary energy sources.

A mandate to increase electrical supply and security of distribution will meet increasing market demands for electric- and hydrogen-powered vehicles within New Zealand, and for exporting electricity and hydrogen to international consumers striving to become carbon neutral.

New Zealand, with astute insight and organization, can become a major international supplier of clean, renewable energy.

Biography

Anthony, following graduation from Massey University, Palmerston North (1967), served as a Farm Advisory Officer and Research Scientist, Ruakura Research Station, Department of Agriculture, and, with Ford Foundation fellowships, he completed a PhD, North Carolina State University, (1970) and post-doctoral research at Johns Hopkins University (1971) and Harvard Medical School, Harvard University (1972).

Anthony was appointed Assistant Professor at Harvard Medical School (1972-1978) and subsequently became an Associate Professor at the same institution (1978-1985). He combined teaching and research with administrative activities as the Associate Chairman for the Division of Medical Sciences, College of Arts and Sciences at Harvard University. In that capacity he administered nine departmental PhD programmes.

Family circumstances necessitated a move to New York City where he became tenured as Professor of Anatomy and Cell Biology, College of Physicians & Surgeons, Columbia University Health Sciences, Columbia University (1985-2001).

During his academic career Anthony pioneered research on male stem cells, by employing innovative biochemical, immunological, molecular and morphological techniques, to identify and prove unique proteins organise into discrete topographic and functional domains during spermatogenesis. Studies on gene expression defined the roles of novel gene products during germ cell differentiation and fertilisation. These pioneering findings are presented in books (2) and reported in publications (105) in leading, international, peer-reviewed, scientific journals.

Serving on various Advisory Panels of the Population Centre at the National Institute of Child Health and Human Development, Washington, DC, Anthony reviewed major proposals for funding inter-disciplinary research centres in the USA and Canada.

Anthony received a ‘First Science Award’, American Society for Animal Sciences (1969) and ‘Godding Award’ (1983), Australian Society of Endocrinology and Australian Society for Reproduction.

Since retiring from academia and returning to New Zealand, Anthony has served as Chairman, of the Programme Committee, and as Board Member at the Auckland Museum Institute – Auckland Branch of the Royal Society of New Zealand (2008-2012).

Anthony, as Chairman and Founder, Energy Pacificâ, leads a project for harnessing renewable energy from marine tidal currents. He is a Founder and past Board Member of Aotearoa Wave and Tidal Energy Association (2005-2008), and presently serves as a consultant to Ryedale Consulting Group, Scarborough, U.K. (2013-) and to deltaDOT Limited (2013-), an innovative company at the Royal Veterinary College, London, U.K,

Anthony is a member of various national and international environmental organisations.

He lives with his wife, Renate, in Hamilton, while their children and grand-children pursue their academic careers in New Zealand and in the USA.

Clayton Lines & Tei Paio

Auckland University of Technology

"Feasibility Study on Pacific Island Reef Current Flows for Electricity Generation"

Abstract

Our research is based on electricity generation from ocean energy for pacific island nations. At this stage we have a focus on the Cook Islands, who are attempting to generate all of their electricity renewably by 2020. Pacific islands in general are tending toward the use of solar generation technology and currently the only renewable generation in the Cooks is solar. Solar however has drawbacks and it has been identified that adding diversity to the generation assets could provide consistency of supply and reduce risk. Ocean energy is an obvious (but unexploited) choice for the Cook Islands, and determining the best method to capture ocean energy to satisfy the relatively small energy demands of these islands (and other key factors) is a first step toward a diverse and reliable future supply of electricity.

Our research is founded on a theory that pacific islands (with surrounding reef structures) have unique ocean current characteristics, and contain areas within the reef system with reasonably high and consistent flow rates. Due to the high flow rates and relatively small energy demand we believe that an electricity generation system could be specifically developed for pacific islands to take advantage of these factors. At this stage we are in the infancy of the project, and thus far have been engaged in characterising ocean current flows around the reef structures in Rarotonga.

This research is in collaboration with the Cook Islands state-owned power authority, Te Aponga Uira (TAU).

Biographies

Clayton Lines is currently working for Auckland University of Technology (AUT) as a technician as well as completing a master's degree in engineering. His background is in electrical and industrial engineering and previously to AUT, was employed by LanzaTech, a carbon-to-fuels bio technology company where he was engaged with development of laboratory facilities and scale-up of plant. After completion of his master's degree, Clayton is looking forward to pursuing his interest in novel marine energy conversion research.

Tei Paio is an Electrical Engineering student at AUT, in her final year of study. She is currently employed by Te Aponga Uira (TAU) as an engineer in distribution and generation. TAU is the Cook Islands Government-owned power Authority responsible for generation, distribution and retailing of electricity. Recently Tei has been involved with procedure development for implementation of renewable generation technology in Rarotonga.

Severin Thiebaut

Physcial Oceanographer

MetOcean Solutions Ltd.

“MetOceanView Updates”

Abstract

A new version of the MetOceanView web-based customer portal has recently been released. The two main MetOceanView focuses are forecasting and hindcasting services. MetOcean Solutions’ in-house state-of-the-art oceanographic and atmospheric forecast models provide detailed, reliable weather information worldwide. MetOcean Solutions’ hindcast data provides high quality marine weather data from multi-year numerical model simulations for any location on earth. Historical data archives reach back to 1979, offering key baseline data for project scoping, offshore and coastal design, project planning and environmental impact assessments. The new MetOceanView portal is based on an open access system to several global and regional forecast and hindcast statistics.

Biography

Séverin Thiébaut is a specialist in ocean waves, storm surges, coastal trapped waves, extreme statistics and signal processing. He has a PhD in Physical Oceanography from the University of Otago and 10 years professional experience. At MetOcean Solutions Ltd., Séverin manages the production of metocean consultancy services and analytical work scope and provides leadership for the development of analytical code. This includes:

- Numerous offshore metocean design and operability studies.
- Statistical analysis of measured and modelled (hindcast and forecast) atmospheric and oceanographic data.
- Analysis of long period waves such as infragravity, far-infragravity and continental shelf waves.
- Development of software for analysis of oceanographic data.

Dr. Ross Vennell & Dr. Alice Harang

University of Otago

"Some surprising benefits of building large scale tidal turbine farms"

Abstract

To take advantage of the many sites like Cook Strait which could contribute significantly to the demand for renewable energy, large tidal turbine farms will need to be developed. Novel research at the University of Otago funded by a Marsden Grant is answering the fundamental question, how much power can be produced from a large number of turbines in a tidal channel? Surprisingly, one hundred 1MW rated turbines in a tidal channel don't produce 100MW, they can produce much more or much less than a 100MW depending on the size of the channel. Thus 100 times one isn't always equal to 100! Tidal turbines in large farms have also been shown to have some surprising benefits. To bridge the gap between when power can be produced and when it is needed, solar and wind power have to rely on expensive and inefficient storage such as batteries or pumping water up into dams. The research has shown that tidal turbine farms can store energy for short periods using the inertia of the tidal flows. This storage can be used to better match the tidal turbine farm's power output to daily peaks in electricity demand due to our morning and evening routines around washing, cooking and heating. In addition the research has shown that by being smart about when power is extracted, it is possible to more than double what was previously thought of as the maximum possible power that could be generated by a channel. Being smart about when to produce power also has lower environmental impacts, and typically, does not increase the forces on the turbines, so that producing more power did not require the turbines to be more robust and expensive.

Biographies

Ross Vennell, BE (Engineering Science, Auckland, PhD ,Physical Oceanography MIT/Woods Hole) Ocean Physics Group, Dept. of Marine Science, University of Otago, Dunedin, 03 479 8307, ross.vennell@otago.ac.nz

[From October 2016 Ross will be based at the Cawthron Institute in Nelson]

A physical oceanographer, whose current research centres on using vessel mounted instruments to measure detailed tidal flow patterns and modelling the tidal energy resource.

Alice Harang, PhD(Institut de Mécanique des Fluides de Toulouse, France)
University of Otago, Dunedin, 03 479 5020, alice.harang@otago.ac.nz

Alice has strong interests in environmental fluid mechanics, using principally numerical tools to study their behaviour.

Armin Howard

Business Development Manager

Energy Hydraulics Limited

“Azura Wave Energy Project - 2016”

Abstract

A 20kW half scale device has been deployed at the US Navy’s Wave Energy Test Site (WETS) at the Marine Corps Base Hawaii (MCBH) since June 2015 and is undergoing 12 months of grid connection trials.

The US Department of Energy has committed US$5 million towards the design, development and deployment of a 500kW / 1MW full scale device.

Armin will provide a brief history of the project, an update on the current status of the grid connection trials and the ongoing work to develop the technology to a commercially viable scale.

Biography

Armin Howard is the Business Development Manager for New Plymouth based EHL Group. EHL are the technology partners in a consortium which includes US based Northwest Energy Innovations (NWEI) and Callaghan Innovation, who are seeking to develop and commercialise the Azura (formerly WET-NZ) Wave Energy Converter (WEC) device.

Craig Stevens

Board Member, AWATEA

Principle Scientist – Marine Physics, NIWA & the University of Auckland

President, NZ Association of Scientists

"AWATEA – looking back at a decade of achievement"

Abstract

In this talk I'll take stock of where the Association has come from over the past decade and some of the notable milestones in that period, in both national and international contexts. I'll consider the Association as a microcosm for the interplay between science, research, development, commercialization, production and the interface with society.

Biography

Craig Stevens is a physical oceanographer with a joint position at NIWA (NZ National Institute for Water and Atmospheric Research) and the University of Auckland. His research focus is on the fate of energy injected into the planet's oceans at celestial scales (tides, solar heating) and how energy exchange processes affect us all through influences on biological, ecological and/or physical transformation. Field expeditions have taken him from tidal turbulence in Cook Strait to Antarctica; from water-filled mine pits in Canada to tidal turbines in the U.K.; from inland seas in Europe to the Southern Ocean. His typical approach revolves around focused process-scale experiments that are then connected to larger scales via various means (usually modelling). Stevens has been successful in both Marsden Fund-supported work and applied industrial research. He has a high outreach profile in New Zealand, helping to explain the value of the oceans around New Zealand to the public. He is a past chair of AWATEA and the current President of the NZ Association of Scientists.

Gareth Gretton

Chairman, AWATEA

Academic Staff Member, WelTec

“The Future of AWATEA”

Abstract

The joint anniversaries of 10 years since the foundation of AWATEA and our 10th conference mark a point for looking back and looking forwards. So, where to in the next 10 years? I believe AWATEA needs to focus on a medium-term goal of marine energy, making a significant contribution to a sustainable energy rich New Zealand. And if this medium-term goal is to be achieved, it does involve action in the short-term, which should be the key message for policy makers. We - AWATEA - as an organization also need to focus on how we can grow our membership to promote this vision, and this will be one of the topics to be addressed in an upcoming strategy meeting, which will be open to all members.

Biography

Gareth is currently chair of AWATEA and an academic staff member at Wellington Institute of Technology. Since moving to NZ in 2013, he has worked on a number of consultancy projects including small scale hydro, solar thermal and solar PV, and others related to his skills in fluid dynamics. Prior to his move, Gareth was a post-doctoral researcher at the University of Edinburgh for a number of years, first working on the academic consortium project "Supergen", and then working on the £8m joint academia-industry project "Perawat". Both of these projects made a significant contribution to UK marine energy research over a significant number of years. Gareth has a PhD from the University of Edinburgh on tidal current turbine hydrodynamics.

“AWATEA will promote, aid and foster a vibrant and viable marine energy industry in New Zealand”